GEOLOGY OF THE EASTERN HALF OF THE PETER SNOUT MAP AREA (11P/13E), NEWFOUNDLAND

by

S.J. O'Brien

INTRODUCTION

The Peter Snout (11P/13) map area is situated in southwestern Newfoundland. It contains elements of the Gander and Dunnage zones of the Appalachian orogen and it is underlain by lower to mid-Paleozoic rocks of the Hermitage Flexure belt.

Previous geological studies in the eastern half of 11P/13 include the 1:250,000 scale mapping of Riley (1959), the unpublished work of Buchans Mining Company, Hudson's Bay Oil and Gas, Shell Minerals and Falconbridge Nickel Mines Ltd., and the reconnaissance mapping and compilation of Smyth (1979). That part of the map area that lies to the west of Grandy's Brook was also mapped by Chorlton (1980a).

The area was extensively glaciated during the late Wisconsinian and evidence of this glaciation is ubiquitous. The Grandy's River valley is the most prominent glacial feature in the area. Elsewhere, the morphology of the region east of the valley is dominated by drumlins, ramps, sand ridges and *roches moutonées*.

The eastern half of the Peter Snout map area is traversed by part of a 160 km all weather, unpaved road (Route 480), which joins the community of Burgeo to the Trans Canada Highway (Route 1). Although the road provides access to much of the map area, aircraft support is needed in the more remote parts.

GEOLOGICAL SETTING

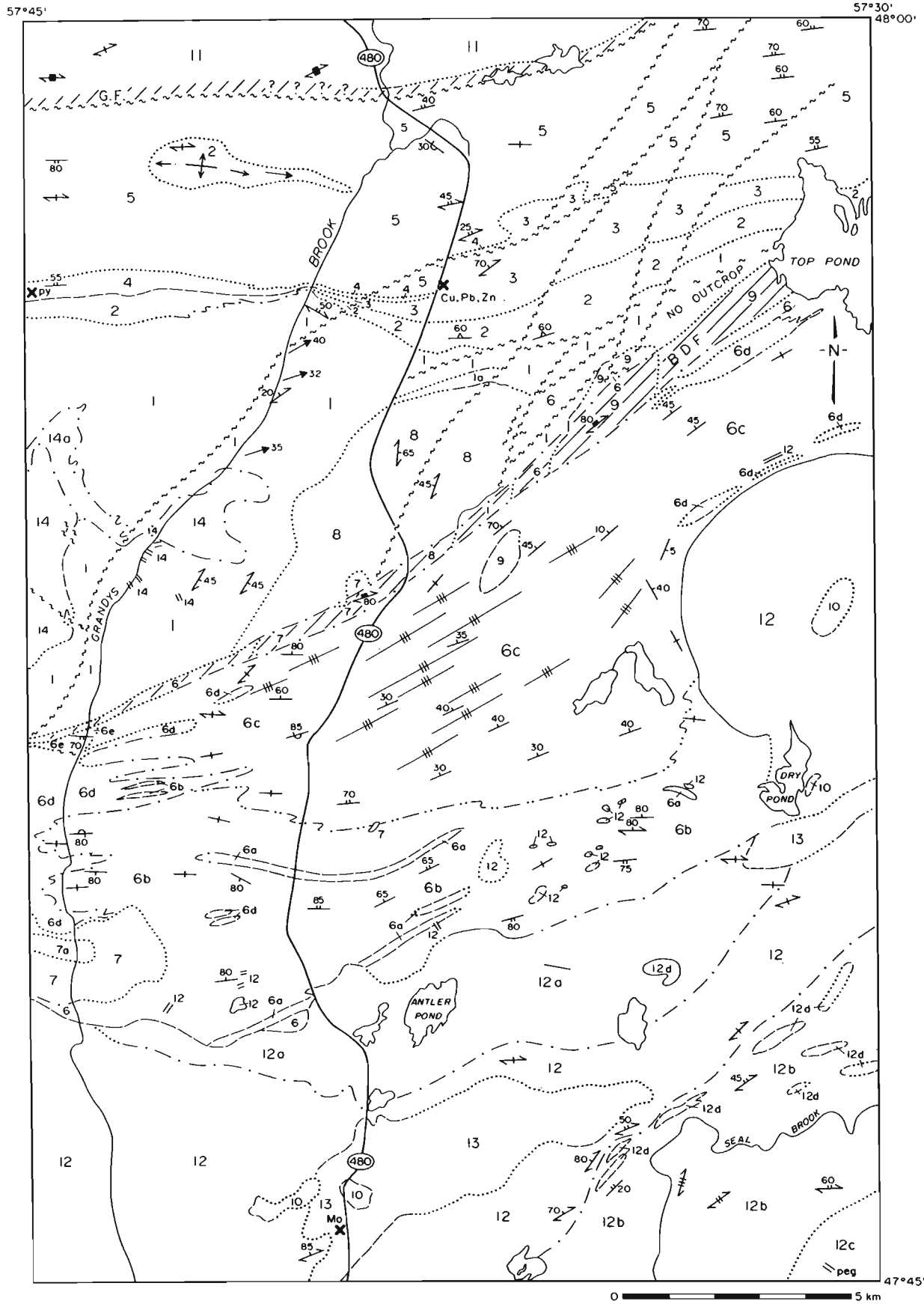
The eastern half of the Peter Snout map area is underlain by six major geological units of Lower Ordovician(?) to Devonian(?) age. With the exception of the late to post-tectonic granitoids, these units trend east-west to northeast across the map area. A northeast trending mylonite zone, the Bay d'Est Fault (Cooper, 1952), bisects the area. A marked contrast in facies development and metamorphic grade is evident across this fault.

