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GEOLOGY OF THE ST LEWIS RIVER MAP REGION, GRENVILLE PROVINCE, EASTERN LABRADOR

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ABSTRACT

The St Lewis River map region is subdivided into three structural–lithological entities, termed the Gilbert River shear belt, the Southwest Pond domain and the Pinware terrane. The Gilbert River shear belt consists of interfingering K-feldspar-megacrystic granitoid rocks, pelitic gneiss, the Alexis River anorthosite–leucogabbronorite and various dioritic, granodioritic and granitic orthogneisses (derived from the Alexis River anorthosite–leucogabbronorite and granitoid plutonic rocks). The Southwest Pond domain is underlain by pelitic gneiss intruded by K-feldspar-megacrystic- and nonmegacrystic-granitoid rocks and minor mafic plutonic rocks. It is bounded and transected by narrow zones of orthogneiss. The Pinware terrane is composed mostly of granitoid plutonic rocks associated with minor metasedimentary schist and gneiss, mafic plutonic rocks and orthogneiss. Granitoid rocks in the Pinware terrane are divided into three groups. Group I (syn-Labradorian?) consists of gneissic to moderately foliated rocks containing amphibolite enclaves interpreted as remnants of mafic dykes. Group II granitoid rocks (late-Labradorian or syn-Grenvillian?) lack amphibolite enclaves and are massive to weakly foliated. Group III comprises posttectonic plutons (late Grenvillian?). Post-Grenvillian units include redbeds of the Bateau Formation, basaltic flows of the Lighthouse Cove Formation, two suites of mafic dykes and huge north-northeast-trending quartz veins.

Thrusts and/or strike-slip faults bound each of the structural–lithological entities. The Gilbert River shear belt and the Southwest Pond domain are predominated by medium- to high-grade rocks having consistent west-northwest-trending structures partly related to the major zone of right-lateral displacement within the Gilbert River shear belt. The Pinware terrane is a region of less intense deformaton and metamorphism, in which west-northwest trends fade out progressively southward, and are replaced by less consistent directions interpreted to reflect emplacement of later granitoid plutons.

Targets for mineralization of economic interest include posttectonic granites and pegmatite, for potential incompatible element enrichment and muscovite respectively.

INTRODUCTION

Geological mapping at 1:100,000 scale of the St Lewis River map region in 1987 marks the fourth and final field season of a 5-year Canada–Newfoundland joint project, aimed at completing the mapping of an 80-km coastal fringe of the Grenville Province in southeastern Labrador. The St Lewis River map region comprises six NTS 1:50,000 scale map areas (3D/4, 5, 13A/1, 2, 7, 8), which collectively encompass a land area of approximately 5,000 km^2. Previous geological knowledge of the area is based mainly on descriptions of coastal localities (Lieber, 1860; Packard, 1891; Daly, 1902; Kranck, 1939; Christie, 1951; Douglas, 1953) and 1:500,000 scale reconnaissance mapping (Eade, 1962) and mineral exploration (Piloski, 1955) of the interior. More recently, complete aeromagnetic coverage and lake-sediment geochemical data have become available for the region (Geological Survey of Canada, 1974a, 1974b, 1984). The adjoining area to the north has been mapped by Gower *et al.* (1987) at 1:100,000 scale and that to the south at 1:125,000 scale by Bostock *et al.* (1983).

GENERAL GEOLOGY

Regional Setting

The region is situated entirely within the Grenville Province in southeastern Labrador (Figure 1). It is divided here into three lithostructural entities, named from north to south as follows: 1) Gilbert River shear belt, 2) Southwest Pond domain, and 3) Pinware terrane. The Gilbert River shear belt is a continuation of the same belt of rocks mapped in the Port Hope Simpson map region to the north (Gower *et al.*, 1987). The Southwest Pond domain also continues from the Port Hope Simpson map region, where it was previously unnamed. As Figure 1 of Gower *et al.* (1987) implied, the region may be a continuation of the Mealy Mountains terrane farther to the northwest, but until the intervening area is mapped this cannot be confirmed. The regional extent and significance of the newly defined Pinware terrane is uncertain, but regional gravity and aeromagnetic data suggest that it is probably distinct from the Mealy Mountains terrane; a speculative extrapolation of the boundary westward, based on geophysical data, is shown in Figure 1.

This project is a contribution to the Canada–Newfoundland Mineral Development Agreement, 1984–1989

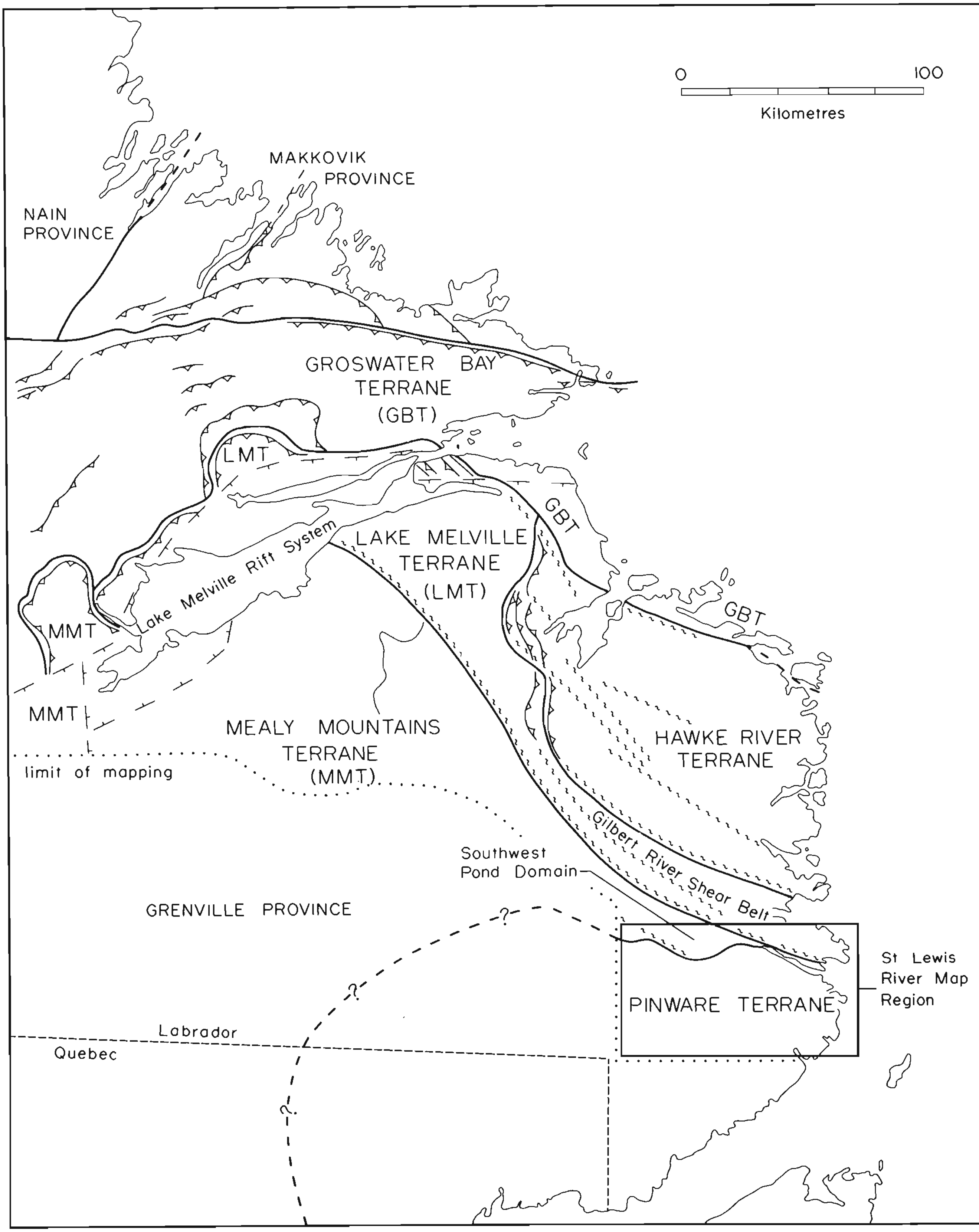


Figure 1. *Structural subdivision of the Grenville Province in eastern Labrador and the location of the St Lewis River map region.*

No geochronological data are available within the study area. Regional geological relationships suggest that the earliest rocks probably have ages between 1700 Ma and 1650 Ma, and have been intruded by granitoid rocks associated with the Grenvillian Orogeny at ca. 1000 Ma. Outliers of Late Proterozoic to early Phanerozoic rocks are present in the southeast corner of the map region.

