A Walking Guide - Ottawa's Building and Monument Stones offers residents and visitors alike an opportunity for outdoor discovery of the dimension stones and natural and built heritage in Canada's capital. The book contains maps, photographs and descriptions by Quentin Gall, a geological consultant and teacher who has lived in Ottawa for over thirty years.

Canadian Geological Foundation · Fondation Géologique du Canada · 1968

Ottawa-Gatineau GEOHERITAGE

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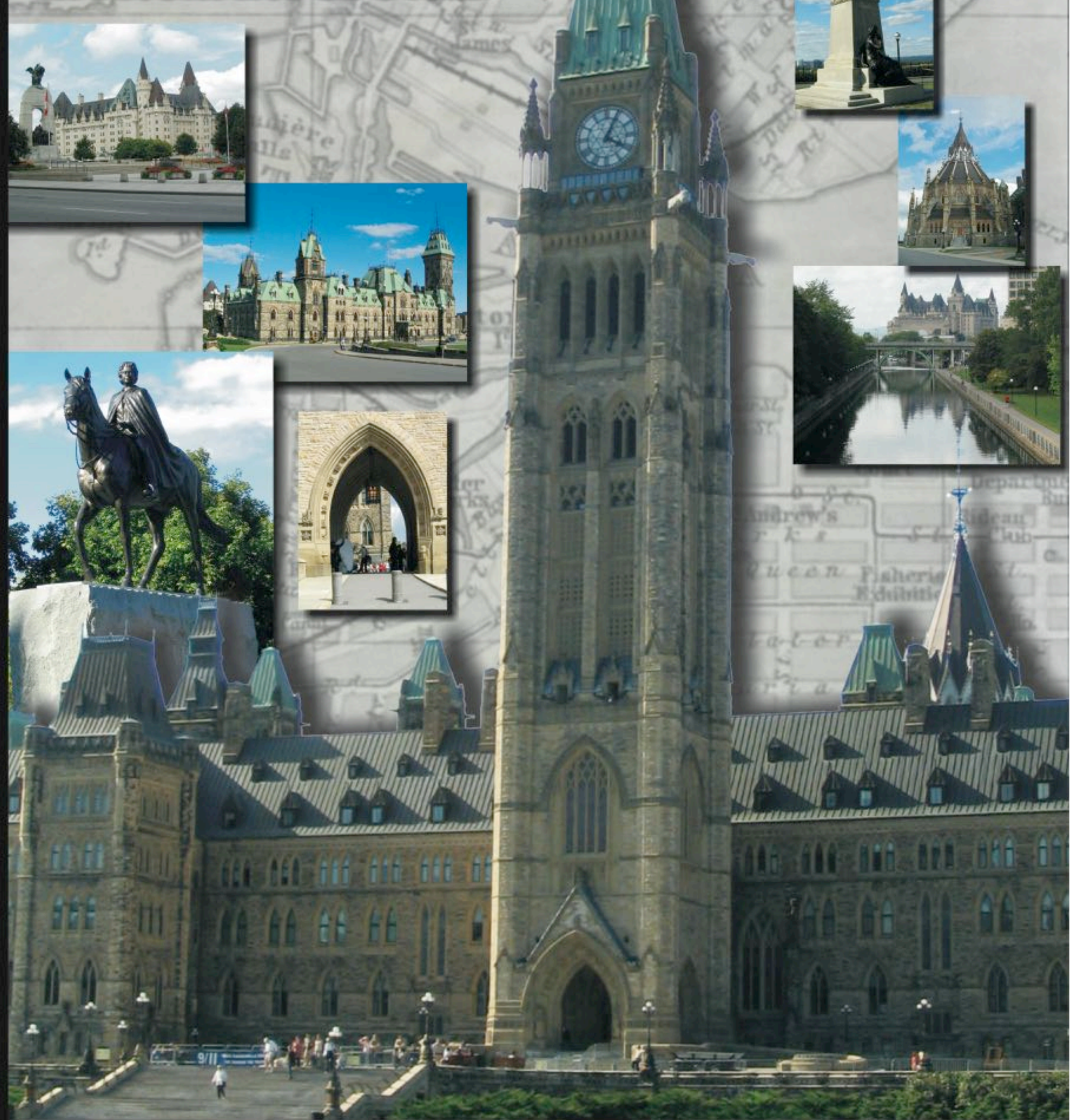
GAC MP7 A WALKING GUIDE - OTTAWA'S BUILDING and MONUMENT STONES

# A WALKING GUIDE

## OTTAWA'S BUILDING and MONUMENT STONES



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by Quentin Gall

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The GEOLOGICAL ASSOCIATION OF CANADA (GAC®) is Canada's national society for the geosciences. It was established in 1947 to advance geology and its understanding among both professionals and the general public. The GAC® membership of about 2500 includes representatives of all geological disciplines from across Canada and many parts of the world. It has specialist divisions for environmental earth sciences, geophysics, marine geosciences, mineral deposits, paleontology, Precambrian, sedimentatology, structural geology and tectonics, volcanology and igneous petrology, remote sensing, geomorphology, and geographic information systems. Regional sections of GAC® have been set up in Victoria, Vancouver, Edmonton, Winnipeg and St. John's, and there are affiliated groups in Canada and the United States.

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L'ASSOCIATION GÉOLOGIQUE DU CANADA (AGC®) est la société nationale canadienne des sciences de la terre. Elle a été fondée en 1947 dans le but de contribuer à l'avancement de la géologie det de sensibiliser le grand public aux sciences de la Terra. Elle comprend environ 2500 membres, représentant toutes les disciplines géologiques et provenant de toutes les régions du Canada et d'ailleurs dans le monde. L'AGC® comprend des divisions spécialisées en géologie de l'environment, géophysique, géologie marine, gisements minéraux, paléontologie, géologie de Précambrien, sédimentologie, géologie structurale, tctonique, volcanologie et pétrologie ignée, télédectction, géomorphologie et systèmes d'information géographique. Des sections régionales ont été établies à Victoria, Vancouver, Edmonton, Winnipeg et St. John's (Terra Neuve), et il existe des groupes affiliés au Canada et aux Etats-Unis.

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Pour de plus amples renseignements, veuillez communiquer acec: L'Association Géologique de Canada, c/o Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Newfoundland et Labrador, Canada A1B 3X5; Courriel : publications@esd.mun.ca; Site internet: www.gac.ca.

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# A Walking Guide.
# Ottawa's Building and Monument Stones

**Quentin Gall**

Geological Association of Canada Miscellaneous Publication 7
**2009 (Revised for complimentary edition 2011)**

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Building stone, architectural and historical details for a number of buildings and monuments were obtained from both federal and municipal depositories. Jill Scott and Steve Dale were very helpful in granting access and directing the author to information at the Federal Heritage Building Registration Office. Similarly, City of Ottawa heritage staff, Sally Coutts and Jim Mountain, helped access information on municipal buildings. Hellmut Schade (Professor of Architecture, Carleton University; retired) kindly reviewed the manuscript and offered helpful insight into the architecture and history of many of the buildings.

Two publications, in particular, were inspirational and served as organizational templates for this publication. These are: Ottawa A Guide To Heritage Structures, Local Architectural Conservation Advisory Committee (2000); and Geology Tours of Vancouver's Buildings and Monuments, P.S. Mustard, Z.D. Hora and C.D. Hansen (2003).

The author also wishes to acknowledge the generous financial support provided by the Canadian Geological Foundation and Heritage Ottawa.

# QUICK USER GUIDE

Location [1 M3] indicates that Rideau Hall at 1 Sussex Drive has been designated Locality 1 on Map 3. The index map shows the areas within Ottawa in which buildings or monuments have been described.

# INTRODUCTION

This book is intended for use by any persons, including visitors to Ottawa, who want to know about Ottawa's buildings and monuments and their geology, and who might have the time to visit some of the localities described herein. This book serves as a basis for self-guided tours by local educational groups, and visiting groups who want to learn more about Ottawa's local bedrock and urban geology. The idea of writing this book was stimulated by a similar book on the buildings and monuments in Vancouver by Peter Mustard, Danny Hora and Cindy Hansen, published by the Geological Association of Canada, for the 2003 annual joint meeting of the Geological Association of Canada and Mineralogical Association of Canada.

The building and monument stones described here, are by no means exhaustive. It is difficult to find historical information on many buildings and monuments, especially information that describes the stone and the quarry from whence it came. The same applies to local quarries, many of which have long ceased operations and have been covered by vegetation or construction that is more recent. Many buildings and monuments have not been included in this compilation for reasons such as: repetition of information, lack of relevant information, difficulty accessing some areas in Ottawa for self-guided tours, (especially in areas where the buildings or monuments are few and far between), and the difficulty in accessing, photographing and finding information for buildings, such as embassies and consulates (for security reasons).

Where possible and informative, a photograph of the building, monument and/or dimension stone accompanies the description of the building or monument. For most of the dimension-stone photographs a scale is included in the picture, and in most instances, this is a scale card that displays both centimetre and inch gradations. The locality of each building or monument is indicated on one of five maps located on an index map. A number has been assigned for each described locality, and is indicated in brackets immediately following the locality address. For example, [1 M3] indicates that Rideau Hall at 1 Sussex Drive has been designated Locality 1 on Map 3. The index map shows the areas within Ottawa in which buildings or monuments have been described. It is up to you, the reader to choose the area(s) in which to undertake a self-guided and self-designed walking trail or driving tour. At the end of this publication is a glossary of geological words and terms, perhaps not familiar to the lay reader.

Finally, many rock outcrops, in and around Ottawa, record the fascinating natural geological heritage (geoheritage) that evolved in the region over millions of years. This book includes an overview of the regional geoheritage that the public, students and visitors to Ottawa may find informative and useful if they go on any outdoor excursions. For those who want to go on a local geoheritage tour, they may first wish to search out the few publications (see Bibliography) that describe the regional geology (mainly found in the libraries at the Geological Survey of Canada, Carleton University and the University of Ottawa); and/or they may wish to contact geologists associated with the Ottawa–Gatineau Geoheritage Committee, the Geological Survey of Canada, Carleton University, University of Ottawa, Ottawa Lapsmith and Mineral Club or the Ottawa Paleontology Club. Other available resources are the Urban Geology of the National Capital Area website and publication [http://gsc.nrcan.gc.ca/urbgeo/natcap/index_e.php] and Bélanger (1998), and Geoscape Ottawa/Gatineau website and poster [http://geoscape.nrcan.gc.ca/ottawa/index_e.php] and Aylsworth (2004). Geoscape Ottawa/Gatineau is a comprehensive review of earth sciences in the Ottawa–Gatineau region. The website includes student lesson plans and activities that are aimed at raising awareness of the significance of earth sciences in the Ottawa–Gatineau region.

If you choose to go on an excursion of discovery in, and around, Ottawa, be aware of the traffic, the instability of some outcrops, and the boundaries of private property. Additionally, just as the building and monument stones should not be damaged or sampled, for the sake of protecting the rock outcrops and thereby protecting and preserving geoheritage in the Ottawa–Gatineau region, you are asked not to mark, scratch or remove even loose pieces from the outcrops (by using hammers etc.). Visitors to these sites are asked to observe and preserve their memories through notes and photographs.

# OVERVIEW AND GEOLOGIC HISTORY

## OVERVIEW

All rocks can be placed into three main groups: igneous, sedimentary and metamorphic.

*Igneous rocks* are formed from cooled molten magmas either within the Earth's crust, and referred to as plutonic or intrusive rocks, or from magmas that escape the Earth's interior and flow out onto the Earth's surface, and are referred to as volcanic or extrusive rocks. Within the Earth's crust, magma cools slowly and, consequently the minerals that form are generally larger and grow into one another. Magmas that are extruded onto the Earth's surface are cooled relatively quickly by either air or water and, consequently, the minerals found in volcanic/extrusive rocks are generally smaller than those found in plutonic/intrusive rocks.

*Sedimentary rocks* are formed from the weathering and erosion of pre-existing rocks, leading to the formation of grains that are deposited in layers within sedimentary basins. Eventually, these granular layers form sedimentary rocks such as mudstone, sandstone and conglomerate. Sedimentary rocks are also formed when minerals precipitate from seawater or lake water, sometimes with the help of organisms, and accumulate to form sedimentary layers that eventually solidify to form rock such as limestone, dolostone or gypsum.

*Metamorphic rocks* are formed when pre-existing rocks, or sediment, are buried (typically a kilometre or more) below the Earth's surface, or when they are brought in contact with hot magmas. The increase in temperature and pressure on pre-existing rocks or sediment forms new minerals and textures and, over time, forms a metamorphic rock. The metamorphic rock characteristically contains 'metamorphic' minerals (such as chlorite, biotite, garnet or amphibole) that are aligned to form a metamorphic fabric or foliation. Common metamorphic rocks containing metamorphic minerals and a foliation include slate, schist and gneiss.

Historically, people have been using rocks and minerals as natural resources for thousands of years. The 'stone age', 'bronze age' and 'iron age' are defined by the use of rocks and the minerals that form the rocks. Through the millennia, most cultures have used rocks and minerals to some extent (e.g. to trade and barter using stone or metal coinage or <u>sal</u>t as payment, hence the Latin word *<u>sal</u>arium* for <u>sal</u>ary), for medicine, for cosmetics (e.g. mercury-bearing cinnabar by the ancient Egyptians) and for agricultural tools and weapons. In North America, the First Nations people used red, yellow or brown ochre (the minerals hematite and limonite) for dyes and ceremonial purposes, and sharp-edged chert or easily shaped stone for weapons and tools. Certainly, it is not hard to imagine our ancestors using loose rocks to construct fire pits, kilns and shelters. In the Ottawa area (originally called Bytown *after* Lieutenant-Colonel John By), there is ample evidence that the early European settlers used field stones to construct church and house walls and chimneys. There are abundant, easily collected cobble- to boulder-size field stones in the region that were deposited by the melting of the last Ice Age ice sheet, about 10 000 years ago. Early settlers also quarried local limestone outcrops for building stone. This activity included building kilns for lime production that was used as fertilizer and building mortar (e.g. the accessible Flood lime kiln in the Stony Swamp Conservation Area west of Ottawa, which operated between 1882 and 1906).

Almost any type of igneous, sedimentary or metamorphic rock can be used as building material. Once the rock has been extracted from a quarry, cut and finished to specifications, it is referred to as dimension stone. The general characteristics of an igneous, sedimentary or metamorphic rock are important in determining whether the rock can be used as dimension stone. For example, a builder, engineer or architect may require a dimension stone that has a particular and consistent colour, grain or crystal size, texture or strength with the ability to withstand a weight (load). Similarly, they do not usually want a rock that is highly fractured because the rock is hard to quarry, and shape into dimension stone. As well, if a highly fractured dimension stone is used, the fractures may allow rainwater and salt meltwater to permeate the rock and form larger fractures and alteration minerals that, in turn, bring about a change in colour and will weaken the dimension stone and cause it to break. Depending on the needs of the builder, engineer or architect, a particular rock characteristic may be ideal for one purpose but useless for another. For example, a slaty foliation in a metamorphic rock, where the rock can be cleaved into millimetre-thick flat pieces, may be ideal for making floor and roof tiles and wall cladding, but useless as stable, load-bearing foundation stone or monument pedestal. In a similar way, uniformly crystalline granite may be ideal for making attractive, highly polished façade for the ground floors of buildings; but the granite is not ideal for making a sculptured monument stone or intricately designed archway; instead a softer more easily carved sandstone or limestone would be more suitable.

The surface of a dimension stone can be finished in particular ways to make it more visually and aesthetically appealing. A dimension stone can be polished to increase light reflectance or, alternatively, hydro- or flame-finished to roughen the surface using high-pressure water or heat, respectively. In addition, the exposed surface (face) of the dimension stone can be shaped with masonry tools. Some tools are used to impart a directional texture on the face, resulting in a face broken to an approximate plane (split face), or with a pronounced relief (pitch faced) or with a central raised area (bossaged). Different tools can also be directed to produce a roughly smoothed face (honed) and a closely spaced or widely spaced grooved face (crenulated or tooled respectively). Striking the face with a multiple-headed hammer will produce a nondirectional, pitted finish (bush hammered). For the most part, these finishes make the dimension stone more appealing, but occasionally they also cause deterioration of the stone. For example, the heat treatment of ground-floor façade in some Ottawa area buildings has caused microscopic fractures to form within the crystalline minerals that comprise the façade. During the wet rainy or snowy seasons, water splashes against the ground-floor façade or is pooled at the base of the façade and is absorbed into the façade stone ('wicked') along the microscopic fractures in the minerals. The absorption of the water causes the heat treated façade stone to discolour and cracks to form.

The Ottawa area contains many exposures of rock that are of great interest to geologists and non-geologists alike. Some of these rocks have been quarried and used for local construction. The section, *Quarries Near and Far*, describes some of the local dimension-stone quarrying activity. In and around Ottawa, the rocks are dominated by Paleozoic sedimentary strata that overlie older Precambrian rocks that are extensively exposed in the Gatineau hills to the north of Ottawa. Although developed over many millions of years, the rocks in the Ottawa area record only a small fraction of the Earths 4.5 billion year geological history.

## GEOLOGIC HISTORY OF THE OTTAWA AREA

As shown by the accompanying Tables 1 and 2, rocks of the Ottawa area represent the Mesoproterozoic Eon and the early Paleozoic Era, with older Proterozoic and Archean and younger Paleozoic, Mesozoic and Tertiary rocks missing. The youngest geologic unit, overlying the early Paleozoic sedimentary rocks, consists of unconsolidated sediments that were deposited in the Pleistocene Epoch, during the last stage of the Ice Age and subsequent flooding by the Champlain Sea, about 12- to 10-thousand years (ka) ago. This time gap, represented by the unconformity between the early Paleozoic rocks and the Pleistocene sediment, is about 444 million years (Ma). This huge gap in the geological record was caused mostly, by the massive erosion of rocks mainly before, and some during the ice ages that occurred during the Pleistocene, when glaciers eroded the surface of the land. The following paragraphs offer an overview of the geology of the Ottawa area; and a series of block diagrams depicts the geologic history.

### *Precambrian*

The oldest rocks in the Ottawa area are part of the Grenville Province of the Precambrian Canadian Shield (Figures 1 and 2). Locally, the Precambrian rocks can be seen in the rugged Gatineau hills north of Ottawa and the northwest-trending Eardley Fault, and in the Carp Ridge west of Ottawa (Kanata through Carp to Arnprior) and north of, and parallel to, the north-

Table 1. Geological Time Scale

| ERA | AGE (Ma) | DIVISION | |
|---|---|---|---|
| Cenozoic | .01 | Quaternary | Holocene |
| | 1.6 | | Pleistocene |
| | 65.5 | Tertiary | |
| Mesozoic | 145 | Cretaceous | |
| | 199 | Jurassic | |
| | 251 | Triassic | |
| Paleozoic | 299 | Permian | |
| | 360 | Carboniferous | |
| | 416 | Devonian | |
| | 444 | Silurian | |
| | 488 | Ordovician | |
| | 542 | Cambrian | |
| Precambrian | 2500 | Proterozoic | |
| | 4500? | Archean | |

Table 2. Geology in the Ottawa area

| ERA | PERIOD | EPOCH | AGE (Ma) | GROUP | FORMATION |
|---|---|---|---|---|---|
| PALEOZOIC | ORDOVICIAN | Late | 458 | | Queenston |
| | | | | | Carlsbad |
| | | | | | Billings |
| | | | | OTTAWA | Eastview (Mbr.) |
| | | | | | Lindsay |
| | | | | | Hull |
| | | | | | Bobcaygeon |
| | | | | | Chaumont |
| | | | | | Lowville |
| | | | | | Pamelia |
| | | Middle | 478 | | Hog's Back |
| | | | | | Rockcliffe |
| | | Early | 488 | BEEKMANTOWN | Carillon |
| | | | | | Beauharnois |
| | | | | | March |
| | | | | POTSDAM | Nepean |
| | CAMBRIAN | Late | 523 | | Covey Hill |
| PRECAMBRIAN | PROTEROZOIC | Meso | 1600 | Grenville Province | |

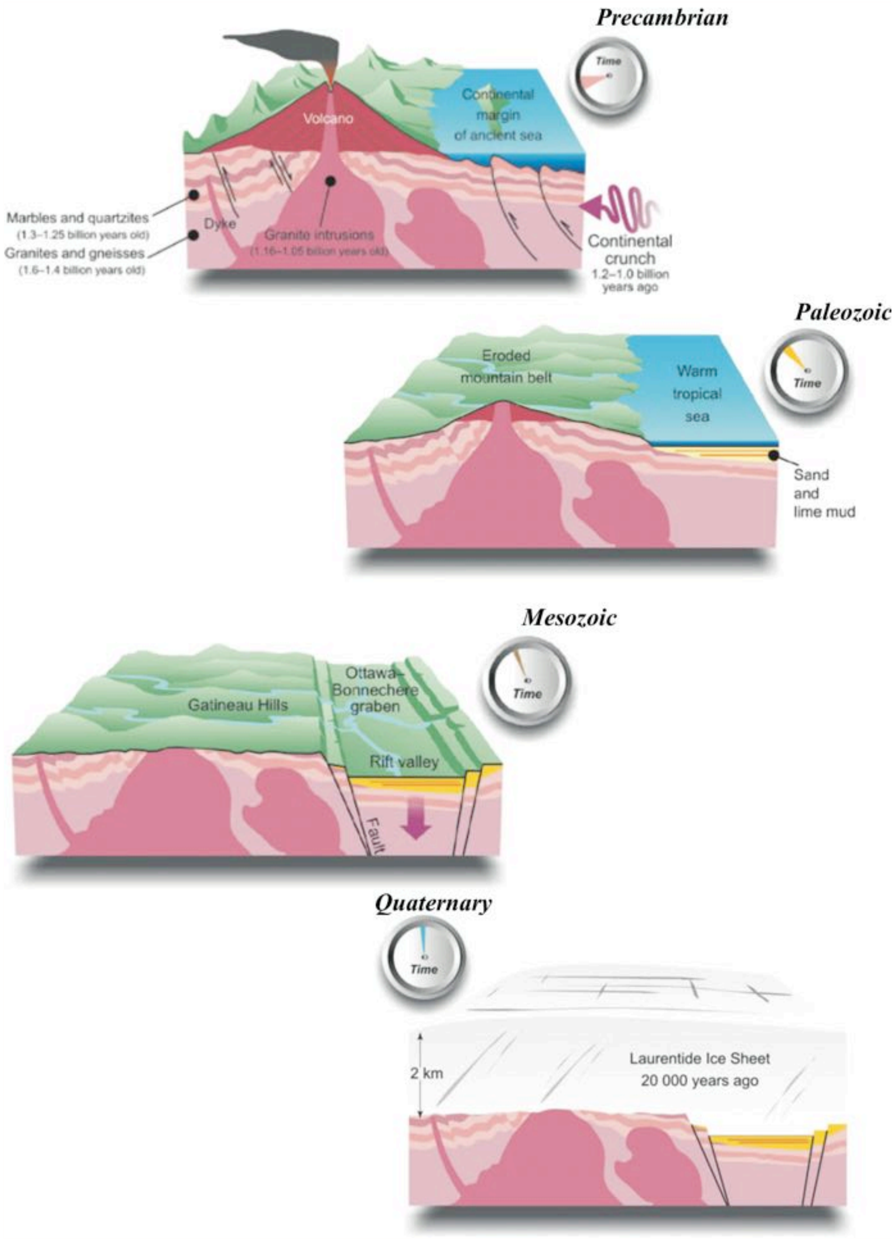



Figure 1. Geologic History of the Ottawa area (Aylsworth 2004). The clock next to the block diagrams depicts the time each stage developed relative to a 12-hour clock in which Earth formed about 4.6 billion years ago (zero o'clock).

