A Guide to the Building Stones of Glasgow University

A Geological Trail around the Campus

Geological Society of Glasgow

INTRODUCTION

The University moved from High Street to its present site at Gilmorehill in 1870 and waiting for it was a purpose-built stone building, the Gilbert Scott Building, still one of the largest in Glasgow. This building was constructed of local stone much of which came from a quarry on Gilmorehill itself on the site of the old Western Infirmary. Stone from elsewhere in Glasgow, and Scotland at large, was used to trim and decorate the building and to pave the quadrangles and approaches.

As the University expanded from the early 20th century, especially in science, new buildings were constructed. Many buildings in the University are made of, or use, a wide variety of natural stone as a structural or decorative material and show a wide variety of architectural styles and construction techniques. Their stones reflect closely the advancement of stone-quarrying, transport and construction during that time, and form a technical and architectural history in themselves.

Stone for construction continued to be used up until the early 1920s, coming from further afield as transportation improved, but became uneconomic in the years following World War I as wages rose. Its place in construction was then taken by brick and concrete, up to and post World War II, but stone has regained its place latterly as modern building methods have turned to its use as thin cladding panels hung on a concrete framework.

Good stone can be of any geological age and the stones of the buildings we will look at are no exception, making use of materials from much of the Earth's history (Fig.1), although stone from the Devonian and Carboniferous Periods is in the majority.

The type of stone used in building is also important, since it must be durable, yet easy and economical to extract and work.

The University has chosen many types of stone but has always favoured sandstones and limestones for price and characteristics.

Stratigraphic Chart

Period	Age Ma (Ma = million years)
Quaternary	2.5 to present
Neogene	23 to 2.5
Paleogene	65 to 23
Cretaceous	145 to 65
Jurassic	199 to 145
Triassic	252 to 199
Permian	299 to 251
Carboniferous	359 to 299
Devonian	416 to 359
Silurian	443 to 416
Ordovician	488 to 443
Cambrian	542 to 488
Precambrian	4600 to 542

Fig. 1. Geological Time Scale. The majority of stone used in Glasgow University is from the Carboniferous Period.

THE TRAIL

The trail starts and finishes at the University Shop (see Map on Pages 6 & 7).

Leave the shop and foyer and climb the steps to the West Quadrangle of the Gilbert Scott building. It dates from 1870 and its later addition, the University Chapel from 1929. Move right towards the modern sculpture.

Locality 1. The Gilbert Scott Building

The stone slabs you are standing on are flagstones of Devonian age from the Carmyllie Quarry at Arbroath (E. Scotland). They are sandstones containing mica and renowned for their non-slip qualities. They contain their mica in layers, allowing the stone to be split easily into "flags" or slabs.

You may notice some deterioration of the Gilmorehill Sandstone on the walls (Fig. 2). This is because the grains of sand making up the sandstone are held together by calcite (lime), which over 100 years of acid rain has dissolved. Many blocks have now been replaced.

Fig. 2. Weathered Gilmorehill Sandstone at Locality 1.

You will have noticed numerous sections and blocks of new stone, contrasting with the sootier nineteenth century stone. This contrast relates to the pale stonework in front of you. Notice first the difference between the smooth sandstone used for the window cases and the corners and the rougher, more weathered sandstone which fills in between (Fig. 3) . They are both local sandstones of Carboniferous age but the better wearing, smooth sandstone is Kenmore Sandstone from Bishopbriggs, to the north of \ Glasgow, while poorer quality sandstone is the more local Gilmorehill Sandstone which weathers badly because of its thinner beds and coarser texture.

Fig. 3. Gilmorehill Sandstone (L) and Kenmore Sandstone (R) at Locality 1.

Now enter the cloisters, turn right through the pillars and go through the door past the University's Reception Offices to the hall under the tower. Stop at the archway with the second set of glass doors

Locality 2. Hall under the Tower

The arch here is supported and embellished by fine pillars of polished granite with large, regular pink feldspar crystals. This is Shap Granite from Cumbria and is of Devonian age (Fig. 4).

Fig. 4. Shap Granite at Locality 2 with large pink feldspar phenocrysts.

