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EPIGENETIC GOLD MINERALIZATION, BAIE VERTE PENINSULA, NEWFOUNDLAND

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ABSTRACT

The Baie Verte Peninsula is well known for its abundance and variety of mineral occurrences. Gold occurs both as syngenetic mineralization associated with the early Paleozoic volcanogenic massive sulphide deposits, and as epigenetic mineralization related to Siluro-Devonian orogenesis. The epigenetic mineralization is structurally controlled and is spatially associated with the structurally complex Baie Verte Line and its subsidiary structures. Gold occurs in both poly- deformed rocks of the Fleur de Lys Belt to the west of the Baie Verte Line and in lesser deformed rocks of the Baie Verte Belt to the east of the Baie Verte Line. However, approximately 98 percent of the known occurrences are hosted by rocks of the Baie Verte Belt. The geological evolution of the epigenetic gold mineralization is analogous, in many respects, to the Californian Mother Lode Belt.

There are two classes of epigenetic gold occurring on the Baie Verte Peninsula: i) vein-hosted mineralization, in which the gold is restricted to quartz veins, and ii) altered wall-rock hosted, in which the gold is disseminated throughout the alteration zone, typically tied to pyrite. Vein-hosted gold mineralization can be subdivided into three subclasses based mainly on gangue mineralogy. These are: i) quartz veins containing free gold, ii) quartz–pyrite veins, and iii) base-metal-rich quartz veins that locally contain free gold. The altered wall-rock gold mineralization is subdivided into four subclasses. These are: i) carbonate–quartz–pyrite, ii) sericite–quartz–pyrite, iii) talc–magnesite–magnetite, and iv) red albite–ankerite–pyrite. The sericite–quartz–pyrite-altered wall-rock subclass occurs within the Silurian subaerial volcanic sequences. This form of alteration and mineralization is similar to that of low-sulphidation style epithermal gold deposits.

Field work in 1998 concentrated on the Goldenville Horizon, Mings Bight peninsula, and the MicMac Lake area. Gold mineralization associated with the oxide-facies iron formation and ferruginous cherts of the Goldenville Horizon is an example of non-stratiform banded iron formation gold. Rocks underlying many of the islands and the eastern shoreline of MicMac Lake were originally included in the Silurian Mic Mac Lake group. Mapping has revealed that much of this area is underlain by submarine mafic volcanic and intrusive rocks that are probably correlative with the Ordovician Flat Water Pond Group. Significant gold mineralization is associated with these mafic rocks.

INTRODUCTION

The Baie Verte Peninsula has long been the focus of mineral exploration and mining activity, beginning with the Dorset people who exploited the soapstone deposits at Fleur de Lys more than 2000 years ago. More recent activity, beginning in 1860 with the opening of the Terra Nova Mine, focussed on the ophiolitic-hosted volcanogenic massive sulphide deposits. In total, eight volcanogenic sulphide deposits were mined between 1860 and 1996 (Table 1). Many of these deposits were auriferous and appreciable amounts of gold were recovered, particularly during latter years. It is estimated that between the years 1896 and 1906 approximately 47 043 oz of gold were recovered from the Notre Dame Bay copper mines (Snelgrove, 1935). This total also includes the 307 oz recovered from the Sops Arm and Goldenville gold mines.

Gold-bearing quartz veins were first discovered in the Mings Bight area of the Baie Verte Peninsula prior to 1867 (Murray and Howley, 1881). However, it was not until the resolution of the French Shore issue that mineral exploration and development west of Cape St. John could proceed unhindered. As a result, it was not until 1903 that the Goldenville Mine was discovered. In 1906, a ten-stamp mill and Wilfley Concentrator were erected at the site and 158 oz of gold were recovered before the mine was forced to close. The property lay dormant until the 1930s when increased gold prices resulted in renewed interest in the site (Snelgrove, 1935; Hibbard, 1983).

Despite the more than 100 years of mining activity on the Baie Verte Peninsula there had been no systematic exploration for gold mineralization other than in the small area around the Goldenville Mine. The 1984 BP Resources

Table 1. Production statistics for volcanogenic massive sulphide deposits, Baie Verte Peninsula (after Evans *et al.*, 1992; Bradley, 1997)

Deposit	**Host Rock**	**Years Mined**	**Grade and Tonnage**
Terra Nova	Advocate Complex	1860-1864, 1902-1906, 1913-1915	2-2.5 % Cu, 226 700 tonnes
Tilt Cove	Betts Cove Complex	1864-1917, 1957-1967	1-12 % Cu, 8 160 000 tonnes (42,425 oz of gold recovered 1957-1967)
Betts Cove	Betts Cove Complex	1875-1886	2-10 % Cu, 118 528 tonnes
Main Mine	Pacquet Harbour Group	1961-1967	1.3 % Cu, 2.16 % Zn, 29 g/t Ag, 5.1 g/t Au, 399 000 tonnes
East Mine	Pacquet Harbour Group	1967-1974	1.04 % Cu, 1 933 079 tonnes
Big Rambler Pond	Pacquet Harbour Group	1969	1.2 % Cu, 45 000 tonnes (reserves 15 000 tonnes at 1.5 % Cu)
Ming Mine	Pacquet Harbour Group	1971-1982	3.66 % Cu, 22 g/t Ag, 2.4 g/t Au, 1 991 592 tonnes (15,000 tons of low grade Cu mined from Crown Pillar, 1996)
Ming West	Pacquet Harbour Group	1995-1996	4.5 % Cu (appreciable gold and silver), 150,000 tons
Main Zone Crown Pillar and Footwall	Pacquet Harbour Group	1996	10,000 tons of massive sulphide ore 25,000 tons of silicified footwall ore

Canada Limited discovery of the Hope Brook Deposit, on the south coast of the province (McKenzie, 1986), drew attention to the long overlooked gold potential of Newfoundland. Almost immediately exploration activity focussed on the Baie Verte and GRUB lines, two structurally complex areas that drew comparisons with the Californian Mother Lode Belt. In 1986, Noranda Exploration Company Limited discovered the Deer Cove prospect on the Baie Verte Peninsula, the first significant new gold discovery since the Goldenville Mine was discovered 83 years ago. This new discovery initiated a period of intensive gold exploration that lasted until about 1990 and resulted in approximately 120 new gold discoveries on the peninsula. By 1988, a number of significant discoveries had been announced. These included:

i) the Stog'er Tight deposit, discovered by the Noranda-Impala joint venture (Huard, 1990);

ii) the "Lightning Zone" discovered by Varna Gold Inc. and subsequently optioned to Corona Cooperation in 1988. Follow up diamond drilling led to the discovery of the Thunder Zone and outlined what is the now referred to as the "Pine Cove" deposit having an estimated (undiluted, geologically inferred) reserve of 2.75 million tonnes at 3.0 g/t gold (Dimmell and Hartley, 1991); and

iii) the "Nugget Pond" prospect discovered by Bitech Resources. The Nugget Pond prospect has since been developed by Richmont Mines Inc. Mining and milling infrastructure was completed in February 1997, and mining is presently ongoing. Prior to the commencement of mining, reserves totaled 488 000 tonnes grading 0.357 oz/t gold (Richmont Mines Annual Report, 1996).

Exploration activity on the Baie Verte Peninsula waned during the early 1990s. In 1995, Ming Minerals Inc. successfully mined the Ming West volcanogenic massive sulphide deposit. The company also mined, with limited success, the auriferous Footwall Zone to the Rambler Main Mine, and the Stog'er Tight deposit, which had been purchased from Noranda Exploration Limited (Bradley, 1997).

The concentrated exploration activity on the Baie Verte Peninsula also resulted in a number of government and academic deposit-level studies of gold prospects. These include: Deer Cove (Patey, 1990), Albatross (Field, 1990), Tilt Cove/Cape St. John area (Al, 1990), Rambler (Wieck, 1993), and Stog'er Tight (Ramezani, 1992). The Geological Survey of Canada completed structural and metallogenic studies of the Dorset prospect (Bélanger *et al.*, 1992), the

Stog'er Tight deposit (Kirkwood and Dubé, 1992), and the Deer Cove prospect (Dubé *et al.*, 1993). The results of much of this work is summarized in Dubé *et al*. (1992). Dr. A. Sangster of the Geological Survey of Canada has conducted deposit-level studies of gold mineralization in the Bett's Cove Complex, in conjunction with detailed 1:20 000-scale mapping by Bédard *et al.* (1996).

As can be seen from the government and academic studies, efforts concentrated on some of the more significant gold occurrences on the peninsula. However, very little information was available on the majority of occurrences. Therefore, in 1997, the Department of Mines and Energy initiated a project to document the gold occurrences for which information was lacking. Field work, during 1997 and 1998, concentrated on NTS map areas 12H/09, 12H/16 and the Mings Bight peninsula portion of NTS map area 12I/01. As a result, approximately 110 epigenetic gold occurrences have been documented. The large number precluded conducting detailed work on each occurrence. Detailed work was undertaken where deemed necessary (i.e., different style or setting of mineralization). Also detailed studies were not undertaken where sufficient data were viewed to already exist (e.g., thesis or GSC studies).

REGIONAL SETTING

The Baie Verte Peninsula is located at the northern end of the Appalachian Orogen. It is underlain by two distinct structural and lithic belts, which are separated by a major arcuate, structural zone referred to as the Baie Verte Line (Hibbard, 1983). Rocks to the west of the Baie Verte Line belong to the Fleur de Lys Belt. This belt is part of the Humber Tectonostratigraphic Zone of Williams *et al*. (1988) and comprises a sequence of polydeformed Neoproterozoic to Early Ordovician schists and gneisses considered to represent the eastern margin of Laurentia. The belt is subdivided into three main lithic sequences (Figure 1): 1) high-grade metamorphic basement rocks of the East Pond Metamorphic Suite; 2) a metaclastic cover sequence referred to as the Fleur de Lys Supergroup; and 3) post-kinematic granitic intrusive rocks of the Devonian Wild Cove Pond Igneous Suite.

The rocks lying to the east of the Baie Verte Line belong to the Baie Verte Belt, which is part of the Dunnage Tectonostratigraphic Zone. This belt consists of four main lithic elements: i) Cambro-Ordovician ophiolitic sequences of the Advocate, Point Rousse and Betts Cove complexes and the Pacquet Harbour Group; ii) Ordovician volcanic cover sequences of the Flat Water Pond and Snooks Arm groups and parts of the Advocate and Point Rousse complexes and the Pacquet Harbour Group; iii) Silurian terrestrial volcanic and sedimentary rocks of the MicMac Lake and Cape St. John groups and the Kings Point Complex, which unconformably overlie the Ordovician sequences; and iv) Siluro-Devonian intrusive rocks (e.g., the Burlington Granodiorite, Kings Point Complex and the Cape Brule Porphyry). The Cambro-Ordovician sequences represent vestiges of Iapetus and are interpreted to have formed in supra-subduction zone ophiolitic, and primitive island-arc, environments (Jenner and Fryer, 1980; Swinden, 1991; Piercey *et al.*, 1997 and Bédard *et al.*, 1997).

Regionally, the geology of the Baie Verte Peninsula can be correlated southward to the Glover Island area of Grand Lake, where rocks of both the Humber and Dunnage zones are juxtaposed (Cawood and van Gool, 1993). The boundary between the zones is defined by the Keystone shear zone, which is part of the Baie Verte–Brompton Line. On Glover Island, the Dunnage Zone sequences are host to thirteen significant epigenetic, structurally controlled gold prospects (Barbour and French, 1993).