North of the Bay d'Est Fault, the succession includes pyroclastic volcanics and marine sediments cut by foliated granitoid rocks. The volcanosedimentary rocks lie along strike from and are continuous with the Bay du Nord Group to the southeast (Cooper, 1954; Chorlton, 1980a, b). An east-west trending zone of mylonite, informally named the Gunflap Hills fault (Chorlton, pers. comm., 1982), separates the Bay du Nord Group to the south from the Buck Lake Granite (Kean and Jayasinghe, 1981). This granite underlies the northernmost part of the Peter Snout area and is continuous into the extensive granite/ migmatite terrane to the north (Kean and Jayasinghe, 1981). To the south, the Bay du Nord Group is in contact with foliated tonalite and a mylonitic feldspar megacrystic granite. The contact is not exposed but an intrusive relationship with Bay du Nord volcanics is probable. The Bay du Nord Group is post-tectonically intruded by the Peter Snout granite.

South of the Bay d'Est Fault, the succession includes weakly metamorphosed and relatively little deformed clastic rocks intruded by a late to post-tectonic intrusive suite. This clastic sequence is indicative of fluviatile and shallow marine deposition and contains major volcanic intercalations only in its easternmost and westernmost extent.

Contribution to Canada-Newfoundland co-operative mineral program 1982-84. Project carried out by Newfoundland Department of Mines and Energy.

Peter Snout Map Area *S.J. O'Brien*



DEVONIAN OR EARLIER

"PETER SNOUT GRANITE"

14 Pink muscovite-biotite and biotite, locally garnetiferous equigranular granite and associated aplite and pegmatite dykes. 14a: same as above but with numerous screens of Bay du Nord Group metasedimentary and metavolcanic rocks.

BURGEO BATHOLITH

13 Biotite poor, porphyritic to equigranular, medium to locally coarse grained granite and adamellite; porphyritic grey and pink garnetiferous aplite.

12 Coarse grained, pink and grey, coarse grained K-feldspar porphyritic biotite-rich granite, with subordinate amounts of biotite tonalite and rare granodiorite/adamellite; 12a: same as above, but with numerous screens and roof pendants of metasediment, migmatite and paragneiss; 12b: polydeformed medium and coarse grained, pink and grey porphyritic, locally recrystallized biotite granite; fine grained leucocratic granite; 12c: recrystallized and locally migmatitic fine grained leucogranitoid with numerous amphibolite inclusions and coarse grained pegmatite dykes; 12d: coarse grained biotite schist, paragneiss and migmatite.

