GEOLOGY OF THE BURGEO MAP AREA (11P/12), SOUTHWESTERN NEWFOUNDLAND

by

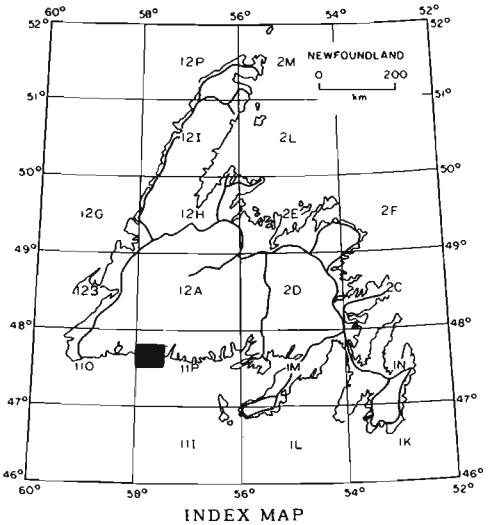
S.J. O'Brien and S.L. Tomlin
Newfoundland Mapping Section

ABSTRACT

The Burgeo map area lies within the southwestern segment of the Hermitage Flexure of the Newfoundland Appalachians. The area is underlain primarily by granitoid rocks of the synkinematic Burgeo granite and the late to posttectonic Chetwynd granite. Both plutons contain zones of earlier migmatite whose protoliths include sedimentary rocks of the mid-Ordovician Bay du Nord Group and gabbros of equivocal age and origin. The Burgeo granite is an extensive early to mid-Silurian, synkinematic, composite, granitoid pluton. Its earliest intrusive phases are diorite and xenolith-rich K-feldspar porphyritic granodiorite; subsequent phases are more granitic in composition. Field relationships indicate that magmatism produced distinct, albeit temporally overlapping, phases. The Chetwynd granite is a high level, siliceous granitoid that intruded the Burgeo granite after the culmination of the regional tectonothermal event. It has untested potential for economic concentrations of F-Sn-W-Mo and U.

INTRODUCTION

The Burgeo map area (Figure 1), bounded by north latitudes 47°30' and 47°45' and west longitudes 57°30' and 58°00', is centred approximately 8 km west of Burgeo, on the southwest coast of Newfoundland. Most of the Burgeo map area east of Grandy's Brook is accessible via route 480, a partially paved highway, which bisects the map area. The area west of Grandy's Brook is in part accessible from the coast; ready access to the remainder requires aircraft support.



INDEX MAP

Figure 1: *Location of the study area.*

Physiographically, the area forms part of the "Atlantic Uplands" of Twenhofel and McClintock (1940), and is characterized by a dissected peneplain surface marked by monadnocks at approximately 330 m to 350 m. Evidence of the Wisconsin glaciation is found in the wide variety of depositional and erosional glacial landforms and features. Geological control of topography is evident in the topographic contrast between areas underlain by the Burgeo and Chetwynd granites. Much of the area underlain by porphyritic phases of the Burgeo granite has an irregular, rugged topography, which southwards is further dissected by fault controlled valleys and gorges. In contrast the mainly equigranular Chetwynd granite and the lithologically similar parts of the Burgeo granite are characterized by a gentle, more rolling topography.

Previous systematic geological studies in the Burgeo area include the 1:250,000 scale mapping of Riley (1959); regional reconnaissance mapping was carried out by the Buchans Mining Company (Scott and Conn, 1950) and a 1:50,000 scale compilation of this work was published by Smyth (1979). Regional lake sediment geochemical studies by the Newfoundland Department of Mines and Energy (Butler and Davenport, 1980) led to follow-up exploration by Shell Canada Resources Ltd. and Falconbridge Nickel Co. Ltd. (Barry et al., 1981). Airborne gamma-ray spectrometric surveys of the region were carried out by the Geological Survey of Canada in 1984.

GENERAL GEOLOGY

The Burgeo map area is underlain by granite and migmatite, part of the Hermitage Flexure (Williams et al., 1970) of the southern Newfoundland Appalachians. The area contains three major geological elements:

1. An Ordovician or earlier suite of metasediment, paragneiss and migmatite,

This project is a contribution to the Canada-Newfoundland Mineral Development Agreement.

2. The Burgeo granite, a large Silurian (?), mostly synkinematic, lithologically diverse pluton of mainly granodioritic to granitic composition, and

3. The Chetwynd granite, a Devonian (?), essentially posttectonic, high level, quartz rich pluton.

MIGMATITES AND METASEDIMENTARY ROCKS (Units 1 and 2)

These rocks include the migmatites, agmatites, metasedimentary rocks and paragneisses that are intruded by and form xenoliths within the Burgeo granite and, to a lesser degree, within the Chetwynd granite. Unit 1 consists mainly of migmatite and agmatite with amphibolite and minor paragneiss. Unit 2 is generally of metasedimentary origin but contains minor amphibolite.

