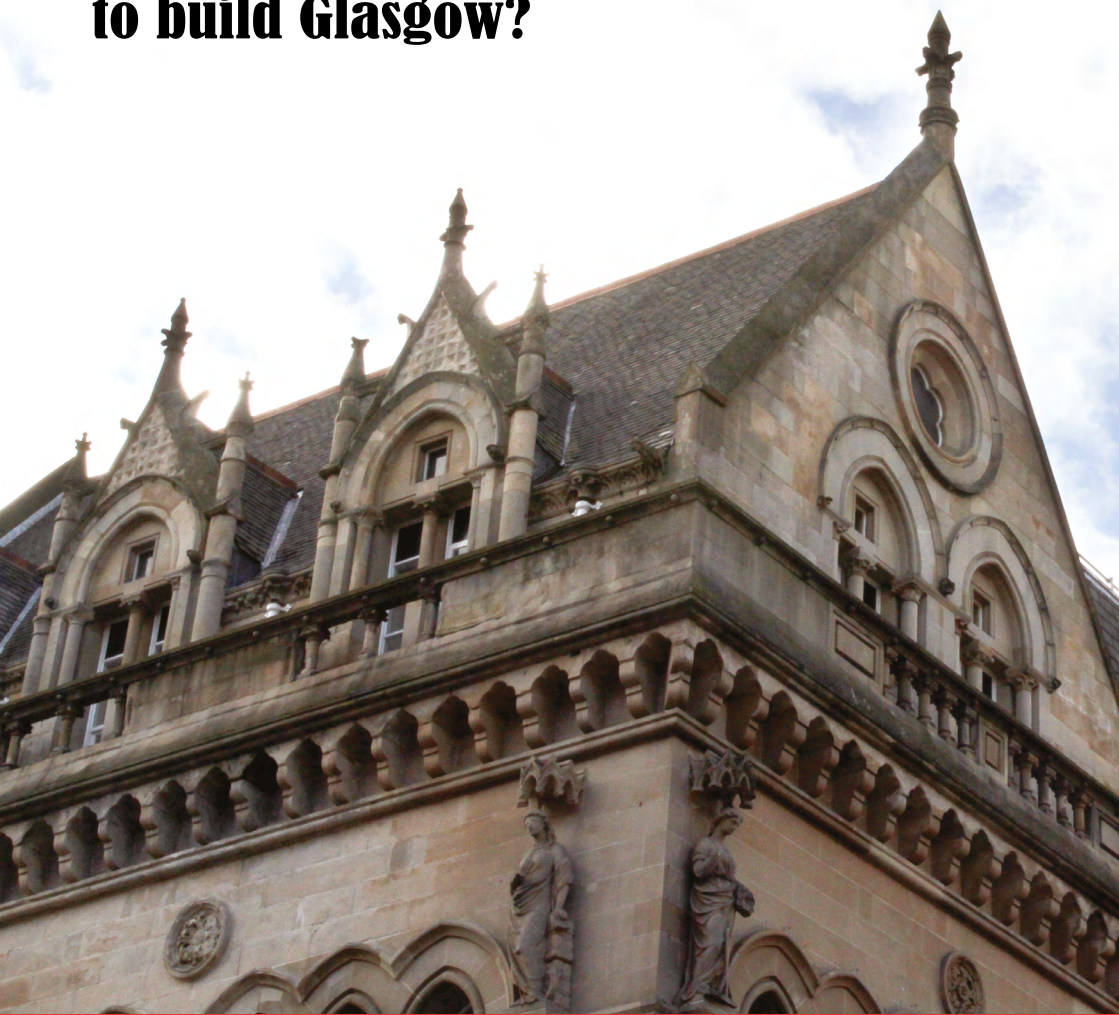


Glasgow Rocks

**What stones were used
to build Glasgow?**



A geological trail round Central Glasgow

Strathclyde Geoconservation Group

Building Stones of Glasgow

This guide to the Building Stones of Glasgow will point out some of the best examples of different types of rock which can be seen around the city centre. A brief description of the various types can be found below.

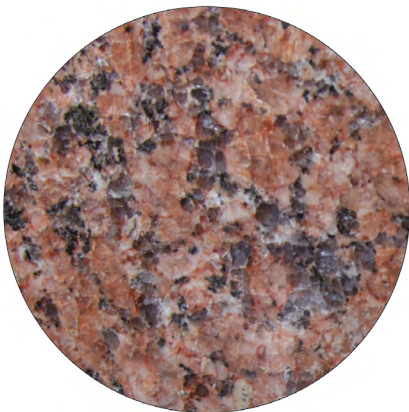
As many of the businesses occupying the buildings in the city centre can be transitory, the guide uses street numbers (where possible) as well as the current name of the building to guide you through Glasgow's building stones.

