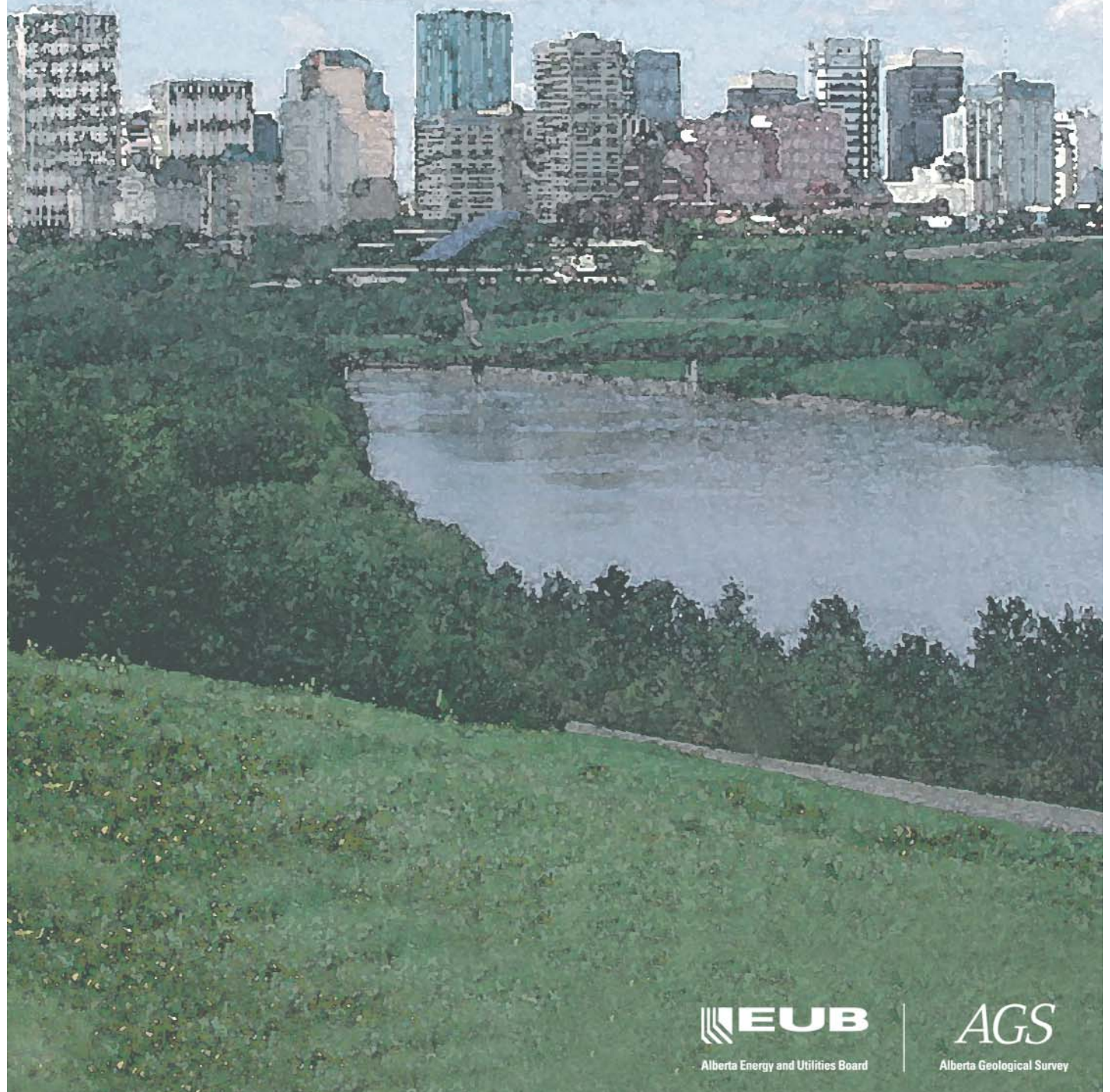


Rock Walk IV

Edmonton City Centre

May 11 - 12, 2004



A Rock Walk Through Downtown Edmonton

A rock walk is a stroll along the sidewalks of downtown Edmonton and the opportunity to see the amazing suite of minerals and rocks on display in the building stone and rock materials of the city structures. The information for this rock walk was assembled through a comparison with similar rocks in hand, from other geologists and masons, from referenced publications and, in a very few cases, from the analysis of actual pieces of the building stone.