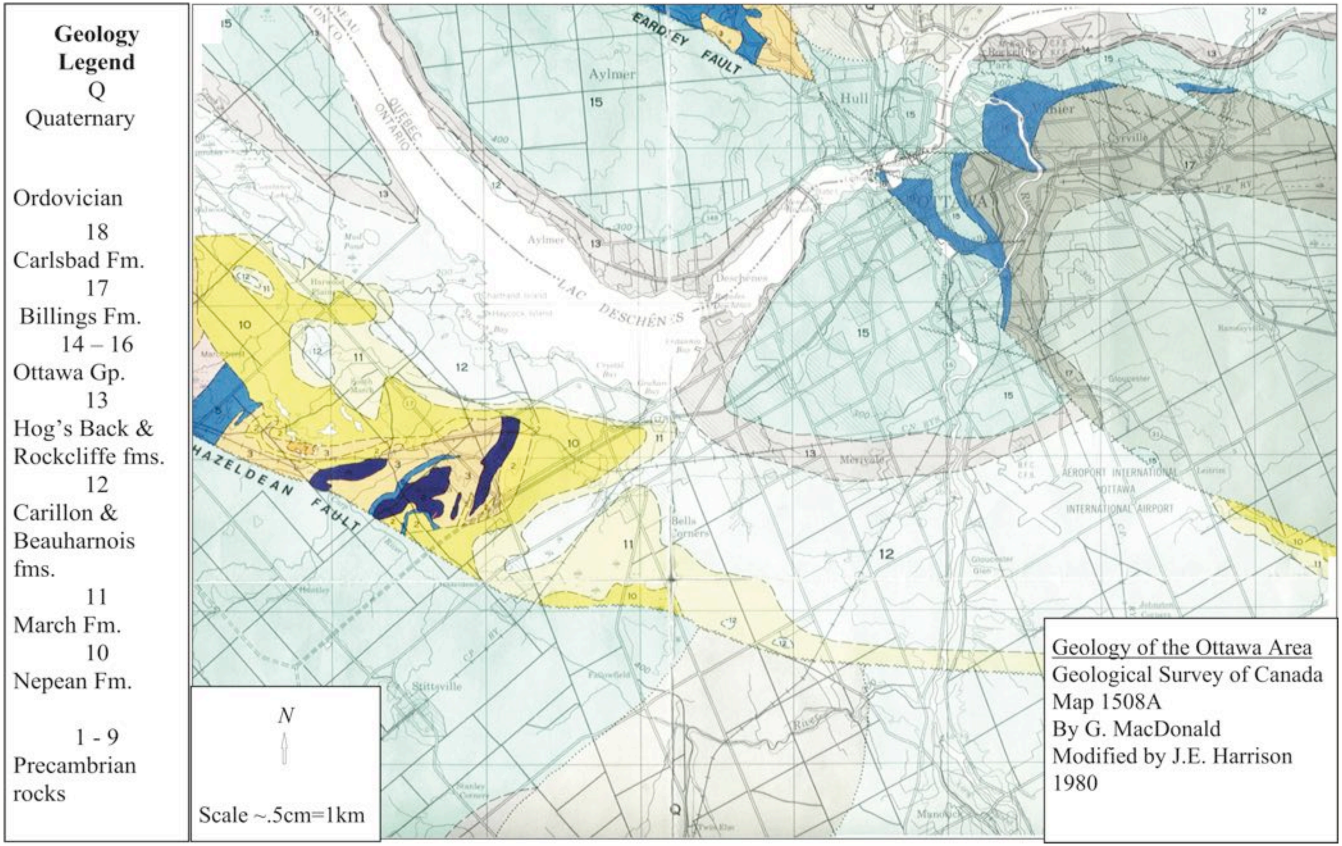



Figure 2. Geology of the Ottawa area.

west-trending Hazeldean Fault (see the accompanying geology map, Figure 2).

The Precambrian rocks include deformed metamorphosed gneiss and marble, of sedimentary origin, and plutonic rocks such as diorite, gabbro, syenite and granite. These Precambrian rocks are the deeply eroded roots of an ancient mountain belt that formed during the Mesoproterozoic (Table 2, ca. 1600 to 900 Ma). This mountain belt may have been as high as today's Himalayas. Millions of years of erosion and weathering eroded the ancient mountain belt. Today, Precambrian rocks are exposed in elevated areas, largely due to uplift along the Hazeldean and Eardley faults, possibly during the Mesozoic.

Relatively flat-lying and unmetamorphosed Paleozoic sedimentary rocks overlie the deformed and metamorphosed Precambrian rocks. Separating the Precambrian and Paleozoic rocks is an unconformity developed over hundreds-of-millions of years during erosion and weathering of the Precambrian rocks, prior to deposition of the Paleozoic sediments. The weathering of the Precambrian rocks led to the development of a paleosol (ancient soil). Perhaps the best local exposure of the paleosol is in Parc du Lac Beauchamp, Gatineau, where it can be seen developed on Precambrian gneiss and buried beneath Paleozoic sandstone (Nepean Formation).

***Paleozoic***

During the Paleozoic Era, the Ottawa area was near the equator and mostly covered by warm, shallow tropical seas that were teaming with marine life (now fossilized). The succession of Cambrian to Ordovician sedimentary rocks in the Ottawa area consists of sandstone, limestone, dolostone and shale units, mostly deposited in the shallow marine environments and beaches that lapped onto highlands of exposed Precambrian Canadian Shield. The rise and fall of the Paleozoic sea level, respectively lead to dominantly shale or limestone deposition. Locally, this site of Paleozoic sediment deposition is referred to as the Ottawa Embayment or the Ottawa–St. Lawrence Lowlands. Through correlation with similar sedimentary rocks in the northeastern United States and Ontario, and age-specific fossils in the limestone units, it is now known that the Paleozoic rocks in the Ottawa area range from the Late Cambrian to Late Ordovician (ca. 523 Ma to 444 Ma). A cumulative thickness for all Paleozoic sedimentary rocks in the Ottawa Embayment is about 300 m.

The names and ages of the different sedimentary-rock units in the Ottawa area are shown in Table 2. In ascending order, the basal conglomerate-sandstone of the Covey Hill Formation underlies the quartz-rich sandstone and minor conglomerate of the Nepean Formation, deposited in marginal marine, fluvial and aeolian environments and containing trace fossils including evidence of the world's earliest-known land-based animal activity (tracks of a large arthropod). These sedimentary units are overlain by more fossil-rich shallow marine layers, beginning with the mixed sandstone–dolostone of the March Formation, and then dolostone–limestone of the Beauharnois and Carillon formations. In turn, these rocks are overlain by mixed sandstone–shale of the Rockcliffe Formation, then shale, sandstone, impure limestone and dolostone of the Hogs Back Formation. Stratigraphically higher are the dominantly limestone formations of the Ottawa Group, starting with the stromatolite-bearing limestone of the Pamelia Formation. Overlying the Ottawa Group are the shale-rich Billings Formation, sand–shale Carlsbad Formation and finally, the uppermost red shale of the Queenston Formation.

### *Mesozoic*

The next geologic event in the Ottawa area is the development of west–east and northwest–southeast oriented normal faults which dissect, and locally warp, the late Precambrian and early Paleozoic rocks (e.g. Hazeldean and Eardley faults shown on the map, and the Gloucester Fault and splays extending from Gloucester northwest to Hull; Figure 2, see Geology of the Ottawa Area map). These and other faults are considered to be part of an extensive, northwest-trending rift valley that formed during the Mesozoic, called the Ottawa–Bonnechere Graben. These local faults are in the same orientation as the Ottawa Embayment, and it has been speculated that the faults are reactivated Precambrian faults that controlled the shape of the Ottawa Embayment during the early Paleozoic. It has also been suggested that the faulting occurred during the Cretaceous (Late Mesozoic Era), because a few, small Cretaceous-age alkalic intrusions and dykes in the Ottawa area are similar in appearance to the Cretaceous-age Monteregian Hills intrusions near Montreal. The alkalic intrusions and dykes may be associated with the initial rifting and formation of the Atlantic Ocean. These ancient faults are sporadically still active today. Slippage along the reactivated faults is responsible for the earthquakes periodically felt in the Ottawa area.

### *Quaternary*

During the Quaternary, thick ice sheets covered most of Canada including the Ottawa area. The ice sheets grew and melted several times during the last 1.6 million years. The last ice sheet (known as the Laurentide Ice Sheet) to cover the Ottawa area about 20 000 years ago, may have been as much as two kilometres thick. As the ice sheets grew, they sculpted and eroded the landscape, and carried along with it large blocks and finer sediment grains of eroded bedrock. As the Laurentide Ice Sheet melted and receded northward 12 000 to 10 000 years ago, it deposited the eroded material as loose sediment; this loose sediment now forms the youngest surface deposits in the Ottawa area. The sand and coarse gravel that blanket much of the Ottawa area was deposited during the Quaternary in glacial meltwater river environments. Because the weight of the ice sheet had depressed the crust underneath, the area was lowland into which the Atlantic Ocean flooded to form the Champlain Sea. Fine marine sediment, such as the 70-m thick Leda Clay, was deposited in the Champlain Sea. The Leda Clay is very unstable, and is responsible for local building subsidence (e.g. Museum of Nature) and periodic landslides (e.g. 1908 Notre-Dame-de-la-Salette landslide with 33 deaths; and the 1993 Lemieux–South Nation River landslide).

Subsequently, the crust began to slowly rise due to isostatic rebound and the Champlain Sea retreated eastward to the St. Lawrence River valley. As the front of the ice sheet continued to retreat northward, large volumes of Holocene meltwater drained into the Ottawa area via the Ottawa Valley and Gatineau River valley. River channels cut into the older Champlain Sea marine deposits and glacial river deposits and, after some channel re-establishment and terrace and bog formation (e.g. Mer Bleue bog), the present course of the Ottawa River stabilized, and soils, beneficial for agriculture, developed.

# QUARRIES NEAR AND FAR

Stone, used to construct the buildings and monuments in Ottawa, was extracted mainly from quarries in Canada, but also from quarries in the United States and farther abroad. Depending on the demand for a particular stone, and the size of the deposit that contained the desirable qualities, the life span of a quarry may be as short as a couple of years or as long as many centuries. Locally, scores of quarries have been opened and abandoned since the early 19th century, some being operational only for as long as it took to construct a particular building or to satisfy an immediate, local need. Conversely, some building stone used in Ottawa came from quarries farther away in Québec, Manitoba, the United States and Europe which, because of their size and the beauty of the stone, continue to operate after many decades or centuries.

Quarrying for building stone has existed in Ontario since the early 1800s and in adjacent Québec and the American states for even longer. An important stimulus to the quarrying industry in eastern Ontario was the construction of the Rideau Canal between 1826 and 1832. The canal construction employed many stonemasons from the British Isles, who subsequently settled in the area and continued to quarry and use local building stone for construction. Many older homes and buildings in Kingston, Ontario, were constructed with local limestone, and consequently Kingston became known as the 'Limestone City'. Similarly, many of the older buildings in communities along the Rideau Canal, such as Perth and Ottawa, are constructed from readily available local sandstone (Nepean/Potsdam sandstone) or limestone (Gloucester limestone). The introduction of Portland cement into eastern Ontario around 1889 began to replace local building stone and, consequently, quarries and lime kilns ceased production. The local Flood Lime Kiln (Stony Swamp, Moodie Drive, Ottawa), for example, ceased production in 1906 as a direct result of increased use of Portland cement. Adding to the downturn in local quarrying and lime production in the early 1900s was the increased use of steel for building framework. The use of steel in buildings lessened the need for massive, thick load-bearing stone walls, and encouraged the use of specifically cut dimension stone that only a few local quarries could produce.

Some of the building stone used in and around Ottawa, such as glacially derived field stones, has been simply picked up and incorporated into a building or monument. However, most of the building stones are specifically cut dimension stone that have been finished in various ways after they have been extracted from a quarry. The types of finishes seen in Ottawa include polished, honed, sawn, sandblasted, flamed, bush hammered, tooled, split face and pitched face. In some buildings, the entire wall or floor may consist of thick blocks of a particular building stone. Other buildings may only use an ashlar, tile or veneer face, or a fascia and moulding, on the outer, visible extremities.

Numerous varieties of rock have been used as building stone in Ottawa. In many cases it is obvious where the rock was quarried; for others it is not, and extensive research would be necessary to determine the ultimate source. Two of the most popular building stones quarried in the Ottawa region are the Nepean Formation sandstone and the Gloucester limestone (Ottawa Group, see Table 2). The main Nepean Formation sandstone quarries were located on a ridge just east of Kanata. The main Gloucester limestone quarries were located along Montreal Road, east of St. Laurent Boulevard. Currently, few quarries are operating in the Ottawa area. Perhaps the largest of these operating quarries are: Dibblee Paving & Materials Ltd. on Moodie Drive near Fallowfield; Frazer-Duntile Co. Ltd. on Clyde Avenue; Aecon Construction and Material Ltd. (was Armbro Aggregates quarry) on Bank Street in South Gloucester; and the Lafarge Stone and Aggregate (was Francon Quarry) on Bearbrook Road near Blackburn Hamlet. These quarries are mainly producers of crushed stone for roads, roofing, walkways, terrazzo, concrete blocks and cement production. None of the currently active local quarries are producing dimension stone, although minor construction components, such as sills and lintels, have been produced for local needs.

The old abandoned quarries in the Ottawa area are now often difficult to study or even to find. Some have been flooded with water, or filled in with landfill or garbage. Others are covered over by vegetation so that only small outcrops are now visible. Most of the abandoned quarries in the Ottawa core and suburbs have been built upon, leaving only a legacy of sparse historical documents and aerial photographs. Table 3 is a summary of the rock formations in the Ottawa area that have been used to provide the raw material for building stone and aggregate, and where known, quarries from which the material was extracted.

It is worth noting that numerous occurrences of mineralization have also been found in the Ottawa area. A few of these occurrences have been found in the Paleozoic sedimentary strata, such as chalcopyrite (copper-bearing mineral) and thucolite (uranium-bearing hydrocarbon) in the March Formation near the community of South March. Most, however, occur within the metamorphosed and structurally deformed Precambrian rocks in the Carp Ridge west of Ottawa and, more commonly, in the Gatineau hills, Québec, north of Ottawa. Many of the mineral occurrences in the Precambrian rocks were significant enough to be mined; however, all the mines have since closed. Examples of these mines were:

Kingdon/Galetta (lead), Morris Island, Ottawa River
South March (feldspar), west of Hazeldean
Forsyth (magnetite), Gatineau hills

Table 3. Quarries within the Ottawa area

| FORMATION | QUARRY | USE |
|---|---|---|
| Nepean (sandstone) | Campbell: Nepean Tp., Con. 11, Lot 3<br>Cohie / Tillson: Nepean Tp., Con. 2, Lot 6<br>Bishop: Nepean Tp., Con. 2, Lot 6 | Parliament buildings, Museum of Nature, War Museum, Observatory, Connaught Bldg., Royal Canadian Mint, private houses |
| March (sandstone-dolostone) | Stewart: Clarence Tp., Con. 9, Lots B & C<br>Aecon Construction and Material Ltd.: Gloucester Tp., Con. 5, Lots 23-25 | Private houses, aggregate |
| Beauharnois (limestone-dolostone) | Mille Roches: Russell Tp., Con. 10, Lot A<br>Aecon Construction and Material Ltd.: Gloucester Tp., Con. 5, Lots 23-25 | Rideau Canal, aggregate |
| Carillon (limestone-dolostone) | Stewart: Clarence Tp., Con 9, Lots B & C | Private houses, aggregate |
| Rockcliffe (sandstone, shale) | Stewart: Clarence Tp., Con. 9, Lots B & C<br>Highway 17: Cumberland Tp.,<br>Dunrobin: Torbolton Tp., Con. 5, Lot 1 | Private houses, flagstone, aggregate |
| Hog's Back (siltstone, sandstone, limestone-dolostone) | Mille Roches: Russell Tp., Con. 10, Lot A | Rideau Canal |
| Lowville (siltstone, sandstone, limestone-dolostone) | Huntley: Huntley Tp., Con. 4, Lots 2-5<br>Dibblee Paving & Materials Ltd.,: Nepean Tp., Con. 5, Lots 23-25<br>Frazer-Duntile Co. Ltd.: Clyde Ave.<br>McCarthy Rd.: S. & W. of Owl Dr. | Lord Elgin Hotel (part), sills & lintels, aggregate |

Headley (apatite, mica), Gatineau hills
High Rock (apatite), Gatineau hills
Donaldson Lake (graphite), Gatineau hills
Maxwell (brucite), Gatineau hills

A thorough review of the mines in the Ottawa area can be found in publications by Hogarth (1962), Sabina (1987) and Udd (2005).

Most of the building stones used in Ottawa came from quarries in other Canadian provinces and other countries. In my opinion, the most colourful and beautifully textured dimension stones in Ottawa originate outside the

Table 3. *(Continued)*

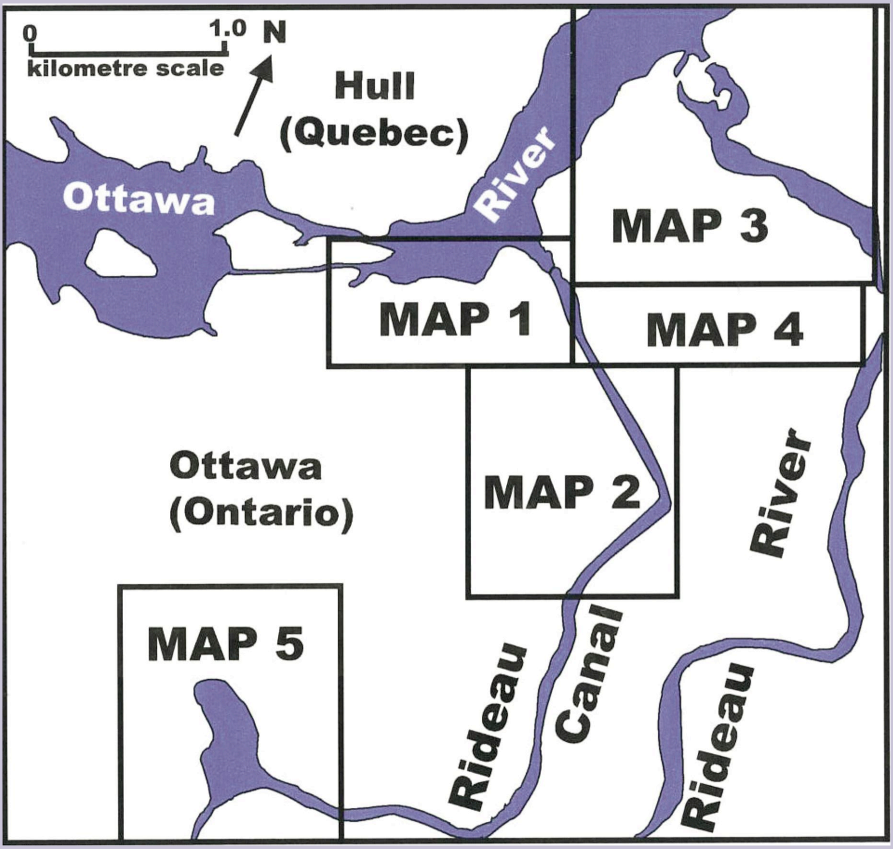
| FORMATION | QUARRY | USE |
|---|---|---|
| Chaumont (limestone) | Huntley: Huntley Tp., Con. 4, Lots 2-5<br>Dibblee Paving & Materials Ltd.: Nepean Tp., Con. 5, Lots 23-25<br>Frazer-Duntile Co. Ltd., Clyde Ave.<br>McCarthy Rd., S. & W. of Owl Dr.<br>Lafarge Stone and Aggregate (Francon): Gloucester Tp. | Aggregate |
| Bobcaygeon (limestone, shale) | Dibblee Paving & Materials Ltd.: Nepean Tp., Con. 5, Lots 23-25<br>Frazer-Duntile Co. Ltd.: Clyde Ave.<br>Montreal Road (Gloucester quarries)<br>Lafarge Stone and Aggregate (Francon): Gloucester Tp. | Ottawa Marble & Granite Works, Arts Court, Union Mission, Ottawa Normal School, Basilica Notre-Dame, Philomène Terrace, private houses |
| Hull (limestone, shale) | Canada Cement (abandoned): Saint-Raymond St., Hull | Aggregate |
| Lindsay (limestone, shale) | (covered by Château Laurier)<br>Montreal Road (Gloucester quarries) | Bytown Museum / Commissariat, Lockmaster's Station, private houses |
| Queenston (shale, siltstone) | Canada Brick: Russell Tp. | Red brick |
| Pleistocene Epoch | Field stones | Farmhouses, houses and foundations, churches, fire places and chimneys |

region. In many instances, the finished dimension stone was transported great distances, some originating in quarries that are world renowned and which have been active for decades or even centuries.