The recommended route, shown in the map on the centre pages, is along pavements and starts in front of the City Chambers. Glasgow traffic can be very busy so take care when crossing roads and where possible use traffic light controlled crossings. Glasgow is a largely Victorian city and has some of the best 19th century architecture in the world, so as well as studying the building material, look up and admire the buildings as a whole.

More detailed information can be found on the Strathclyde Geoconservation website at www.geologyglasgow.org.uk

What are building stones?

The three types of rock that are used to make building stones are igneous, sedimentary and metamorphic. Each has their own unique formational history, which is summarised below.



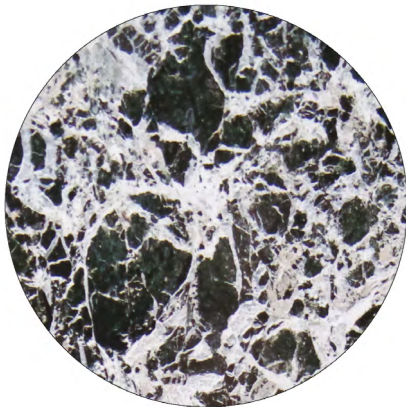
Igneous rocks form when molten rock originating from deep within the earth's crust cools (either below the surface as an intrusion e.g. granite, or above the surface as an extrusion e.g. basalt lava). The resulting igneous rock is composed of interlocking crystals, the size of which depends on the time taken for the molten rock to cool. If the molten rock cooled rapidly, the crystals are small if it cooled slowly, the crystals will be large.

A common building stone of the latter type is granite – due to the large crystal size in granite it is a very aesthetically pleasing rock, and as such is found in many forms, cladding buildings around Glasgow and also being used for ornamental pillars and balustrades.



Sedimentary rocks form as the result of sediment deposition (e.g. sand, mud, pebbles) by the action of wind or water, and as such are composed of layers (beds) of sediment. Some beds are laid down with the succeeding bed coming in at a slightly different angle; this is called cross-bedding. Geologists use this to tell if the rocks have been inverted or are still in their original setting, sometimes the sandstone building blocks are laid upside down, as in the doorway at the

Chaophraya restaurant (location 26). Sedimentary rocks can also form as the result of chemical or biological processes, which can produce rocks rich in calcium, such as limestone. Due to its calcite-rich nature, limestone is liable to weathering and as such does not make a long lasting building stone. On the other hand, sandstone is composed of quartz which weathers well, and is therefore commonly used as a building stone. Blonde sandstone is particularly common in the older Glasgow buildings, as it was initially quarried within and around the city.



Metamorphic rocks are those which have been altered from their original state, either by heat, pressure, or very often, both. The altered state often results in new crystals, textures and foliation forming within the rock. Mudstone which has been altered in this way results in slate which will split easily along foliation planes to produce roof tiles. Metamorphic rocks were originally igneous or sedimentary, before being subjected to high temperatures and

pressures: when limestone is metamorphosed, it results in marble, a rock often used for cladding building. Many of the original limestones contain impurities and these give rise to new minerals when metamorphosed. The resulting marbles show many colour variations.

Sandstone Building Stones of Glasgow

The older buildings of Glasgow are predominantly made of sandstone. The majority of tenements throughout the city are made of it, as are larger public buildings, such as Glasgow University and Kelvingrove Museum. Two colours of sandstone can be seen in the buildings of Glasgow; red sandstone and blonde sandstone (cream/yellow in colour).

The blonde sandstone is generally from the Carboniferous period (approx 320 million years ago), a period which also produced the coal seams found in and around Glasgow. The blonde sandstones were laid down in vast river systems, evidence of which comes from finding pebbly layers or even bits of plant debris within this rock. In the 18th and 19th centuries, this sandstone was quarried from a number of sites around the city centre and it tends to be rather thinly bedded with more evidence of organic matter. Glasgow Queen Street station is built within the space left after one such quarry. There were quarries at Cowcaddens and around Kelvingrove and Partick as well as other areas of the city. Once the railway network was established, stone could be brought in from further afield and much of that brought in to Queen Street station was from the east, towards the Stirling area.