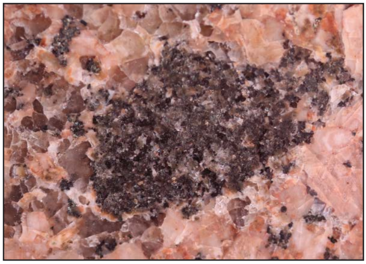


Fig. 5. Ross of Mull Granite at Locality 3 with xenoliths of meta-sedimentary rock.

Go through the main door and stand outside facing the doorway.

Locality 3. South Door

The door case is of carved Gilmorehill Sandstone of Carboniferous age complemented with more polished granite, a pink granite from the Ross of Mull (W. Scotland) which contains crystals of pink feldspar, clear quartz and dark specks of mica, as well as xenoliths (fragments) of older meta-sedimentary rocks trapped in the granite (Fig. 5).

There is a magnificent view from the doorway south over the city, in the foreground of which is Kelvingrove Art Gallery and Museum, constructed of deep red Locharbriggs Sandstone (Permian age) from the extensive quarries north of Dumfries.

Turn left through the car park and go down the steps to Lord Kelvin's Sundial (Fig. 6) It is reputed to have belonged to William Thomson (Lord Kelvin), Professor of Natural Philosophy (Physics) in the University (1846-99).

Locality 4. Lord Kelvin's Sundial & Locality 4a James Watt Building

The sundial is made of sandstone and it is surrounded by a pavement of dolerite setts, formerly used to pave Glasgow streets and quarried in North Ayrshire.

Fig. 6. Lord Kelvin's Sundial.

Directly beyond the sundial, down a grassy bank is the James Watt Building (Engineering). The southern gable of this modern building (Locality 4a) consists of a narrow base of yellow Heworth Burn Sandstone, a Permian rock from Gateshead, above which is white fossil-bearing Portland Limestone, a Jurassic rock from Dorset, into which is carved a large mural.

Walk along the road back towards the flagpole and then along the terrace to its western end and stop near the corner of the building.

Locality 5. Southwest corner of the Gilbert Scott Building

Fig. 7. Window pillars of Old Red Sandstone at Locality 5.

The upper windows have occasional pillars of a red sandstone (Fig. 7), this is Old Red Sandstone of Devonian age from Bonhill in Dunbartonshire, there are also some with pillars of Ross of Mull granite.

Descend the granite steps and turn right to the Lion and Unicorn staircase (Fig. 8). This staircase and the statues are the oldest structures in the University, dating from 1690, and they came from the Old College at High Street, the former buildings of Glasgow University. They were moved to their present site in 1872.

Locality 6. The Lion and Unicorn Staircase

Fig. 8. The Lion and Unicorn staircase (Locality 6) with its sandstone statues.

The staircase is made of a pale Carboniferous sandstone, probably quarried in the city centre. The sandstone contains ripple marks, indicating deposition in shallow water.

Go back to the road junction and, turning right, walk 100 metres to the Davidson Building – now housing Biochemistry. This is the first of a range of the Science Faculty buildings, dating from 1963 and is an addition to the original Wolfson Building.

