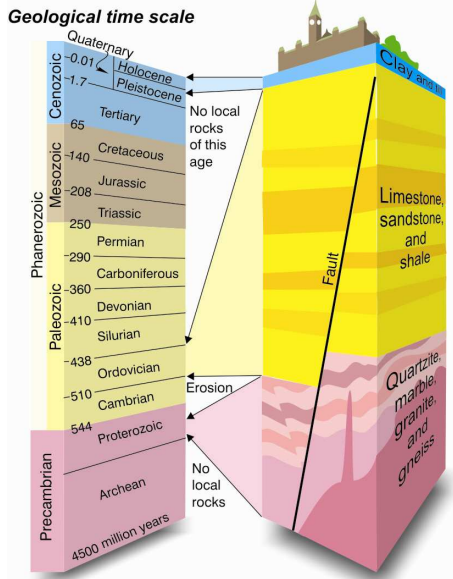


A TRIP THROUGH TIME - THE LAST TWO BILLION YEARS IN OTTAWA

Jan Aylsworth and Jean Dougherty



Few Canadian cities have as wide a variety of geology and as extensive a geological history as does Ottawa. At various times, our mountains have been as high as the Himalayas, our seas have been as warm as Australia's and as cold as the Arctic Ocean, earliest fossils have been preserved, major earth movements have ripped our rocks along great faults, and huge rivers have flowed over us.

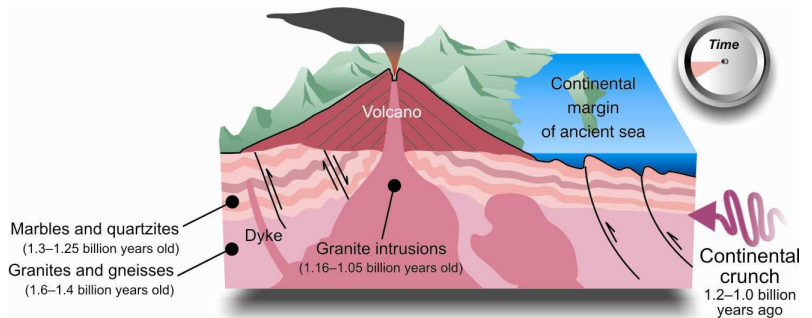
It's All About Time

Earth formed about 4.6 billion years ago. Geologists have broken this enormous length of time into major divisions using radiometric dates and fossil assemblages. The late Precambrian, early Paleozoic, and late Cenozoic (Quaternary) are recorded in the rocks beneath our feet. Each rock-building interval was followed by a long interlude of erosion, spanning hundreds of millions of years, that we see as a gap in the rock record.

Ancient Mountains

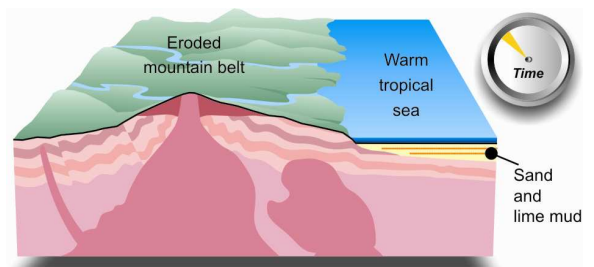
The oldest rocks in the region are the **Precambrian** marbles, quartzites, and granites of the Gatineau Hills and parts of Carp-Kanata area. These rocks are the deeply eroded roots of ancient mountains that were once as tall as the present-day Himalayas.

Between **1.2 and 1.0 billion years ago**, sedimentary and volcanic rocks, originally deposited along the margin of ancient North America were deformed, metamorphosed and intruded by magma as a result of collision with another continent. This collision ceased about 1.0 billion years ago and the Precambrian mountains began to slowly wear down.



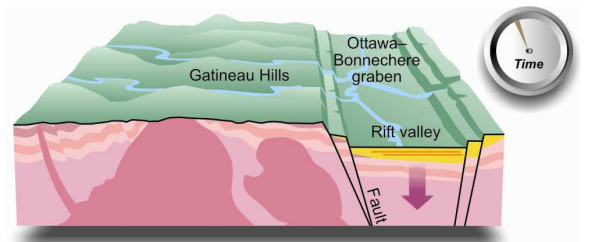
Tropical Ottawa

In the **Paleozoic**, between **510 and 440 million years ago**, a warm tropical sea flooded the region. (We were near the equator then!) The oldest Paleozoic rock, (the Nepean Sandstone) was an ancient **Cambrian** beach. In the **Ordovician**, an ocean covered this beach and limestones and shales were deposited. Trilobites, cephalopods, crinoids, corals, snails and other shelled animals that lived in the ancient coral reefs can be found by the thousands in the shales and limestones under our feet.



Breaking Apart

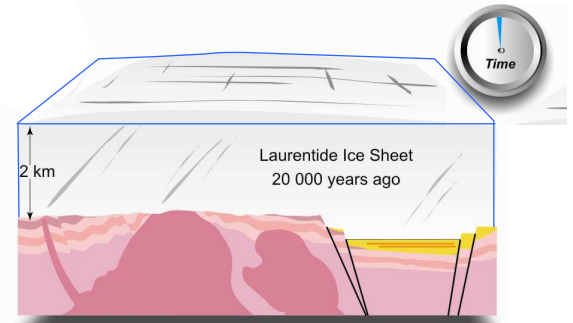
About **175 million years ago**, in the **Mesozoic**, the Ottawa-Bonnechere graben formed when the land surface moved downward between two major fault zones. These ancient faults are occasionally reactivated today, releasing crustal stress in the form of earthquakes.



