

GEOLOGICAL ASPECTS OF SOME HISTORICAL BUILDINGS AND STRUCTURES IN NEWFOUNDLAND

W.L. Dickson, P.Geo. and M. King¹
Mineral Deposits Section

ABSTRACT

Several historic buildings and structures in Newfoundland contain stone as an integral or, at least functional/artistic, part of their design. Stone was examined in historic buildings in Corner Brook, Brigus, Harbour Grace and St. John's, and rock walls were examined at the Queen's Battery in St. John's, in Brigus, and in Grates Cove. In Corner Brook, local limestone and glacial erratics have been used to construct walls and gate posts and imported cut and polished marble was used for the staircase in the Corner Brook Museum. The Queen's Battery wall used local stone capped and faced with imported sandstone. The Presentation Convent in St. John's is faced with imported (probably Irish) and Holyrood Granite. The Stone Barn in Brigus used stone from Kellys Island; local stone was used in Brigus for church foundations and retaining walls. The Conception Bay Museum used local stone for the foundations and a large amount of granite from the late 19th century quarries at The Topsails in central Newfoundland. This indicates that the present building could not have been built in 1870 (as considered by some) as the quarries had not yet opened. At Grates Cove, the 18th century walls are constructed from local siltstone fieldstones.

INTRODUCTION

Several well-known and not-so-well known buildings and historic structures within the Province were visited during 2004. All of these buildings and structures contain stone as an integral feature of their design. The published descriptions of many of these historic buildings usually include an indication that they contain stone, but the descriptions of the stone may be simplistic and sometimes inaccurate. The buildings were also examined to see if they contain any native stone, which could indicate forgotten sources of building stone within the Province that, if suitable, could be developed as a product for commercial use. The general location of the sites visited is shown in Figure 1.

CORNER BROOK HOUSE

Corner Brook House (Figure 1, Plate 1) was constructed in 1924-25 for Sir W.G. Armstrong whose company, Sir W.G. Armstrong, Whitworth and Co. Ltd., had been engaged by the Government of Newfoundland and the Reid Newfoundland Company to oversee construction of the pulp mill in Corner Brook, design and construct the Corner Brook town site, a water reservoir, a power plant and transmission

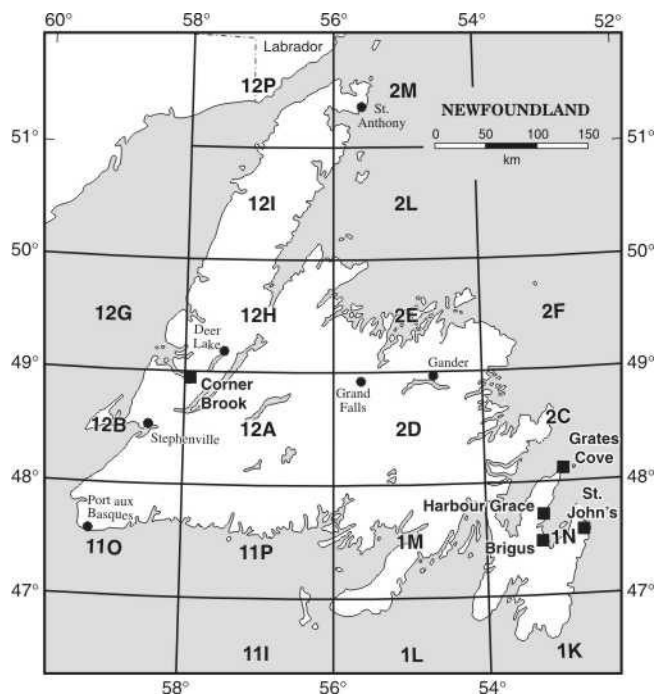


Figure 1. Location of the various historic sites visited in 2004.