BUCK LAKE GRANITE

11 Fine to medium grained equigranular biotite granite with local coarse grained porphyritic phases.

SILURIAN OR EARLIER

10 Fine to medium grained gabbro, diabase and related metabasic rocks.

9 Massive to predominantly mylonitic, pink feldspar porphyritic granitoid.

8 Medium grained hornblende (± biotite) rich, equigranular tonalite.

ORDOVICIAN OR EARLIER

ROTI GRANITE

7 Medium grained, grey to pink biotite (± rare muscovite); 7a: fine to medium grained gabbro.

LA POILE GROUP

6 Fine to medium grained, cross bedded feldspathic sandstone and conglomerate; 6a: angular, quartz pebble and quartz granule conglomerate; 6b: medium to coarse grained quartz arenite with subordinate feldspathic sandstone; 6c: thickly bedded, internally cross-laminated feldspathic and quartzofeldspathic arenite; rare granule conglomerate and quartz rich siltstone; 6d: ash flow tuffs and related epiclastic and pyroclastic rocks; 6e: massive to amygdaloidal mafic flows.

BAY DU NORD GROUP

5 Predominantly black and grey sandstone, siltstone, shale, slate and phyllite; rare granule to pebble conglomerate.

4 Feldspathic sandstone and bedded tuffs; black slate and phyllite.

3 Cobble to boulder conglomerate, black slate and phyllite, grey siltstone. Contains rare tuffaceous zones several metres above its base.

2 White, cream, grey and pink felsite, rhyolite and welded tuffs.

1 Predominantly felsic volcaniclastic rocks: ash flow tuff and rhyolite; biotite schist and related metavolcanic rocks of pyroclastic origin; 1a: gabbro boulder conglomerate.

These clastics are traceable along strike to the southeast into the volcano-sedimentary La Poile Group (Cooper, 1954) with which they are tentatively correlated. The La Poile Group sediments are intruded, essentially post-tectonically, by a variety of intrusive and other igneous rocks known collectively as the Burgeo Batholith. The batholith contains two major granitoid phases. Gabbroid rocks that occur as roof pendants within the batholith may be either intrusive in origin or related to ophiolitic gabbros exposed to the west (Chorlton, 1980a). Large metasedimentary screens and/or rafts are widespread through the coarse grained porphyritic phase of the batholith. Recrystallized granitoids in the southeastern extremity of the area may represent either early phases of the batholith or an older predeformed intrusion.

The succession to the north of the Bay d'Est Fault was metamorphosed under mid-greenschist to amphibolite facies conditions. Earliest recognizable structures are recumbent and these are refolded on generally upright axial planes. The La Poile Group has been metamorphosed under biotite grade greenschist facies conditions. Large scale folds are absent. Cordierite is developed in the thermal aureole of the Burgeo Batholith.

The ages of rocks in the Peter Snout area are unknown. The Bay du Nord Group volcanics to the southwest have been isotopically dated at 449 + 20 Ma (U/Pb zircon, reported in Chorlton, 1980b). The La Poile Group in the same area has been dated at 459 + 18 Ma (Rb/Sr isochron, reported in Chorlton, 1980b).

STRATIGRAPHY

Bay du Nord Group (Units 1 to 5)

The Bay du Nord Group was described by Cooper (1954) as a sequence of dominantly metasedimentary rocks exposed in two belts in La Poile Bay and Garia Bay on the southwest coast of Newfoundland. He included in the group a sequence of sedimentary rocks containing Devonian plant fossils (Dorf and Cooper, 1943). Chorlton (1980b) redefined the Bay du Nord Group, separating the fossil bearing sequence from the remaining belt of polydeformed and metamorphosed volcanic and sedimentary rocks, migmatites, amphibolites and subvolcanic granites. Chorlton extended the group northwestwards from La Poile Bay as far as the western half of the Peter Snout map area. The volcanic and sedimentary rocks and their metamorphic equivalents, which underlie much of the map area between the Bay d'Est and Gunflap Hill faults, form the northeastern extension of the Bay du Nord Group and are thus correlated with it.

In the eastern half of the Peter Snout area, the group is tentatively subdivided into five units. From base to top these include: a lower succession of ash flow tuffs and epiclastic rocks together with their metamorphic equivalents (1) with a distinctive gabbro boulder conglomerate (1a), felsite, rhyolite and densely welded tuff (2), bedded tuffs and graphitic phyllite (3) and an upper succession of black slate, phyllite, conglomerate and graphitic schist (4) and well bedded gray siltstone, shale and subordinate conglomerate (5).

