

Trail 3: Around the Shops

This trail explores the use of natural stone in Birmingham's retail areas, from the most modern of shopping centres to a rare surviving 19th century arcade. The church of St. Martin in the Bull Ring lies en route in the heart of old Birmingham. This area has always been a centre for trade, but the building materials have changed dramatically since the medieval origins of the church.

From the Rotunda, the trail follows St. Martin's Walk to St. Martin's Square then enters the modern Bullring shopping centre. Moving through to Grand Central and New Street Station, the trail continues up Lower Temple Street visiting a few more geological treats through the older shopping area. The trail finishes at the late Victorian entrance to the Great Western Arcade.

This is the last of three trail leaflets for the Building Stones of Birmingham City Centre.

The trail is about 1.5 mile long (2.4km).

Do you want to know more?

Have a look at the extended web version of this trail, with more building stones to look at, more photos and more geological and historical information. (Details are on the back page.)

Start at the entrance to the Rotunda near the Bull sculpture in the bustling Rotunda Square.

1. The Rotunda and St. Martin's Walk

The iconic 24-storey Rotunda is the only survivor of the 1960s Bull Ring Centre. The street level is clad with small brick-shaped blocks of white Carrara Marble, a stone more often associated with monumental sculpture due to its exceptional quality and beauty. (See front cover photo and detail.) These blocks have a naturally broken surface making an interesting texture which catches the light. Carrara marble comes from Tuscany in NW Italy. It is a metamorphic rock derived from Jurassic limestones. (See box on Metamorphic Rocks.) These were compressed and uplifted by tectonic earth movements during the Alpine Orogeny (mountain building) around 30Ma (million years ago).

Go across the square and turn onto St. Martin's Walk heading for the church of St. Martin in the Bull Ring.



The granite paving is almost certainly of Chinese origin as is much of the 21st century block paving encountered on this trail. Pause to admire the statue of Nelson and note the supporting column of fossiliferous Portland Whitbed Stone. (See front cover photo for Nelson, and Trail 2 for more on Portland Stone.)

Go down the steps to the right of the statue and on to the church front.

2. St. Martin in the Bull Ring

A church has existed here since the 12th Century. It was the original parish church of Birmingham until 1715, when St. Philip's Church (later the Cathedral) took on this rôle. The modern church dates from 1875. It is mostly built of Lower Triassic Grinshill Stone, 260–230Ma. This comes from near Wem in Shropshire, and is a medium-grained

Metamorphic Rocks

Metamorphic rocks are formed when existing igneous or sedimentary rocks are subjected to pressure and heat to form a distinctly different type of rock from the original material. **Gneiss** is a common metamorphic rock formed at high temperature and pressure. It usually has a banded texture. **Migmatite** forms under similar but more extreme conditions than gneiss, causing partial melting. **Marble** is a metamorphosed limestone, in which the original carbonate sedimentary material has recrystallised, obscuring the structures and textures of the original rock. In true marble any original fossil material will be lost (e.g. Carrara marble from Italy). The term 'marble' is widely used for any carbonate stones which take a good polish, but if they contain recognisable fossils they are technically limestones, not marble (e.g. the Devonshire Marbles in the Museum & Art Gallery in Trail 1).

sandstone composed mainly of the minerals quartz and feldspar. It comes in shades of white, buff, brown and red, here mostly red-brown.



Note the prominent quartz grains, and the fairly even texture of the stone. Cross-bedding is also evident in some of the blocks. (See box on Sedimentary Rocks for more on sandstone and limestone.)