The 1:100,000 scale map, from which Figure 2 is simplified, is based on about 2000 data stations established during ground traverses spaced at 3- to 4-km intervals in the interior of the region, at spot helicopter landings in the intervening areas and during ground traverses along the coast. All samples have been slabbed and stained (potassium specific) and about 500 thin sections examined in a cursory manner.

Gilbert River Shear Belt

The Gilbert River shear belt is a zone of intense deformation about 30 km wide forming a southeasterly attenuated part of the Lake Melville terrane (Figure 1). Farther to the northwest, the equivalent zone of deformation marks the boundary between the Lake Melville and Mealy Mountains terranes, giving a total strike length of over 270 km for this shear belt.

Only a small portion of the Gilbert River shear belt is within the St Lewis River map region, where it underlies a triangular-shaped area in the northeast part of the area. Three distinct lithological zones are present. These are: 1) intermixed K-feldspar-megacrystic granitoid rocks, and (mainly) pelitic metasedimentary gneiss and orthogneiss on the northeast side, 2) a belt that includes the Alexis River anorthosite and its dioritic gneiss envelope, and 3) a narrow band of intermixed K-feldspar-megacrystic granitoid rocks, K-feldspar-augen gneiss and fine grained granitic gneiss on the southwest side. The first two of these lithological zones are direct continuations of those previously described from the Port Hope Simpson map region (Gower *et al.*, 1987).

Northeast side. The earliest rocks are metasedimentary gneisses. These are mostly pink and black, white, brown, grey or rusty-weathering, fine- to medium-grained, recrystallized, homogeneous to well-banded rocks. Banding results from alternation of leucosome and restite, intercalated amphibolitic layers and concordant minor granitoid intrusions. Some metasedimentary gneiss is gradational or interspersed with K-feldspar-megacrystic granitoid rocks.

The mineralogy of the pelitic gneiss comprises K-feldspar, plagioclase, quartz, biotite, sillimanite, garnet and opaque minerals. Garnet occurs as mauve to dark-red grains, in places up to 1 cm across, although most are commonly less than 2 mm in diameter. It is scattered throughout the gneiss or concentrated into distinct garnet- and biotite-rich (restite?) layers.

Associated metasedimentary rocks include quartzite, calc-silicate rocks and quartzofeldspathic gneiss, probably derived from an arenaceous protolith. These lithologies occur as grey- to green- or rusty-weathering pods or boudins within the pelitic gneiss and orthogneiss, and as enclaves in the surrounding megacrystic granitoid rocks. In places, boudins comprising mutually interlayered quartzite and calc-silicate rocks can be observed. The calc-silicate rocks contain diopside, hornblende, epidote, quartz, titanite, grossularite, plagioclase, phlogopitic mica, K-feldspar and carbonate. Minor thulite was noted in calc-silicate pods in the Mecklenburg Harbour area.

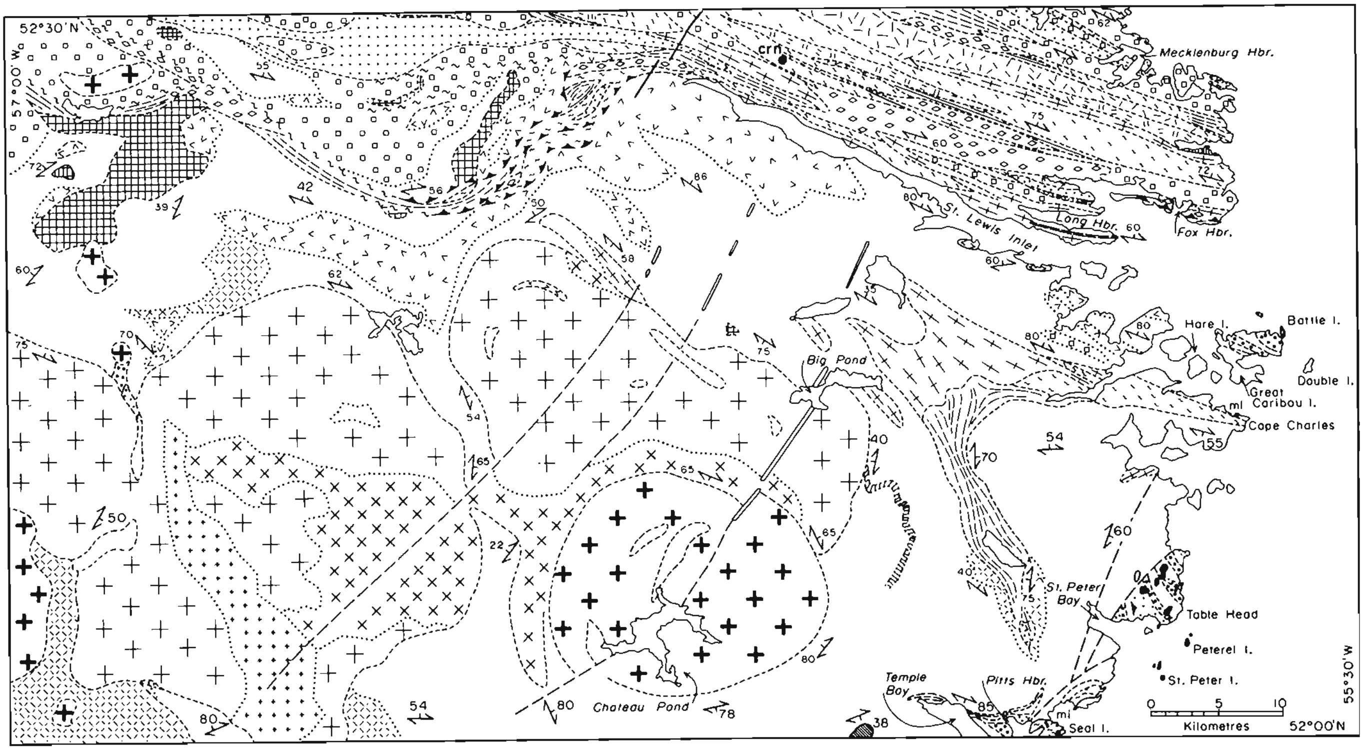
The K-feldspar-megacrystic granitoid rocks are grey, pink- or buff-weathering, fine- to coarse-grained rocks of granodiorite to quartz monzonite composition. Texturally, they vary from homogeneous, moderately foliated units to rocks that have been very strongly deformed and thoroughly migmatized. Although typically strongly deformed, megacrystic textures can be recognized and their granitoid origin inferred. The megacrysts form up to 30 percent of the rock, and range from 2 to 4 cm in diameter. Commonly they exhibit rounded, zoned, unrecrystallized cores and, irregular, recrystallized rims. The matrix consists of quartz, plagioclase, green biotite, minor garnet, allanite and opaque minerals. Seriate or equigranular textures give way to laminated rocks in zones of strong deformation, where recrystallization and grain-size reduction are extreme.

Enclaves within the megacrystic granitoid rocks include anorthosite (one locality), amphibolite and metasedimentary gneiss. The anorthosite is identical with the Alexis River anorthosite, from which we assume it to have been derived. The amphibolite enclaves, although consisting of recrystallized, polygonized minerals retain diabasic textures in places. They are interpreted as remnants of two suites of mafic dykes, emplaced prior to Labradorian deformation and metamorphism at ca. 1650 Ma (Gower *et al.*, 1987). Syntectonic and posttectonic pegmatite and microgranite are also associated with the K-feldspar-megacrystic granitoid unit.

