8.3 Appendix: Stone

Figure 1. Greystone.

▪ **Greystone:** 'Greystone,' a type of dolomitic limestone, is the most common building stone in Saskatoon (Mysyk & Kulyk, 2006). Greystone is common to the area around Saskatoon and through the South Saskatchewan River valley. It was originally found and gathered on or near the surface of the soil, and is therefore often referred to locally as 'fieldstone', although it is now more frequently quarried. Greystone formed 450 million years ago during the Ordovician period, but was deposited in the South Saskatchewan River valley when the glaciers of the last ice age retreated 10,000 years ago. Although it is a type of limestone, greystone is characterized by an absence of fossils, due to its formation in deep cool waters that were devoid of marine life. The term greystone is a colloquialism that refers to its colour, although it is in fact predominantly a buff colour, with some shades of yellow, pink and purple.

Greystone is a significant character-defining element of many buildings at the University of Saskatchewan, and of the campus as a whole. Its significance lies in the consistency of its use through one hundred years of building, and due to the fact that the material is local. In *Saskatchewan: The Making of a University* (1959) Arthur Morton, describes how the university Board of Directors came to choose greystone for Saskatchewan Hall and for the Agriculture Building, now the MacKinnon Building:

"The building contracts specified that the College of Agriculture (now MacKinnon) Building and the Residence (now Saskatchewan Hall) were to have exterior walls of rock-faced Tyndall stone. After the stone work was started and several car loads of Tyndall stone were either on the site or in transit, a man named James Wilson proposed that the builders use a local limestone instead. This limestone was available about six miles northeast of the site. The contractors were instructed to build a sample wall of this stone for the Board's inspection. They did so; the Board approved of the result and ordered the substitution of the Greystone for the Tyndall. The local stone proved to be a much better stone than the Tyndall; it was harder and more impervious to moisture, and its varied colour made for a more pleasing appearance of the finished wall."

Figure 2. Fieldstone north of campus ca. 1910. Photo A-758, retrieved from http://scaa.usask.ca/gallery/uofs_buildings/

Figure 3. Stones used for the construction of University hospital. The Thorvaldson Building is in the background. Photo A-1067, retrieved from http://scaa.usask.ca/gallery/uofs_buildings/.

This decision would come to define the character of the main campus. Greystone became the material of choice for buildings at the University of Saskatchewan, and has been used ever since. The origin of the greystone used on the early buildings at the University of Saskatchewan has not been determined with certainty. However, a recent report by Willis Kirkham, commissioned by the Meewasin Valley Authority, identifies the source of the stone as several farmsteads forming part of the 'Northeast Swale', a valley northeast of Saskatoon, formed by an ancient former channel of the South Saskatchewan River. University records document payments for stone between 1911-13, to several land owners in this area, including a James D. Powe and a C.S. Copp (Kirkham, 2012). The Northeast Swale also shows significant evidence of quarrying activity.

A 1916 report by William A. Parks identifies a ridge, about 2.25 miles from Saskatoon, "rich in boulders which have been utilized for the construction of the building of the University of Saskatchewan." The author identifies the origin of the stone as an elevated ridge of glacial material on the southeast side of the Saskatchewan River, near Clarksboro. Parks states that the buildings of the University of Saskatchewan are constructed of a "pinkish Silurian limestone." (1916).

The greystone used for current projects at the University of Saskatchewan is sourced from various locations, depending on the masonry contractor and on availability. Gracom, who have carried out the masonry work on several recent construction projects, currently obtain greystone from a site in north-eastern Saskatchewan in the Deschambault Lake region. This dolomite does not come in the filedstone or boulder format more commonly found in the Saskatoon region, but in the form of large slabs beneath the base soil, and is quarried.

Figure 4. 1912, surplus greystone shortly after the completion of the MacKinnon Building. Photo A-758, retrieved from http://scaa.usask.ca/gallery/uofs_buildings/

▪ **Tyndall Stone:** Tyndall stone is named for its origin, the area around Tyndall, in southeast Manitoba. The stone was first used in the construction of Fort Garry in 1832, north of modern day Winnipeg. Tyndall stone fabricators August Gillis and Sons purchased their first quarry in 1915 and incorporated as Gillis Quarries Ltd. in 1922. Gillis Quarries now owns over 1800 acres of quarriable land. Notable buildings featuring Tyndall stone include the Parliament Buildings in Ottawa and the Canadian Museum of Civilization in Hull, Quebec.