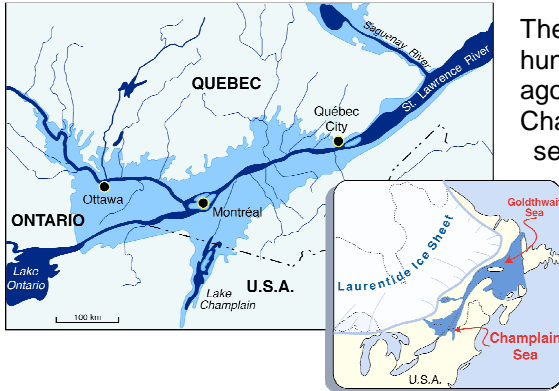
Did you know? The dramatic escarpment that forms the southern edge of the Gatineau Hills between Quyon and Gatineau is a fault scarp along the northern side of the Ottawa-Bonnechere graben.

The Big Chill

During the **Quaternary**, great ice sheets covered Northern North America several times during the last 1.6 million years. The last one covered the region from 20 000 to 11 000 years ago. The loose sediments that blanket bedrock in much of the Ottawa area were left by these glaciers or deposited in the Champlain Sea at the end of the ice age.



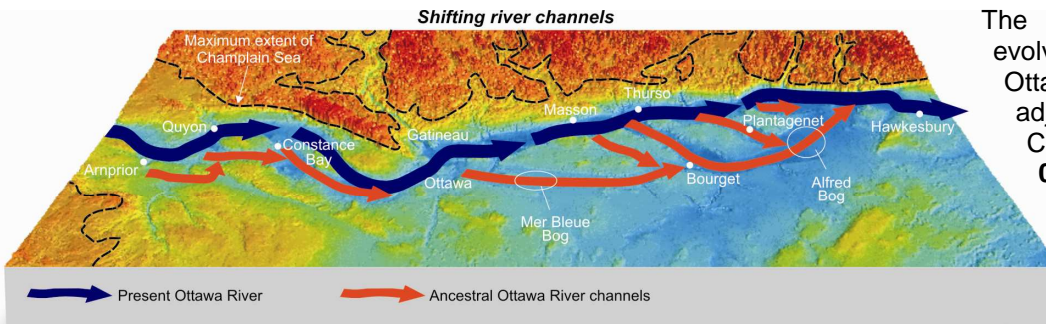
Seaside Ottawa



The great weight of the ice sheet had depressed the land surface by hundreds of metres, and, as the glacier retreated, about 12 000 years ago, the Atlantic Ocean flooded the Ottawa valley, forming the Champlain Sea. As the glacially-depressed lands gradually rose, the sea receded, finally leaving the Ottawa valley about 10 000 years ago. Beaches and deltas, now lying 220 m above present sea level, and a widespread blanket of marine mud (Leda clay) are evidence of this sea in the present landscape.

Did you know? ... Landlocked marine fish survive today in the Ottawa area. Trapped in isolated basins as sea level dropped, a marine-type stickleback in Pink Lake, Gatineau Park, and "red" trout, a form of salmon found throughout the area, adapted to freshwater conditions.

The Ottawa River Evolves

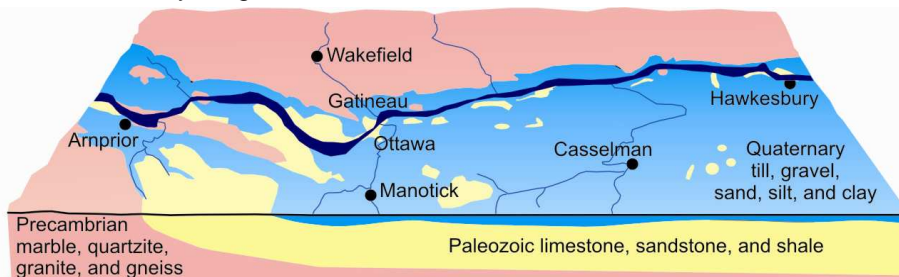


The modern river system evolved as the ancestral Ottawa River and its tributaries adjusted to the retreat of the Champlain Sea. Between **10 000 and 8 000** years ago, there was a much larger flow of water through the ancestral Ottawa River than at present. Large glacial lakes in northern Ontario and the Prairie Provinces,

and the Upper Great Lakes all drained into the Ottawa River. Several times during this period the Ottawa River shifted into new channels. By about 8 000 years ago, modern drainage had become established. Abandoned early Ottawa River channels became peatlands such as Mer Bleue and Alfred bogs.

Different Rocks - Different Landscapes

The resistant granitic and metamorphic Precambrian rocks of the Canadian Shield form highland areas that are characterized by rough terrain, numerous small lakes, and abundant rock outcrops. In contrast, the flat-lying



Paleozoic rocks underlie lowland plains and low hills and outcrops are confined largely to low scarps and riverbanks. Much of the area is covered by Quaternary sediments which form landscapes that range from gently undulating plains and low hills of glacial deposits to the flat plains of the Champlain Sea.

Geological map of the Ottawa-Gatineau region