

DUDLEY GEOLOGICAL HERITAGE TRAIL

Discover millions of years
of geological history along
our heritage trail

Dudley
Metropolitan Borough Council

July 2019

 **HERITAGE
FUND**

WELCOME TO DUDLEY'S GEOLOGICAL HERITAGE TRAIL

This tour allows you to experience Dudley's fascinating history through its buildings and forms just one part of Dudley Council's suite of self-guided tours for the town centre - including the brilliant heritage trail (detailing 40 key locations throughout the town), Dudley Time Trail (30 bronze ground plaques) and the Tecton Trail (Dudley Zoo's 12 examples of 1930s reinforced concrete structures). Find out more about these trails at www.dudley.gov.uk (search Dudley trails).



1 ST JAMES'S ROAD

Start at Dudley Library in St James's Road, which is partly made of Tixall Sandstone from North Staffordshire. The pale yellow sandstone's layers lie at different angles, known as 'cross-bedding', formed around 230 million years ago by flowing rivers during the Triassic Period.



Dudley's Town Hall was built in 1925. The corner doorway has the same yellow Tixall sandstone as the Library and Top Church (stops 1 and 6). The large carved bollard next to the door has a granite top that is speckled black and white and comes from Cornwall's Bodmin Moor. This is Permo-Carboniferous in age and is about 290 million years old. The bottom is 'Ebony Black' - a gabbro from Johannesburg, South Africa that is over 1,000 million years old!

2 FORMER DUDLEY MUSEUM & ART GALLERY, ST JAMES'S ROAD

Look at the windowsills made of red sandstone, displaying distinctive wavy layers (ripple marks seen edge on) these formed in a river during the Permian and Triassic Periods, 250 - 280 million years ago. The reddish iron minerals are oxidised demonstrating they were from a hot semi-arid condition. The red terracotta mouldings are probably made from local clays.



3 COURT PASSAGE COBBLESTONES

There are two distinctive cobblestone types. The white stone in the middle is Dudley Limestone formed during the Silurian Period, 428 million years ago. It formed as limey mud and shell sand on the bed of a shallow tropical sea covering the Dudley area. It is



quite soft and is worn into a smooth rounded surface. The second, at the edge of the road, is Rowley Rag, basalt or dolerite, quarried in the Rowley Hills. They are very hard, black, shiny, crystalline rocks and were once molten magma injected at about 1100°C during the Carboniferous Period, about 307 million years ago.

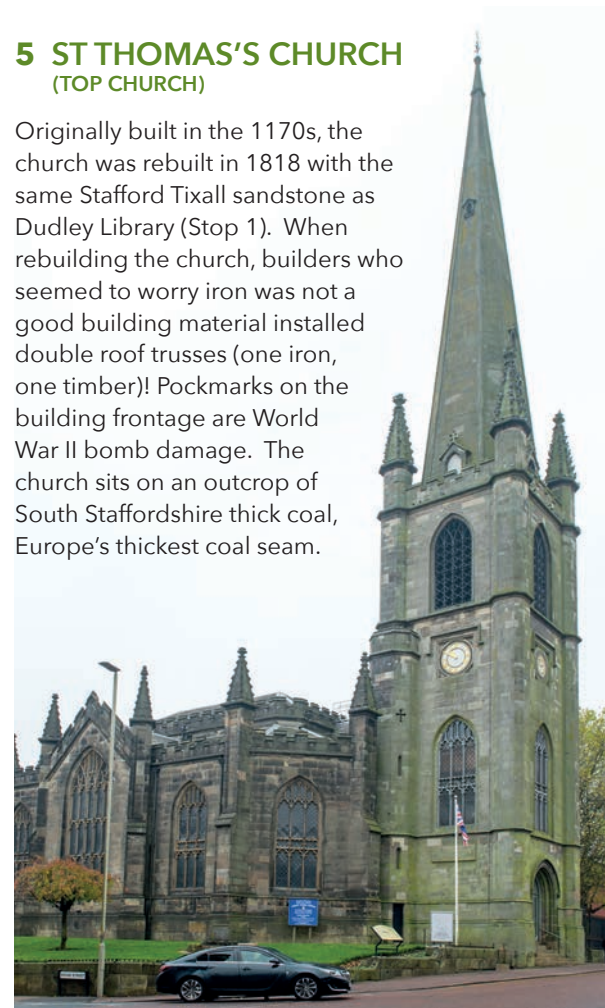
4 201 WOLVERHAMPTON STREET (THE CROWN INN)