¹ Present address: 34 Carberry's Road, Corner Brook, NL, A2H 7P5



Plate 1. Stone wall and gate post at the entrance to Corner Brook House.

lines (Symonds, 2001). Armstrong never used the house and it became the residence of the General Manager of the Newfoundland Power and Paper Co. pulp and paper mill. Corner Brook House is a wood and brick structure built in the Tudor Revival style (Symonds, 2001), and displays little use of stone. However, the walls and gate posts at the entrance to the house (Plate 1), as well as the stone walls along West and Main streets in Corner Brook, were built during the late 1920s to early 1930s. The variety of rock types used in the walls at the entrance to Corner Brook House suggests that several sources were used. However, one strong possibility is that they are mainly glacial erratics that were collected locally and shaped into blocks for use in the wall. The walls along West and Main streets are constructed from grey marble that could have been obtained from an area along the Trans-Canada Highway or along the southwestern area of the Humber Gorge where Knight (1995) has described a variety of grey limestones (that have been variably altered to marble) from the St. George and Table Head groups.

CORNER BROOK MUSEUM AND ARCHIVES

Constructed in 1926, the Corner Brook Museum building (Figure 1, Plate 2) was originally the Corner Brook Public Building and used as a police station, courthouse, telegraph office and jail. After renovations to the original concrete building were completed in 1997 it became the home of the Corner Brook Museum and Archives. The major stone feature found within the museum is a marble staircase that extends from the basement, where the jail cells were located, to the courthouse located on the third floor (Plate 2). The steps are constructed from a white, streaky marble breccia and is possibly a variety of the world famous Italian Carrara Marble.



Plate 2. Marble staircase inside the Corner Brook Museum.

QUEEN'S BATTERY, ST. JOHN'S

Originally constructed in 1796, the Queen's Battery (Figure 1, Plate 3) was used as a defensive point to protect



Plate 3. Outside face of the rampart at the Queen's Battery, Signal Hill, St. John's showing the local stone used to construct the wall.



Plate 4a. *Front of Presentation Convent, Convent Square, St. John's.*



Plate 4b. *Porphyritic granite used in the basement-level wall of Presentation Convent.*



Plate 4c. *Equigranular granite used in the upper floor walls of Presentation Convent.*

St. John's harbour. The outside of the ramparts, facing the Narrows, is constructed of local red and green sandstone from the Gibbett Hill and Quidi Vidi formations of the Signal Hill Group (King, 1990). The blocks are roughly shaped. The cap rock and interior wall (facing the barracks) is composed of blocks of medium-grained, uniform, light grey to buff sandstone having bevelled edges and a crenulated inside vertical face. This sandstone is not available locally and must have been imported. The age of the current wall is not known and it is possible that the imported sandstone was recycled from another building or structure well after 1796. The adjacent renovated barracks is also constructed from stone available from the Signal Hill area but new imported green sandstone (possibly Wallace Sandstone from Nova Scotia) was used for the window sills.

PRESENTATION CONVENT, ST. JOHN'S

The Motherhouse of the Presentation Sisters (Figure 1 and Plate 4a) was opened in 1853. Various published reports indicate that granite from the Holyrood area was used to construct the building. However, two types of granite were used as facing stone for the walls. The basement-level stone is different from that used for the upper floors, and the front steps are third type of granite. Some stone is now coated in paint and the rock type could not be determined without marring the paintwork.

The basement-level granite is pink, coarse-grained, K-feldspar-porphyritic granite (Plate 4b), which was not available in the 1850s from Newfoundland quarries for use as building stone. The source of this granite is not known but it could have come from Ireland where another variety of granite was imported into the Province for the construction of parts of the nearby Basilica. The granite used for the upper floors of the convent is a pink, coarse-grained, undeformed, equigranular, biotite–hornblende granite (Plate 4c). This type of granite is easily recognized as Holyrood Granite. Investigations were carried out along Quarry Brook, which forms part of the boundary between the towns of Holyrood and Conception Bay South (CBS), the name of which obviously indicates that there should be a quarry somewhere in the area. The granite outcrops both upstream and downstream from the road bridge over Quarry Brook (Route 60). The most likely area for a quarry site is about 300 m downstream from the bridge where numerous blocks of granite are exposed on the sides of the river and on bedrock within the shallow stream (Plate 4d). Other nearby areas, to the east along Route 60, also have granite exposures that could have been suitable for obtaining building stone. Some drillholes were observed on low outcrops located just east of the road bridge over Quarry Brook. However, it is also possible that this stone was quarried during railway construction in the early 1880s, as several rail bridge but-



Plate 4d. Blocks of equigranular Holyrood Granite found in Quarry Brook, near Holyrood. Notebook is 17 cm high.



