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Abstract

The Committee Bay Belt is underlain by northeast-trending rocks of the Archean Prince Albert Group, flanked to the north and west by paragneiss and associated peraluminous and metaluminous granitoid bodies, and to the south and east by metaluminous granitoid bodies. The Prince Albert Group comprises dominant semipelite and psammite, iron-formation and quartzite, with less abundant, spinifex-textured komatiite, and rare basaltic and *intermediate to felsic volcanic rocks. Synvolcanic intrusions ranging from rare gabbro, quartz diorite and diorite, to abundant tonalite, granodiorite and granite, outcrop south, east, and northwest of a plutonic body of tonalite to granodiorite interpreted to be younger than the supracrustal belts. To the west and north, metamorphic grade increases to amphibolite facies with consequent development of paragneiss and accompanying peraluminous melts. To the southeast, a granitic intrusive suite is cut by an anorthosite complex, both of which are intruded by Paleoproterozoic monzogranite.*

Résumé

La zone de Committee Bay comporte des roches du groupe archéen de Prince Albert de direction nord-est; elle est bordée au nord et à l'ouest par du paragneiss et des massifs granitoïdes hyperalumineux et méta-alumineux associés, et au sud et à l'est par des massifs granitoïdes méta-alumineux. Le Groupe de Prince Albert est composé principalement de semipélite et de psammite, de formation de fer et de quartzite, avec des quantités moins abondantes de komatiite à texture spinifex et de rares roches volcaniques basaltiques intermédiaires à felsiques. Des intrusions synvolcaniques allant de rares intrusions de gabbro, de diorite quartzique et de diorite à des intrusions abondantes de tonalite, de granodiorite et de granite affleurent au sud, à l'est et au nord-ouest d'un massif plutonique de composition tonalitique à granodioritique interprété comme étant plus récent que les zones supracrustales. Vers l'ouest et le nord, le degré de métamorphisme passe jusqu'au faciès des amphibolites et il y a eu formation de paragneiss et de bains hyperalumineux. Vers le sud-est, un complexe d'anorthosite recoupe une suite intrusive granitique; les deux sont recoupés par du monzogranite paléoprotérozoïque.

INTRODUCTION

The Western Churchill Province of the northwest Canadian Shield can be subdivided into the northwestern Rae and the southeastern Hearne domains, separated by the geophysically defined Snowbird Tectonic Zone (Hoffman, 1988; Fig. 1). Whereas the Hearne domain is characterized by Archean juvenile supracrustal belts dominated by basalt through felsic volcanic rocks and associated tonalite intrusions, the Rae domain is comprised of metasedimentary-rock-dominated Archean supracrustal belts with komatiite-quartzite associations. The latter supracrustal sequences are exposed semicontinuously along a northeast-trending strike length in excess of 1100 km, comprising, from southwest to northeast, the Whitehills–Tehek and Woodburn Lake belts (Henderson et al., 1991; Zaleski et al., 1997), the Committee Bay Belt (Schau, 1982), and, to the extreme northeast, the Mary River Belt (Bethune and Scammell, 1993; Jackson, 2000) exposed on Baffin Island. Recent detailed mapping (Ashton, 2000) suggests that comparable rocks, although at higher metamorphic grade, may continue to the southwest into Saskatchewan, thereby extending the strike length to about 1800 km.

The Prince Albert Group of the Committee Bay Belt comprises a sequence of Archean supracrustal and plutonic associations that have traditionally been considered to represent correlatives with those exposed in the Woodburn Lake area lying about 100 km north-northeast of the community of Baker Lake (Fig. 1). Previous investigations in the Committee Bay Belt southwest of Committee Bay include the reconnaissance mapping of Heywood (1961), who roughly delineated the extent of supracrustal versus granitoid units. Subsequent work in parts of the Laughland Lake (NTS 56 K) and the northern half of the Walker Lake (NTS 56-O) map areas (Schau, 1982) further subdivided the supracrustal rocks of the Prince Albert Group and formulated names for the distinct granitoid units enclosing the supracrustal belts. The proposal to establish a new national park at Wager Bay, including the headwaters of the Brown

River, led to mineral-resource assessment reports by the Geological Survey of Canada (Jefferson and Schau, 1992; Chandler et al., 1993). These studies incorporated local, detailed geological mapping in well exposed areas, in conjunction with aerial reconnaissance and archival data compilation.

This contribution represents a summary of field observations, resulting from 1:100 000 scale geological mapping of map area NTS 56 K, during the summer of 2000. The report presents results of the first year's field work of a three-year mapping project jointly undertaken by the Canada-Nunavut Geoscience Office and the Geological Survey of Canada.

GENERAL GEOLOGY

The Committee Bay Belt extends northeast from the northern margin of the Amer shear zone to the shore of Committee Bay (**Fig. 1**). Bedrock represents about 10 per cent of the total surface area, and is limited to rare, glacially sculpted, roches moutonnées and to glacial meltwater channels characterized by sparse glacial boulder coverage. The map area is extensively covered by thick packages of glacial till and fluvioglacial sediments (*see* Little, 2001).