Unit 1

Migmatite and agmatite of Unit 1 are exposed mainly along a 2 km wide coastal strip west of Burgeo, underlying much of the Sandbanks and the eastern part of the Big Barasway (Figure 2). A diagnostic feature of Unit 1 migmatite is that it forms well rounded, albeit knobby, gray weathering exposures that are largely devoid of any vegetation. Rocks of Unit 1 display a random gradation between agmatite and migmatite. The agmatites consist of dark green and gray to black, either massive or banded gabbro and diorite xenoliths in a granitoid host (Plate 1). The The orientation of banding within the blocks varies widely from that which is developed in the surrounding granitoid. The granitoid is mainly equigranular but locally contains rare feldspar phenocrysts, and has a weakly developed to pronounced banding. The blocks are either flattened or subrounded to rounded and rarely angular; they range from a few centimetres to approximately 2 m in maximum dimension (Plate 2). Within the agmatite, the proportion of matrix to inclusion is highly variable, and the inclusions show varying degrees of migmatization or assimilation into the granitoid matrix (Plates 3 and 4). The true migmatites display raft textures, together with nebulitic and schlieren structures. Commonly, these migmatites are irregularly layered into biotite ± hornblende rich bands and granitoid bands. Orientation of the banding is quite variable. The banding itself is variably developed and the migmatite leucosome may be either gneissic or nebulitic and, locally massive (Plate 5). In the nebulitic migmatite good equigranular texture is preserved; grain size is variable but usually about 1-2 mm. Very rarely, the granitoid contains isolated feldspar phenocrysts. Locally, the migmatite is cut by posttectonic coarse grained, muscovite rich, granitoid pegmatite.

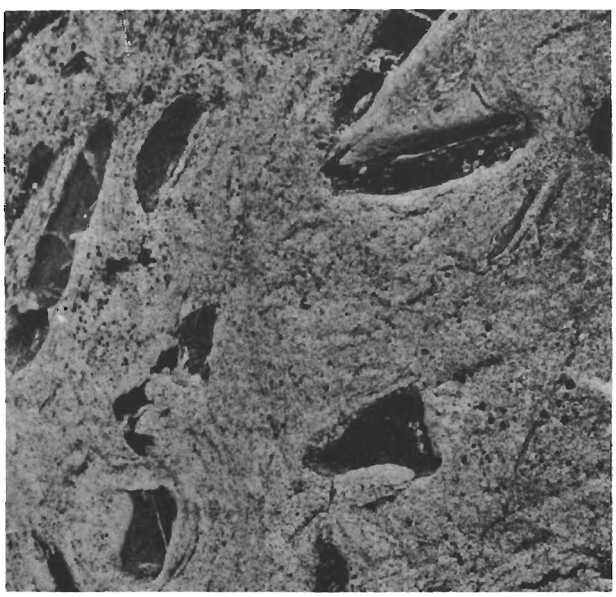


Plate 1: *Gabbroic xenoliths in agmatite of Unit 1.*

Plate 2: *Large xenolith of banded gabbro, Unit 1.*

Unit 1a consists of the migmatite and agmatite which underlies an area of about 7 km^2 near the Wolf Hills, approximately 6 km north of Burgeo. The migmatite is designated as a separate subunit because it contains irregularly shaped and sized rafts and xenoliths of paragneiss, as well as amphibolite and gabbro. The migmatitic granitoid is well banded or nebulitic, and contains irregular shaped zones with a

LEGEND

PLEISTOCENE TO RECENT

12 *Unconsolidated sand and cobbles.*

DEVONIAN AND EARLIER

11 *Fine and medium grained diabase.*

10 *Pink, quartz-feldspar porphyry.*

CHETWYND GRANITE

9 *Pink, fine grained, equigranular or quartz porphyritic granite: coarse grained equigranular granite and minor K-feldspar porphyritic granite; 9a, pink equigranular granite with screens of rhyolite tuff.*

BURGEO GRANITE (Units 3 to 8)

8 *Pale pink to white, fine to locally coarse grained, equigranular biotite ± muscovite, rarely garnetiferous granite and adamellite; minor aplite; 8a, dark grey, foliated, equigranular biotite ± muscovite granite and granodiorite.*

7 *Pink, orange and red, coarse grained porphyritic adamellite and granite.*

6 *Pink, medium and coarse grained, phenocryst rich, K-feldspar porphyritic granite; 6a, aplite.*

5 *Grey and pale pink, variably porphyritic granite and adamellite; minor aplite; 5a, unseparated variably porphyritic and equigranular granite.*

4 *Grey, white and pale pink, foliated, coarse grained, K-feldspar porphyritic, xenolith bearing granodiorite; minor adamellite; 4a, xenolith rich porphyritic granodiorite; 4b, pink aplite; 4c, granite pegmatite.*

3 *Dark green and grey, fine to medium grained diorite; minor agmatite.*

ORDOVICIAN(?)

