



# SOME NEW DIMENSION STONE PROPERTIES IN BRITISH COLUMBIA PART III

By Z.D. Hora and K.D. Hancock

**KEYWORDS:** Industrial minerals, dimension stone, building stone, granite

## PROPERTY DESCRIPTIONS

## INTRODUCTION

The first two parts of this project were published in Exploration in British Columbia 1992 and Geological Fieldwork 1994. In 1996 the industry has grown again (Figure 1). A new processing plant has been opened by the Garibaldi Group Inc. in Squamish (Figures 2, 3 and 4) and Margranite Industries Ltd. has added a hydraulic splitter to its tile processing plant in Surrey. During 1995 and 1996 more quarries, prospects and potential sites were visited. The descriptions presented here are based on site visits, polished slabs (typically 400 square centimetres) and thin section analysis. Rock names in the petrographic descriptions are based on Streckeisen's classification (1976).

### *Ashlu River Quarries*

**Location:** lat.: 49°59'30" long.: 123°32'00"; 92G/13, Vancouver Mining Division. At mile post 2.5 on the Ashlu River forestry road.

**Access:** From Squamish by logging road upstream along the Squamish and Ashlu rivers.

**Owners:** Garibaldi Group Inc.

**Operator:** Garibaldi Group Inc.

**Commodities:** Dimension stone - granite

## LOCAL GEOLOGY

Both Ashlu River properties are located in the lower part of the Ashlu River valley. It is broad and U-shaped with many bedrock outcrops. The two properties are in a similar type of granite only 100 metres apart. Because of its distinctive colour, the stone on the west side of the river is called "Garibaldi Golden" while stone on the east side is called "Garibaldi Grey". The granite on the west side is covered by thin patches of clayey till with water seepage along the till/bedrock interface. While the clayey till is dark grey in colour, the seepage is characterized by a rusty yellow layer a few centimetres thick. This yellow, clayey material has soaked into the bedrock along joints and microcracks, resulting in the unusual colour of the stone when it is cut and polished. Both quarry site display widely spaced natural fracturing and allows quarrying of 5 to 10 cubic metre blocks with a minimum of waste (Figure 5). In outcrop, the stone has a smooth, slightly pitted surface indicating absence of microfractures and exfoliation features (Figure 6). The stone has a uniform look without dark knots or inclusions. The granite is part of the Coast Plutonic complex.

## PETROGRAPHY

Garibaldi Gold is a grey-blond, fine-grained granite. The rock is distinguished by a slight, pervasive yellow staining and some "banding" of a darker stain. This appears to be related to successive weathering/ alteration fronts that introduced stain from overlying till. The authors and the operator anticipate staining will diminish with depth. Major mineral constituents are orthoclase,

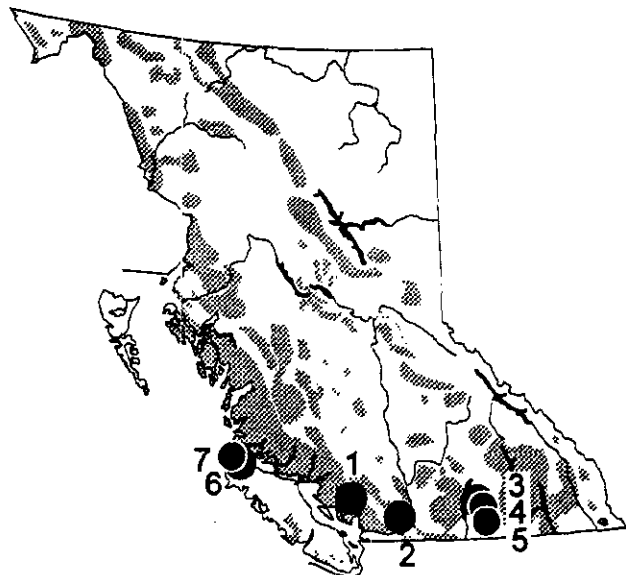


Figure 1. Location of stone properties in British Columbia.  
1: Ashlu River, 2: Raven Black; 3: Grano Creek; 4: Gabe claims; 5: San Pedro Black; 6: Tsitika Grey; 7: Port McNeil. The shaded areas are major granitic terranes in the province.

quartz, plagioclase and microcline. Minor constituents are magnetite, biotite, clinopyroxene (augite), chlorite, apatite, sphene and clinozoisite. Most crystals are cracked at the microscopic scale and appear to be the conduits through which the surface waters can migrate. The mafic minerals are fairly fresh with minor chloritization and the feldspars are weakly sericitized. The rock takes a fair polish (7-8/10) with some pitting at biotite grains. There is no fabric or fracturing and the microcracking of grains is not visible macroscopically.