Locality 7. Davidson Building

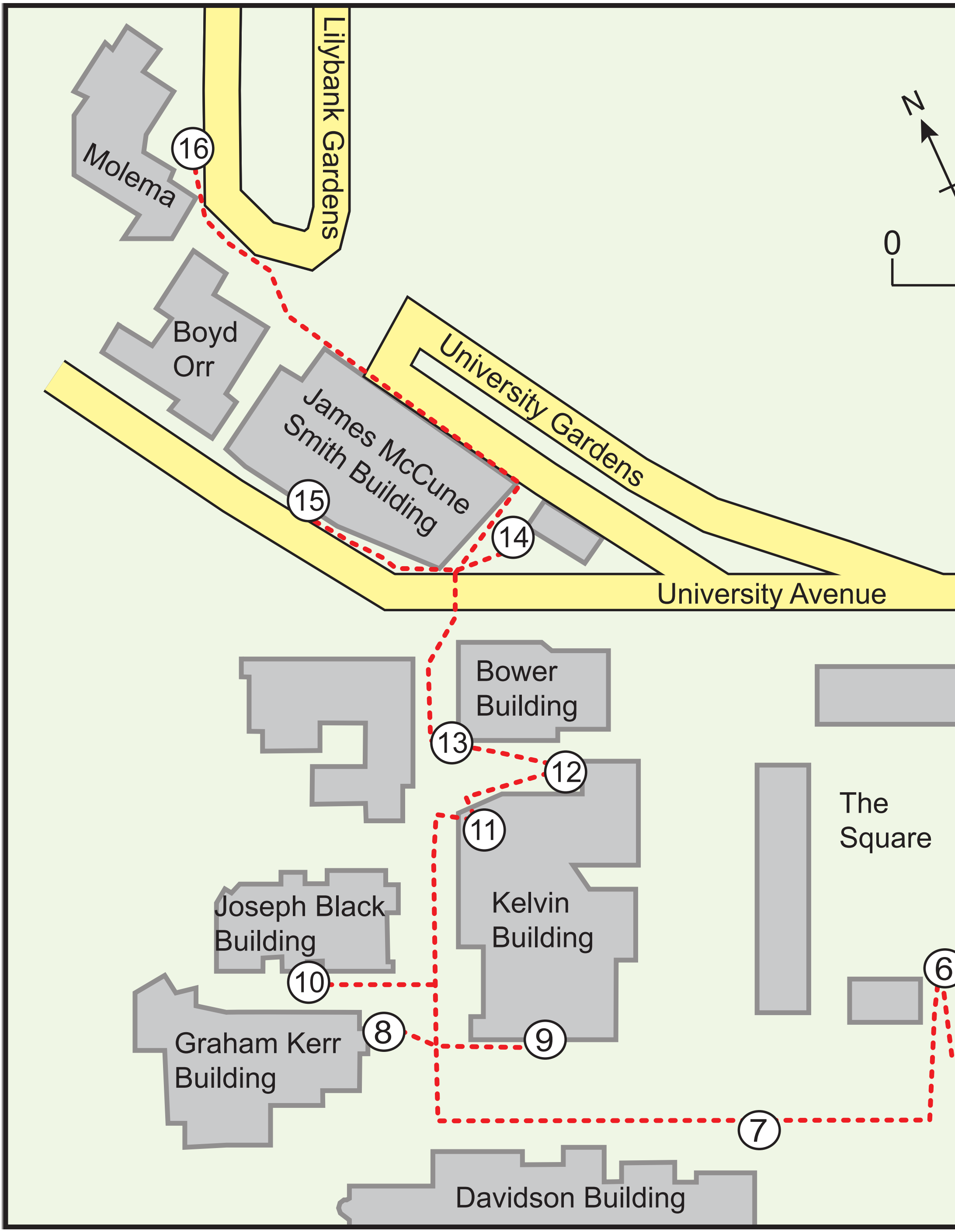
The gable, door area and the wall of the garden are concrete clad in thin slabs of fine yellow sandstone of Permian age, the Springwell Sandstone from Gateshead.

Cross the road and go down the walkway to reach the Graham Kerr Building (Fig. 9), which contains the Zoology Museum. It was the last building on the campus to be constructed of stone and was completed in 1923.