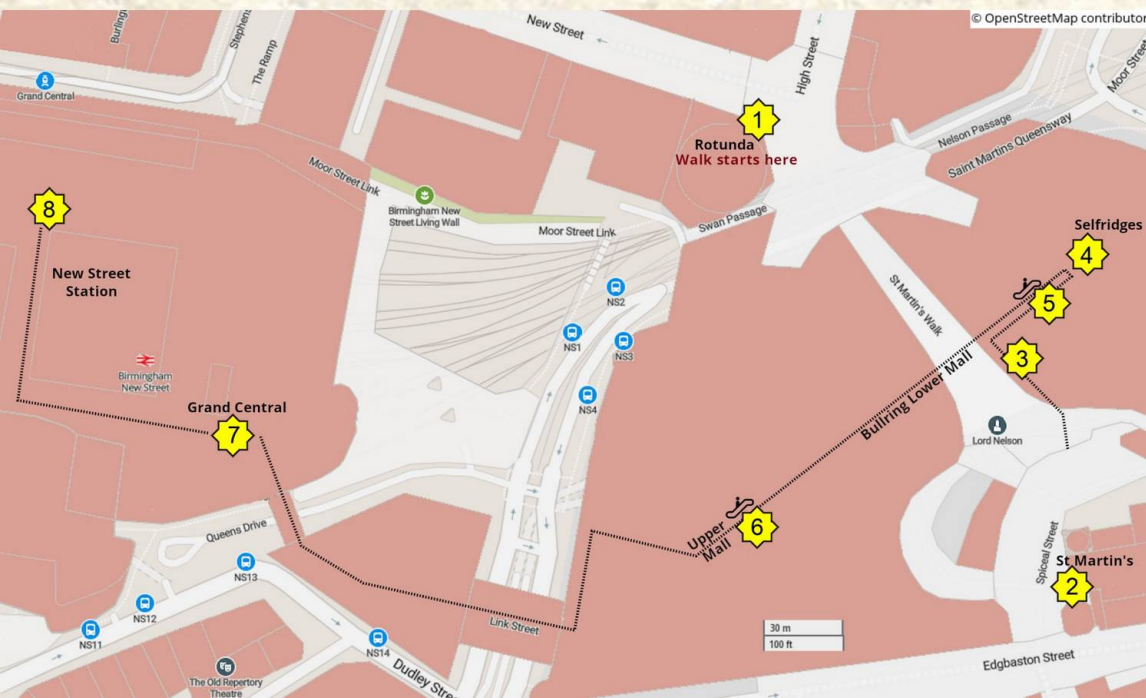
Hauteville Limestone is used as paving in front of the church. This has a distinctive yellow to pink colour variation. It is a Lower Cretaceous limestone around 145Ma, quarried near Hauteville high in the French Jura mountains. These follow roughly the line of the French/Swiss border. Hauteville Limestone is variably fossiliferous, and a few examples can be seen here.



Note how the slabs are riddled with irregular shaped cracks. These are formed by pressure causing mineral material to be dissolved, thereby reducing the total volume of the rock. They are known as



St. Martin in the Bull Ring

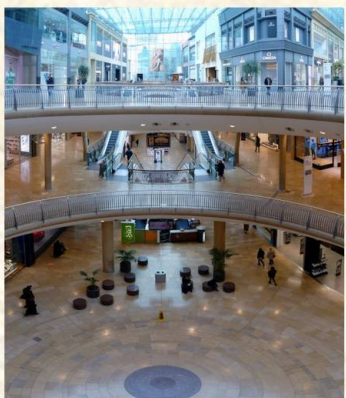


'stylolites'. Look for the large (10cm) long section through a helically coiled ammonite on the edge of a slab, adjacent to the black paving of St. Martin's Square. This stone is a Cretaceous basalt around 145Ma, from the Fujian province of SE China. (See box on Igneous Rocks, and more on granites from China at stop 8.)

Turn back to face the steps, and enter the Lower Level of the Bullring shopping centre to the right of the steps.

3, 4, 5 and 6. Bullring

This area of Birmingham has been a market place since the 12th Century. It has seen numerous transformations since then, but it is still the home of Birmingham's markets. The most recent development is an enclosed shopping mall on three levels (lower, middle and upper), which opened as the one-word 'Bullring' in 2003. Modern shopping centres are good places to see decorative polished stone, and the paving in the Bullring provides a geological feast. Most stone varieties are revealed on the lower mall. The trail focusses on the lower and upper malls.



