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DIMENSION STONE IN LABRADOR

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ABSTRACT

The 1994 field program in Labrador consisted of dimension-stone assessment in the Hopedale and Nain areas. Follow-up work on soapstone prospects in the Hopedale area led to the acceptance of a new source of carving stone by Labrador carvers, and the initiation of a project to collect and stockpile this material. Initial investigations into the dimension-stone potential of migmatites in the Hopedale area were started, and test blocks were extracted from a second anorthosite deposit near Nain.

INTRODUCTION

An evaluation of soapstone deposits within Archean terranes on the northern Labrador coast has been carried out over the last two years (Meyer and Montague, 1993b, 1994). The study, although incomplete, indicates that the Archean rocks in the Okak and Hopedale areas host a variety of small soapstone deposits that can provide suitable carving stone for this growing industry on the northern Labrador coast. The Hopedale area is the more accessible (Figure 1), and sampling to date has shown it to contain the widest selection of soapstone, in terms of colours and textures. Carvers generally prefer soapstone soft enough that it can be carved without the use of power tools (although most carvers now use power tools to do their initial shaping of carvings to increase production). Soapstone that is distinctive from what other carvers in Canada use, is also preferred. This latter distinction is very important in regard to establishing a geographic identity, when marketing carvings in southern Canada and elsewhere.

There are many soapstone sites having archaeological significance on the Labrador coast. One of these sites in the Hopedale area is Semiak Island, where Neo-Eskimo lamp preforms were discovered by archaeologists in 1984. This site was reported on by Meyer and Montague (1994). [When revisited this past summer, it was discovered that the preforms had been partially destroyed. It is not known whether attention was brought to this site by the 1994 report, but the loss of such important archaeological evidence is tragic. Thus, no subsequent archaeological finds by geologists or archaeologists will be reported from these surveys.]

SOAPSTONE

A second evaluation of soapstone prospects in the Hopedale area resulted in renewed interest and preliminary development of one deposit. Following the 1993 evaluation (Meyer and Montague, 1994), some local carvers sampled three sites. However, not a large amount of interest was shown. In 1994, larger samples were collected (between 25 and 50 kg) from 4 prospects that had been described and sampled in 1993. These large samples were shipped to the Nain carving studio for the carvers to work with and evaluate. Within a month of these evaluations, a trip was arranged at the request of one of the prominent Nain carvers, John Terriak, to go to Hopedale and collect soapstone from the Kukkiniarvik Bay and Fred's Bay deposits.