The map pattern shown in Figure 2 is centred on an approximately oval plutonic body of tonalite to granodiorite (VTT: **Fig. 2**), about which the main supracrustal belts are wrapped. To the extreme southwest of this pluton, the belt comprises thinly layered, greenschist- to amphibolite-grade metasedimentary rocks that structurally overlie foliated and lineated granitoid bodies. Together they incorporate a series of east-west-trending, cataclastic and protomylonitic strands of the Amer shear zone (Asz: Tella and Heywood, 1978). To the north of the oval pluton, a number of east-west-trending, anastomosing shear zones constitute the western extension of the Walker Lake shear zone (WLsz).

The western and northern parts of the map area (Fig. 2) are underlain by sequences of alternating, coarsely crystalline, partially melted psammite, semipelite, and pelite with rare amphibolite, quartzite, and ultramafic rock. These are extensively intruded by biotite±muscovite±garnet monzo- and syenogranite, commonly transformed into paragneiss or diatexite. Locally, gneissic biotite±hornblende tonalite to granodiorite is abundant and is intruded by strongly lineated biotite granodiorite.

South and southeast of the supracrustal belt, metasedimentary rocks are generally absent, and this region is underlain by intrusive rocks ranging from anorthosite and gabbroic anorthosite through well foliated diorite and tonalite, and predominantly by potassium-feldspar-augen monzogranite. All of these units are crosscut by salmon-pink, unfoliated equigranular or weakly foliated, biotite±magnetite±fluorite monzogranite.

In the far northwest of the map area, diatexite and associated peraluminous granitoid, as well as banded tonalite, are widely intruded by well foliated, potassium-feldspar-augen granitoid bodies, all of which are invaded by voluminous, fine- to medium-grained equigranular biotite+magnetite monzogranite.

Primary stratigraphic relationships are best preserved in supracrustal units exposed immediately west of the central tonalite (VTT on Fig. 2), where interlayered volcanic and sedimentary units exhibit greenschist- and lower-amphibolite-facies metamorphic mineral assemblages. The supracrustal rocks consist predominantly of biotite±muscovite semipelite and psammite, with less abundant clean quartzite, komatiite, iron-formation and rare pelite, basaltic and felsic volcanic ((?)volcaniclastic) and carbonate rocks. Komatiite with well preserved spinifex textures provide the best, and typically only evidence for stratigraphic younging. Although bedding is commonly observed in all of the lower grade metasedimentary rocks, stratigraphic younging directions are obscured by subsequent extensional deformation and metamorphism (*see* Sandeman et al., 2001).

PRINCE ALBERT GROUP

Psammite and semipelite

The most abundant rock types of the Prince Albert Group include siliciclastic rocks dominated by fine-grained, biotite psammite and semipelite, that are interbedded on millimetre to decimetre scale (Fig. 3). These rocks occur throughout the Prince Albert Group, but generally form recessive, low rubbly outcrop, rubble, and dispersed rubble. They comprise grey to brown metasandstone units containing quartz, plagioclase, biotite, rare garnet, and local muscovite. They occur interlayered (≤50 cm) with less abundant pelitic, arenitic, and metavolcanic units. Although bedding is commonly preserved, clear younging indicators are rare but include pebble lags, graded beds, and crossbeds similar to hummocky cross stratification.

Fine-grained siliciclastic rocks

Chlorite phyllite and quartz sericite schist form thin, recessive horizons and are rarely exposed as coherent bedrock, but locally comprise abundant chips and fragments in mud boils, particularly in the west and southwest. The former likely represent fine-grained siliciclastic sediments derived from weathering of cogenetic iron-rich sedimentary rocks, whereas the latter, containing abundant quartz and sericite, were probably derived from a more mature, well weathered source. Some of the quartz-sericite schists may represent deformed and recrystallized felsic volcanic or volcaniclastic rocks.

Conglomerate

Conglomerate units were observed at six areally restricted localities (shown as letters on Fig. 2). The first (locality a, Fig. 2) is associated with silicate-facies iron-formation, can be traced over 3 km strike length, is strongly foliated and lineated, and includes subrounded clasts of quartzite, ultramafic rock, and mafic and intermediate volcanic rock set in a mafic to intermediate matrix. Two of the occurrences (localities b and c on Fig. 2) comprise local, intraformational, polymictic, matrix-supported pebble (≤5 cm) conglomerates characterized by angular to subrounded quartzite and felsic volcanic clasts set in an intermediate composition matrix (Fig. 4). Occurrence d (Fig. 2) was a oligomictic, subrounded to rounded, quartz-cobble conglomerate set in a quartz-rich matrix exposed near the base of an approximately 100 m thick section of decimetre-scale, bedded, pure quartz arenite. The conglomerate exposed at locality e (Fig. 2) was a pyritic (≤5 %), very strongly lineated, oligomictic quartz-cobble conglomerate with a quartz-rich matrix. It is significant to note that none of these were observed to outcrop in proximity to possible basement to the Prince Albert Group, and that all comprised locally-derived materials, probably representing channel deposits.