Bullring shopping centre showing roundel feature

From the entrance, walk on to the junction with the main concourse, with eyes down to look at the decorative paving as you go (stop 3).

The stone used here is a yellow and black striped gneiss known in the trade as Cinza Rajado. It is a metamorphic rock with distinct banding. This is almost certainly from Brazil, the source of many ornamental stones of Archaean age (i.e. more than 2000 million years old), but its precise origin is unknown.

Turn right onto the main concourse and head towards the roundel at the end, outside Selfridges (stop 4).

The main paving stone here and throughout the complex is a yellow-coloured Spanish, mid-Cretaceous limestone around 125Ma. Known in the trade as Yana Limestone it comes from La Jana near Tarragona in NE Spain. The colour ranges from yellow through cream and pale pink, sometimes mottled with all these colours.

It is variably fossiliferous, with fossils dominated by oyster shell fragments concentrated in 'lags' (clusters winnowed by wave action). Gastropods and ammonites are also present. Some slabs are entirely devoid of fossils, others are packed full with them.

At the roundel, the main stone used is Rosso Tigrato (trade name), another metamorphic rock. It has a tiger-striped appearance, as it is composed of a finely banded pink and black gneiss. It comes from NE Brazil, and is part of an ancient remnant of the Earth's continental lithosphere, around 2500-2000Ma. In the centre of the roundel the stone used is known as Vånga Granite, a rich wine-red granite from Skåne in southern Sweden which features red feldspar and black biotite crystals. It is strongly deformed, so is technically a metamorphic rock. It derives from a vast area of granite intrusions around 1400Ma.

Retrace your steps along the concourse as far as the first flight of escalators. (stop 5). The map may help here.

Note here the use of Rosso Tigrato to surround the escalators, with a lozenge-shaped feature in Vånga granite between them. The escalator housing is faced with Yana Limestone, providing an opportunity to see some fossils without looking down!

Move on to the next flight of escalators (stop 6).

Two stones with contrasting purplish-blue shades are used here, as paving to surround the escalator and to face the escalator housing. The darker one is Vizag Blue (trade name) and the lighter one is known as Orissa Blue. They are both ancient migmatitic gneisses from a belt of metamorphic rocks in eastern India, around 2000-1500Ma.

Look closely, and you will see that they both contain dark red garnet crystals, and opalescent quartz. The lighter Orissa Blue also shows large brick-shaped crystals of light grey feldspar. Note also the diamond-shaped paving feature near the bottom of the escalator. This makes attractive use of the two stones, contrasted against the Yana Limestone.



Orissa blue gneiss with garnets

Go up two flights of escalators to the upper mall. Turn round, and head towards the end of the concourse.

The yellow fossiliferous Yana limestone again forms the bulk of the paving, and there is continuity with the Lower Level design with further diamond-shaped features using Vizag Blue and Orissa Blue stone.

Exit the Bullring, heading towards a conspicuous blue stained glass window. Follow the linkway round to emerge on the upper level of Grand Central Mall.

7. Grand Central

The development which encompasses the remodelled New Street railway station and Grand Central shopping mall opened in 2015. The upper level of Grand Central is paved with two contrasting natural stones, yellow Jura Marble and black Nero Marquina (trade names). Both provide a feast for fossil hunters. Jura Marble is also used as cladding on the walls and round the windows at the end of the linkway. It is not a true marble, but is a fine example of a polished limestone. It comes from the German Jura mountains in Central Bavaria, and is Late Jurassic in age, around 145Ma.