Orthogneiss, associated with the above rock types, is minor. It includes granitic, granodioritic and dioritic types that have been fully described from the Port Hope Simpson map region (see Gower *et al.*, 1987). Isolated outcrops of mafic plutonic rocks, in the northeast part of the Gilbert River shear belt, are dark green- or brown-weathering, medium- to coarse-grained metagabbronorite having garnet and/or amphibole coronitic textures.

Central zone, including Alexis River anorthosite. This zone, including the Alexis River anorthosite and its (mainly) dioritic gneiss envelope, is 6 to 7 km wide in the St Lewis River map region, which is similar to that farther northwest, although the ratio of anorthosite to dioritic gneiss is lower in the St Lewis area. The borders of the zone are gradational and interdigitating with the surrounding more felsic gneiss.

The Alexis River anorthosite is a white, grey, brown or rusty-weathering, fine- to very coarse-grained rock, locally characterized by very pitted weathered surfaces. The anorthosite is gradational into leucogabbronorite. A complete



LEGEND

UPPER PRECAMBRIAN–LOWER PALEOZOIC

Gabbro, diabase (solid); quartz veins (open)

Bateau and Lighthouse Cove formations

UPPER PROTEROZOIC
Group III granitoid rocks

Massive, coarse grained granite (late-Grenvillian)

UPPER OR MIDDLE PROTEROZOIC
Group II granitoid rocks

Syenite, quartz syenite, alkali-feldspar granite

Coarse grained granite, alkali-feldspar granite

Fine grained granite, alkali-feldspar granite

MIDDLE OR LOWER PROTEROZOIC
Group I granitoid rocks

Syenite, quartz syenite

Biotite granite, alkali-feldspar granite

K-feldspar-megacrystic granitoid rocks

Hornblende–biotite quartz monzonite–diorite

Unassigned mafic plutonic rocks

Gabbro, norite, websterite

Alexis River anorthosite

Anorthosite–leucogabbro–norite

Gabbronorite and associated ultramafic rocks

MIDDLE OR LOWER PROTEROZOIC *(continued)*

Metasedimentary gneiss

Sillimanite–K-feldspar pelitic gneiss and muscovite schist

Banded (bedded?) quartzofeldspathic rocks; volcanoclastic?

Quartzite, commonly associated with calc-silicate rocks

Orthogneiss

Schistose epidote-rich amphibolite, possibly supracrustal

Biotite granite gneiss

Biotite granodiorite gneiss

Biotite–hornblende diorite to quartz diorite gneiss

K-feldspar augen gneiss

SYMBOLS

Geological boundary; approximate, diffuse

Undifferentiated faults, mostly strike slip

Normal faults

35 *Gneissosity, foliation*

mi • *Muscovite prospect*

crn • *Corundum locality*

Figure 2. *Geology of the St Lewis River map region.*

spectrum exists from weakly deformed rocks that retain primary mineralogy, texture and structure (including layering) to intensely deformed mylonitic or gneissic units. The most characteristic lithology is a white, sugary-textured, fine grained, strongly foliated and recrystallized plagioclase-rich rock, in which the mafic silicates occur as lenses or streaked-out aggregates.

In those rocks containing primary minerals, purplish-grey plagioclase (An_{57} at a spot determination) occurs with rusty-brown orthopyroxene and grey-green clinopyroxene. These relict grains are commonly enveloped in recrystallized aggregates of the same mineral, or are mantled by amphibole and/or garnet coronas. Garnet also occurs as discrete euhedral and anhedral porphyroblasts, locally as large as 3 cm. The rocks are, in places, veined by secondary prehnite.

Closely associated with the leucogabbronorite are more melanocratic rock types that include mesogabbronorite and ultramafic units. The largest of these are shown separately from the anorthosite in Figure 2. They are grey-green, medium- to coarse-grained, massive to schistose rocks consisting dominantly of amphibole, with lesser orthopyroxene, clinopyroxene, garnet, plagioclase and opaque minerals. The close spatial association with the anorthositic rocks clearly indicates that they were once part of the same layered intrusion. Mappable units (at 1:100,000 scale) of both anorthositic and melanocratic types, extending for several kilometres along strike, occur within the dioritic gneiss envelope separate from the large areas, but are too narrow to be indicated in Figure 2.

The orthogneiss envelope to the Alexis River anorthosite is dominated by dioritic gneiss, with lesser amphibolitic, granodioritic, augen granodioritic, monzonitic and granitic variants. The dioritic gneiss is a grey- to rusty-white-weathering, fine- to coarse-grained rock having a discontinuous banding emphasized by layers of concordant amphibolite, leucosome and minor granitoid intrusions. It consists of hornblende and plagioclase associated with minor clinopyroxene, garnet, quartz, K-feldspar and opaque minerals. Amphibolitic gneiss is similarly banded, but may contain vestiges of primary igneous plutonic layering. The felsic orthogneisses are generally medium grained, creamy, buff or pink migmatitic rocks derived almost certainly from tectonic interleaving of metamorphic derivatives of the anorthositic package with the surrounding granitoid intrusions.

An outcrop of metasedimentary gneiss included within the anorthosite–dioritic gneiss deserves special mention. At this locality there are schists containing abundant muscovite, mauve garnet and K-feldspar porphyroblasts. These are interlayered with zones containing abundant sillimanite and garnet, quartzite layers containing large purple garnet, some biotite-rich schlieren and concordant layers of amphibolite. In addition, there is a very distinctive rock containing plagioclase (An_{48}), red-brown biotite and large blue corundum porphyroblasts as large as 2.5 cm across and several centimetres long (Plate 1). We interpret the corundum-bearing rock to be a metasomatized anorthosite.

Plate 1. *Corundum porphyroblasts (arrowed) in plagioclase-rich rock (metasomatized anorthosite?) associated with pelitic gneiss in outcrop; Gilbert River shear belt.*

Southwest side. The K-feldspar-megacrystic granitoid rocks, K-feldspar-augen gneiss and granitic gneiss on the southwest side of the Gilbert River shear belt form a zone of tectonically interleaved units varying from homogeneous rocks to well-banded gneiss and migmatite. The rocks are pink, buff, grey or creamy weathering, fine to medium grained and consist of quartz, microcline, plagioclase, biotite, opaque minerals, titanite, allanite, apatite and epidote. The common occurrence of titanite and epidote distinguishes these units from the granitoid rocks north of the Alexis River anorthosite. In the K-feldspar-megacrystic granitoid rocks, the megacrysts comprise as much as 25 percent of the rock and may be as large as 3 cm in diameter. The augen gneiss differs mainly in intensity of deformation and extent of migmatization, and can be interpreted as the tectonized equivalent of the megacrystic granitoid rocks.

The associated fine- to medium-grained granitic gneiss is comparable to that described by Gower *et al.* (1987) from the Port Hope Simpson map region. The most probable protolith is either granitoid plutonic rocks or psammitic metasediment, but extreme recrystallization and grain-size reduction renders unequivocal identification impossible. The description and discussion of the granitic gneiss in the Port Hope Simpson map region applies equally well to similar lithologies in the St Lewis River map region and the reader is referred to Gower *et al.* (1987) for further details.

Southwest Pond Domain

The Southwest Pond domain comprises metasedimentary gneiss associated with granitoid plutonic rocks, subsidiary mafic plutonic bodies and minor orthogneiss. The domain is distinguished from the Gilbert River shear belt by the less intense deformation (except flanking the north side of St Lewis Inlet), and from the Pinware terrane by higher metamorphic grade.

Most of the pelitic metasedimentary gneiss is contained within a single, east-southeast-tapering unit. The maximum width is about 5 km, considerably reduced from the 15 km in the Port Hope Simpson map region, immediately to the northwest. At its eastern end the metasedimentary gneiss merges into fine grained granitic gneiss, which in part may represent a psammitic equivalent, although no diagnostic metasedimentary gneiss features are retained. A tectonic sliver of metasedimentary gneiss north of Long Harbour is interpreted as the discontinuous strike extension of the same unit.

