

# Rock Around Uptown Waterloo

*Peter Russell*

Our tour begins at the Waterloo Memorial Recreation Complex in uptown Waterloo. This is where you should park. The tour is approximately two hours long and will also end at this location.

Our first stop is found in the middle of the traffic circle in front of the recreation complex. You will find a display of metamorphic rocks. Metamorphic rocks are formed by heat and pressure under growing mountain ranges. The rocks in front of you are called Gneiss, pronounced “nice”. The gneiss was formed 25km deep under the Grenville Mountains which formed over one million years ago. This Grenville Mountain range was as high



as the Himalayan Mountains. The mountains eroded away, exposing the rocks at the surface. During the ice age, glaciers ripped the rocks from their outcrop and transported them to Waterloo County. The large rock in the centre was collected from a local gravel pit. Notice this rock has a “W” on the surface. This was created from the rock forming into banded layers that were then folded as the mountains were built. This formed the shape of the letter “W”. This unique feature was noted by city hall staff and was chosen for this site. When the rock cooled, cracks opened in it



and an igneous, or molten rock called pegmatite filled the cracks. Look for the white lines or stripes. These are called pegmatite veins. The rock layers were folded first then the veins with white or pinkish crystals formed afterwards. In front of the big rock with the W you will see sparkling muscovite mica and glassy quartz, forming gneiss. These rocks are from Redbridge, near North Bay, and were formed in the same way as our W rock.

Walk over to the front of the recreation complex to the right of the main entrance and look at the walls. Check out the white and grey materials that make the walls. You'll notice some grey concrete bricks and some white concrete bricks. The white concrete bricks are made by using marble. Marble is a metamorphic rock, formed by heat and pressure changing limestone (a sedimentary rock). Big calcite crystals in the marble were crushed and mixed in the concrete with pieces of marble to form the bricks. Crushed marble was also used to make the cement white between each brick. The contrast between the two colours of concrete make it a very attractive wall treatment.



Walk over towards Father David Bauer Drive and you will notice some drainage ditches around this complex with big stones in them. These stones are from gravel pits nearby. The gravel was brought down by the glaciers during the ice age, over 12,000 years ago, and then sorted by water as the ice melted back. They were rounded smooth during this process. You will notice most of the rocks are grey or whitish. If you look closely at the grey rocks, you will see that most have fossils in them. The grey rocks are limestone. Limestone is a sedimentary rock formed in a warm shallow sea. It is formed by the accumulation of shells and corals which hardened and turned into rock over time. If you have visited a beach in Florida or Mexico these beaches are limestone in the making. The whitish and pale yellow ones with holes are dolostone. We will talk about this rocks formation later. You will notice that most of the rocks are limestone or dolostone. The glaciers collected them from the Niagara escarpment. 10% of the rocks are glacial erratics from the Canadian Shield. The Canadian Shield is made of ancient rocks, and forms the foundations of our continent. It is found over 800 metres below Waterloo and is seen anywhere north of Barrie, Ontario, where it starts to appear in a place called Wabusheen. On the way to Sudbury you will find banded gneiss and pieces of greenish grey rock also from the Canadian Shield. You may find pillow lava or other igneous rocks like diabase, which is greenish grey and has a salt and pepper texture. Just look for the different rocks. The unusual rocks are from the Canadian Shield.





Walk along the sidewalk down Father David Bauer Drive to your left, towards Luther Village, to a walk-way across the road to Waterloo Park. You will notice a fancy gateway and a rock wall. Cross the road to the median and look to your left. You will see a pile of shattered material. Originally, this material made one block of dolostone but it has broken apart because it contains chert. Chert is a kind of silica. This silica is soluble in water, and when it recrystallizes it splits the rock apart. Chert was used to make arrow heads by First Nations Peoples and our ancestors. If you look closely you will see black material on the surface. This is evidence of hydrocarbon oil which formed in the rock over time. Look closely and you will also find some soft gypsum on the left side of the rock. Gypsum is a soft mineral which is easily scratched with your fingernail. **(This may have disappeared as the city maintains the area)**



Finish crossing the road, and walk up to the decorative arch. Note that the arch is made of bricks and there is also something that looks like stone between them. This stone is made by Arriscraft in Cambridge and it is a man made stone. The stone can be coloured any colour you'd like to match original stonework in buildings. It is made by sand, calcium, and a colouring material which is then heated to form a man-made sandstone. It is quite durable.



Walk under the arch to your left and take a look at the big blocks of rock. This is dolostone from Flamborough, Ontario. Dolostone is formed by seawater flowing through lime mud as it gradually forms hard rock. The magnesium from the seawater turns the calcium carbonate in the shelly fragments into magnesium carbonate and it also forms holes.