The Bay du Nord Group is faulted against the La Poile Group and the Buck Lake granite, and is post-tectonically intruded by the Peter Snout granite. An intrusive contact between the Bay du Nord Group and tonalitic and granitic rocks of Units 8 and 9 is inferred. The Bay du Nord Group is interpreted to represent a facies variant and approximate time equivalent of the La Poile Group to the south (see below).

Unit 1

Unit 1a is a boulder conglomerate unit which locally separates the Bay du Nord Group volcanics from tonalite of

Unit 8. The conglomerate is interpreted to represent the lowest stratigraphic level of the Bay du Nord Group in the area.

The conglomerate has well rounded clasts, and is poorly sorted and polymict. Its diagnostic feature is the gabbroic detritus which, in places, forms up to 50% of a single outcrop ridge. The conglomerate also contains clasts of high level granitoid porphyry and a variety of diabasic and metabasic clasts. Several small clasts of probable trondhjemite composition were noted.

The conglomerate faces upwards into, but is faulted against welded and unwelded ash flows of Unit 1. The conglomerate is not traceable west of Route 480. Its maximum thickness is in the order of 100 m.

The extent of gabbroic detritus in the conglomerate may be interpreted as an indication of a gabbroic (ophiolitic?) substrate to the Bay du Nord Group in this area. In hand specimen, gabbroic clasts from Unit 1 are indistinguishable from the ophiolitic gabbros of the Blue Hills of Couteau, 15 to 20 km to the west.

The diagnostic rock types of the remainder of Unit 1 are pyroclastic and epiclastic volcanic rocks and their metamorphic equivalents. Massive flows are rare, and are exposed only in a narrow belt west of Route 480. The volcanism is almost exclusively felsic to intermediate (dacitic) in nature; less than 1% of the Bay du Nord Group volcanics in the area are of mafic composition.

The volcaniclastics are highly strained throughout and in most areas have been metamorphosed to streaky biotite schist. The biotite schists are lithic rich, quartz- and feldspar-phyric and they display a diagnostic ferromagnesian lineation. Pegmatite veins and tourmaline veinlets are common in exposures near the Bay d'Est Fault and adjacent to the Peter Snout granite (Unit 14). Pegmatitic patches are widespread throughout the belt.

The epiclastic rocks of Unit 1 are unseparated from the pyroclastic rocks at 1:50,000 scale. The epiclastics occur as small, discontinuous lentils within the tuffaceous units. Where strongly metamorphosed, these rocks have a pronounced biotite-defined banding.

Massive, densely welded tuffs are not readily identifiable in Unit 1. Many of the pyroclastic rocks, however, are tentatively interpreted to be of ash flow and possibly air fall origin.

Unit 2

Unit 2 forms the upper part of the Bay du Nord volcanic succession in the western part of the map area. The unit varies in lithology along strike, but is most commonly massive in nature, being dominated by felsite, rhyolite and welded tuff. It is best exposed in a south-flowing river in the northwestern corner of the area. Other exposures occur in Grandy's Brook and in one of its tributaries. A large antiformal structure at the Stag Ridges (Fig. 1) is underlain by gray, quartz-phyric tuffs which are tentatively assigned to Unit 2. The welded tuffs of Unit 2 are mostly crystal-lithic in composition and vary in grain size from lapilli to fine ash tuffs. The massive welded tuffs and rhyolites are quartz porphyritic; quartz has a diagnostic blue color and is present as ca. 1 mm phenocrysts. Feldspar crystals are 1 to 2 mm in length. The extent of the massive rhyolite is unclear as, in hand specimen, these rocks are often indistinguishable from densely welded tuffs.

Unit 3

In the eastern half of the map area, Unit 2 welded tuffs are succeeded to the north by a succession of bedded tuff, minor graphitic schist, and rhyolite tuff. Although it is tentatively inter-

preted to overlie Unit 2, Unit 3 may include within it unseparated parts of overlying and underlying units.

The bedded tuffs are planar bedded, feldspar-rich siliciclastics; a strong planar parting is diagnostic. The rhyolitic tuffs have a streaky appearance, but lack the metamorphic character of Unit 1. These tuffs are tectonically interleaved with minor amounts of graphitic pelite and phyllite.