The pelitic gneiss is a creamy-, buff-, grey- or rusty-weathering, fine- to medium-grained rock showing nebulitic, schlieric or well-banded fabrics. Locally it grades into metasedimentary diatexite consisting of wispy biotite-rich schlieren and inhomogeneous pegmatoid patches. The mineralogy comprises quartz, plagioclase, K-feldspar, biotite, sillimanite, garnet, apatite and opaque minerals. Garnet is locally retrograded to plagioclase and biotite. Hornblende-bearing layers and enclaves of amphibolite occur in many outcrops and minor granitoid intrusions are ubiquitous. Metasedimentary gneiss north of Long Harbour contrasts in being a white- to grey-weathering, fine grained, strongly recrystallized, biotite–muscovite–plagioclase–quartz schist. Muscovite is interpreted as a retrograde product formed during shearing associated with the Gilbert River shear belt.

Distinctive calcareous quartzite and calc-silicate rocks south of Long Harbour, on Battle Island and on Great Caribou Island are also described in this section, although their tectonic affinity with the Southwest Pond domain is not certain. Quartzite, south of Long Harbour, forms a distinctive unit of grey- to white-weathering, medium grained rock and was previously mapped by Christie (1951). The extrapolation of this unit westward from the coast is based on Christie's map, as it was only examined on the shoreline during this study. It seems likely, as suggested by Christie, that the quartzite south of Long Harbour is the lateral equivalent of quartzite on Battle Island, first described by Kranck (1939). The superbly exposed Battle Island quartzite is grey, white or maroon (where hematized) weathering, medium grained and exhibits both parallel lamination and crossbedding (Plate 2). A primary sedimentary origin for the crossbedding noted previously by Kranck (1939) is not in doubt and the unit consistently gives west facing. These quartz-rich rocks also contain plagioclase, microcline, biotite, amphibole, titanite, epidote, carbonate and opaque minerals. A distinctive feature is the presence of amphibole porphyroblasts, up to about 1 cm across, surrounded by halos depleted in mafic silicates.

The presence of Ca-bearing silicates in the quartzite is easily understood in terms of their close association with calc-silicate rocks. Excellent exposures of the latter are present at the north end of Battle Island (Plate 3), where they consist of grey-green-weathering, medium grained, well-banded, diopside–plagioclase–epidote–carbonate rocks, interbedded with quartzofeldspathic and amphibolitic layers (see also descriptions by Kranck, 1939 and Christie, 1951). Similar quartzite and calc-silicate rocks form small islands northwest of Battle Island.

A similar assemblage is present on the northeastern half of neighbouring Great Caribou Island, where they are associated with maroon, yellow and white-weathering,

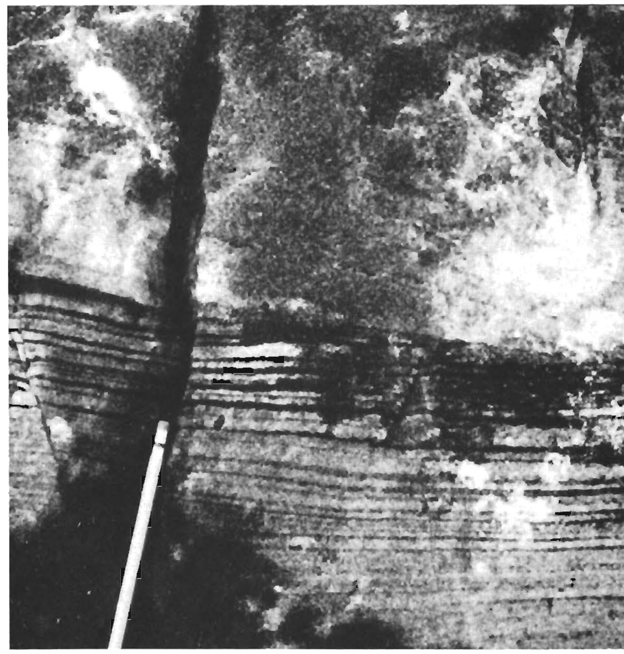


Plate 2. *Crossbedded quartzite; Battle Island.*

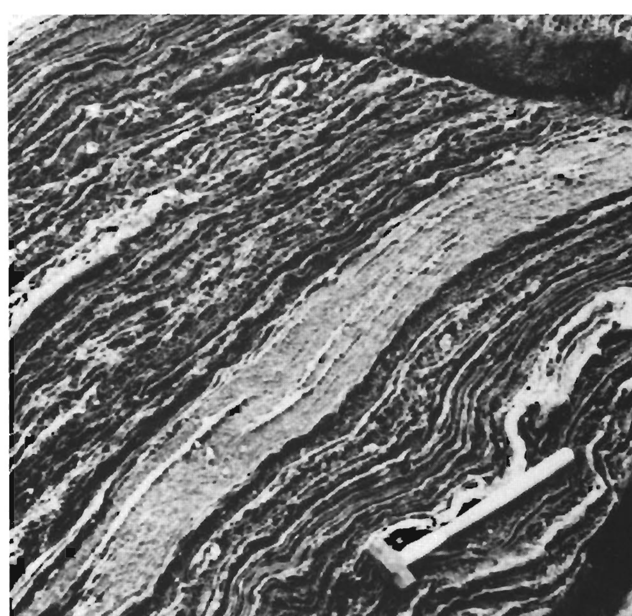


Plate 3. *Well-bedded calc-silicate rocks; Battle Island.*

medium grained, arkosic units. Some layers are deformed conglomerate or felsic agglomerate, as indicated by ellipsoidal clasts having a wide range of quartzofeldspathic compositions (Plate 4). These clasts, coupled with the crossbedded quartzite, makes the Battle Island area unique in the Grenville Province of eastern Labrador, in being the only area where unequivocal features demonstrating a supracrustal origin, are preserved. The agglomerate–conglomerate contains abundant carbonate as a matrix mineral and is interbedded with thinly laminated quartz-rich metasediment. Both Battle Island and the northeast corner of Great Caribou Island are pervasively intruded by large pegmatite dykes (in places over 10 m wide) containing common muscovite and magnetite.

Plate 4. *Deformed conglomerate or felsic agglomerate containing ellipsoidal clasts of various compositions; eastern Great Caribou Island.*

Granitoid rocks in the Southwest Pond domain include quartz diorite, quartz monzonite, granodiorite, granite and K-feldspar-megacrystic variants. K-feldspar-megacrystic granodiorite is most common, forming ovoid (in plan) plutons intruding metasedimentary gneiss, and irregularly shaped bodies associated with other granitoid units. These buff, honey, white and pink-weathering, medium grained rocks have fabrics that grade from massive or weakly foliated to gneissic or mylonitized. K-feldspar megacrysts typically measure 2 cm by 2 cm and constitute 10 to 20 percent of the rock. In places, these rocks grade into nonmegacrystic variants with otherwise similar characteristics. The mineralogy is quartz, plagioclase, microcline, biotite, minor hornblende, allanite, titanite, apatite, opaque minerals and garnet.

Quartz diorite, quartz monzonite and granite in the Southwest Pond domain are melanocratic and leucocratic variants of the same suite of granitoid rocks. The quartz diorite–monzonite is a black and creamy- or grey-weathering, medium- to coarse-grained rock, having weak to strong foliation and grading locally into gneiss. The mineralogy comprises quartz, plagioclase, microcline, hornblende, biotite, titanite, allanite and opaque minerals. The granite differs mainly in weathering colour (being pink or white) and mineralogy, lacking hornblende and containing more quartz and K-feldspar. All the granitoid rocks in the Southwest Pond domain are characterized by mafic enclaves, ranging from amphibolite layers as wide as 5 m to biotitic schlieren only 1 to 2 cm across. Concordant and discordant pegmatite and microgranite veins and dykes are ubiquitous.

Mafic plutonic rocks in the Southwest Pond domain occur as isolated outcrops and more extensive sill-like bodies. They are green-black, dark grey- and rusty-weathering, medium grained rocks, typically massive to weakly foliated; rock types range from leucogabbro to ultramafite. The mineralogy consists of olivine, orthopyroxene, clinopyroxene, amphibole, plagioclase, opaque minerals, green spinel and garnet. Coronitic textures are present in places. In part, these minerals are relict primary grains; elsewhere they are granoblastic metamorphic aggregates.