2 *Migmatized semi-pelitic schist; paragneiss; amphibolite; granite migmatite.*

1 *Migmatite, including agmatite, and associated granitoid; 1a, migmatite, biotite schist, amphibolite and metadiorite; minor peletic schist; 1b, grey migmatic to equigranular granitoid.*

Plate 3: *Partially assimilated diorite xenolith in migmatite of Unit 1.*

Plate 4: *Remnants of metabasic xenolith in migmatite of Unit 1.*

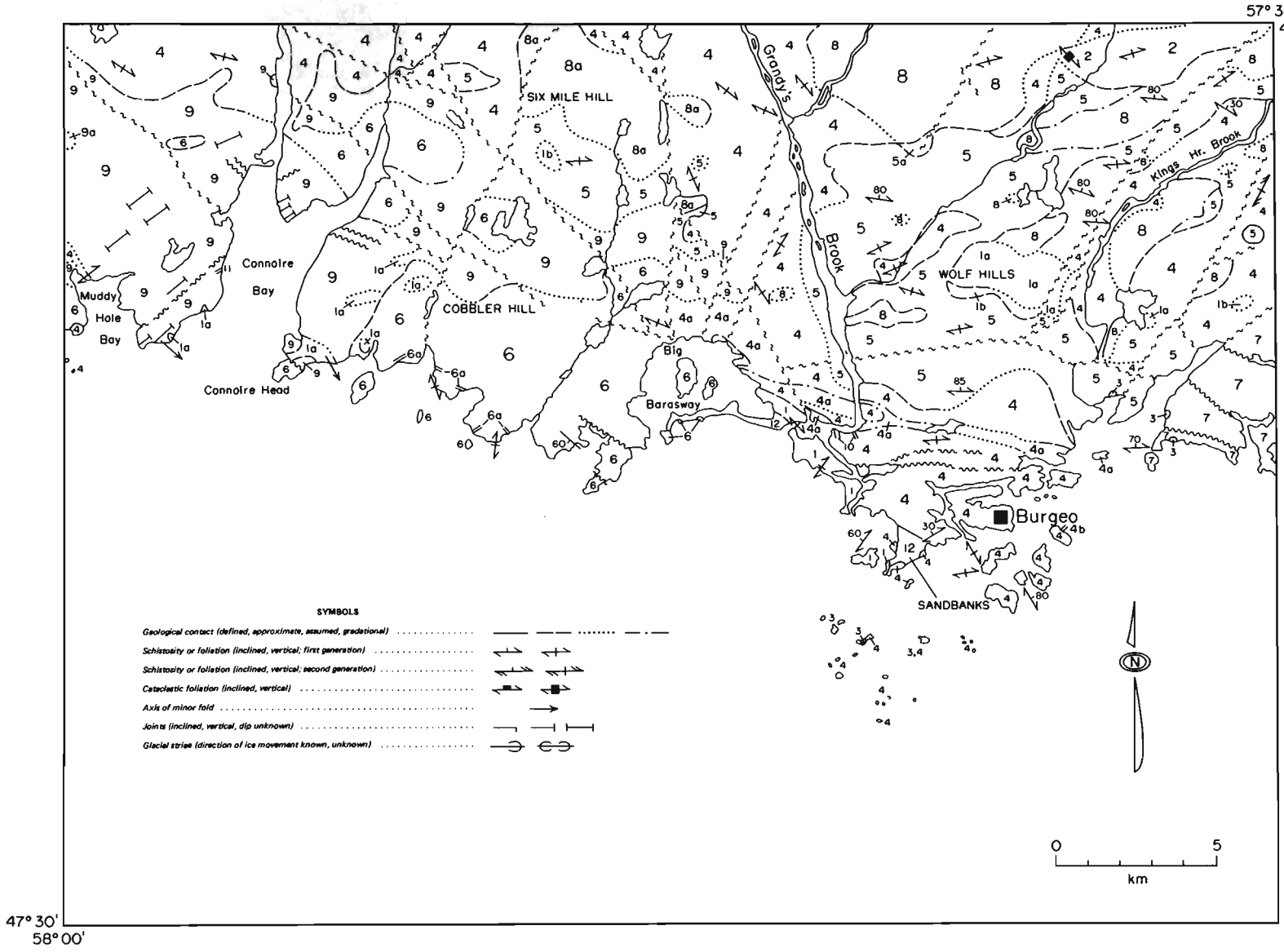


Figure 2: *Geology of the Burgeo Map area, southwestern Newfoundland.*

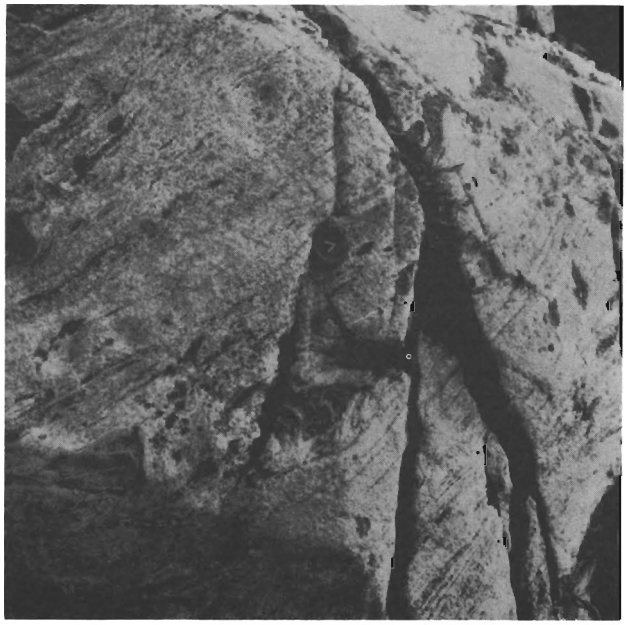


Plate 5: *Banding in leucosome of Unit 1 migmatite.*

Plate 6: *Migmatized metasedimentary raft in the Chetwynd granite.*

coarser grain size than that of the surrounding rock. As is the case with Unit 1, migmatites of Unit 1a are cut by post-tectonic muscovite-bearing granite pegmatite dikes.

Unit 1b consists of fine to medium grained, gray, mainly equigranular to nebulitic granite, which borders Unit 1a to the south. It grades northwards into Unit 1a migmatite.

Unit 2

Unit 2 is a poorly exposed zone of metasedimentary rocks, granite and migmatite that is surrounded by equigranular and porphyritic phases of the Burgeo granite in the northeasternmost corner of the Burgeo map area. Similar metasedimentary migmatite occurs as inclusions in the Chetwynd granite, east of Connoire Bay. It consists of biotite schist associated with amphibolite, variably migmatized semipelite and associated psammite (Plate 6). Associated with, but not in contact with the metasediments, is a cataclastically foliated, locally migmatitic granitoid, containing xenoliths of paragneiss and amphibolite.

The origin of Unit 2 and its relationship to Unit 1 are uncertain. The migmatites and the metasedimentary rocks are probably equivalent to either the Ordovician La Poile or Bay du Nord Groups, exposed nearby (O'Brien, 1983; O'Brien and Tomlin, 1984; Blackwood, 1984). Presumably, the paragneiss has a similar protolith.

Burgeo granite (Units 3,4,5,6,7,8)

The Burgeo granite is a new name that is informally proposed to denote the large (approximately 3,000 km^2), roughly semicircular shaped, synkinematic granitoid pluton in southwestern Newfoundland, which is exposed between Connoire Bay and La Hune and whose northernmost extension lies near Top Pond (approximately 47°56' latitude). The new name Burgeo granite replaces the previously used name Burgeo Batholith (Williams, 1978; O'Brien, 1983; O'Brien and Tomlin, 1984).

U/Pb isotopic studies on the Burgeo granite are ongoing; finalized data are not available at the time of writing, but an early to mid-Silurian age is indicated by preliminary results (Krogh, personal communication, 1984).