This iconic building has decorative stones from around the world. The green roofing is Westmorland Slate which is actually fine volcanic ash that lay on a shallow seabed in the Lake District before being intensely squeezed by earth movements to become slates some 400 million years ago. They come from Spain. At street level, at the corner, around the front door, there are columns of speckled pink crystalline granite, 'Balmoral Red', from Vehmaa in south west Finland. It is around 1,500 million years old and gained the name 'Balmoral Red' being cut and polished in Aberdeen.



5 ST THOMAS'S CHURCH (TOP CHURCH)

Originally built in the 1170s, the church was rebuilt in 1818 with the same Stafford Tixall sandstone as Dudley Library (Stop 1). When rebuilding the church, builders who seemed to worry iron was not a good building material installed double roof trusses (one iron, one timber)! Pockmarks on the building frontage are World War II bomb damage. The church sits on an outcrop of South Staffordshire thick coal, Europe's thickest coal seam.



6 55 HIGH STREET (FORMER MCDONALDS RESTAURANT)

McDonalds used to dress their restaurants with distinctive and characteristic stone - Italian Travertine, quarried above Rome in the Tirolo Hills. It formed from mineralised waters from hot springs, which then evaporated, leaving layers of limy tufa about 3 million years ago during the Pliocene/Pleistocene Periods. This rock is naturally porous and full of cavities, many of which began as lime lined channels housing stems and roots and aquatic plants. These cavities have been plugged with cement or resin and polished.



7 47 HIGH STREET (BARCLAYS BANK)

The impressive building front is Portland Stone again, formed during the Jurassic Period some 140 to 150 million years ago when dinosaurs roamed the UK. Quarried on the isle of Portland, it is a limestone containing shelly oyster fossils. The quarry's basal bed -The Whit Bed - is the best source (thicker beds 1.5 to 2m thickness). Roach is the blotchy version, often rough and highly fossiliferous, dismissed by architects due to fossils and voids. It is often selected due to its white colour and ease of working.



8 23 HIGH STREET (SHIPLEY'S AMUSEMENTS)

This highly polished, ornate shopfront has large blue-grey crystals shimmering and changing colour. This is 'Larvikite', quarried in western Norway, formed by interlocking mineral crystals called feldspars. When two types of feldspars intermix, they reflect light, creating crystal reflections. There are also dark shiny metal mineral inclusions within the stone. During the Permian Period, about 295 million years ago, this was gooey molten magma below Norwegian mountains. It cooled very slowly forming large crystals before it solidified. This variety of Larvikite is called 'Blue Pearl'.

9 3 STONE STREET (FORMALLY GLADRAGS)

The storefront's 'Serpentine' rock is named by geologists because of its green veining and dark green background. It is a piece of ancient shattered



ocean floor thrust up onto the Greek islands when Africa crashed into Europe because of plate tectonics and continental drift. Hydrothermally altered by circulating hot waters passing through fractures, it has pale stripes and was probably quarried in the hills of Selonica in Greece. It was formed during the same earth-movements that created the Alps mountain range (the Alpine Orogeny). This rock is about 50 million years old.

We now move on to Dudley market place.

10 25/26 HIGH STREET (BOOTS PHARMACY)

Below the windows of the pharmacy you will find the stone called Gabbro, made up of very dark crystals rich in iron and magnesium, including Olivine (known as peridot when gem quality) and black glassy minerals known as pyroxenes. This Gabbro is a very ancient hard stone able to take on a high polish. It has distinctive mottling of grey and black, known as Rustenberg gabbro quarried in the Pretoria region of South Africa in the Bushveld complex. It is Pre Cambrian age, almost 2 billion years old (2,000 million years!)



