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# LABRADORITE OCCURRENCES NORTH OF DAVIS INLET

J.R. Meyer and H.E. Montague[1]
Mineral Deposits Section

## ABSTRACT

*Newly reported labradorite occurrences in the Tunungayualok Island area, north of Davis Inlet, have been evaluated as a source of both gem-quality stone and dimension stone. The labradorite occurs in breccia zones and dykes within a large body of anorthositic rocks, in which, the crystals are typically fractured, making it difficult to extract from the breccia. In several prospects, the percentage of visibly chatoyant labradorite is up to 15 percent.*

*No potential dimension-stone sites were observed within the study area.*

## INTRODUCTION

Labradorite was discovered in the Nain area (Figure 1) in the 1700's and is presently quarried at Tabor Island, about 15 km south of Nain. It is used locally in the making of jewellery and other handicrafts and a small amount is sold to lapidary shops outside of Labrador. A survey of labradorite occurrences was carried out by the Newfoundland Department of Mines in 1979 (Watson, 1980), and 7 major prospects and 20 or more minor prospects were identified, in the coastal area between Nain and Kamarsuk (NTS 14C/5,6,11,12) (Figure 2).

A new labradorite prospect was reported to the Newfoundland Department of Mines in the spring of 1988, by Bert Saunders of Davis Inlet. The prospect is located on Tunungayualok Island, 16 km north of Davis Inlet (Figure 2) and was subsequently visited by one of the authors (H. Montague) and based upon the initial evaluation, an additional two-week survey of the area was carried out in August 1988, to investigate the economic potential for additional labradorite prospects.

## GEOLOGY

The surveyed area consists of approximately 300 km² of anorthositic rocks, which have been mapped by Wiebe (1974, 1975) (Figure 3). Archean basement is exposed on the eastern side of Tunungayualok Island, and on islands to the north and south. Younger adamellite (mostly quartz monzonite and granodiorite) form the western margin of the anorthositic rocks, and adamellite and small dioritic bodies and dykes, occur within the anorthosite rocks.

The anorthositic rocks are divided into three main units by Wiebe (1974, 1975), although all the three units are internally heterogeneous and extremely variable in texture. The three units as determined by Wiebe *(op. cit)* are: 1) anorthosite—which is generally dark grey, and ranging from massive anorthosite and relatively even-textured 2-cm plagioclase crystals, to seriate anorthosite and plagioclase crystals 2 to 20 cm in length; 2) leuconorite—which consists of anorthositic rocks having a higher colour index (mostly 15 to 25), due to the increased amount of orthopyroxene; and 3) megabreccia—a transition zone between units 1 and 2 with

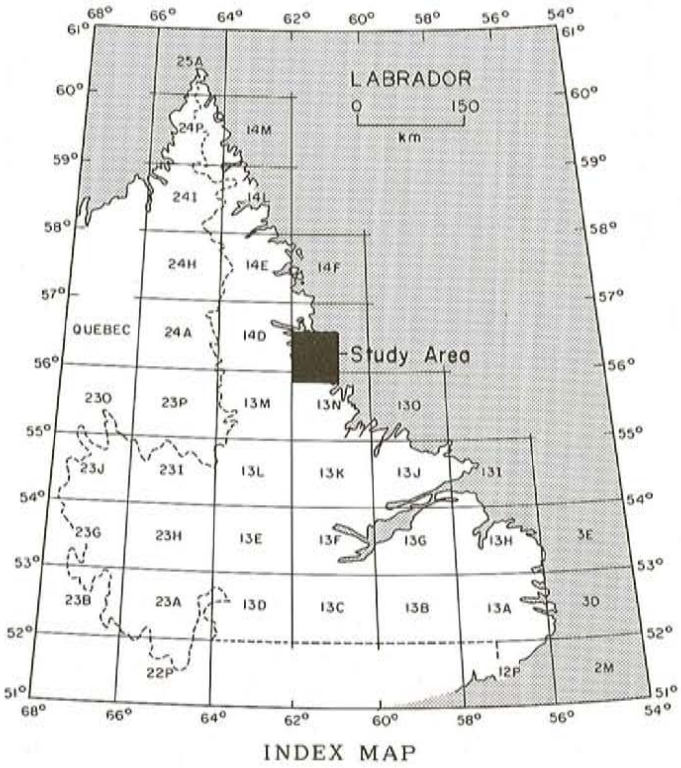


**Figure 1.** *Location of study area.*

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[1] Mineral Resource Management Branch