The following are some of the buildings and sites that you see as you do a rock walk through downtown Edmonton. The next time you are standing on the corner waiting for the lights to change, have a look at the building near you.



Map of downtown Edmonton (not to scale) outlining some of the buildings on the rock walk.



Very attractive, polished pink granite, trade name Rosa Sardo, is used for the fountains and benches in Canada Place (building number 1). The granite is composed of light grey quartz, large pink or flesh-coloured feldspars, white plagioclase feldspar and black mafic minerals.

Fired granite is used on the walkways and the floor. The same fired granite is used on the outside sidewalk.





The former Imperial Bank of Canada (number 2 on the map) first opened its doors at this site in 1891. In 1950, the building was demolished to build a larger structure. However, due to a shortage of structural steel, construction was delayed until 1952. You may note the relief panels, which show trains and planes, the metal spandrels with the bank's logo, as well as the quoins and pilasters stylized as bands of rectangles. (Historical Walking Tours of Downtown Edmonton, 1995.)

The building stone and rock materials consist of fossiliferous Indiana limestone and black granite. The black granite consists primarily of feldspar. A closer look at the black granite will reveal brilliant flashes of blue as the light changes on them.



A view of the south entrance to the building reveals the use of Indiana limestone and black granite (close-up of the black granite with the blue crystals).





Number 3 on the map is the Toronto-Dominion Bank Building at 10004 Jasper Avenue. It is made with one of the world's most common building stones—marble. This particular building is made with Carrarra marble from the Carrara region in northwest Italy.

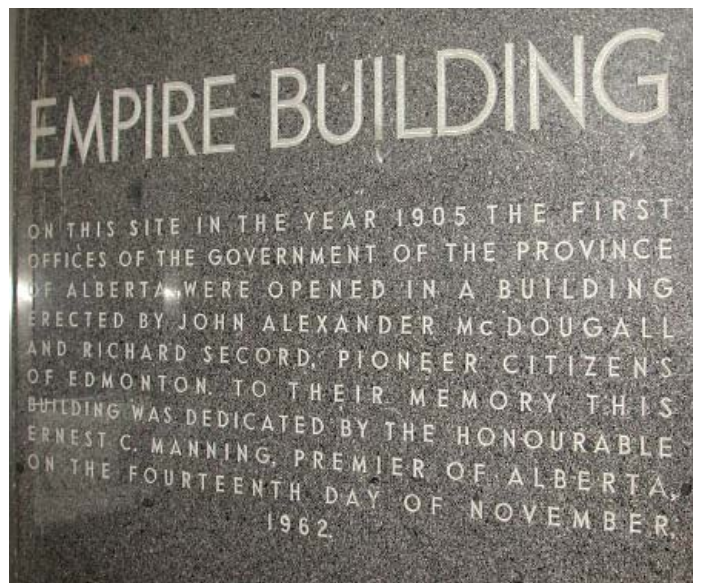
Marbles of commerce (rocks with the trade name of marble) include true (geological) metamorphic marble, polishable serpentine rocks (verd antique) and certain crystalline limestones. Carrarra is a fine-grained marble with a mosaic of calcite crystals 0.1 to 0.3 mm in size. The marble is 97% calcite with minor feldspar and mica particles.



Pink and black granite are the dimension stones used for the Empire Building, number 4 on the map. The pink granite is very coarse grained with large pink crystals of feldspar.



A much finer grained black granite is used on the entrance on the east end of the building. The history of the Empire Building is carved into this black granite.

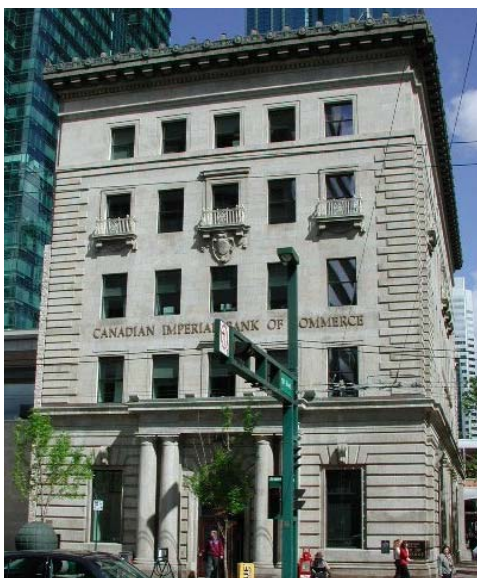


Igneous, Metamorphic and Sedimentary

The corner of Jasper Avenue and 101 Street contains buildings constructed with the three major rock types (igneous, metamorphic and sedimentary). The CIBC on the northwest corner represents the sedimentary group as it is constructed with Tyndall limestone (Tyndall Stone). The Royal Bank on the southwest corner represents the igneous group as it is constructed using brown granite. The former Bank of Montreal on the southeast corner represents the metamorphic type as it uses gneiss.