Plate 4e. Equigranular hornblende-biotite granodiorite, similar to “Dublin Granite”, used for the front steps of Presentation Convent.

tresses in the CBS-Holyrood area have abutments constructed of Holyrood Granite.

The material used for the stone steps in front of the Convent is almost certainly an Irish granite, possibly “Dublin Granite”. The granite is a coarse-grained, equigranular, hornblende granodiorite (Plate 4e). The granite used for the stone steps is virtually identical to the granite used for the bases of the Italian Carrara marble statues in front of the Basilica and also that used as a facing stone for the disused Diocesan offices, located between St. Bonaventure’s College and the Basilica Museum. The length of the steps (over 3 m) is similar to that seen in the Diocesan building where several granite ashlar of this length can be observed near ground level.



Plate 5. Conception Bay Museum, Harbour Grace showing the use of Topsails Granite for the quoins, doorway, lintels, sills and dentils, the red slate roof and red brick facing.

CONCEPTION BAY MUSEUM, HARBOUR GRACE

The Conception Bay Museum, also known as the Harbour Grace Museum (Figure 1, Plate 5), is located in a former 1870s customs building (see www.manl.nf.ca/conceptionbay.htm and www.hrgrace.ca/museum.html). The architectural style of the building is Georgian, which is characterized by the symmetrical design of the front of the building, its sturdiness and simplicity. The building also has some added elements that are not associated with the Georgian style. Shane O’Dea (written communication, 2004) indicated that the modified Georgian style is common in Newfoundland and has been termed “Vernacular Classical” by the Heritage Committee of the Heritage Foundation of Newfoundland and Labrador.

A prominent feature of the museum is the use of sandstone, granite, red brick and red slate in the construction of the rectangular building. The museum foundations are constructed of rough-hewn, grey sandstone, which is similar to the sandstone of the late Precambrian Fermuese Formation of the Conception Group (King, 1988). This formation outcrops in Harbour Grace and may be observed along the shoreline adjacent to the museum. It was mentioned by a Harbour Grace resident that the basement stone is from Kellys Island. However, this is not likely because the foundation stones are grey and have a weak cleavage, a feature not found in the light grey to white, quartz-rich Ordovician Kellys Island Formation sandstone (King, 1988). Overlying the foundation and probably used as a facing stone are two strings (layers) of granite ashlar. The quoins (corner blocks), window sills and lintels, doorway and doorstep, eaves and associated dentils (tooth-like projections from the eaves), and the window surround on the upstairs middle

front window are also made from the same granite. The building is roofed with red and green slate that may have been obtained from the Random Island area (*see e.g.*, Martin, 1983).

The granite used in the museum is readily identified as Topsails Granite, which is typically a coarse-grained, equigranular, yellow-green rock. The presence of Topsails Granite in the building indicates that the current building was not constructed in 1870 but must be post-1870. Topsails Granite was only produced between 1894 (when the railway reached the Gaff Topsails) and the early 1900s. During this time, most of the buttresses for the railway bridges were constructed from stone quarried along the Gaff Topsails. It should also be noted that from 1898 to 1901, stone was quarried at the Gaff Topsails for the construction of the railway station in St. John's and for the cobblestones of Water and Duckworth street (Cuff, 2001).

A prominent feature of the museum walls is use of red brick, which is similar to the Accrington brick used in the construction of many prominent buildings in St. John's following the 1892 fire. Examples include the St. Andrew's and Gower Street churches and the Masonic Temple (*see Heritage Foundation of Newfoundland and Labrador, 2004*). The use of the red brick possibly also supports a late 19th century date for construction of the present building.

BUILDINGS AND STRUCTURES AT BRIGUS

The Stone Barn in Brigus (Figure 1, Plate 6a) was originally built in 1825 but due to severe deterioration, the building was razed and reconstructed in the late 1980s. The rebuilt barn has sandstone walls, which used the original stone blocks, and a slate roof. The Barn was opened to the public, as a museum, in 1991. The stone used for the exterior walls is uncleaved, light grey to white, quartz-rich sandstone and is probably from Kellys Island. The blocks of stone have not been squared off, the flat surfaces being naturally flat. The original slate tiles were unusable and new slate tiles were obtained from the Britannia Cove quarry in Trinity Bay.