In this rock, crystals have grown in the holes. The whitish crystals with points on them are called dolomite. The grey, almost clear crystals are calcite. Finally, some in some of the holes you can also find sphalerite, which is honey-yellow in colour. Further down Father David Bauer Drive you may find the mineral galena. It is black or grey and metallic. It is a lead sulphide. Sphalerite is zinc sulphide. The black coating the top of these rocks is soot left behind as oil was burned in the rocks.



After you finish, walk back towards the Waterloo Recreation Complex, but stay on this side of the road. Past the skateboard park, and at the end of the trees on your left, there is a footpath over the railway tracks. Take this into the park. Take a left and walk across the bridge over Laurel Creek. After the bridge, turn right and take the foot path that takes you around Silver Lake. Continue walking along the boardwalk around the lake. Notice the Pavillion past the pump house.



You will notice a curved area made of stone. These are pieces of Eramosa dolostone. This dolostone was formed by a fine lime mud that was created gently in a calm area of the sea water. The water covered a huge area with a very thin layer. Algae grew in the water and captured the lime mud which caused it to deposit thin, horizontal layers. This rock comes from near Warton, in Southern Ontario. Some people call it waterfall rock. It is used as a decorative stone. Later on our tour we will see how this rock is used in different ways. You occasionally find fossils in





this rock; the most famous ones are scorpions! There are wonderful scorpions in the Wiarnton area; some may be 15cm across. Older fossils found in this rock look like scorpions without the long thin tail. These are called Eurypterids.

Keep walking around the boardwalk. Once you reach the gravel path ahead to your right, check out the rocks. Look closely at these rocks. With a little imagination you can see some wiggly lines called stylolites. Stylos means “writing”. They were formed by the gradual recrystallizing of calcite along a crack as water moved through the rocks, producing the wiggly pattern. You can see it clearly on the third rock.



Keep walking along this foot path and look for more rocks on your right hand side. These rocks are from the Woodstock and Ingersoll area. They have white fossils in them called stromatoporoids. They are an extinct creature which looks like the cross section of a cabbage if you cut one in half. They also have raised areas which look like goose bumps on the rocks. They have a curved pattern to them.



Also, look for carrot shaped horn corals. Scientists call them rugose corals. Rugose means “wrinkled”. Rugose corals are a single coral. All corals today are colonies. Single corals had a sea anemone like body sticking out the top of it. They were carrot or ice cream cone shaped with a calcium secreting scaffolding underneath its body. Think of this as its house.



The third rock on your right has the stromatoporoids in it. You can see that the rock looks like it has goose bumps. You can also see the corals in the rock. Look carefully at the fifth rock, which has the carrot shaped corals in cross section so you can clearly see their shape.



If you count the seventh rock along, just past the Silver Lake information sign, you can also see colonies of coral. They appear in a honey-combe branching sort of pattern.



Continue walking on the trail. Walk up by the side of the Grist Mill. The Grist Mill has been reconstructed. There used to be a dam here many years ago, and they would grind corn or wheat at this site.

To your left, on Caroline Street, you will see the Abraham Erb's Grist Mill Sign. In the middle it has a mill stone. The middle of the mill stone here is made of granite. It has large crystals of muscovite mica that sparkle in the sunshine and white feldspar and quartz. Granite is an



igneous rock which cooled deep underground, allowing large crystals to form. Around the outside of the granite there are interlocking pieces of quartz. These would normally be replaced when they got worn out. You can see ridges and holes in the quartz which gave the grindstone "tooth" to help it grind away



and mill the wheat or corn. The other rocks in this wall are pieces of gneiss, pink feldspar, black mica and grey quartz. There is also a reddish brown rock on the left hand side of the sign which is quartzite. Quartzite comes from the Huronian rocks, which are found north of Lake Huron. These rocks make the spectacular scenery of Killarney Park near Sudbury. They were brought down by the ice during the ice age.



Walk back down Caroline Street, past the Grist Mill and look out onto the creek as it escapes from Silver Lake. At your feet you will find some interesting fossils. Walk over near the Perimeter Institute sign and look on the ground at the blocks beneath the metal fence. You can find more rugose corals in these stones. They have an internal structure and a cap-like top which would hold the soft parts of the creature. You can see the cone shaped coral and the chambers with the supporting layers. These rocks outcrop at the mouth of the Grand River and are quarried at the Woodstock and Ingersoll area.