There are spectacular examples of coiled ammonite shells, and the black bullet-shaped tail pieces of belemnites (extinct cephalopods) are easy to spot against the light background. Sponges were common in the Jurassic seas, and the remnants of these show as mottled, brown, sometimes ring-shaped structures. Harder to spot are the 'tubiphyte' worms, but close inspection reveals their countless fossils, showing up as tiny white flecks.



Belemnite and Ammonite



Tension cracks


The contrasting black stone is Nero Marquina, a limestone of mid-Cretaceous age, around 125Ma, from the Basque country of NE Spain. Like the Jura Marble, it takes a mirror-like polish, and the black colouring is due to the presence of organic material.

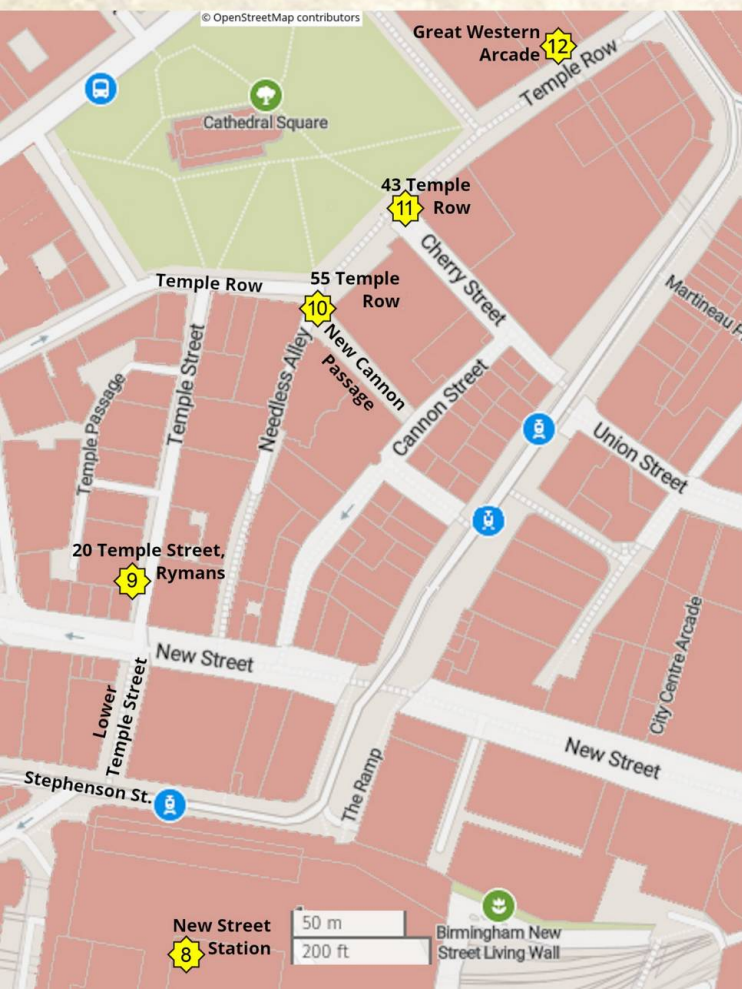
Bivalves and corals can be found showing up as white fossils against the black background. More prominent are the numerous sets of 'en echelon' tension cracks, infilled with white calcite. These show that the rock formation was subjected to pressure causing cracks to form, and it was weakly deformed.

Follow the shopping mall clockwise and go down the second set of escalators (on the right) to the station concourse.

8. New Street Station

Hard-wearing granites are used to pave the main station concourse and the surrounding area, with contrasting dark grey and white stones. Like those seen earlier in St. Martin's Square, they are from China.

 The dark stone is known in the trade as Kobra Granite, a fine to medium-grained igneous rock from Fujian province in SE China. The white stone is known as Royal White Granite: a true granite, coarse-grained, with clearly visible crystals of feldspar, quartz and biotite. This comes from Guangdong province to the south of Fujian.