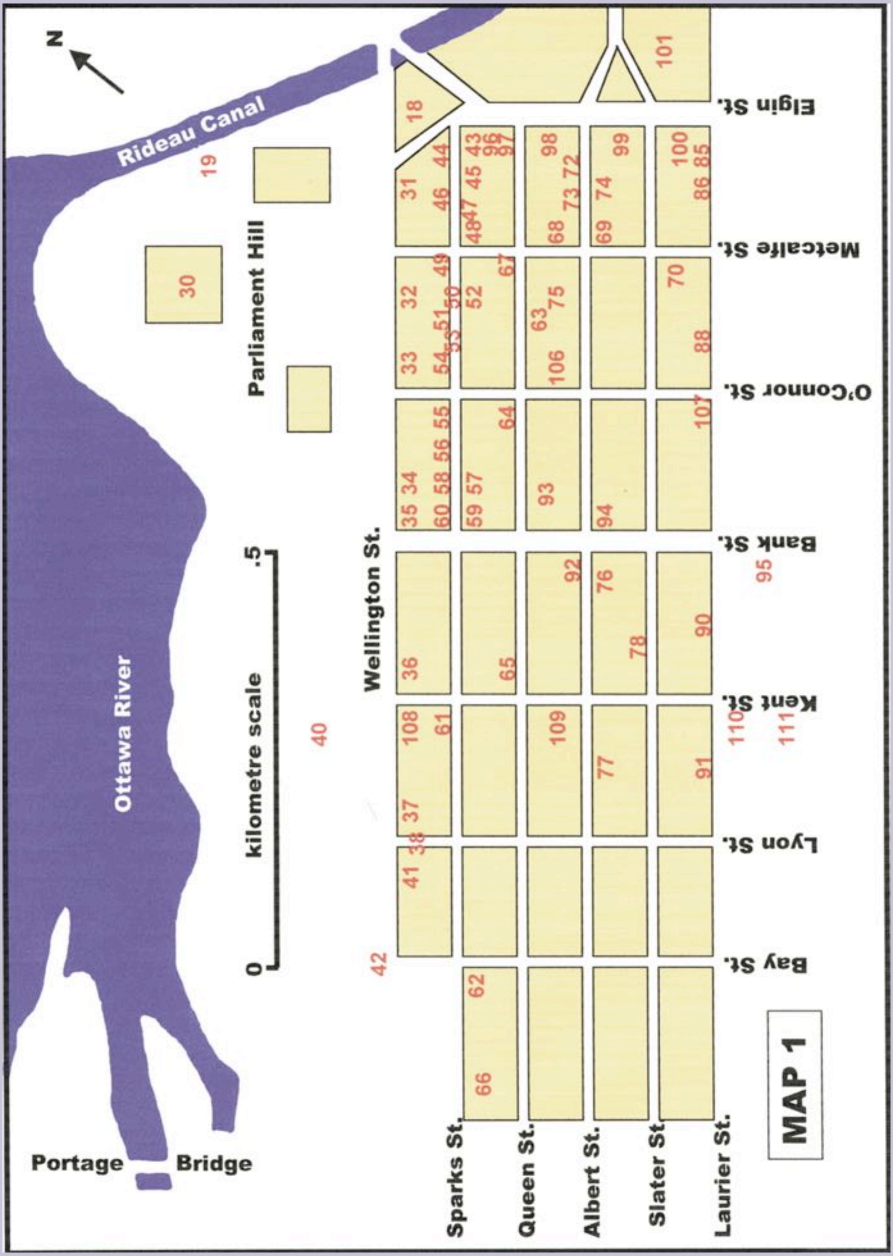
Table 4 shows where some of the building stone of non-local origin has come from and where it has been used in Ottawa.

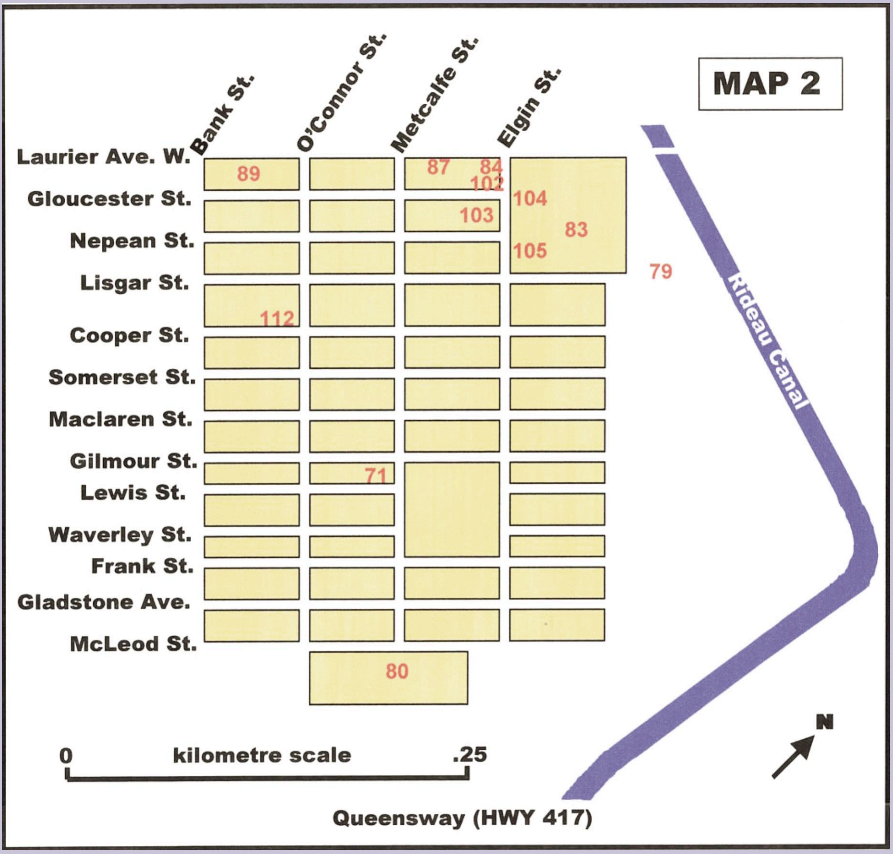
Table 4. Quarries outside the Ottawa area

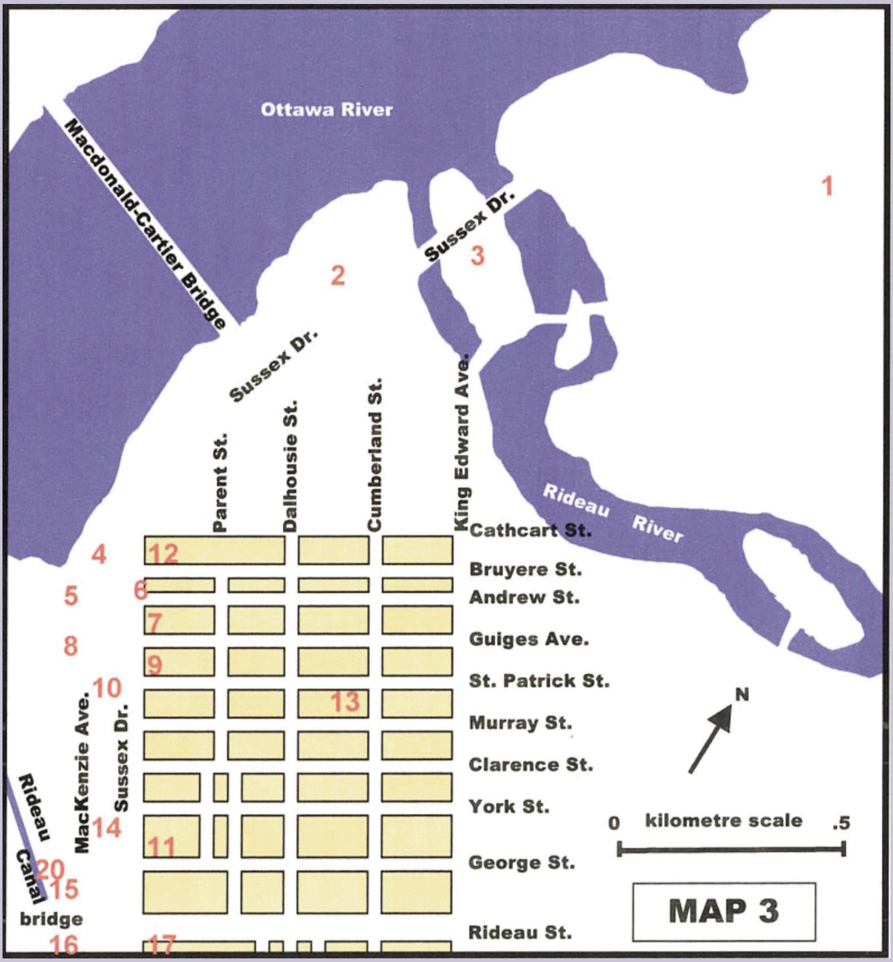
| NAME AND LITHOLOGY | SOURCE | LOCALLY USED |
|---|---|---|
| Adair marble (dolostone) | Albemarle Tp., Ontario | Ottawa Courthouse, L'Esplanade Laurier, Scotiabank (Sparks St.), Ottawa International Airport |
| Bedford stone (Indiana limestone) | Bedford, Indiana, U.S.A | Château Laurier, Conference Centre, former US Embassy |
| Carrara marble | Carrara area, Apuan Alps, Italy | L'Esplanade Laurier, Parliament buildings, National Archives & Library of Canada |
| Deschambault limestone (St-Marc stone) | Sant-Marc-des-Carrières, Québec | Lord Elgin Hotel |
| Hampstead granite | Hampstead area, New Brunswick | Parliament Hill steps and monument bases |
| Hoidge Marble | Bancroft area, Ontario | Parliament buildings |
| Kirkstone slate (sedimentary to volcaniclastic) | Cumbria and Lake District, England | Bank of Canada, C.D. Howe Bldg. (Queen St.) |
| Lac Saint-Jean anorthosite | Lac Saint-Jean area, Québec | HSBC (Metcalfe St.), 189 & 197 Sparks St., Post Office (Sparks St.) |
| Miramichi sandstone | Curryville area, New Brunswick | Langevin Block |
| Missisquoi marble | Philipsburg area, Québec | Parliament buildings, Supreme Court of Canada |
| Ohio sandstone (Berea sandstone) | Amherst, Ohio, U.S.A | Peace Tower, Lisgar Collegiate |
| Portage du Fort marble | Portage du Fort, Québec | Parliament buildings |
| Potsdam sandstone | Malone and Potsdam areas, New York, U.S.A. | Parliament library |
| Queenston limestone | Niagara Falls area, Ontario | Bank of Montreal (Sparks St.), TD Bank (Sparks St.), Lorne Bldg. |
| Stanstead granite (granite to tonalite) | Graniteville and Beebe, Québec | Château Laurier, Conference Centre, Connaught Bldg., Royal Canadian Mint |
| Tadoussac granite (granitic gneiss) | Bergeronnes, Québec | National Gallery of Canada |
| Tennessee marble | Knoxville area, Tennessee, U.S.A. | Parliament buildings, Baldwin Lafontaine monument |
| Tyndall stone (limestone) | Garson, Manitoba | Parliament building, Ottawa City Hall, Kuwait Embassy |
| Verde Antique (serpentinite) | Roxbury area, Vermont, U.S.A. | Wellington Bldg., E.R. Fisher Bldg., Ottawa City Hall |
| Wallace sandstone | Wallace, Nova Scotia | Parliament buildings, Museum of Nature, St. Patrick's Basilica |

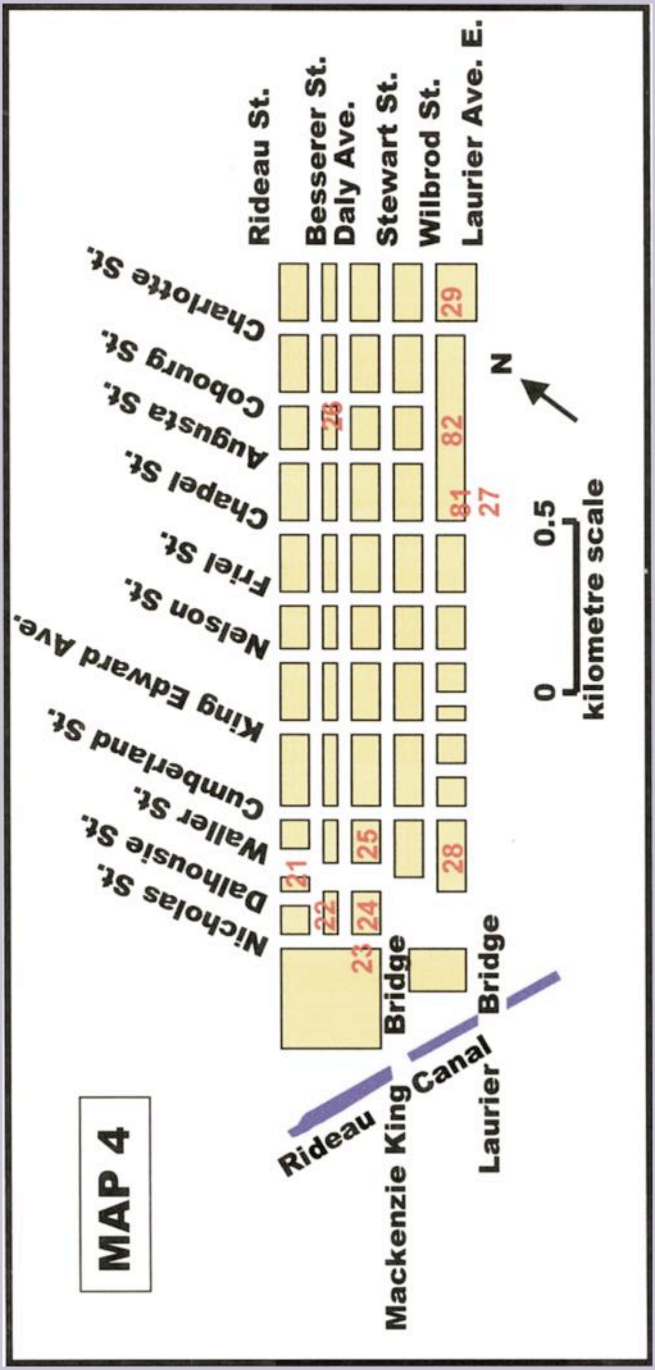


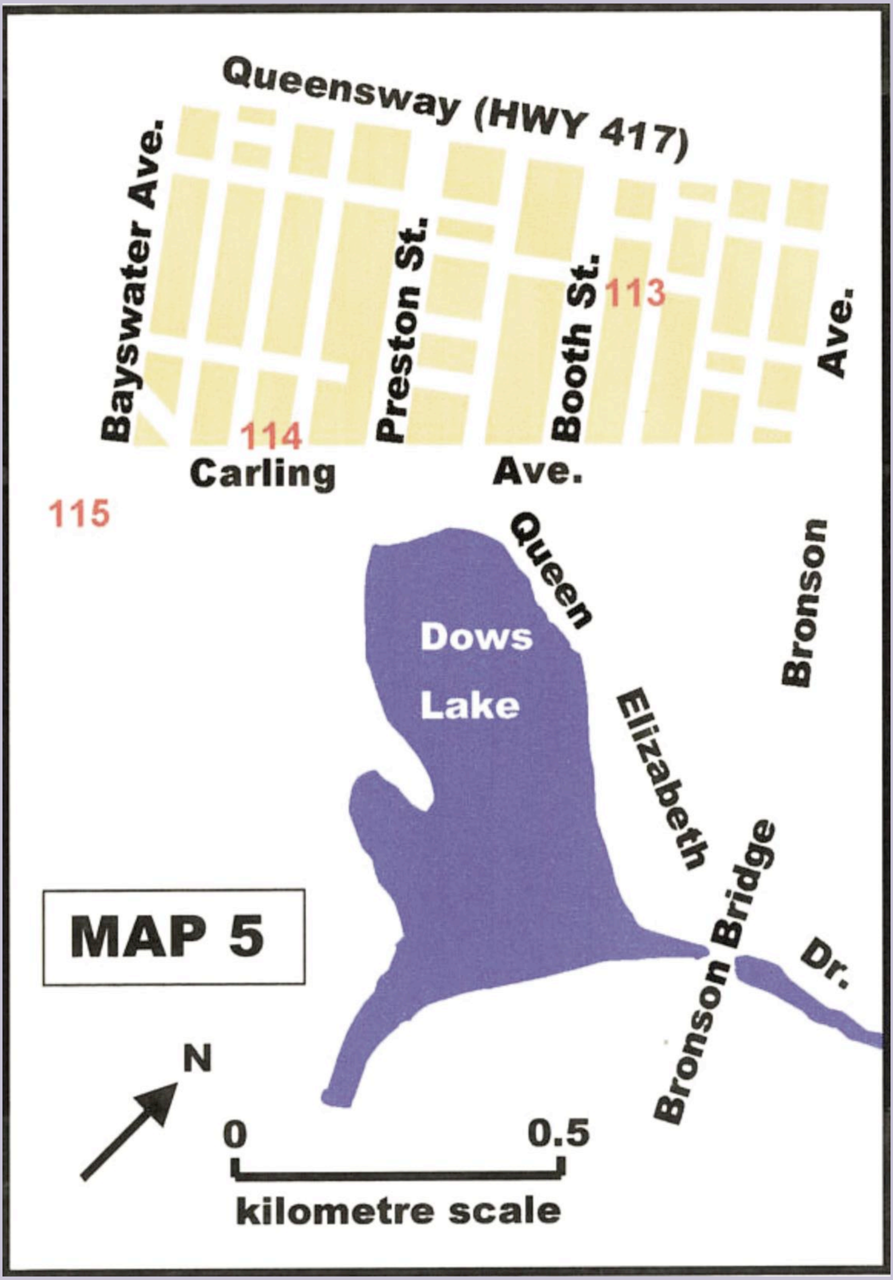

Index Map to Location of Guide Maps 1 to 5.


N
Rideau Canal
Parliament Hill
Ottawa River
kilometre scale
0
.5
Wellington St.
Elgin St.
Metcalfe St.
O'Connor St.
Bank St.
Kent St.
Lyon St.
Bay St.
Sparks St.
Queen St.
Albert St.
Slater St
Laurier St.
Portage
Bridge
MAP 1


MAP 2
Bank St.
O'Connor St.
Metcalfe St.
Elgin St.
Laurier Ave. W.
Gloucester St.
Nepean St.
Lisgar St.
Cooper St.
Somerset St.
Maclaren St.
Gilmour St.
Lewis St.
Waverley St.
Frank St.
Gladstone Ave.
McLeod St.
89
87
84
102
103
104
83
105
79
112
71
80
Rideau Canal
0
kilometre scale
.25
N
Queensway (HWY 417)


Ottawa River
Macdonald-Cartier Bridge
Sussex Dr.
Sussex Dr.
Sussex Dr.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
20
Parent St.
Dalhousie St.
Cumberland St.
King Edward Ave.
Rideau River
Cathcart St.
Bruyere St.
Andrew St.
Guiges Ave.
St. Patrick St.
Murray St.
Clarence St.
York St.
George St.
Rideau St.
MacKenzie Ave.
Rideau Canal
bridge
N
0 kilometre scale .5
MAP 3


MAP 4
Rideau St.
Besserer St.
Daly Ave.
Stewart St.
Wilbrod St.
Laurier Ave. E.
Charlotte St.
Cobourg St.
Augusta St.
Chapel St.
Friel St.
Nelson St.
King Edward Ave.
Cumberland St.
Waller St.
Dalhousie St.
Nicholas St.
Rideau Canal
Mackenzie King Bridge
Laurier Bridge
N
0
0.5
kilometre scale
21
22
23
24
25
26
27
28
29
81
82

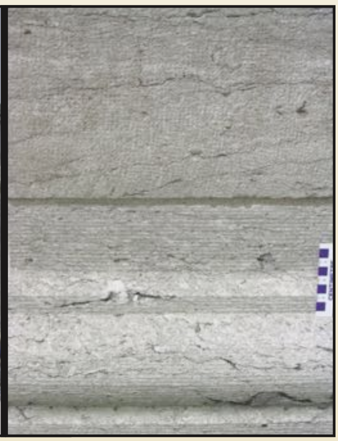

Queensway (HWY 417)
Bayswater Ave.
Preston St.
Booth St.
113
Ave.
114
Carling
Ave.
115
Queen
Dows
Lake
Bronson
Elizabeth
Bridge
Dr.
Bronson
MAP 5
N
0
0.5
kilometre scale

## 1 Sussex Dr. [1 M3]

1

**RIDEAU HALL** 1838, 1866-1868, 1872, 1913.

This impressive building, now the home of Canada's Governor General, was constructed by Scottish stonemason, contractor and mill owner Thomas MacKay. The 88 acre estate initially consisted of an 11-room limestone villa (Rideau Hall) and a stone stable, barn, ice house, piggery and dairy. The main front entrance gate and gate lodge were constructed between 1867 and 1868. Rideau Hall (*left*) consists of medium grey, crossbedded bioclastic limestone that contains abundant lime-mud fragments (micrite intraclasts) and fossil fragments (bioclasts) of crinoids, pelecypods and gastropods (*right*). The same limestone has been used for the wall/fence and gate-posts surrounding the grounds. Monuments in the rose garden were carved from grey granite.