In the rocks behind the Perimeter Institute sign you can see more stromatoporoids. You can also see in the next rock over towards the Clay and Glass Gallery, coiled shells with rugose corals. They're about the size of a toonie! The next rock over has some larger rugose corals. Finally, the last rock has lots of corals which are very delicate with different structures in them. Look closely and check out the honeycomb structure in some of the corals and the very fine tubes that interlock in the other ones.



Head for the lower level main entrance of the Waterloo Public Library. Cross the street either by carefully crossing the busy road or at the traffic lights past the Clay and Glass Gallery. Walk up to the main entrance of the Public



Library. The rock on the right hand side of the entrance way is made up of different pieces of granite-gneiss or gneiss. These rocks have the same minerals as granite: quartz, feldspar and mica. The gneiss is from the Canadian Shield. The rocks have been broken, which allows you to see the structure rather nicely. In some rocks you can even see the pegmatite veins running through them, forming pinkish lines in the rock. If you look along the side of the wall you can also see a cross section of the thin layering in the pieces of gneiss. In some spots you can see an enlargement of the white layer that looks like an eye. Geologists use the word "augen", a German word for eye to describe the eye shaped pods of feldspar crystals in the rock. If you look on the wall that parallels the door you will see a gneiss with red garnets near the top right hand side, about 9 feet up or 3 metres high. Red garnets are found in the gneiss near Perry Sound, Ontario. The billion year old Grenville Mountains formed these rocks twenty five kilometres underground. It takes a long time to make this rock. The mountain then weathers away to form other rocks, and exposes the gneiss on the surface.



Cross the road to the tall building, the Marsland Centre. We are going to discover what it is made of. Check out the big stripes of pink/white material going up the side of the building. The middle part of the building was built first, the two ends build second. In one of the sections they used real rock, and in the other they used artificial rock. I would like you to walk over and look at the pink rock and figure out which is the real granite and which is the fake.



If you check the rock closely the answer is that the old part has the artificial rock, which is twice as thick as the real rock in the newer part of the building. To make the artificial rock they took crushed up pieces of granite and mixed it with a reddish



brown material. It may look like granite, but it doesn't stay quite as bright or as shiny as the original. However, it has stayed in reasonable shape over the years. If you look at the bottom near the door you will see that the granite is getting pitting in it. This is caused by salt damage in the winter time. We will see this damage in other places during our walk.

If the Marsland building is open, go inside. There are a couple of interesting rocks in there. Inside you will find the original cornerstone for the Waterloo City Hall that used to be on this site. It is made of marble. It has been etched away by acid rain. It was originally a very sharp carving, but it now has a more weathered look.



Look down at the floor and you will see black granite and a brown granite. In the brown you will see large crystals of feldspar over 5 cm across.

Walk over to the elevators and look at the walls. They have a banded rock on them. This is travertine, formed from calcium deposits over algal growth which builds up in massive layers as spring water, rich in calcium, flows over the surface. This rock is then cut and extracted in the quarry. You can see some dark brown material which has been used to fill the holes in the rock. The travertine has been polished and the pattern placed to look like pages in a book. So they have taken pieces and opened them out so that the pattern matched on either side, making a rather attractive wall treatment.

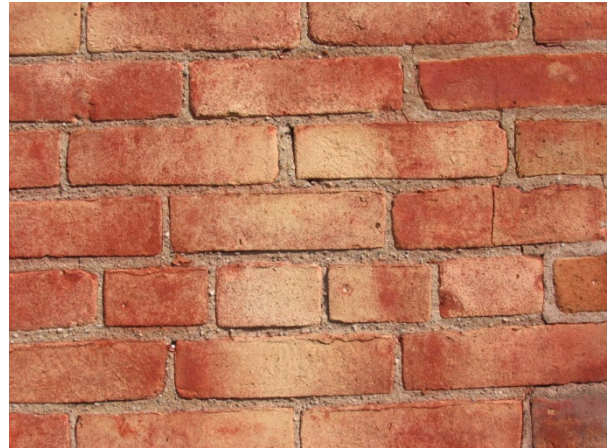


Exit the same door you came in and look over to your right. You should see the old Forsyth Building which used to make shirts and ties. This reddish building used to be one of the factories. Did you know that the Forsyth building was built of local bricks and that the bricks were originally yellow? If you make bricks out of the clay in the Kitchener/Waterloo area the bricks are yellow due to the calcium rich clay mixed with ground up limestone from the Niagara escarpment limestone. The clay formed during the ice age. Most people last century didn't think that yellow



bricks were very good, so on this building they painted them red.

The red colour is slowly weathering off of the surface. We're going to take a closer look at it. Cross Albert Street and stop when you get to the Canadian Employment Services building, the old Forsyth building. Look closely at the red painted bricks and you can see that they were originally yellow.