The Burgeo granite underlies approximately 340 km^2 in the Burgeo map area, and represents almost 75 percent of the total land area there. On the basis of texture, lithology and field relationships, the granite has been divided into six distinctive phases. In order of decreasing age these include: fine and medium grained diorite (Unit 3), foliated, coarse grained porphyritic granodiorite (Unit 4), foliated, variably porphyritic granite and adamellite (Unit 5), locally foliated, pink, phenocryst rich, biotite granite (Unit 6), locally foliated, red, coarse grained, porphyritic adamellite and granite (Unit 7), and foliated and massive equi-

granular biotite ± muscovite granite (Unit 8).

Unit 3

Unit 3 is the least extensive phase of the Burgeo granite, underlying a total exposed area of less than 0.5 km^2. The unit is best exposed on several islands southwest of Burgeo. It consists of dark green and gray, fine to medium grained hornblende diorite. Near its contacts with porphyritic granodiorite (Unit 4), the diorite is agmatized.

The unit is not in contact with either of units 1 or 2, and the relationship between the diorite and the migmatites is unknown. Diorite underlies a small island several metres away from exposures of Unit 1 migmatite. If this diorite is part of Unit 3, then the close spatial association may indicate that the diorite and migmatites are related. Alternatively, it may be a large block within the agmatites, genetically unrelated to the later diorite of Unit 3.

Unit 4

Unit 4 is the most extensive phase of the Burgeo granite, constituting approximately 50 percent of the granite's area. Well exposed throughout, it underlies much of the area north of Connoire Bay, the area in and around Kings Harbour Brook, the area north and east of Big Barasway, and in and around the community of Burgeo.

Unit 4 contains a distinctive, xenolith-rich phase (subunit 4a). Pink aplite (4b) and granite pegmatite (4c) dikes are widespread and diagnostic of the unit.

Unit 4 consists mainly of biotite rich granodiorite and minor amounts of adamellite, which form characteristically knobby, white or gray weathering exposures. The granodiorite is either light to dark gray, mottled black and white, or pale red, with either white or pink phenocrysts (Plate 7). It is generally porphyritic, with 2-4 cm subhedral K-feldspar phenocrysts in a quartz, plagioclase, biotite ± sphene ± rare hornblende groundmass. Biotite is a major component, locally constituting up to 40% of the mode. The groundmass grain size is variable and gradationally between 2 mm and 1 cm. The proportion of phenocrysts to matrix is variable, with phenocrysts constituting between 10% and 30% of the rock. Rarely the granodiorite is essentially free of phenocrysts. Chloritized biotite, cloudy quartz and sericitized feldspar are typical alteration features. Unit 4 granodiorites and adamellites are either xenolith free or contain up to 5% xenoliths of either diorite, quartz diorite or gabbro. It is also weakly to strongly foliated, locally displaying a cataclastic fabric.