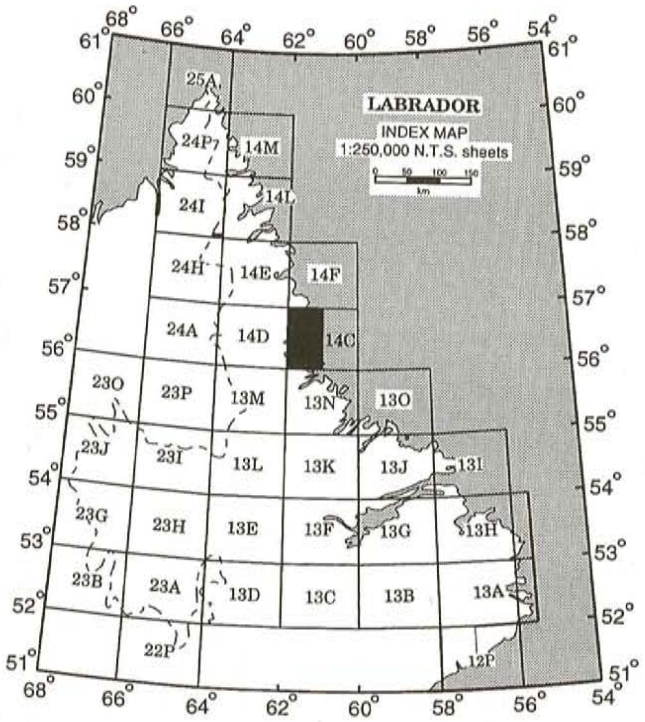

Figure 1. *Location of study area.*

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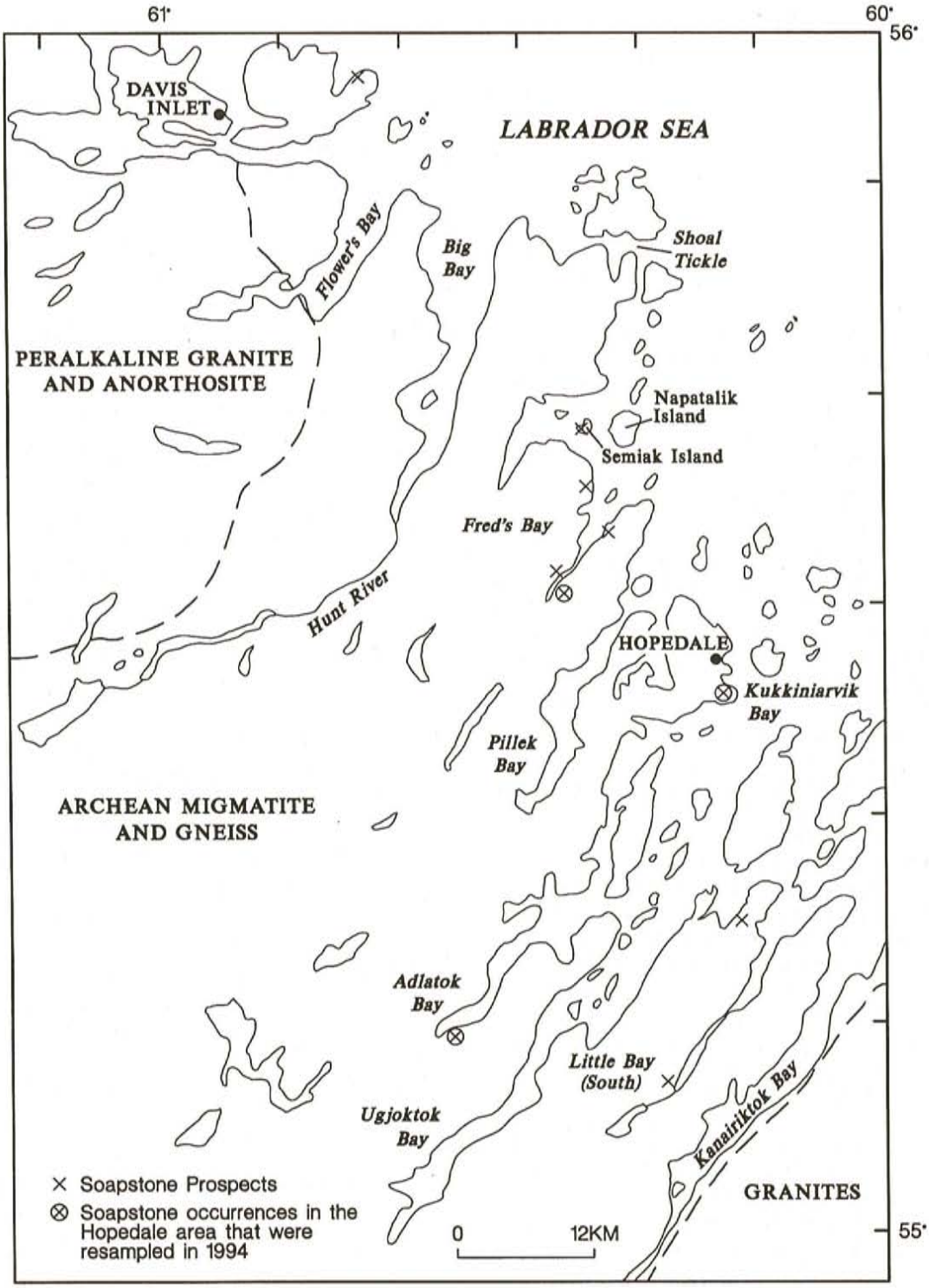