REGIONAL DEFORMATION

Regionally, all pre-Carboniferous rock types and structures on the Baie Verte Peninsula, including the Baie Verte Line, are folded around a major structure referred to as the Baie Verte Flexure (Hibbard, 1983). Structural and lithological trends vary from north-northeast, south of Baie Verte, to east–west, east of Baie Verte. Hibbard (1983) interpreted this flexure to be a primordial feature that reflected the shape of the ancient Laurentian continental margin.

Three phases of deformation have been documented within rocks of the Fleur de Lys Belt and in the northern portion of the Baie Verte Belt (Hibbard, 1983). Regionally, these rocks have been metamorphosed in the upper-greenschist to middle-amphibolite facies. However, within the portion of the Fleur de Lys Belt on the eastern limb of the Baie Verte Flexure and the northern portion of the Baie Verte Belt, Acadian deformation has obliterated all evidence of earlier deformation. Based on radiometric cooling ages for metamorphic minerals, deformation within the remainder of the Fleur de Lys Belt is interpreted to be Taconic in age and related to westward obduction of the allochthonous sequences over the Fleur de Lys Belt (Hibbard, 1983). The remainder of the Baie Verte Belt displays a single penetrative fabric and has been metamorphosed up to the lower-greenschist facies. Deformation within the Baie Verte Belt is interpreted to be related to Siluro-Devonian tectonism.

The Baie Verte Line exhibits a protracted history of movement as a result of the juxtaposition and interaction of the Baie Verte–Fleur de Lys belts and the irregular Laurentian continental margin. Deformation along the Baie Verte Line varied from westward-directed thrusting in the Ordovician to later strike-slip faulting in the Carboniferous (Hibbard, 1983; Goodwin and Williams, 1990).

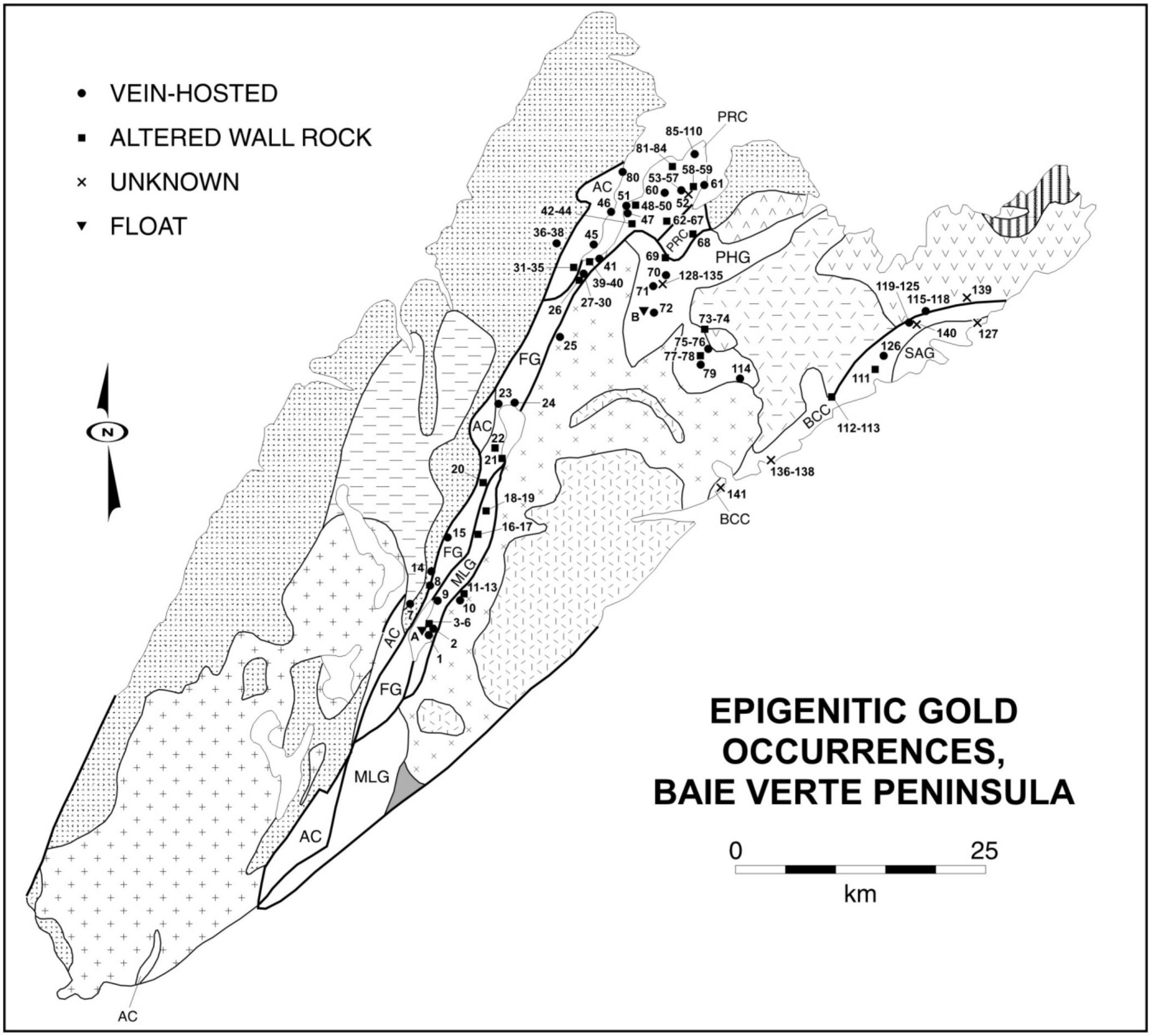

Figure 1. *Simplified geological map of the Baie Verte Peninsula (*after *Hibbard, 1983); also shown are the gold occurrences listed in Table 2.*

BAIE VERTE GOLD MINERALIZATION

Gold mineralization comprises two broad styles: 1) syngenetic gold, which is associated with volcanogenic massive sulphide mineralization, and 2) structurally controlled epigenetic gold, which is associated with major regional-scale structures. The present study focussed on the epigenetic mineralization. Epigenetic gold mineralization occurs in rocks of both the Fleur de Lys and Baie Verte belts. However, about 98 percent of the known occurrences are hosted by rocks of the Baie Verte Belt. It should be noted that much of the Fleur de Lys Belt is mostly unexplored as most of the exploration activity has focussed on the Baie Verte Belt. Many large structures transect the Fleur de Lys Belt and none of these have seen focussed, systematic mineral exploration. The few gold occurrences that occur to the west of the Baie Verte Line appear to be spatially associated with slivers of ultramafic rocks and splays off the Baie Verte Fault system.

Within the Baie Verte Belt, gold occurs in all rock types irrespective of age. However, most of the occurrences cluster along major regionally extensive fault systems such as the Baie Verte–Flat Water Pond fault. Two classes of gold mineralization have been documented form the Baie Verte Peninsula (Dubé, 1990; Evans and Wells, 1998). These are:

LEGEND		
AGE	FLEUR DE LYS BELT	BAIE VERTE BELT
Carboniferous		Conglomerate and Sandstone
Silurian to Devonian	Wild Cove Pond Igneous Suite	**Intrusive Rocks** La Scie Intrusive Suite, Cape Brule Porphyry (includes undivided extrusive phases) Kings Point Complex (includes undivided extrusive phases), and Burlington Granodiorite **Extrusive Rocks** Cape St. John Group MLG Mic Mac Lake Group
Ordovician		**Intrusive Rocks** Dunamagon Granite **Extrusive Rocks** FG Flat Water Pond Group, and SAG Snooks Arm Group
Neoproterozoic to Middle Ordovician	Fleur de Lys Supergroup	AC Advocate Complex PRC Point Rousse Complex PHG Pacquet Harbour Group BCC Betts Cove Complex
Neoproterozoic and Earlier	East Pond Metamorphic Suite	

Figure 1. *(Continued) Legend*

1) vein hosted, in which the gold is restricted to quartz veining, and 2) altered wall-rock or replacement-style mineralization, in which the gold is disseminated throughout the altered rock. The vein-hosted style comprises three subclasses, i) quartz veins having visible gold, ii) quartz–pyrite veins, and iii) base-metal-rich quartz veins that locally contain free gold. The altered wall-rock hosted replacement style consists of: i) carbonate–quartz–pyrite, ii) sericite–quartz–pyrite, iii) talc–magnesite–magnetite, and iv) red albite–ankerite–pyrite. Table 2 lists all of the known gold occurrences located on the Baie Verte Peninsula and classifies them as either vein or altered wall-rock hosted.

QUARTZ VEIN SUBCLASS

The quartz vein subclass are primarily milky-white shear veins. This subclass contains some of the largest auriferous vein sets on the Baie Verte Peninsula including the Romeo and Juliet prospect (Meade *et al.*, 1998) (Figure 1; Table 2). This prospect contains veins up to 2 m wide (Plate 1), having a combined strike-length in three zones of approximately 250 m. The veins are weakly laminated, exhibit multiple generations of veining and contain only traces of sulphide. Wall-rock fragments are preserved locally and Fe-carbonate wall-rock alteration and silicification are present locally. Minor disseminated pyrite may be developed in the wall-rock adjacent to the vein and gold occurs in these veins as free gold, commonly as coarse flecks and clots (Plate 2).

Plate 1. *View of the Juliet zone, Romeo and Juliet prospect, looking toward Baie Verte.*

Table 2. Listing of gold occurrences, Baie Verte Peninsula, Newfoundland (keyed to Figure 1). Abbreviations: gs-grab sample, cs-channel sample, ddh-diamond-drill hole, bs-bulk sample, sil-silicification, ser-sericitization, carb-carbonitization, chl-chloritization, epi- epidotization, serp-serpentinization, stilp-stilpnomelane, alb-albite, feld-feldspar, qtz-quartz, py-pyrite, gn-galena, cp- chalcopyrite, sp-sphalerite, asp-arsenopyrite, bp-bornite, po-pyrrhotite, mag-magnetite, spec-specularite, and hem-hematite. () denotes commodity presence determined by assay.