The red sandstone comes mainly from Dumfries and Ayrshire and is from the Permian period (approx 270 million years ago). During this time period, a vast and expansive desert stretched across Scotland, resulting in massive dunes and arid conditions. Today the evidence of this desert can be found in the red sandstones used in Glasgow, in the form of cross bedding (evidence of where desert sand formed dunes) and by the red colour itself, representing an iron rich coating of the sand grains, a phenomenon which can still be seen today in the Sahara.

Although the original sandstone quarried in Glasgow was of the finely bedded variety, once transport improved it was much more desirable to use more thickly bedded stone called 'freestone', which makes for a smooth, clean looking building stone. The freestone was used to form the public facing side of a building (so as to impress visitors), whereas rubblestone which is not finely finished, was used for the non public facing edges (e.g. traditionally servant entrances and backcourts).

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

Glasgow Rocks - Building Stones Of Glasgow

1 The City Chambers, George Square

Built: 1882-1888. Architect: William Young of Paisley

The base and balustrades are composed of pink Corrennie granite from Aberdeenshire – the colour does not stand out very well due to the matt finish of the stonework. The upper part of the building is of brick clad in sandstone from Polmaise near Plean, Stirlingshire, (the quarry was near the former coal mine there), and Dunmore sandstone from near Airth, also in Stirlingshire. The interior of the City Chambers is worth a visit in itself and free guided tours are given at 10.30 am and 2.30 pm.

2 Former GPO building on south of George Square

(with glass roof)

Built: 1875-76. Architect: Robert Matheson



A number of blonde sandstones: Dunmore (Stirlingshire), Giffnock (Glasgow), and Hermand (West Lothian) have been used for this building. The pillars are composed of Ross of Mull granite, with pink crystals of the mineral feldspar and large black xenoliths. A xenolith is

an inclusion in the magma which formed the granite, quite often it is part of the existing country rock into which the magma was forced.

3 11 George Square (*Monteith House*)

Built: 1863 (redeveloped 1996)

This sandstone building has, at ground level, a cladding of coarse granite with large tabular (rectangular) feldspars displaying a flow texture; an interesting rock, but it's source is unknown. The cladding extends to the corner of Miller Street.

4 Royal Exchange House (corner of Queen Street and Ingram Street)

The metamorphic rock 'gneiss' (pronounced 'nice') has been used for cladding this building. This particular type of metamorphic rock is incredibly old, having experienced extreme heat and pressure since its initial formation as a sedimentary rock. The gneiss on this building is composed of dark 'streaks' of material, representing original sedimentary layers. Follow the streaks and you will see they are folded, another clue to their metamorphic history. It is unknown where the rock was sourced, but it possibly has a Scandinavian or South American origin. The majority of the rock is highly polished but narrow 'flamed' bands can be seen on the pillars. Flaming is a process which makes the surface of the material more rough.