**2**

**100 Sussex Dr.** [2 M3]

**NATIONAL RESEARCH COUNCIL** 1930-1932.

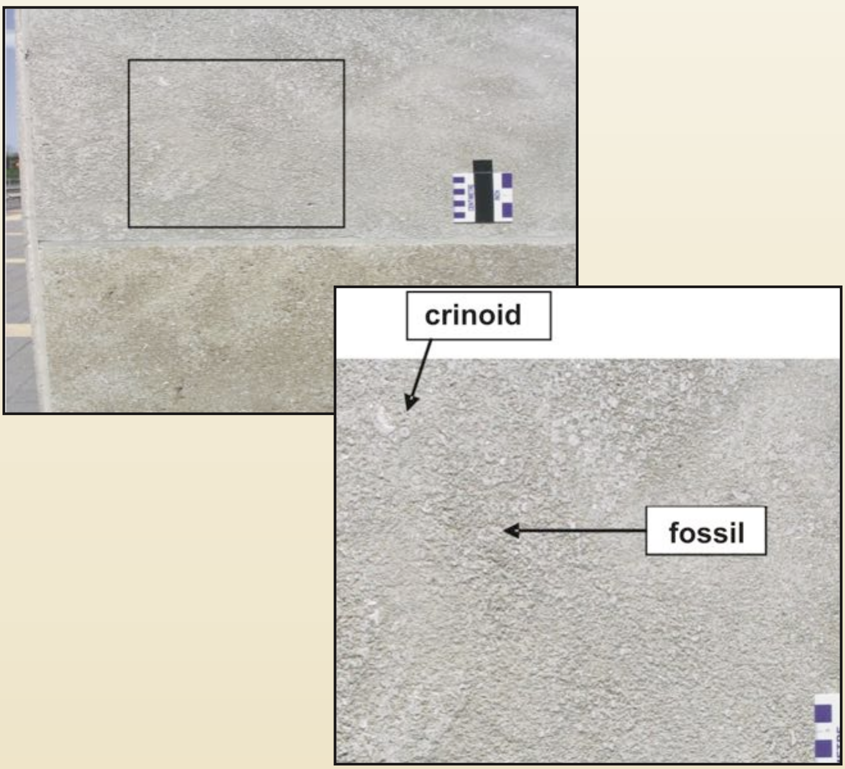
Built in the Italian Renaissance architectural style in the form of a squared figure eight, with two interior courtyards, most of the steel-framed building is faced with light brown, crossbedded Wallace sandstone from Nova Scotia (*left*). The raised basement is faced by massive beige Scotstown granite (hornblende tonalite) from Québec (*right*), which was also used to frame some of the windows and doors. The flat roof, originally covered with slate, has more recently been covered by Styrofoam and crushed stone. The original main doors are bronze. The interior grand staircase contains Italian travertine; both travertine and Tyndall stone have been used for some interior walls. The Power House near Rideau Falls has a façade of Wallace sandstone that displays a smooth-faced sawn ashlar treatment similar to the main building.

**111 Sussex Dr.** [3 M3]

3

**FORMER OTTAWA CITY HALL-GREEN ISLAND** 1958. **SUSSEX PAVILION,** 1992. **BYTOWN AND RIDEAU PAVILIONS**

The eight-storey, steel reinforced concrete-framed Sussex Pavilion is clad with slab blocks of tan to grey fossil-rich Queenston limestone (*left*). Abundant ring-shaped crinoid fragments are visible in the square pillars at the front of the building (*closeup, right*). White marble, from the Green Mountains of Vermont, can be seen throughout the foyer including the oval staircase steps. Some of the interior square columns are clad with grey fossil-rich limestone.



**4**

**320 Sussex Dr.** [4 M3]

**ROYAL CANADIAN MINT** 1905-1908.

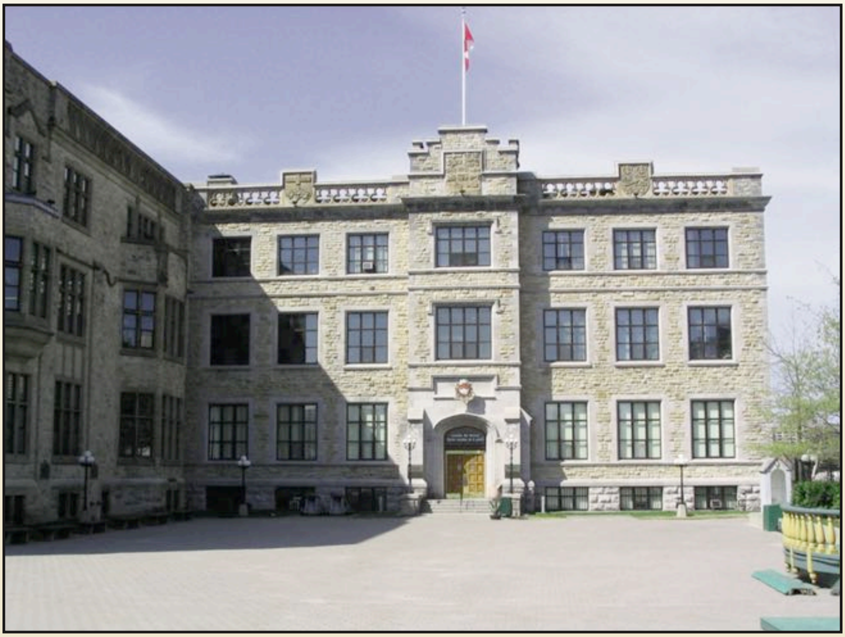
Gothic Revival architectural-style building having crenellated octagonal towers and gatehouse (*left and right*). Yellow-brown, laminated and crossbedded Nepean sandstone is used as the main building stone. Blocks and slabs of Stanstead granite (hornblende tonalite) were used for the gatehouse and for framing the main building windows and door and the corners of salients. Red, coarse hornblende syenite has been used for the front steps.

## 330 Sussex Dr. [5 M3]

5

**FORMER CANADIAN NATIONAL ARCHIVES AND CANADIAN WAR MUSEUM** 1904-1906.

Three-storey Tudor-Gothic Revival style building, with yellow-brown Nepean sandstone facing stones. The basement is grey, laminated limestone and massive fossil-rich limestone. Similar limestone forms the quoins and buttressing on either side of the main doors, and also frames the windows. The 1924 extension is also faced with Nepean sandstone, and Wallace sandstone trim.

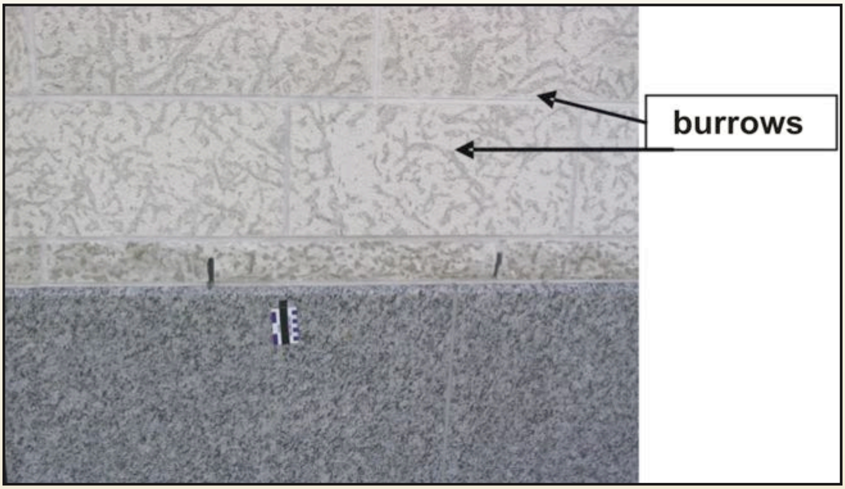


6

**333 Sussex Dr.** [6 M3]

**STATE OF KUWAIT EMBASSY** 2003.

The exterior wall has a one-metre base of flame-treated very coarse grey granite, overlain by burrowed Tyndall stone (dolomitic limestone). The main Embassy building is also built of Tyndall stone.



**373 Sussex Dr.** [7 M3]

7

**COLLEGE OF BYTOWN/LA SALLE ACADEMY** 1849-1852.

The Collège de Bytown was established by the Catholic Oblates as a school before moving to the present site of the University of Ottawa. The Christian Brothers then established La Salle Academy in 1888. The building stone is grey, laminated to nodular Gloucester limestone containing abundant fossil and lime-mud fragments. The stones are both bush hammered and split-face finished.

## 8

**380 Sussex Dr.** [8 M3]

**NATIONAL GALLERY OF CANADA** 1983-1988.

This magnificent building is built of high-grade metamorphic hornblende- and garnet-bearing Tadoussac granitic gneiss, from Grandes Bergeronnes, Québec, which has been flame-treated on its outer surface (*left and right*). The granitic gneiss comprises the outer driveway walls, outer building walls and walkway floors, as well as the inside floors and walls of the gallery. Outside the auditorium, within the gallery, very coarse anorthosite, that have dark green alteration zones, forms the courtyard floor (referred to as Impala stone from Zimbabwe), while gabbro floor tiling forms a star pattern.

**385 Sussex Dr.** [9 M3]

9

**BASILICA NOTRE-DAME** 1841-1853.

The oldest church in Ottawa, the Notre-Dame Cathedral, became a basilica in 1888 and the seat of Ottawa's Roman Catholic archbishop. The Basilica is built in Gothic Revival style architecture, and was primarily constructed from grey fossil- and intraclast-rich Gloucester limestone from the Robillard quarries (Montreal Road). Archbishop Duhamel's statue (1945) outside the Basilica is fashioned of granite.

**THE ARCHBISHOP'S PALACE** (145 St. Patrick St.) 1849-1850, 1863, 1897.

Located adjacent to the Basilica, the Archbishop's Palace was first occupied by Bishop Guigues in 1850. It is built of similar split face and bush-hammered grey Gloucester limestone blocks, some of which contain many fossils. The Parrish Offices (60 Guigue St.) and the walls around the Basilica are built of rough- and smooth-cut grey fossil-rich Gloucester limestone.

## 10

**Sussex Drive at St. Patrick St.** [10 M3]

**CANADIAN PEACEKEEPING MONUMENT** 1992.

This monument honours Canadian peacekeeping forces. Three peacekeepers stand on a wall above the debris of war; nearby is a stand of trees symbolizing peace. The walls are massive granite, and the figures are bronze cast.

**541 Sussex Dr.** [11 M3]

11

1863, 1881, 1917.

Located within the historical commercial area of Ottawa's Lowertown, now known as the Byward Market, this L-shaped stone building has been the site of a hotel (Claredon), an army barracks, and commercial shops and offices. From 1881 to 1911, it housed the Geological Survey of Canada following that agency's move from Montreal. The course, split-faced stone wall and window jambs, lintels and sills are Gloucester limestone.

## 12

**9 Bruyere St.** [12 M3]

**MOTHER HOUSE, SISTERS OF CHARITY OF OTTAWA** 1849-1851, 1876, 1935-1937.

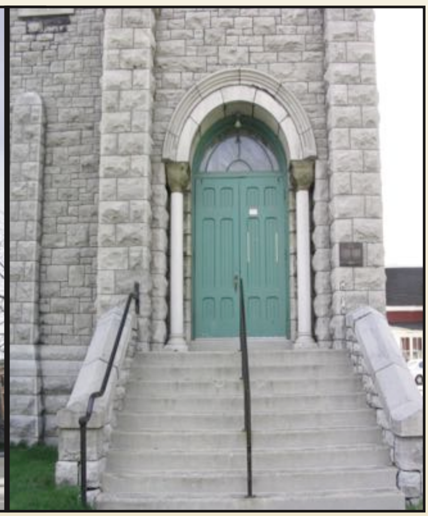
Sister Elizabeth Bruyère and three Soeurs Grises de la croix originally established an orphanage and infirmary here. Situated at the west end of the General Hospital Complex, the building walls and outer wall are built from split- and pitch-face finished blocks of grey Gloucester limestone from the Robillard quarries on Montreal Road. The building has squarely dressed quoins with bush-hammered or pointed finishes. Belt courses and window sills have similar finishes. Some limestone blocks display parallel- and cross-lamination, stylolites and variable amounts of white lime-mud and fossil fragments (coral- and brachiopod-rich).

**314 St. Patrick St.** [13 M3]

**13**

**ST. BRIGID'S PARISH CHURCH** 1889-1890.

Originally built to serve the Irish Catholics of Ottawa's Lowertown, this church (*left*) was designed by John Bowes, and built in the Gothic Revival style of architecture using Italian Renaissance detail around the doors and two octagonal-spire towers. The church walls are rough blocks of light grey limestone, many of which are laminated and contain abundant layers rich in white lime-mud grains (micrite intraclasts) and fossil fragments such as coral. Columns and arches around the doors (*right*) are made of white mica-rich marble, that have carved olive-brown sandstone capitals atop the columns.

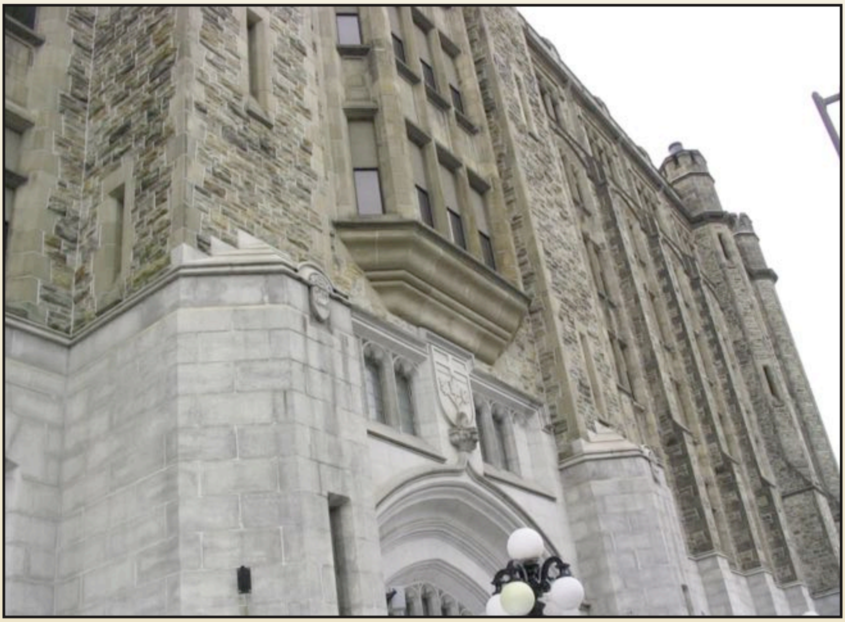


**14**

**525 MacKenzie Ave.** [14 M3]

**CONNAUGHT BUILDING** 1913-1916.

The Connaught building is across the street from the Fairmont Château Laurier Hotel and Ottawa's first park, Major's Hill, and shares a street block with the new United States Embassy. The building is named after Canada's 10th governor general, Prince Arthur the Duke of Connaught. The upper half of this Tudor–Gothic Revival style building has a steel and concrete frame, sheathed in split-face finished Nepean sandstone, with cut Wallace sandstone window jambs, sills and lintels. The lower half of the building, particularly evident on the Sussex St. side, is constructed from Stanstead granite including the window and door jambs, lintels, sills and door arches.



**1 Rideau St.** [15 M3]

15

**FAIRMONT CHATEAU LAURIER** 1908-1912, 1927-1929.

Charles Hays, President of the Grand Trunk Railway, had the luxury hotel built and named it in honour of Sir Wilfred Laurier whose Liberal government enabled the construction of the Grand Trunk Railway.

The main building façade is crossbedded, buff Indiana (Salem) fossil-rich limestone, with a base of Stanstead granite. It has a steeply pitched copper clad roof with dormer windows.

**Interior**- The lobby floor is beige travertine limestone, as are the stairways near the telephones; the adjacent foyer has beige, fossil-rich limestone flooring. Reception and Concierge desks, and base of nearby walls, are black brecciated 'marble' (actually muddy limestone) laced with white calcite veins. Interior walls are tan fossil-rich limestone with thin red banding (liesegang) and some crossbedding; the eastern corridor is faced with light brown Tyndall stone (limestone) with abundant burrows and cephalopod and gastropod fossils.

**16**

**2 Rideau St.** [16 M3]

**CONFERENCE CENTRE** (former Union Train Station) 1909-1912, 1973.

The Union Station was erected by the Grand Trunk Railway Company in the Beaux-Arts style. The building facing matches that of the Fairmont Château Laurier, consisting of buff Indiana (Salem) fossil-rich limestone above a base of Stanstead granite (tonalite). The outer front wall has a granodiorite stone base.

**Interior**- The lobby has a polished floor and wall base of grey, burrowed nodular limestone. An underground tunnel leads to the Fairmont Château Laurier across Rideau Street.

**10 Rideau St.** [17 M3]

17

**RIDEAU CENTRE.**

Stanstead granite base beneath an Indiana limestone façade (similar to old Union Station and Fairmont Château Laurier).

18

## NATIONAL WAR MEMORIAL [18 M1]

1938-1939.

The War Memorial comprises 503 tonnes of granite and 32 tonnes of bronze (figures), and has a reinforced concrete base (*below*). The National War Memorial in Confederation Square was originally built to commemorate the Canadians who died in the First World War, but now commemorates all of Canada's war dead. The 23 bronze figures represent the different services from the First World War, which are moving through the arch from war to peace beneath winged figures representing peace and liberty. The Unknown Soldier sarcophagus (*right, page 43*) is similar to the one at the Canadian National Vimy Memorial in France. In 2000, the remains of an unknown Canadian soldier killed during the First World War was brought from France and laid to rest here.

Many building stones comprise the National War Memorial:

Rose-grey granite (Rose Cendré) pedestal from Dumas Quarry at Rivière-à-Pierre near Québec City, along with the arch granite, are virtually iron free (less chance of staining).

Terraces and walks and grading have seven varieties of Canadian granite, namely:

Grey granite from Scotstown, Québec (curbs and borders).


Lacasse white granite from Beebe, Québec (upper steps and borders).

Pink granite (Caledonia or Rose Cendré) from Rivière-à-Pierre, Québec (square tile panels).

Pink granite (Laurentian Pink) from Guénette, Québec (mosaic work).

Mackenzie green granite from Scotstown, Québec (mosaic work).

Dark pink Rivière-à-Pierre granite (Caledonia) (mosaic work).

Pink granite (Vermilion Pink) from Vermilion Bay, Ontario (mosaic work).

## 19

**1 Canal Lane** [19 M1]

**BYTOWN MUSEUM/THE COMMISSARIAT** 1827.

Oldest building in Ottawa (*right*). Built by Thomas MacKay (who later built himself a house, which became Rideau Hall), the pitch-faced stones are calcite-rich sand (calcarenite) and fossil-rich limestone conglomerate. The limestone was quarried on site at the foot of the locks. The Commissariat was a warehouse for materials required for the building of the Rideau Canal (1826-1832), and also had limited living space.

The Lockmaster's Station (1884), or Lock Office (*left*), adjacent to the Bytown Museum, is also made from pitch-faced blocks of grey limestone rich in fossils and lime-mud fragments, and has a slate roof.

The canal walls, from the Canal Bridge to the Ottawa River, have been restored using Adair marble (dolostone) from Bruce Peninsula. The original stone that was used to build the canal walls was quarried locally. For example, local Lindsay Formation limestone was extracted from the cliffs beside the canal from a quarry now filled in by the

Fairmont Château Laurier Hotel. The bridge over the Rideau Canal locks has grey Stanstead granite towers, between which is carved olive Wallace sandstone.

**1 Rideau Canal** [20 M3]

**20**

**CANADIAN MUSEUM OF CONTEMPORARY PHOTOGRAPHY**

1992.

Indiana limestone, imported to match Fairmont Château Laurier Hotel.

Pink feldspar-rich (syenitic) gneiss walkway stones.

## 21

**14 Waller St.** [21 M4]

**OTTAWA MARBLE AND GRANITE WORKS** 1866.

Between 1872 and 1881, this building was used as a marble and granite workshop by stonemasons who had previously worked on the Rideau Canal. The two-foot thick building walls are massive to laminated grey, fossil-fragment rich (bioclastic) Gloucester limestone that exhibit minor iron staining; the iron staining is likely caused by weathering of pyrite within the limestone.

## SIMÓN BOLÍVAR [22 M4]

**22**

1783-1830.

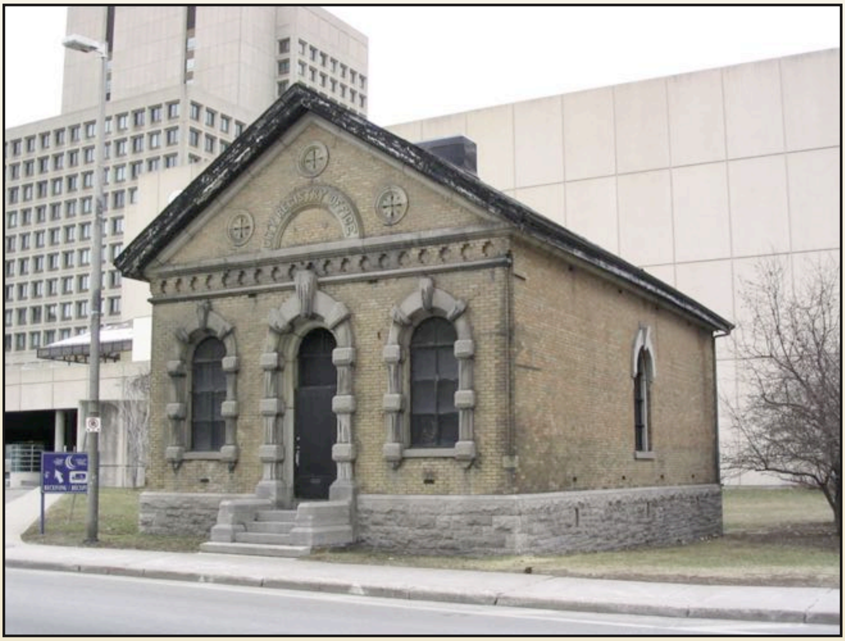
Intersection of Besserer Street and Dalhousie Avenue. A hornblende-bearing coarse crystalline granite pedestal supports the bronze figure of Simón Bolívar, who liberated Colombia, Ecuador, Peru, Panama and Venezuela from Spanish rule, and also was the founder of Bolivia. The statue is a 1988 gift from the Government of Venezuela.

