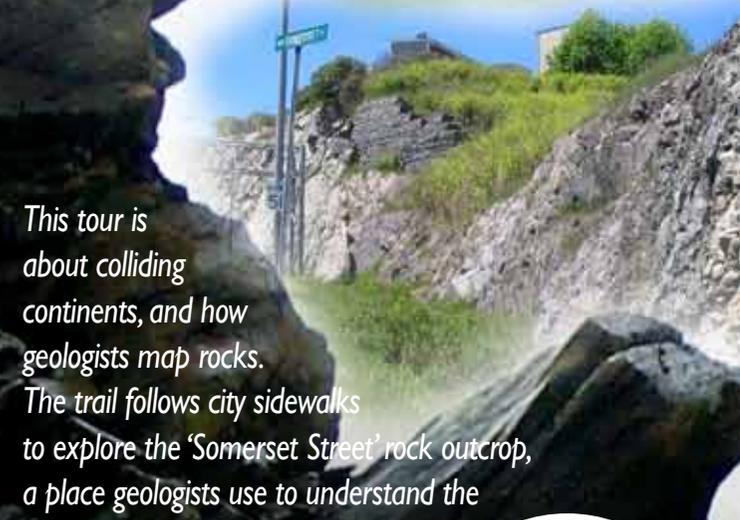
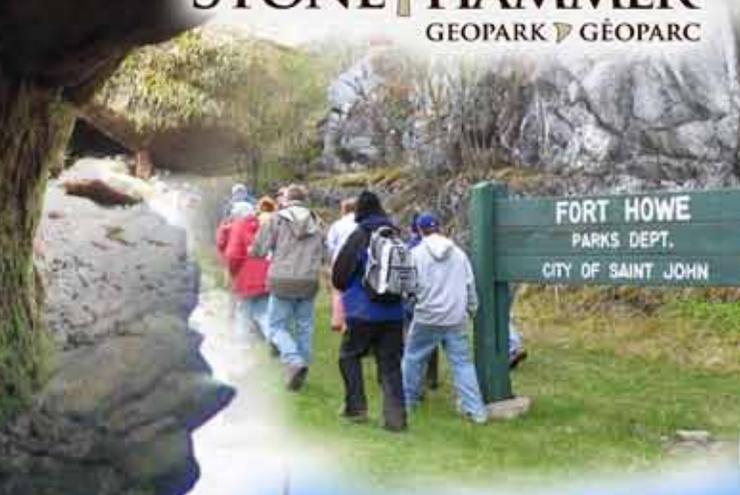


FORT HOWE & SOMERSET STREET GEOLOGY WALK



STONE HAMMER™
GEOPARK / GÉOPARC



This tour is about colliding continents, and how geologists map rocks. The trail follows city sidewalks to explore the 'Somerset Street' rock outcrop, a place geologists use to understand the geology of Saint John.



CONTINUE until you cross Millidge Street.

45°16.64'N • 66°04.03'W

Paradise Row - Main Street

You are now walking in the opposite direction in time, the sidewalk cuts across the layered Cambrian rocks and the rocks are getting older. Stop where the road begins to merge with Main Street and find the white rock outcrops of the Glen Falls Formation. Try to find the Ratcliffe Brook Formation (grey and red), the McBrien Lake Formation (green), and the Ashburn Formation (grey). Near the beginning of the Ratcliffe Brook Formation you see several small drill holes where rock samples were taken for research. Minerals in the rock act like miniature compass needles. They point to the earth's magnetic pole and can be used to figure out how far north or south of the equator the rocks were when they were formed.

Walking from the green dacite to the grey marble you again cross the boundary from the Caledonia to the Brookville terrane. Here we can see the fault line that separates the two terranes as a small, treed hollow below the houses. 45°16.60'N • 66°04.20'W. —>



CONTINUE up Main Street to Metcalfe Street. Turn right up Metcalfe Street, then right up Magazine Street to the entrance to Fort Howe. Along the way you pass outcrops of the Ashburn Formation.

45°16.56'N • 66°04.47'W

Another layer of volcanic ash here is 511 million years old. Fossils are rare at Somerset Street but have been found at other sites. Recent research at this spot has shown that the chemical element 'phosphorus' is abundant. Phosphorus is essential to life, one of the elements in seawater that helped produce the explosion of life by allowing animals to build shells. Around the corner the outcrop disappears. Before moving on, look for the features called tension gashes caused by stress pulling the rock apart. The gashes are filled with quartz. —>



CROSS Somerset Street at the streetlights at the corner of Paradise Row. Follow the sidewalk West.