OCCURRENCE	STYLE	Au GRADES	MINERALOGY	HOST ROCK	ALTERATION
Kings Point (NTS 12H/09)					
1. El Stratos	Quartz Vein	150.4 g/t (gs)	(Au),(Ag),gn,sp,cp,py	Felsic Volcanics	
2. Mega Vein	Quartz Vein	1.0 g/t (gs)	(Au),py,cp	Gabbro	Sil, Ser
3. Pandora	Altered Wall Rock	6.9 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Ser
4. Tornado	Altered Wall Rock	5.2 g/t (gs)	(Au),py,gn	Gabbro	Fe-Carb, Chl
A. Voodoo Float	Quartz Vein	105.3 g/t (gs)	(Au),(Ag),gn,sp,cp,py	Gabbro	Fe-Carb
5. Tamsworth	Altered Wall Rock	11.1 g/t (gs)	(Au),py,gn	Mafics	Fe-Carb
6. MicMac Lake East	Altered Wall Rock	4.62 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
7. MicMac Lake West	Quartz Vein	1.03 g/t (gs)	(Au),asp,py	Pelite	Carb
8. MicMac Lake (NW)	Quartz Vein	33.4 g/t (gs)	(Au),py	Pelite	Sil, Ser
9. Clydesdale	Quartz Vein	59.6 g/t (gs)	(Au),(Ag),py	Granodiorite	Carb, Epi, Chl
10. Kreuger	Quartz Vein	32.9 g/t (gs)	(Au),(Ag),Cu,py,Mo	Mafic dykes in Granodiorite	Sil
11. Mackenzie	Altered Wall Rock	8.71 g/t (gs)	(Au),py	Mafic dykes in Granodiorite	Sil
12. Bedford	Altered Wall Rock	0.75 g/t (gs)	(Au),py	Gabbro	Sil, Epi, Ser
13. Sidewinder	Altered Wall Rock	8.3 g/t (gs)	(Au), py	Mafic dykes in Granodiorite	Sil
14. Wild Cove Pond E	Quartz Vein	1.9 g/t (gs)	(Au),asp,cp,bo,py	Pelitic Schist	Sil?
15. Kidney Pond South	Quartz Vein	1.5 g/t (gs)	(Au),py	Granite	???
16. Crow Hill South	Altered Wall Rock	1.01 g/t-10.6 m (DDH)	(Au),py, spec	Felsic Volcanics	Sil, Ser
17. Raven	Altered Wall Rock	8.0 g/t - 0.40 m (cs)	(Au),py	Felsic/Mafic Volcanics Contact	Sil, Ser, Fe-Carb
18. Crow Hill North	Altered Wall Rock	2.27 g/t -8.0 m (DDH)	(Au),py	Felsic Volcanics	Sil, Ser
19. Crow Hill NE	Altered Wall Rock	1.3 g/t (gs)	(Au), py	Felsic Volcanics	Sil, Ser
20. Bear Pond	Altered Wall Rock	5.9 g/t (gs)	(Au),py,po	Graphitic Sediments	Nil
Baie Verte (NTS 12H/16)					
21. Flatwater PondPark	Altered Wall Rock	1.9 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Carb
22. Gossan Zone	Altered Wall Rock	3.14 g/t (gs)	(Au),py,po	Mafic Volcanics & Graphitic Sediments	Sil, Carb, Chl
23. Flatwater Pond NW	Quartz Vein	0.99 g/t (gs)	(Au),py	Virginite	Talc–Carb, Serp, Fuch
24. Burlington Roadcut	Quartz Vein	1.95 g/t (gs)	(Au),py,gn	Sericite Schist	Sil, Ser
25. Black Duck	Quartz Vein	5.8 g/t (gs)	(Au),py	Mafic Volcanics (?)	???
26. Central Carbonate	Altered Wall Rock	5.5 g/t (gs)	(Au),py	Gabbro	Fe-Carb (Pervasive)
27. Le Braz	Quartz Vein	314.0 g/t (gs)	Au,py	Mafic (Gabbro?)	Sil, Fe-Carb (weak)
28. Gunshot	Quartz Vein	162.0 g/t (gs)	Au,py	Gabbro	Sil, Fe-Carb
29. Dorset # 1	Quartz Vein	407.0 g/t (gs)	Au,gn,sp,cp,py,bo,asp	Mafic Volcanics	Nil
Dorset # 2	Quartz Vein	41.6 g/t - 1.5 m (cs)	Au,gn,sp,cp,py,bo,asp	Gabbro / Mafic Volcanics	Nil
Dorset # 3	Quartz Vein	6.0 g/t (gs)	(Au),cp,py,	Mafic Volcanics	Nil
30. Dorset Extension	Quartz Vein	56.0 g/t - 2.5 m (cs)	Au,gn,sp,cp,py,bo,asp	Gabbro	Nil
31. Phoenix	Altered Wall Rock	1.07 g/t - 5.45 m (cs)	(Au),py	Gabbro	Sil, Fe-Carb
32. Albatross	Altered Wall Rock	2.8 g/t - 5.0 m (cs)	(Au),py	Gabbro	Sil, Fe-Carb
33. Casa Loma	Altered Wall Rock	2.3 g/t - 2.0 m (cs)	(Au),py	Mafic Volcanics	Sil, Carb, Chl
34. Powerline	Altered Wall Rock	1.6 g/t - 1.6 m (cs)	(Au), py	Gabbro	Sil, Fe-Carb
35. TN-89-01	Altered Wall Rock	2.35 g/t - 0.5 m (DDH)	(Au), py	Gabbro	Sil, Fe-Carb
36. Castor's Brook	Quartz Vein	8.25 g/t - 0.40 m (cs)	(Au), py	Psammite	Sil, Ser
37. Breezeway	Quartz Vein	25.5 g/t (gs)	(Au),bo,cp	Amphibolite Schist	Sil, Carb
38. Osbournes Pond	Quartz Vein	6.75 g/t (gs)	(Au),cp,gn	Qtz - Biotite Schist	Sil, Carb
39. Barritz	Altered Wall Rock	3.9 g/t - 4.0 m (cs)	(Au),py	Gabbro	
40. Tidewater	Altered Wall Rock	8.2 g/t (gs)	(Au),py	Chert Breccia	Sil, Fe-Carb
41. Powder House	Quartz Vein	2.71 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
42. Anoroc	Altered Wall Rock	18.9 g/t - 1.0 m (DDH)	(Au),py	Mafic Volcanics & Sediments	Sil, Fe-Carb, Chl
43. Anoroc Extension	Altered Wall Rock		(Au),py	Mafic Volcanics & Sediments	Sil, Fe-Carb, Chl
44. Pine Cove	Altered Wall Rock	2.75 mt @ 3.0 g	Au,py	Mafic Volcanics, Gabbro, & Sediments	Sil, Chl
(1) Lightning Zone		-11.1g/t-8.1 m (DDH)			
(2) Thunder Zone		-10.0g/t- 36.0 m (cs)			
45. Sandy Point	Quartz Vein	1.12 g/t (gs)	(Au),py	Gabbro	
46. Baie Vista	Quartz Vein	5.7 g/t (gs)	(Au),py	Gabbro	Fe-Carb
47. Romeo & Julliet	Quartz Vein	10 t @ 1 oz/t (bs)	Au,py	Gabbro	Sil, Epi
48. Corkscrew	Altered Wall Rock	32.0 g/t - 1.0 m (DDH)	(Au),py	Silicified Gabbro (?)	Sil
49. Pumbly Point					
Pumbly Point	Altered Wall Rock	1.91 g/t (gs)	(Au), py	Gabbro	Fe-Carb
Carbonate Zone	Altered Wall Rock	2.7 g/t-1.4 m (cs)	(Au), py	Gabbro	Fe-Carb
Fuel Bog Zone	Altered Wall Rock	1.15 g/t-4.0 m (cs)	(Au), py	Gabbro	Fe-Carb
50. Corner Shore	Quartz Vein	1.46 g/t (gs)	(Au),p	Mafic Volcanics	Fe-Carb
51. Penny Cove/Cuvier	Altered Wall Rock	5.97 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Fe-Carb
Goldenville Horizon					
52. East Shaft	Unknown	Unknown	Unknown	Unknown	Sil
53. Main Shaft	Quartz Vein	12.89 g/t - 1.8m (DDH)	(Au),py,mag	Iron Formation	
		3.29 g/t - 0.7m (DDH)			Sil, Carb
54. North Shaft	Quartz Vein	Unknown	(Au),py	Intermediate Volcanics	Unknown
Maritec Trenches					
55. # 3	Quartz Vein	14.3 g/t (gs)	(Au),py,mag	Iron Formation	Fe-Carb
56. # 4	Quartz Vein	9.8 g/t (gs)	(Au),py,mag	Iron Formation	Sil, Fe-Carb
57. # 5	Quartz Vein	4.68 g/t (gs)	(Au),py	Mafic Volcanics	Sil