The stone retaining walls (Plate 6b), located behind the barn are made from local sandstone and were probably constructed in the early 19th century. There are three tiers of walls visible from the grounds of the stone barn. The walls are up to 100 m long and up to 2 m high. It is clear that great care was taken in building the walls as distinctive stone patterns can be observed in the walls.

St. George's Anglican Church and Brigus United Church were built in 1876 and 1875 respectively. Both



Plate 6a. *The Stone Barn, Brigus, constructed from Kellys Island sandstone, and the Britannia Cove red slate roof.*



Plate 6b. *Stone wall behind the Stone Barn constructed from local sandstone blocks.*

churches are wooden structures but their foundations are made from local, cleaved sandstone that outcrops near the churches. The stone at St. George's Anglican Church has been painted but at Brigus United Church the original stone may be observed (Plate 6c). It is assumed that both churches used similar stone.

The rock used in the walls and the church foundations in Brigus is a grey-green, weakly cleaved, fine-grained sandstone that is similar to the Drook Formation of the late Precambrian Conception Group (King, 1988) which outcrops in Brigus. The stone could easily be split into thin building blocks for use in building the church foundation walls and the retaining walls.



Plate 6c. Foundation wall of Brigus United Church constructed from local sandstone blocks.

GRATES COVE WALLS

In and around the community of Grates Cove (Figure 1), located at the entrance to Trinity and Conception bays, a large number of historic stone walls may be seen (Plate 7). The area has been designated as a National Historic site. The walls were built by the early settlers commencing around the end of the 18th century and enclose an area of about 65 hectares (from the interpretation plaque at Grates Cove). The walls were used to protect vegetable gardens from domestic animals and continued to be used, with minor modifications such as the addition of wire fences, possibly until the 1950s. The stones used in the wall construction were obtained from heaved blocks of the cleaved siltstone bedrock, which at Grates Cove has been assigned to the late Precambrian Old Perlican Member of the Bay de Verde Formation of the Signal Hill Group (King, 1988). Frost heaving and natural weathering of the bedrock, produced angular, thin and flat blocks of stone. These blocks were a suitable and readily accessible material for building the walls. Some of the stone would also have been obtained during the clearing of land for use as vegetable garden plots. There is no indication that any rock was quarried from bedrock. The rock is susceptible to weathering and blocks commonly have rounded edges. The walls are now nearly all in ruins and form numerous polygons of rock strings generally less than 1 m in height.

CONCLUSIONS

The rock walls at Corner Brook indicate that locally occurring limestone and marble is suitable for wall construction and is a long-lasting material. The blocks of sandstone used in the Brigus area are also a good building material. This type of rock has been used for centuries in Newfoundland to construct the foundations of many buildings.



Plate 7. Remnants of the historic stone walls at Grates Cove constructed from local siltstone.

The use of Topsails Granite in the Conception Bay Museum indicates that the published history of the building should be reviewed. The stone used in the walls at Grates Cove, although useful for garden walls, is not suitable for use as a building stone.

ACKNOWLEDGMENTS

This paper benefitted from a review by Richard Wardle.

REFERENCES

- Cuff, R.
2001: Mainline Construction, 1881-1897. www.heritage.nf.ca/society/mainline_construction.html
- Heritage Foundation of Newfoundland and Labrador
2004: Alphabetic listing of by place R - S). http://www.heritage.nf.ca/society/rhs/rhs_rs.html
- King, A.F.
1988: Geology of the Avalon Peninsula, Newfoundland (parts of 1K.1L, 1M, 1N and 2C). Newfoundland Department of Mines, Mineral Development Division, Map 88-1.
1990: Geology of the St. John's area. Newfoundland Department of Mines and Energy, Geological Survey, Map 90-120.
- Knight, I.
1995: Preliminary 1:50 000 mapping of Lower Paleozoic parautochthonous sedimentary rocks of the Corner Brook area. *In* Current Research. Newfoundland Department of Natural Resources, Geological Survey, Report 95-1, pages 257-265.

Martin, W.

1983: Once Upon a Mine. Canadian Institute of Mining, Metallurgy Special Volume 26, Montreal, Quebec, 98 pages.

Symonds, R.

2001: The architecture and planning of the townsite development Corner Brook 1923-5. Heritage Foundation of Newfoundland and Labrador. www.heritage-foundation.ca/docs/townsite.pdf