Unit 4

Unit 4 forms the base of the Bay du Nord clastic succession. It disconformably overlies Unit 2 and its contact is defined by cobble to boulder conglomerate. The conglomerate contains a variety of felsic volcanic and high level intrusive clasts but no previously deformed detritus. It is not considered to represent a major structural break within the succession. Above the conglomerate, the succession is essentially entirely clastic; a 1 m thick tuffaceous bed occurs several metres above the basal conglomerate. The main rock types of Unit 4 are fine grained, pyritic black shale, slate and graphitic schist. East of Route 480, Unit 4 may be continuous into the tuffaceous feldspathic sandstone and phyllite of Unit 3, representing a time equivalent facies variant of the latter.

Unit 5

Unit 5 consists mainly of interbedded gray and black sandstone, siltstone, shale and their metamorphic equivalents. Granule to pebble conglomerate is relatively uncommon, and occurs only as thin beds. Some of the conglomerate units are of several hundreds of metres lateral extent. Unit 5 lies to the north of the main belt of Unit 4 and is interpreted to overlie it. This unit forms most of the Bay du Nord Group clastic succession within the area.

In areas of least deformation, the finer grained clastics are characterized by thin, regular and planar bedding; grading is only locally developed in the coarser siltstone beds. Coarse grained siltstones are interbedded with 1 to 5 mm shaly beds. The siltstones are parallel-laminated on a millimetre scale. Rare granule conglomerate forms beds of several millimetres to 50 cm thickness.

A significant boulder conglomerate bed occurs with the lower parts of Unit 5. The bed has a maximum thickness of approximately 4 m. The conglomerate is matrix-supported and unsorted, containing up to 70% shaly matrix. Clasts vary in size from <1 mm to approximately 20 cm; they are generally well rounded in section but are strongly flattened in the plane of foliation. The most prominent clasts are high level granophyre/granite, felsite and (?) volcanic rocks. At least one clast has a pronounced compositional banding. The most notable feature of this conglomerate is the abundance of clasts containing an early, locally cataclastic foliation. The significance of the clasts is discussed below.

La Poile Group (Unit 6)

Cooper (1954) first used the name La Poile Group to designate those volcanic and sedimentary rocks in the La Poile - Cinq Cerf area that lay to the south of the Bay d'Est Fault, and which were truncated against the Chetwynd Granite. Chorlton (1978) redefined the group, and extended it to the northeast dividing it into a sequence of volcanic and sedimentary rocks named the Georges Brook Formation and a subvolcanic pluton named the Roti Granite.

The dominantly sedimentary succession that underlies the part of the map area between the Burgeo Batholith and the Bay d'Est Fault forms the northeastern extension of the volcanosedimentary belt referred to by both Cooper (1954) and Chorlton (1980b) as the La Poile Group. Although these sediments are here considered to be a facies variant of the Bay du Nord Group, they do occur as a lithologically distinctive

unit within the map area. For the purposes of this report and until further study can ascertain its relationship to the Bay du Nord Group, the name La Poile Group will be retained to designate these rocks.

Unit 6

Unit 6 includes all the clastic rocks within the La Poile Group and constitutes approximately 90% of its outcrop area. It forms a west facing sequence that can be subdivided into several facies, some of which are of stratigraphic significance. In the eastern and western extremes of the map area, the clastics either interdigitate with or onlap the volcanic facies of the La Poile Group.

Units 6a and 6b together form the stratigraphically lower half of the clastic succession. Xenoliths and large roof pendants of these units are present within the Burgeo Batholith, up to 5 km south of the contact with the La Poile Group. Unit 6a occurs as two distinct bands within unit 6b.

The diagnostic rock types of Unit 6a are angular, poorly sorted, locally cross-bedded, quartz bearing granule and cobble/boulder conglomerate. Angular clasts of vein quartz, up to 15 cm in diameter, are supported by a quartz-rich sandy matrix. Between 80 and 90% of the detrital assemblage of this unit is vein quartz; other detritus includes rhyolite porphyry, leucocratic granophyre, diabase and sandstone.

Unit 6b consists of medium and coarse grained, blue quartz rich, immature arenaceous sandstone, pebbly sandstone and fine grained granule conglomerate. The sandstones include quartz arenite, feldspathic arenite and feldspathic lithic arenite. Unit 6b sandstones are massive to thickly bedded, internally cross-bedded and very rarely planar-bedded. The granule conglomerates contain clasts of quartz porphyritic biotite granite, pink equigranular granite, rhyolite, aplite, diabase and vein quartz.