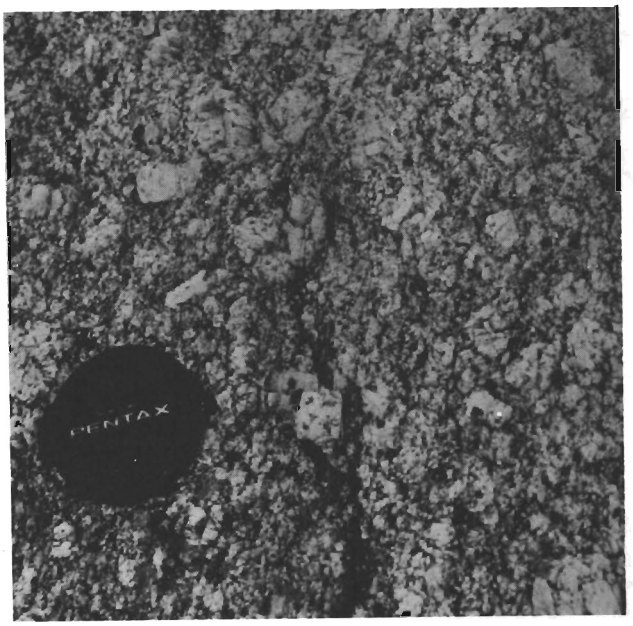


Plate 7: *K-feldspar porphyritic granodiorite, Unit 4 of the Burgeo granite.*

Unit 4a is a coarse grained, porphyritic granodiorite rich in mafic xenoliths. It forms a 0.5 to 1.0 km, roughly east-west trending zone within Unit 4 granodiorite; its contact with that phase is gradational. With the exception of the xenoliths, it is lithologically the same as Unit 4. The phase contains from 5 to 50 percent, characteristically flattened, gabbro, diorite and quartz diorite xenoliths from a few centimetres to 1 metre in length (Plate 8). While most xenoliths have sharp, rounded boundaries, some are partially assimilated into the granodiorite.

Plate 8: *Xenolith-rich granodiorite, Unit 4a of the Burgeo granite. Width of field of view is approximately 10 m.*

Units 4b and 4c are composed of dikes of aplite and pegmatite respectively, which intrude units 4 and 4a. The aplite is pink, fine grained and rarely quartz porphyritic, commonly sheared or brecciated, and form both distinct dikes and network vein systems. The pegmatite is composed of quartz and K-feldspar, with or without plagioclase, muscovite and biotite. They form pegmatitic or monomineralic segregations, veinlets and sharply bounded dikes.

Units 4 and 4a show both intrusive and gradational relationships with Units 1 and 1a and are intrusive into Units 2 and 3. The contact between Unit 4 and Unit 1 migmatite near Grandy's Brook is locally represented by a zone, several tens of metres wide, where the migmatite is cut by dikes and variably shaped plugs of porphyritic granite. In the same area, however, the granodiorite contains partially assimilated magnetite rich metabasic xenoliths near the contact. The granodiorite is gradational with finer grained, recrystallized, equigranular granitoid, similar to the migmatitic granitoids of Unit 1. This zone appears gradational into inclusion rich migmatite of Unit 1. The gradational nature of the contact between the granite and the migmatite suggests that migmatite formation and early plutonism are essentially contemporaneous, and that the migmatites may represent deep levels of the Burgeo granite.

The contact between Units 4 and 1a is marked by a hybrid zone of granodiorite, nebulitic migmatite and equigranular granite. The granodiorite locally grades into nebulitic granitoid migmatite (orthogneiss) over a distance of 1 m.

The contact between Units 4 and 2 is sharp and intrusive in nature. The contact of units 4 and 3 is similar, and is locally marked by a narrow (approximately 10 m) zone of agmatite.

Unit 5

Unit 5 is a granite-adamellite phase which is spatially associated with Unit 4. Unit 5 intrudes Unit 4 in most areas, but locally the contact is gradational. This phase includes equigranular biotite rich adamellite, equigranular granite, variably porphyritic granite and adamellite, and dikes of aplite and fine grained leucocratic adamellite. It differs from Unit 4 in that it: (1) is lithologically more diverse; (2) is more granitic in composition; (3) is either equigranular or more sparsely porphyritic; (4) generally contains less biotite; and (5) contains fewer xenoliths. Typical exposures are gray, pale pink or pale red and lack the knobby appearance of Unit 4. Porphyritic varieties usually contain either between 1 and 5 percent or 10 and 15 percent phenocrysts; rarely, up to 40 percent phenocrysts have been noted. The phenocrysts vary from 0.5 cm to 2 cm in length and are irregularly dispersed in a fine to medium grained groundmass of quartz plus K-feldspar, with or without biotite, sphene and rare muscovite. On average the unit is less melanocratic than Unit 4, with 3 percent to 5 percent biotite being characteristic. Equigranular varieties are medium to coarse grained and in many places are gradational into porphyritic granite. Locally the granite is more biotite rich, containing small (less than 50 cm^2) cognate zones of quartz diorite and tonalite. Unit 5 is pervasively foliated and metamorphosed.

