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and woodlot are covered with up-to-40-year-old trees, including Red, Scotch, and White Pine; Red, White, Colorado Blue, and Black Spruce; European Larch (Tamarack, Hackmatack); and Balsam Fir. Thousands of these trees have been planted by Lowell, with occasional help. The usual hardwood trees of an Acadian forest have reappeared naturally – White, Grey, and Yellow Birch; Red Oak; Sugar Maple; and Poplar. Both brooks have substantial canopies of alders; these canopies are very important for maintaining the cool water temperatures which ensure an abundance of natural aquatic life. Also, this growing forest is now home to White-tailed Deer (from which Lowell harvests one yearling annually), Black Bear, Porcupine, Eastern Coyote, Fox, Snowshoe Hare, and the usual assortment of small creatures such as Red Squirrel, Weasel, and Skunk.

Two small portions of the property are devoted to growing Christmas trees and boughs, an endeavour that the Lowells undertook to create a small cash flow. The Scotch Pine and Balsam Fir are highly cared for and groomed to near perfection, and, upon request, White and Scotch Pine can be spray-painted a dark green. Each tree requires a lot of work over ten or more years and yields a meager $12.00 return! Boughs, on the other hand, require far less work and yield a fair profit. The Christmas tree business is in steep decline due to the loss of American markets, the growing use of artificial trees, and the increasing number of people living in condo and apartment buildings that do not allow natural trees.

Over lunch and while strolling though the tree farm, Lowell talked about the ups and downs, the successes, and the failures of his labour of love. He answered our questions and expressed his opinions with candour. A natural and eager story teller, he regaled us with tales of property-related experiences, including being outwitted by busy beavers and having shotgun confrontations with tree-ravaging porcupines and trespassing ATV riders!

This was an informative and thought-provoking field trip in a quiet, peaceful, and beautiful forest setting.

Thank you Lowell, Marion, and Charlie for your stewardship of this special place, and for graciously hosting our visit.

PURCELL'S COVE QUARRY WALK

– Burkhard Plache

Date: Saturday, Nov. 14th
Place: Purcel's Cove Quarries
Weather: Sunny, but sub-0ºC, and a cold wind
Leader: Geologist Marcos Zentilli
Participants: 35

The walk to the granite and bluestone quarries around Purcell's Cove was led by geologist and local resident Marcos Zentilli, and attracted 35 participants eager to learn more about the local history of the quarries and their role in the building of Halifax. We met at the Purcell's Cove Social Club parking lot, where Marcos started with a brief introduction.

Geology can explain the properties of the two types of rocks (bluestone and granite) we were to see:

Bluestone is the older of the two types of rocks. It is a sedimentary rock that originated some 500 million years ago at the bottom of a deep ocean. The sediments deposited there were typically tiny particles, slowly drifting downward in the water column to form regular layers of material. This process of deposition was not always uniform; occasional submarine landslides far away would generate turbulent waters carrying more and larger particles which would settle down more quickly, suddenly interrupting the steady layering from before. After such a disturbance, the sedimentation would return to its slow and steady pace. These sediments were overlaid by more material, pushed deeper into the crust of the earth to be compressed, becoming rock in the process. Then, at around 400 million years ago, these sedimentary rocks experienced sideways pressure from plate tectonic movements, causing them to be heated and folded.

Granite is the younger of the two types of rocks. It is an igneous rock that originated some 380 million years ago when hot, liquid magma (at some 800ºC) pressed upward and cooled to crystallise into granite. During this event, it displaced and partially melted the bluestone rock already in place. Today, Purcell's Cove is located at the edge of this ancient magma upwelling, with granite on one side of the road, and bluestone on the other side. However, even the bluestone which was not displaced or outright melted was affected; the heat of the magma created the equivalent of a potter's kiln, fusing the material in the bluestone even more tightly, creating in the process a particularly hard rock. The amount of heating diminished with increasing distance from the granite. For example, the bluestone rocks seen near Purcell's Cove continue onto the Halifax Peninsula, with outcrops visible, among other places, at the Martello Tower in Point Pleasant Park, where the heat was less intense.

All the folding, heating, and subsequent cooling took place deep underground. Over time, the overlying rock layers eroded, and the final sculpturing of the land ended some 10,000 years ago, when the ice fields of the last ice age scoured the rocks. Occasional erratic boulders bear witness to the ice age origin of the landscape, while gouging marks on the rock surfaces show that the last movement of ice was from north to south.

With this solid background, we set out to first explore the granite quarry. Initial quarrying operations started in the late 18th century, and by the mid 19th century, it had developed into a major industrial operation. Only in 1957 did the quarry close.