45°16.76'N • 66°03.84'W

Notice the rock layers are tilted vertically and the same on both sides of Somerset Street. Along Paradise Row you are in a valley and walking 'along strike' (with, instead of across, the layers). The rocks of the Ashburn and McBrien Lake formations are high above you to the right. These older rocks make up the high hills in Saint John. The softer rocks of the Cambrian formations are folded against the older rocks in a 'U' shape or syncline. —>

Trilobite NBMG 9039 Courtesy: New Brunswick Museum



Tension Gash



NEW BRUNSWICK MUSEUM
MUSÉE DU NOUVEAU-BRUNSWICK



45°16.62'N • 66°04.37'W

—>> **START** Enter Fort Howe park from Magazine Street and go left to the Blockhouse.

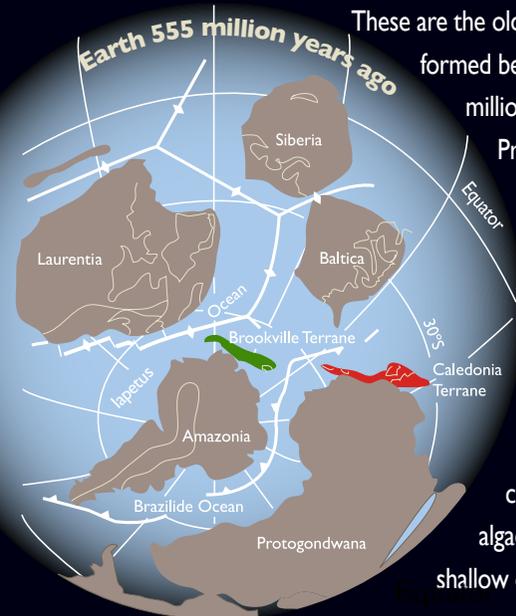


Fort Howe

Begin by looking all in directions to get a sense of Saint John's landscape. Hills and valleys are controlled by the complex geology. From here you can see three terranes, the Caledonia Terrane (south), the Brookville Terrane (under your feet), and the Kingston Terrane (north). A terrane is a broken fragment of the earth's crust (or tectonic plate), attached or welded to the crust on another plate. The fragment of crust preserves its own distinctive geologic history, which is different from the crust it has become welded to.

You are standing on the Brookville Terrane made up of two rock units called the Martinon Formation, named for the small village of Martinon, and the Ashburn Formation, named for Ashburn Lake. The grey Ashburn Formation at your feet is a limestone that has been baked and pressurized into marble. It is smooth and rounded, worn by glaciers and weathering.

These are the oldest rocks in New Brunswick, formed between 1.2 billion and 750 million years ago near the end of Precambrian time (4.6 billion to 542 million years ago). The rock-forming sediments were deposited in an ancient ocean near the South Pole. It contains stromatolite fossils, the layered remains of cyanobacteria (or blue-green algae) that grew in the shallow ocean. —>



Globe modified from Atlantic Geoscience Society, The Last Billion Years, 2001



WALK EAST, downhill, turning left on the road to Kitchener Street. Turn left again to Magazine Street and then right to Somerset Street. Cross at the streetlights. Walk down Somerset Street to the rocks.

45°16.75'N • 66°04.15'W

Somerset Street

Near the top of Somerset Street rough and blocky green volcanic rocks are called dacite. Known as the McBrien Lake Formation, these rocks formed from molten magma near the end of the Precambrian, 560 million years ago. You have crossed a geologic boundary marked by a fault and are now on the Caledonia Terrane. As you walk downhill notice the rocks change colour to a reddish-purple (the Seely Beach Formation) and then to red and grey (the Ratcliffe Brook Formation). The rocks, now in thin layers, are sedimentary rocks created at the bottom of the ocean. You have crossed a major geological boundary from Precambrian time to the Cambrian Period, a time horizon placed at 542 million years old. The Cambrian Period is exciting; this is the time when the ancestors of most animals first appear in the fossil record. It happened so fast it is sometimes called the 'Cambrian Explosion' of life. Few fossils are found here, but east of Saint John these rocks have small fossil shells and winding trails left by snails.

Cambrian Mural | Courtesy: New Brunswick Museum

Volcanic ash, seen as thin ash-bed layers composed of tiny crystals, spewed out of volcanoes and settled in the ocean. They contain small amounts of radioactive minerals (not enough to harm you) that allow geologists to figure out the age of the rocks. They decay at a known rate, like a clock that disappears a little every time it ticks. About 17 paces from where the rocks turned red there is a thin ash layer that is 530 million years old. —>

Keep walking until the rock changes colour again. Stop when you get to the rock that is almost white.

These are sedimentary rocks too, but they contain no fossils anywhere where they are found. This coarse sandstone, called the Glen Falls Formation, probably formed on a beach where waves kept it clear of animal life. It is so white it stands out as a marker for geologists around the city. When you see it you know 'when' you are.

Another 10 paces and the rock changes colour again, now it is dark grey. We sometimes see fossils of small animals called brachiopods and even crab-like trilobites. This is where the real Cambrian Explosion begins. —>



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