Igneous Rocks


Igneous rocks are formed from molten material or magma which comes from deep under the Earth's surface. When the magma solidifies underground it is known as an **intrusive** igneous rock. The slower the cooling process, the larger the crystals. **Granite** is an intrusive rock showing a distinct crystal structure. Crystals of quartz, feldspar and mica (black biotite and clear, flaky muscovite) are commonly visible. The colours vary in accordance with the composition of the magma. When the magma solidifies above the surface (e.g. from a volcanic eruption) it is described as **extrusive**. Exposed to the air the magma will cool more rapidly, resulting in smaller crystal sizes, e.g. **basalt**. Geologists divide igneous rocks into many categories, but in the building trade they all tend to be grouped together as granite. The three trails cover a wide variety of building stones of igneous origin.

Both of these granites were intruded during the Late Jurassic to Early Cretaceous periods, 180-130Ma, in association with volcanic activity and tectonic earth movements along the continental margins of SE China.

From the bottom of the escalator, head slightly left, and exit the station onto Stephenson Street. Leaving the station and 21st century enclosed shopping malls behind, cross over and head up Lower Temple Street to New Street, through part of Birmingham's pre-1960s shopping centre. Cross over and continue on the left side of Temple Street to No. 20 (Ryman's at the time of writing in 2021).

9. 20 Temple Street, Ryman Stationers

Though unimpressive at first sight, this is one of Birmingham's top fossil spots! It is clad with a Carboniferous limestone, around 340Ma, known as Derbydene. It comes from the district of Cromford in Derbyshire.

 This spectacular stone is packed with crinoid fragments. Crinoids are also known as sea lilies. Though they look like plants, they are in fact sea creatures attached to the sea floor with a stem. They are related



Derbydene limestone

to star fish, and similarly show 5-way symmetry. The stem segments, or 'ossicles', are up to a centimetre in diameter, and stem sections are up to 10 centimetres long. The orange colour comes from a process known as 'dolomitisation', which occurs when magnesium-rich fluids circulate through the rock after it has solidified.


Continue up Temple Street towards the Cathedral Square and turn right into Temple Row, passing by a patch-work of granites round the recessed window of Nos. 61-63, at the corner of Temple Row and Needless Alley. Cross Needless Alley to the wall opposite.

10. 55 Temple Row, CBRE Building



Portland Roach Stone


This wall forms the south side of the impressive CBRE building, and is clad in a variety of Portland Stone known as Roach Stone. Fossil fragments are abundant, but even more prominent are the cavities where the original shell material has leached away. Like the other Portland limestones, Roach Stone is of Jurassic age, around 150Ma, and comes from the Isle of Portland in Dorset.

 Look for oyster shells, bivalves (rather like modern cockles), and a distinctive spiral snail shell known as the 'Portland Screw'. A small detour down New Cannon Passage will reveal more fine specimens.

The trail continues along Temple Row following the wall of No. 55. Cross Cherry Street to No. 43 Temple Row.

11. 43 Temple Row

The lower cladding, pillars and steps are made of a variety of Rapakivi granite known in the trade as Baltic Brown. It is a popular decorative stone from SE Finland used for exterior and interior work, and is particularly well displayed here. It is quarried from an igneous complex around 1500Ma, near the Finnish/Russian border.

 Look for the distinctive 'ovoid' shapes of pink-brown coloured feldspar which characterise this attractive variety of Rapakivi granite, and note the great range of crystal colours, shapes and sizes. Look out for it elsewhere around the City Centre!

Sedimentary Rocks


Sedimentary rocks are made of particles and fragments which have accumulated over time and gradually been compressed and cemented into rock, usually showing distinct layers or beds which we can see in exposed surfaces and building stones. **Sandstones** are sedimentary rocks formed when silt, sand and small particles have been carried by rivers to settle in lakes or in the sea, or blown by the wind to form desert sand dunes. Cross-bedding is a common sedimentary feature, formed when the water flow or wind changes direction, causing the sediment to be deposited at an angle to the previous deposits. **Limestones** are sedimentary rocks made largely of the mineral calcite which is mostly produced by biological activity. Calcite shells and skeletons are gradually broken down by wave-activity, but large fragments and whole specimens may be preserved as distinct fossils. There are many examples in the limestones seen on these three trails.