11 39/41 HIGH STREET (WILKINSONS)

Here you will find another black Gabbro, also probably from South Africa, and more than 1,000 million years old. This type is called 'Bon Accord'. Here we also see a pale granite from Bodmin Moor in Cornwall (very pale and speckled). This formed deep in the Earth about 290 million years ago.



12 226 HIGH STREET (HSBC BANK)

The front is dressed in stones different in texture and colour. You have Portland Stone (this is also the rock type seen in Stops 5 and 8) clearly showing some nice squashed fossil mussels. The pale green dull surfaced stone is Westmoreland Slate, which is volcanic ash from the Borrowdale quarries of the Lake District. They were formed as ash layers falling from erupting volcanoes, some 490 million years ago during the Ordovician Period. The ash was buried deeply and



compressed by earth movement; turning it into the rock we now call slate, which can be split easily into slabs for building purposes.

13 THE FOUNTAIN





The fountain was erected in 1867 on the site of the old town hall and was a gift of the Earl of Dudley to encourage 'temperance' by providing clean drinking water. It was designed by John Forsyth using four different stones;

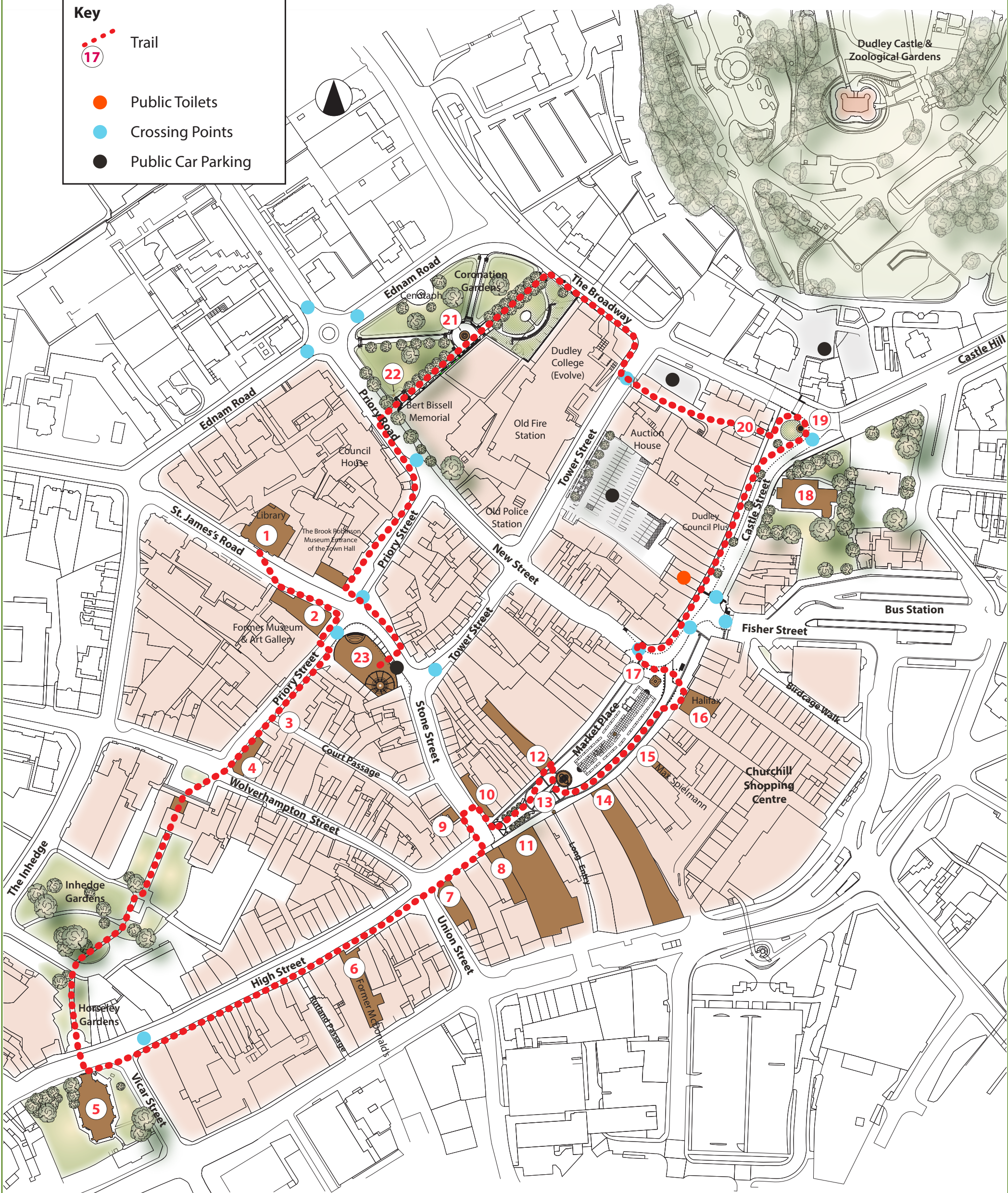
1. Carrara marble from Italy makes up the scrolls and lion's head
2. Portland stone with fossil oysters of the Jurassic Period
3. Pink Peterhead granite from Stirling Hill, Boddam, Scotland
4. Grey Rubislaw granite from Aberdeen