Figure 2. *Soapstone deposits resampled in the Hopedale area.*

KUKKINIARVIK BAY

The Kukkiniarvik Bay deposit (Figure 2) has been previously referred to as the Tooktoosner Bay deposit. It is located at tidewater on the south side of the bay, approximately 2 km south of Hopedale. The deposit, which lies within a 1-km-long unit of altered ultramafic rocks (mapped by Ermanovics, 1993), consists of three small lenses of light-green-weathering serpentinite adjacent to a shear zone. The largest lens is 15 by 25 m, and consists of broken outcrop and small, loose boulders. The other two lenses are approximately 5 by 10 m and consist of loose boulders of

various sizes (Plate 1). The total volume of soapstone within these three lenses is approximately 100 to 200 m³ (300 to 600 tonnes). The serpentinite is dark green on fresh surface, and has a hardness of between 3 and 4 on the Mohs scale of hardness. This means that carvers can work the stone with hand tools relatively easily, yet the final dark-green polished surface is hard enough to withstand handling by buyers without excessive chipping or scratching. The carver's response to this serpentinite was so positive that the Labrador Inuit Development Corporation (LIDC) hired two carvers from Hopedale to spend the rest of the summer collecting soapstone boulders and loose bedrock at this site. They used prybars and sledgehammers to loosen the soapstone subcrop and reduce the size of very large pieces. The two individuals had stockpiled and transported approximately 20 tonnes of this soapstone to Hopedale and Nain by the early Fall. The soapstone will be used not only by individual carvers throughout the winter, but also by the Labrador College crafts section and the Torngasok Cultural Centre for use in instructional carving classes.