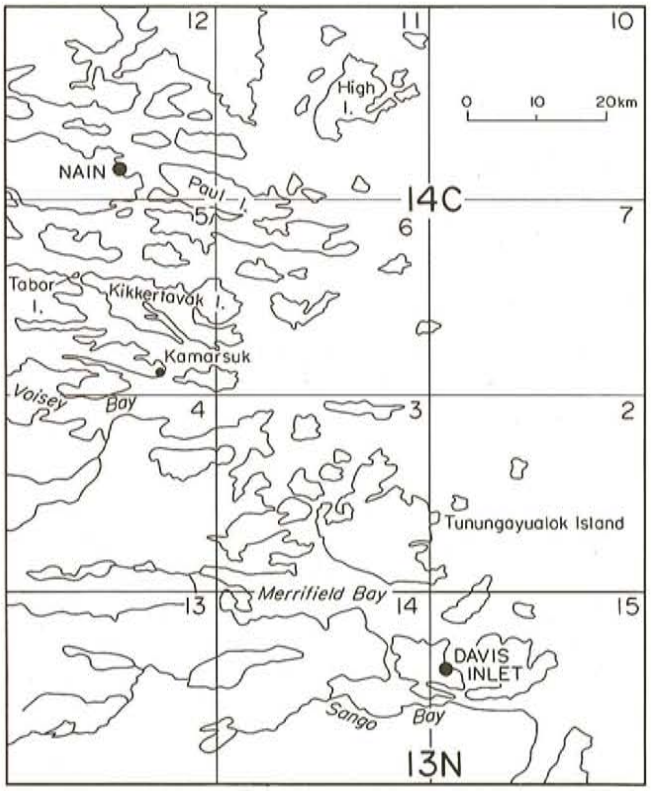


**Figure 2.** *Location map for area between Davis Inlet and Nain.*

angular to rounded blocks of anorthosite (several centimeters to tens of metres in size) within a leuconoritic matrix.

## LABRADORITE

Labradorite prospects on Tunungayualok Island differ from those in the Tabor Island–Kikkertavak Island area in the north. In the latter areas, they consist of extremely coarse grained pegmatitic pods of tightly packed labradorite crystals and minor pyroxene. The labradorite prospects in the Tunungayualok Island area consist of breccia zones or dykes, containing angular to rounded labradorite crystals (Plate 1). The crystals range in size from 1 to 35 cm and are typically fractured, often cut by thin white feldspar veins. The degree of chatoyancy visible in outcrops, varies considerably, and in some prospects ranges up to 15 percent; the typical colours are deep-blue, blue-green to yellow and frequent colour zoning. The percentage of matrix in the breccia zones is very varied as well, ranging from white to grey. The white matrix, which weathers a distinctive yellow to orange-brown, consists of crushed labradorite crystals, 1 to 10 mm in diameter, often having accessory pyroxene, magnetite, pyrite, and less commonly quartz and pale-orange feldspar. In some prospects, the matrix content is as high as 20 percent, but in others it is less than 5 percent. The breccia zones are up to several hundred metres wide in shoreline exposures, and are generally located within the megabreccia unit. The leuconorite and norite units also contain several breccia zones and numerous dykes ranging from 1- to 5-m in width. The following is a descriptive account of some of the better labradorite prospects in the Tunungayualok Island area.

### Kayutak Bay

Kayutak Bay is located on the northwestern side of Tunungayualok Island (Figure 3). At the east end of Kayutak Bay, there is a moderately steep talus slope that stretches approximately 75 m from the outcrop down to the ocean. The talus slope contains hundreds of blocks of rock ranging in size from 10 cm to 2 m. The blocks are almost all composed of labradorite breccia. Approximately 75 percent of the breccia has a white matrix, and the remainder has a dark grey matrix. Many of the blocks are partially iron-stained. The breccia contains rounded to angular chatoyant labradorite crystals ranging in size from 1 to 30 cm, (average size approximately 4 cm), and has a matrix content of 5 to 15 percent. The crystals are generally fractured, but there are many of high quality that have excellent colour, colour zoning, and twinning. Some of the colour-zoned crystals show repeated zoning in an octagonal pattern. There are an abundance of labradorite fragments in the intertidal zone at the base of the talus slope. The majority of these, however, are fractured, and would not be suitable for high-quality jewellery. Despite the availability of loose blocks, the dimension-stone potential is limited, as most blocks are less than 1 m in diameter, fractured, iron-stained, and irregularly shaped.

