

localnews

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LIVING

At the edge of two rocky worlds

Kawarthas split between Canadian Shield and bedrock remains of ancient sea

If there is a metaphor that best describes the natural features of Peterborough County and the Kawarthas, it has to be "sitting on the edge."

On a map, the edge is simply an irregular line running across the middle of the county, dividing the Precambrian rock of the Canadian Shield to the north from the Ordovician limestone bedrock underlying the Great Lakes-St. Lawrence Lowlands to the south. To a naturalist, however, the edge represents the meeting point of two worlds: pink granite, white pine, ravens and the smell of sweetfern to the north and farmland, white cedar, cardinals and the smell of a hayfields to the south. The co-existence of these two physical regions in the Kawarthas results in wonderful biodiversity where southern species like the white-footed mouse compete for resources with their northern cousin, the deer mouse. Living here on the edge also means that a woodlot might be home to both species of flying squirrel – the northern and the southern.



millions of years passed during which there was relatively little activity in a geological sense. However, starting about 1.65 million years ago, ice sheets (glaciers) began to form over subarctic Canada and to advance southward across much of the continent. Each advance was followed by a melting phase during which time the ice sheet shrank back to its point of origin. This occurred at least four times and possibly as many as 20. The last glacier to cover the Kawarthas peaked at about 21,000 years ago and only completely melted about 9,000 years later. Measuring as much as 2,500 metres thick – a full two-and-a-half kilometres – the ice would have extended higher than the big, puffy cumulous clouds that often dot the sky on a sunny day. The ice sheet, however, was not only thick and heavy but it was continually on the move. The movement came as a result of differences in the amount of snow deposition on the ice. Where snow storms resulted in thicker accumulation, the greater weight caused the ice to "flow" forward or ooze along like a thick liquid. You can compare glacial advance to what happens when you press with your thumb on a ball of putty.

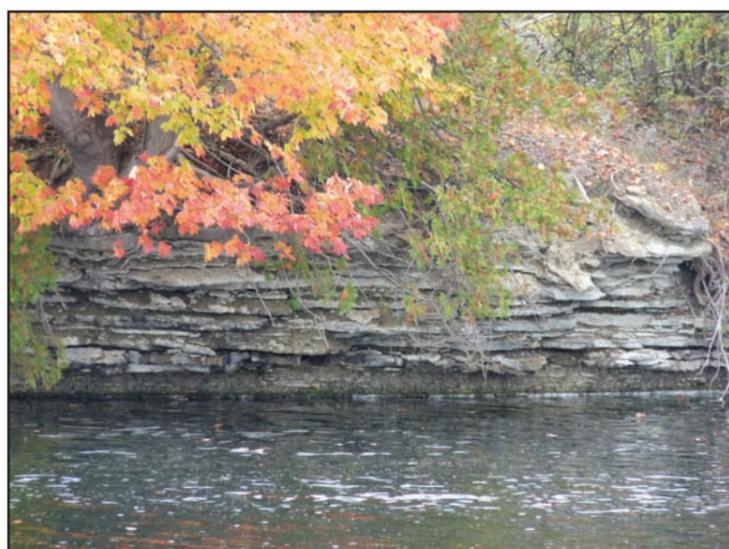
GLACIER ON THE MOVE

As it the glacier moved, the ice scraped the ground under it, almost like a two-kilometre thick piece of sandpaper. In the process, soil, gravel, rocks and boulders were incorporated into the ice and further contributed to the scrapping and scouring action. Some of the boulders were moved huge distances and then deposited in areas where they no longer match the surrounding rock types. Several of these "erratics" can be seen right in the village of Buckhorn.

The ice sheets removed and redeposited mammoth amounts of rock and soil from both the Shield and the southern parts of the Kawarthas. In the process, the landscape was completely transformed. Each successive advance of the ice, however, completely wiped out the changes to the landscape left by its predecessor. This means that we only have clear evidence for the advance of the last ice sheet, the Wisconsin advance. Most of the transformation to the land actually occurred when the ice sheets were melting back. The huge amounts of meltwater deposited material into the landforms we see south of the Shield today: drumlins, moraines, eskers, glacial lake beds, glacial spillways, reconfigured lakes and more. On the Shield itself, however, there was very little deposition but rather a huge amount of removal of material. Wide areas of exposed bedrock were one of the results.

I will take a close look at the many glacial features of Peterborough and the Kawarthas in my next column. For an in-depth description of the physical landscape of our area and a selection of drives you can take to see many of these landscape features, I would highly recommend the third edition of *Peterborough and the Kawarthas*, a very informative book written by the Trent University geography department and edited by Peter Adams and Colin Taylor.