Dikes of sparsely porphyritic aplite and granite, presumably related to Unit 5, cut porphyritic granodiorite of Unit 4. In other areas the contact appears to be gradational, and is based largely on a gradual decrease in phenocryst population from Unit 4 into Unit 5.

Unit 6

Unit 6 is a phenocryst-rich granite phase of the Burgeo granite, tentatively interpreted to be partly equivalent in age to Unit 5. It is exposed along the coast between Connoire Head and Big Barasway, northwards to Cobbler Hill, and in isolated stocks near Muddy Hole Bay and northeast of Connoire Bay. The granite is mainly medium to coarse grained, porphyritic, biotite-bearing and characteristically rich in euhedral, equant, 1-2 cm K-feldspar phenocrysts (Plate 9). It is pink or red, with diagnositc pink or pink and white, rapikivi-textured K-feldspar phenocrysts.

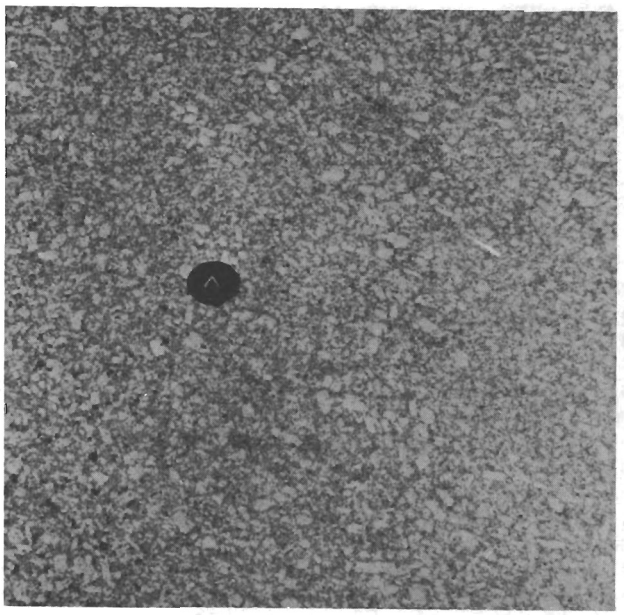


Plate 9: *K-feldspar porphyritic granite, Unit 6 of the Burgeo granite.*

Locally, textural variations occur, and the porphyritic phase is gradational into smaller zones of coarse grained equigranular granite. Pink, fine grained, equigranular granite and aplite dikes are widespread within the unit. Aside from a smaller modal proportion of biotite, Unit 6 is mineralogically similar to Units 4 and 5. The unit appears to lack the pervasive foliation and extensive metamorphism of earlier phases. It is, however, foliated locally, and is also sheared and brecciated along late northeast and northwest trending faults.

Unit 7

Unit 7 includes porphyritic granite and adamellite, that form a 10 km^2 boss east of Bay de Loup. Characteristically, it is either pink, orange or red, medium to coarse grained, K-feldspar porphyritic and generally phenocryst rich. The unit locally contains xenoliths and large (approximately 100 m^2), stoped rafts of diorite. It is foliated and brecciated along a major northeast trending fault which passes through Bay de Loup. This fault separates Unit 7 from the remainder of the Burgeo granite, thus its temporal relationship to Units 4, 5 and 6 is uncertain.

Unit 8

Unit 8 includes the equigranular tured granitic phases of the Burgeo granite. These occur throughout the map area, forming more than a dozen separate bosses ranging in area from less than 1 km^2 to approximately 20 km^2. On the basis of color, biotite content and the presence or absence of xenoliths, the equigranular phases can be divided into two subunits.

Unit 8 consists of granite, adamellite, microgranite and aplite. These are either white to pink or light gray, and either fine, medium or coarse grained, and free of xenoliths (Plate 10). The granitoids are typically rich in K-feldspar and quartz, and contain variable amounts of biotite plus muscovite and garnet locally. Estimated modal biotite content is normally between 1 percent and 5 percent, but locally reaches up to 15 percent.

Unit 8 is typically equigranular; however, there is a slight, gradational increase in its K-feldspar phenocryst content towards the contact with Unit 5. Unit 8 lacks the ubiquitous foliation of Unit 4, but is affected locally by the regional deformation.