**23**

**70 Nicholas St.** [23 M4]

**FORMER CITY REGISTRY OFFICE** 1873.

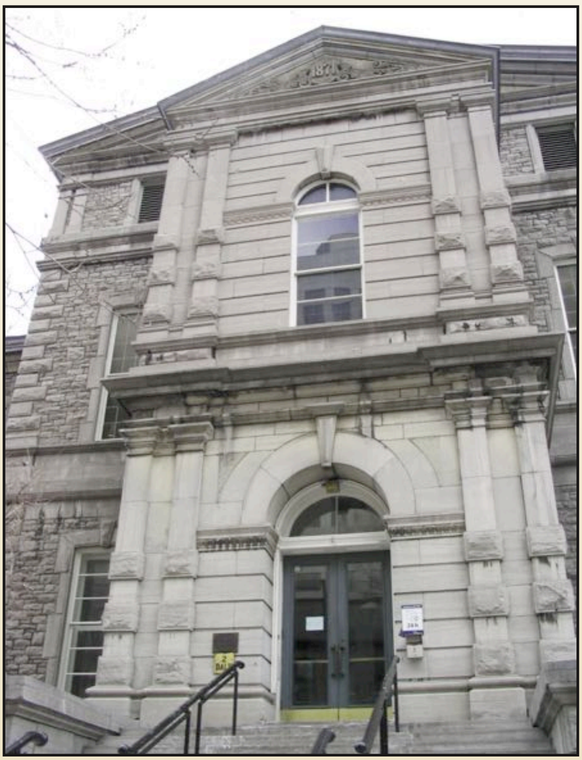
The four-foot wall base (plus nine feet below ground) consists of two-foot thick pitch-faced blocks of grey, crudely bedded limestone rich in fragments of fossils (bioclasts) and lime-mud (intraclasts). Fossil fragments include corals and brachiopods. The round-headed door and window arches are made from similar, but split-faced, blocks of limestone. The original roof was slate tiled.



**2 Daly Ave.** [24 M4]

**24**

**ARTS COURT** (former Carleton County Courthouse) 1870-1872. Constructed of split-faced and bush-hammered finished wall stones of grey Gloucester limestone containing fossils and intraclasts and a crude bedding. Italianate features include window jambs, sills and lintels, rusticated quoins and tall chimney stacks. The entrance foyer has white marble walls. The surrounding walls are also built of Gloucester limestone. According to City of Ottawa documents, 1995 renovations on the building used Deschambault limestone. The Carleton County jail, now a youth hostel, is located next door to the Arts Court on Nicholas Street.



## 25

**47-49 Daly Ave.** [25 M4]

**UNION MISSION FOR MEN** 1861-1862, 1930s 4th storey addition. Built as a three-storey, double residence on the estate of Louis Besserer, the building was sold to the Union Mission for men in 1912, and still provides temporary shelter for homeless men. The walls consist of cut- and split-face finished blocks of grey Gloucester limestone, displaying lamination and abundant fragments of brachiopods.

## 363-383 Daly Ave. [26 M4]

26

**PHILOMENE TERRACE** 1874-1875.

This is the earliest stone row or terrace housing in Ottawa. It was built by stonemason and Member of Parliament Honoré Robillard, whose family owned a stone quarry along Montreal Road. It is named after Robillard's wife. Walls of the eight-unit row house are grey Gloucester limestone.

## 27

**315 Chapel St.** [27 M4]

**ALL SAINTS ANGLICAN CHURCH** 1899-1900.

The church was built in the Gothic Revival style, and has a large crenellated tower. The rough-faced church walls and the tower use limited ashlar, and are constructed from grey Gloucester limestone containing abundant lime–mud fragments (micrite intraclasts). One document (filed with the City of Ottawa) refers to the building stone as Queenston limestone.

## 550 Cumberland St. [28 M4]

28

**TABARET HALL** (University of Ottawa) 1904.

One of many old buildings in the Sandy Hill West conservation area, built with grey fossil-rich limestone. The administrative centre for the University of Ottawa, Canada's first bilingual university, Tabaret Hall has tonalite to granodiorite front steps that are flanked by Gloucester limestone banisters. The base of the building is constructed of similar grey limestone overlain by tan fossil-rich limestone, possibly from Chambord, Québec. The portico columns are also made from tan limestone.

**29**

**500 Wilbrod St.** [29 M4]

**FLECK / PATERSON HOUSE** 1900-1902, additions in 1946, 1948 and 1953.

Built in the Queen Anne style as a residence for Andrew Fleck (Secretary-Treasurer, Canada Atlantic Railway) and then Senator Norman Paterson (owner of Great Lakes Shipping Co.). Currently, the Embassy of the People's Democratic Republic of Algeria. Limestone was used for the foundation of the house, most of the walls and the tower is variegated, bedded Nepean sandstone (quarried just west of Ottawa), and trimmed with red sandstone sills and lintels. Red tiled roof with some copper cladding and trim.

## PARLIAMENT BUILDINGS [30 M1]

30

Centre Block, Parliamentary Library and Victoria Tower 1859-1878; East and West Blocks 1859-1865; 1916 fire destroyed Centre Block and Victoria Tower; 1916-1922 reconstructed Centre Block; 1916-1927 reconstructed Peace Tower. After Queen Victoria chose Ottawa as the Capital in 1857, the Parliament Hill buildings first became the centre of government for the United Provinces of Canada and then, in 1867, the Dominion of Canada. The Parliament buildings were built in the High Victorian Gothic Revival architectural style.

**Exterior-** Nepean sandstone (some March Formation sandstone) comprises most of the Parliament buildings' walls. Most stones in the walls have a split-faced finish except for the quoins and corners which have a smooth or bush-hammered finish. Dressed Ohio sandstone

was used for exterior trim and decoration around windows and doors in the Parliament buildings. East and West Block door and window arches and rosettes are red Potsdam sandstone. The buildings have copper roofs and trim. Wallace sandstone was used for trim, ventilation shafts, chimneys and penthouses in the reconstructed Centre Block. Portage du Fort white marble forms the corner stone. Gloucester limestone (Robillard quarries) was used in the flying buttresses of the library, and some interior walls.

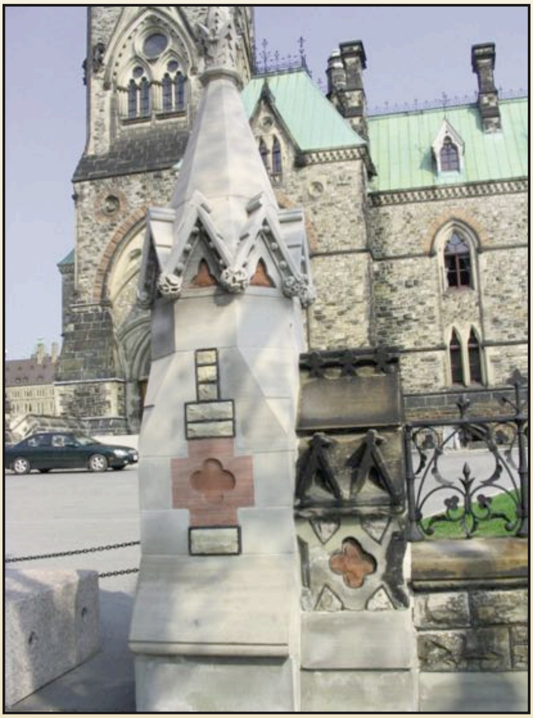
**Interior-** Tyndall limestone, with its characteristic burrows *(below)*, was used to build many interior walls; plus at least 24 other types of stone were used, including: Bath Stone, Peerless Indiana limestone, Stanstead granite, Tinos #2 serpentine, Battlefield Stone, Red granite, Windsor Green syenite, Missisquoi marble, Hoidge marble and Tennessee marble.

**Parliament Hill**

30

Outer fence has posts consisting of Nepean Formation sandstone, a beige rippled quartzose sandstone, containing oxidized/rusted sulphides. Dressed parts of the posts are Ohio sandstone; red Potsdam sandstone was also used.

The Centennial (or Eternal) Flame, lit by Prime Minister Lester B. Pearson on December 31st, 1966, is made of Caledonia Red granite, and the central walkway leading to the Peace Tower and Centre Block is built using granitic gneiss containing eye-shape (augen) feldspar. The stairs leading to the Peace Tower and Centre Block are Hampstead granite (tonalite) containing dark hornblende. Steps about the East Block are tooled and bush-hammered grey, fossil-fragment rich limestone.



**Monuments**

Baldwin (1804-1858) and Lafontaine (1807-1864) erected 1913; two statesmen who were the main proponents of the Principle of Responsible Government. Their statue has a pink Tennessee marble base containing prominent jagged lines (stylolites). The marble (limestone) appears to be composed of pink fossil fragments within a grey lime mud (micrite) matrix, and has cryptic crossbedding.

Borden (1854-1937) 8th Prime Minister of Canada (1911-1917 and 1917-1920). Statue has a base of fine to medium crystalline pink granite.

Diefenbaker (1895-1979). 13th Prime Minister of Canada (1957-1963). His statue (*left*) is bronze on a pink hornblende granite base.

Elizabeth II statue (*right*) shows the Queen mounted on her horse on a tonalite–granodiorite pedestal.

D'Arcy McGee (1825-1868) statue has a Stanstead granite base.

30

Laurier (1841-1919). 7th Prime Minister of Canada (1896-1911). Statue (*below*) has a Stanstead granite base.

The Confederation and Justice buildings, respectively to the west of Parliament Hill on Wellington Street, are both Château-style buildings constructed from Nepean sandstone and have Wallace sandstone and Ohio sandstone trim, and copper-clad roofs.

Much of this information comes from a publication by D.E. Lawrence (2001), which offers a thorough review of the construction of the Parliament buildings and the building stones that were used in its construction.

**31**

**50 Wellington St.** [31 M1]

**LANGEVIN BLOCK** 1883-1889.

Sir Hector-Louis Langevin was the minister of public works between 1879 and 1891. The Langevin Block, designed by the Chief Dominion Architect, Thomas Fuller, is a four-storey Second Empire style building, and represents the first expansion of the Federal Government beyond Parliament Hill. It currently serves as the Prime Minister's Office and the Privy Council Office. The exterior walls are crossbedded, coarse olive sandstone (Miramichi sandstone) from the Curryville area quarries in Albert County, New Brunswick. The stone at the base of the building is bossaged, while the remaining wall stones are cut smooth or, near entrances, have a tooled finish. The roof is copper. The window columns on the second and third floors are red granite.

## 100 Wellington St. [32 M1]

32

**FORMER UNITED STATES EMBASSY** 1931-1932.

A Beaux-Arts design building faced with bedded Indiana limestone and displaying possible dewatering structures (disrupted laminae within beds).

## 33

**140 Wellington St.** [33 M1]

**SENATE OF CANADA, VICTORIA BUILDING** 1927-1928.

The two-storey base has an Indiana limestone cladding; the third storey and the top of the building have an alternating striping of limestone and red brick. The central shaft of the building is clad with red brick.

**Interior**- The floors are travertine limestone; the walls are faced with Caen stone (limestone from France) and Cassergne rose marble.

## 150 Wellington St. [34 M1]

34

**NATIONAL PRESS BUILDING / NORLITE BUILDING** 1917-1918. The building is constructed in the typical 'skyscraper' style, with tripartite base, shaft and capital sections. The ground and mezzanine floors have an Indiana limestone façade. The base of the building is a grey, wavy-bedded limestone rich in rounded, grey lime-mud fragments (intraclasts). The upper seven stories of the building are clad with buff semi-glazed terra cotta and brick imitating the Indiana limestone lower walls.

**35**

**180 Wellington St.** [35 M1]

***(195 Sparks St.)***

**WELLINGTON BUILDING** 1925-1927.

White granodiorite base; remainder of building walls are Indiana limestone rich in fossils and millimetre-size spherical grains (ooids). Along Wellington Street, a prominent Corinthian colonnade rises from the ground floor to the entablature.

**Interior**- Beige travertine to pisolite limestone lobby walls, except at the ends of the lobby where the walls are white to green serpentinite (Verde Antique).

**234 Wellington St.** [36 M1]

36

***(245 Sparks St.)***

**BANK OF CANADA** 1937.

On the Wellington St. side (*left*), the original building with its grey tonalite to granite walls has serpentinite stone panels between the windows on which are raised bronze figures. It has a copper roof, and some copper wall cladding. Other exterior walls are green (because of abundant chlorite) sandstone to granule conglomerate, with cross-bedding and thin bedding (*right*).

**Interior-** The inner reception area has similar wall panelling and floor tiling of Kirkstone slate from the Cumbria area of England.

Surrounded by the Bank of Canada building, within a glass-windowed shell, is the Currency Museum, which has a hornblende tonalite to granite façade. In the Museum foyer is a three-ton Yapstone, composed of crystalline limestone, which was quarried on one of the Caroline Islands in the southern Pacific Ocean.

**37**

**284 Wellington St.** [37 M1]

**DEPARTMENT OF JUSTICE BUILDING; EAST MEMORIAL BUILDING** 1935-1938.

Almost identical to the West Memorial Building (344 Wellington Street). Lower wall and protective outer wall are unpolished and polished Stanstead granite (mostly quartz monzonite; *right*); door jambs and lintel (*left*) are polished brown medium crystalline charnockite. Upper walls of the building are made of beige fossil-rich limestone. **Interior-** Walls of polished, light brown breccia (angular fragments) limestone with white calcite venation; green Verde Antique (serpentinite) borders the base of the wall. The floor is reddish brown stylolite-bearing sandstone.

## THE CANADIAN PHALANX [38 M1]

38

**(Located under the Memorial Arch that links the East and West Memorial buildings)** 1920, 1972.

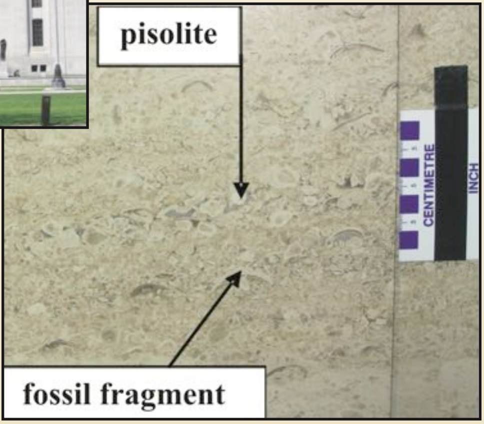
Grey granite 1914-1918 War memorial (*left*). Coarse bush-hammered pedestal (*right*).


**40**

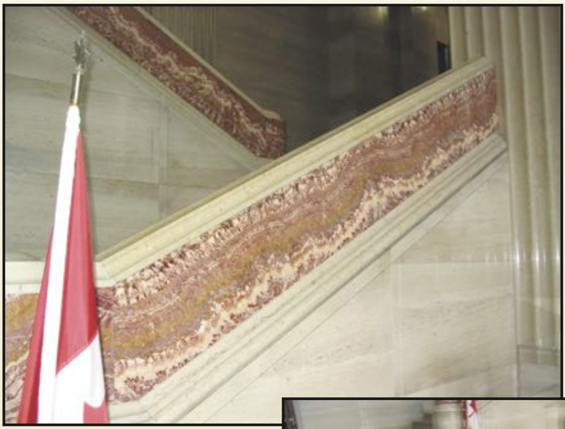
**301 Wellington St.** [40 M1]

**SUPREME COURT OF CANADA** 1939-1941.

Cut grey Stanstead granite cladding and double stairway (*left*). Copper roof. The low wall surrounding the sides and back of the parking area is khaki Wallace sandstone. Exterior and interior architecture reflects the Beaux-Arts and Art Deco style. Bronze allegorical statues (Justice and Truth) are three metres high, and were erected in 1970. **Interior-** Vestibule walls are polished highly deformed serpentinite-bearing metamorphic gneiss containing zones of melted material. The grand entrance hall is dominated by varieties of polished limestone (*right*). The walls are tan limestone (Rubané marble) rich in fossils and lime-mud (micrite), displaying occasional jagged lines (stylolites) and normal graded-bedding and crossbedding. Carbonate particles include rounded calcite-rich grains (pisolites) and brachiopod, pelecypod, coral, bryozoa and gastropod fossil fragments. The fluted wall corners and freestanding columns are mottled orange-tan limestone, with stylolites and sparse gastropod shells. The grand entrance hall floor, referred to as



Verdello and Montanello marble, are polished rudstone (limestone conglomerate, similar to the walls) and coarser tan rudstone dominated by shelly fossil fragments and centimetre scale concentrically laminated grains (oncolites). In the centre of the grand hall floor (*right*), is a square containing inlaid dark green serpentinite, red marble, and tan and white fossil-rich limestone tiles. The main staircase is Verdello marble and the railings (*left*) are red to pink, banded travertine with alternating layers of white radiating calcite crystals and reddish iron carbonate (the mineral ankerite). The corridor floors on the ground, first and second level, are Missisquoi marble.



## 41

**344 Wellington St.** [41 M1]

**WEST MEMORIAL BUILDING** 1955-1958.

Brown, medium crystalline charnockite door jambs and lintel; and coarse granite to granodiorite wall base, low protective wall and stairs (*left and right*). Bush-hammered beige fossil-rich limestone comprises most of the building walls. The seven-storey building has a copper-clad roof.

**Interior-** Similar lobby stones as in the Department of Justice building; outer lobby walls display layers of brown travertine and brachiopod-rich limestone, and layers with columnar stromatolite structures (up to 20 cm high) with laminated limestone between the stromatolite columns.


## 395 Wellington St. [42 M1]

**42**

**NATIONAL LIBRARY OF CANADA AND NATIONAL ARCHIVES OF CANADA** 1953-1967.

The steps and walls of the building are grey Stanstead granite (granodiorite) (*left and right*).

**Interior-** The floors are polished white marble; the walls and columns are polished white brecciated (anglular pieces) marble.

## 43

**42-50 Sparks St.** [43 M1]

**SCOTTISH ONTARIO CHAMBERS** 1883.

Originally owned by the Scottish Ontario and Manitoba Land Company, the building contains commercial and office space on its upper, ground and basement floors. Ground floor façade of grey limestone blocks contain abundant fossils, intraclasts and lamination. Upper floors have a façade of Italianate-style brick pilasters with limestone string courses between floors, and mixed stone and brick over the windows.

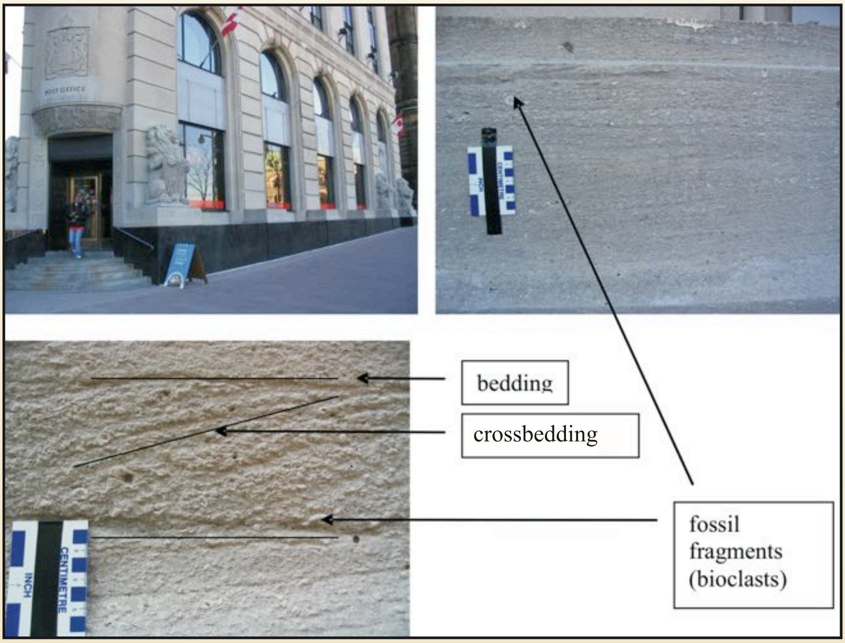
## 59 Sparks St. [44 M1]

**44**

**POST OFFICE** 1938-1939.

The base of the eight-storey, steel-frame building consists of black anorthosite (*left*). Façade above the anorthosite consists of sorted and crossbedded beige Queenstone limestone (*right*) containing abundant fossil fragments (bioclasts). Window panels are grey Stanstead granite. The building has a steeply pitched, Château-style copper roof pierced with dormers.

**Interior-** Beige travertine limestone floor. Walls are beige nodular limestone conglomerate, with black fossil-rich limestone along base of the walls, wall columns and counters.



## 45

**56-60 Sparks St.** [45 M1]

**OTTAWA ELECTRIC BUILDING** 1927.

Stanstead granite was used for the first floor façade. The façade for the upper floors is Indiana limestone.

**Interior** (56 Sparks St.)**-** Hallway floor of travertine limestone, floor borders and wall base is black fossil-rich limestone. The remainder of the walls consist of beige limestone bearing jagged stylolites and concentrically-laminated grains (pisolites). The walls beside the hallway elevators appear to be a vinyl veneer replicating a carbonate-cemented conglomerate containing abundant grey and white pebble-size framework grains.

**61-63 Sparks St.** [46 M1]

46

**HOPE BUILDING** 1910.

This building was constructed for bookseller and stationer James Hope. Nine-storey, steel frame and concrete slab building, with a storefront and façade of finely crystalline, mica-bearing Stanstead granite with bronze spandrels. Top story is clad in light grey glazed terra cotta (Doulton potteries, Leeds, England) and has a bronze cornice. Door alcove is walled with white marble.