Table 2. *Continued*

OCCURRENCE	STYLE	Au GRADES	MINERALOGY	HOST ROCK	ALTERATION
58. # 1	Altered Wall Rock	1.38 g/t (gs)	(Au), py	Gabbro	Sil
59. # 2	Altered Wall Rock	22.2 g/t (gs)	(au), py	Gabbro	Sil, Carb
60. Green Cove Brook	Quartz Vein	6.44 g/t (gs)	(Au), spec	Iron Formation (Goldenville Horizon)	Nil
61. Barry & Cunningham	Quartz Vein	331.0 g/t (gs)	Au,py,cp	Quartz Sericite Schist	Sil, Ser
62. Stog'er Tight Mine	Altered Wall Rock	0.65 mt @ 6.5 g/t	Au,py	Gabbro	Sil, Carb, Py, Alb
63. Gabbro Zone	Altered Wall Rock	4.6 g/t - 14.0 m (DDH)	Au,py	Gabbro	Sil, Carb, Py, Alb
64. Main Zone	Altered Wall Rock	Unknown	Au,py	Mafic Volcanics / Tuffs	Sil, Carb, Py, Alb
65. Magnetic Zone	Altered Wall Rock	7.68 g/t - 6.4 m (DDH)	(Au),py	Gabbro	Sil, Carb, Py, Alb
66. Cliff Zone	Altered Wall Rock	7.11 g/t - 3.5 m (cs)	(Au),py	Gabbro	Sil, Carb, Py, Alb
67. Massive Sulphide	Massive Pyrite	2.3 g/t - 1.0 m (cs)	(Au),py	Mafic Volcanics/Fe-Formation	Sil, Carb, Py, Alb
68. Shear #1	Altered Wall Rock	1.63 g/t (gs)	(Au),py	Ultramafics	Unknown
69. Carrol Option	Altered Wall Rock	2.3 g/t (gs)	(Au),py	Gabbro	Sil, Fe-Carb
70. Stuckey Vein	Quartz Vein	6.2 g/t - 0.6 m (cs)	Au,(Ag),gn,cp,py	Gabbro	Fe-Carb (weak)
71. Uncle Hank	Quartz Vein	Unknown	(Au),gn,sp,cp,py	Unknown	Unknown
B. Krissy Boulder (float)	Quartz Vein	Visible Au	Au, py	Unknown	Unknown
72. Krissy Trend	Quartz Vein	3.4 g/t - 1.0 m (DDH)	(Au),py,gn	Qtz-Lithic Tuff	Sil, Ser
73. WJ-660	Altered Wall Rock	1.0 g/t - 4.0 m (cs)	(Au),py	Crystal Lithic Tuff	Sil, Ser
74. FDR (Fred Derf)-263	Altered Wall Rock	76.0 g/t (gs)	(Au),py	Feldspar Porphyry	Sil, Ser
75. Brass Buckle	Quartz Vein	242.5 g/t -0.25m(DDH)	Au,py	Gabbro, Mafic and Felsic Volcanics	Sil
76. Brass Buckle Ext.	Quartz Vein	Visible Au	Au,py	Unknown	Unknown
77. BBT	Altered Wall Rock	4.3 g/t (gs)	(Au),py	Felsic Pyroclastics	Sil, Ser
78. Skidder Pond	Altered Wall Rock	5.1 g/t (gs)	(Au),(Ag),py,cp	Feldspar Porphyry	Sil, Ser
79. Tie Line (Twin Pond)	Quartz Vein	2.8 g/t (gs)	(Au), mag	Mafic Volcanics	Sil
Fleur De Lys (NTS 12I/01)					
80. Marble Cove Point	Quartz Vein	9.9 g/t (gs)	(Au),py	Ultramafics (?)	Sil, Ser
81. Fox Pond (#1)	Altered Wall Rock	61.8 g/t - 1.0 m(cs)	Au,mag,py,cp,bo	Ultramafics	Talc, Carb, Serp
82. Fox Pond (#2)	Altered Wall Rock	18.5 g/t - 0.20 m(DDH)	Au,mag,py,cp,bo	Ultramafics	Talc, Carb Serp
83. Fox Pond North	Altered Wall Rock	2.7 g/t (gs)	(Au),py	Gabbro	Sil, Carb, Chl, Ser
84. Gabbro Showing	Altered Wall Rock	1.90 g/t (gs)	(Au),py	Gabbro	Sil, Carb, Chl, Ser
85. Main Zone Deer Cove	Quartz Vein	226.0 g/t - 1.5 m	Au,py,cp,asp	Mafic Volcanics, Diabase and Gabbro	Sil, Carb, Chl, Epi, Ser
86. AK-2	Quartz Vein	7.65 g/t (gs)	(Au),py	Microgabbro	Sil, Carb, Chl, Epi, Ser
87-108. Deer Cove Block	Quartz Vein		(Au),py	Mafic Volcanics	Sil, Carb, Chl, Epi, Ser
109. Devils Cove	Quartz Vein	4.44 g/t (gs)	(Au),py	Ultramafics	Talc-Carb
110. Eastern Point	Quartz Vein	2.5 g/t (gs)	(Au),py	Mafic Volcanics	Sil, Carb, Chl, Epi, Ser
Nippers Harbour (NTS 2E/13) (Not examined during this study)					
111. Nugget Pond Mine	Altered Wall Rock	0.488 mt @ 0.357 oz/t	Au, Ag, py	Nugget Pond Horizon	Py, Stilp, Qtz-Feld- Carb Stockwork
112. Pine Pond West	Altered Wall Rock	1.83 g/t (gs)	(Au)	Ultramafics/quartz-feldspar porphyry	Sil
113. Pine Pond East	Altered Wall Rock	26.12 g/t (gs)	(Au), py	Gabbro/Diabase	Py
114. South Yak Lake (OMJ Showing)	Quartz Vein	4.22 g/t (gs)	(Au),(Ag),gn,bo,cp,co, mag,hem	Fe-Formation ?	Sil
115. Boneyard Showing	Quartz Vein	3.01 g/t (gs), 6.87 g/t - 2.01 m (DDH)	(Au),py	Felsis Volcanics	Sil, Py
116. Long Pond/Inco	Quartz Vein	2.8 g/t (gs), 21.5 g/t - 1.19 m (DDH)	(Au),py,spec,cp	Ultramafic Rocks	Carb, Hem, Sil, Serp, Talc
117. Long Pond West	Quartz Vein	5.814 g/t	(Au),spec	Conglomerate	Sil, Carb
118. Long Pond Shear	Quartz Vein	4.1 g/t A (gs)	(Au),py	Gabbro	
119. Low Water (Newmont) Showing	Quartz Vein	13.5 g/t (gs), 2.13 g/t - 0.64 m (ddh)	(Au),spec,py	Basalt	Qtz-Carb Veining
120. Betts Big Pond	Quartz Vein	60.6 g/t (gs)	(Au),py	Quartz Porphyry	Nil
121. George Showing	Quartz Vein	12.43 g/t - 7 cm (cs)	(Au),spec	Felsic Tuff	Sil, Carb
122. Tom Showing	Quartz Vein	3.7 g/t - 30 cm (cs)	(Au),spec	Felsic Tuff - Conglomerate Contact	Sil
123. Red Cliff Pond "A and B"	Quartz Vein	2.0 g/t (gs) Fe-Formation, 4.0 g/t (gs) Chlorite Schist	(Au)	Fe-Formation, Chlorite Schist	
124. Red Cliff Pond West	Carbonate Vein	1.49 g/t - 2.02m (ddh)	(Au),py	Ultramafic	Talc, Carb
125. Arrowhead Pond	Quartz Vein	1.2 g/t (gs)	(Au),cp	Ultramafic	Talc, Carb
126. Inco No Name	Carbonate Vein	1.35 g/t -1.5m (ddh)	(Au),spec	Ultramafic	Unknown
127. Long Pond East	Unknown	15.4 g/t (gs)	(Au),py	Argillite	Unknown
Genesis Unknown (Syngenetic or Epigenetic) (NTS 12H/16)					
128. Uncle Enos	Altered Wall Rock	22.4 g/t - 1.1 m (cs)	(Au),py	Qtz-Sericite Schist	Sil, Ser
129. Footwall Au Zone	Altered Wall Rock	32 Kt @ 6.12 g/t	(Au),py	Qtz-Sericite Schist	Sil, Ser
130. Hill Bog	Altered Wall Rock	13.6 g/t - 1.5 m (cs)	(Au),py	Qtz-Sericite Schist	Sil, Ser
131. Uncle Bill	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
132. Uncle Theo	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
133. Uncle Angus	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
134. Uncle Will	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
135. Uncle Mike	Altered Wall Rock	Anomalous	(Au),py	Qtz-Sericite Schist	Sil, Ser, Chl, Fuch
Genesis Unknown (Syngenetic or Epigenetic) (NTS 2E/13)					
136. Nippers Harbour N.	Unknown	4.3 g/t (gs)	(Au)	Mafic Dykes	Unknown
137. Nippers Harbour Cu	Unknown	6.3 g/t (gs)	(Au),cp?	Mafic Dykes	Unknown
138. Pittmans Bight	Unknown	1.2 g/t (gs)	(Au),cp?	Mafic Dykes	Unknown
139. Dump Pond	Unknown	3.57 g/t (gs)	(Au)	Ultramafic?	Sil, Carb
140. East Pond Newmount	Unknown	2.09 g/t (gs)	(Au),py	Pillow Lava	Sil
141. Jilks Point	Unknown	2.75 g/t (gs) (>10,000 ppm Cu)	(Au),cp ?,py	Diabase Dyke	Sil

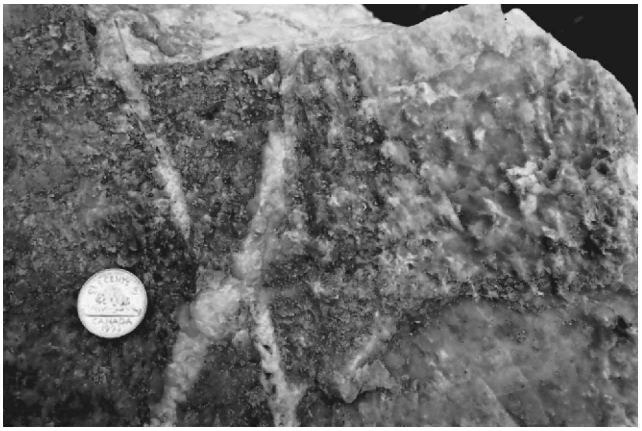

Plate 2. *Close-up of Juliet sample, small flecks of gold are visible along the vein margin.*

QUARTZ-PYRITE VEIN SUBCLASS

The quartz-pyrite vein subclass comprise shear, quartz breccia and tension-gash style veins. The veins are typically milky white and contain weakly disseminated to coarse patches, clots and bands of pyrite (Plate 3). Wall-rock alteration varies from weak to locally intense having Fe-carbonatization of mafic rocks and sericitization and silicification of felsic rocks. Disseminated pyrite may be present in the altered wall rock. Elevated to economically significant gold values are only associated with the veining and can generally be correlated with pyrite concentrations. These veins, while typically small, often contain very high concentrations of gold. For example, assay results from the Brass Buckle prospect (Figure 1) included 242.5 g/t Au over 0.25 cm in diamond-drill core (Dimmell, 1989).

BASE-METAL-RICH QUARTZ VEIN SUBCLASS

The base-metal-rich quartz vein subclass occur typically as shear veins that are generally smokey grey to milky white and banded. The base metals occur as clots and laminations consisting of galena, chalcopyrite and ± sphalerite (Plate 4). Wall-rock alteration is generally weak but where developed, comprises sericitization and silicification; gold generally occurs as coarse flecks and clots. Similar to the quartz-pyrite veins, assay results for the base-metal-rich subclass are generally impressive, for example grab samples from the El Strato showing assay up to 150.4 g/t Au (MacDougall *et al.*, 1989).

Plate 3. *Quartz-pyrite vein, Brass Buckle prospect. The vein assayed 242.5 g/t Au over 0.25 cm.*

Plate 4. *Close-up of the base-metal-rich El Strato vein.*

CARBONATE–QUARTZ–PYRITE REPLACEMENT SUBCLASS

The carbonate–quartz–pyrite subclass is marked by extensive and distinctive wall-rock alteration. Where exposed, these zones are quite impressive, with the altered rocks weathering a distinctive orange-rust colour; examples include the Central Carbonate Zone (Plate 5) and the Albatross prospect (Figure 1). Drill core from these zones or rock newly exposed by trenching soon oxidizes making the Fe-carbonate alteration relatively easy to spot. Within gabbroic and mafic volcanic rocks, this alteration varies from weak to intense and is accompanied by generally weak sulphidation. These zones typically occur as structurally controlled and modified lenses, which locally occur as clusters.

Plate 5. *View of the Central Carb Zone showing distinctive rusty-weathering iron-carbonate alteration.*

The individual zones can be up to 40 m thick and in excess of 100 m long.

Field (1990) described the alteration zonation from the Albatross prospect, one of a cluster of similar gold occurrences hosted by gabbro of the Advocate Complex (Figure 1), as comprising four alteration assemblages, which he attributed to progressive alteration. These assemblages include: i) chlorite–calcite, ii) chlorite–calcite–ankerite, iii) sericite– ankerite–siderite, and iv) chlorite–ankerite–fuchsite. Gold occurs only within the sericite–ankerite–siderite zone, and abundances are directly correlated with the pyrite content of the zone. Quartz veining can form a significant component of this subclass.

Shear, quartz breccia and tension-gash vein styles are locally developed and they typically consist of milky-white quartz ± carbonate; pyrite occurs within the veins as weak disseminations, coarse patches, clots and bands. Disseminated pyrite may be present in the altered wall rock. Elevated to economically significant gold values are associated with pyrite, both in the veining and in the altered wall rock. Gold concentrations can be correlated with pyrite abundances and gold appears to occur within fractures and as inclusions within the pyrite grains. Selected grab samples from the Albatross prospect, containing between 2 and 10 percent pyrite, can assay up to 31 g/t Au (Table 2). However, channel samples are typically much lower, having values <3 g/t Au over 5.0 m.

SERICITE–QUARTZ–PYRITE REPLACEMENT SUBCLASS

The sericite–quartz–pyrite subclass occurs within Silurian subaerial felsic volcanic sequences such as the Mic Mac Lake group. The occurrences are associated with zones of pervasive sericitization and silicification, which are spatially associated with large fault zones; e.g., the Crow Hill prospects (Table 2; Figure 1). The Crow Hill prospects consist of five occurrences developed over a 3.5 km strike length. The felsic rocks are typically pink to maroon quartz–feldspar porphyritic lithic tuffs. Where altered, the tuffs are bleached-looking and have a yellowish-green cast. Sericitic zones also exhibit a strong penetrative fabric, indicating post-alteration deformation. The alteration, particularly within more sericitic zones, is typically accompanied by 1 to 5 percent disseminated pyrite. Pyrite also can occur with chlorite in small crosscutting vein-filled fractures. Milky-white quartz tension-gash veins are common and locally contain coarse specularite (Plate 6). Some small quartz veinlets were noted to contain a bright pinkish-red mineral tentatively identified as adularia, a low-temperature hydrothermal K-feldspar. Gold values associated with this subclass are typically low, having values up to 1.87 g/t Au over 11.0 m (Deering and MacDougall, 1989). Assay results of up to 5.6 g/t Au have been reported from mineralized float located within the Crow Hill area (MacDougall, 1988).