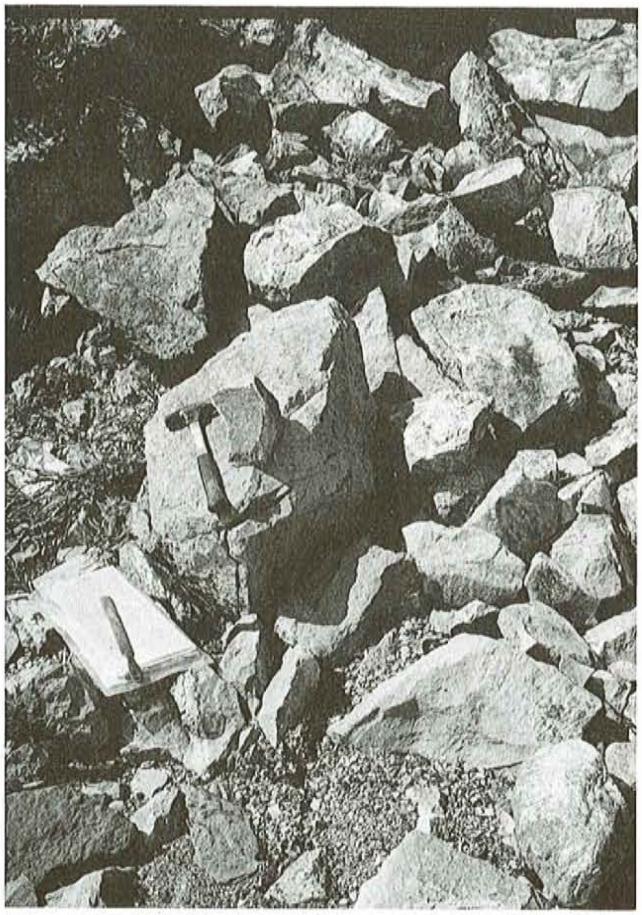

Plate 1. *Loose soapstone boulders at Kukkiniarvik Bay deposit.*

ADLATOK BAY

A unique soapstone deposit at the southern end of Adlatok Bay (Figure 2) was evaluated in 1993 (Meyer and Montague, 1994). This deposit is quite different from all others described in the Hopedale and Okak areas because it consists of a continuous unit of soapstone. The other deposits typically consist of smaller, discontinuous pods of soapstone. The Adlatok Bay deposit consists of a 4.6-m-wide soapstone unit, containing beds that are 45 to 90 cm thick. Three beds, having a total thickness 2.5 m, are medium-hard to hard, dark-grey carving stone, which was previously considered to be acceptable by the carvers. This unit is vertically dipping and can be traced up the side of a moderately steep hill, and was thought to have excellent potential for small-scale quarrying.

During the 1994 field program, this deposit was resampled, and more than 50 kg of soapstone were shipped to the Nain studio. The response was not very enthusiastic; the colour is not unique and the carvers stated that they would definitely need power tools to carve this soapstone. The availability of dark-green serpentinite from Kukkiniarvik Bay, which can be transformed into carvings more quickly, has greatly lessened the interest in this deposit, and lowered its former high rating. Several other ultramafic units mapped by Ermanovics (1993) in the southern part of Adlatok Bay area were investigated, but no additional deposits of soapstone were found.

FRED'S BAY

Outcrops of blue-grey soapstone were resampled in 1994 on the southeast shore of Fred's Bay (Figure 2). There is at tidewater, a 10 by 30 m outcrop of variably altered ultramafic rock, possibly the remanents of a larger, north-trending unit of ultramafic rock (Plate 2). Loose pieces of soft to medium-hard soapstone, 5 to 50 kg in weight, are present at the base of the main outcrop. Directly north of the main outcrop, along the edges of the recessive zone, there are many outcrops and large boulders of soapstone that could be split into smaller pieces for carving. The outcrops are not consistent with regards to texture and hardness, but a large amount of this stone would be suitable for carving. A closer examination of this site in 1994 requires that a revision of the original estimate of the volume of carving stone available, from 20 m³ to between 50 to 100 m³ (150 to 300 tonnes).

Plate 2. *Fred's Bay soapstone deposit.*

A 1.5-m red-grey soapstone boulder was discovered along the western shore of Fred's Bay during the 1993 survey. The boulder was subsequently sampled by local carvers, who liked the very distinctive colour and expressed a great interest in getting a reliable source of this soapstone. The presence of this and other types of soapstone in this bay indicate the need for an intensive survey of the shoreline and surrounding hills to better define the potential resource.

DIMENSION STONE

The Labrador Inuit Development Corporation (LIDC) operate the anorthosite quarry at Ten Mile Bay (Figure 3), 10 km south of Nain (see Meyer and Montague, 1993a, for complete description of this deposit). In 1994, they quarried approximately 500 m^3 of rough block for shipment to Italy. This is their third season, and each year the production has doubled from the previous year. The larger shipments of block in 1994 made it possible to charter transatlantic vessels to come to Ten Mile Bay to collect the blocks (Plate 3), which greatly reduced the shipping costs to Italy. The LIDC had previously barged or shipped the blocks to the Island of Newfoundland or to Quebec City, where the blocks were then picked up by larger vessels. This new shipping arrangement has made it economically feasible to consider new deposits of stone that could also be sold in the exclusive Italian market.

JOHN HAYS HARBOUR

The John Hays Harbour anorthosite deposit is located 18 km south of Nain on the north side of Kikkertavak Island (Figure 3). The deposit was sampled and described in 1986 during an evaluation of the dimension-stone potential of the Nain anorthosite (Meyer and Dean, 1987). The anorthosite at John Hays Harbour differs from the Ten Mile Bay anorthosite in many aspects. The Ten Mile Bay anorthosite is a homogeneous, medium-grey stone consisting of labradorite crystals that average 1 cm in size. On a cut and polished surface, up to 15 percent of the crystals will display a blue chatoyancy, when viewed from a single direction. An additional feature of the Ten Mile Bay deposit is the presence of irregularly spaced, discontinuous pyroxene-biotite foliae (up to 5 percent), which give a subtle banding effect to many of the polished slabs.