The building stone in the CIBC building (number 5) is

Tyndall limestone. This limestone is quarried approximately 30 km northeast of Winnipeg, Manitoba, at Tyndall and Garson, Manitoba. It has been used since 1832 (e.g., Fort Garry). Tyndall Stone



is limestone (light colour) with dolomite (darker colour) in the irregularly shaped burrows of ancient marine worms. The limestone is 250 million years old (Upper Ordovician).

The outside of the building uses various cuts of the Tyndall Limestone. A close-up look at the walls will reveal many interesting fossils embedded in them.



Cephalopods are represented very well in the rock. These are like modern squids or nautili. The ones with a straight shell are *Orthocone* cephalopods, and the ones with a curved shell are *Winnipegoceras*.



True corals are well represented in the rock as well. The 'chain coral' is appropriately named. Upon a closer look, you will see the pattern in the rock is a series of interlinked chains (*Favosites*).

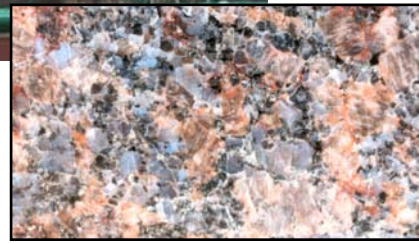


The 'horn coral' is a solitary coral. In the rock the fossil has a pattern of lines radiating out to an oval or horn-like pattern (*Grewingka*).

'Sunflower coral' is typical of Tyndall Limestone. It is actually an alga. The fossil is characterized by a uniform grid pattern and

a distinguishable deep hollow in the centre (*Receptaculites*).



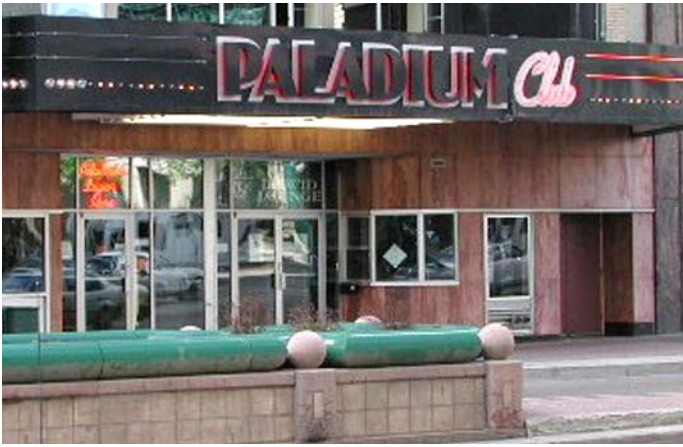


Igneous rock is represented in the 6th building on the tour, the Royal Bank building, consisting of brown granite (Dakota Mahogany). This building stone is a medium-grained granite that can be brown, blue or pink depending on the light. The quartz crystals look like blue 'eyes' in the rock.



The 7th building is the former Bank of Montreal building. Dimension stone slabs are cut from large blocks of Morton Gneiss. This gneiss comes from Minnesota and is believed to be 3.6 billion years old. The large dimension stone panels are arranged to create a matching pattern on the side of the building. Each slab is cut from a large block and is usually less than 1/2 inch thick. The 'flow' of various materials in the development of the gneiss is clearly visible throughout the panels on the building.





The outside facing entry of the Paladium Club, number 8, is a soft travertine (spring deposit), probably from Bari, Italy. The rock is about 100 million years old. It forms when algae grow in nutrient-rich pools and trap calcite crystals to form layers. As the layers are buried, the algae suffocate, die and decompose, forming gas bubbles that are preserved as the holes you see between the layers.

The holes in the travertine are plugged with epoxy to make the rock more resistant to weathering. Occasionally you see rock with the holes left open.



In front of the box office there is a red rock with a crest. This rock is red granite and uses both polished and unpolished granite.