12. Great Western Arcade

The Arcade is one of the last surviving examples of Birmingham's Victorian shopping arcades. Dating from 1876, it was built over the railway track adjacent to Snow Hill station. That end of the arcade sustained WW2 bomb damage, but the Temple Row façade remains intact. It is elaborately carved in Renaissance style using Bath Stone, an attractive honey-coloured limestone of Jurassic age, around 168Ma.



Bath Stone entrance to the Great Western Arcade

 Bath Stone has an 'oolitic' texture, like Portland Stone, but

here the ooids are generally larger and it is easy to see the cavities left as the ooids weather away. Stand back to appreciate the grandeur of the monumental stonework, with figures personifying Art and Industry above the arch, and take a few moments to reflect on the ever-changing face of Birmingham's retail world, as seen through the materials which have constructed and decorated its buildings.



Oolitic texture of Bath Stone

This trail ends here. We hope you have enjoyed it.

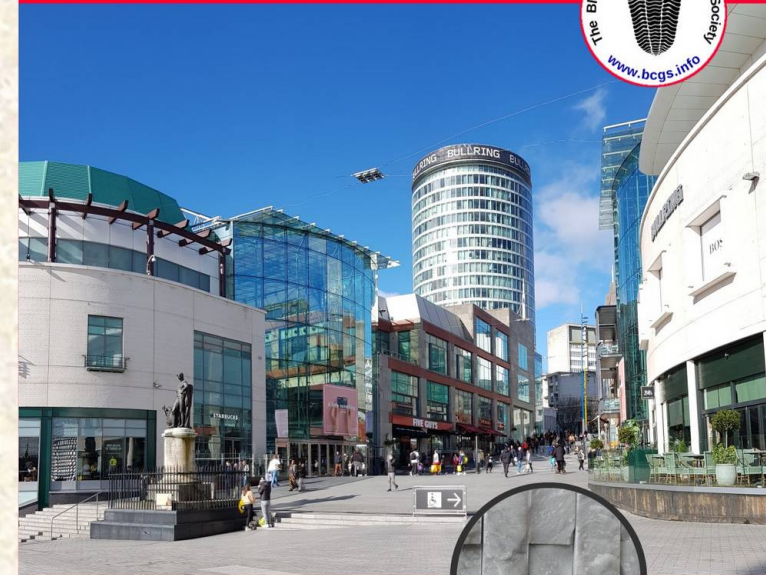
Trails 1 and 2 explore more geological secrets hidden in the buildings of Birmingham. These three trail leaflets and the fuller versions of all the trails (Siddall, R., et al., 2016) can be found on the Black Country Geological Society's website at: <https://bcgs.info>. Produced by members of the BCGS. © Black Country Geological Society, 2021.



Building Stones of Birmingham

A three part tour telling stories of the stones which built the city

Trail 3 Around the Shops



Take a closer look at Birmingham's buildings and travel back into the depths of geological time!

Walk alongside the ramp and turn right up the steps into the porch area to look at the ivory-coloured wall ahead.



Tivoli Travertine

This is clad in Tivoli Travertine, which comes from Bagni de Tivoli near Rome. Travertine is formed when calcium carbonate precipitates from warm, geothermal waters, usually containing fragments of vegetation. This decays over time, leaving irregular shaped cavities. These deposits formed during the period of the Ice Ages, 2.6Ma-11.8Ka (thousand years ago). The most recent of the Tivoli deposits are just 30Ka, making them the youngest building stone you will encounter on any of the three Birmingham Building Stone trails.



Rapakivi granite

Continue along Temple Row to the Great Western Arcade entrance, on the left.