5 Gallery Of Modern Art (GOMA)

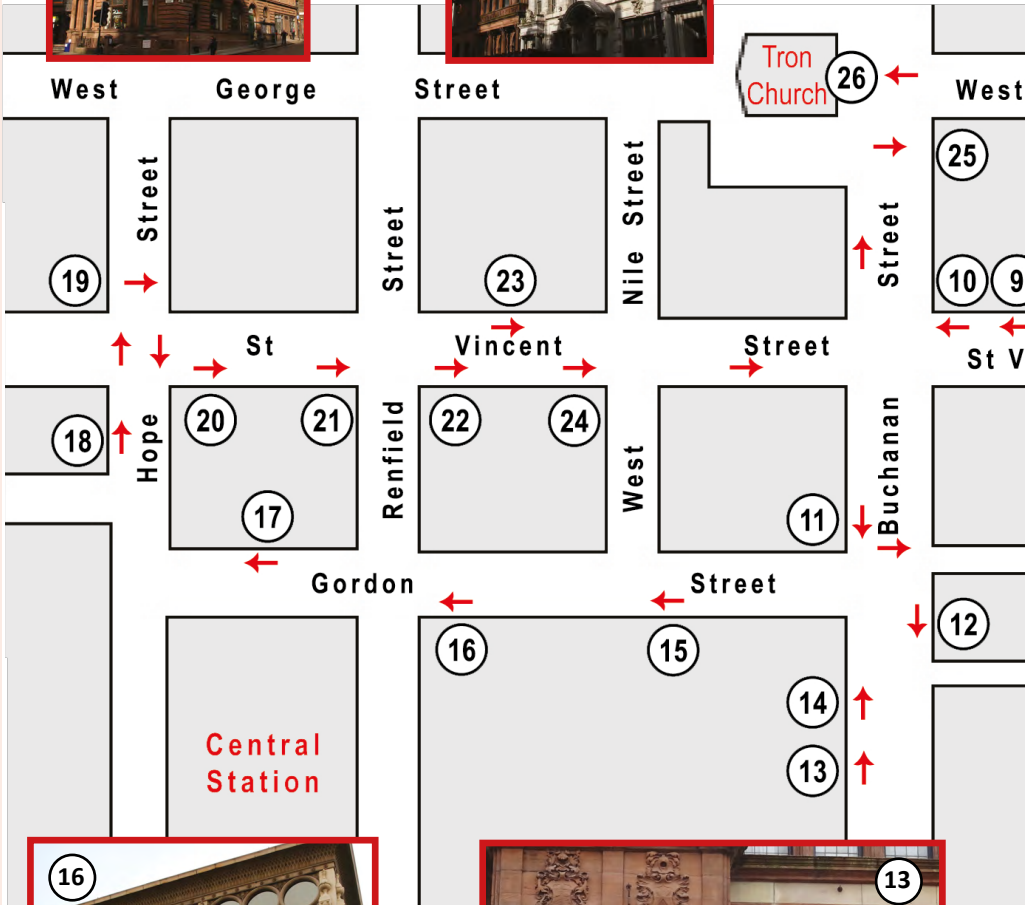
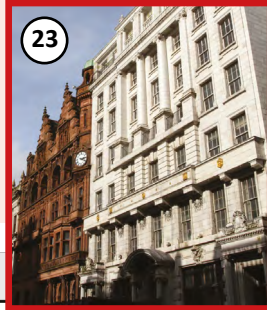
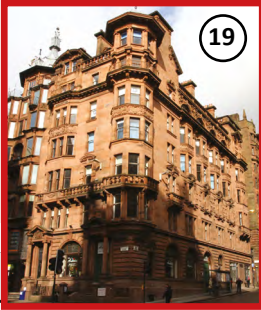
Built: 1829-30. Architect: David Hamilton

The portico of the building is blonde sandstone which was transported by river and canal from Humble Quarry, Linlithgow. The pillars were originally painted to imitate granite, but after a visit in 1873 by Lord Beaconsfield when he remarked that to be painted was 'an insult to their natural beauty and dignity' they were restored to their original condition. There is an interesting collection of marbles on the walls and pillars of the library in the basement of this building. The bollards in the pedestrian area next to GOMA are of pale grey Cornish granite.

6 153 Queen Street

The blonde sandstone used in the construction of this building is not of the best quality. If you look closely there are a number of sedimentary features in the stone: dark organic (plant) matter, cross-bedding and ripples; all indicators that this was laid down in a river. This stone would have been used for building because it was convenient to mine from a quarry close to the city centre, but it has not lasted well, as can be seen by the numerous patches where the original stone has weathered away.



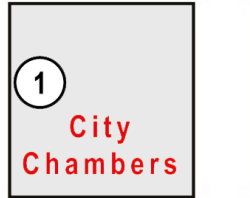
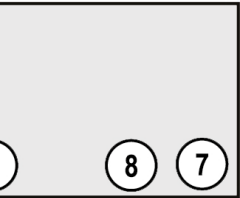




Queen St Station

George Street

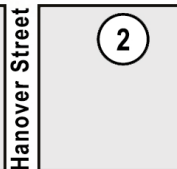
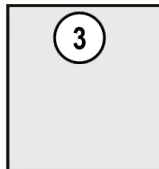
George Street



Vincent Place

Street

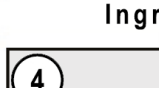
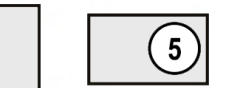
Cochrane Street



Queen

Hanover Street

Street



Ingram

Street

Street

South



7 The Counting House, George Square

(Wetherspoons Restaurant)

Built: 1869

Architect: J.T. Rothead

Extended 1874

Architect: Campbell, Douglas and Sellars

The Counting House is composed of Dunmore Sandstone with a ‘vermiculated rustication’ design on stonework; vermiculated means covered with a dense but irregular pattern of lines, as though made by worm-tracks. Ashlar is the term used for the blocks of sandstone used on this building, meaning that the massive blocks have all been cut to the same size and shape.