Number 9 on the map, the Union Bank, is the only pre-World War I bank building remaining in downtown Edmonton. The facade of local pressed brick and Indiana limestone conceals a modern, fireproof, steel and brick structure.

The surface on the front of the building is rough because the rock is composed of small fossils. The rock is made of the mineral calcite and is quite soft. Although the rock is soft, it is tough, easy to saw and makes a great building stone. This limestone is found in many of Edmonton's older buildings.



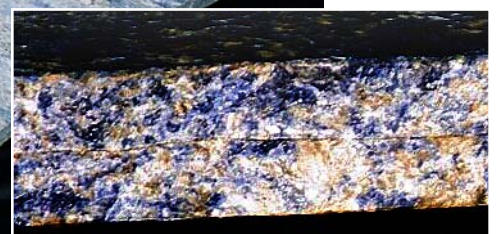
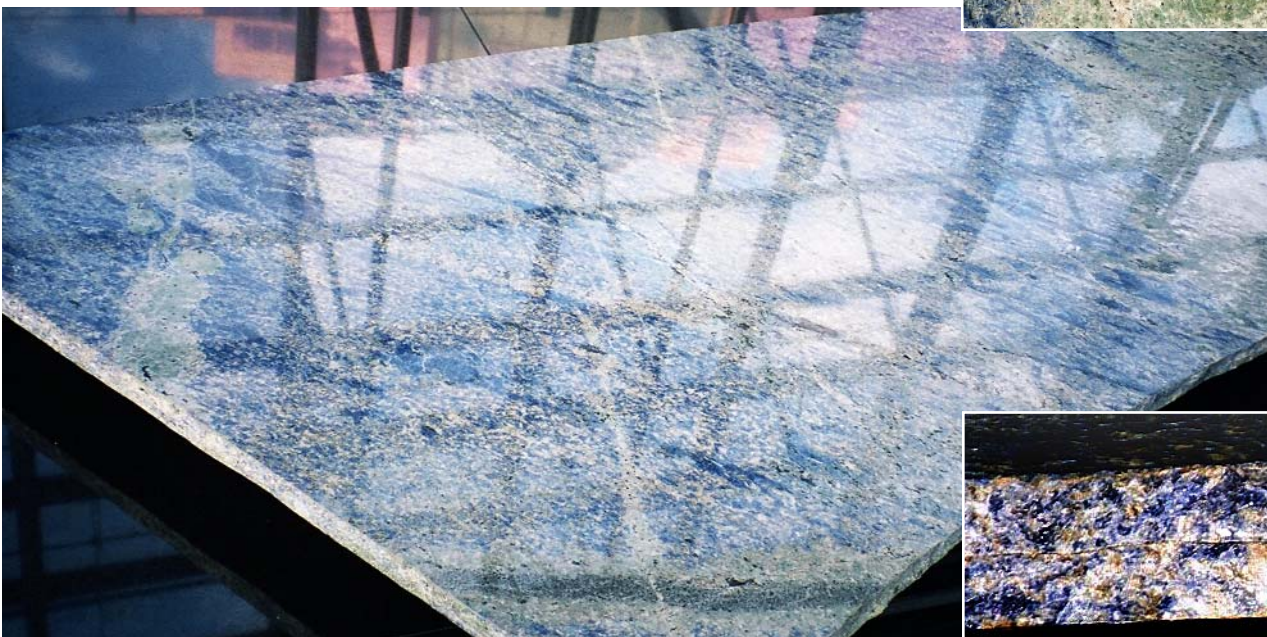
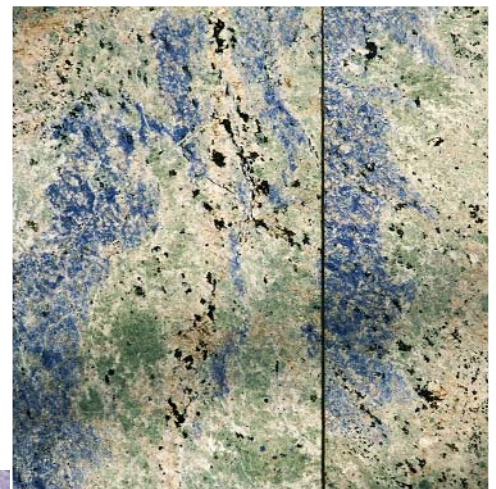


The Fairmont Hotel Macdonald (number 10) was designated as a municipal historical resource by the City of Edmonton in 1985. The skeleton of the hotel is steel and reinforced concrete, which is hidden beneath a skin of Indiana limestone, granodiorite and sheet copper roofing. Throughout the interior of the building, in the floors, walls and furniture, you may also see Carrarra and Lepanto marble, syenite (Blue Pearl) and gneiss.