### Nuvudluktok Bay

Nuvudluktok Bay, on the west side of Tunungayualok Island, is a large inland bay having many smaller coves and several islands and is well protected from the sea with a very narrow entrance. The easternmost of the two large islands in the bay is underlain by labradorite breccia and megabreccia. At the west end of this island (Figure 3), there are large exposures of breccia having a high matrix content and large chatoyant labradorite crystals, commonly up to 15 cm in length. The crystals display a variety of colours and colour zoning, but they are typically fractured and would be difficult to extract for jewellery. There are many smaller occurrences of labradorite breccia exposed along the shoreline of Nuvudluktok Bay, and several outcrops of medium to coarse grained anorthosite exhibiting 5 to 10 percent chatoyant labradorite. However, the anorthosite outcrops are too small and fractured to be considered as dimension-stone prospects.

### South Tunungayukuluk Island

This prospect, on the flat-lying, wave-washed northeast corner of the island (Figure 3), is a good example of Wiebe's (1974) megabreccia unit. Rounded inclusions of medium grained anorthosite, up to a metre in diameter, are well exposed in an orange weathering, white matrix that also contains numerous chatoyant labradorite crystals (Plate 2). The labradorite crystals are up to 45 cm in diameter, but generally average about 5 cm. The larger crystals are rounded and display a beautiful variety of colours and colour zoning,