Locality 8. Graham Kerr Building

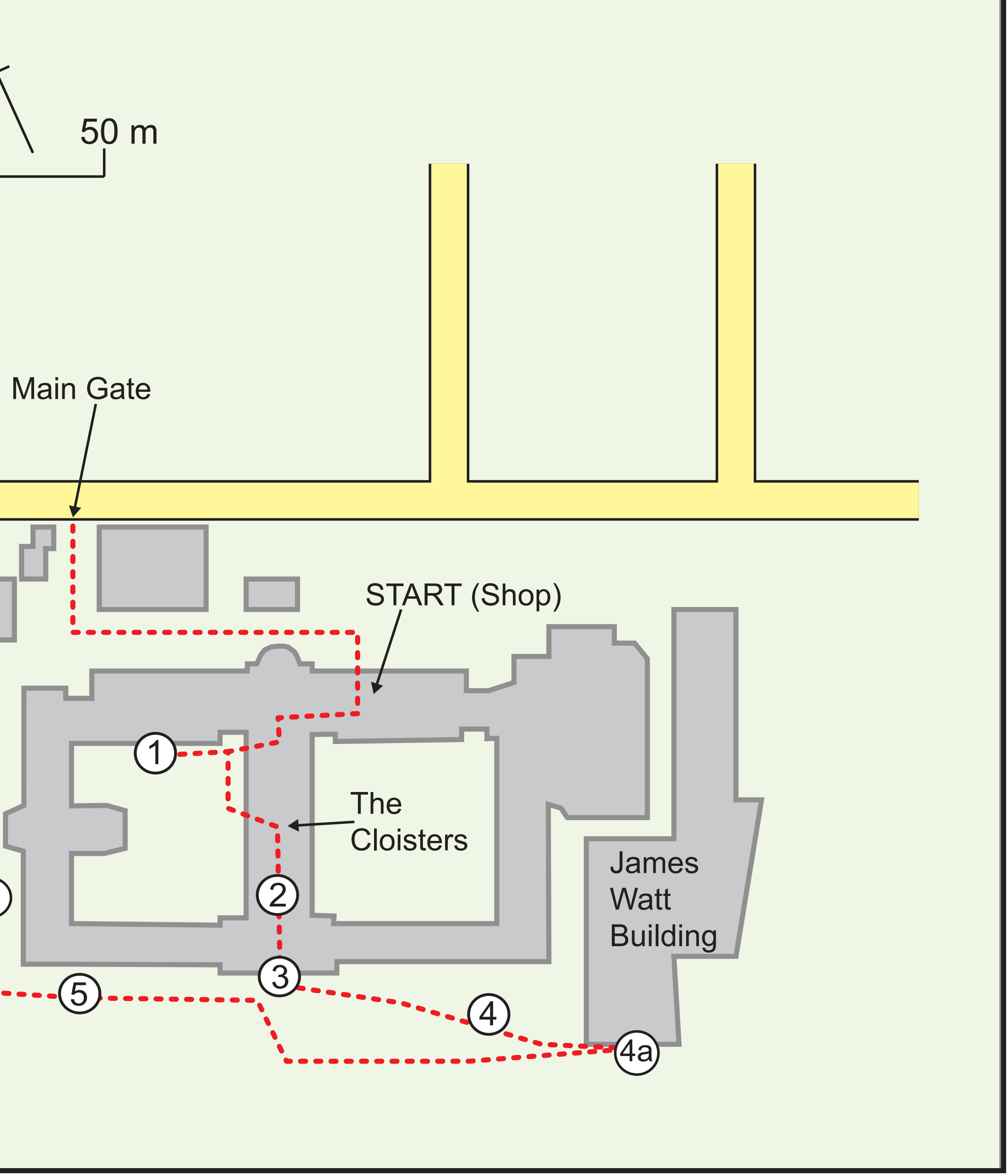
The building is built of a Carboniferous sandstone, probably from the North East of England, with large, well-cut, smooth identical blocks (ashlar) in a rusticated pattern (joint inset in slots).

Fig. 9. Graham Kerr Building.



Molema
16
Lilybank Gardens
Boyd
Orr
James McCune
Smith Building
15
14
University Gardens
University Avenue
N
0
Bower
Building
13
12
11
The
Square
Kelvin
Building
Joseph Black
Building
10
Graham Kerr
Building
8
9
6
7
Davidson Building

TRAIL MAP



50 m
Main Gate
START (Shop)
1
The
Cloisters
2
3
4
4a
5
James
Watt
Building

Facing the Graham Kerr Building is the Kelvin Building, built to house Physics and Astronomy in 1907.

Locality 9. Kelvin Building.

The building and its carvings are constructed from the Carboniferous Fell Sandstone from Northumberland, quarried around Blaxter and Bellingham. The sandstone is massive and compact and was deposited by a very large, ancient river.

Now go to the entrance of the small road to the left between the Graham Kerr Building and look towards the Joseph Black Building, (Chemistry), built in 1939.

Locality 10. Joseph Black Building.

This is a typical pre-World War II building, constructed, after stone became too expensive, of brick dressed with concrete. It is unremarkable, except for the wall facing the Graham Kerr Building, on which is a frieze depicting deer, dinosaurs and other fauna (Fig. 10). It is claimed the professor of Zoology had it made to compensate for the loss of his view!