Unit 8a outcrops in the vicinity of Six Mile Hill, west of Grandy's Brook. It consists of light to dark gray, foliated, equigranular, biotite ± muscovite granite and granodiorite. Unit 8 contains numerous

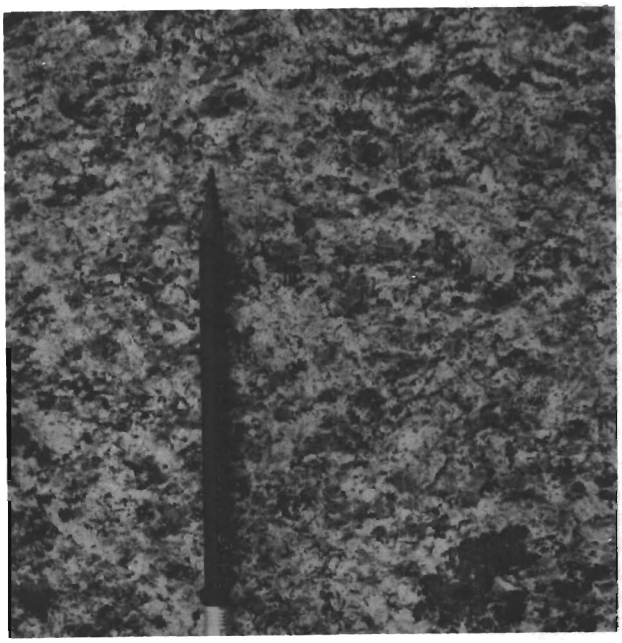


Plate 10: *Equigranular granite, Unit 8 of the Burgeo granite.*

diorite xenoliths. Unit 8a is presumed to be intrusive into Unit 5; it intrudes and is in fault contact with Unit 4.

Unit 8 intrudes Units 1a, 4 and 5. Its contacts with 1a and 4 are sharp; both units are cut by narrow dikes of Unit 8. Both dikes and country rocks are at least locally affected by the same regional foliation. Although crosscutting relationships are seen locally, the contact of units 5 and 8 is generally gradational, marked by a gradual increase in phenocrysts from Unit 8 into Unit 5.

Chetwynd granite (Unit 9)

The name Chetwynd granite (Cooper, 1954) denotes the late to posttectonic granite which intrudes the Burgeo granite in the west-central parts of the map area. These rocks form the eastward extension of the granite from its type exposures in the La Poile area (Chorlton, 1978). The granite underlies approximately 75 km^2 of the Bureo area, and is intrusive into Units 4, 5 and 6 of the Burgeo granite.

The Chetwynd granite has yielded zircons dated at 377 ± 20 Ma (Dallmeyer, 1980). $^{40}Ar/^{39}Ar$ spectra for biotite from the granite in the adjacent La Poile area indicate a cooling age of 372 ± 5 Ma for the Chetwynd granite (Dallmeyer, 1980).

The Chetwynd granite, undivided in the Burgeo map area, is a high level, essentially massive, quartz rich granite. It is either pink or red and locally white weathering. It is texturally variable but mainly medium to coarse grained and equi-

granular. Locally, the granite contains zones that are fine grained quartz porphyritic, fine grained K-feldspar porphyritic, or rapikivi textured. The granite is characteristically leucocratic, with less than 1-2% modal biotite. It contains rare granitoid xenoliths and is, in places, miarolitic. The Chetwynd granite is essentially posttectonic, and intrudes the Burgeo granite after the main regional deformation. Structurally, it is characterized by a pronounced northeast trending parallel joint system;it is cut by several late faults which have little obvious displacement. The granite is intrusive into Units 4, 5 and 6 of the Burgeo granite and contains variably sized inclusions of Unit 1a metasediments, migmatites and diorite. Near the west boundary of the map area, the granite contains inclusions and small roof pendants of felsic tuff and tuffaceous sediments; these are presumably related to the La Poile Group to the west (e.g. Chorlton, 1978). A zone of network veins, dikes and stocks of Chetwynd granite intrude the Burgeo granite at the contact; the contact zone is of variable extent, in places over 1 km wide.

Units 10 and 11

These units consist of late, posttectonic dikes, which intrude the Chetwynd and Burgeo granites and the earlier migmatites. Unit 10 is composed of pink, leucocratic, fine grained, quartz and feldspar porphyritic, granite dikes. These are widely distributed and vary widely in orientation. They are locally continuous along strike for several hundreds of metres and have characteristically straight, sharp boundaries.

Unit 11 consists of diabase dikes. These are less widespread than the quartz-feldspar porphyry dikes and are dark gray, massive, and fine to medium grained.

MINERAL EXPLORATION POTENTIAL

Within the Burgeo map area, the Chetwynd granite has the greatest potential for granite hosted mineralization. It is high level, highly differentiated, potassic, and quartz rich, and thus potentially geochemically specialized. The Sn-W-F-Mo-U potential of the granite should be considered, especially since there are multi-element lake sediment geochemical anomalies near its margins (Butler and Davenport, 1980).

The latest phases of the Burgeo granite, particularly Unit 8, have a potential for molybdenite mineralization as well as related Sn-W-F mineralization. Molybdenite occurs in equivalent units in the adjacent Peter Snout map area (11P/13), two kilometers north of the Burgeo map area (O'Brien, 1983). Elsewhere in the Burgeo granite, pegmatite dikes are widespread; these may be of some economic interest.