## 47

**62 Sparks St.** [47 M1]

Base of front façade is black charnockite. It is overlain by blocks of massive, tan limestone. Copper cladding on the door arch.

**Interior-** Beige travertine limestone covers foyer floor and walls.

## 90 Sparks St. [48 M1]

48

**THOMAS D'ARCY MCGEE BUILDING** 1978-1981.

The dominant dimension stone façade, medium crystalline, mica- and amphibole-bearing granite, is particularly evident on the Metcalfe St. and Queen St. sides of the building.

## 93 Sparks St. [49 M1]

49

1870-1871, 1953.

Three and one-half storey building constructed in the Second Empire Style for the Merchant's Bank, and then occupied by Great Northwest Telegraph Co. Keystones for second storey window arches were carved by W.H. Burns (who did the stone carving for the Library of Parliament). Built from Nepean sandstone with Ohio sandstone dressing.

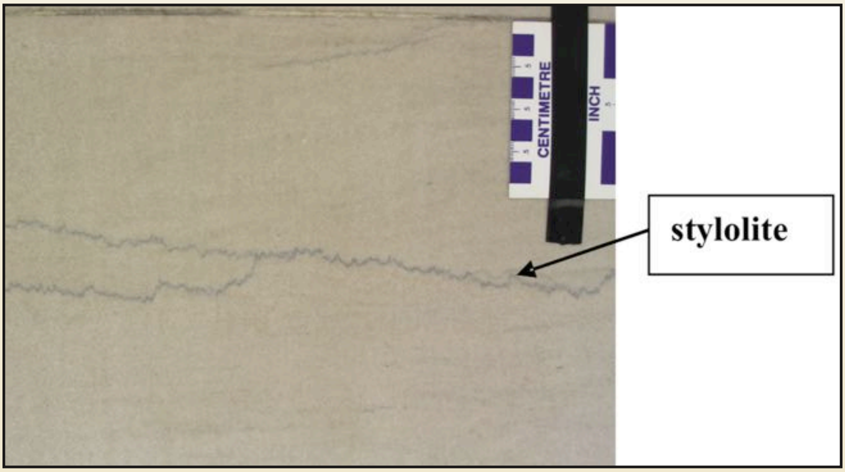
50

**101-107 Sparks St.** [50 M1]

**BIRKS BUILDING** 1910-1911.

Originally built for the Ottawa jeweller A. Rosenthal and Sons, later sold to Henry Birks and Sons and then sold to the Federal government in 1973. This seven-storey building has a ground floor that is sheathed in stylolite-bearing limestone walls (Philipsburg marble). The entrance vestibule is floored by red and green slate. Terra cotta once decorated the façade along with fluted Ionic terra cotta columns flanking the entrance.

**Interior-** Floor of calcite-veined, angular-fragmented (brecciated) serpentinite; with French Bresche Violet brecciated marble-sheathed concrete columns.

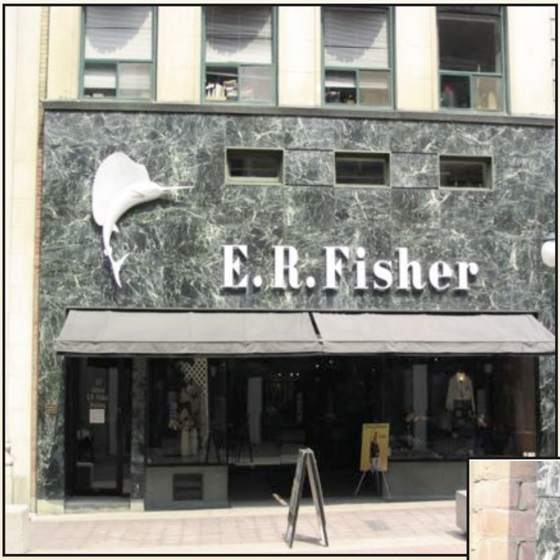


**117 Sparks St.** [51 M1]

51

**E.R. FISHER BUILDING** 1868.

Brecciated serpentinite (Verde Antique) with calcite venation. The Hallmark Building, farther towards Bank St., has a similar street-level façade.




## 52

**118 Sparks St.** [52 M1]

**SCOTIABANK** (119 Queen St.).

Façade of wavy bedded Adair marble (dolostone).

## 53

**119 Sparks St.** [53 M1]

**IMPERIAL BANK OF COMMERCE** 1922.

Stanstead granite base overlain by Indiana limestone-colonnaded Corinthian portico and façade (similar to adjacent 125 Sparks St.).

**Interior-** Tennessee marble floors and tellers' cages and desks of Belgian marble and bronze trim.

**125 Sparks St.** [54 M1]

54

**LIBRARY OF PARLIAMENT- Information and Documentation Branch** (former Bank of Nova Scotia) 1832, 1924-1925.

Designed by the Canadian architect John Lyle, the building has an overall Beaux-Arts design with a Grecian Doric style. Dominantly a façade of beige Indiana limestone, including fluted Doric columns, with smooth grey Stanstead granite street-level stone blocks. The frieze on either side of the bank name depicts Canadian historical objects (wheel, anvil, ship, scales, cloth bolt, wheat sheath, cabin and axe).

**Interior-** Indiana limestone walls containing jagged lines (stylolites) and a slate floor; limestone door surrounds and staircase railing that leads to the basement.

## 55

**161 Sparks St.** [55 M1]

***(144 Wellington St.)***

**BANK OF MONTREAL** 1930-1932.

Built in the Art Deco and Beaux-Arts style, the symmetrical façade has Stanstead granite (tonalite) at the base of the building and forming the door surround (*right*). A sculpture of the bank's coat-of-arms is above the door. The façade of large pilasters and entablature is bedded and stylolite-bearing, fossil-rich Queenston limestone (*left*).

**Interior-** Polished wall panels of tan limestone conglomerate (rudstone) containing bryozoa and corals, fragmented in places, and stylolite-bearing muddy limestone. Other wall panels and service counters consist of quartz-rich and fragmented fine-grained sandstone and siltstone containing quartz-filled gashes. Entrance surrounds are polished dark grey pebble conglomerate and black St. Geneviève marble. Floor tiles include beige travertine limestone and serpentinite, and smaller inlays of travertine and brown nodular limestone, serpentinite, and hematite-rich brecciated volcanic rock.

**189 Sparks St.** [56 M1]

56

Polished, coarsely crystalline black Lac Saint-Jean anorthosite façade.

**198 to 210 Sparks St.** [57 M1]

57

Polished, white marble façade (*below*).

**58**

**203 Sparks St.** [58 M1]

**HALLMARK BUILDING.**

Ground-floor façade of angular, fragmented serpentinite (brecciated) with calcite venation.

**212 Sparks St.** [59 M1]

59

**TD BANK.**

Exterior walls have a charnockite base overlain by beige Queenston limestone.

**60**

**215 Sparks St.** [60 M1]

**HMV STORE.**

Lower floor walled by grey Stanstead granite (tonalitic); upper floors walled by grey limestone. Store entrance is clad in copper.

**275-283 Sparks St.** [61 M1]

61

**DEPARTMENT OF JUSTICE BUILDING (Rear view)**.

Polished brown anorthosite, containing dark magnetite and ilmenite crystals between the lighter plagioclase feldspar crystals (*left and right*). Other parts of the building wall are green laminated tuff (Kirkstone slate) containing volcanic fragments (ash to lapilli size).

62

**400 Sparks St.** [62 M1]

**ST. PETER'S LUTHERAN CHURCH** 1952.

This English Gothic Revival style church is made from white to beige quartz-rich Nepean sandstone, displaying occasional granule-rich beds and cross bedding. The church foundation and front stairs are bush hammered limestone. The arched door jambs and window sills and lintels are honed fossil-rich limestone.

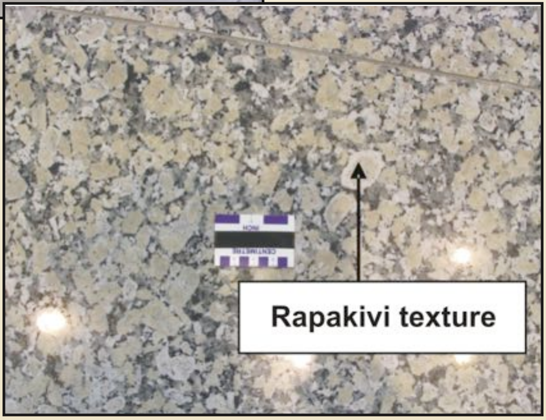
**100 Queen St.** [63 M1]

**63**

**WORLD EXCHANGE PLAZA.**

Polished, coarsely crystalline granite façade (*left*).

**Interior**- polished, very coarse crystalline granite floor with some coarse crystals (phenocrysts) displaying a concentric zonation of feldspar crystals (Rapakivi texture, *right*). The floor bordering the Rapakivi-texture granite consists of ilmenite- and magnetite-bearing larvikite. Interior walls are beige limestone containing fossil fragments.



**64**

**155 Queen St.** [64 M1]

**HERITAGE PLACE** 1983.

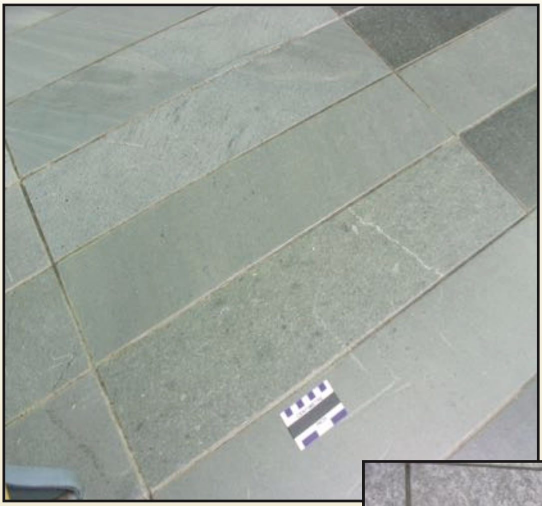
The sidewalk, interior and exterior walls are polished and unpolished red, very coarse-grained quartz-bearing syenite. The syenite is also hornblende-bearing and, similar to the location on 100 Queen Street, some feldspar phenocrysts display Rapakivi texture (*right*). This same building stone was used to build the façade either side of the Poulin Dry Goods Store (1871-1872) / Zellers at 156-158 Sparks Street.

**235 Queen St.** [65 M1]

65

**C.D. HOWE BUILDING** 1974-1977.

C.D. Howe building ground-level floor is Kirkstone slate, a metamorphosed green volcanic tuff (*left*) containing ash- to lapilli-size volcanic fragments. At the western extent of the building, the Holt Renfrew store has exterior walls made of white, muscovite-rich gneiss (*right*).



## 66

**439 Queen St.** [66 M1]

**CHRIST CHURCH CATHEDRAL** 1832-1833, rebuilt 1872-1873.

The original, smaller Christ Church Cathedral is built on land donated by the wealthy landowner Nicholas Sparks, and continues to be the seat of the Anglican Bishop of Ottawa. Built in English Gothic Revival style architecture from Nepean sandstone.

Stonework inside the cathedral includes a double row of white marble clustered and linked columns.

**30 Metcalfe St.** [67 M1]

67

**HSBC BUILDING.**

Columns of white, muscovite- and biotite-bearing Stanstead granite (quartz monzodiorite). Dark façade base is Lac Saint-Jean charnockite.

## 68

**55 Metcalfe St.** [68 M1]

**BUSINESS DEVELOPMENT BANK OF CANADA**.

Lower exterior façade of labradorite-rich (iridescent feldspar) charnockite (*left* with dollar coin for scale). Outside the BDBC building, is an Indian hunter with bow and arrow on a feldspar-rich pink, foliated gneiss pedestal (*right*).

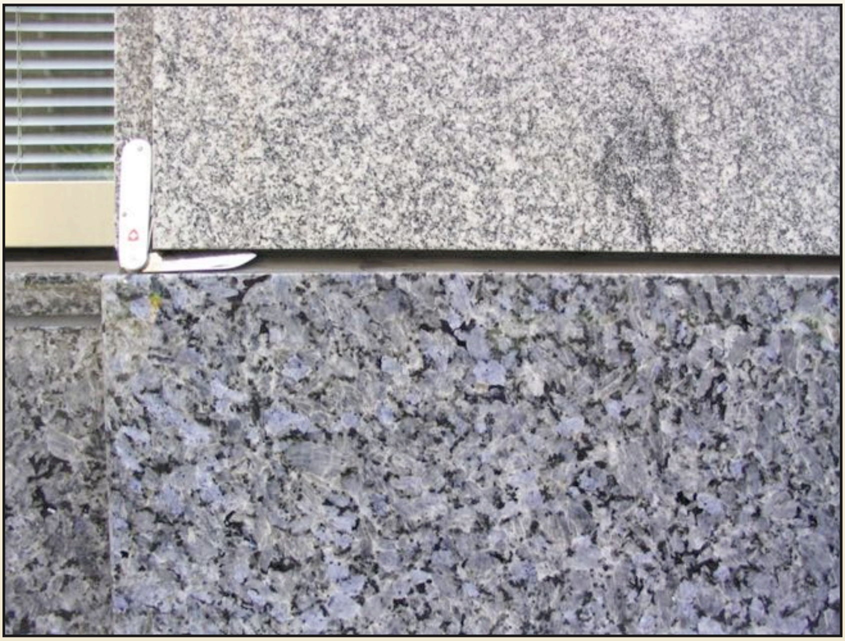
**77 Metcalfe St.** [69 M1]

**69**

**COMMONWEALTH BUILDING**.

Polished, perthite-rich charnockite along base of walls and square columns, and forming a 'stoneline' higher up the walls and columns. Remainder of the walls and columns are polished, grey hornblende-bearing granite (*also shown below, above knife blade*).

The interior lobby walls are identical to the outside walls. The lobby floor and outside walkway are unpolished hornblende-bearing granite.



70

**100 Metcalfe St.** [70 M1]

**THE URBANDALE BUILDING.**

Polished panels (except at base of building) of granite containing large feldspar-megacrysts (large pink crystals) and smaller dark hornblende crystals.

**288 Metcalfe St.** [71 M2]

**71**

**FIRST CHURCH OF CHRIST SCIENTIST** 1913.

The Beaux-Arts architectural style church has grey Stanstead granite (tonalite) steps that lead to the front portico which has a grey shale floor. The portico Corinthian columns and the tan church walls are Ohio sandstone. Ripple marks and cross bedding can been seen on some of the cut ashlar blocks. The base of the church walls consists of large rough blocks of grey limestone containing stylolites and variable amounts of rounded lime-mud grains (intraclasts) and coral- and brachiopod-rich material. Copper cladding edges the roof.

## 72

**75 Albert St.** [72 M1]

**FULLER BUILDING.**

Façade of polished white marble comprised of angular fragments (breccia). Walkway of coarse granite.

**Interior-** The lobby floor and stairs are white limestone containing rounded, concentrically-laminated grains (pisolites) and irregular jagged lines (stylolites). The lobby walls and square columns are brown laminated travertine. Elevator walls are white and red brecciated limestone.

**85 Albert St.** [73 M1]

**73**

Exterior and lobby walls are polished pinkish-grey faintly foliated granite, containing large potassium feldspar crystals (megacrysts) and black hornblende streaks.

**74**

**88 Albert St.** [74 M1]

**CAPITAL HILL HOTEL AND SUITES**.

Polished and rough white marble blocks and tiles, exhibiting black carbon-rich streaks.

**111 Albert St.** [75 M1]

**75**

**WORLD EXCHANGE PLAZA.**

Coarse-crystalline, red granite wall panels (Royal Canadian Red from Whitemouth, Manitoba; *right*). The plaza contains very coarse-grained gabbro and granitoid gneiss on the stairs and floor; slabs of coral-bearing muddy limestone lie above the plaza floor (*left*) and in the gardens.

## 76

**250 Albert St.** [76 M1]

White coarse granite walls.

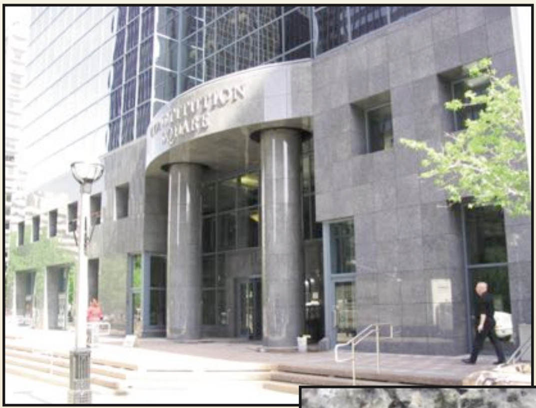
**Interior**- Similar white granite floor and wall stones; plus white marble and grey, coarse hornblende-bearing granodiorite on walls.

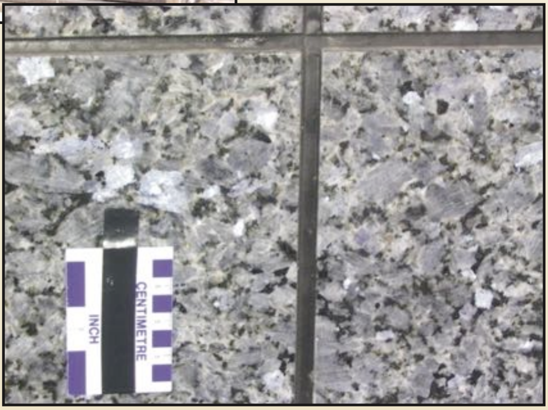
## 77

**350 Albert St.** [77 M1]

**CONSTITUTION SQUARE** 1987.

Polished anorthosite (Blue Pearl Granite) containing coarse plagio-clase crystals showing iridescence, and fewer dark pyroxene crystals. Megacrystic granite sidewalk stones.



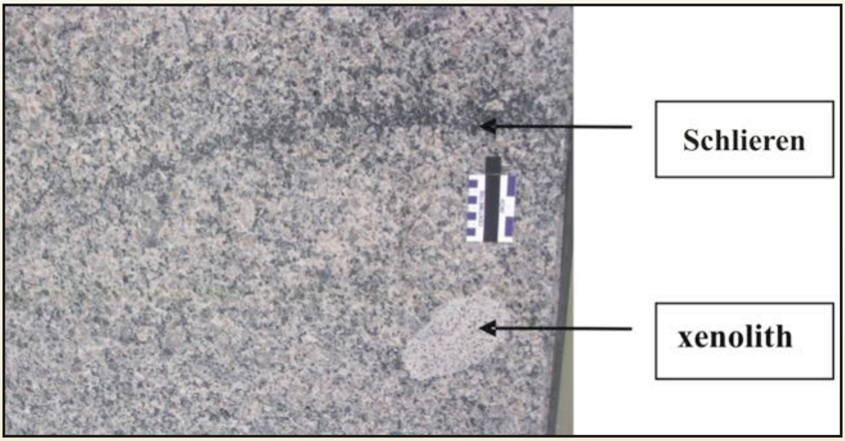



**275 Slater St.** [78 M1]

78

Very coarse-grained granite with a faint foliation. Some panels contain decimetre-scale feldspar-rich inclusions (xenoliths) and schlieren that are rich in magnesium- and iron-bearing (mafic) minerals.

**Interior**- Polished, tan limestone (marble) containing calcite venation, fossils (gastropods?) and a sporadic 'milled' texture.



**79**

**29 Lisgar St.** [79 M2]

**LISGAR COLLEGIATE** (former Ottawa Collegiate Institute) 1874-1908.

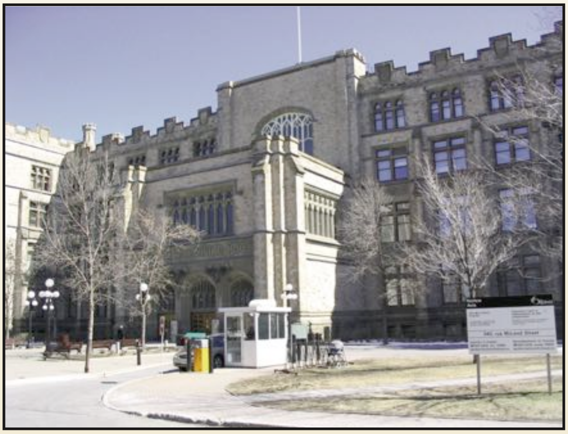
Named after the second governor general of Canada, Sir John Young (Lord Lisgar), the school is built in the Gothic Revival architectural style. Bossaged blocks and honed quoins, door and window frames of grey Gloucester limestone from Robert Skead's quarry in Nepean. Particularly at the back of the school, facing the Drill Hall, some rough and cut blocks are made of Ohio sandstone (Berea stone).

## 240 McLeod St. [80 M2]

**80**

**VICTORIA MUSEUM/MUSEUM OF NATURE** 1905-1911.

Once home to the Geological Survey of Canada, Parliament and National Gallery of Canada, this castle-like building exhibits a Gothic Revival exterior over Beaux-Arts style of architecture. Its exterior is constructed from beige Nepean sandstone and grey-green Wallace sandstone. Some of the quartz-rich sandstone is reported to have been quarried near Havelock, Québec. This sandstone is similar to



the Nepean sandstone that was quarried in Nepean Township to the west of Ottawa. Contractor, George Goodwin, assembled 300 master stonemasons and stonecutters from Scotland to carry out the construction. It is built upon unstable Leda clay (which is still settling and, generally, quite susceptible to earthquake vibration).

## 81

**335 Laurier Ave. E.** [81 M4]

**LAURIER HOUSE** 1878.

Two Prime Ministers lived in Laurier House; Sir Wilfred Laurier (and wife, Zoë) from 1897 to 1919; and Mackenzie King from 1923 to 1950 (year of his death). The house was built for the jeweller John Leslie in the Second Empire architectural style. One and one-half metre wall base of grey limestone contains fossil and lime-mud grains and minor thin beds. Slate roof.