Orthogneiss is confined to the borders of the Southwest Pond domain, and to narrow shear zones within it (Plate 5). A wide range of compositions is present, including diorite, granodiorite, megacrystic granodiorite and granite. The rocks are similar to those described from the Gilbert River shear belt, and, likewise, can be interpreted as severely deformed and migmatized plutonic intrusions. In several places, but especially in the zone of southeast-directed thrusts (Figure 2), the gneisses are very fine grained, laminated mylonites showing prominent linear fabrics.

Plate 5. *Isoclinally folded dioritic orthogneiss associated with southeast-directed thrusts bounding the south side of the Southwest Pond domain, St Lewis River. Notebook is 11 cm wide.*

A small body of granite in the western part of the Southwest Pond domain contrasts from the other units in the domain in that it is a massive to weakly foliated, pale grey- to pink-weathering, homogeneous, medium grained, muscovite biotite granite. It also contains enclaves of more strongly foliated granitoid rocks and, hence, we interpret it to be a younger granite intrusion, possibly postdating Grenvillian orogenesis. It is possible that several closely grouped smaller bodies are present, rather than the single intrusion depicted.

Pinware Terrane

The Pinware terrane is a newly defined region that underlies the southern 80 percent of the St Lewis River map region. It contrasts from other terranes in eastern Labrador by its lithological homogeneity, being composed principally of granitoid plutonic rocks. This lack of diversity invites comparison with the Grenvillian Long Range Inlier in Newfoundland, mapped and described by Erdmer (1986) and Owen *et al.* (1987). The main components are metasedimentary gneiss, orthogneiss, mafic plutonic rocks and granitoid plutonic rocks.

Metasedimentary gneiss is areally insignificant, probably underlying less than 1 percent of the Pinware terrane. The writers discovered two localities in the western part of the map region; a group of quartzite—calc-silicate rocks occur south of Big Pond, and more extensive rocks of probable metasedimentary origin were seen on the coast. The two outcrops in the west both have pelitic and psammitic components. The pelitic rocks are white- to pale pink-weathering, medium grained rocks having discontinuous to continuous banded fabrics. The mineralogy is quartz, plagioclase, K-feldspar, biotite, sillimanite, garnet and opaque minerals. The locality in the southwest corner of the map region also contains serpentine pseudomorphs, possibly after cordierite. The psammitic gneiss comprises quartz, plagioclase, K-feldspar, biotite, garnet and opaque minerals and lacks diagnostic metasedimentary features. It is noteworthy that Bostock *et al.* (1983) recorded sillimanite-bearing pelitic gneiss, locally associated with calc-silicate rocks at a few localities southeast of, and roughly on strike with the outcrop in the southwest corner of the St Lewis River map region. They did not attempt to show the regional extent of areas underlain by metasedimentary gneiss.

Quartzite mapped south of Big Pond is a laminated, white- or grey-weathering, fine- to medium-grained rock consisting of quartz with minor amounts of plagioclase, clinopyroxene, amphibole, clinozoisite or opaque minerals. It is associated with calc-silicate rocks and some banded amphibolite. The mineralogy of the calc-silicate rocks includes clinopyroxene, quartz, plagioclase, carbonate and opaque minerals. Most of the outcrops are small and isolated; linking them into the single sinuous layer indicated on the map is somewhat speculative.

Presumed metasedimentary rocks in the southeast coastal part of the Pinware terrane, can be divided into muscovite schists and compositionally layered quartzofeldspathic rocks. The muscovite schists are grey-, white- or creamy-weathering, fine- to medium-grained rocks, consisting of quartz, K-feldspar, plagioclase, biotite, muscovite, garnet and accessory phases. Schistose zones containing abundant muscovite alternate with broader, more homogeneous layers. It seems likely that these rocks were derived from an argillaceous or fine grained pyroclastic protolith. The quartzofeldspathic rocks show very pronounced layering (bedding?) defined by colour (maroon, cream, white, grey, and purple), grain size and composition (Plate 6). Commonly the rocks contain amphibole porphyroblasts and have K-feldspar-rich segregations. One rock contains abundant, strongly pleochroic (lilac to dark blue-green) amphibole, and is probably sodic in composition. This rock also contains corundum and a serpentine pseudomorph, possibly after orthopyroxene. The rocks lack garnet or aluminosilicates. Texturally, the rocks are completely recrystallized and show no diagnostic fabrics pertinent to inferring their protolith. The distinctive layering, anomalous mineralogy and association with muscovite schists suggest a supracrustal origin, possibly an arenaceous or felsic volcanic protolith. Comparable rocks occur on Great Caribou Island, broadly associated with quartzite and calc-silicate units.

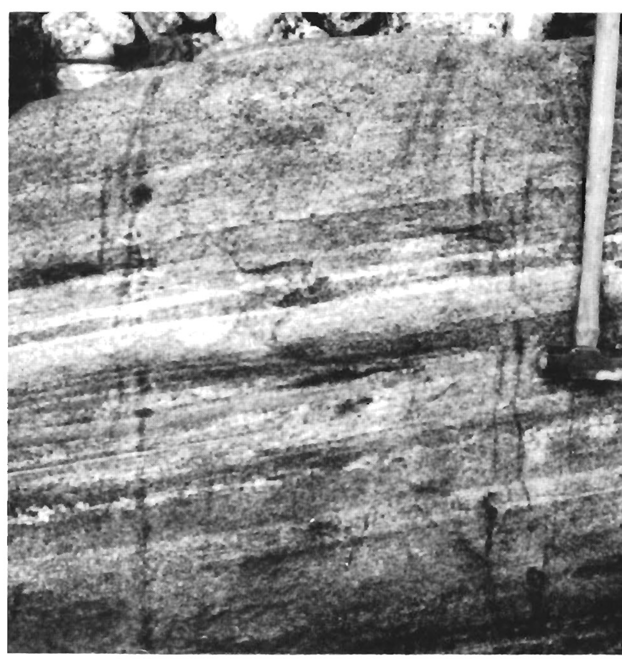


Plate 6. *Compositionall banded (bedded?) quartofeldspathic rock, possibly derived from an arenaceous or volcanoclastic protolith; west of Table Head.*

Isolated outcrops of orthogneiss occur throughout the Pinware terrane, but it is extensive only in the eastern part of the region. The area defined by Cape Charles, Big Pond and Pitts Harbour is underlain by dioritic, granodioritic, granitic and amphibolitic gneiss. The dioritic gneiss consists of pink-, creamy- or grey-weathering, medium- to coarse-grained, hornblende quartz diorite to monzonite having irregular quartzofeldspathic leucosome segregations. It is found with migmatized amphibolite and intruded by granitic veins. On the coast, these rocks are interlayered with broader, concordant zones of granite. The granodioritic gneiss grades from relatively homogeneous units containing mafic enclaves or boudinaged dykes to well-banded, migmatitic rocks. The granitic gneiss is similar in appearance, differing only in bulk composition. Some granitic gneiss displays well-defined, regular layers, suggestive of a metasedimentary protolith. It is noteworthy, in this regard, that muscovite schist is present in the southern tip of the Big Pond–Temple Bay orthogneiss belt. Orthogneiss in the southeast Pinware terrane lacks the strongly foliated, well-banded and thoroughly migmatized appearance of the orthogneiss farther north. Instead, they appear to be the result of multiple injection of various granitoid and mafic dyke phases, onto which deformaton has been superimposed to give a banded rock.

The belt of orthogneiss extending southward from Big Pond can be conceptually linked with gneiss in the Pitts Harbour–Temple Bay area. These rocks are indicated as granodioritic orthogneiss in Figure 2, but also include syenitic and monzonitic variants. Further extrapolation of the gneiss westward suggests a link with fine grained, schistose, laminated amphibolite at the southern boundary of the map region. The amphibolite is distinctive in that it contains acicular amphibole and abundant epidote and titanite; it may be supracrustal in origin. Bostock *et al.* (1983) have mapped more extensive amphibolite southwest of, and on strike with this locality. Orthogneiss was also mapped east of Pitts Harbour, intercalated with gneiss of probable metasedimentary origin. These gneisses include dioritic, granodioritic, syenitic and granitic varieties, associated with broad amphibolite layers and abundant pegmatite.