Unit 6c overlies Units 6a and 6b and constitutes most of the upper half of the La Poile Group in this area. Its main rock type is gray, fine to medium grained feldspathic sandstone. It is finer grained, less quartz rich and more mature than the lower parts of the group and does not contain the thick conglomerate lenses and beds that are common elsewhere in Unit 6. It is extensively crossbedded; foresets are locally defined by detrital magnetite and more commonly by fine grained granule conglomerate. Planar bedding is locally developed in some of the upper parts of 6c. The beds display crude grading with parallel lamination development. The uppermost levels of 6c are quartz-rich but very fine grained and may be quartzite.

Unit 6d includes the felsic volcanic rocks of the La Poile Group. These are almost exclusively volcaniclastic in nature and mainly restricted to the easternmost part of the La Poile Group where they interdigitate with immature arenites and conglomerates of Unit 6b. To the west the volcanic facies of 6d grades into the clastic facies of 6b. Further to the west on 11P/13W, the volcanic facies predominates (Chorlton, 1980a); there, volcanic centres within the La Poile Group have been identified (Chorlton, pers. comm., 1979).

The main rock types in Unit 6d are ash flow tuffs and lahars and related epiclastic rocks. The ash flows are welded, quartz phyric and of apparent rhyolitic and rhyodacitic composition. They are associated with a sequence of laharic breccias, which fine rapidly eastwards. These are presumably related to volcanic activity to the west, where the ash flow tuffs predominate. The welded ash flows are not extensively developed to the east of Grandy's Brook where the volcanics are either of air

fall pyroclastic or epiclastic origin. These may represent the distal facies variants of the lahars to the west.

Unit 6e exclusively consists of mafic volcanic rocks and related hypabyssal intrusives. The flows are feldspar porphyritic and locally coarsely amygdaloidal, and are locally intruded by massive metabasic rocks.

Intrusive Rocks

Unit 7

Unit 7 forms the eastern extension of the Roti Granite of Chorlton (1980a). In the western half of the Peter Snout area, the Roti Granite is intrusive into the La Poile Group but also occurs as a major detrital component within the sedimentary succession of the group. In view of this relationship, Chorlton (1979) has interpreted the granite as a subvolcanic pluton, genetically related to La Poile Group volcanism.

In the map area, Unit 7 intrudes both the clastic (6b) and volcanic (6d) facies of the La Poile Group. The main phase of the granite is gray to pink, medium grained, equigranular biotite granite. A small gabbroic intrusion (7a) is exposed within the boundaries of the granite; its relation to the Roti Granite is unclear.

Unit 8

Unit 8 is a black and white, medium grained, equigranular hornblende biotite tonalite. It occurs within and to the north of the Bay d'Est Fault and is interpreted to intrude syntectonically the Bay du Nord Group. Nevertheless, little evidence of an intrusive contact remains exposed. The tonalite is foliated in most areas and is mylonitized along the Bay d'Est Fault. It contains cognate xenoliths of granodiorite and diorite and accidental xenoliths of gabbro. The tonalite is cut by gray aplite and more rarely by metabasic dikes.

Unit 9

Unit 9 is a pink, K-feldspar porphyritic, fine grained granite that occurs as two separate intrusions within and to the south of the Bay d'Est Fault. It intrudes both the Bay du Nord and the La Poile Groups and is extensively mylonitized along the Bay d'Est Fault. It contains zones of mylonitic felsic volcanics within its boundaries.

Unit 10

Unit 10 includes all gabbroic rocks within the map area, other than those associated with the Roti Granite. The gabbros occur in four separate areas, all as roof pendants within the "Burgeo Batholith". They are medium to coarse grained, massive to foliated, altered and hornblende bearing. It is unclear at present whether the gabbroic rocks are intrusive in nature or related to the ophiolitic gabbro terrane to the west (cf. Chorlton, 1980a). If the latter is the case in this area, then these gabbros would represent the oldest succession within the area.

