

Trail 2: Centenary Square to Brindleyplace

Centenary Square has been the focus of many attempts at civic centre planning, and the area from here to Brindleyplace is now unrecognisable from the derelict industrial remains that were here until the end of the 1980s. Centenary Square's most recent redevelopment was opened in July 2019.

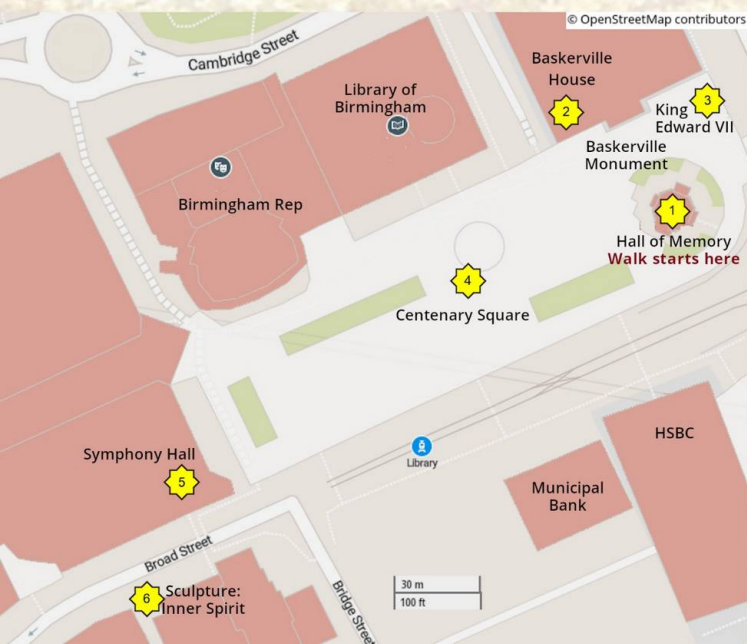
This trail starts with the stones used in buildings and paving around Centenary Square, then along Broad Street you will see the oldest building stone to be found anywhere in the three trails. Via Oozell's Square you will emerge into Brindleyplace Central Square, where the paving is our focus. This is the second of three trail leaflets for the Building Stones of Birmingham City Centre.

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.)*

The trail is about $\frac{3}{4}$ mile long (1.3km).

The walk starts at the Hall of Memory, prominently situated at the eastern end of Centenary Square. It is one of three similarly constructed buildings.



Centenary Square, showing Symphony Hall, the water feature and paving setts from China

1. Hall of Memory

A memorial to those who lost their lives in the Great War, the Hall of Memory is in a classical Greek style, and was completed in 1925. *(See the front cover photo with a detail of fossil shell debris.)*

The main part of the building is in white Portland Stone, the Whitbed variety. *(See the box on Portland Stone and the box on Sedimentary Rocks.)*



Look for fragments of fossil shells standing proud from the surface. These are mostly from an extinct species of oyster. In places you can see the hinged part of the bivalve shell. Close examination with a magnifier or hand lens should reveal the oolitic texture in the matrix (surrounding stone).



Oyster shell in the Hall of Memory wall

The base of the Hall of Memory is made of a coarse-grained granite from Cornwall. *(See box on Igneous Rocks.)* It was intruded towards the end of a mountain building episode in the early Permian period, 299-275Ma (million years ago).



This granite is characterised by two types of the mineral mica. These are black 'biotite', and silvery-white 'muscovite'. These mineral crystals catch the light, making this an attractive building stone.

Take a few steps to the north from the Hall of Memory towards the imposing building of Baskerville House. Pause at the Monument to John Baskerville, where you can find more examples of typical Portland Stone fossils.

2. Baskerville House

Baskerville House was completed in 1940 and housed offices of Birmingham City Council until 1998. In keeping with the Hall of Memory, it is built mostly from Portland Whitbed stone on foundations of Cornish granite.



Note that the Portland Whitbed masonry on the ground floor has been rusticated to give the appearance of greater weightiness.

Look at the fine carving on the heraldic arms and garlands above the main doorway. The stone used here is Portland Basebed. Above the doorway, the upper stories are in smooth ashlar masonry, meaning that they are finely dressed in regular shaped blocks, which is one of the most common uses of Portland Stone.