Fig. 10. Dinosaurs on the Joseph Black building.

Return to the main road and climb the steps to the platform outside the front door of the Kelvin Building:

Locality 11. Kelvin Building (NW Corner).

This second section, built in 1954, is a concrete building clad, eclectically, in natural stone (Fig. 11). Examine the door case, made of pale brown, fossiliferous Carboniferous limestone from Derbyshire, Hadene Stone. The building itself is clad in another kind of limestone - Jurassic Portland Stone - from Dorset. The columns, one of which can be examined at the end of the platform, are of greenish slate of Ordovician age from the English Lake District.

Fig. 11. Locality 11. Door frame of fossiliferous Carboniferous limestone (L), cladding of Portland Stone (Centre) and Ordovician slate (R).

Fig. 12. Unusual ouroboros symbol at Locality 11.

To the right hand side of the door is a curious local Carboniferous sandstone slab on which is carved an ouroboros (an ancient symbol depicting a serpent eating its own tail) encircling a triangle within which is a six pointed star (Fig. 12). It probably represents using triangulation to measure the distances of stars in an infinite Universe. The carving came from the old University Observatory on Horselethill - now demolished. The wall around the ouorboros is made of a massive micaceous sandstone.

Descend the steps and, turning right, walk up the small lane between the Kelvin Building and the Bower Building.

Locality 12. Kelvin Building (North side).

The newest part of the Physics building (1966) is to the right, clad in slabs of white Portland Stone of Jurassic age from southern England. Notice the beds of fossil shells (bivalve seashells) being eroded out of the stone by the acidity of the rain (Fig. 13). The best examples are at the goods entrance.

Fig. 13. Bivalve fossils at Locality 12.

Descend to the main road and turn right, walking towards the gate. At the corner turn right, and with the Kelvin Building behind you, face the Bower Building, built in 1901 to house Botany (Fig. 14).

Locality 13. Bower Building.

This is constructed of a fine Carboniferous sandstone from Hunterhill in Bishopbriggs (N Glasgow), where the stone was mined not quarried, The stone is massive and assembled as a base of smooth ashlar, on which rest blocks with pecked surfaces arranged in a snecked pattern (small blocks interspaced among larger blocks).

Fig. 14. Bower Building. Ashlar blocks below, snecked pattern above.

Walk out of the gate and cross University Avenue via the pedestrian crossing, turning right along the pavement to George Service House.

Locality 14. George Service House.

The building illustrates well the uses of various grades of stone. For the public face of the building (in University Gardens and University Avenue) fine ashlar is used, for the rear (Ashton Lane), seen only by the servants, rubblestone is used (squared, not finely finished and of irregular shapes). For the wall of the yard irregular unfinished *quarry-rubbish was used. However, this poor quality stone does show ripples in cross-section and cross-bedding, showing that the sands were deposited by running water (Fig. 15)*

Fig. 15. Cross-bedded sandstones at Locality 14.

Retrace your steps to the adjacent building you have just passed, the James McCune Smith Learning Hub.

Locality 15. James McCune Smith Building.

This modern building comprises two types of stone cladding, one man-made and the other natural stone. The man made polished concrete cladding is manufactured in Ireland and this particular design and colour is a result of a specific mix of hard aggregates (granite or quartz) and certain coloured sands and pigments incorporated into the concrete (Fig. 16). The polishing process "seals" the face of the panel, helping to keep the panel clean over the years. Polished concrete is much favoured by architects as it a mouldable product, almost limitless in forming possibilities and appearance.

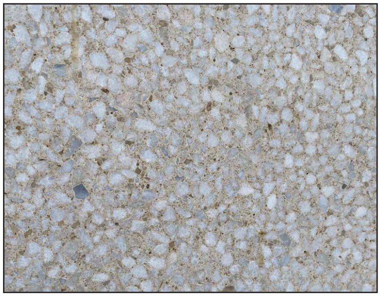


Fig. 16. Polished cement cladding at Locality 15.

Walk towards the University Avenue entrance and stop at the Foundation Stone which is to the right of the entrance (Fig. 17).