## 395 Laurier Ave. E. [82 M4]

**82**

**STADACONA HALL** 1871.

Built in the Gothic Revival style, this is where Prime Minister Sir John A. Macdonald and Lady Macdonald lived from 1882 to 1888. Currently the High Commission of Brunei Darussalam; its stone walls are made from fossil-rich limestone.

**83**

**110 Laurier Ave. W.** [83 M2]

**OTTAWA CITY HALL** 1986-1990.

Tyndall stone (limestone) comprises most of the building façade (*left*). The cut and rough building stones of Upper Ordovician Tyndall stone (limestone) consist of mottled beige to grey burrowed (dolomitized) and fossil-rich muddy limestone. Fossils (*right*) include gastropods (*Maclurites*), orthocone cephalopods (shown in photo) and sponge-like *Receptaculites*. Lost Child sculpture (1989), on the west side of City Hall, consists of well-bedded arkosic sandstone.


**Interior-** The interior of City Hall contains wall stones of burrowed Tyndall stone (limestone), polished panels of green serpentinite breccia (Verde Antique) with calcite veining (*page 109, right*), and polished, orange-brown to red sedimentary conglomerate (breccia) in a finer gravel to sand matrix. At

the base of the walls are wavy-bedded, dolostone blocks containing jagged stylolites. Near the Lisgar St. entrance of the main hall, are polished wall panels of light brown limestone (*left*), with clear calcite crystals filling cavities. Polished, dark red to rose syenite slabs with very coarse feldspar crystals (megacrysts) have been used as floor tiles and as pedestals around information boards. Concentric zoning of some of the feldspar megacrysts (Rapakivi-textured) is evident in some polished slabs.

## 84

**140 Laurier Ave. W.** [84 M2]

**FIRST BAPTIST CHURCH** 1877.

Designed by James Mather, the church was built in the Gothic Revival architectural style. The walls are built from rough blocks of intraclast- and fossil-rich grey limestone. The blocks are variably laminated, crossbedded and fossil-rich, containing fossil fragments including solitary rugose coral, gastropods and brachiopods. Prime Minister Alexander Mackenzie laid the cornerstone to the church.

**141 Laurier Ave. W.** [85 M1]

**85**

**THE GILLIN BUILDING.**

Diorite steps and floor stones. The façade and lobby displays polished, black fossil-rich limestone that have white calcite veins.

**161 Laurier Ave. W.** [86 M1]

**86**

**MARRIOTT RESIDENCE INN.**

Polished anorthosite along base of the walls, and beige travertine limestone walls and door framing.

## 87

**170 Laurier Ave. W.** [87 M2]

Uniform red, medium-grained syenite façade.

**219 Laurier Ave. W.** [88 M1]

88

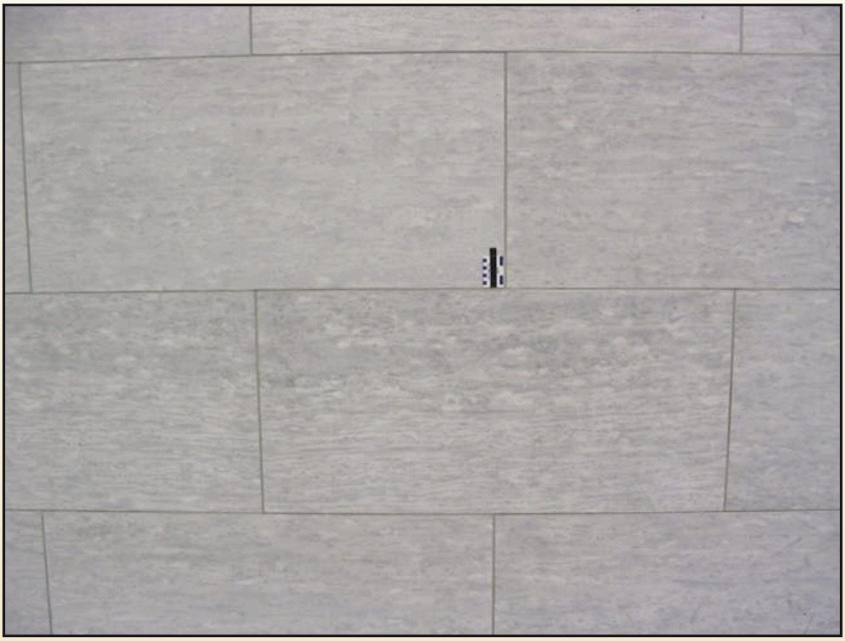
Dark green, chlorite-rich phyllite pillar facing. The radiating cleavage fracture pattern and sheen of this metamorphic rock is evident. Lobby is floored by polished beige 'marble'.

**89**

**300 Laurier Ave. W.** [89 M2]

**L'ESPLANADE LAURIER.**

Polished, white Carrara marble walls and square columns; also used on foyer walls. Near Bank St., walls are made of grey-beige mottled Adair marble (dolostone), that have wavy, disrupted bedding and irregular jagged lines (stylolites).



**333 Laurier Ave. W.** [90 M1]

**90**

**STANDARD LIFE CENTRE.**

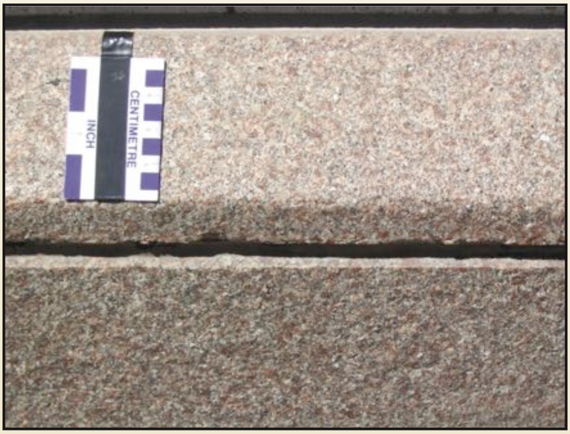
Façade of pink feldspar-rich foliated to massive granite.


**91**

**427-433 Laurier Ave. W.** [91 M1]

**MINTO PLACE**.

Façade and clock tower of uniform medium-grained granite.



**96-108 Bank St.** [92 M1]

92

Polished, pale grey, coral-rich limestone wall tiling (*right*), displaying spectacular sections of fossilized corals, bryozoa, pelecypods and stromatoporoids. Some slabs contain white calcite veins, especially those at the south side of the building. At the corner of the street is a polished granite column (*left*).


## 93

**99 Bank St.** [93 M1]

***(to 50 O'Connor St.)***

**CLARICA COMPLEX.**

Flame treated, medium- to coarse-grained white to buff granodiorite comprises most of the building façade (*left and right*).


**Interior**- Polished floor stone comprised of coarse granodiorite and black gabbro. Walls of pinkish-brown, coarse fossil-rich dolostone with polished stone strings of orange marble containing calcite veins.

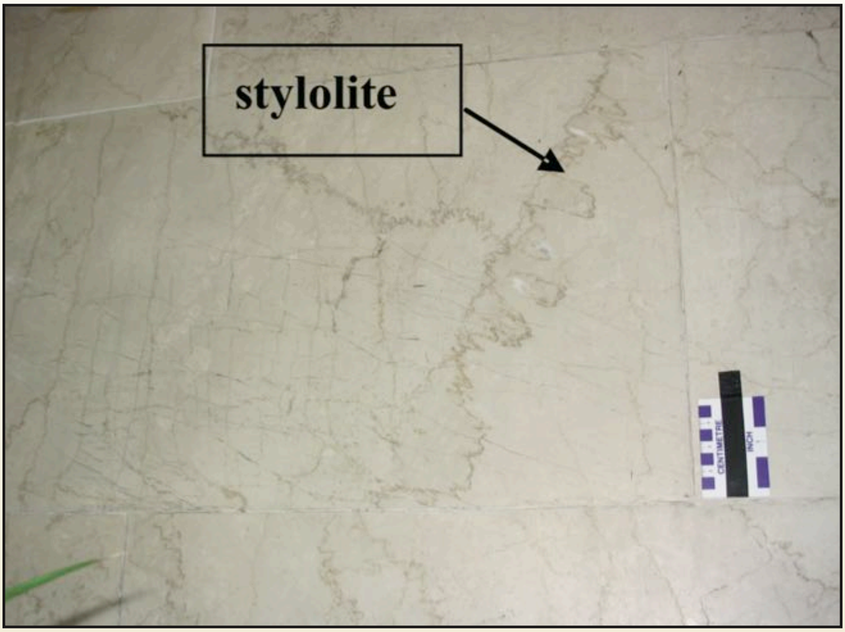
**109 Bank St.** [94 M1]

**94**

**OTTAWA HYDRO ELECTRIC COMPANY BUILDING** 1934-1935. This office building at the corner of Bank and Albert streets was the Consumer Electric Company's (later to become Ottawa Hydro Electric Company) main office until 1957. Street-level base of grey Stanstead granite (tonalite), overlain by grey fossil- and intraclast-rich limestone showing distinct stylolites (*centre*).

**Interior**- The Art Deco style foyer (*bottom left and right*) has polished

white travertine limestone floors with black marble (limestone) borders and piers, and stylolite-bearing white marble wall panels, trim and staircase.



**186 Bank St.** [95 M1]

95

**BANK OF NOVA SCOTIA.**

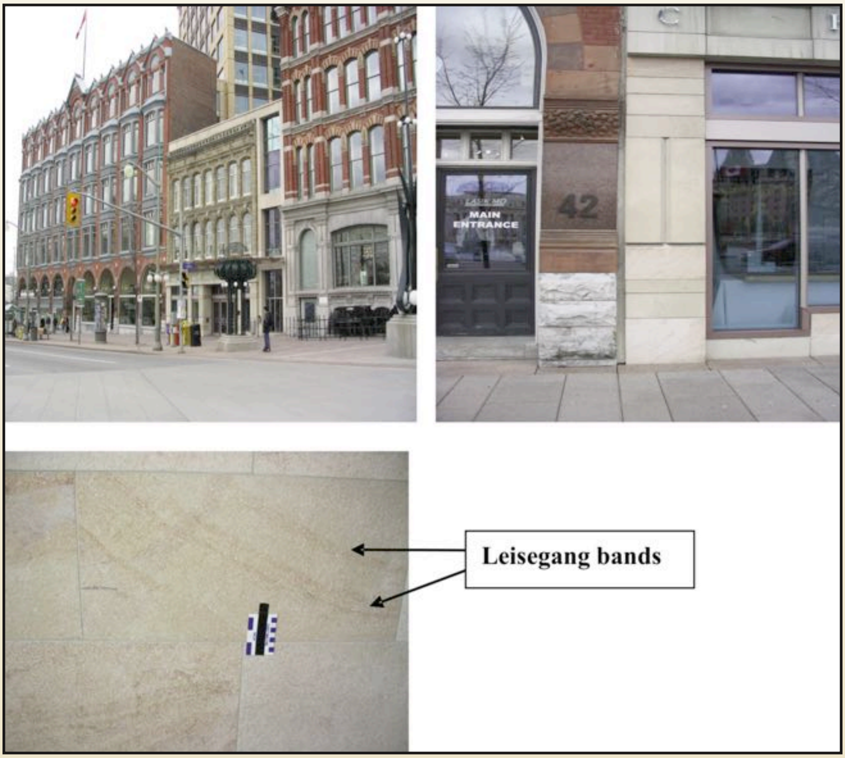
Upper tiers and columns have been cut from light buff-grey ooid-bearing Queenston limestone. The basal two tiers of large blocks are light grey Gloucester limestone that contains abundant fossils and rounded lime-mud grains (intraclasts). Some of these stone blocks are well laminated and others are limestone conglomerate. Branching burrows are weathered out on several basal blocks along the south side of the building that have been cut parallel to bedding. Prominent stylolites are accentuated by weathering as well, and also can be seen in the blocks cut parallel to bedding along the east side of the building.

## 96

**40 Elgin St.** [96 M1]

**BELL BLOCK** 1867.

Along with the Central Chambers (42-55 Elgin St.) and Scottish Ontario Chambers (42-50 Sparks St.), the Bell Block is encompassed within the Confederation Square National Historic Site. The Bell Block contains light brown sandstone blocks exhibiting red hematite-rich Liesegang banding (*below left and right and bottom*). Interior lobby walls are made of the same sandstone. Italianate style upper floors of brick, including carved keystones on the second storey.



## **42-54 Elgin St.** [97 M1]

**97**

**CENTRAL CHAMBERS** 1890-1893.

The six-storey Central Chambers exhibits Queen Anne Revival architecture, with ground-level grey limestone columns overlain by red brick and red granite pilasters and carved capitals (*above left and right, facing page*). Upper floor façade of red brick with carved terra cotta panels.

## **80 Elgin St.** [98 M1]

**98**

**BRITISH HIGH COMMISSION**.

Polished magnetite-bearing grey diorite along base of the building, wall pillars and window sills. The walls are faced with slabs of polished red syenite surrounded by grey diorite. Sidewalk wall planters and alcove columns are dark grey, coarse-grained magnetite-bearing charnockite.

**99**

**90 Elgin St.** [99 M1]

**LORNE BUILDING** (former National Gallery) 1957-1958.

Polished, red syenite columns and upper floor walls on sides of building (*left*). Large labradorite crystals appear extensively fractured compared to the pink potassium feldspar crystals (*right*). Polished and rough slabs of diorite cover the walls of the lower floors on the Elgin St. side of the building, whereas the upper floor walls consist of beige fossil-rich Queenston limestone.

**100 Elgin St.** [100 M1]

100

**LORD ELGIN HOTEL** 1941.

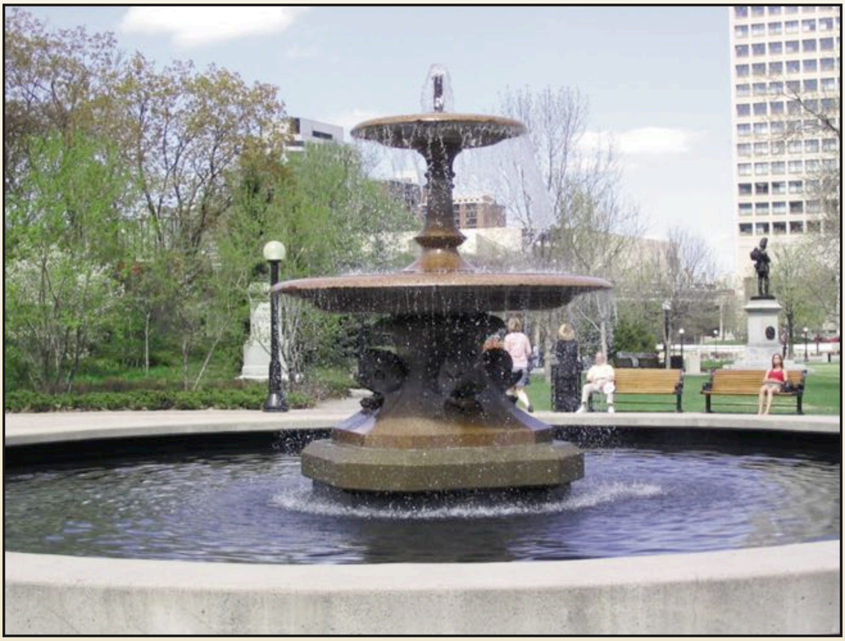
Bush-hammered greyish white blocks of Deschambault limestone containing fossil fragments (*left and right*). The new addition to the hotel (bordering Laurier St.) has corner blocks and window and door surrounds of light grey honed blocks of fine-grained dolostone. The front entrance is floored with polished, beige laminated travertine, pink marble and dark green serpentinite.

**101**

**In Confederation Park [**101 M1]

**COLONEL BY MEMORIAL FOUNTAIN.**

Red granite from Scotland. Colonel By was a Royal Engineer, who oversaw the building of the Rideau Canal (1826 to 1832), and founded Bytown which was renamed Ottawa in 1855. The fountain played in Trafalgar Square, London England, between 1843 and 1948. It was dedicated to the present site in 1955, and re-erected and rededicated on May 23, 1975.



## 150 Elgin St. [102 M2]

102

**GRANT HOUSE** 1875.

This Heritage building was built by Braddish Billings. The Second Empire to Italianate style house was owned by the prominent physician and Member of Parliament Sir James Grant. The ground-level and foundation of the house are mortared grey fossil- and intraclast-rich limestone (similar to adjacent First Baptist Church).

## 160 Elgin St. [103 M2]

103

**PLACE BELL CANADA.**

Door frames and borders of flower beds around the outside stairwells are faced with highly polished pink syenite with coarsely crystalline orbicular potassium feldspar (megacrysts) (*left*).

**Interior**- Lobby floor is polished red and white travertine exhibiting some onyx pore filling (*right*). Polished walls are also white travertine.

**104**

**161 Elgin St.** [104 M2]

**OTTAWA COURTHOUSE AND LAND REGISTRY OFFICE.**

White to beige, wavy-bedded Adair marble (dolostone) and blocks of uniform light grey concrete are alternated in horizontal tiers on the façade of this building. Most of the Adair dimension stones are cut and bush hammered; some are roughly polished, including stairs. Adair marble also has been used along part of the main entrance hall-way. Pinkish grey coarse-grained syenite curb stones border the flowerbeds around the building.

**195 Elgin St.** [105 M2]

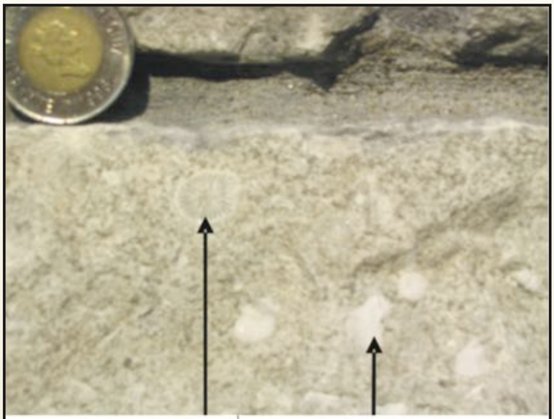
**105**

**OTTAWA–CARLETON CENTRE HERITAGE BUILDING** (former Ottawa Normal School) 1875, additions 1879, 1891-1892.

This building is now part of Ottawa City Hall. The building incorporates Gothic Revival (pointed) and semi-circular Italianate windows, Romanesque columns and Second Empire roof. The building walls (*left*), fence and posts are crudely-bedded, grey bioclastic and intraclastic Gloucester limestone containing abundant fragments of fossils and rounded lime-mud intraclasts and prominent stylolites (*right, page 130, top left*). Some blocks at corners and around windows are bush hammered. The roof is pale green slate.

Symbolic sculptures (roses, thistles, shamrocks, bearded faces and a lion, child and owl) decorate the drip stones high up on the façade *(page 130)*.

The Human Rights Memorial, on the corner of Elgin and Lisgar streets, is made from coarse-grained red syenite and concrete, and has a base of foliated coarse granite.



| Rugose coral | Micrite intraclasts |
|---|---|

## 45 O'Connor St. [106 M1]

**106**

**TD TOWER/WORLD EXCHANGE BUILDING.**

Façade of polished medium- to coarse-grained granite. Lobby walls and columns are polished greyish brown muddy limestone displaying highly disrupted lamination.

**Interior**- The lobby floor is pinkish-grey foliated, garnet-bearing marble, polished dark pinkish-black granite and a dark pinkish-brown igneous-textured stone of unknown origin.

## 124 O'Connor St. [107 M1]

**107**

**EMPIRE BUILDING.**

The base of the wall is polished, coarsely crystalline red syenite, overlain by fossil-rich beige Queenston limestone.

**108**

**82 Kent St.** [108 M1]

**ST. ANDREW'S PRESBYTERIAN CHURCH** 1828 land deeded, 1872-1874, 1894 adjoining Hall.

Built in Gothic Revival architectural style, St. Andrew's is the oldest Protestant church in Ottawa, on land deeded by Nicholas Sparks. The church is built from local grey, intraclast- and coral-bearing Gloucester limestone that contains abundant stylolites. Door lancet arches are tan-weathered laminated Wallace sandstone. The roof is copper-clad.

**112 Kent St.** [109 M1]

109

**PLACE DE VILLE.**

Unpolished granitic gneiss sidewalk and wall base.

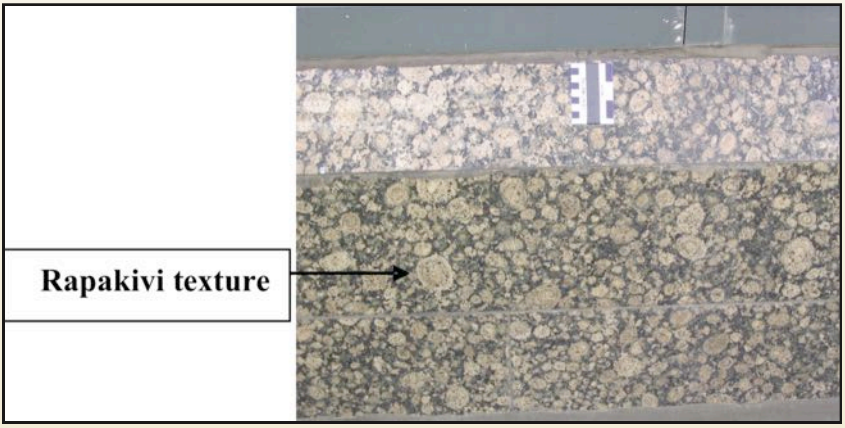
**Interior**- The lobby displays a polished white to pink and greenish black fragmented-marble wall, and a granitic gneiss floor. The large pink feldspar crystals (phenocrysts) show zoning. Wispy black lenses of finer grained rock are elongate parallel to the metamorphic layering (foliation).

**110**

**200 Kent St.** [110 M1]

**CENTENNIAL TOWERS.**

Façade and flooring shows classic Rapakivi texture (large ovoid crystals of alkali feldspar rimmed by plagioclase feldspar) granite. Some crystals (phenocrysts) are up to 10 cm in diameter. The black matrix is rich in the minerals amphibole and pyroxene. This unusual rock contains rare black inclusions. Flame-treated blocks of the same stone have been used in the walkways surrounding the building.