Quartz arenite

Prominent topographic features in the map area are two ridges of clean quartz arenite composed of decimetre- to metre-scale massive beds, distinguished by the presence of heavy-mineral bands and hematite staining (Fig. 5). Locally, pale pink (hematitized) beds are readily distinguished from white to pale blue beds. Although crossbeds were reported by Schau (1982) and Chandler et al. (1993), we were unable to corroborate their findings. Hence, stratigraphic younging directions were not conclusively determined in these units.

Quartz arenite units are also common to the west and southwest of the central tonalite (VTT on Fig. 2), where clean, white to grey, and bedded (decimetre-scale) quartz arenite occurs with garnet+grunerite silicate and magnetite iron-formation. Collectively, they form common and distinctive marker units. The quartz arenite units commonly contain moderately abundant fuchsitic mica, interpreted by Schau (1982) as detritus from paleoweathering of the adjacent komatiite.

Iron-formation

Iron formation occurs locally throughout the Prince Albert Group as discontinuous, ≤50 m wide units, and includes finely laminated magnetite and chert (oxide facies); centimetre- to decimetre-scale layered, garnet-amphibole-bearing (silicate facies), and minor sulphide-facies iron-formation. Iron-formation more commonly occurs as interlayered combinations of the aforementioned types (Fig. 6). Sulphides, mostly pyrrhotite and pyrite with minor arsenopyrite and chalcopyrite, are locally associated with secondary quartz veining. The style of sulphide mineralization, however, is difficult to determine based on field observations due to metamorphic and deformational overprinting. Iron-formation is commonly hosted in volcaniclastic and semipelitic rocks, but locally occurs in association with quartz arenite and/or komatiite and is complexly folded, appearing chaotic or brecciated.

Komatiite

The dominant volcanic rock type is komatiite. These rocks occur throughout the supracrustal belt as thick, (≤200 m) high ridges consisting of numerous individual flows, many of which preserve spectacular spinifex textures and cumulate zones (Fig. 7). Thin, talc-serpentine or talc-anthophyllite, ultramafic schists are interpreted as altered komatiite.

The most extensive and best preserved sequence of komatiite units is located on the northeast margin of the central tonalite (VTT on Fig. 2) in a 5 to 10 km wide and up to 25 km long zone (Fig. 2). Komatiite and lesser komatiitic basalt units in this area are flanked to the west by pillowed and massive basalt with rare silicic tuffaceous horizons. However, the outcrop between the two distinctive sequences is poor and typically comprises biotite psammite rubble. The komatiite units form infolded ((?)synformal keels) with predominant tonalitic granitoid on the eastern side of this volcanic zone and are intruded by the central tonalite to the west.

Another well preserved sequence of komatiite, komatiitic basalt, and basalt outcrops 5 to 15 km due west of the central tonalite (Fig. 2). This ultramafic-mafic volcanic sequence preserves consistent tops to the northwest and northeast, respectively. The abundance of spinifex textures, basaltic breccia and a lack of pillow forms suggest that the spinifex-textured komatiite and komatiitic basalt erupted in a subaerial volcanic setting. This sequence is structurally, and possibly stratigraphically, overlain by hydrothermally altered ultramafic schist, oxide- and silicate-facies iron-formation, mafic phyllite and clastic sedimentary rocks including quartzite and psammite, and intermediate to felsic volcanic and volcaniclastic rocks that are interpreted to have been subaqueously deposited.

Mafic volcanic rocks

Basaltic rocks are significantly less abundant than ultramafic rocks and typically comprise chloritic schist units having knobbly and irregular surfaces resulting from preferential weathering of ankerite and calcite blebs. The mafic rocks typically form thin (≤40 m thick) horizons in biotite psammite throughout the Prince Albert Group and are commonly interlayered with oxide- and silicate-facies iron-formation. Exposed north and east of the central tonalite (**Fig. 2**) is a discontinuously exposed, apparently thick sequence of pillowed (**Fig. 8**) and massive basaltic flows with rare interflow, tuffaceous felsic rocks. Overall, primary volcanic features such as pillows, lava shelves, or amygdales are very rare.

Felsic volcanic rocks

Intermediate and felsic volcanic rocks typically comprise laminated lapilli, crystal, and lithic tuff units (**Fig. 9**) that are associated with both komatiite flows and late, high-level porphyritic intrusions. No unequivocal rhyolite flows or autobreccia units were identified. Three major occurrences of felsic to intermediate volcanic rocks were noted. Immediately west of the central tonalite (Fig. 2), they comprise either massive quartz- and feldspar-phyric rocks that apparently conformably overlie komatiite flows, or as thin (≤5 m), laminated, volcaniclastic rocks interlayered with komatiitic basalt, basalt, and silicate iron-formation. Northeast of the central tonalite, a sequence of felsic lithic and lapilli tuff units are interlayered with komatiite and semipelite, and are crosscut by a plagioclase-porphyritic granodiorite. To the far southwest, an approximately 1 km thick sequence of monotonous plagioclase±quartz-phyric felsic metavolcanic rocks is interlayered with semipelite and finely layered, compositionally variable metasedimentary rocks.