Garibaldi Grey is a fine-grained, grey, salt and pepper granite. Major constituents are white plagioclase and orthoclase, grey quartz and black biotite. Minor constituents are chlorite, pyroxene, magnetite, pyrite and clinozoisite. The texture is uniform with a coarse sugary appearance and no fabric. The rock polishes well (7-8/10) to a bright finish with minor, shallow pitting at the corners of biotite grains. The rock appears quite fresh with minor chlorite after biotite and some sericitization of the feldspars. There is a trace of pyrite present but no visible staining.

### *Raven Black Quarry*

**Location:** lat.: 49°36'00" long.: 121°37'00", 92G/12, Vancouver Mining Division. Approximately 42 kilometres northeast of Harrison Hot Springs.

**Access:** From Harrison Hot Springs north on the east side of the lake and then east on Cogburn Creek road.

**Owner:** W. Streicek

**Operator:** Granite Creations and Stonework

**Commodities:** Dimension stone - black granite

### LOCAL GEOLOGY

Large, blocky outcrops are exposed in the bottom part of a V-shaped valley. The stone is sound, lacking microfractures. The homogeneity is affected by scattered, long, 1 to 2 millimetre wide, very dark green veinlets (Figures 7 and 8). The anorthosite is part of the Coast Plutonic complex.

### PETROGRAPHY

Raven Black is a medium black, medium-grained anorthosite. It has an even texture and uniform colour. The rock is comprised of plagioclase with very small amounts of biotite, chlorite and trace magnetite. It has no alteration, staining or fabric. It takes a fair to good polish (7-8/10) with some minor pitting on biotite. There are some narrow (1-2 mm), through going black to very dark green fractures, healed with chlorite, that mar the uniformity of the rock.

### *Grano Creek*

**Location:** lat.: 49°33'00" long.: 118°47'00", 82E/7, Greenwood Mining Division. At the confluence of Grano Creek and Kettle River on the east side of the valley, 57 kilometres north of Rock Creek.

**Access:** North on Christian Valley road and then east on Grano Creek road across the Kettle River bridge.

**Owner:** C. H. Maddin

**Operator:** Quadra Stone Co. Ltd.

**Commodities:** Dimension stone - granite

### LOCAL GEOLOGY

The quarry is located at the base of a large rock outcrop, almost free of joints, about 50 meters high and 150 metres long in steep cliffs on Kettle River (Figure 9). It is comprised of porphyritic, pink granite of the Okanagan Batholith suite. The stone is sound, with smooth surface and no exfoliation features. The orthoclase megacrysts, mostly 1 by 2 centimetres in size, exhibit preferential orientation, probably reflecting flow during emplacement. The stone is uniform in texture with no inclusions or agglomerations of mafic minerals.

### PETROGRAPHY

Grano Creek stone is a classic porphyritic, pink granite. The matrix is grey and medium to coarse-grained with pink orthoclase megacrysts, mostly 1 to 2 centimetres long. The matrix comprises quartz, plagioclase and orthoclase with minor biotite, magnetite, chlorite and sericite. The orthoclase megacrysts show some perthitic texture and are frequently cracked. Alteration is minor with some chlorite and iron staining after mafic minerals (<<1/2%). The rock has a moderately developed linear(?) fabric defined by a general preferred orientation of the orthoclase megacrysts. The polish of the rock is fair (7/10) with narrow ( $\pm 0.25$  mm) cracks up to 40 millimetres long and some pitting. This is largely from preferred cracking parallel to cleavage in orthoclase megacrysts that persists into the matrix. Pitting is generally due to small fragments of matrix that have fallen out of the cracks.

### *San Pedro Black Quarry*

**Location:** lat.: 49°19'30" long.: 118°35'30", 82E/7, Greenwood Mining Division. On Almond Creek, 3 kilometres northeast of Almond Mountain.

**Access:** From Grand Forks north on the North Forks road and Pass Creek Forest Service road to the 23 kilometre sign and then 2 kilometres up a branch road to the left.