Now we are going to move down to the old Waterloo post office. The post office building is made of Whirlpool sandstone from Cataract Ontario. It is a red sandstone. This rock was also used to build the Ontario legislature in Toronto. If you look closely you can see the layering in the sand as it was deposited, forming layers at an angle. It is pronounced on the large pieces of sandstone that we used as sills under the windows. The reddish colour is caused by iron oxide/ hematite in the rock. Around the front entrance of the building you can see that the rock is suffering from salt damage. Look closely and you will see a powdered material around the steps. Touch the rock where it is crumbling and notice that you can easily rub it off with your finger! Don't do too much damage or they will think it is your fault!

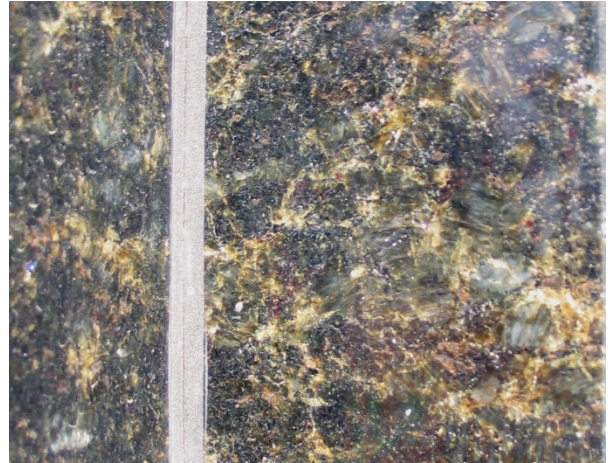


Cross Dupont Street and walk down King Street towards the Canadian Imperial Bank of Commerce (CIBC). Look closely at the rock that makes the CIBC building. It is a limestone and it has been weathering. This limestone is from Indiana, it is used as a building material because it has a nice, even texture. Look closely at the carving around the window. It is wearing away as acid rain weathers the calcite in the limestone. The columns around the door of the building have been covered with stucco to cover the damage to the original stone.





Walk down King Street and stop in front of the Stag Shop. The black polished stone is an anorthosite. A rock formed as molten magma cooled slowly underground, like granite. This rock is mainly feldspar. The feldspar sparkles in the sunshine and reflects from different angles in the crystals.



The Hatahita Jewellery and Gem Shop next door is the next stop. Look at the windowsills and you will notice it is travertine, the same material as inside the Marsland centre. The acid rain and salt damage has taken all the shine from this rock.



Cross Erb Street to the Bank of Montreal. The Bank of Montreal was originally the Molson Bank of Canada. If you look high up on the building you can see the sign. Look closely at the stone on the side of the building. It is still preserved in fine detail. It has texture and stippling effects in places. Sandstone doesn't weather by acid rain which is why this building is still in good condition. If you go over to the steps you will see some more salt damage. Salt gets in the rock. It freezes and thaws; as well, crystals grow and dry out again. These two cycles gradually break apart the sand into little grains and crumbles the wall away.



Cross King Street at the traffic lights at King and Erb. Look towards the Waterloo Hotel. It was built in 1819 and it was made of locally made bricks. They are once again yellow rather than brown or red.

Walk down King Street towards Franks Jewellers. The building is made from a similar rock to the one that covers the outside of the Stag Shop, anorthosite. Here you can also see the large shiny crystals of feldspar which makes up over 90% of this rock.



Past the Ontario Seed Company you will come to 22 King Street South. Go inside and look at the marble in the walls. This marble was formed by the metamorphism of limestone. The limestone had little bits of quartz and other minerals in it. This is what produced the dark stripes in the white marble.



Continue down King Street past O.W. Sports and over the rail road tracks. Stop in front of the uptown parkade. Please notice the fountains. Sometimes they are flowing and sometimes they are not. Check out the large rocks around the edge of the fountain and try to see which ones are real and which ones are fake. Don't read ahead until you have tried to figure it out!



The answer is that most of the rocks are fake! You can put your hands underneath one of the concrete rocks and feel inside. I think the idea behind these rocks was to have the rocks wrap over the basin for the fountain, which was a difficult task. So they made these concrete pseudo rocks to lap over the top. I don't think they are going to survive very well because the chicken wire inside the concrete rocks is gradually failing and cracking apart over time.



Look across the road at the intersection to the new building: RBC Dominion Securities. The core part of this building is dolostone from up near Warton, Ontario. It is called "Adair Marble". The same rock was used to make the Canadian embassy in Washington. The quarry is owned by Arriscraft in Cambridge. It is even, almost like the Indiana Limestone, but if you look closely you can see some layering.