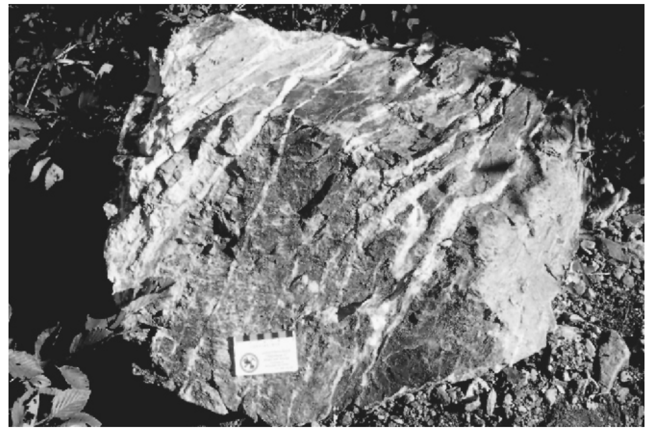

Plate 6. *Milky-white tension-gash veins developed within sericitized felsic volcanic rocks of the Mic Mac Lake group, Crow Hill South prospect.*

Noranda interpreted the alteration associated with the Crow Hill prospects to be epithermal-like (MacDougall, 1988). However, trace-element geochemistry data indicated that the alteration zones exhibited no enrichment in Hg, As or Sb, elements typically associated with epithermal deposits. The pervasive sericite–silica alteration, the presence of chlorite, the quartz–specularite–adularia (?) veins and broad zones of gold enrichment are features typically associated with low-sulphidation-style epithermal systems (Heald *et al.*, 1987; Hedenquist *et al.*, 1996). The Silurian sequences of the Baie Verte Peninsula may offer potential for large tonnage, low-grade epithermal-style gold mineralization.

TALC–MAGNESITE–MAGNETITE REPLACEMENT SUBCLASS

The talc–magnesite–magnetite subclass is not extensive, the known occurrences are mainly restricted to the Fox Pond prospects within the Point Rousse Complex (Table 2; Figure 1). The mineralization and alteration are localized within narrow approximately north–south-trending high-strain zones that cut weakly serpentinized ultramafic rocks. Within these shear zones, the ultramafic rocks are strongly altered to an assemblage of talc and magnesite (Plate 7). The zones are cut by: i) talc–magnesite–dolomite tension-gash veins that are up to 15 cm thick, ii) anastomosing stockwork-like veinlets, and iii) fracture-controlled porcelain-white dolomite veins. Gower (1988) reported that the dolomite veins also contain minor pyrite, chalcopyrite, malachite, bornite and locally exhibit greenish, crystalline talc margins.

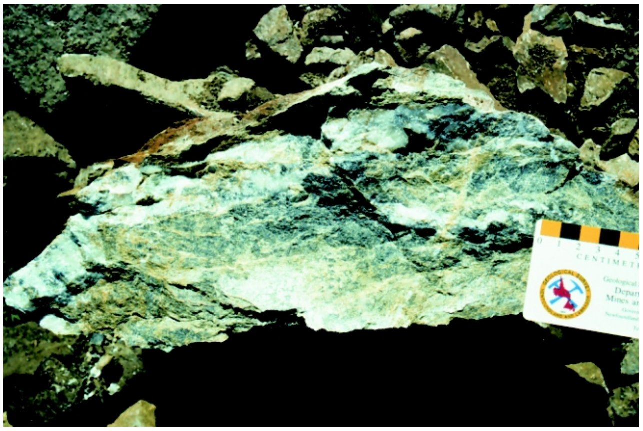

Plate 7. *Talc-magnesite-magnetite alteration, Fox Pond #1 prospect, Mings Bight peninsula.*

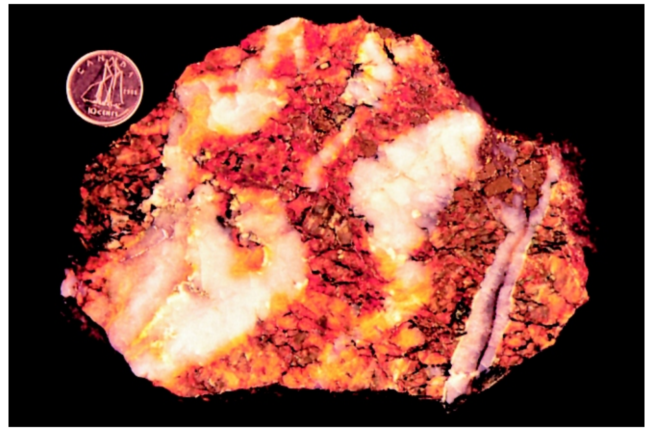

Plate 8. *Red albite-pyrite-ankerite developed marginal to a quartz vein, Stog'er Tight deposit, Mings Bight peninsula..*

All the vein sets contain clots of magnetite. Fine stringers and disseminations of magnetite are also present within the talc–magnesite-altered ultramafic rocks adjacent to the veins and as blocks within the stockwork-like veining. Visible gold was observed in the altered wall-rock at the Fox Pond #1 prospect (Gower, 1988). Gower (1988) also reported that gold values were obtained from the talc–magnesite–dolomite veins, dolomite veins that do not contain sulphide minerals, vein selvages, and wall-rock within the shear zones including the magnetite-rich blocks. Channel-sample assay results from the Fox Pond #1 prospect range up to 61.8 g/t Au over 1.0 m. Diamond drilling at the Fox Pond #2 prospect intersected a 0.2 m zone of talc–magnesite that assayed 18.5 g/t Au.

RED ALBITE–ANKERITE–PYRITE REPLACEMENT SUBCLASS

The red albite–ankerite–pyrite subclass appears to be unique to a cluster of five gold occurrences, which includes the Stog'er Tight deposit, located within the Point Rousse Complex just west of the community of Mings Bight. The structural setting of the occurrences has been documented by Kirkwood and Dubé (1992). They interpreted the alteration and mineralization to have formed during brittle-ductile deformation attributed to a late D1 event.

The mineralization and alteration have been examined as part of a M.Sc. thesis study by Ramezani (1992). He defined four alteration zones based on distinct mineral assemblages, these include: i) a chlorite–calcite zone, ii) an ankerite– sericite zone, iii) a chlorite–magnetite zone, and iv) a red albite–pyrite (+gold) zone. The red albite–pyrite zone is a replacement vein. Abundant quartz veins occur within the mineralized zones both as barren tension-gash veins, which are interpreted to postdate the mineralization, and as shear-parallel, quartz–albite–ankerite veins. The gabbroic wall-rock adjacent to the shear veins is characterized by intense red albite alteration and by coarse auriferous pyrite (Plate 8). The intensity of the alteration diminishes within 5 to 15 cm from the shear-parallel veins. The hydrothermal alteration at Stog'er Tight has been dated by U–Pb zircon at 420 ± 5 Ma (Ramezani, 1992).

Ramezani (1992) reported that the gold within the Stog'er Tight deposit occurs as fine-grained (<.05 mm) micro veinlets and disseminated blebs within the pyrite. Channel sampling across the Stog'er Tight deposit returned values of up to 23.0 g/t Au over 7.0 m and grab samples up to 115.3 g/t Au (Huard, 1990). Diamond drilling and trenching undertaken by Noranda Exploration Company Ltd. traced the zone approximately 150 m down-dip and along a strike length of 650 m. The zone was also interpreted to plunge to the east. Based on this work, a deposit having a probable geological reserve of 650 000 tonnes grading 6.7 g/t Au was outlined. The deposit was purchased by Ming Minerals Incorporated and open-pit mining of the deposit was conducted between October 1996 and January 1997. Mining revealed that the ore zone was not a continuous sheet-like body but rather a series of discrete lenses or pods developed within a shear zone (Bradley, 1997).

MINGS BIGHT PENINSULA

The Mings Bight peninsula is underlain by ophiolitic and cover sequence rocks of the Cambro-Ordovician Point Rousse Complex (Norman, 1973; Hibbard, 1983). The complex hosts approximately 50 gold occurrences (Figure 1), both vein and altered wall-rock styles of gold mineralization are present. The Pine Cove deposit, the Romeo and Juliet prospect, the Stog'er Tight deposit, the old Goldenville Mine and the Deer Cove prospect are among the more significant gold occurrences located on the peninsula. Field work in 1998 concentrated on the area surrounding the old Goldenville Mine.

The Point Rousse Complex forms a complete but dismembered ophiolite suite having conformable volcanic and volcaniclastic cover (Hibbard, 1983) that outcrops in a broad but structurally modified, east–west-trending synclinorium. Ophiolitic plutonic components occupy the northern and southern limbs, whereas the central portion of the peninsula is underlain by the cover sequence rocks. The complex is tectonically bounded. However, internally the complex exhibits a generally weakly developed, moderately northwesterly dipping, penetrative cleavage. The cleavage locally intensifies within thrusts and shear zones. Cover sequence rocks in the south, outcropping immediately north of the Scrape Thrust, and a volcanic thrust slice, which outcrops between Deer Cove and Devil's Cove in the north, are both moderately to intensely deformed. These units are host to the more significant gold occurrences on the peninsula. The south-verging thrust faults are interpreted to be cogenetic or later than the cleavage and predate high-angle faults (Hibbard, 1983). The complex has been metamorphosed to the greenschist facies.

The cover sequence contains a distinctive, regionally ex-tensive, but discontinuous unit of ferruginous chert and iron formation referred to as the Goldenville Horizon (Figure 2). The horizon outcrops sporadically from Big Head in the east to Green Cove in the west. An attempt to trace the horizon inland from Big Head was thwarted due to lack of exposure and rugged coastal terrane. Coastal exposures at Big Head consist of structurally disrupted magnetite and purple chert beds up to 1 m thick developed within a sequence of mafic breccia. Previous workers (Watson, 1947; Hibbard, 1983) in-dicated that this section may be stratigraphically equivalent to the section exposed at the Goldenville Mine. Immediately south of the iron formation, but separated from it by a narrow mylonite zone, is a sequence of volcaniclastic sedimentary rocks, sandstone, siltstone, conglomerate, that extend southward for about 500 m along the shore (Norman, 1973). These rocks are interpreted to conformably overlie the iron formation. To the south, pillow breccia and pillow lava are exposed.

Inland at the Goldeneville Mine, volcaniclastic rocks appear to be less well developed. Mafic volcanic breccia and chloritic tuff form both the structural footwall and hanging wall to the iron formation. However, volcanic rocks in the footwall appear to be more epidotized, indicating that they may lie stratigraphically beneath the iron formation.

At Green Cove, a narrow unit of magnetite-rich breccia, which occurs within a sequence of mafic volcanic breccia and pillow lava, may represent the western-most exposure of the Goldenville Horizon. Just inland and north of Green Cove Brook, ferruginous chert and argillite of the Goldenville Horizon are exposed in a series of exploration trenches. To the south of the horizon, logging roads near Green Cove Brook have exposed a rhythmically bedded, east–west-trending, north-dipping unit of siltstone–sandstone. Graded bedding within the coarser sandstone beds indicate that the unit is overturned to the south. These sediments occupy a similar stratigraphic setting to the sediments exposed south of Big Head and are interpreted to stratigraphically overlie the Goldenville Horizon. Based on a magnetometer survey undertaken for Cuvier Mines Inc. (Ovens and McBride, 1988), the horizon appears to be folded between the Corkscrew prospect and Green Cove (Figure 2).