**Owners:** San Pedro Stone Inc.

**Operator:** San Pedro Stone Inc.

**Commodities:** Dimension stone - black granite

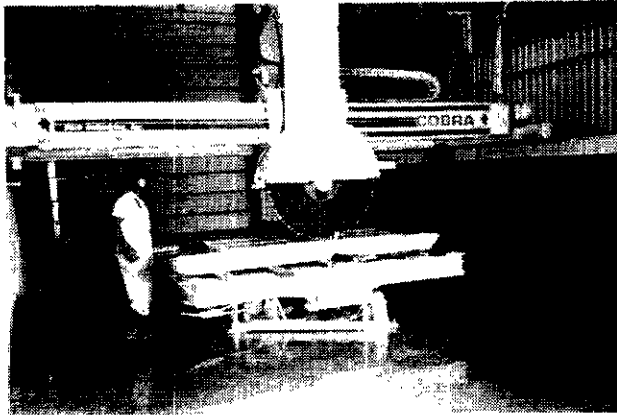


Figure 2. Garibaldi Group Inc.'s Squamish plant. Cutting granite slabs



Figure 5. Garibaldi Golden quarry, Garibaldi Group Inc.

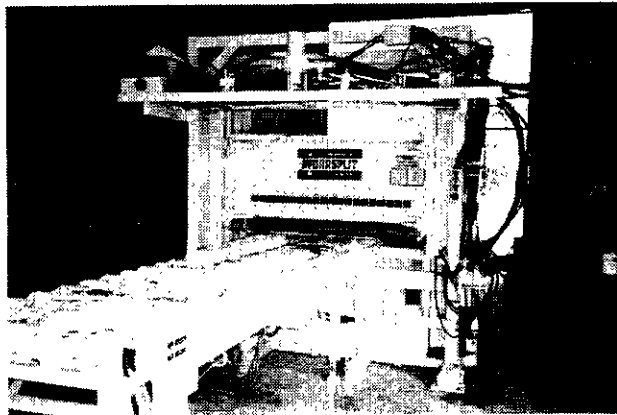


Figure 3. Garibaldi Group Inc.'s Squamish plant hydraulic splitter.

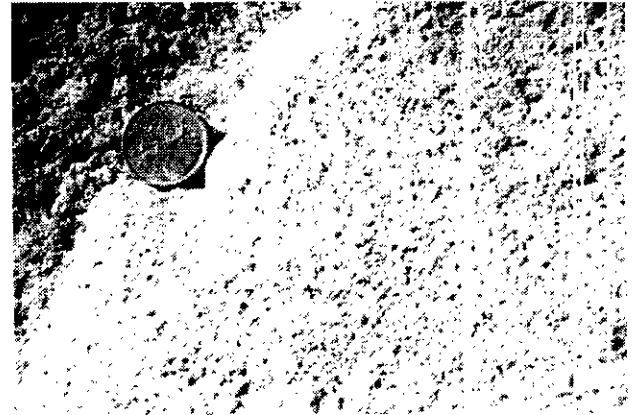


Figure 6. Slightly pitted but otherwise sound weathered surface of Garibaldi Golden granite.

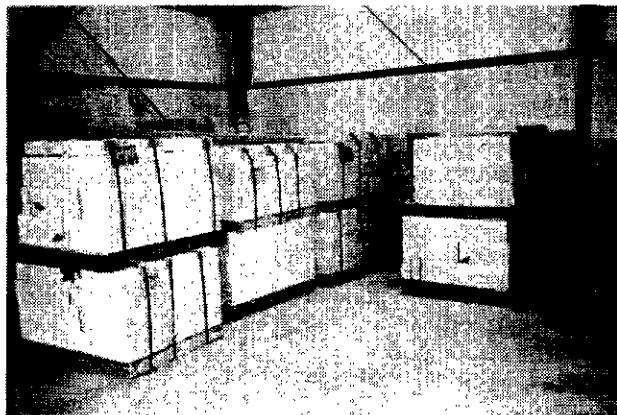


Figure 4. Garibaldi Group Inc.'s palletized split stone product, Garibaldi Grey.



Figure 7. Raven Black quarry site at Coğburn Creek.

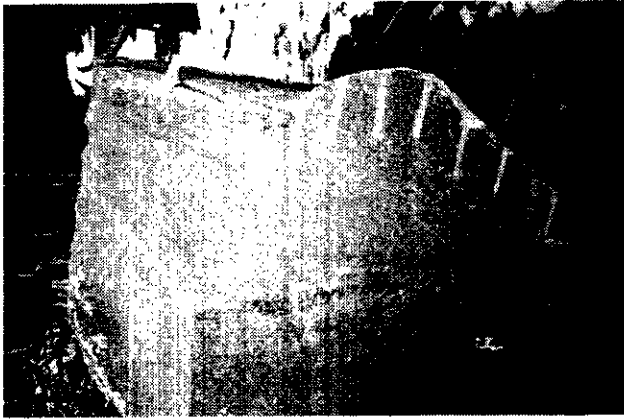


Figure 8. Raven Black split face with crosscutting vein.



Figure 11. San Pedro Black quarry showing large block size.