3. Statue of Edward VII

A regal statue of King Edward VII stands close to Baskerville House. The spectacular plinth, adorned with bronzes is of sandstone, whereas Edward himself is in

Portland Stone

Portland Stone has been quarried as a building stone since Roman times owing to its quality and attractive appearance. It comes from the Isle of Portland in Dorset, which is now riddled with quarries and underground mines. The Portland limestones are Late Jurassic in age, deposited around 150Ma. They are oolitic limestones, which means they are made up of tiny egg-shaped grains or ooids. These form when sediment grains have been rolled around in a warm, shallow tropical sea, then become coated with calcium carbonate when evaporation has increased the concentration of dissolved carbonates. The stone is quarried from three beds: **Basebed** is the lowest in the sequence with few distinct fossils. This is the finest variety for decorative carving. Above this is **Whitbed**, which contains many shell fragments, especially oysters. This is the most widely used of the Portland stones, and can be found throughout the world in war memorials and Commonwealth war graves. On top is the highly fossiliferous **Roach Stone**, notable for its cavities where the original shell material has leached away leaving fossil shell casts. All the Portland building stones are freestones, which means they can be cut and carved in any direction. They are all encountered on these three trails.

pure white marble (in need of a clean at the time of writing). An Upper Carboniferous sandstone of unknown origin is used for the plinth; it is a medium-grained, quartz-rich sandstone probably from the Millstone Grit Group (*as detailed at stop No.8*). Stand back to admire the magnificent finely-carved statue made of pure white marble, probably Carrara marble from Tuscany in Italy. This was the main source of statuary marble in the early 20th Century. These marbles formed from earlier limestones, which were uplifted during the Alpine Orogeny (mountain building) around 30Ma. (See box on Metamorphic Rocks.)



Statue of Edward VII

The colonnaded building on the south side of Centenary Square, now dwarfed by modern developments, was built in 1933 as the First Municipal Savings Bank. The building was acquired by the University of Birmingham in 2016. Together with Baskerville House and the Hall of Memory, this trio of Portland Stone buildings represent the unfinished early 20th century plan for a grand new civic centre.

Our route takes us through Centenary Square past the library and Repertory Theatre to Symphony Hall.


4. Centenary Square

The new-look square (from 2019) now boasts natural stone where previously there was ornamental brickwork. Four varieties of igneous rock have been used in the paving and furniture. They are of Late Jurassic to Early Cretaceous age (160-130Ma), and come from eastern



Samples of paving setts from China in Centenary Square

China. The black and white stones come, respectively, from the Hebei and Shandong provinces around Beijing in the north, and the buff-yellow and red stones from Fujian province in the south.

 The paving is mostly made of small blocks or 'setts', in an attractive variety of colours. Larger slabs of the red stone are used around Baskerville House, giving a better chance to see the structure and texture of this stone. The light grey-white granite is used for the furniture. This is a two mica granite, in keeping with the foundations of the older buildings seen so far. The black 'granite' (more likely an extrusive igneous rock) is used for the central water feature.

Passing the new Symphony Hall frontage (completed in 2021) turn the corner into Broad Street and stop to look at the façade of the original building.

5. Symphony Hall

Symphony Hall was built between 1987 and 1991 and the original part of the building is clad with granite, predominantly light grey, with a red stone used for bands and for columns on the Broad Street façade.



Symphony Hall granites

The grey granite comes from the Italian island of Sardinia, and is around 290-280Ma. It has a distinctive texture, with prominent large grey-white feldspar crystals.

The red granite is from SW Finland. It is one of the so-called Rapakivi granites all of which are characterised by red feldspar crystals. It is over 1500Ma. This type is known in the trade as Balmoral Granite.

Cross over Broad Street to the complex of buildings around Regency Wharf, aiming for the stone sculpture.