Synvolcanic intrusions

Much of what was termed ‘Brown River Gneiss’ (Schau, 1982; Chandler et al., 1993) comprises a suite of foliated to gneissic intrusive rocks ranging from gabbro through monzogranite. Along the southern margin of the supracrustal belt, foliated diorite to granodiorite intrudes biotite psammite and silicate and magnetite iron-formation. From oldest to youngest, these comprise medium-grained, typically plagioclase-phyric quartz diorite intruded by foliated and foliation-parallel veins and dykes of biotite tonalite. Together they are crosscut by foliated, irregular masses of medium-grained biotite+titanite granodiorite and less commonly monzogranite. On the basis of their low-strain state (2 structural fabrics) and because they intrude and include similarly foliated blocks of supracrustal rocks, these units are interpreted as synvolcanic with respect to the volcanic units of the Prince Albert Group.

Other tonalite plutons, exposed throughout the map area and interpreted as synvolcanic, include 1) a large body of well foliated, plagioclase+quartz-phyric biotite granodiorite to tonalite exposed immediately west of the central tonalite ('western tonalite stock' of Schau (1982)); and 2) many of the bodies arrayed along the eastern margins of the supracrustal belts (B and B1 units: Chandler et al., 1993). The former intrudes the local volcanic and metasedimentary units of the Prince Albert Group and it is compositionally similar to the quartz-feldspar-porphyritic rocks described above.

Paragneiss and diatexite ((?)Kuagnat complex)

Rocks exposed to the west and north of the 'melt in' isograd on Figure 2 are at higher metamorphic grade than those of the supracrustal belt exposed on the down-grade side of the isograd. Overall, rocks to the north and west exhibit similar lithological variations to rocks of the Prince Albert Group (proper) and comprise a wide range of amphibolite-facies metasedimentary paragneiss and diatexite (**Fig. 10**) that is intruded by foliation-parallel, foliated, biotite±muscovite±garnet±tourmaline-bearing, commonly K-feldspar-phyric to megacrystic augen monzogranite and syenogranite. These granitoid bodies clearly crosscut the metasedimentary rocks as veins or dykes, and represent anatectic melts probably formed at somewhat lower crustal levels. Less abundant, grey to beige, biotite±titanite gneissic tonalite, typically associated with strongly lineated biotite granodiorite, locally occurs northwest of the 'melt-in' isograd. These rocks locally contain a well banded gneissosity and are characterized by discontinuous zones of protomylonite. To the far northwest, a series of foliated, locally augen granodiorite intrusions with metasedimentary xenoliths are crosscut by widespread dykes and laccoliths of variably foliated fine-grained equigranular biotite+magnetite monzogranite.

The Kuagnat gneiss complex (Schau, 1982) is separated from the Prince Albert Group (proper) by a recrystallized mylonitic shear zone, the Kellett fault zone. On the basis of the lithological and structural similarities between the well preserved supracrustal rocks and the metasedimentary diatexite, the rocks of the Kuagnat gneiss complex are considered to represent deeper structural/metamorphic levels of the Prince Albert Group (proper) stratigraphic sequence. On this basis, we revise its name to the Kuagnat complex, and its extent to include only those predominantly granitoid rocks exposed in the far northwest of the map area (**Fig. 2**).

PLUTONIC ROCKS

Central tonalite

Previously termed a B2 tonalite (Chandler et al., 1993) the remarkably homogeneous, central pluton consisting of variably foliated biotite±hornblende±titanite±allanite-bearing tonalite to granodiorite (VTT on Fig. 2). Contact relationships with the surrounding supracrustal units are rarely exposed. Northwest of Cabin Lake (CL on Fig. 2), the Central tonalite contains abundant rafts of biotite semipelite, and veins of tonalite are observed to crosscut the metasedimentary rocks. Along the eastern margin of the belt, the tonalite occurs as veins and dykes in biotite semipelite, although locally its contact appears to be faulted.

The Walker Lake intrusive complex

South and east of the Prince Albert Group supracrustal belt, the Walker Lake intrusive complex is composed of a chaotic array of foliated and locally gneissic plutonic units ranging from rare gabbro through abundant tonalite, granodiorite, and monzogranite. This area is roughly divided into northern and southern zones based on the relative abundance of tonalite versus augen granite. In the northern zone, potassium-feldspar augen granite is rare and the dominant rock type consists of foliated, grey biotite±titanite tonalite that is commonly inundated by lineated biotite granodiorite, together containing supracrustal keels. Where the two rocks occur in approximately equal proportions, foliation-parallel veins and pegmatitic patches of granodiorite in tonalite result in a ‘banded’ rock having the appearance of a gneiss.