The Goldenville Horizon varies in thickness from about 3.7 m near the Main Shaft to about 4.6 m approximately 1 km to the southwest of the Main Shaft (Watson, 1947). The horizon thickens to the southwest where Fitzpatrick (1981) reported the horizon to be 7.0 m thick. There the horizon is comprised of 1.5 m of chert nodules and sedimentary detritus in chlorite–magnetite matrix, which is overlain by 5.0 m of massive ferruginous chert containing lenses of quartz and magnetite. This is in turn capped by 50 cm of massive magnetite. Diamond drilling (O'Donnell, 1988; MH-88-11) near the Main Shaft, intersected approximately 34 m of chloritic mafic volcanic rocks containing numerous purple and reddish chert blocks and lenses. This is interpreted to be a thickened equivalent to the base of the section described by Fitzpatrick (1981). The increased thickness of the section may be the result of folding in the vicinity of the Main Shaft.

The Goldenville Horizon is host to five gold occurrences (Figure 2), including the old Goldenville Mine, the Maritec/Noranda trenches (Wells, 1989), and Green Cove Brook (Ovens and McBride, 1988). Previous workers (Snelgrove, 1935; Watson, 1947; Frew, 1971; Fitzpatrick, 1981; Hibbard, 1983) attributed the auriferous quartz veining developed at the Goldenville Mine to remobilization of gold from within the iron formation as a result of regional deformation. Regionally, the horizon is enriched in gold up to 15 to 20 times the background levels for the surrounding mafic volcanic rocks (Frew, 1971; Fitzpatrick, 1981), and fractured and veined portions of the horizon contain up to four times more gold than the massive chert. Grab samples from a magnetite bed at Big Head assayed between 19 and 130 ppb gold (Table 3). Hibbard (1983) noted that the gold was most highly concentrated in veins and fractures that crosscut the regional foliation, indicating that the remobilization of the gold was a relatively late event.

All of the gold occurrences associated with the iron formation examined during the present study are considered to be spatially associated with crosscutting faults. At the Goldenville Mine, a number of north-trending high-angle faults cut the horizon in the vicinity of the Main Shaft. Away from the iron formation, these faults, which host weakly pyritiferous quartz veins, were found to contain anomalous

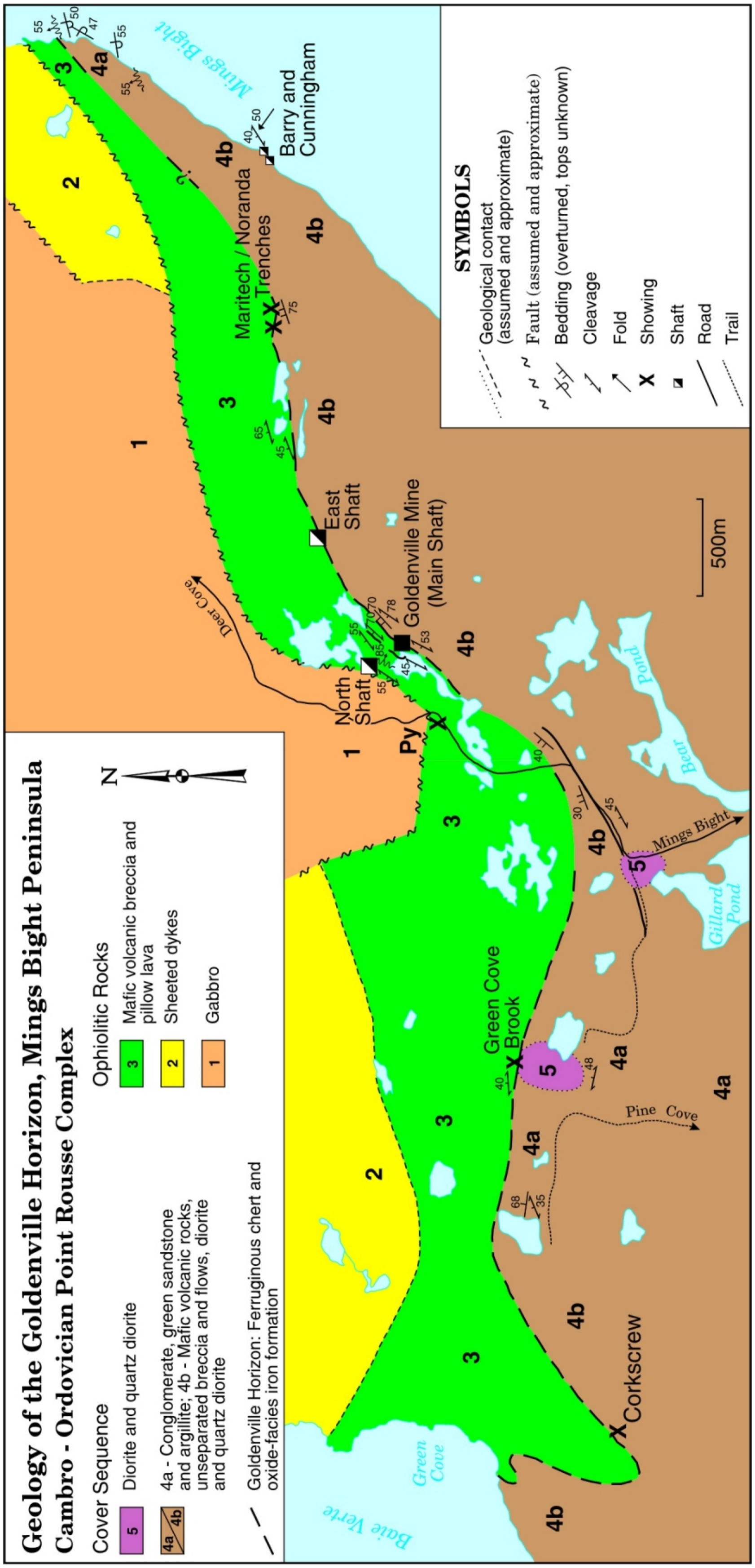

Figure 2. *Simplified geological map showing the distribution of the Goldenville Horizon and associated gold occurrences, Mings Bight peninsula.*

gold concentrations, having values up to about 3 g/t Au. One such fault outcrops at the North Shaft (Figure 2). The shaft exposes mafic breccia that has been weakly mylonitized resulting in a millimetre-scale banding composed of quartz–carbonate and chlorite. Milky-white quartz shear veins containing minor pyrite occupy the central portion of the fault zone. Grab samples collected from the dump have assayed up to 2.07 g/t Au (Table 2). Similar zones have been intersected by diamond drilling near the Main Shaft.

Where the late faults cut the oxide-facies iron formation (bedded magnetite), quartz veins contain and are mantled by coarse-grained pyrite. The magnetite acted as a ready source of iron, promoting the growth of the pyrite. Pyrite also occurs as disseminations, small veinlets and as semi-massive bedding parallel bands. Drillhole MH-88-11 intersected 4.5 m of variably cleaved, seritcitized and carbonitized chlorite schist. The schist contains blocks or lenses of purple and red chert up to 30 cm thick and bands of magnetite and chert up to 80 cm thick. Quartz veinlets cut the chert–magnetite bands and pyrite occurs marginal to the veins as coarse patches, disseminations and bands. These veins crosscut both the bedding and the cleavage. A 1.8-m-wide section of this zone assayed 12.89 g/t Au (O'Donnell, 1988) Alteration extends well beyond the mineralized section as is apparent by the weakly oxidized nature of the drill core.

Mineralization at the Goldenville Mine is an example of a non-stratiform banded iron-formation-hosted gold occurrence. In this type, the gold is restricted to late structures and veins that crosscut oxide-facies iron formation and the gold is associated with pyrite that has replaced magnetite (Kerswill, 1993). Ore-body-scale mesothermal-style alteration is often present. These deposits often consist of small discrete ore shoots that tend to be small and difficult to mine. Regionally, the Goldenville Horizon occupies a similar stratigraphic

Table 3. Grab sample assay results for samples collected during the course of this project