Mafic plutonic rocks are a minor component of the Pinware terrane, and only one extensive body is present. This is in the northwest part of the terrane and consists of grey-, brown-, purple- or buff-weathering, medium- to coarse-grained gabbronorite, gabbro, leucogabbro, diorite and monzogabbro, all of which are extensively modified by metamorphism. Primary pyroxene and plagioclase occur as relict grains enveloped in recrystallized mosaics, or surrounded by amphibole–spinel coronas. Most of the leucocratic rock types are in the southern arm of the body. Scattered outcrops of mafic plutonic rocks elsewhere include metamorphosed pyroxenite, gabbronorite, websterite and gabbro, and occur mostly in the northern half of the Pinware terrane.

Granitoid rocks of the Pinware terrane can be divided into three groups. Group I consists of moderately foliated to gneissic granitoid rocks having common amphibolite enclaves. Group II granitoid rocks are massive to weakly foliated and lack amphibolite enclaves. Group III comprises posttectonic plutons. No age data are available for any of these groups, but as a working hypothesis, we consider the first group to have been emplaced synchronously with the Labradorian Orogeny (1.65 Ga); the second group to be either late-Labradorian or syn-Grenvillian: and the third group to postdate the Grenvillian Orogeny (1.0 Ga).

Group I granitoid rocks. Granitoid rocks in the first group include granite *sensu stricto,* (which is the most abundant rock type), quartz syenite to alkali feldspar granite, quartz monzonite to quartz diorite and K-feldspar-megacrystic variants. The granite weathers pink, grey, buff, white or rusty, and commonly has a characteristic, streaky pink and white appearance. Grain size varies from fine to coarse, and the rocks have recrystallized, seriate, homogeneous or nebulitic textures. A separate leucosome component is normally absent, but some rocks do show diffuse patches or layers enriched in K-feldspar. The mineralogy comprises quartz, K-feldspar, plagioclase, biotite, apatite, allanite, titanite, opaque minerals and sporadic clinopyroxene or amphibole. Titanite is a ubiquitous and unusually abundant accessory mineral in most granitoid rocks in the Pinware terrane.

The granites show considerable variation in mineralogy and texture and probably include rocks emplaced over an extended period. Deformational histories of two granites exposed on the coast are instructive. Granite in St Peter Bay was intruded by mafic dykes, then microgranite and pegmatite and subsequently deformed twice. During the second deformation, axial planar segregations developed and were then crosscut by pegmatite. The late-stage history includes local shearing, further pegmatite injection, and hematite alteration along late-stage fractures. Granite south of Cape Charles contains elongate enclaves of banded quartzofeldspathic rock, possibly derived from a supracrustal protolith. The enclaves were deformed and migmatized prior to intrusion by mafic dykes and subsequent inclusion in the granite. Deformation of the granite was followed by pegmatite injection, intrusion of a distinctive buff-coloured microgranite, and finally brittle faulting. Combining the histories of these two areas leads to the simplest conclusion that there were either two periods of mafic dyking (if the granites correlate), or that there were two periods of granite emplacement (if the mafic dykes correlate). Good geochronological evidence exists for both alternatives farther north. Samples have been collected from the two granites for dating.

Group I quartz syenite to alkali feldspar granite is most common in the western half of the Pinware terrane, especially in the southwest corner of the map region. The rocks are pink, buff or white weathering, medium to coarse grained, generally homogeneous and moderately foliated. Minerals include perthitic K-feldspar, lesser quartz and plagioclase and minor biotite, amphibole, clinopyroxene and magnetite. It is possible that some of this unit should be included with Group II granitoid rocks.

Quartz diorite–monzonite is mostly present in a somewhat sinuous, elongate belt in the central-north part of the Pinware terrane. Smaller bodies were mapped on the south side of the St Lewis Inlet and on islands farther east; these are on strike with the main belt and could be genetically related. The rocks are grey, brown, white or creamy weathering, fine to coarse grained, and show moderately foliated to locally gneissic fabrics. Leucosome partings occur in rocks close to the northern boundary of the Pinware terrane. The mineralogy is plagioclase, quartz, microcline, biotite, amphibole (soda rich in places), apatite, titanite, zircon, clinopyroxene and opaque minerals. The amphibole is commonly extensively altered to an orange-brown phyllosilicate.

K-feldspar-megacrystic granitoid rocks are notoriously sparse in the Pinware terrane, and are found mostly near its northern boundary. The rocks have limited areal extent and commonly have gradational boundaries with seriate-textured or nonmegacrystic units. The rocks are pink to grey weathering, medium to coarse grained, typically moderate to strongly foliated and extensively recrystallized. The fabric can be attributed to proximity to the more strongly deformed northern boundary of the Pinware terrane.

Amphibolites associated with Group I granitoid rocks are black, dark grey- or green-weathering, medium grained rocks that occur in bodies ranging in size from a few centimetres to units over 10 m wide. At one locality two contrasting types occur together. The earlier amphibolite is tightly folded and migmatized, in contrast to the later amphibolite, which is homogeneous and less deformed. We interpret amphibolite in the Pinware terrane as metamorphosed mafic dykes, and suggest that at least two suites are present. These were emplaced prior to the main and late deformations, respectively, that affected the host granitoid rocks.

Group II granitoid rocks. These rocks comprise two main rock types, namely 1) granite and 2) alkali feldspar granite to quartz syenite. Both types are pink, white, buff or creamy weathering, medium to coarse grained and have a homogeneous, massive to weakly foliated appearance. Stronger foliations are apparent in rocks adjacent to the Group III Chateau Pond granite. No leucosome component or migmatitic textures are evident. The mineralogy comprises perthite–microcline, plagioclase, quartz, biotite, minor amphibole, titanite, allanite, apatite, zircon and magnetite. The plagioclase content is very low in some rocks and the proportion of accessory minerals very high. Enriched rare-earth element patterns can be anticipated.

Although amphibolite is absent from these rocks they are not devoid of enclaves. These include amphibole- or biotite-rich schlieren and granitoid enclaves lithologically comparable to Group I units. The arrangement of enclaves near the northern margin of the eastern lobe suggests a concentric structure of some type. Foliation directions in the host granite follow the trend of the enclaves.

An elongate area of finer grained granite has been mapped in the western lobe. This could be a Group I unit, but it could also represent a border, or infolded roof zone of a Group II granite.

Group III granitoid rocks. Group III granitoid rocks include the Chateau Pond granite, the eastern margin of a slightly smaller pluton on the western margin of the study area, and scattered smaller intrusions. Similar plutons occur throughout southern Labrador and eastern Quebec and are characterized by doughnut-form aeromagnetic anomalies having magnetically high rims and low interiors. A monzonite from the centre of one such anomaly, immediately west of the St Lewis River map region, has yielded a U–Pb zircon age of 966 ± 3 Ma (Gower and Loveridge, 1987). In the St Lewis River map region, the Chateau Pond granite is the clearest example of a pluton belonging to this group (Plate 7). It is circular in outline and its emplacement has imparted a pronounced foliation to the surrounding rocks parallel to the margin of the pluton. The granite is pink to white weathering, coarse to very coarse grained, massive and homogeneous. K-feldspar occurs in grains up to 3.5 cm across. The mineralogy is perthite–microcline, quartz, sericitized plagioclase, chloritized green biotite, titanite, apatite, allanite, zircon and opaque minerals. The pluton lacks minor granitoid dykes and does not contain mafic enclaves or dykes. Large rafts of foliated biotite granite (Group I) are present and are probably more common than indicated in Figure 2.