In the southern zone, the oldest rock types observed are rare, strongly foliated amphibolite, rusty silicate-facies iron-formation, and tonalite and diorite that occur as rafts and inclusions in well foliated potassium-feldspar-augenitic, biotite+magnetite granodiorite to monzogranite. This latter unit is the dominant rock type in the southern and southeastern parts of the map area (Fig. 2). This assemblage is in turn crosscut by an array of variably foliated, but locally well lineated, fine- to medium-grained, salmon pink, biotite+magnetite±fluorite monzogranite. Field characteristics and compositions suggest that the latter monzogranite may be correlative with the ca. 1830–1810 Ma calc-alkaline Hudson monzogranite units that occur throughout the Western Churchill Province (Peterson and van Breemen, 1999).

Although Schau (1982) assigned the names ‘Brown River gneiss’ and ‘Walker Lake gneiss’ to a majority of these rocks, the northern, tonalite-dominated zone probably represents a suite of plutonic rocks that were cogenetic with the supracrustal belts. In contrast, much of the southern zone is dominated by potassium-feldspar augen granite that intrudes the tonalitic units. Accordingly, we suggest that the terms ‘Brown River gneiss” and ‘Walker Lake gneiss’ be dropped and rename the southern zone as the Walker Lake intrusive complex.

Laughland Lake anorthosite suite

The Laughland Lake anorthosite suite occurs to the northeast of Laughland Lake (**Fig. 2**) as a series of well exposed resistant ridges and boulder-encircled peaks surrounded by poorly exposed, glacial-till-covered uplands. The central part of the complex consists of massive, coarse-grained (≤6 cm) leucocratic, plagioclase-megacrystic anorthosite that is characterized by intercumulus hornblende or locally chlorite after primary clinopyroxene. Gabbroic anorthosite layers (≤10 m) occur locally and form spectacular igneous layering on a scale of 5 cm to 10 m with the anorthosite (**Fig. 11**). Contact relationships with other units are poorly exposed, and were observed only at two localities. The western margin is characterized by abundant fine-grained anorthosite and by locally extensive albitization of its wall rocks, suggesting that the anorthosite complex intrudes the Prince Albert Group. The eastern edge of the complex is characterized by an abundance of fine-grained and locally mylonitic rocks including pyroxenite, gabbro, and diorite that exhibit intimate net-vein intrusive relationships with a fine-grained cataclastic pink anorthosite (locality f on Fig. 2).

Late granite

Rocks of the Kuagnat gneiss complex and Walker Lake intrusive complex (Fig. 2) are intruded by a range of variably foliated, fine- to medium-grained monzogranite that contains biotite+magnetite±fluorite and locally is potassium-feldspar-phyric. They form sheet-like, laccolithic bodies that have massive interiors and gradational margins with abundant ghost schlieren and country-rock inclusions. Although none of these intrusions have been dated, texturally similar rocks from near Wager Bay (LeCheminant et al., 1987) and other dated examples from the remainder of the Western Churchill Province (*see* Peterson and van Breemen, 1999) yielded ages of ca. 1830 Ma.

A small (15 km^2) circular pluton exposed 10–15 km southwest of the central tonalite comprises a massive, potassium-feldspar-phyric, biotite+fluorite monzogranite with fine-grained margins. The massive character and chilled margins of this pluton suggest that it is probably postmetamorphic (cf. Schau, 1982).

ECONOMIC GEOLOGY

Several favourable targets for mineral exploration have been identified in the Laughland Lake map area. Sulphide mineralization in iron-formation predominantly occurs in association with secondary quartz veins. Disseminated, presumably primary sulphides are, however, locally abundant. Pyrrhotite and pyrite constitute the main sulphide minerals, but minor arsenopyrite and chalcopyrite were observed locally. A petrological investigation of iron-formation from numerous localities in the map area will form the M.Sc. thesis research of D. Hyde.

Other mineral occurrences include sulphide-bearing quartz-carbonate veins that occur in intensely lineated mafic volcanic rocks and in fine-grained gabbro (locality g on Fig. 2); metre-scale rusty quartz veins containing up to approximately 50 per cent pyrite mineralization were observed near locality h (Fig. 2); a previously drilled (Aquitane Company of Canada) showing of densely disseminated pyrite-pyrrhotite hosted in a gabbroic body near the intrusive contact of the Laughland Lake anorthosite complex, as well as other lithologically similar gabbroic bodies, may provide favourable targets for platinum group elements (locality i on Fig. 2).

Mapping of komatiite in the Prince Albert Group indicates that major lateral- as well as stratigraphic-facies changes occur over short distances. Recognition of thick flows (>10–15 m) and their associated cumulate-dominated sequences within the east-central supracrustal belt is encouraging, and highlights their potential for primary Ni-Cu and PGE mineralization. Detailed studies of selected localities by Trevor MacHattie will form a part of his Ph.D. research.