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DREW MONKMAN Special to The Examiner
A granite outcropping (top) on Rathbun Lake in the Kawartha Highlands Provincial Park, west of Apsley, is typical of the pink granite found in much of the north section of the Kawarthas. Layered sheets of limestone left behind when the Ordovician sea retreated are another common feature of the Kawarthas. This example (left) is on a section of the bank of the Otonabee River.



DREW MONKMAN

OUR CHANGING SEASONS

What I would like to do this week is provide a geological sketch of the land that literally lies below our feet. Its history is far more amazing than you would ever think. The story of the Kawarthas is no less than a saga of mountains rising and slowly eroding away, oceans forming and disappearing and two-kilometre thick glaciers advancing and melting back. Easy-to-see evidence of all of these processes can be found throughout the area.

THE NORTH

Let's begin with an exploration in the northern half of the county, starting roughly at Buckhorn or Burleigh Falls. Northern Peterborough County is part of the Precambrian Shield, one of the oldest geological features on the planet. The rocks here are unfathomably old – 600 million to 1.2 billion years of age – and they underlie much of the North American continent. They also have diverse origins. Many, such as the pink granite you see around Burleigh Falls and Buckhorn, are igneous rocks pushed up from the Earth's interior. When the molten rock cooled, it hardened into a mass of crystals. Other areas of the Shield were originally covered with sedimentary rocks that formed from sediments that were deposited onto the beds of ancient seas. Many of these original igneous and sedimentary rocks were in turn subjected to intense pressure and heat when movements of the Earth's crust carried them deep underground. They were transformed into metamorphic rock (from "metamorphosis" or change). Some can be seen at Petroglyphs Provincial Park where ancient limestone was changed into a massive white marble deposit. In other areas, sandstone was transformed into quartzite and granite into gneiss.

The Canadian Shield is no less than the mineral storehouse of Canada. Some local examples of this storehouse include the nepheline syenite mine at Blue Mountain, northeast of Stony Lake. This mineral is used in the production

of ceramics and in glass-making. Long-abandoned gold mines can be found northeast of Havelock and an old iron mine just east of Marmora. In the Madoc area, there is still an active talc mine and several marble quarries.

Many of the rock types to be found on the Shield can be seen in the numerous road cuts. A particularly good example is at Haultain, about three kilometres north of Woodview on Hwy. 28. However, the rocks you are looking at in these cuts represent only a tiny fraction of what was here originally. It is believed that northern Peterborough County – and the Canadian Shield in general – was once covered by huge mountains, not unlike the Rockies of today. Over hundreds of millions of years, however, the mountains were worn down by erosion to almost a plain.

THE SOUTH

As the Precambrian mountains eroded and weathered away, much of the eroded material ended up in a giant inland sea of warm, shallow water. The sea covered much of the area we now know as the Gulf of St. Lawrence and the Great Lakes Basin. Over 20 million years, huge amounts of sediments, including the shells of minute sea crea-

tures, formed deposits on the sea floor. The shells of these creatures were composed of calcium carbonate in the form of the mineral calcite.

These deposits were thousands of metres thick in some areas. Eventually, as a result of cementation and the incredible pressure of their own weight, the deposits hardened into layers of Ordovician limestone and shale. Because the sea supported a plentiful and diverse bottom-dwelling fauna, much of the limestone is rich in fossils. Trilobites, brachiopods and even corals are most common in layers known as the "Trenton beds" such as seen in the old limestone quarry just east of Lakefield.

The contact zone between the ancient Precambrian rock to the north and the younger Ordovician limestone to the south is clearly visible at the junction of Douro 2nd Line and County Rd. 6, about six kilometres northeast of Lakefield. Here, you can easily see about a metre of limestone lying right on top of the ancient Canadian Shield rock below. As you would expect, the limestone beds generally become thinner as you approach the edge of the Shield. Although the original shoreline of the ancient Ordovician sea was prob-

ably much further north, it is intriguing to imagine yourself standing at this very location a few hundred million years ago as the warm waters of the inland sea lapped up against the already-ancient Shield rocks.

If you return to Hwy. 28 and drive north through Burleigh Falls to Woodview, you can see what is called an "outlier." This is an island of limestone located some distance north of the main body and completely surrounded by Shield rock. The layers of limestone are clearly visible in a number of rock cuts here. Another outlier is located at Flynn's Turn at the junction of County Rd. 36 and County Rd. 507, about six kilometres north of Buckhorn.

LYNCH'S ROCK 'INLIER'

By the same token, there are occurrences of old Shield rock that project up through areas that are otherwise completely limestone. Lynch's Rock is a particularly fine example of one of these "inliers." It is located right at the junction of Douro 5th Line and Lynch's Rock Road and consists of a rounded, small hill of granite and gneiss surrounded by limestone. The road passes directly over this hill.

After the Ordovician sea retreated,