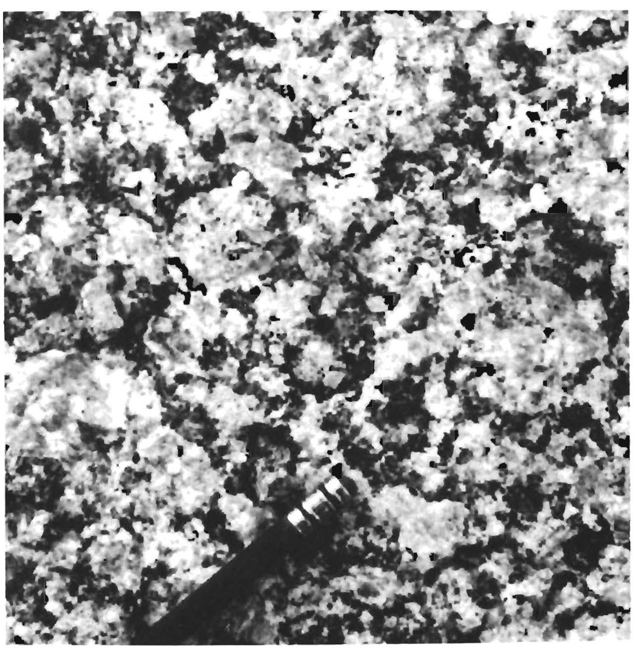


Plate 7. *Chateau Pond granite; Chateau Pond area.*

The granite on the western margin of the area is pink to rusty weathering, medium to coarse grained and massive to weakly foliated. It contains perthite, quartz, biotite, hornblende, clinopyroxene, zircon, magnetite and minor epidote. The common occurrence of clinopyroxene is a notable feature of this pluton. The smaller bodies are all pink, medium- to coarse-grained biotite granite. Their limited extent makes their classification as Group III intrusions equivocal.

Bateau Formation

Orange-, red- and maroon-weathering conglomerate, pebbly sandstone and arkose that uncomformably overlies

Grenvillian basement and underlies columnar-jointed basalt is correlated here with the Bateau Formation of Williams and Stevens (1969). These rocks are found on St Peter Islands, Peterel Islands, Table Head and several outliers northwest of Table Head. The present distribution of the Bateau Formation appears to be restricted to the west by a northeast-trending fault.

Talus from the overlying basalt prevents accurate measurement of section thickness at Table Head and the outliers to the northwest. The maximum thickness is probably about 10 m. On one of the western islands in the St Peter Islands group, an almost complete 5-m section of Bateau red arkose and conglomerate is exposed. On the most southerly of the St Peter Islands, the unit has a maximum thickness of 30 cm. In general, there appears to be a southeasterly thinning of the unit.

The arkose includes both parallel lamination and crossbedded layers, which have master bedding planes, up to 30 cm apart, defined by colour, grain-size variation and heavy-mineral laminae (Plate 8). The conglomeratic layers contain pebbles of quartz, granite and pegmatite derived from the underlying quartzofeldspathic basement. Basement relationships are well exposed on the most southerly of the St Peter Islands where pegmatite intruding basement amphibolite is unconformably overlain by basalt of the Lighthouse Cove Formation. The base of the basalt is marked by a breccia layer, between 2 to 30 cm thick, formed from the basement regolith that includes clasts of pegmatite, intermixed with scoriaceous material from the flow.

In thin section, the arkose is seen to consist of grains of quartzofeldspathic rock associated with smaller particles of quartz, feldspar, phyllosilicates and opaque minerals. These are contained within a carbonate–hematite cement.

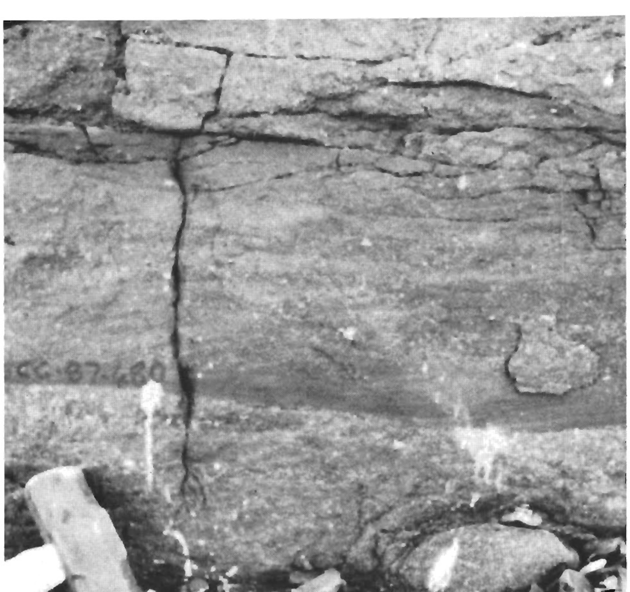


Plate 8. *Crossbedded arkose of Bateau Formation; St Peter Islands.*

A clastic dyke, assumed to correlate with the Bateau Formation, was discovered on Great Caribou Island. It is 30- to 50-cm wide and is made up of two parts. The older part is a conglomerate–breccia containing fragments of K-feldspar and quartzofeldspathic rocks. This is cut by a maroon sandstone dyke containing fragments of the earlier breccia in a matrix of carbonate, hematite, quartz and feldspar.

Lighthouse Cove Formation

Basalt overlying the Bateau Formation is correlated with the Lighthouse Cove Formation (Williams and Stevens, 1969; Strong and Williams, 1972). The thickest section is on the St Peter Islands, where about 15 m of basalt is exposed (Plate 9). At Table Head and the other mainland outliers, the sections are less than 10 m thick. No rocks overlie the basalt and the uppermost parts of the basalt have been removed by erosion in all areas, hence the original thickness is unknown.

Plate 9. *Unconformity between Grenvillian basement and overlying Lighthouse Cove Formation–the basement rocks comprise amphibolite intruded by deformed pegmatite dykes; St Peter Islands.*

On the St Peter Islands, the basalt can be divided into a lower columnar-jointed part and an upper, hackly fractured part, similar to that present at Henley Harbour (immediately south of the St Lewis River map region), and described by Bostock *et al.* (1983). The basalts are brown to grey weathering, locally with green or maroon hues and are plagioclase- or pyroxene-porphyritic and amygdaloidal in places. The amygdules are pink near the base of the flows, but black farther up.

No pegmatite or mafic dykes were seen to intrude either the Bateau or Lighthouse Cove formations.

Upper Precambrian–Lower Palaeozoic Mafic Dykes and Quartz Veins

One dyke belonging to this north-northeast-trending suite (divided into two *en echelon* parts), was mapped in the north-central part of the St Lewis River map region. It is a continuation of a dyke mapped south of the Alexis River (north of the present map area) by Gower *et al.* (1987), and which continues from Alexis River northeast for over 50 km. The dyke is exposed along St Lewis River, where it is about 10 m wide, and crops out in isolated exposures a few kilometres north of the river. There is little evidence from aeromagnetic or topographic lineaments that the dyke continues much farther to the southwest. The dyke is a brown-weathering, massive, coarse grained gabbro consisting of euhedral sericitized plagioclase, anhedral later-crystallizing clinopyroxene, opaque minerals and late-crystallizing interstitial material, which includes K-feldspar.

Three, large, parallel quartz veins (up to 400 m wide and, discontinuously, up to 20 km long) transecting the St Lewis River map region are assumed to be coeval with the north-northeast-trending mafic dykes, because of their same trend. These were first recorded by Piloski (1955) and subsequently mapped by Eade (1962). More recently they have been examined by Meyer and Dean (1986) for their silica potential. Meyer and Dean, who only located two of the three dykes (perhaps because one was plotted slightly inaccurately by Eade, 1962), describe them as consisting of quartz and feldspar with minor hematite, magnetite and epidote and showing evidence of multiple intrusion and brecciation.

Younger Phanerozoic Dykes

Dykes postdating the north-northeast-trending dykes are uncommon in the St Lewis River map region. Three outcrops (at the south end of Battle Island, on Hare Island, and on the adjacent mainland to the southwest) are aligned on an 060° trend, which compares closely with dyke trends measured at the three individual localities. We interpret them to be all part of a single intrusion. The dykes are dark grey or brown weathering, fine grained and have widths between 0.2 and 2.0 m. They are vertical, rectiplanar, unmetamorphosed and have well-defined chilled margins (Plate 10). They also show bifurcation, offshoots and sharp changes in trend. The latter feature, in particular, suggests high-level emplacement along pre-existing brittle fractures. The mineralogy is plagioclase, clinopyroxene and opaque minerals, occurring both as small phenocrysts and as quenched groundmass grains. The trend, unmetamorphosed state and high-level features of these dykes suggest correlation with similar dykes farther north (Gower *et al.* 1982, 1987).