The anorthosite at John Hays Harbour is a medium to dark grey-brown stone. The labradorite crystals are 5 mm to 5 cm in size, with the larger labradorite crystals (2 to 5 cm) set in a background of smaller labradorite crystals (<1 cm) with interstitial black hypersthene. The larger labradorite crystals are medium to dark brown, and 10 to 20 percent are chatoyant and ubiquitously colour zoned. The John Hays Harbour deposit also contains pegmatitic pods of labradorite and hypersthene, which may increase waste rock in a quarry. However, the labradorite and hypersthene crystals in these pods are often up to 50 cm in size, and perhaps could be utilized in the manufacture of ornamental stone products, i.e., small tabletops or craft items for the summer tourist trade.

At the south end of John Hays Harbour is a sandy beach, behind which is a wooded area that leads up to the base of the deposit. A moderately steep, massive face of anorthosite rises 80 to 90 m above the woods, to a 300-m-wide saddle-shaped pass. The anorthosite in the saddle area has very little vertical jointing or fracturing; quarry sites have been investigated and small samples extracted in previous years (Meyer and Dean, 1987). However, the anorthosite exposed on the north slope is more accessible, and in 1994 the LIDC opened up a small trial quarry at the base of this slope. Several trial blocks were extracted, and a boat with a long cable was used to drag one block through the woods, across the beach and into the ocean. This block was shipped to Italy in November, 1994 and processing and test marketing will be carried out in the winter of 1995. Both the LIDC and the Italian marketing agent are very optimistic about the prospects of a second major quarry developing at John Hays Harbour.

Plate 3. *Loading blocks of anorthosite onto a transatlantic vessel near Ten Mile Bay.*

HOPEDALE

Outcrops and old rock quarries in the vicinity of Hopedale (Figure 2), adjacent to the old radar-site roads, consist of 'swirly-banded' white, pink, and black granitic migmatite. These rocks, which show a large variety of deformation and injection textures, are referred to as the Maggo migmatite (Ermanovics, 1993), and are approximately 3-billion years old. The migmatites (Plate 4) are not