GEOLOGICAL HERITAGE TRAIL MAP

Key

-  Trail
-  Public Toilets
-  Crossing Points
-  Public Car Parking





14 34 HIGH STREET (FORMER LITTLEWOODS)

This is the older, much darker, quarried version of Larvikite, ‘black pearl’ or ‘green pearl’ dependent upon its colour. It is quarried at shallower levels where it is affected by weathering by rain and ice, altering its minerals over time. It formed during the Permian Period, about 295 million years ago, as molten magma deep below the Norwegian mountains. The main mineral grain is Labradorite feldspar which gives it the blue shimmering effect known as ‘schillerisation’. The quarries are on the eastern shores of Norway’s Oslo Fjord, and it is often imported to the UK prior to polishing in the UK.

15 24 HIGH STREET (MAX SPEILMAN)

The shop front has polished panels of ‘Baltic Brown’ a special type of orbicular granite in the process of ‘digesting’ itself. You can see the sharp edges of the big crystals of feldspar in stages of reacting with magma, where they dissolve and become rounded ‘balls’ before cooling to the point that the rock solidifies. Look closely and you will see layers of small crystals trapped in the large round feldspar crystals. This rock is very ancient, more than 1.5 billion years old and quarried at Imatra in Finland. Geologists refer to it as ‘Orbicular Granite’.

19 EARL OF DUDLEY STATUE

The sculpture, produced by Charles Bell Birch, is Sicilian marble to mark Viscount Ward becoming a hereditary Earl. The base is Carrara marble from Italy when Jurassic limestone of approximately 20 million years of age was squeezed and heated by great earth movements that created the Alps and turned the limestones into marble. The column is a wonderful example of Cornish granite with large white feldspars. It probably came from Penryn quarries and includes some darker blobs called ‘Xenoliths’ that are different rocks absorbed into the magma as it squeezed up into Cornwall some 285 million years ago during the Permian Period.



20 GREEN MAN ENTRY



This is a good example of a surviving medieval lane within Dudley. It is paved with dark hand cut ‘setts’, black or dark green ‘Rowley Rag’ cobbles, quarried in the basalt (dolerite) of the Rowley Hills. It is fine crystalline rock with the same minerals as the gabbros. The small grain size shows that it cooled quickly. It squeezed into

the Black Country coalfield as molten magma about 307 million years ago in the Carboniferous Period. The entrance plaque was produced by Dudley Borough Artist, Steve Field, to keep a watchful eye over passers-by!

We now move to Coronation Gardens.