8 14 St Vincent Place (12-16)

Built: 1906-7 as offices for the Anchor Line.

Architect: James Miller

The entrance pillars to this building are of a pale green serpentinous marble (metamorphic), with the base of the columns composed of a darker rock – possibly Larvikite, an igneous rock that has shiny blue crystals which can be seen best when it is polished. The building is faced with white Doulton ceramic tiles of “Carrara” ware, which have a very smooth finish; fine cracks in the tiles can be seen on close inspection.

9 24 St Vincent Place

Built: 1885-89, previously Evening Citizen building.

Architect: T. L. Watson

This is faced with a prominent red sandstone from Mauchline in Ayrshire, and is an example of Permian sandstone.

10 30 St Vincent Place 12

Built: 1872–74.

Architect: John Burnet



Three different granites have been used as building stones here. The ballustrades are of Shap granite from Cumbria, which has large pink feldspar crystals; these are best seen when the rock is wet. The pillars are similar in form to the granite at the

former GPO building (Location 2) which is from the Ross of Mull. The flooring of the entranceway is composed of granite, which is red with large tabular feldspars, very similar to the Argentinean granite seen at Location 28 of this guide.

11 123-125 Buchanan Street (*The White Company*)

Architect: James Boucher

The bottom of the door pillars and the step are clad in a good example of orbicular granite (the name originating from the form of the feldspar crystals, which can be seen as large round creamy/brownly coloured crystals). The popular trade name for this granite is Baltic Brown, and it was sourced from the Rapakivi granite from southern Finland. The cladding extends to the premises next door.

12 98 Buchanan Street (*All Saints Spittalfield*)

Two buildings in one:

1827 Architect: Arch. Elliott Jnr. and

1850-51 Architect: Charles Wilson.

Around 1989 this was re-clad in a gritty cream sandstone probably from the north of England. On the main face of the building and round the corner in Royal Bank Place, many of the bedding planes can be seen picked out by coarser pebbly grains and by dark organic matter. Cross bedding can also be clearly seen at this point. The presence of the pebbles indicates that this would be laid down



in alluvial fans during flash floods, with the stronger flow of water being able to carry larger grains. Higher up on the wall in Royal Bank Place is a carving of Medieval Masons at Work which was commissioned by the Incorporation of Masons of Glasgow and is carved in Stanton Moor sandstone from the North of England.

13 91 Buchanan Street (*PUMA*)

Built: 1897.

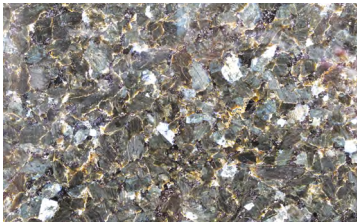
Architect: George Washington Browne

This building was formerly one of Miss Cranston's tearooms whose interior was designed by Charles Rennie Mackintosh. A mixture of red sandstone from Dumfriesshire and blonde sandstone from Newcastle was used to clad the exterior.

14 95 Buchanan Street (*Whittards*)

The cladding below the windows of this building is made of dark green serpentinite panels, which is a green metamorphic rock formed by the alteration of ultrabasic igneous rocks. The name is derived from the fact that the rock resembles snake skin.

15 23 Gordon Street (*Greaves Sports Ltd*)



The cladding is of Larvikite from Norway, with dark, very shiny bluish crystals. Due to its visually pleasing appearance, this rock type is popular today for kitchen work-surfaces and fireplaces. The glinting of the shiny crystals is called schillerisation.

16 Corner of Gordon Street and Union Street

Built: 1872.

Architect: John Honeyman

This building became known as the Ca'd'oro in 1927 when a restaurant of that name was opened in the mansard roof. The basic structure of the building is cast-iron, but the cladding is of fine grained blonde sandstone from Northumberland. When much of the building was destroyed by fire in 1987 fresh sandstone was quarried in Northumberland and used to carve the faces, flowers and 6ft tall urns which sit just under the top coping frieze of the building.

17 Grosvenor Building (*opposite Central Station*)

Built: 1884. Architect: Alexander (Greek) Thomson

The base of the building is of granite very like the Ross of Mull granite in the pillars at George Square (Location 2). The remainder of the building is composed of blonde Giffnock sandstone.

18 Santander Building (*corner of Bothwell Street and Hope Street*)

The cladding under the windows is of brown and blue Dakota granite from North America.