Tyndall stone is a dolomitic limestone characterized by its light grey colour, mottled appearance and visible fossils. The fossils in Tyndall stone are a result of the way in which the stone was formed. 450 million years ago, much of Saskatchewan and southern Manitoba was covered by a vast, shallow, inland sea. Marine animals, such as corals, sponges, molluscs, trilobites and stromatoporoids, lived on or above the soft, muddy sea floor. After they died, their remains settled into the mud, and became fossilized over time. The calcium carbonate in their skeletons and shells, mixed with silt, became limestone. The fossil remains of these animals are visible in Tyndall Stone. The channels formed by burrowing animals created the worm-like mottling which gives Tyndall Stone its characteristic mottled appearance. Tyndall stone is sometimes called 'tapestry stone' due to this patterning. Geologically, Tyndall stone is referred to as 'Upper Mottled Limestone of the Red River Formation of the Ordovician System'.

At the University of Saskatchewan, Tyndall stone replaced Indiana Limestone as the most common stone used for cut and carved stone ornamentation after the Second World War. Its first use appears to have been on the Health Science building (now the Academic Health Sciences A Wing), which began construction in 1945. It was used more extensively, as a wall cladding material, on parts of the Murray Memorial Library in 1954. Tyndall stone was the material originally chosen for the exterior walls of the first buildings at the University of Saskatchewan in 1910; however, the local availability of greystone made it the preferred choice. (Refer to Greystone, above). The common use of Tyndall Stone at the University of Saskatchewan has made it an important character-defining element.

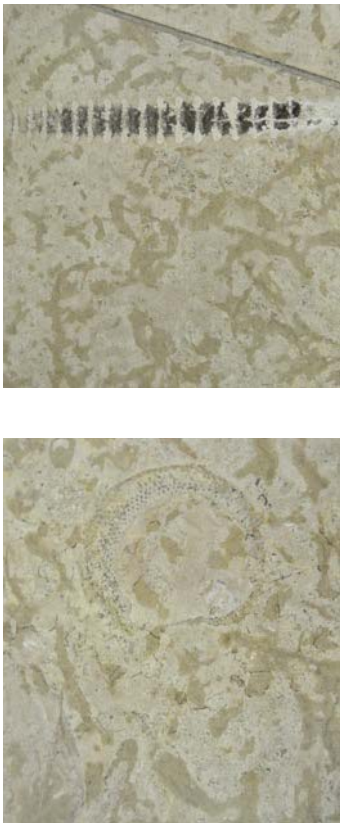

Figure 5. Tyndall stone showing fossil remains and characteristic mottling.

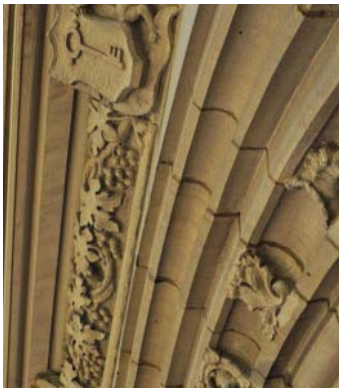

Figure 6. Sandstone.

Figure 7. Indiana Limestone.

▪ **Sandstone:** Berea Sandstone is a sedimentary rock composed mainly of sand-sized grains of quartz and other minerals, bonded by silica and lime. Berea sandstone was formed during the Carboniferous period, between 360 to 300 million years ago. Berea Sandstone was used for cut and carved stone ornamentation on the earliest buildings at the University of Saskatchewan, such as the MacKinnon Building (1910-12), Saskatchewan Hall (1910-12), and the College of Emmanuel and St. Chad (1910-12). Beginning with Qu'Appelle Hall in 1914, Salem or Indiana limestone replaced the use of sandstone because it was found to be more durable and easier to carve (Mysyk & Kulyk, 2006).

The 'Berea' is a geological formation of sandstone in northeast Ohio, where this stone is quarried. Cleveland Quarries began quarrying the stone, located near Amherst and Birmingham, in 1868. The company owns over 1000 acres which contain over 300 million cubic feet of sandstone deposits. The Berea formation has produced a total of 500 million cubic feet of sandstone to date.