16 15 CASTLE STREET (HALIFAX BANK)

The frontage is polished slabs of Sardinian grey granite, also known as ‘Rosa beta’, quarried from the Gallura region of Sardinia. It is the cheapest granite in Europe and is identifiable by the dark and light shiny mica crystals, plus the pale pink crystals (feldspars). It was formed sometime between the end of the Carboniferous Period to the early Permian Period, about 280 – 300 million years ago.



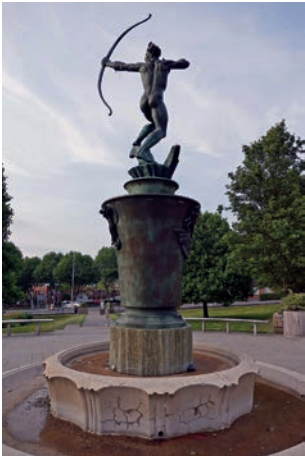
17 DUNCAN EDWARDS’ STATUE

Duncan Edwards was a very famous footballer player born in Dudley, who played for Manchester United and England until his death in the 1958 Munich air disaster. In October 1999, this statue, created by sculptor James Butler, was unveiled by his mother and Sir Bobby Charlton. The plinth is Hoptonwood Limestone from the Matlock area of Derbyshire. The cream fine-grained limestone formed when the area was a shallow, warm tropical sea during the Carboniferous Period, 350 million years ago. Look closely to see fossils of seashells and ring shaped ‘ossicles’ of stems of sea lilies (crinoids).



21 STATUE OF APOLLO

Located adjacent to the Council House is Coronation Gardens where you will find the Apollo Fountain, unveiled in 1939. This bronze statue stands on a plinth of veined green and dark green ‘Verde Tinos’, Serpentine rock. This is a better example than that at stop 10 as it is highly stripped and not shattered and broken. It is also probably from the hills of Selonica, Greece and formed as the result of the collision of Africa and Europe plates, approximately 50 million years ago.



22 BERT BISSELL MONUMENT

Bert Bissell was a well known local man who created a peace cairn at the summit of Ben Nevis. He scaled the mountain more than 100 times and dedicated his life in the service of others, particularly under-privileged children. This symbolic cairn of Dudley limestone (Lower Quarried Limestone, Silurian Period, around 429 million years ago) was placed here in 2003. It was obtained from Wren’s Nest National Natural Reserve



with special permission and contains well-preserved fossil sea creatures from the ancient coral seas, which covered the area at that time. Dudley was located where Brazil now lies back then!

18 ST EDMUND’S CHURCH (BOTTOM CHURCH)

The original church appeared during the reign of King Alfred around 870 AD, deliberately demolished during the 17th Century Civil War and rebuilt in 18th Century. The building’s corners and many gravestones use local honey coloured sandstone, ‘Gornal Grit’. This rock formed in the late Silurian Period, around 390 million years ago in a sandy delta or estuary, where a river poured out into the sea. The carved gravestones show the softness of sandstone, eroding with time. The church itself sits on older Silurian shales at the edge of limestones quarried here and around Castle Hill. These are about 428 million years old.



23 STONE STREET SQUARE

The final stop is Stone Street Square.

The square underwent major refurbishment in 2011, when this area became an events space. The flooring traces the outline of a glass cone and its internal workings. The Chinese grey granite is used for polished speckled paving slabs tracing the outline of the former glass cone. These were formed as molten rocks deep beneath a large mountain chain which collided between two continents in the Fujian Province and are from quarries in the Xiamin area.

The sculptural seat near to the former museum is a depiction of Dudley Castle made of Swedish granite which is more than 400 million years old. On the floor there is a children’s maze created from hand-carved blocks (setts) of Mount Sorrel granites from Leicestershire. The central blocks are special as they have a range of textures and mineral veins formed when cooling beneath the surface of the earth some 250 million years ago.

The yellowish paving around the square is a flagstone called ‘Winter Green’. It is actually a fine-grained sandstone – ideal for paving slabs due to ease for splitting. Originally, it was sand deposited into flowing rivers in the Kota area near Rajustan, India. These flagstones are approximately 290 – 350 million years old. The yellow gritty road surface is very hard-wearing Chinese bauxite.