19 144 St Vincent Street

Built: 1902. Architects: Gardner & Millar

Locharbriggs sandstone, Dumfriesshire. The building is called the 'Hatrack' as it is less than 10metres wide but ten stories high. Note many of the nearby buildings are of red sandstone with ornate carvings.

20 123 St Vincent Street

Built: 1860. Architect: David Rhind

This is a modern building office block and permission to look around should be asked on entering. Inside the foyer, to the right of the door is a red sandstone cladding called Cove Red from Dumfriesshire and opposite is a blonde sandstone from Stanton Moore, North England.

21 Corner of Renfield Street and St Vincent Street (*Moss Bros*)

The cladding is a mixture of Larvikite (with the shiny blue-tinged crystals) and a darker rock which is an igneous rock called Gabbro.

22 93 St Vincent Street (*Drum and Monkey*)

The cladding here is of a grey granite similar to that quarried at Rubislaw or Kemnay in Aberdeenshire.

23 86-92 St Vincent Street



The building is clad in white Portland stone, a limestone from Dorset which is of Upper Jurassic age. The lower storey is painted over so the stone can only be seen on the upper levels. The floors and walls in the doorways use travertine marble from Italy. This marble is characteristically streaked and has small cavities. Travertine has long been quarried in Italy and many well known

sites in Rome, including the Trevi Fountain, are made of this marble.

24 Corner of West Nile Street and St Vincent Street *(Costa Coffee)*

The shop is clad in pink limestone which is full of fossils such as corals and the shelly fragments of bivalves and gastropods. There are irregular zig-zag boundaries which cut across the fossils, these are called stylolites and they formed fairly late in the history of the rock when mineral material was dissolved out by pressure. The limestone is called Estoril Marble from Portugal which is probably of Cretaceous age.



25 Corner of Buchanan Street and West George Street *(New Look)*

This is Sierra Chica granite from Argentina; the stone was cut in Argentina then sent to Italy to be cut into slabs and then to Aberdeen to be either 'flamed' or polished to provide contrasting surfaces.



26 Nelson Mandela Place

There are three contrasting buildings facing onto Buchanan Street at this point.

(A) Designed in 1874. Architect: John Burnet

No 7, Stock Exchange House: This building is composed of blonde Carboniferous sandstone from the Overwood Quarry in Lanarkshire; the blocks are beautifully cleanly cut in what is called 'freestone' as there are no obvious layers. The Stock Exchange building has been described as an example of Ruskinian Gothic.

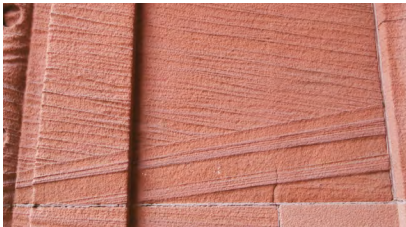
(B) Built: 1807. Architect: Wm. Stark

Opposite, at the Tron Church, the blonde Carboniferous sandstone used here has many features; dark bands and pits of organic plant matter and evidence of layering. This sandstone can be compared to the building in Queen Street (Location



6) as being not the best for building but it's old and local. The sides of the building have a 'broached' ornament, another form of rustification where the horizontal lines are hand tooled. The sandstone used on the sides and back appears to be from a slightly different locality from that at the front, as no visible organic matter can be seen and cross bedding is more pronounced, but all the stone could have come from different sections of the same quarry.

(C) In contrast, the next building along, (housing Chaophraya and Amarone Restaurants) is composed of red Permian sandstone from



Locharbriggs, Dumfriesshire. Cross-bedding and layering can be seen in this desert sandstone; but note that on either side of the doorway of Chaophraya some sections of the cross-bedded sandstone were placed upside down by the original builders.



Medieval Masons at Work (location12)

This leaflet was written and produced by the Strathclyde Geoconservation Group which is part of the Geological Society of Glasgow. We are a mainly amateur group whose aim is to conserve and promote local geology and identify sites which highlight local geodiversity and earth heritage. Geodiversity is the variety of rocks, minerals, fossils, soils and landscape and the natural processes which form them.

If you would like to find out more about us, visit our page on

www.geologyglasgow.org.uk.

To find out more about Scotland's geology visit

www.scottishgeology.com

This publication is based on the booklet *The Building Stones of Glasgow* by Judith A. Lawson, published in 1981. This has been compiled by Margaret Greene with the help and advice of many others too numerous to mention.

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