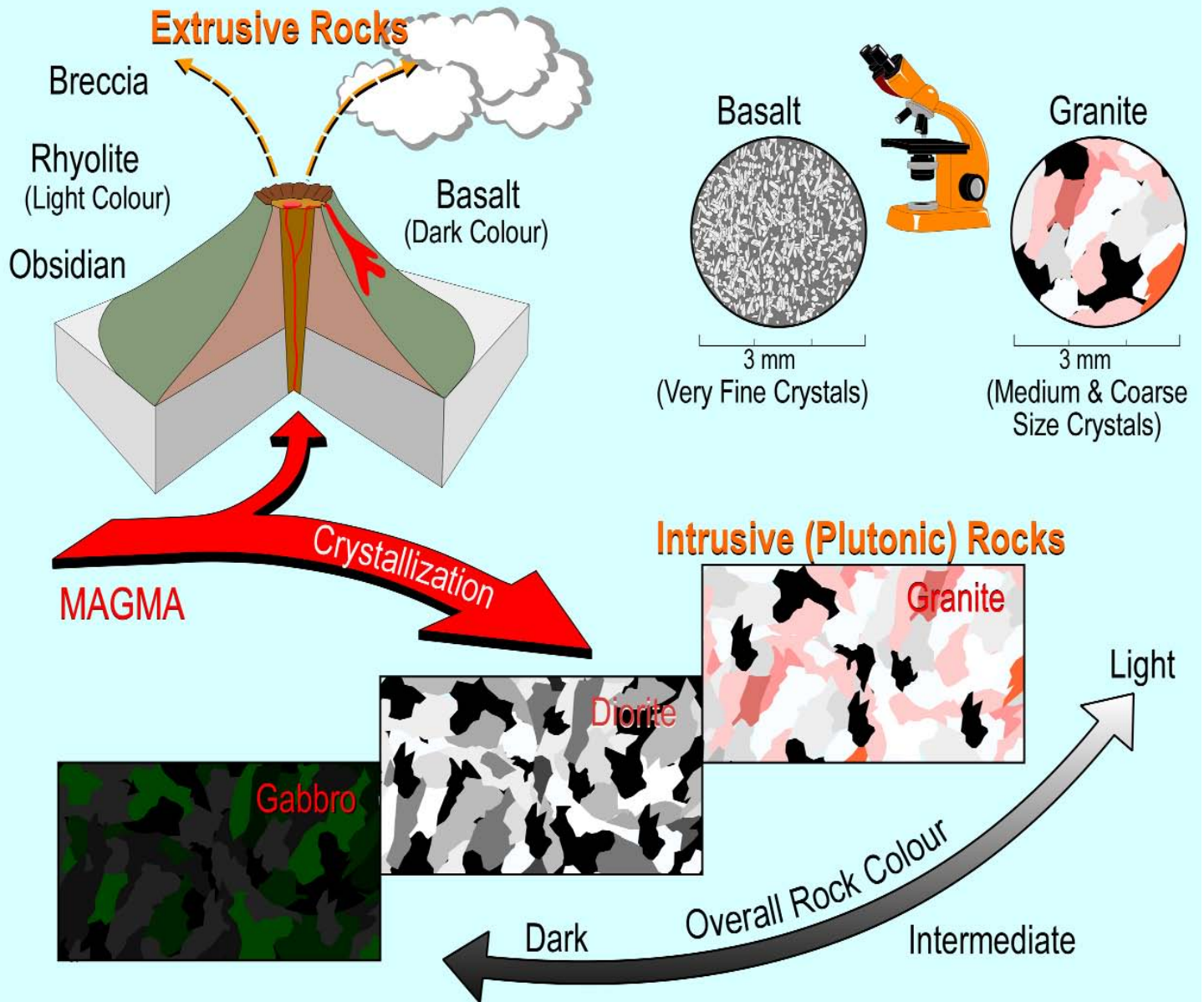




The Shaw Conference Centre, number 11 on the map, was opened in June 1983. The building has more than 50 000 yards of concrete and is bolted directly into the bedrock, as this is the western edge of the 1901 Grierson Hill landslide. The most obvious rock in the building is a large, blue, tabular slab inside the Jasper Avenue entrance, by the pond. The blue mineral is sodalite and the rock is a syenite, a kind of 'no quartz' granite. It is composed of blue sodalite and large blebs of magnetite (metallic grey). The bench below the blue slab is made of a polished black rock with dark plagioclase feldspar and mafics. It is probably diorite. ❖