Several unmetamorphosed, rectiplanar, parallel dykes between 1- and 5-m wide intrude basement gneiss on Double Island, southeast of Battle Island. These trend at 175° and at least one of the dykes has a very shallow easterly dip. It is unknown whether these dykes are coeval with the east-northeast-trending dykes, or are part of a separate suite (perhaps related to the Tertiary opening of the Labrador Sea).

Plate 10. *Younger Phanerozoic diabase dykes, Hare Island; notebook is 19 cm long.*

STRUCTURE

The structure of the northern half of the map region is dominated by west-northwest trends that are very consistent in the Gilbert River shear belt and in much of the Southwest Pond domain. The northern half of the Pinware terrane shows similar trends but farther south there are more variable directions.

In the Gilbert River shear belt, west-northwest-trending fabrics are imposed on all units, except post-Grenvillian mafic dykes. Planar fabrics are steep to vertical, and lineations plunge shallowly to the west-northwest. Tight to isoclinal westward-plunging folds were observed in several places. Evidence abounds for right-lateral tectonic transposition, especially in the form of rotated K-feldspar megacrysts in granitoid rocks (Plate 11), and shear bands and minor folds in gneisses. Simplification in Figure 2 disguises the fact that many units are sliced-up, tectonic slivers of limited lateral extent.

A major mylonite zone in the vicinity of Fox Harbour marks the boundary between the Gilbert River shear belt and the Southwest Pond domain. This zone consists of steeply northward-dipping, fine grained, finely laminated, dark-weathering, mylonite grading into rocks recognizably derived from monzonite, K-feldspar-megacrystic granodiorite, granite, quartz diorite and amphibolite. Lineations consistently plunge north to northwest at 40 to 65°.

Plate 11. *K-feldspar megacryst showing dextral rotation; Gilbert River shear belt at Mecklenburg Harbour.*

The interior of the Southwest Pond domain lacks well-developed fabrics, most deformation being confined to shear zones that transect the domain and also mark its boundaries. Within the Southwest Pond domain, planar fabrics are steep and trend northwest, except near the zone of northwest-dipping thrusts where foliations have variable trends with an overall regional southwest strike. Lineations have shallow to moderate, west to north plunges.

The shear zones defining the southern boundary of the Southwest Pond domain are marked by well-banded gneiss and mylonite. Mylonite is particularly well developed in the thrust zone and is a very strongly foliated, fine grained flaggy rock having obvious northwest-plunging lineations. A fanning pattern in the lineations is apparent, suggesting noncylindrical folding.

In the Pinware terrane, foliations are well-defined in Group I granitoid rocks and mostly have steep attitudes, although some shallow-plunging or horizonal foliations are present. Lineations are weakly developed or are absent. In some coastal localities it is clear that planar fabrics are the product of several deformational episodes. It seems likely that foliations in Group II granitoid rocks reflect emplacement mechanisms, as they tend to be parallel to pluton boundaries and enclaves within plutons, especially in the eastern lobe. Foliations in Group III granitoid rocks are only present in the outer parts of plutons. The Chateau Pond granite has imposed well-defined fabrics on its country-rock envelope, suggesting intermediate-level, forceful emplacement.

The main post-Grenvillian structures in the map region are north-northeast-trending fractures and faults. Some are defined by fault breccias, which, in places, are veined by quartz, carbonate or (at one locality) pegmatite. The direction and amount of displacement, if any, on most of these fractures is unknown. Late-stage faults and fractures are also expressed by airphoto lineaments discordant to regional structural trends. Dominant trends are northeast and northwest.

METAMORPHISM

Metamorphic assemblages attained upper amphibolite to granulite facies in the Gilbert River shear belt and the Southwest Pond domain and amphibolite facies in the Pinware terrane. Metasedimentary gneiss in both the Gilbert River shear belt and the Southwest Pond domain is characterized by sillimanite–K-feldspar-bearing assemblages. In the Gilbert River shear belt these have been retrogressed to give widespread muscovite. Mafic rocks in both the Gilbert River shear belt and the Southwest Pond domain have garnet and/or amphibole coronitic textures and widespread granoblastic pyroxene and plagioclase. Further evidence of widespread retrogression in the Gilbert River shear belt is the common occurrence of retrograde rims mantling garnet and the presence of prehnite in veinlets in anorthosite.

The presence of sillimanite–K-feldspar-bearing assemblages in the metasedimentary gneisses in the Pinware terrane attests to an early high-grade metamorphism, presumably related to the emplacement of Group I granitoid rocks during the ca. 1650 Ma Labradorian Orogeny. Most rocks, however, do not show evidence of severe metamorphism. Garnet is lacking throughout the terrane, except sporadically near its northern boundary and in a few amphibolites and muscovite schists. Titanite, unstable in quartzofeldspathic rocks at high grades, is common in all granitoid rocks, and quartz–muscovite-bearing assemblages are stable in schists in coastal areas.

One feature of the Pinware terrane is the widespread development of secondary magnetite. This has formed from the oxidation of biotite according to the reaction,

$$\text{biotite} + O_2 = \text{K-feldspar} + \text{magnetite} + H_2O$$

The reaction is demonstrated in many granitoid rocks by the presence of biotite-depleted halos around magnetite grains (Plate 12), where the width of the halo is proportional to the size of the magnetite grain at its centre. The halos do not appear to be especially enriched in K-feldspar, as one might anticipate from the above reaction. We attribute this to dispersal of the K-feldspar-forming components in a fluid phase. Many examples were seen where there is a grain-size increase in quartz and feldspar around individual magnetite grains, or clusters of magnetite grains, which we explain by assuming the presence of a fluid phase. Various stages of this process were observed, the end result is pegmatite produced by coalescing several fluid-enriched patches along pre-existing fractures.

Post-Grenvillian metamorphic effects are slight in the Pinware terrane. The Chateau Pond granite experienced

Plate 12. *Secondary magnetite surrounded by biotite-depleted halo; Cape Charles area.*

sericitization and chloritization. The north-northeast-trending mafic dykes and Lighthouse Cove Formation show moderate low-grade alteration, but metamorphic effects are very weak in the younger Phanerozoic mafic dykes.

ECONOMIC POTENTIAL

The economic potential of the region remains largely untested. Some prospecting and excavation has been carried out on pegmatites in the Seal Islands and Cape Charles areas, and the interior of the region received cursory examination by BRINCO in the early 1950's (Piloski, 1955). More recently, the silica potential of the large north-northeast-trending quartz veins has been assessed by Meyer and Dean (1986). They concluded that only the vein south of Big Pond has a wide enough zone of pure quartz to be considered a good silica prospect.

The targets of potential economic interest outlined by Gower *et al.* (1987) for the Port Hope Simpson map region also apply to the present study area. These include pyritic gossans in metasedimentary gneiss, muscovite in pegmatite, and base metal and platinum-group metal potential in mafic plutonic rocks. Metasedimentary gneiss, however, is not extensive in the St Lewis River map region and pyritic horizons are less common than farther north. None were considered worth assaying for base or precious metals. Pegmatites are abundant in the Pinware terrane and some contain large books of muscovite. The largest observed books (15 cm in diameter) occur at the abandoned prospect at Seal Islands. The muscovite-bearing pegmatites are also characterized by large green alkali feldspar (cf. amazonite) up to 50 cm across. These feldspars were observed at several localities along the coast in the Pinware terrane, and invariably were the last pegmatites to be emplaced.

Other pointers of potential economic interest include the following: 1) malachite staining associated with the Lighthouse Cove Formation, 2) malachite staining in the Alexis River anorthosite—seen where it intersects the coast, 3) blue corundum (cf. sapphire) for its gemstone potential associated with metasedimentary gneiss and anorthosite in the Gilbert River shear belt (Plate 1), 4) granitophile-element mineralization related to Group II and Group III plutons as these rocks show some correlation with incompatible element lake-sediment anomalies, and 5) the extensive pegmatites in the Battle Island area, which intrude chemically reactive metasedimentary gneiss containing traces of fluorite. No anomalous radioactivity was found anywhere in the map region.

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