Starting from the parking lot, we followed an old access road to the quarry which runs parallel to the so-called 'Trolley Track', the bed for the first steam engine in Nova Scotia, built in 1834. This predates the more well known Albion Mines' Pictou steam engine by five years. After reaching the top of the hill, we could see the first traces of quarrying – blocks of granite cut

in straight lines, with holes spaced along the margins. Marcos explained that individual building stones were cut from bedrock to specification, requiring knowledge of rock properties and skilled workers. Typically, rocks exhibit layers that separate easily, and in the rocks before us, the horizontal layer had been worked first. Then the north-south direction was cut, and finally, the east-west direction. For cutting at the desired line, holes were drilled along it a few inches apart. Then, two metal shims ('feathers' in the quarryman's language) were inserted into the holes, and wedges were slowly driven between them into all the holes until a uniform crack developed, splitting the rock into a building stone. Sometimes, a rock may have hidden inside cracks; then, when the stone is cut, it breaks into an irregular shape, making it useless for building. We saw many such rejects in the quarry grounds. Marcos also pointed out the foundation of a fairly large building, and small heaps of slag, showing that the quarrying was supported by a forge, for the making or repairing of tools.

In the granite, we could see the constituent quartz and potassium feldspar crystals, and occasionally there were xenoliths (foreign stones, from the Greek 'xenos', foreign; and 'lithos', stone) – remnants from some other rock that was partially melted when the magma was pushing upward. These xenoliths were up to a few inches in size, and generally dark gray in colour.

Marcos also mentioned another invisible ingredient of granite – trace amounts of uranium. As a consequence, it releases radioactive radon gas, which is a concern for local residents. The radon gas can accumulate in basements or in the water of a well drilled into the granite, causing exposure to ionizing radiation. Radon gas exposure is the second leading cause of lung cancer after smoking. However, testing for radon gas is fairly simple, and there are methods of mitigating the risk, like sealing or venting the basement, or collecting rain water into a cistern instead of using a well.

After visiting the granite quarry, we headed to Bluestone Road located on the eastern side of purcell's Cove Road. There we had a look at a former bluestone quarry, which left a depression which is now filled with water. Remnant bedrock is visible next to the road and as a major outcrop across the man-made pond. We stayed on the road, where the layering of the rocks was clearly visible in a number of places. Due to its sedimentary origin, bluestone separates best along its original layers. The stones quarried here were typically cut to a smaller size than the granite was. Many of the Dalhousie University buildings are clad with the dark gray stone obtained from these quarries. The outcrop across the pond also had a layered structure, but the top looked very irregular. That material was most likely deposited in a sudden massive event, disrupting the neat layering, and in our time disrupting the quarrying operation, since those deposits would only separate into irregular stones, unsuitable for building.

We returned to the social club via a small road along the shore of the cove. Here, the residents experience the impact of rising sea levels first hand. When the road was originally put in, probably more than 100 years ago, it was above the highest expected water level. These days, the road is regularly flooded, and it requires seaward maintenance, in the form of boulders, to break the action of the waves. One of those boulders was of the bluestone type, and it showed cracking from weathering. It was a sulphidic slate, and the weathering is due to its containing pyrite (FeS_2) or pyrrotite (FeS). Both pyrite and pyrrotite react with air to form sulphuric acid, which in nature kills water dwelling animals (fish, amphibians). If it gets into wells, the water will taste bad, cause corrosion to pipes, and stain armatures. Thus, any disturbance (road or building construction; mining) of rocks containing sulphidic slate is problematic, because the excavated rocks must be deposited where either no weathering occurs, or where the acidic runoff is controlled.

After this final point of interest, everybody was happy to return to the Social Club. Even though the sun was shining most of the time, sub-zero temperatures and a brisk wind had taken a toll on everybody's comfort. We were all thankful for the hospitality offered by the Social Club, and equally grateful for a wrap-up slide presentation by Marcos, summarising all we had seen, and putting it all into context.

For those who are interested to learn more about this area's history, the book Purcell's Cove: the little place that helped build Halifax by Elsie (Purcell) Millington is available at the Halifax Public Libraries.

On behalf of the Halifax Field Naturalists, I want to thank Marcos for bringing both these very old and fairly recent histories to our attention.

NATURE NOTES

– Allan Robertson

OCTOBER

Clarence Stevens saw **nine breeding pairs of Cardinals** near his home and his neighbours told him of **four more pairs**. He observed that Cardinals in Nova Scotia were first noted in Yarmouth, and they've moved up the valley from there.

Stephanie Robertson noted that while hiking in the Dingle recently one of her granddaughters saw **a Kingfisher**. She had watched as it left its tree, caught a fish, and then flew back to the tree. It seemed to have had a great deal of difficulty getting it down.

Near her cottage in Kings County, Judi Hayes saw, from a distance of about ten feet, **a Porcupine** that was roughly four feet long! It was sitting up in a tree.

Two weeks ago when returning from her cottage near Kejimkujik and passing through Berwick in the Valley, Lesley Jane Butters saw what she thought looked like a very weird crop in a field by the road. She stopped to examine it more closely, and found it to be **a field full of spider webs** – thousands of them! They were on aver-