Turn down Willis Way to Regina Street. Take a left and walk along Regina Street towards the button factory. The button factory used to make buttons out of oyster shells. Now it is the Waterloo Community Art Centre. Right across the road you can see the old Waterloo railway station. Carefully cross Regina Street because the old Waterloo Railway Station is out next stop. The rocks framing the building are Syenite, an igneous rock like granite but without quartz in it. It is mostly made up of feldspar. Likely it comes from near Marathon Ontario. You can also see greyish and reddish types of the same rock. You can see some real granite near the doorway facing Regina Street. Compare the syenite above to the granite at the very bottom.



When you are finished, walk back down Regina Street the way you came, towards Waterloo City Hall. Stop when you get to Laurel Creek. The creek was made into a concrete channel when it was the thing to do with natural streams in urban areas. This was done to try to make the water flow as fast as possible. Birds don't seem to mind, but it sure doesn't look very natural.



Enter Waterloo City Hall. The floor is made of a marble and serpentine rock, broken up into fragments, cemented together, and cut and polished into slabs to make a marble floor. The greenish material is serpentine, and the beige material is a kind of marble.



Exit City Hall towards William Street. You will see 99 Regina Street, the Community Health and Services Building. Cross Regina Street to that building and have a close look at the rock on the front entrance. The front entrance of the building is made of the same material as Franks Jewellers: anorthosite. If you look closely at the bottom piece of rock you will notice that all the shine has come off both sides of the doorway but the next one up is shiny. This is caused by salt damage. You can also do your little test here: rub your fingers on the rock and little crumbs of feldspar crystals fall on the floor. Don't let anyone see you because you are damaging region property!



Walk up William Street towards King Street. Cross King Street to the First United Church. If you would like to have a break at this time Whole Lotta Gelato is just down the street. On a warm summer day this is a great place to go and freshen yourself up with a tasty treat! For those Starbucks fans, you will have to cross the street in order to get yourself a nice cup of coffee.

Walk past the First United Church sign towards the church and down a little bit to the little side path. Examine the wall of the building. It is mostly made of brown and yellow sandstone. There is also some limestone framing the windows. In between, where the windows are above, you will see they used a kind of gravel made of white quartz and pieces of red and black gneiss sprinkled together. Hiding in between the gneiss are occasional





pieces of pyrite. Pyrite gradually breaks down to form rust spots! So if you look higher up you will see brown rust spots where the pyrite has decayed because of rain. Look at a few of these panels and see if you can find the rust damage. Also you will be able to see some marble crushed near the bottom of the wall is decorative stone edging the wall.

Look across the street to Terrace on the Square, a retirement residence. This building is made like a beer cooler! It has a wooden frame with Styrofoam and is covered with a thin layer of Stucco to make it look good and solid. Of course the Styrofoam keeps the heat inside in the wintertime and keeps the building cool in the summertime. Remember that Styrofoam is made from oil.



Walk up William Street to Caroline Street. As you walk in front of Hilliard Hall, which is part of the First United Church. Stop and examine the doorway. It is made of a coarse grained limestone with bits and pieces of fossils. Imagine yourself walking along a shelly beach in Florida and that turning into a limestone very much like this. All it needs is a little bit of time. Cross at the lights.



Walk down Caroline Street towards the Seagram Lofts building. I want you to have a look at the fountain feature on the side of the building. The fountain is made of the Eramosa dolostone from Warton. This is attractive when cut horizontally, showing interesting patterns. This rock is used to make fireplaces and polished marble-like floor tiles. This is the same rock we saw in Waterloo Park. The Seagram building is made from those yellow bricks again. It is quite a nice looking brick. Some people complain about the

brick bring porous and hard to work with. The walls have been cleaned and that may have damaged the original surface of the bricks, it is unclear how the bricks will hold up because of this.



Walk over on the sidewalk to the side of the Seagram building. We will look closely at the wall along the edge of the sidewalk. Some of the bricks are breaking apart; this is caused by water penetration. The water penetrates through the capping piece of concrete on top and goes down in between the bricks. When freeze-thaw happens, during the wintertime, the brick crumbles. So take my advice, install a waterproof barrier that stops water penetrating your brick walls and this will stop the effect, but these walls are pretty damaged by water already. This wall has recently been repaired, watch for further damage!



Walk past the Sole restaurant, which is also made from those yellow bricks. Walk across Erb Street at the traffic lights and make your way to the Waterloo Memorial Recreation Complex where you left your car. This will conclude your tour of Rock Around Uptown Waterloo.