Unit 11

Unit 11 is a granitoid intrusive that underlies that part of the map area north of the Gunflap Hill fault. It forms the southern extension of the Buck Lake granite of Kean and Jayasinghe (1981). It is faulted against the Bay du Nord Group along the Gunflap Hill fault. Unit 11 consists primarily of fine to medium grained biotite granite. A coarse grained porphyritic granite phase occurs in the northern extremity of the area; this phase is much more extensive to the north (Kean and Jayasinghe, 1981) where it represents the main phase of the Buck Lake granite. The granite is strongly mylonitized along the Gunflap Hill fault.

"Burgeo Batholith"

The informal name "Burgeo Batholith" was used by Williams (1978) to designate the large granitoid terrane which

extends from Connoire Bay to La Hune Bay, on the south coast of Newfoundland. For the purposes of this report, that name is retained for the late to post-tectonic intrusive suite, which underlies the southern parts of the area. In the map area, the "Burgeo Batholith" can be divided into two major phases.

Unit 12

The major rock type of Unit 12 is massive, coarse grained, biotite-rich, K-feldspar porphyritic granite. The granite is characterized by euhedral and subhedral orthoclase phenocrysts up to 6 cm in length. This phase is predominantly biotite-rich but it does contain irregularly shaped biotite-poor zones. Small areas of biotite tonalite are also included in Unit 12. The tonalite is equigranular, coarse grained and dark gray. Unit 12 granitoids are cut by numerous pink and gray, quartz porphyritic aplite dikes; dikes of more mafic composition are rare.

Unit 12a differs from Unit 12 only in that it contains numerous xenoliths, screens and roof pendants of La Poile Group metasediment and related migmatite.

Unit 12b consists of deformed granitoid with extensive zones of metasediment. It is interpreted as being gradational into Unit 12. The main rock type is a highly strained, coarse grained feldspar porphyritic granite. The granite is gradational into zones of finer grained granitoid and aplite. The finer grained granitoid is in places recrystallized.

Unit 12c underlies the southeastern-most corner of the map area. It consists of a fine grained, recrystallized, predominantly leucocratic granitoid with numerous, small amphibolite and metasediment xenoliths. Its relation to the remainder of the Burgeo Batholith is unclear. It is presumed to be relatively older than the other Unit 12 granitoids but its absolute age is unknown. Unit 12c is cut by numerous pegmatite dikes.

Unit 12d includes the metasedimentary xenoliths that are present in Unit 12b. The metasediments occur in northeasterly elongated roof pendants, the largest of which is approximately 1 km in length. The protolith of these rocks is considered to be, in part, La Poile Group clastics. The major rock types in the roof pendants are coarse grained biotite-schist and banded migmatite.

Unit 13

Unit 13 consists of pink, coarse grained, equigranular to slightly porphyritic, biotite-poor granite and pink, garnetiferous, quartz porphyritic aplite. In most areas, Unit 13 is clearly intrusive into Unit 12, but locally the contact appears to be gradational.

Unit 14 (Peter Snout granite)

Unit 14 contains fine and medium grained pink, equigranular, biotite $\pm$ muscovite granite. It post-tectonically intrudes the Bay du Nord Group; the contact with adjacent volcanics is exceptionally diffuse and irregular. The granite contains small irregularly shaped zones of more tonalitic composition and numerous muscovite-bearing garnetiferous pegmatites.

STRUCTURAL AND METAMORPHIC EVENTS

The Bay d'Est and Gunflap Hills faults divide the region into three belts of contrasting structural and metamorphic style.

The northerly and least extensive of the belts is characterized by cataclastic fabrics and extensive migmatization. The migmatites are not exposed in the Peter Snout map area, but are extensively developed in the northerly adjacent King George IV Lake map area. This belt is interpreted to represent deeper structural levels of the Bay du Nord Group than are exposed to the south.

The succession between the Gunflap Hills and Bay d'Est Faults has been polydeformed and metamorphosed under amphibolite facies conditions. The characteristic migmatites of the northern belt are absent. Evidence of earliest deformation is preserved in the predeformed detritus in the conglomerates of Unit 5 of the Bay du Nord Group. The extent and nature of this early deformation is uncertain. There is no structural break between the Bay du Nord Group sediments and the underlying volcanics, and the basal conglomerate of the sedimentary sequence contains no previously deformed volcanic or plutonic detritus. It is suggested that the predeformed clasts are related to localized synvolcanic tectonism, active during evolution of the Bay du Nord volcanic arc.