Screens of rhyolite tuff of the La Poile Group within the Chetwynd granite may indicate that volcanic rocks are present elsewhere within the granite, and are more extensive than previously thought. This is of particular interest in the light of recent gold discoveries within the La Poile Group, adjacent to the Chetwynd granite, 6 km west of the Burgeo map area (Northern Miner, August 30, 1984).

SUMMARY

The oldest rocks in the region are the migmatites. In the north they are metasedimentary in origin, related to the upper amphibolite facies metamorphism and local partial melting which accompanied the main regional deformation. Their protolith is presumably the metasedimentary rocks of the mid-Ordovician Bay du Nord Group or its equivalents. The southern migmatite zone has in part an igneous protolith; in the least remobilized zones, inclusions of layered and banded gabbro are recognizable. The protolith of the mafic rocks in the inclusions is equivocal and may be related to either early mafic phases of the Burgeo granite or to Lower Ordovician or earlier metagabbros interpreted as ophiolitic basement to the Bay du Nord Group in the White Bear River area to the north (O'Brien and Tomlin, 1984). The formation of the migmatites is considered to be essentially contemporaneous with early synkinematic plutonism of the Burgeo granite, in the early Silurian. The locally gradational contact between the migmatites and the earliest xenolith rich granodiorite phase of the Burgeo granite may indicate that these migmatites represent deep levels or parts of the root zone of the Burgeo granite.

Early to mid-Silurian magmatism produced several texturally and mineralogically distinct granitoid phases. In general, these become progressively more granitic with time. However, the existence locally of both crosscutting and gradational relationships between the same two phases indicate that some of the magmatic pulses are in part contemporaneous and of variable duration. The major phases are variably deformed, and in places relatively massive; this style of deformation is in keeping with the synkinematic nature of the Burgeo granite (e.g. Blackwood, 1984; O'Brien and Tomlin, 1984).

Late Silurian - Devonian magmatism resulted in the emplacement of essentially posttectonic quartz rich, potassic, high level granite, associated felsic porphyry dikes and diabase. The Chetwynd granite was

emplaced circa 372±5 Ma (Dallmeyer, 1980); this age date represents an upper time limit on the regional deformation and a minimum age for the Burgeo granite. The greatest potential for economic mineralization lies within the Chetwynd granite.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the excellent assistance in the field provided by Messrs. Jacob Lushman and Richard Lushman of Grey River. A special vote of thanks is due Gerard Hartery of Universal Helicopters (Nfld.) Ltd., who cheerfully provided expert and obliging service throughout a field season marred by persistently inclement weather. Thanks also go to the Mineral Development Division Administrative Section for logistical support.

An initial draft of this manuscript was reviewed by R.F. Blackwood, S.P. Colman-Sadd, W.L. Dickson and P.W. Delaney.

REFERENCES

Barry, J.M., Trépanier, A. and MacLeod, R.
1981: Assessment report on the 1981 geology and geochemistry of the Connaire Bay area, Southwest Newfoundland. C.B. 1806-1808; Lic. 1737-1739. [11P/12 (93)].

Blackwood, R.F.
1984: Geology of the west half of the Dolland Brook map area (11P/15), Southern Newfoundland. *In* Current Research. *Edited by* M.J. Murray, J.G. Whelan and R.V. Gibbons. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 84-1, pages 198-210.

Butler, A.J. and Davenport, P.H.
1980: Lake Sediment Geochemical Survey of Southwestern Newfoundland. Open File Nfld. (1150).

Chorlton, L.R.
1978: The geology of the La Poile map area (110/9), Newfoundland. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 78-5, 14 pages.

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

Dallmeyer, R.D.
1980: Subproject 1-20, Geochronology - Insular Newfoundland mapping. Progress report 10/31/79 - 9/1/80; Newfoundland Department of Mines and Energy, Mineral Development Division, unpublished report, 31 pages.

O'Brien, S.J.
1983: Geology of the eastern half of the Peter Snout map area (11P/13E), Newfoundland. *In* Current Research. *Edited by* M.J. Murray, P.D. Saunders, W.D. Boyce and R.V. Gibbons. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 83-1, pages 57-67.

O'Brien, S.J. and Tomlin, S.L.,
1984: Geology of the White Bear River map area (11P/14). Southern Newfoundland. *In* Current Research. *Edited by* M.J. Murray, J.G. Whelan and R.V. Gibbons. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 84-1, pages 220-231.

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

Scott, H.S., and Conn, H.K.
1950: Preliminary report of the geology of Buchans Mining Company concessions in central and south-central Newfoundland. Photographic Survey Corporation Ltd., Geological Division, unpublished report, 12 pages.

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

Twenhofel, W.H. and McClintock, P.
1940: Surface of Newfoundland. Bulletin of the Geological Society of America, Volume 51, pages 1665-1728.

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

Williams, H., Kennedy, M.J. and Neale, E.R.W.
1970: The Hermitage Flexure, the Cabot Fault, and the disappearance of the Newfoundland Central Mobile Belt. Geological Society of America Bulletin, Volume 81, pages 1563-1568.