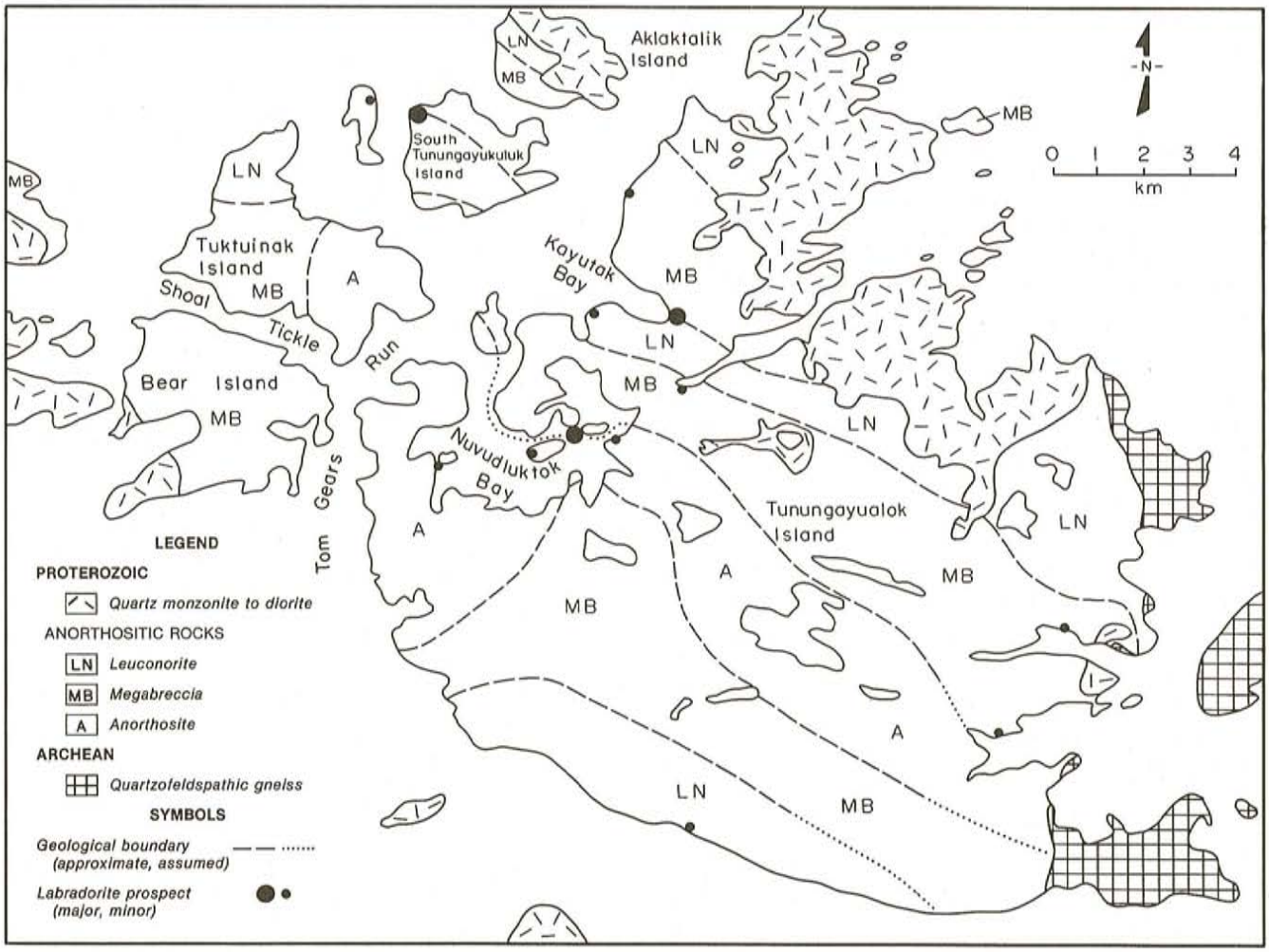


**Figure 3.** *Geology of Tunungayalok Island (after Wiebe, 1975).*

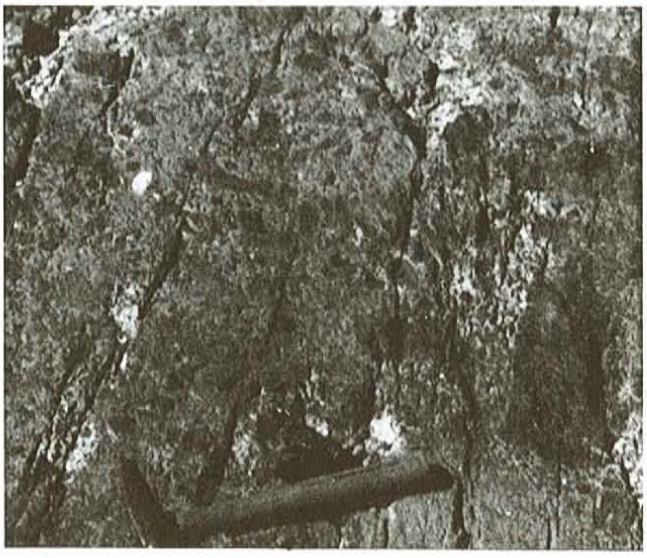

**Plate 1.** *Fractured outcrop of labradorite breccia containing crystals of labradorite ranging from 2 to 20 cm in length.*

**Plate 2.** *Coastal outcrop from South Tunungayukuluk Island prospect showing large rounded anorthosite inclusions and 2- to 10-cm labradorite crystals in orange-brown weathered matrix. (Note pen for scale.)*

but are extensively fractured and cut by thin white feldspar veins, which cut across both the matrix and inclusions.

## CONCLUSIONS

Labradorite occurrences in the Tunungayualok Island area have a low potential for gem-quality stone, when compared to existing labradorite quarries in the Nain area. In contrast to the very coarse grained pegmatitic labradorite occurrences in the Nain area, these recently investigated occurrences consist of medium- to coarse-grained labradorite crystals, which occur within breccia zones. The labradorite crystals are generally fractured, and may contain impurities or be cut by thin white veins. The matrix content of the breccia zones is 5 to 15 percent. The individual crystals, which are generally much smaller than those found in the pegmatitic occurrences, would have to be cut out individually to obtain gem-quality stone, providing good sites with abundant unfractured crystals could be located. Alternatively, loose pieces of labradorite could be scavenged in the vicinity of the larger breccia zones, but these weathered pieces are often unsuitable.

The dimension-stone potential of the labradorite breccia is limited by the generally small block sizes that could be quarried. Most breccia zones are moderately to strongly fractured and seldom would it be possible to quarry blocks that are larger than 1 $m^3$. Smaller blocks of labradorite would be marketable if a high enough percentage of chatoyant labradorite were visible on a cut surface. Preliminary results of slabbed samples indicate that this would be rare. Whereas the irregular surface of several outcrops visible in the field were quite spectacular when washed with water, a smooth, cut surface never displays as high a percentage of chatoyant labradorite. This is analagous to previous studies carried out by the Newfoundland Department of Mines using labradorite aggregate in concrete work (Meyer and Dean, 1987). It was found that the smooth surface of a terrazzo tile never displayed as high a percentage of chatoyant labradorite crystals as the rough, irregular surfaces of a precast concrete panel, which preserves the natural cleavage faces of the labradorite crystals.

## ACKNOWLEDGMENTS

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