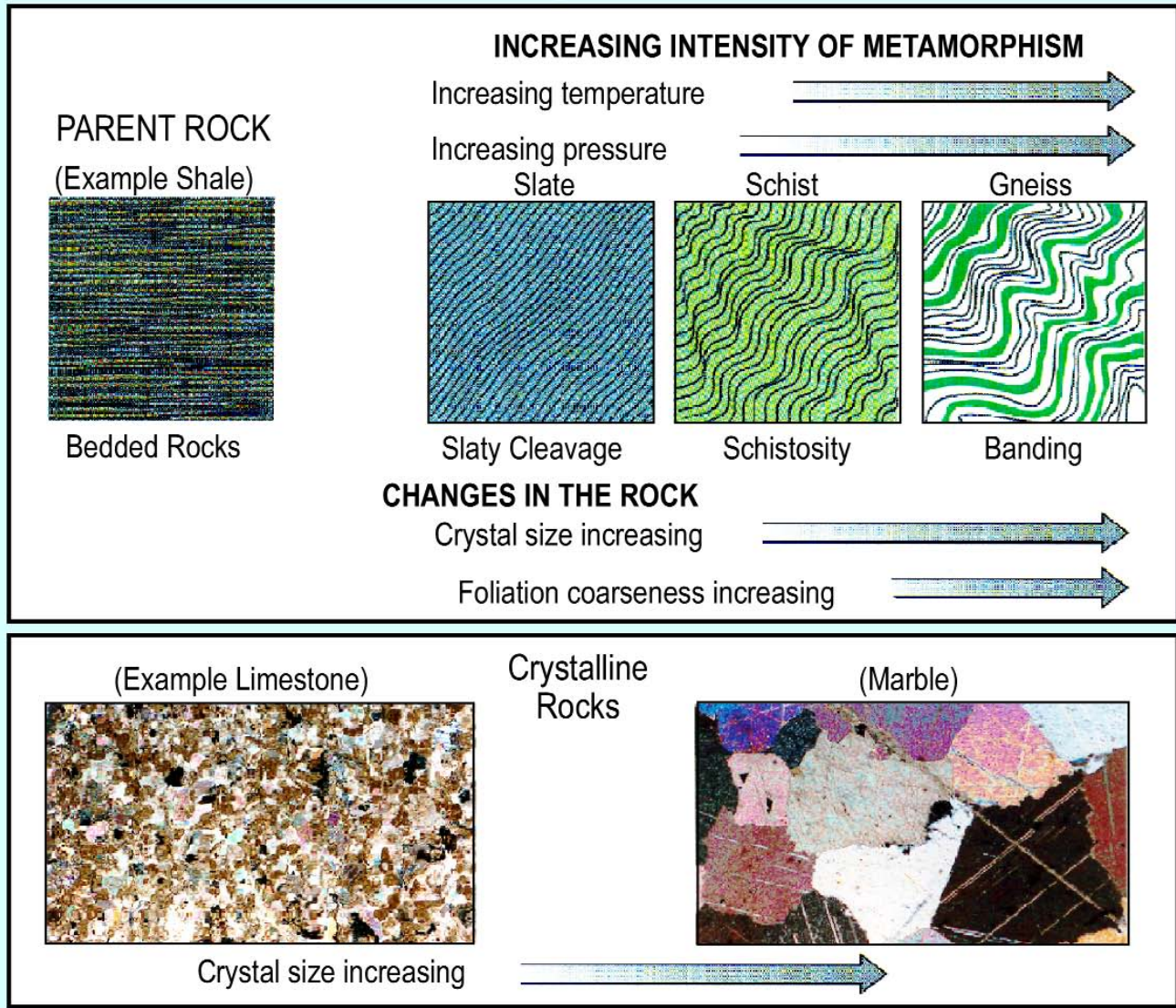


Igneous Rocks



Notes

Metamorphic Rocks



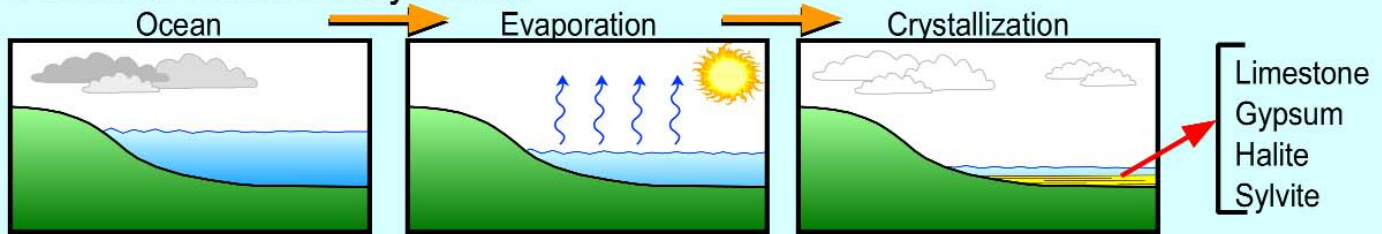
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Sedimentary Rocks

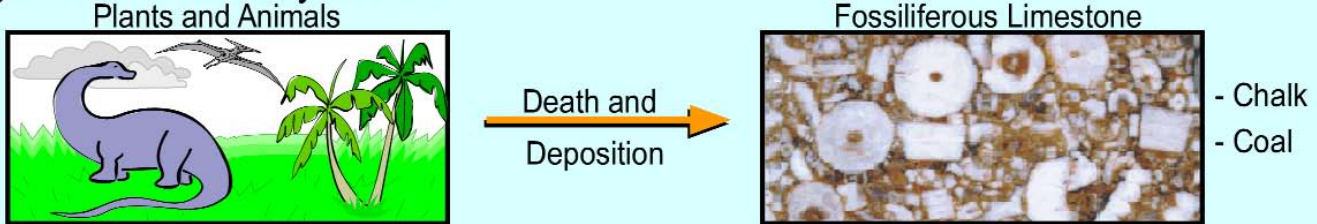
Clastic Sedimentary Rocks



Chemical Sedimentary Rocks



Organic Sedimentary Rocks



Notes

Geoscape Edmonton



Our river valley, once a transportation corridor and source of mineral riches, is now a spectacular parkland. The valley also is a window into Edmonton's geological landscape or geoscape. In that geoscape, we see geological forces carving the valley and creating resources and hazards, geological layers opened like the pages of a book for reading and a long and remarkable history. Geology helps us see and study the past and learn to guide our future.

Geological Time

ROCKING THE RECORD: time & river again

Over 100 million years ago, the North American continent was a supercontinent. It was a single landmass that stretched from the North Pole to the South Pole. The supercontinent was made of several smaller continents joined together. The supercontinent was a single landmass that stretched from the North Pole to the South Pole. The supercontinent was a single landmass that stretched from the North Pole to the South Pole.

ALL ABOARD: going down

The geological record is a book that tells us about the Earth's history. It is a book that tells us about the Earth's history. It is a book that tells us about the Earth's history. It is a book that tells us about the Earth's history.

How we read it

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Geological Time Scale

The geological time scale is a scale that measures time in millions of years. It is a scale that measures time in millions of years. It is a scale that measures time in millions of years. It is a scale that measures time in millions of years.

Regional Resources

ENERGY & MINERALS: the Edmonton region has it

The Edmonton region is rich in energy and minerals. It is a region that is rich in energy and minerals. It is a region that is rich in energy and minerals. It is a region that is rich in energy and minerals.

OIL AND GAS: energy from fossils

Oil and gas are fossil fuels that are formed from the remains of plants and animals. They are fossil fuels that are formed from the remains of plants and animals. They are fossil fuels that are formed from the remains of plants and animals.

COAL: stepping power

Coal is a fossil fuel that is formed from the remains of plants. It is a fossil fuel that is formed from the remains of plants. It is a fossil fuel that is formed from the remains of plants.

SALT: pass the salt, please!

Salt is a mineral that is used for many purposes. It is a mineral that is used for many purposes. It is a mineral that is used for many purposes. It is a mineral that is used for many purposes.

OIL SANDS: our huge resource

Oil sands are a type of oil that is found in Alberta. They are a type of oil that is found in Alberta. They are a type of oil that is found in Alberta. They are a type of oil that is found in Alberta.