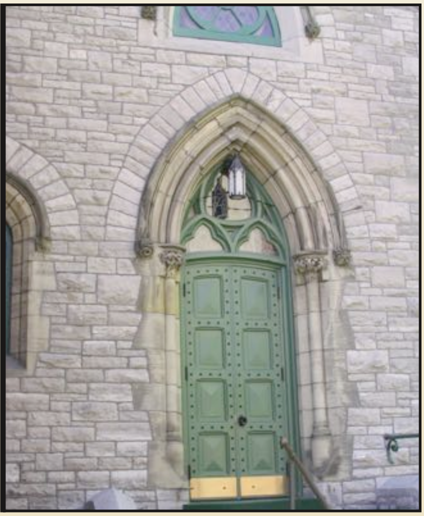
## 220 Kent St. [111 M1]

**111**

**SAINT PATRICK'S BASILICA** 1869-1898.

The Gothic Revival style St. Patrick's Basilica (*left*), designated as Heritage Property in 1978, comprises a mix of both bossaged and honed blocks of grey fine- to coarse-grained Gloucester limestone (comprised of both laminated muddy limestone and fossil-rich calcarenite). The blocks forming the buttressed walls of the basilica display variable amounts of white grains of lime mud (intraclasts), coral-rich grains, rare bioturbated (burrowed) lamination and prominent stylolites parallel to bedding. The Gothic arches and columns surrounding the portals and window arches (at the front only) are crossbedded, pale olive-brown Wallace sandstone containing thin brown intraclasts. The roof is copper clad.

**Interior-** Exotic stone within the church includes Carrara marble comprising the main altar hand railing with panels of pink Sienna marble; and the high alter made of Belgian marble and Mexican onyx.



## 112

**335 Cooper St.** [112 M2]

**DOMINION–CHALMERS UNITED CHURCH** 1912-1914.

The church walls are built of white to beige quartz-rich Nepean sandstone, with a base and front steps of bush hammered grey fossil-rich limestone from the Rockcliffe Formation. The sandstone displays parallel lamination and crossbedding, in places accentuated by red hematite staining; more than half the blocks display pervasive pink to brown iron oxide alteration. Honed massive light brown to olive sandstone frames the doorways and windows. Part of the roof is copper clad.

## 601 Booth St. [113 M5]

**113**

**GEOLOGICAL SURVEY OF CANADA.**

Black syenite facing stone, columns and planters near the front entrance are from Mount Megantic, Québec. Front steps, door sills and entrance facing are granodiorite from Mont Saint-Cecile, Eastern Township area of Québec (*left*). Jasper-bearing conglomerate inscription stone (*right*) near the front entrance, and a nearby boulder bearing a plaque commemorating Sir William Logan, founder of the Geological Survey of Canada, are from the Bruce Mines area, Ontario. Outcrop near street level is bedded grey limestone of the 'Cobourg Formation' (equivalent to the Hull Formation), Ottawa Group, which is Ordovician in age.

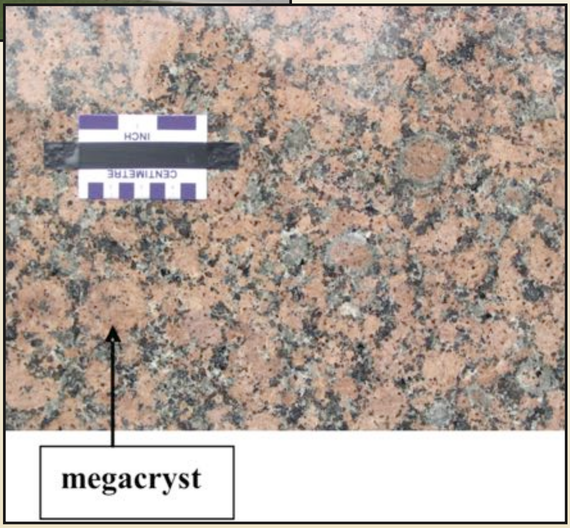
**Interior**- Logan Hall and foyer have Monte Verde serpentinite walls, from Italy; marble breccia was used for other walls and window sills. The foyer floor is pink Tennessee marble (limestone). Italian marble has been used as elevator fronts. Some window sills are buff fossil-rich (mostly bryozoa and coral) limestone, also from Italy. Black fossil-bearing limestone from Vermont has been used for baseboards. The Logan Hall displays inside the building include many rock, fossil and mineral specimens as well as historical information.

## 114

**865 & 875 Carling Ave.** [114 M5]

**DOW'S LAKE COURT**.

These two new buildings (*left*) have façades of polished and flamed-treated quartz syenite (to granite) comprised of large, pink potassium feldspar crystals (megacrysts), quartz and plagioclase feldspar (*right*). Circular, ovoid megacrysts are unusually large (up to 15 cm), and some display Rapakivi texture.

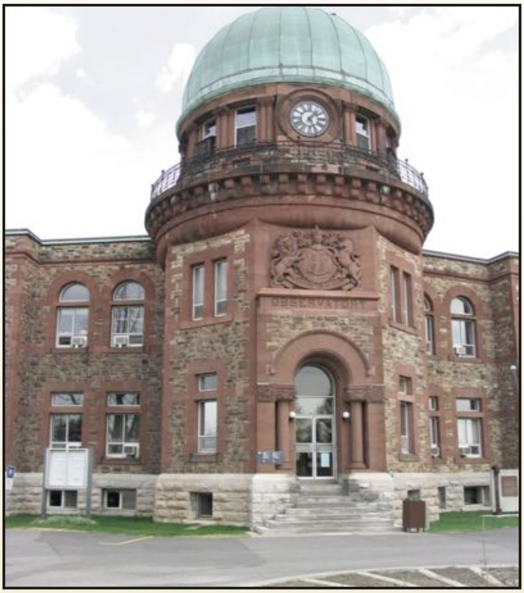


## 1 Observatory Crescent [115 M5]

**115**

***(south of intersection of Carling and Irving avenues)***

**DOMINION OBSERVATORY** 1902-1904.



The base of the walls is built from grey limestone containing grains of lime-mud (intraclasts) and broken fossils and is riddled with stylolites and fractures. The limestone base is overlain by brownish red to pinkish beige, thinly bedded to laminated Nepean sandstone. Different, crossbedded red sandstone was used for quoins and window jambs, sills and lintels. The roof and dome are copper clad. A bronze plaque on the north wall indicates the position of a Canadian Prime Meridian at 05º 02' 51.940" west of Greenwich.

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# GLOSSARY

**ALCOVE**: vaulted recess in room
**ANKERITE**: iron-rich, calcium-magnesium carbonate mineral
**ANORTHOSITE**: a plutonic igneous rock consisting primarily of calcium-rich plagioclase feldspar (commonly labradorite)
**ARCH**: curved structure above entrance or passage
**ARENITE**: sandstone
**ARKOSE**: feldspar-rich sandstone
**ASH**: finest-grained erupted volcanic material
**ASHLAR**: stone with a square or rectangular shape installed as a facing stone

**BEDDING**: parallel layers in sedimentary rock that mark successive episodes of deposition (e.g. see 59 Sparks St. photograph)
**BIOCLAST**: a fossil fragment (e.g. see 59 Sparks St. photograph)
**BIOTITE**: dark coloured, iron- and magnesium-rich mica
**BIOTURBATED**: churning and swirling texture in a sedimentary rock caused by organic disruption of bedding (before lithification)
**BOSSAGED**: a dimension stone with a carved or sculptured central part that is higher than its edges
**BRACHIOPOD**: a marine invertebrate (fossil) that has two dissimilar but bilaterally symmetrical valves
**BRECCIA**: rock consisting of angular fragments
**BRONZE**: metallic alloy of copper and tin
**BRYOZOA**: colonial invertebrate (characterized by millimetre-scale connecting chambers)
**BURROW**: a tubular or cylindrical hole (now infilled) made in unconsolidated sediment by a feeding invertebrate (e.g. see 333 Sussex Dr. photograph)
**BUSH HAMMERED**: a mechanical finish on dimension stone surface resulting in numerous millimetre-scale hollows

**CALCITE (micrite, microspar, sparry)**: calcium carbonate (mineral), in which the individual crystals are <5 microns (micrite), 5 to 20 microns (microspar) or coarser and visible with the eye (sparry)
**CALCARENITE**: limestone predominantly composed of sand-size carbonate grains
**CAPITAL**: crowning feature of a column or pilaster
**CARBONATE**: sedimentary rocks or mineral comprising organically or inorganically precipitated cations (mainly calcium and magnesium) and anionic $CO_3^{-2}$
**CEPHALOPOD**: marine invertebrate mollusc (fossil) with a definite head

and foot region and a straight (e.g. Nautiloidea Orthoceras; see 110 Laurier Ave. W. photograph) or coiled (e.g. ammonoids) shell

**CHARNOCKITE:** a pyroxene-bearing granite, often with bluish perthitic feldspar. Commonly found only in highly-metamorphosed terranes

**CHLORITE**: a platy, typically green, phyllosilicate mineral

**CLADDING**: a non-load bearing veneer used as the facing material in exterior wall construction

**COLUMN**: long vertical cylinder usually supporting an arch or capital

**CONGLOMERATE**: sedimentary rock primarily composed of gravel-size material

**CRINOID**: a marine invertebrate (fossil) commonly preserved as disarticulated five-sided or circular plates or ossicles (with central hole) (e.g. see 111 Sussex Dr. photograph)

**CROSS BEDDING**: centimetre-scale layers inclined to the main bedding, resulting from lateral transport of sediment by a current as dunes (e.g. see 59 Sparks St. photograph)

**DACITE**: volcanic igneous rock whose main minerals are plagioclase feldspar, quartz and dark pyroxene or hornblende

**DEWATERING**: sedimentary structure formed by the loss of pore water during sediment compaction

**DIABASE**: see Gabbro

**DIMENSION STONE**: building stone that has been cut and finished to specifications

**DIORITE**: a plutonic igneous rock whose main minerals are sodic plagioclase feldspar and dark hornblende

**DOLOSTONE (dolomitized)**: sedimentary rock primarily composed of dolomite (typically formed by alteration of the mineral calcite)

**DYKE**: an intrusive igneous rock with a tabular shape that has intruded (cut) across any rock layering

**EON**: largest division of geologic time. The Phanerozoic Eon encompasses the Paleozoic, Mesozoic and Tertiary eras.

**ERA**: division of geologic time that is smaller than an eon, but encompasses two or more geologic periods

**FAÇADE**: face of a building

**FAULT**: a fracture, or zone of fractures, in rock in which there has been displacement of one side of the fractured rock relative to the other side

**FASCIA**: horizontal belt or vertical face of building stone

**FELDSPAR**: group name for the most abundant rock-forming silicate minerals, containing aluminium and variable amounts of potassium, sodium and calcium

**FIELDSTONE**: building stone derived from unconsolidated surface deposits, typically of glacial origin in the northern hemisphere
**FLAME FINISH**: building stone finish created by intense heat, resulting in a rough surface
**FLUTE**: groove aligned along the length of a column or pilaster
**FOLIATION**: layering in metamorphosed rock caused by the alignment or segregation into layers of metamorphic minerals
**FOYER**: large room adjacent to the main entrance in front of a larger room or theatre

**GABBRO**: dark intrusive igneous rock composed of calcium-rich plagioclase feldspar and pyroxene. **Diabase** is a fine-grained gabbro.
**GARNET**: group name for dark coloured silicate minerals found in igneous and metamorphic rocks
**GASTROPOD**: invertebrate mollusc with a single, unchambered shell, that is often spiral and closed at the apex
**GLACIOFLUVIAL**: pertaining to meltwater rivers flowing from a glacier
**GLOMEROPORPHYRITIC**: cluster of large crystals of a single mineral
**GNEISS**: foliated metamorphic rock, often exhibiting alternating layers of dominantly light- and dark-coloured minerals
**GRABEN**: elongate fault-bound area of rock, which has been downthrown between two bounding faults
**GRANITE**: intrusive igneous rock containing subequal proportions of alkali feldspar and plagioclase feldspar, at least 10% crystalline quartz, and lesser amounts of mica, magnetite or hornblende
**GRANODIORITE**: intrusive igneous rock similar to granite but with minimal amounts of alkali feldspar
**GRANULAR**: rock texture where the mineral grains are similar in size and visible

**HEMATITE**: metallic iron oxide mineral, typically black to red
**HONED FINISH**: smooth surface finish with little or no gloss, applied to a dimension stone
**HORNBLENDE**: dark, prismatic amphibole group mineral with distinct cleavage
**HYDRO FINISH**: a dimension stone finish attained with high-pressure water, resulting in a rough surface similar to a flame-finished surface

**ILMENITE**: black, rhombic iron- and titanium-bearing oxide mineral
**IGNEOUS**: rock formed by cooling of molten magma
**INTRACLAST**: detached, reworked sedimentary fragment within a sedimentary rock, commonly limestone. Intraclasts are eroded from sediment, and are incorporated in younger sedimentary beds (e.g. see 195 Elgin

Street photograph)
**ISOSTATIC**: vertical adjustment of rocks to loading or removal of a load (e.g. ice)

**JAMB**: side post of a doorway or window
**JASPER**: an iron-bearing chert (silica-rich rock), commonly red due to dispersed hematite

**KEYSTONE**: last wedge-shaped stone placed in the crown of an arch

**LABRADORITE**: plagioclase feldspar that commonly shows blue iridescence; abundant in anorthosite
**LAMINAE**: millimetre-scale layers that are parallel, or inclined (cross-lamination)
**LAPILLI**: erupted volcanic fragments 2 mm to 64 mm in diameter
**LARVIKITE:** an alkali syenite with intergrown, bluish alkali feldspar and plagioclase feldspar phenocrysts and mafic minerals
**LIESEGANG BANDING**: secondary nested bands of a mineral (e.g. hematite) precipitated after consolidation of the rock (commonly sedimentary), and typically oblique to bedding (e.g. see 40 Elgin St. photograph)
**LIMESTONE**: sedimentary rock consisting of more than 50% calcium carbonate (calcite)
**LINTEL**: block of stone spanning the top of a doorway or window

**MAFIC**: mineral or rock containing appreciable amounts of iron and magnesium
**MAGNETITE**: metallic grey mineral consisting of iron oxide
**MARBLE**: metamorphic rock derived from the recrystallization of a limestone or dolostone
**MEGACRYSTS**: crystals or crystal aggregates in igneous or metamorphic rocks that are larger than the surrounding groundmass of crystals (e.g. see 100 Metcalfe St. and 865 & 875 Carling Ave. photographs)
**METAMORPHIC**: rock derived from a pre-existing rock by mineralogical and chemical changes brought about by changes in temperature, pressure and bulk rock chemistry
**MICA**: a group of layered silicate minerals that characteristically comprise flexible and very thin sheet-like layers
**MIGMATITE**: metamorphic rock formed under high temperature and pressure conditions that have resulted in melting and the development of igneous-like textures
**MONZODIORITE**: intrusive igneous rock composed of sodic plagioclase feldspar, a lesser amount of alkali feldspar and very little, if any, quartz
**MONZONITE**: intrusive igneous rock composed of subequal amounts of

plagioclase feldspar and alkali feldspar and very little, if any, quartz
**MUSCOVITE**: light coloured, potassium- and aluminium-rich mica-group silicate mineral

**NODULAR**: texture characterized by scattered to loosely packed nodules in a matrix of similar material; nodules are spherical to ovoid
**NORMAL GRADING**: vertical progression in grain size within a bed from basal coarse granular material to finer material at the top

**ONCOLITE**: a centimetre-scale calcite-rich grain exhibiting concentric, irregular lamination about a core
**ONYX**: deposit of translucent, crystalline calcium carbonate (calcite) with characteristic layering
**OOID**: millimetre-scale, spherical calcium carbonate grain exhibiting regular concentric lamination about a core
**ORTHOCONE**: straight but generally tapered cephalopod / nautiloid shell (fossil) (e.g. see 110 Laurier Ave. W. photograph)

**PEDESTAL**: base supporting column, pillar, statue etc.
**PELECYPOD**: benthic mollusc (fossil) that has bilaterally symmetrical bivalve shells, but each valve is asymmetric
**PHENOCRYST**: relatively large conspicuous crystal within a finer grained groundmass in an igneous rock (e.g. see 200 Kent St. photograph)
**PHYLLITE**: metamorphic rock in which uniform fine crystals of mica or chlorite impart a silky sheen to the surface
**PILASTER**: rectangular column set into a wall
**PISOLITE**: spherical, concentrically laminated carbonate grain in a limestone or dolostone, where the grain has unspecified origin (e.g. see 301 Wellington St. photograph)
**PITCHED FACE**: dimension stone finish created by carving wedges or chisels, resulting in a pronounced relief on the stone face
**PLUTONIC**: (equivalent to intrusive) rock type resulting from the emplacement of magma within a pre-existing rock that has subsequently cooled and crystallized
**POLISHED**: the finest and smoothest dimension stone finish, characterized by high gloss and reflectivity
**PORTAL**: door or doorway
**PORTICO**: roof supported by columns at regular intervals, usually attached as a porch to a building
**PYROXENE**: dark rock-forming silicate mineral with blocky cleavage, typical of igneous and high-grade metamorphic rocks

**QUARRY**: open surface working where rock is extracted

**QUOIN**: stone or brick forming an angled corner of a building

**RAPAKIVI TEXTURE**: texture in an intrusive igneous rock, where centimetre-size potassium feldspar crystals are surrounded by a mantle, or rim, of sodium feldspar crystals in a finer crystalline matrix (e.g. see 100 Queen St. and 200 Kent St. photographs)
**REVERSE GRADING**: vertical upward progression in grain size within a bed from fine to coarse
**RIPUP**: sedimentary intraclast of semi-consolidated sediment that was 'ripped up' by a current or wave action and deposited elsewhere
**RIPPLE**: small ridge (few centimetres high) of fine sediment formed on a bedding surface by wave or current movement. Ripple marks are a lateral succession of small-scale ridges and hollows
**RUDSTONE**: carbonate sedimentary rock where gravel-size (>2 mm diameter) grains support one another in a finer grained matrix

**SALIENT**: structure that juts out, or points outward
**SANDBLASTED FINISH**: matte-textured surface finish on dimension stone achieved by exposing the stone face to bombardment by sand under pressure
**SANDSTONE**: sedimentary rock composed of sand-size grains cemented by compaction or by cement precipitation between the grains
**SCHLIEREN**: tabular bodies in intrusive igneous rocks, up to a few metres long, that have a similar mineralogy to the rest of the rock but have a different, therefore distinctive, mineral ratio (e.g. see 275 Slater St. photograph)
**SEDIMENTARY**: rock resulting from the accumulation in layers of precipitated minerals, or eroded and transported rock material, or accumulated plant and animal debris
**SERPENTINE**: hydrous magnesium silicate mineral, typically green, with a silky luster and soapy feel. **Serpentinite** is a rock composed of serpentine
**SHALE**: fine-grained sedimentary rock with millimetre-thick lamination, and a tendency to split parallel to this original bedding (fissility)
**SILICICLASTIC**: sedimentary rock composed mostly of grains of transported silicate minerals
**SILICIFIED**: rock where many of the components have been replaced by varieties of quartz (silica)
**SILL**: a horizontal flat stone slab used at the base of an exterior door or window
**SLATE**: metamorphic rock composed of finely divided crystals and which breaks along parallel, thin layers (cleavage) that are oblique to bedding
**SPANDREL**: part of a wall between adjacent arches or pillars

**SPLIT FACE**: stone in which the face has been broken to an approximate plane

**STONELINE**: layer of distinct dimension stone within a wall

**STROMATOLITE**: laminated biogenic structure in a sedimentary rock formed by entrapment or precipitation of sediment, generally carbonate minerals and silt, by cyanobacterial mats (biofilms); they display a variety of growth morphologies (e.g. flat lamination, stacked hemispheres, laminated columns)

**STROMATOPOROID**: extinct sponge-like benthic organism (fossil) with a carbonate mineral skeleton made up of multiple millimetre-scale chambers

**STYLOLITE**: irregular surface of dissolution that appears as a dark jagged line (insoluble minerals) in a sedimentary rock, commonly limestone or dolostone (e.g. see 101-107 Sparks St. and 109 Bank St. photographs)

**SULPHIDE**: metallic mineral in which sulphur is the dominant component (e.g. pyrite)

**SYENITE**: intrusive igneous rock in which alkali feldspar is the dominant mineral, but containing dark (mafic) minerals; quartz and plagioclase feldspar are subordinate

**TECTONIC TERRANE**: regionally extensive body of rock that exhibits a similar geologic history (e.g. age, structural deformation, metamorphism)

**TERRA COTTA**: fired clay used as ornamental building material, in figurines, statues etc.

**TILE**: thin modular stone unit, usually less than 20 mm thick

**TILL**: unsorted sediment carried and deposited by a glacier

**TONALITE**: intrusive igneous rock with subequal amounts of quartz and plagioclase feldspar and little, if any alkali feldspar

**TOOLED**: dimension stone finish with parallel concave grooves

**TRACE FOSSIL**: structure in sedimentary rock formed by the activity of animals (e.g. feeding burrows, trails, tracks)

**TRAVERTINE**: layered sedimentary rock that is light coloured and formed of precipitated calcium carbonate minerals

**TUFF**: fine-grained, commonly laminated, air-fall deposit of ejected volcanic detritus, ranging from ash to lapilli

**UNCONFORMITY**: surface in the rock record formed during a period of erosion or non-deposition

**VEIN (venation)**: layer, seam, or narrow irregular body of minerals that has intruded (cut into) the surrounding host rock

**VENEER**: non-load bearing facing stone attached to a backing for the purpose of ornamentation, protection or insulation

**VESTIBULE**: ante-chamber, hall or lobby next to an outer door of a building

**XENOLITH**: inclusion of pre-existing rock in an igneous rock body, dyke or vein (e.g. see 275 Slater St. photograph.)