Other potential targets for mineral exploration in the map area include shear-zone-hosted Au; Au in pyritic quartz-pebble conglomerate; volcanogenic massive-sulphide mineralization associated with mixed mafic and felsic volcanic rocks; and Mo, Sn, W, U, and rare metals in fluorite-bearing granite.

SUMMARY

The Prince Albert Group exposed in the Laughland Lake (NTS 56 K) map sheet comprises predominantly metasedimentary rocks including biotite semipelite and psammite, iron-formation, quartzite and phyllite, with less abundant, spectacular, spinifex-textured komatiite, and rare basaltic and intermediate to felsic volcaniclastic rocks. Komatiitic flows with well preserved spinifex and cumulate textures provide the best, and typically only evidence for stratigraphic younging. Iron-formation consist of oxide- and silicate-facies varieties, although locally, disseminated pyrite and pyrrhotite are present. Sulphide minerals, however, are more commonly found in small quartz veins transecting the primary bedding and occurring axial planar to mesoscopic fold hinges. Much of the western and northen parts of the map area were previously mapped as granitic gneiss (Schau, 1982; Chandler et al., 1993). These rocks incorporate

metasedimentary paragneiss, diatexite, and peraluminous granitoid intrusions and are interpreted here as high-grade metamorphic equivalents of the Prince Albert Group that have undergone local metamorphic differentiation and anatexis.

Supracrustal rocks are intruded by a series of plutonic and subvolcanic intrusions ranging in composition from diorite to dominant tonalite to monzogranite. They transect the supracrustal units as veins or dykes and contain supracrustal rafts and xenoliths. The central tonalite intrusion (B2 tonalite of Chandler et al., 1993) is remarkably homogeneous, variably to weakly foliated, and intrudes the majority of the rock units of the Prince Albert Group. This body is interpreted to be relatively young.

To the southeast and east, plutonic rocks ranging in composition from predominant tonalite to monzogranite form an intrusion complex that has subsequently been deformed to commonly yield a gneissic appearance. From oldest to youngest these include a) synvolcanic tonalitic to granitic plutons with supracrustal rafts and xenoliths; b) foliated potassium-feldspar-augen granite and granodiorite; c) the Laughland Lake anorthosite suite; and d) variably foliated, pink, equigranular biotite+magnetite±fluorite monzogranite bodies that are correlated with ca. 1830 Ma Hudson monzogranite (LeCheminant et al., 1987; Peterson and van Breemen, 1999). The smaller potassium-feldspar-phyric, biotite+fluorite monzogranite pluton exposed southwest of the central tonalite (VTT on Fig. 2) is lithologically comparable and may be correlative to the ca. 1750 Ma granitoid bodies of the Nueltin Suite (Peterson and van Breemen, 1999).

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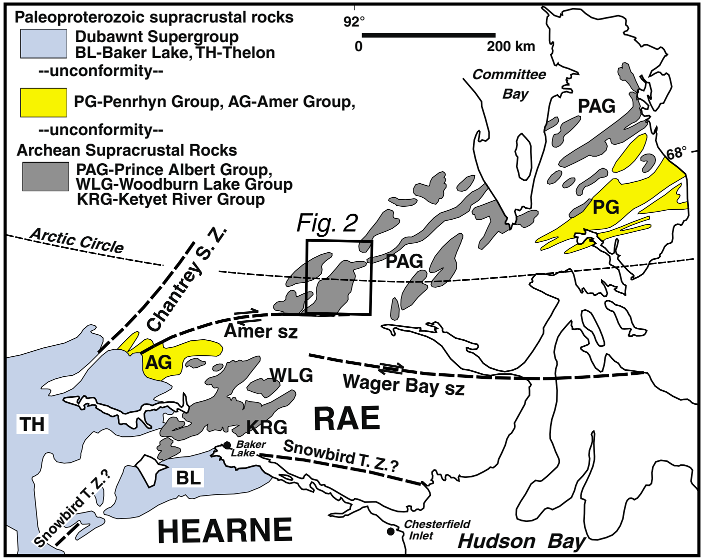

Figure 1. Regional geological setting of the study area northwest of Hudson Bay showing the distribution of Archean supracrustal rocks of the Prince Albert Group, the Woodburn Lake Group, and the Ketyet River Group relative to the Paleoproterozoic supracrustal suites of the region. *Adapted from* Zaleski et al. (1997).