Name	NTS	UTM	Au (ppb)	Ag (ppm)	Name	Rock Type
DE-97-1b	12H/16	567570 5537940	85		Goldenville Mine	Red chert
DE-97-1c	12H/16	567570 5537940	37		Goldenville Mine	Red chert with specularite
DE-97-1d	12H/16	567570 5537940	11500		Goldenville Mine	Magnetite with quartz and pyrite
DE-97-3	12H/16	563650 5536875	2530		Corkscrew	Silicified gabbro (?)
DE-97-4	12H/16	563650 5536875	8860		Corkscrew	Silicified gabbro (?)
DE-97-5a	12H/16	567500 5538000	2070		North Shaft, Goldenville	Sheared and altered mafic breccia
DE-97-5b	12H/16	567500 5538000	173		North Shaft, Goldenville	Sheared and altered mafic breccia
DE-97-5c	12H/16	567500 5538000	586		North Shaft, Goldenville	Quartz vein
DE-97-12a	12I/01	567125 5539300	18000		Fox Pond #2	Magnetite-bearing talc carbonate
DE-97-12b	12I/01	567125 5539300	23400		Fox Pond #2	Magnetite-bearing quartz-talc vein
DE-97-17	12H/16	555050 5526875	33100		Gunshot	Pyrite-bearing quartz vein
DE-97-18a	12H/16	557480 5530500	85		Tidewater	Pyrite-bearing chert
DE-97-18b	12H/16	557480 5530500	32		Tidewater	Sulphide-rich float
DE-97-21	12H/09	545625 5498875	320		Bedford	Altered granodiorite
DE-97-24b	12H/09	541500 5494675	197		El Strato	Quartz vein
DE-97-31	12H/09	543000 5497500	5500	10	Clydesdale	Sericitized granodiorite
DE-97-32a	12H/16	552375 5527430	532		Castors Brook	Quartz vein
DE-97-40	12H/16	551280 5517170	6		Burlington Road Cut	Quartz-carbonate vein
DE-97-41c	12H/09	547000 5505125			Crow Hill South	Adularia(?) quartz vein
DE-97-42b	12H/09	547000 5505125	122		Crow Hill South	Pyritiferous quartz vein
DE-97-50b	12H/16	569100 5538450	93		Old Trench	Pyritiferous quartz-carbonate vein
DE-97-51a	12H/09	547440 5510590	<4		Bear Pond	Pyritiferous graphitic shale
DE-97-51b	12H/09	547440 5510590	7		Bear Pond	Quatrz-sericite altered shale
DE-97-53	12H/16	562350 5536450	<2		Pumbly Point East	Sericitized mafic breccia
DE-97-60	12H/16	570950 5521450	586		Brass Buckle Trend	Pyritiferous quartz breccia
DE-97-65b	12H/16	566950 5528550	83		Stuckey Vein	Altered gabbro
DE-97-65d	12H/16	566950 5528550	227		Stuckey Vein	Altered gabbro
DE-97-66	12H/16	565380 5526600	6180	49	Uncle Hank (float)	Sulphide-bearing quartz vein
DE-97-67	12H/16	547500 5527000	31		Seal Cove	Quartz vein
DE-98-1b	12I/01	561900 5540400	7110	2	Marble Cove Point	Pyritiferous quartz vein
DE-98-1c	12I/01	561900 5540400	395	<2	Marble Cove Point	Tension gash quartz vein
DE-98-2a	12I/01	561900 5540400	2260	<2	Marble Cove Point Vein 2	Pyritiferous quartz vein
DE-98-2b	12I/01	561900 5540400	2150	<2	Marble Cove Point Vein 2	Quartz-muscovite-garnet schist
DE-98-3c	12H/16	560700 5536150	150	<2	Baie Vista	Quartz vein/altered mafic volcanic
DE-98-3d	12H/16	560700 5536150	29	<2	Baie Vista	Mafic volcanic
DE-98-4c	12H/16	562900 5537200	2	<2	Vein north of Cuvier Vein	Quartz vein
DE-98-5d	12H/16	562900 5537200	3000	150	Cuvier Showing	Quartz-sulphide vein
DE-98-5f	12H/16	562900 5537200	7	<2	Cuvier Showing	Pyritiferous mafic volcanic
DE-98-6a	12I/01	569600 5542600	4440	<2	Devils Cove	Pyritiferous quartz-carbonate vein
DE-98-7a	12I/01	568300 5541900	28	<2	Eastern Point, Deer Cove	Mafic volcanic
DE-98-7b	12I/01	568300 5541900	2	<2	Eastern Point, Deer Cove	Quartz vein
DE-98-7c	12I/01	568300 5541900	19	<2	Eastern Point, Deer Cove	Mafic volcanic
DE-98-7d	12I/01	568300 5541900	2910	<2	Eastern Point, Deer Cove	Quartz vein
DE-98-8b	12H/16	562900 5537200	<2	3	Penny Cove Vein	Quartz vein
DE-98-8c	12H/16	562900 5537200	110	<2	Penny Cove Vein	Quartz vein
DE-98-9	12H/16	561800 5535900	28 600	6	Corner Shore Showing	Pyritiferous quartz vein
DE-98-11b	12H/16	563650 5536850	5830	<2	Corkscrew	Silicified gabbro(?)
DE-98-MP	12H/16	566800 5536000	56	5	Mud Pond Prospect	Chlorite schist
DE-98-12a	12H/09	548300 5507300	31	<2	Crow Hill Northeast	Quartz vein in felsic volcanic
DE-98-14a	12H/09	547000 5597800	23 500	92	Kruger	Quartz-sulphide vein
DE-98-22a	12H/09	542300 5595800	5950	5	MicMac East	Base-metal-rich quartz vein
DE-98-22b	12H/09	542300 5595800	3310	6	MicMac East	Base-metal-rich quartz vein
DE-98-22c	12H/09	542300 5595800	14	<2	MicMac East	Altered mafic volcanic
DE-98-22d	12H/09	542300 5595800	1230	<2	MicMac East	Altered mafic volcanic
DE-98-22e	12H/09	542300 5595800	6	<2	MicMac East	Altered mafic volcanic
DE-98-26a	12H/09	546950 5505300	2240	2	Raven	Pyritiferous silicified felsic
DE-98-26b	12H/09	546950 5505300	1730	2	Raven	Pyritiferous silicified felsic
DE-98-28b	12H/16	567600 5537900	20 000	<2	Goldenville Mine	Pyrite in magnetite
DE-98-28c	12H/16	567600 5537900	37 500	<2	Goldenville Mine	Semi-massive pyrite in magnetite
DE-98-28d	12H/16	567600 5537900	200	<2	Goldenville Mine	Magnetite with minor pyrite
DE-98-28e	12H/16	567600 5537900	67	2	Goldenville Mine	Magnetite with trace pyrite
DE-98-29a	2E/13	595100 5526050	24	4	Nodulama	Base-metal-rich quartz vein
DE-98-29b	2E/13	595100 5526050	6	<2	Nodulama	Pyritiferous quartz vein
DE-98-30b	2E/13	595800 5525800	14	<2	Long Pond West	Specularite-bearing quartz vein
DE-98-31b	12H/09	547000 5505100	368	5	Crow Hill South	Altered felsic volcanic
DE-98-39	12I/01	567050 5539400	594	<2	Fox Pond #1	Magnesite vein with minor pyrite
DE-98-42a	12I/01	570500 5540000	19	<2	Big Head	Chert
DE-98-42b	12I/01	570500 5540000	130	<2	Big Head	Chert/magnetite
DE-98-42c	12I/01	570500 5540000	25	<2	Big Head	Quartz vein
DE-98-46	2E/12	572500 5505000	8010	5	Eastern Pt., Green Bay	Pyritiferous quartz vein
DE-98-47	2E/05	578350 5476400	4550	<2	Chignic, Roberts Arm area	Pyritiferous chert
DE-98-48	12H/16	562700 5537050	383	<2	Pumbly Point float	Quartz vein
DE-98-49	12I/01	567850 5540900	33	<2	Deer Cove float	Pyritiferous quartz vein

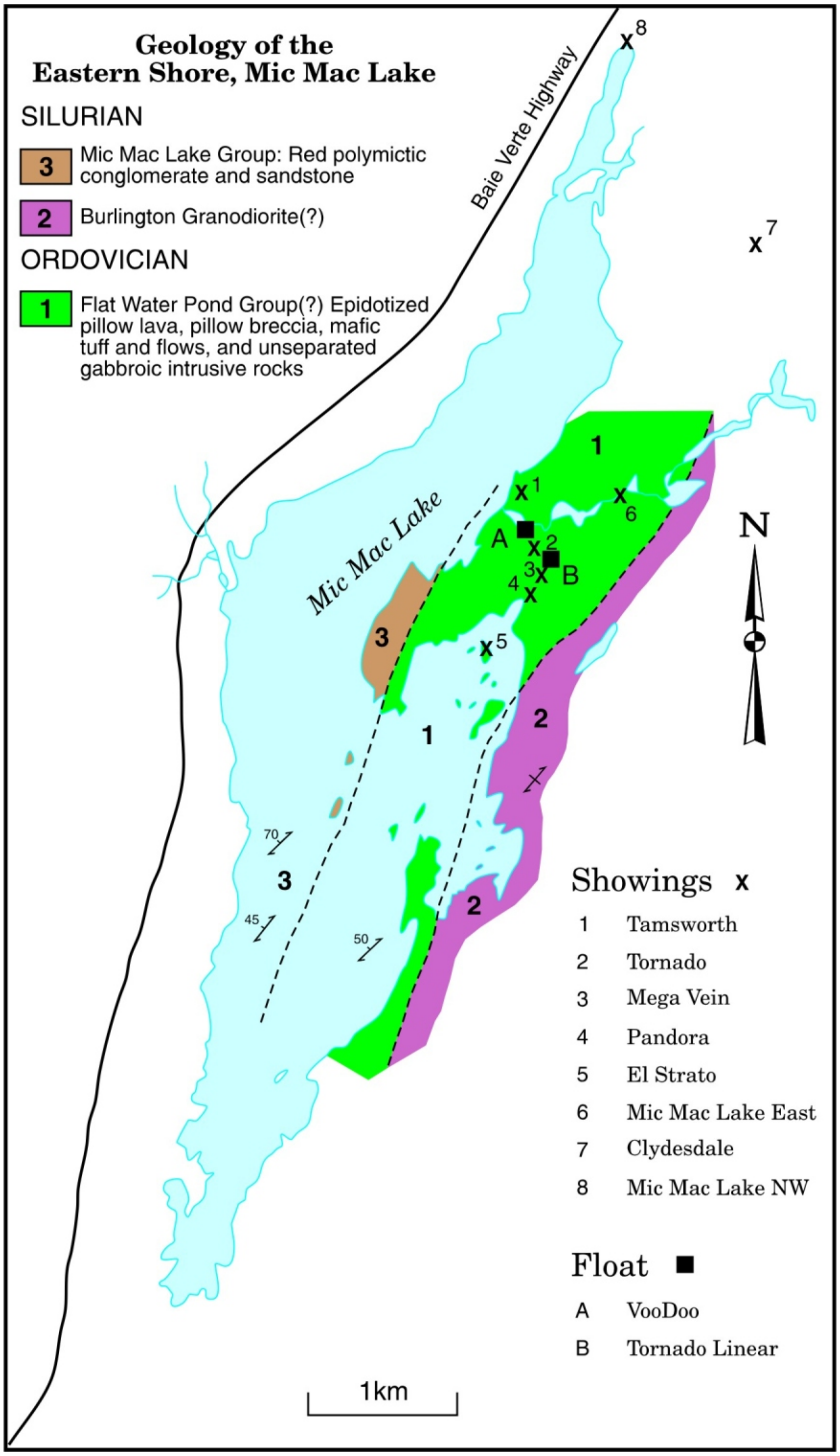

Figure 3. *Simplified geological map of the MicMac Lake area showing the location of gold occurrences and mineralized float.*

setting to the Nugget Pond Horizon within the Snooks Arm Group (A. Sangster, personal communication, 1998).

MICMAC LAKE AREA

The rocks underlying the islands and eastern shore of MicMac Lake were originally included in the Silurian Mic Mac Lake group (Kidd, 1974). However, Neale and Nash (1963) reported that pillow lavas outcropped on a number of islands within MicMac Lake. The Mic Mac Lake group consists of subaerial volcanic and sedimentary rocks; pillow lava is more typical of the Ordovician volcanic sequences. Geological mapping of the islands, a portion of the eastern shoreline, and an examination of trenches and diamond-drill core from the Voodoo (Figure 1; Table 2) area indicates that much of the Mic Mac Lake is underlain by an assemblage of pillow lava, pillow breccia and mafic intrusive rocks (Figure 3). Mapping indicates that this mafic volcanic unit is sandwiched between granodiorite to the east and Mic Mac Lake group polymictic conglomerate to the west. These mafic volcanic rocks do not form part of the Mic Mac Lake group as defined by Kidd (1974); they are lithologically similar to the dominantly submarine mafic volcaniclastic and volcanic rocks of the Flat Water Pond Group to which they should be reassigned.

Along portions of the easternmost shore, a number of exposures of granodiorite were observed. It is not known whether these are continuous with the Burlington Granodiorite. However, these outcrops occur close to a northeast-trending topographic linear that may mark the western contact of the Burlington Granodiorite. These exposures are located approximately 600 m west of the mapped contact as shown by Hibbard (1983).

The pillow lavas exposed on the islands and intersected in diamond drilling are relatively undeformed, but are variably epidotized. The pillows are grey-green, locally vesicular and quartz amygdaloidal, having slightly purplish cores and darker coloured selvages. Interpillow greenish chert was noted locally. Polymictic, red to maroon conglomerate of the Mic Mac Lake group was noted on some of the most westerly islands. The clasts are typically well rounded, up to 20 cm in diameter and are slightly flattened parallel to bedding. Disrupted sandstone beds occur throughout.

A number of significant showings and prospects occur within the area previously thought to be underlain by the

Mic Mac Lake group (Figure 3). These include the El Strato base-metal-rich quartz vein, and the Tamsworth, Mega Vein, Tornado and the Pandora quartz–pyrite veins. Abundant high- grade float was reported from numerous localities along, and to the east of, the eastern shore of MicMac Lake (MacDougall, 1987). The most significant of which is referred to as the Voodoo float. This float comprises metre-scale angular blocks of quartz that contain visible gold and base metal that have yet to sourced. The size of these blocks indicates the potential for large vein systems. All of the known occurrences are hosted by mafic volcanic and intrusive rocks and none were found to occur within the Mic Mac Lake group.