▪ **Indiana Limestone:** Indiana Limestone, also known as Bedford or Salem Limestone, is a sedimentary rock composed primarily of calcium carbonate. Indiana Limestone was formed during the early Carboniferous period, between 360 and 323 million years ago. It was formed from the remains of marine organisms, which were deposited as sediment over millions of years at the bottom of a shallow inland sea which covered most of the present-day Midwestern United States. Indiana Limestone is a light buff-coloured stone, with consistent colour and a fine-grained texture, known for the ease with which it is cut, split and carved. Beginning with Qu'Appelle Hall in 1914, Indiana limestone replaced the use of sandstone because it was found to be more durable and easier to carve (Mysyk & Kulyk, 2006). Other buildings constructed with Indiana Limestone trim include the Chemistry Building (1919-21), the Physics (Thorvaldson) Building (1922-24), and the Memorial Gates (1927-28).

The Indiana Limestone Company started quarrying limestone in the mid-1800s, and has grown to be the largest limestone quarrier and fabricator in North America. The Indiana Limestone Company owns over 4000 acres containing in excess of 100 years worth of reserves. Notable buildings built with Indiana Limestone include the Empire State Building and the Pentagon (Indiana Limestone Company, 2013).

▪ **Granite:** Granite is a common type of igneous rock composed mainly of quartz, mica and feldspar. Granite is a product of the slow crystallization of magma under the earth's crust. The 'flecks' in granite are mineral grains that are large enough to be visible to the naked eye. Granite is most often quarried as a 'dimension stone.' A dimension stone is a rock that has been cut into blocks or slabs of specific length, width and thickness. Granite is exceptionally hard, durable, and resistant to chemical erosion from salts or acids, and has therefore gained widespread use as a building stone. In its architectural applications it may be finished with a rough face, a smooth cut face, it may be honed or polished to a high sheen.

At the University of Saskatchewan, Granite has commonly been used to form base courses and steps, for example, on the MacKinnon Building (1910-12) or the Physics (Thorvaldson) Building (1922-24). The granite typically seen at the university for these applications is light grey in colour. On later buildings, such as the Murray memorial Library (1954-56), pink granite panels were used as a wall cladding on the entry vestibule.

Most granite at the University of Saskatchewan is cut. The Stone Barn (1910-12) is an exception; its ground floor walls are composed of rough-faced granite of a darker variety.

▪ **Slate:** Slate is a fine-grained homogenous metamorphic rock formed from shale. With heat and compression, the clay in shale turns into mica which transforms the mineral from shale to slate. Slate is most commonly used for roofing tiles. The properties and formation of slate make it easy to cut into thin sheets for this application. In addition, slate is a water-shedding material and withstands contact with freezing water.

Slate tile roofing and slate stair treads were used on most University of Saskatchewan buildings during the first phase of construction from 1909-1929. The slate tile at the University of Saskatchewan is characteristically green in colour. Many of staircases on early university buildings, such as those in the MacKinnon Building (1910-12), feature original slate treads which show grooves from years of use. In some places, black slate is used. There are still some black slate chalkboards in use on campus; the lecture theatre in the Thorvaldson Building (1922-24) is one example.

Figure 8. Top to Bottom : Grey dimension cut granite bollard, rough cut, dark granite wall, polished red granite.

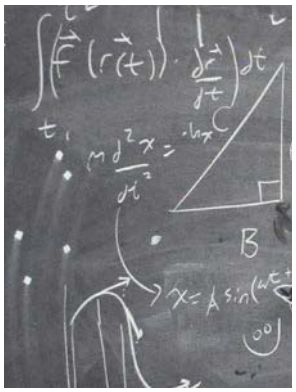

Figure 9. L to R: slate roof tiles, natural cleft slate surface, slate chalkboard.

Figure 10. Top to Bottom: White marble, green marble.

▪ **Marble:** Marble is a metamorphic rock composed of recrystallized carbonate minerals, most commonly calcium or dolomite. It is formed from the heat and compression of limestone. Marble will take a high polish, and is most often used as an interior finish material.

Marble is seen in its most abundant use in the first residence buildings at the university: Saskatchewan Hall and Qu'Appelle Hall. It is found in the washrooms of Saskatchewan Hall and in the bedrooms and corridors of Qu'Appelle Hall. The window sills, baseboards stair treads and landings in Qu'Appelle Hall are composed of white marble. Some of the original white marble has been replaced with a locally available, green variety. The swirls and veins of coloration found in marble are due to mineral impurities. The colour green is most often indicative of high magnesium limestone or dolostone with silica impurities.

Supporting Documents for Appendix: Stone

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