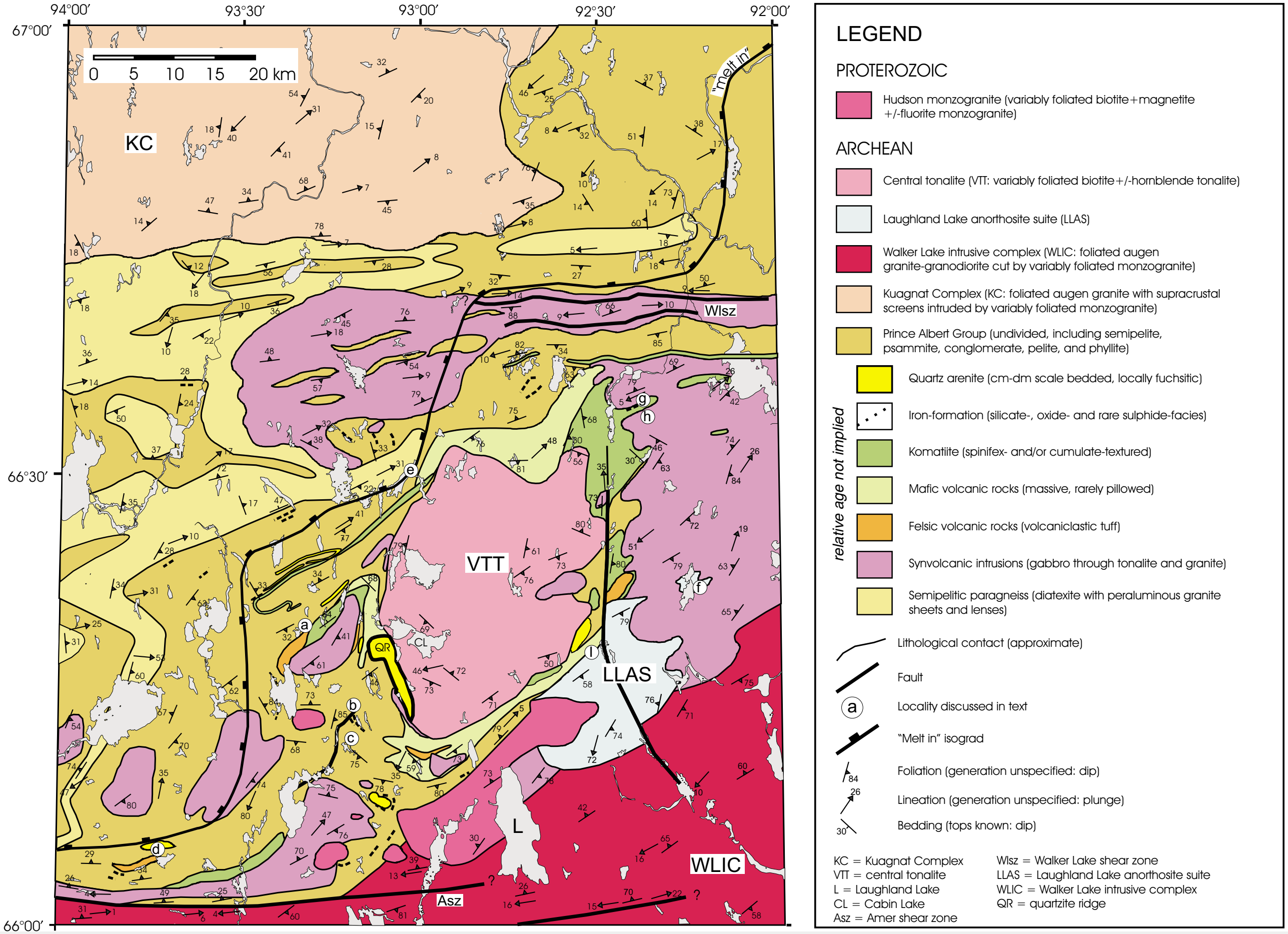

Figure 2. Generalized geology of the Laughland Lake map area. Letters are locations discussed in the text. KC = Kuagnat complex; VTT = VT (central) tonalite; L = Laughland Lake; CL = Cabin Lake; QR = quartzite ridge; Asz = Amer shear zone; Wlsz = Walker Lake shear zone; LLAS = Laughland Lake anorthosite suite; and, WLIC = Walker Lake intrusive complex.

Figure 3. Millimetre- to centimetre-scale bedding in biotite psammite and semi-pelite. Note the small pebble-rich channel in the centre of the photograph. Two-dollar coin for scale.

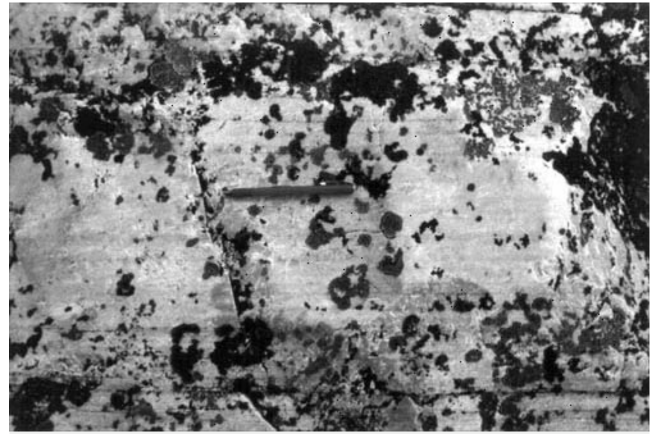

Figure 5. Millimetre- to decimetre-scale bedding in annealed quartz arenite on quartzite ridge (QR on Fig. 2) The thin, millimetre-scale bedding is defined by pale pink, hematite-stained heavy-mineral bands. Pencil magnet is 10 cm long.