A base-metal-rich quartz vein was discovered during the course of this study as a result of exceptionally low water levels in the brooks flowing into MicMac Lake. In examining the MicMac Lake East showing, which was discovered by Noranda Exploration Limited, a series of narrow quartz veins were discovered within the stream bed. The original discovery was described as a zone of silicified and carbonitized mafic volcanic rock containing up to 5 to 10 percent pyrite. Grab samples from the zone assayed up to 4.62 g/t Au (MacDougall, 1987). Upon re-examination, the zone, which has an exposed width of 5 to 6 m, was found to contain a series of laminated base-metal-rich quartz veins up to 10 cm thick. The veins trend 40° and dip steeply to the north. Locally, heavy concentrations of sulphide mantle the veins. Wall rock to the veins comprises bleached-looking, fine- grained gabbro(?) containing clots and disseminations of pyrite. The zone trends northeast–southwest, but away from the brook the zone is covered by overburden. Grab sample assays for gold (Table 3) include: 5950 ppb, 3310 ppb and 1230 ppb from quartz veins; and 14 ppb and 6 ppb from altered wall rock.

COMPARISON WITH THE MOTHER LODE BELT

The Mother Lode Belt was found in 1848 with the discovery of placer gold by James Marshall in the stream bed of the South Fork of the American River. Since that discovery, approximately 13.4 million oz of gold have been recovered from placer deposits, quartz veins and large low-grade altered wall-rock deposits. The potential for further discoveries is very high, however, environmental concerns and permitting restrictions have largely curtailed exploration and mining activity. The tectonic evolution of the Californian Mother Lode region closely parallels the development of the Baie Verte Peninsula. The following section on the geological evolution of the Mother Lode area was drawn mainly from the California Gold Country and Mines Field Trip Guide (Field Trip to California Gold Country and Mines, 1998).

During much of the Paleozoic, the western continental margin of North American was passive and covered by miogeoclinal sedimentary sequences. In Newfoundland, the clastic sedimentary sequences of the Fleur de Lys Belt were deposited along a similar passive margin. By the end of the Paleozoic, eastward-dipping subduction was initiated along the western continental margin and subduction of oceanic crust created an accretionary-wedge complex consisting of submarine volcanic and sedimentary rocks. Subduction lasted about 100 million years from the late Paleozoic to the Late Jurassic when subduction ceased and a crustal suture belt formed. This event is analogous to Taconic accretion and juxtaposition of the Baie Verte and Fleur de Lys belts along the Baie Verte Line.

About 150 Ma, renewed subduction was initiated approximately 100 km to the west along the Franciscan Subduction Zone. This subduction was coincident with the onset of the Nevadan Orogeny, which lasted from the Late Jurassic into the Early Cretaceous. The Nevada Orogeny was accompanied by intrusion of the composite Sierra Nevada Batholith beginning about 210 Ma and continuing until 80 Ma. The Nevadan Orogeny produced widespread deformation, metamorphism, and plutonism throughout the Sierra Nevada. The previously accreted terranes were strongly deformed, folded and metamorphosed to form the Foothills Metamorphic Belt. Suture zones between the accreted terranes were reactivated to form the Foothills Fault System, one of the more significant of these faults is the Melones Fault zone. In central Newfoundland, the Nevadan Orogenic event would be comparable to the Late Silurian Salinic Orogeny, which produced much of the deformation, metamorphism and plutonism that effected the Baie Verte Belt.

The Melones Fault Zone is about 195 km long. It dips 40° to 60° to the east and is marked by elongate slivers of serpentinite, serpentinite melange, greenstone, slate and bull quartz veining. The fault zone is interpreted to be a suture–subduction zone along which two distinct geological terranes of similar age are juxtaposed; to the east of the fault lie polydeformed and metamorphosed rocks and to the west are less deformed and metamorphosed rocks that host the Mother Lode Belt. It is believed that progressively deeper stratigraphic levels are exposed from north to south along the Melones Fault Zone. The fault zone varies from sheared serpentinite melange in the south, to a broad zone of shearing up to 3.5 km wide along central portions, to a mylonite–phyllonite zone up to 1 km wide in the north. The Melones Fault is comparable in style and length to the portion of the Baie Verte Line extending from Glover Island in the south to Baie Verte in the north. Juxtaposition of the polydeformed and metamorphosed Fleur de Lys Belt with the less deformed Baie Verte Belt along the Baie Verte Line roughly mirrors the evolution of the Melones Fault.

The gold deposition within the Mother Lode Belt is believed to have occurred between 108 and 120 Ma in an oblique stress regime. Large volumes of CO_2-rich fluids were generated during regional deformation and metamorphism. Regionally, extensive brittle fault zones such as the Melones Fault provided fluid pathways for the gold-bearing fluids.

Two styles of gold mineralization are associated with the Melones Fault zone; high-grade gold- bearing quartz veins, and low-grade altered wall rock gold referred to as ‘grey ore'. Veining is developed discontinually along the entire strike length of the fault zone. The veins occur as lenticular bodies hosted by a linked and anastomosing system of faults and shear zones that make up the larger Melones Fault Zone. The veins are typical mesothermal-style quartz veins (i.e., milky-white braided or en echelon tension-gash veins). Veins typically exhibit ribbon textures indicative of multiple vein generations and typically pinch and swell both along strike and down dip. Ore shoots occur where the veins curve or intersect. Vein widths can vary from a few centimeters up to 30 m and individual ore shoots can exceed 1.8 km in length. The concentration of veins increases from south to north along the Melones Fault Zone.

The veins most commonly occur in slates of the Mariposa Formation, but veins also occur in greenstones as well. Hydrothermal alteration surrounding the veins typically comprises sericitization and carbonitization accompanied by pyrite, albite, ankerite, and locally arsenopyrite. Along the southern Mother Lode, quartz veining is also hosted by mariposite (named after the town of Mariposa), a rock consisting of quartz, carbonate and bright green chrome mica. These al-tered ultramafic rocks are identical to the virginite exposures located near Flat Water Pond on the Baie Verte Peninsula.

Gangue minerals in the Mother Lode veins typically include pyrite, arsenopyrite, chalcopyrite, sphalerite and galena. Pyrite locally can form 1 to 2 percent of the ore by volume. The average gold grade of the veins varies from 0.14 to 0.33 oz/ton and free gold can occur as pockets, seams and in quartz stockworks. The Mother Lode Belt was renown for its large gold specimens with many mines producing nuggets up to 1500 oz and placer nuggets up to 50 lbs. A 44 lb crystalline gold specimen, which is currently on display at the Ironstone Vineyards in Calaveras County, was part of 1568 oz of coarse gold recovered from the Crystalline Pit, Jamestown Mine on December 26, 1992.

The lower grade or "grey ore" ore is commonly hosted by carbonate–sericite–pyrite-altered rocks. Low-grade ore commonly accompanies the gold-bearing quartz veins. However, in the southern Mother Lode Belt, the low-grade style of mineralization forms relatively large ore bodies, a number of which have recently been mined by open pit methods. As of 1990, reserves in the five deposits comprising the Jamestown Mine were 20.8 million tons having an average grade of 0.063 oz/ton gold (Allgood, 1990). The gold typically is associated with pyrite, occurring as surface coatings, fracture fillings and micro-inclusions, and rarely as free gold.

SUMMARY AND DISCUSSION

There are many parallels between the geological evolution of the Baie Verte Peninsula and the Mother Lode Belt of California. Both areas formed through accretion of marine volcanic and sedimentary sequences along a destructive continental margin. Both areas were affected by subsequent orogenic events resulting in extensive deformation, metamorphism, plutonism, and gold mineralization. In both instances, the gold is associated with structurally complex zones that juxtapose poly- and lesser-deformed terranes. The Mother Lode Belt occurs within the lesser deformed sequences and, similarly, most of the gold occurrences in the Baie Verte area are hosted by rocks of the Baie Verte Belt; the polydeformed Fleur de Lys Belt is known to host few gold occurrences.

Unlike the Mother Lode Belt, in which the gold-bearing veins have remained relatively intact since their formation, the Baie Verte Line was subjected to continued deformation long after gold deposition. As a result, many of the auriferous vein and altered wall-rock occurrences are deformed. Vein systems associated with the larger fault zones exhibit evidence of brittle (brecciation) and ductile (boudinaged) deformation. Alteration zones tend to be lensoidal and transposed parallel to the regional cleavage.

Regionally, there is no significant variation in the style of gold mineralization along the trace of the Baie Verte Line. However, there is an obvious correlation between the style of gold mineralization and the host lithology. The ophiolitic sequences are the most prolific gold host on the Baie Verte Peninsula. With the exception of the base-metal-rich quartz vein and the sericite–quartz–pyrite-altered wall-rock subclasses, all other subclasses are represented in the ophiolitic sequences. The carbonate–quartz–pyrite subclass is the most widely developed style of gold mineralization on the peninsula. It occurs within mafic rocks of both the ophiolitic and Ordovician cover sequences. This subclass most closely resembles the "grey ore" deposits of the southern Mother Lode Belt. These occurrences offer potential for large tonnage, low grade deposits.

The base-metal-rich quartz vein subclass appears to be restricted to the Ordovician cover sequences. The presence of lead in these veins precludes a totally ophiolitic fluid source. Obducted sedimentary or island-arc volcanic rocks would be the most obvious source for the lead. Alternatively, lead may have been derived from rocks of the Fleur de Lys Belt over which the Baie Verte Belt had been thrust. Lead isotope data from the gold occurrences will be examined for a Grenville signature.

Low-sulphidation epithermal-like alteration is restricted to the Silurian cover sequences. This alteration comprises broad zones of silicification and sericitization, disseminated pyrite, and quartz–specularite and quartz–adularia (?) veins. However, these zones do not appear to show enrichment in the typical epithermal elements Hg, As, and Sb (MacDougall, 1988). Gold values, while typically low, are enriched over broad areas. Some narrow higher grade zones and high-grade float have been reported. These occurrences offer excellent potential for large tonnage low-grade deposits.

Unlike in the Mother Lode Belt, where mariposite locally forms the immediate host rock for some of the gold occurrences, no significant gold mineralization is associated with similar rocks (virginite) exposed along the Baie Verte Line. Williams *et al.* (1977) reported the presence of virginite blocks in the Kidney Pond conglomerate east of Trap Pond on the Baie Verte Highway. The Kidney Pond conglomerate probably forms the base of the Ordovician Flat Water Pond Group. Hence, the genesis and exhumation of the virginite must predate deposition of the Flat Water Pond rocks. If, as evidence would suggest, the gold mineralization is related to Siluro-Devonian deformation then the zones of virginite, which are exposed at numerous localities on the Baie Verte Peninsula, are unrelated to subsequent gold mineralizing events. However, it is important to note that Cr-micas are almost ubiquitous to mineral deposits within the Baie Verte Belt. Traces of these micas are present in many of the gold occurrences and fuchsite occurs in the Footwall Zone of the Main Mine (Bradley, 1997). This suggests a ophiolitic–Cr component in the mineralizing fluids.

Field work has concentrated on documenting the numerous gold occurrences located on the Baie Verte Peninsula. A joint study comparing the various iron-formation-hosted gold occurrences located throughout the Notre Dame Subzone is being undertaken in conjunction with Dr. A Sangster of the Geological Survey of Canada. Similarly, a joint study with Dr. D. Wilton of the Department of Earth Sciences at Memorial University is aimed at developing an isotopic and fluid-inclusion data base for the gold occurrences on the Baie Verte Peninsula. This information will be compared with existing data for other central Newfoundland gold occurrences. The Baie Verte area has tremendous potential for further gold discoveries. Large areas remain to be explored, and many of the known occurrences have received only grass-roots level exploration. Much detailed work remains to be done. Detailed regional and deposit level mapping in the form of university theses is needed.

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