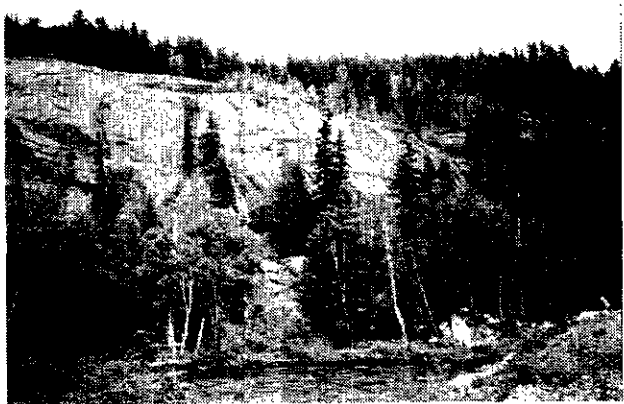


Figure 9. Grano Creek prospect.



Figure 12. Tsitika Grey granite - typical texture with common dark inclusions.



Figure 10. San Pedro Black quarry.



Figure 13. Port McNeil andesite prospect.

## LOCAL GEOLOGY

A small group of outcrops, of coarse-grained gabbro, along a logging road lead to stripping and test quarrying which has exposed the gabbro over a 30 by 50 metre area (Figure 10). The stone has a moderate, irregular fracture pattern which allows quarrying of commercial sized blocks with estimated waste of up to 50 percent (Figure 11). The stone is uniform without any foreign rock inclusions. It may be part of a Nelson Plutonic suite pendant in a Coryel Syenite pluton.

## PETROGRAPHY

Stone from the San Pedro prospect is a uniform, dark black with a slight greenish cast, medium-grained gabbro. Major constituents are plagioclase, clinopyroxene (augite) and biotite. Minor constituents are orthoclase, chlorite, apatite, magnetite and pyrite ( $\pm 1\%$ ). The mafic minerals are slightly altered to chlorite, plagioclase is slightly albitized and pyrite is fresh. There is no quartz. The rock takes an excellent, bright, glassy, polish (9/10) with very minor pitting at mafic minerals. The rock looks fresh with no visible alteration, staining or fabric. There are a few, tight cracks, typically 1 to 3 centimetres long.

### *Gabe Claims Prospect*

**Location:** lat.: 49°28'00" long.: 118°35'00", 82E/7, Greenwood Mining Division. Eight kilometres east of Gable Mountain.

**Access:** Seventy five kilometres north from Grand Forks on the North Forks road then along the Pass Creek Forest Service road, then up the Gable Creek Forest Service road.

**Owners:** J. Kemp and D. Hairsine

**Operator:** none

**Commodities:** Dimension stone - granite

## LOCAL GEOLOGY

This rose pink rock occurs in a boulder field approximately 1 by 2 kilometres and an outcrop about 30 by 50 metres across. The stone is uniform, pink quartz syenite of the Okanagan Batholith suite and has no inclusions or inhomogeneities. Part of the area is underlain by porphyritic rock. No exfoliation features, joints or microfracturing have been observed.

## PETROGRAPHY

The Gabe claims stone is a light pink, fine to medium-grained quartz syenite. The texture is fairly uniform and even with no large phenocrysts. Major constituents are orthoclase, plagioclase and quartz. Minor constituents are biotite, chlorite, magnetite, pyrite (<0.5%), apatite, zircon and clinzoisite. The rock shows no staining and only a little alteration in the form of green dots of chlorite after biotite. There are a few short (<2 cm), tight cracks scattered in the rock.

### *Tsitika Grey Prospect*

**Location:** lat.: 50°16'00" long.: 126°22'00", 92L/8, Nanaimo Mining Division. Ten kilometres south of Woss on the Island Highway.

**Access:** One to two hundred metres, north and south, to each side of the Island Highway on logging roads.

**Owners:** T. Henneberry

**Operator:** Tsitika Stone Industries

**Commodities:** Dimension stone - granite

## LOCAL GEOLOGY

The stone is found as scattered outcrops and boulder fields between the Island Highway and the Tsitika River. It is fresh and boulders vary in size up to several tens of tonnes. There are no visible microfracture or exfoliation features. Rounded inclusions of darker facies rock are a common feature in the whole area (Figure 12). The stone is part of the Vancouver Island intrusive suite.