Plate 4. *Block of Maggo migmatite in old quarry at Hopedale.*

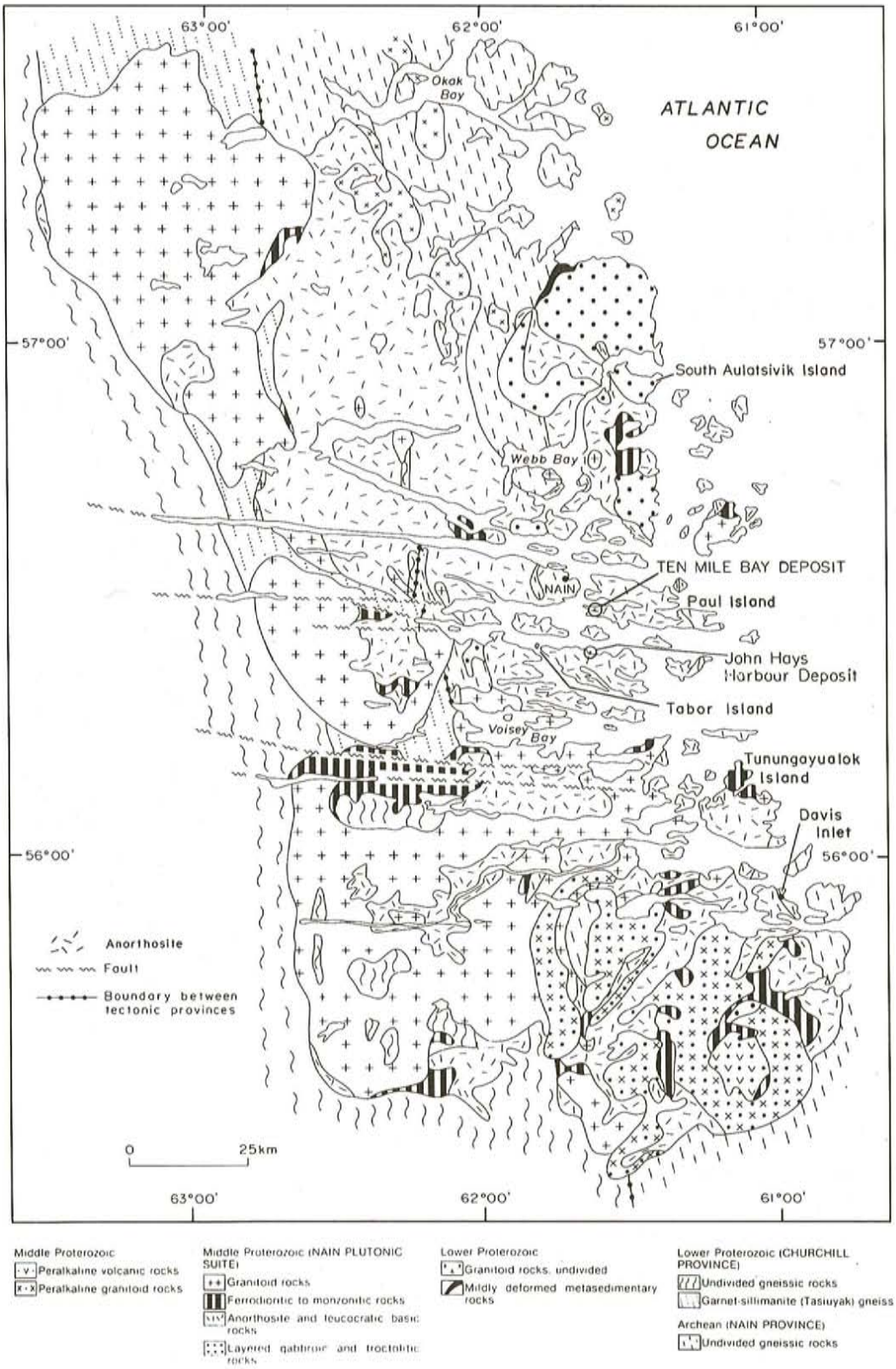

Figure 3. *Geology of the Nain anorthosite complex (Ryan, 1991) and location of anorthositic dimension-stone deposits.*

particularly homogeneous, contain hematite-stained fracture zones, and pink pegmatitic pods of feldspar are irregularly distributed throughout. Black mafic-rich zones are up to a metre in width, and often closely spaced. However, some zones of thin irregularly banded, migmatite show similarities to some stones now marketed in dimension-stone trade magazines. Initial sampling of selected outcrops has generated strong interest from the company currently marketing the anorthosite from Ten Mile Bay. Test blocks may be extracted from this area this spring. A significant advantage for this area in developing a dimension-stone quarry is the presence of numerous gravel roads leading to the main outcrops, good wharf facilities, and the availability of heavy construction equipment in Hopedale.

SUMMARY

Dimension-stone deposits and prospects in the Hopedale area include soapstone for local carvers, and migmatites for the 'cut and polished stone' markets. A soapstone deposit at Kukkiniarvik Bay was initially 'quarried' in the summer of 1994 by the LIDC, and small test samples of migmatite from the town of Hopedale were processed, and sparked serious interest from the Italian geologist who markets the anorthosite from the Ten Mile Bay deposit south of Nain. A second anorthosite deposit south of Nain, at John Hays Harbour, was test quarried by the LIDC in 1994 and a test block was shipped to Italy for evaluation. New transatlantic shipping arrangements at the Ten Mile Bay quarry may hasten the development of the second anorthosite deposit and of a migmatite deposit in Hopedale.

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