6. Sculpture: Inner Spirit

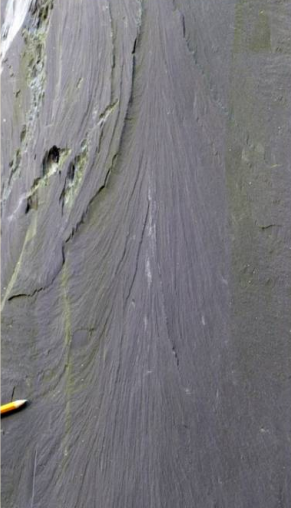
This public artwork lies in a walkway to Regency Wharf, between the Regency Hyatt Hotel and Wetherspoons pub. Of geological interest are the monolithic slabs of slate. Slate is a metamorphic rock formed from a fine-grained sedimentary rock. Here, it is possible to see the original layers of sediment cut across by 'cleavage planes' which

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.

are formed by compression during metamorphism. The rock can be split along the cleavage planes.

This purple-coloured slate comes from North Wales and is of Lower Cambrian age (around 540Ma). The slabs have not been further worked following extraction. They have naturally broken along the cleavage and joint planes, which form flat surfaces. This stone is world-famous as a roofing slate, and is still quarried at Penrhyn Quarry near Bethesda, the likely source of this stone.



Inner Spirit Sculpture

 Look for the two different planar structures (bedding and cleavage) and for the prominent feather-like pattern on one of the surfaces. This feature is known as 'plumose structure' and forms as fractures propagate through a rock. The direction of propagation goes from the base of the feather to the 'plumage'. Can you work out in which direction this rock split?

Next door is a rather drab-looking building, housing a branch of Wetherspoons. Step a few metres around the corner to view the Broad Street frontage.

7. Wetherspoons: The Soloman Cutler

From a distance the façade could be mistaken for concrete or Portland Stone, but it is in fact a smoothly-finished ivory-coloured oolitic limestone from Portugal. This is of mid-Jurassic age, around 168Ma.

Look for the rich variety of fossil debris, mainly sections through bivalve shells and echinoid spines. Ooids are just visible to the naked eye, especially at the corner of the building where damage reveals a rough surface and the ooids stand out.

The foundation of this building is a metamorphic rock from SE Brazil known in the trade as Verde Candeias. It is a migmatite derived from granite, and at 2750Ma it is the oldest rock seen on the three trails. (See box on Metamorphic Rocks.)



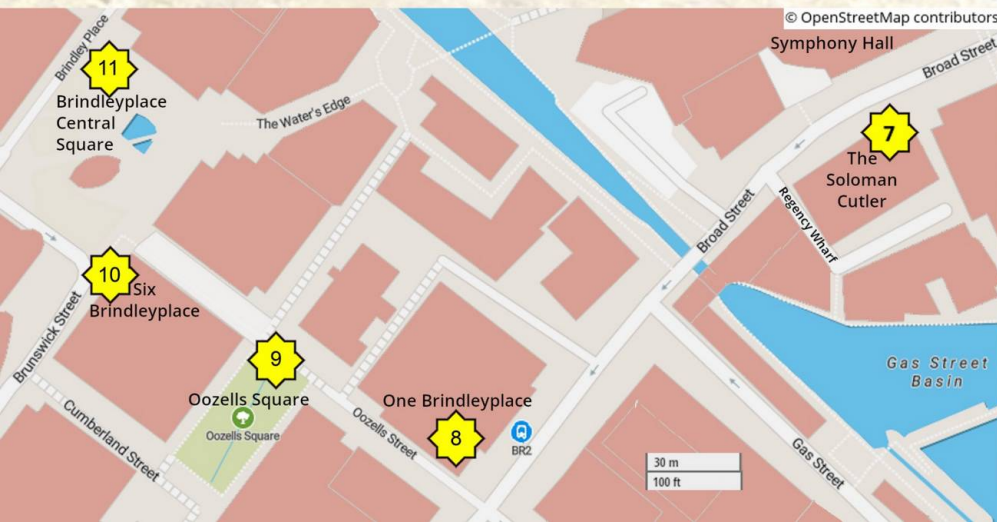
Xenolith in Verde Candeias

Walk along Broad Street past Wetherspoons, turn left and walk a short way along Regency Wharf.

The building here shows Verde Candeias in all its glory.

Look for black inclusions in the green coloured stone. These are chunks of rock picked up by the original granite magma, which have retained their identity despite metamorphism. They are known as 'xenoliths'.

Cross Broad Street, and walk on to One Brindleyplace.



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).