## PETROGRAPHY

Tsitika Grey is a fairly uniform, medium to coarse-grained quartz monzonite. The colour is medium grey with black 'peppering' by coarse-grained mafic minerals. Major constituents are plagioclase, quartz, hornblende, biotite and orthoclase. Minor constituents are magnetite, apatite and clinzoisite. The mafic minerals are unaltered and feldspar has minor sericitization. The rock looks fresh with no alteration, fabric or staining on the polished face. It takes a good, bright polish (8/10) with rare pitting on biotite. Magnetite grain aggregates, up to 3 millimetres across, give a scattered metallic glint. Mafic knots are rare, small, less than 2 centimetres across, and consist of mats of hornblende, biotite and feldspar.

### *Tsitika Black Prospect*

**Location:** lat.: 50°19'00" long.: 129°29'00", 92L/8, Nanaimo mining Division. Eighteen kilometres northeast of Woss on the Tsitika River.

**Access:** On the Tsitika River forestry road, 30 kilometres east of Woss at the Island Highway.

**Owners:** T. Henneberry

**Operator:** Tsitika Stone Industries

**Commodities:** Dimension stone - granite

## LOCAL GEOLOGY

The rock is found as scattered outcrops and boulder fields in the Tsitika River valley. This stone is a more fractured and darker phase of Tsitika Grey. Because of the high fracture density, it has limited use other than for masonry blocks.

## PETROGRAPHY

Tsitika Black is light black with grey-pink highlights. It is a uniform, (fine) medium-grained diorite (gabbro). Major constituents are plagioclase, biotite and clinopyroxene (augite). Minor constituents are chlorite, magnetite, pyrite ( $\pm 3\%$ ), quartz and apatite. Pyroxene is strongly altered to chlorite, biotite is generally unaltered and plagioclase shows weak albitization. Pyrite is fresh and unaltered. The rock takes a good polish (8/10) and has minor pitting on biotite. The rock has a well developed planar fabric but no visible alteration or staining. There is no macroscopic fracturing and only minor microfracturing of primarily plagioclase.

### *Port McNeil (Haddington Island) Andesite Prospect*

**Location:** lat.: 50°34'00" long.: 127°11'00", 92L/11, Nanaimo Mining Division. Seven kilometres west of Port McNeil on top of Cluxewe Mountain.

**Access:** From the Island Highway, 4 kilometers south on a road that leads to a radio tower/transmitter.

**Owners:** T. Henneberry

**Operator:** Tsitika Stone Industries

**Commodities:** Dimension stone - andesite

## LOCAL GEOLOGY

The Port McNeil site occurs as a flat, horizontal lava flow that caps the table shaped Cluxewe Mountain. The stone is exposed in cliffs 5 to 10 metres high (Figure 13). The flow is vertically fractured with spacing up to several metres apart. The surface is smooth, very homoneneous, light grey in colour and almost aphanitic in appearance. This volcanic rock, because of its texture, colour and splitting characteristics, could be used in applications where sandstone would normally be used. In contrast to British Columbian sandstones, Haddington Island andesite has an excellent performance record and durability in the coastal climate.

## PETROGRAPHY

The Port McNeil andesite is a buff, very fine-grained andesite. The rock is made up of a dense mat of feldspar laths with biotite disseminated or forming small clumps throughout creating a slight speckle to the appearance. Minor constituents are magnetite and quartz with weak sericite alteration of the feldspar. The cut, unpolished rock has a very uniform texture with no alteration, staining and minor, tight cracking visible. The rock has uniform void space (vugs) about 0.2 millimetres in diameter and form approximately 1 percent of the rock. Thin section work indicates the rock is not microfractured and so is probably quite impermeable, though slightly porous.

## ACKNOWLEDGEMENTS

The authors wish to thank Joe Jelincic, Tom Bruusgaard, Tim Henneberry, John Kemp and Don Hairsine for their help during visits to the prospects, quarries and Squamish plant site.

## REFERENCES

- Hora, Z.D. and Hancock, K.D. (1992): Some New Dimension Stone Properties in British Columbia; in *Exploration in British Columbia 1992, B.C. Ministry of Energy, Mines and Petroleum Resources*, pages 107-116.
- Hora, Z.D. and Hancock, K.D. (1995): Some New Dimension Stone Properties in British Columbia II; in *Geological Fieldwork 1994, B.C. Ministry of Energy, Mines and Petroleum Resources*, B. Grant and J.M. Newell, Editors, Paper 1995-1, pages 365-369.
- Roddick, J.A., Müller, J.E. and Okulitch, A.V. (1979): Fraser River, British Columbia - Washington Sheet 92, *Geological Survey of Canada*, Map 1836A.
- Streckeisen, A. (1976): To Each Plutonic Rock its Proper Name; *Earth and Science Reviews*, Volume 12, pages 1-33.
- Tempelman-Kluit, D.J. (1989): Geology, Penticton, British Columbia; *Geological Survey of Canada*, Map 1736A.