The inscription is on the natural cladding on the McCune Smith building which is Dunhouse Buff Sandstone. It is a buff coloured, fine grained sandstone of Upper Carboniferous age. It is quarried near Darlington, County Durham. The sandstone was formed in cyclical marine and deltaic environments and evidence of fossil roots (carbonaceous material) is evident in the dark streaky marking on the stone. If you look carefully you may find fossil shells too. Dunhouse Buff is widely used in repairs and restoration as it is a very durable building and paving stone not badly affected by acid rain or air pollution. It lends itself well to intricate carving, columns and major refurbishment projects.

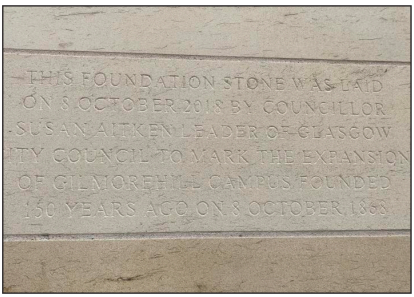


Fig. 17. Dunhouse Buff sandstone cladding at Locality 15.

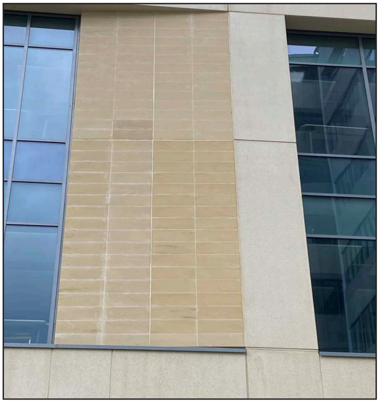


Fig. 18. The two types of cladding on the north side of the James McCune Smith building.

Retrace your steps up University Avenue and turn left at the end of the building into a small tree lined area and walk up the steps. This takes you to the north entrance to the James McCune Smith Building. Walk into a courtyard area and then look back up to the side of the building where you will see a pleasing design made by the two types of cladding used (Fig. 18).

Now walk the few metres along to the Molema Building at the end of Lilybank Gardens.

Locality 16. Molema Building.

Fig. 19. Granodiorite railway culvert entrance stones from Ballachulish in front of the Molema Building, Locality 16.

Built to house Geology and Applied Geology in 1976, it is, ironically, constructed of brick. However in front of the building is a strange monument (Fig. 19), originally part of a culvert on the West Highland Railway, re-cut for its present use. The stone is a grey granodiorite from Ballachulish and contains xenoliths of dark Ballachulish Slate.

Go into the hall of the building and examine the mural (by George Garson, 1977) on the rear wall. The artist used local rocks, plus many fossils and minerals in this abstract allegory of Geology. Also of interest is the slab of Old Red Sandstone on the right of the Foyer which shows some excellent soft-sediment deformation features (Fig. 20). The staircase down to the lower lecture room also has some interesting geological posters and exhibits.

Make your way back to the University Shop via the handsome sandstone terraces of University Gardens.

Fig. 20. Slab of Old Red Sandstone in the foyer of the Molema Building.

WHERE

The University Shop of the University of Glasgow is situated close to the Main Gate of the University on University Avenue, Glasgow G12 8QQ.

TRANSPORT

Bus- There is a regular bus service (#4) which stops in University Avenue opposite the Main Gate

Train & Subway - The nearest Glasgow Underground station is Hillhead and the nearest railway station is at Partick, both less than 10 minutes walk away.

Parking- Areas nearby are metered and are usually busy.

This booklet was produced by members of the Strathclyde Geoconservation Group (formerly known as Strathclyde RIGS Group) which is a sub -committee of the Geological Society of Glasgow.

The Group thanks the late Dr Chris Burton, formerly of the Department of Geology and Applied Geology, for allowing the Strathclyde Geoconservation Group to update and reprint his original publication “ Building Stones Trail” published in 1993.

This edition of the booklet has been updated by Dr Allison Drummond, Barbara Balfour and David Webster.

To know more about the Geological Society of Glasgow and geoconservation, go to the website at www.geologyglasgow.org

THE GEOLOGICAL SOCIETY OF GLASGOW

GEOCONSERVATIONUK

2023 Edition