8. One Brindleyplace

This building belongs to the Brindleyplace development of the mid 1990s. The steps and paving of the colonnade are made of a medium-grained gritty sandstone showing a number of interesting features. It is most likely 'Rough Rock' York Stone, One Brindleyplace from the Millstone Grit group of sandstones, collectively known as York Stone in the building trade. These are sourced from many parts of the Pennines. They formed from sandy sediments washed down from high mountains to form massive river deltas, and date from the Carboniferous period, around 320Ma.



York Stone, One Brindleyplace

Look for examples of cross-bedding where layers of sediment are inclined in the direction of water flow. Changes in flow direction are recorded by the new alignment in each layer. There is evidence of organic material which shows up as black streaks of material and larger fragments of plant fossils.

Irregular lines show where patches of partially bedded sand crumpled and deformed before lithification. Iron staining is marked by brown-orange patches and lines. Note the bedding plane exposed in the steps at the corner of Oozells Street, tilted at a shallow angle to the step surface. Erosion here shows that this stone has poor resistance to weathering.

Follow the colonnade along Oozells St. to Oozells Square.

9. Oozells Square

The old Gothic-style Oozells Street School (1877) has been preserved in the new development and dominates this attractive square. The central sculpture is composed of six granite benches and a granite arch. These are made from another two-mica granite similar to those seen in Centenary Square, though this one comes from Cornwall. The rill is lined with a black dolerite, most probably Nero Zimbabwe (trade name), which is widely used for kerb stones. This is an intrusive igneous rock around 1800Ma, from Mashonaland in Zimbabwe.




Oozells Square

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.

Reclaimed cobblestones form a colourful patchwork at the exit from Oozells Square heading towards Central Square. A wide range of stones, mostly of igneous origin, were used for cobbles in the 18th and 19th centuries.

 Compare the variety, crystal size and colours in the igneous rocks represented here. The fine-grained dark grey setts are most likely 'Rowley Rag' from Rowley Regis in the Black Country, once a common sight in Birmingham's streets. Like Nero Zimbabwe, this stone is dolerite, but much younger. It formed during volcanic activity in the Carboniferous period around 300Ma.


Continue towards Central Square, and turn left up the steps into the covered walkway overlooking the Square.

10. Six Brindleyplace

Dating from the early 1990s, the buildings of Brindleyplace are dominated by brickwork, but look down, and the paving reveals a feast of geology. This walkway belongs to Six Brindleyplace, and is paved with York Stone similar to number One, but here showing more striking sedimentary features.



Pebble line marking the edge of a channel

 The stone is a very coarse-grained sandstone showing a wide variety of grain sizes, including small pebbles. These have been sliced through to make a level surface. Curved boundaries mark the edges of channels where the sediment was deposited. Many slabs show current cross-bedding. The dramatic sedimentary structures here are evidence of a fast flowing river with many channels, possibly caused by episodes of flash flooding.




Central Square, Brindleyplace

At the end of the walkway turn right into Central Square.

11. Central Square, Brindleyplace


The steps around the central paved area are constructed from Portland Whitbed Stone. This is the only example of its use for paving within the three trails.

 Fossils are sparse, but there are a few examples of a clam-like bivalve with shell material preserved. You may also find examples of the gastropod known as the 'Portland Screw'.



Portland Screw

The Square was originally paved in York Stone showing similar features to the earlier examples, but in 2020-21 this has gradually been replaced with a harder variety from the Crosland Hill quarries, near Huddersfield in Yorkshire.

 The fine grained even texture of the new sandstone paving indicates that it was laid down in calmer water than the sandstone at stops 8 and 10. Note the colourful lines and swirls in many of the paving stones. This is called Liesegang banding, a form of iron staining produced from circulating ground water percolating through the rock.

The upper part of the fountain at the eastern corner of the square features a polished kerb of Rapakivi granite. This is the variety known in the trade as Baltic Brown, a popular decorative stone from Finland, known for its distinctive 'ovoids' of pink-brown coloured feldspar. Like the Balmoral Granite of Symphony Hall, it comes from an igneous complex around 1500Ma.

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

Trails 1 and 3 explore more geological secrets hidden in the buildings of Birmingham. These three trails 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

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