DIAMONDS: the new frontier

Diamonds are a precious gemstone that is found in Alberta. They are a precious gemstone that is found in Alberta. They are a precious gemstone that is found in Alberta. They are a precious gemstone that is found in Alberta.

Geosights

FLOODING: all washed up

Flooding is a natural hazard that can cause significant damage. It is a natural hazard that can cause significant damage. It is a natural hazard that can cause significant damage. It is a natural hazard that can cause significant damage.

LANDSLIDES: slip sliding away

Landslides are a natural hazard that can cause significant damage. They are a natural hazard that can cause significant damage. They are a natural hazard that can cause significant damage. They are a natural hazard that can cause significant damage.

River Valley

VALLEY FORMATION: first deeper, then wider

The river valley was formed by the action of the river. It was formed by the action of the river. It was formed by the action of the river. It was formed by the action of the river.

REVER TIRASSES: the valley record

Rever terraces are a type of landform that is found in the river valley. They are a type of landform that is found in the river valley. They are a type of landform that is found in the river valley. They are a type of landform that is found in the river valley.

River Valley Geology

LET'S ROCK

The geology of the river valley is a study of the rocks and minerals that are found there. It is a study of the rocks and minerals that are found there. It is a study of the rocks and minerals that are found there. It is a study of the rocks and minerals that are found there.

Valley Resources

COAL: mining gone but not forgotten

Coal mining was a major industry in the river valley. It was a major industry in the river valley. It was a major industry in the river valley. It was a major industry in the river valley.

GRAVEL AND SAND: the foundation of our society

Gravel and sand are important resources that are used in many ways. They are important resources that are used in many ways. They are important resources that are used in many ways. They are important resources that are used in many ways.

PLACER GOLD: flour, flakes and fear

Placer gold is a type of gold that is found in the river valley. It is a type of gold that is found in the river valley. It is a type of gold that is found in the river valley. It is a type of gold that is found in the river valley.

Glacial Geology

GLACIATION: when can't you see this

Glaciation is a period of time when glaciers cover a large part of the Earth. It is a period of time when glaciers cover a large part of the Earth. It is a period of time when glaciers cover a large part of the Earth. It is a period of time when glaciers cover a large part of the Earth.

HUMMOCKY LANDSCAPE: doughnuts anyone?

A hummocky landscape is a type of landscape that is formed by the action of glaciers. It is a type of landscape that is formed by the action of glaciers. It is a type of landscape that is formed by the action of glaciers. It is a type of landscape that is formed by the action of glaciers.

Groundwater

SET THE TABLE with water

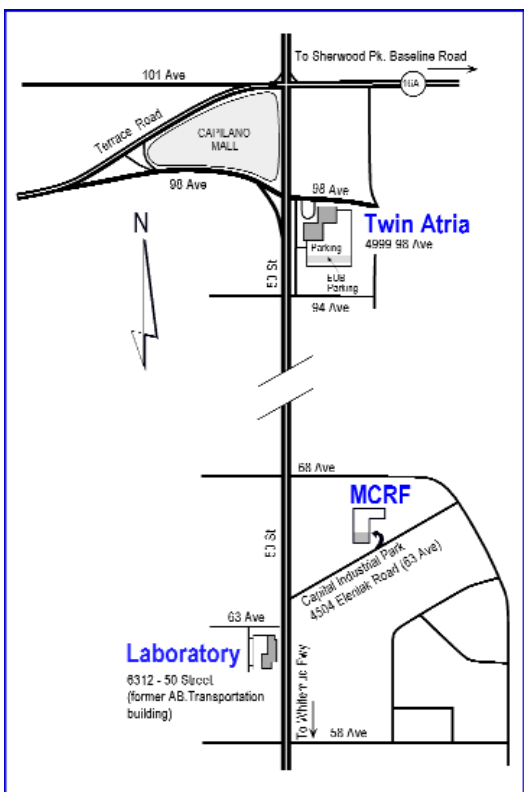
Groundwater is a type of water that is found underground. It is a type of water that is found underground. It is a type of water that is found underground. It is a type of water that is found underground.

SPRING IN THE VALLEY: all year long

A spring is a natural source of water that is found in the river valley. It is a natural source of water that is found in the river valley. It is a natural source of water that is found in the river valley. It is a natural source of water that is found in the river valley.

URBAN DEVELOPMENT: water delivery - change your flow direction

Urban development can affect the flow of groundwater. It can affect the flow of groundwater. It can affect the flow of groundwater. It can affect the flow of groundwater.



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