Figure 4. Matrix-supported polymictic conglomerate with subangular clasts of quartzite and felsic to intermediate volcanic rock in an intermediate-composition matrix (locality c on Fig. 2). Two-dollar coin for scale.

Figure 6. Finely laminated, interlayered magnetite-quartz ((?)chert: oxide-facies) and garnetite-grunerite (silicate-facies) iron-formation of the Prince Albert Group. Two-dollar coin for scale.

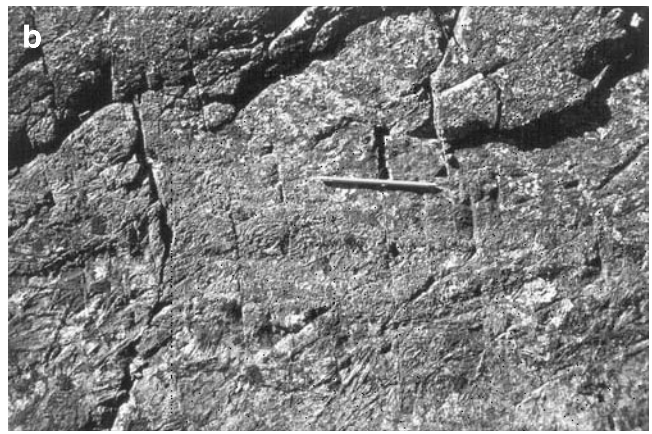

Figure 7. a) Well preserved komatiite exposed on a resistant ridge due west of the central tonalite (VTT on Fig. 2). Note the distinct banding separating spinifex (dark) from cumulate zones (light). **b**) Decimetre-scale remnant olivine spinifex developed in the upper zone of a komatiite flow. The pencil (12 cm) demarcates the spinifex from the overlying cumulate zone.

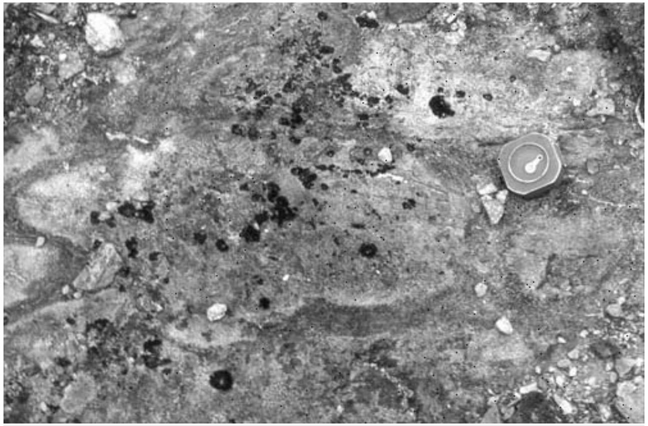

Figure 8. Rare pillows in a mafic volcanic flow exposed immediately north-northeast of the central tonalite (VTT on Fig. 2). Brunton compass for scale.

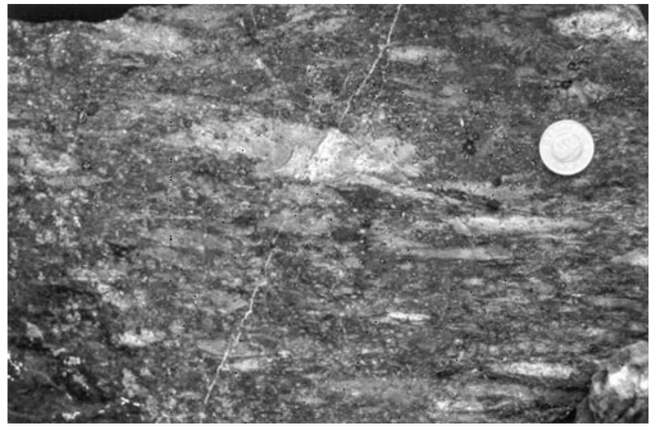

Figure 9. A felsic lithic tuff containing flattened felsic and intermediate volcanic fragments, northeastern supracrustal belt. Two-dollar coin for scale.

Figure 10. Metasedimentary diatexite or paragneiss of the Prince Albert Group comprising pinch and swell bands of muscovite+biotite granite (leucosome) with biotite+plagioclase±garnet±sillimanite melanosome. Note the crosscutting dyke of muscovite+biotite pegmatite. Hammer for scale is 1 m.

Figure 11. Steeply dipping, decimetre- to metre-scale, modal layering between anorthosite and gabbroic anorthosite of the Laughland Lake anorthosite suite.