The Bay du Nord Group has been affected by early recumbent structures that have been refolded on upright northeast trending axes. The prominent structural feature of the lower, volcanic units of the group is a northeasterly trending shallow to moderately northeast plunging lineation.

The succession to the south of the Bay d'Est Fault has been openly folded and metamorphosed under greenschist facies metamorphic conditions prior to the intrusion of the Burgeo Batholith. Both the La Poile Group and the Burgeo Batholith have been affected by late faulting and shearing. Within the Burgeo Batholith, a progressive increase in deformation towards the southwest is evident. This presumably is related to either late and/or inhomogeneous deformation, although older granitoids may be present in that area.

The Bay d'Est Fault (Cooper, 1954) is a major mylonite zone in this map area and it juxtaposes amphibolite facies volcanics of the Bay du Nord Group against greenschist facies sediments of the La Poile Group. The fault is a high angle reverse structure. In the map area, the facies contrast across the fault is obvious; however, facies similar to the La Poile Group do occur on its northern side. Further to the southwest, volcanic and sedimentary facies have been traced across the structure (Chorlton, 1980a).

The Gunflap Hill fault is a late high angle reverse fault that postdates the deformations in the Bay du Nord Group. Like the Bay d'Est Fault, it has a pronounced cataclastic fabric. Chorlton (1980a, pers. comm., 1982) has shown the fault to be a splay of the Cape Ray Fault.

MINERAL EXPLORATION POTENTIAL

The potential for the discovery of significant mineralization within the map area is high. Possible exploration targets are base metals, uranium and molybdenum.

The Bay du Nord Group represents the southern extension of the central Newfoundland island arc (Chorlton, 1980), and thus should be seriously considered as favourable for massive sulfide exploration. Furthermore, the fine grained rocks in the upper parts of the Group are a potential target in the exploration for sediment-hosted sulfide deposits. Examples of both styles of mineralization have been documented within the Bay du Nord belt. The volcanic facies of the La Poile Group, of minor extent in the map area, has a similar potential for massive sulfides.

Known uranium showings in the western half of the Peter Snout area lie within the western extension of the Bay du Nord Group. The stratiform nature of at least two of these showings makes the Bay du Nord Group an excellent exploration area for volcanogenic uranium mineralization. The two-mica granites of Unit 14 are also potential targets for uranium and other rare element mineralization.

Much of the Burgeo Batholith is of little economic interest at present. Molybdenite mineralization is known within fine grained granite and aplite

of Unit 13. Pegmatite dikes within the batholith may also be of some economic interest.

ACKNOWLEDGEMENTS

The author thanks Mr. Richard Lushman and Mr. Jacob Lushman for their capable and cheerful assistance in the field. The manuscript was reviewed by W.L. Dickson and B.F. Kean.

REFERENCES

Chorlton, L.B.
1980a: Notes on the geology of Peter Snout (11P/13, west half), Newfoundland, and accompanying Map 80201. Newfoundland Department of Mines and Energy, Mineral Development Division, Map 80201 with marginal notes.

1980b: Geology of the La Poile River map area (110/16), Newfoundland. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 80-3, 85 pages.

Cooper, J.R.
1954: The La Poile - Cinq Cerf map area, Newfoundland. Geological Survey of Canada, Memoir 256, 62 pages.

Dorf, E. and Cooper, J.R.
1943: Early Devonian plant fossils from Newfoundland. Journal of Paleontology, Volume 17, pages 264-270.

Kean, B.F. and Jayasinghe, N.
1981: Geology of King George IV map area, Newfoundland. *In* Current Research. *Edited by* C.F. O'Driscoll and R.V. Gibbons, Newfoundland Department of Mines and Energy, Mineral Development Division, Report 81-1, pages 32-39.

Riley, G.C.
1959: Burgeo - Ramea, Newfoundland. Geological Survey of Canada, Map 22-1959.

Smyth, W.R.
1979: Peter Snout, Newfoundland. Newfoundland Department of Mines and Energy, Mineral Development Division, Open File Map 7952.

Williams, H.
1978: Tectonolithofacies map of the Appalachian Orogen. Memorial University of Newfoundland, Map 1.