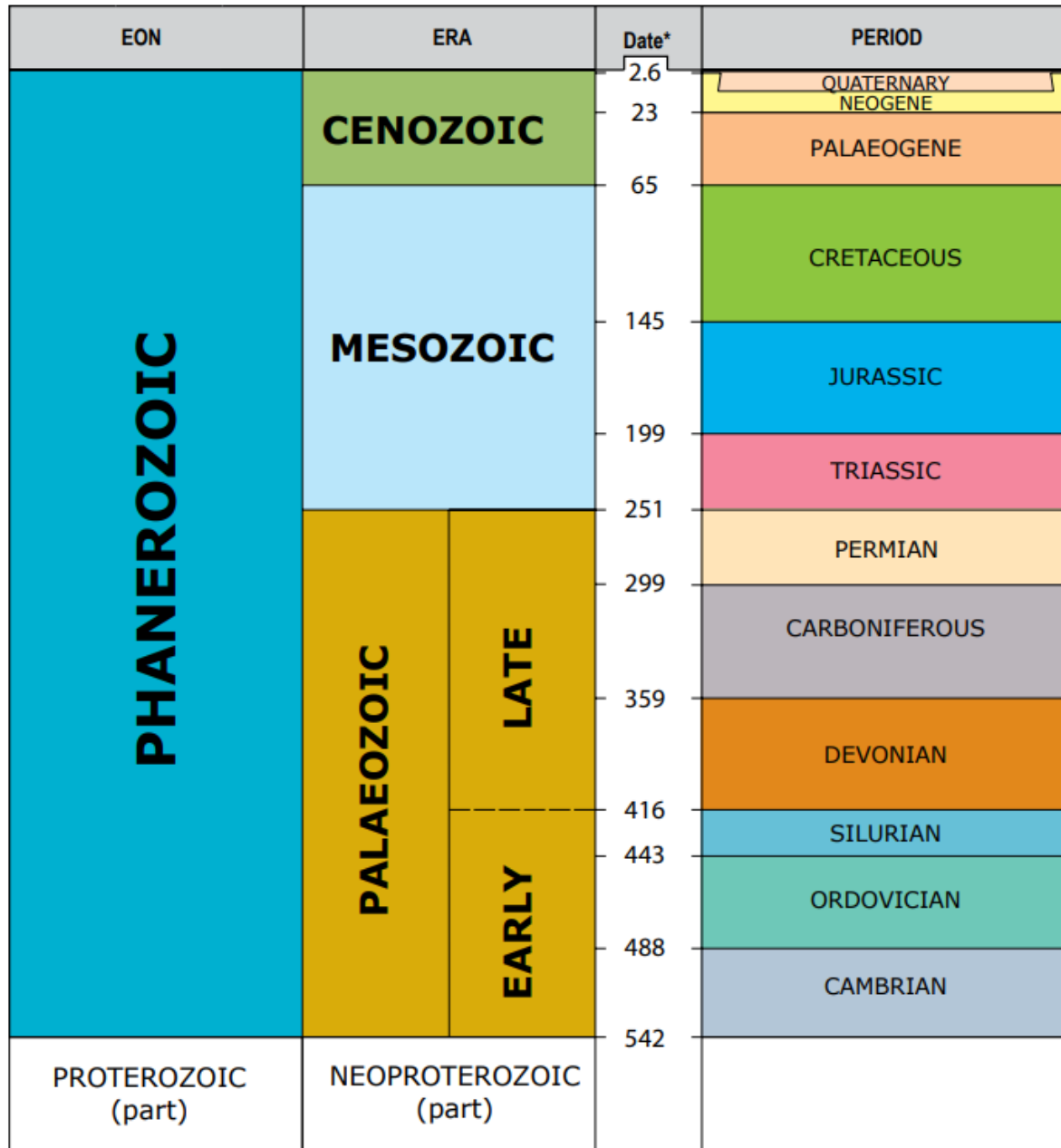




A Virtual Building Stones Walk in Pinner

BGS Geological Timechart



The walk visits the Parish Church, the High Street and Bridge Street then finishes in the Pinner Memorial Park.

The building stones we will see are from several periods shown in the chart going back to the Cambrian and a few are much older.

*Ages and dates are in millions of years (Ma).

The timechart was produced by the British Geological Survey.

Pinner is in the London Borough of Harrow and the High Street still retains its village atmosphere. Geologically, Pinner lies on the Paleogene Reading and London Clay Formations in the London Basin. The London Clay was laid down in the sea about 50 million years ago and the older Reading Formation (mainly clays and sands) was deposited in coastal swamps, estuaries and deltas. An upfold in the underlying Cretaceous Chalk brings it close to the surface in the north of the parish, where it was quarried and mined until the late 19th century.



Queen's Head, High St



Church Farm

We begin at the Parish Church of St John the Baptist.

Situated at the top of the High Street, the main building material in this 14th century church is **flint**. The nearest sources were medieval chalk pits 1-2 km to the north but most of the flint may date from 19th century restoration.

You will see here that other stones were used, brought in from further afield mainly by river and cart.

The church's restoration introduced stone from further afield still, made possible by the canal and railway network.



Walling

Other than **flint** (F), two other local stones can be seen here – iron-cemented **sandstone** or **ferricrete** (Fe) and a very hard **sandstone** called Sarsen (S) i.e. **silcrete**.

The flints were knapped to make them flush with the wall.

Ferricrete and sarsen blocks occur locally in the Reading Formation:

- Ferricrete formed when gravelly sand was cemented by iron oxide-rich groundwater concentrating above a less porous layer
- Sarsen stone was cemented by silica-rich groundwater near the surface during the Paleogene and Neogene when the climate was much warmer than today.



Quoin Stones, South Transept

This is the best example of the use of **ferricrete** in the church.

These dressed blocks probably came from the local medieval workings in the Reading Formation and the Chalk.





North wall

Sarsen boulder (length about 30cm) with holes where pebbles and/or plant roots were.



The Tower

The tower (SW buttress shown) features a variety of stones other than flint and ferricrete. They are:

- *Kentish Ragstone* (K), a hard **limestone** from the marine Lower Greensand Formation of Lower Cretaceous age. The Kentish Ragstone has been quarried around Maidstone since Roman times and has been in common use in London and the South-East.
- *Magnesian Limestone* (M), a Triassic **limestone** that has a narrow outcrop from Nottinghamshire to Co. Durham.
- *Reigate Stone* (R), a marine calcareous **sandstone** from the Lower Cretaceous Upper Greensand of the North Downs. Its weak calcite cement has made it prone to weathering and has been replaced at the left end of the plinth. It was quarried, mainly underground, in east Surrey.

These stones were deposited in warm shallow seas.

Tower buttress

Here is a Jurassic **limestone** with current bedding. Rich in shell debris, it was laid down in a warm shallow sea which had bottom currents.

The source is uncertain, but it is similar to *Taynton Stone*, named after a village near Burford in Oxfordshire. The Taynton Limestone Formation is part of the Middle Jurassic Great Oolite Group which extends widely over the dip slope of the Cotswold Hills.

Alternatively, this could be from the Lincolnshire Limestone Formation of similar age.





Reigate Stone has again been used here, but it has weathered.



West Door

Bath Stone

For the 19th century restoration, Bath Stone was used for the porch and window dressings. Bath Stone is a Jurassic **limestone** from around Bath and North Wiltshire. Unlike Portland Stone it weathers yellow-brown owing to a higher iron content. The outer ribs are of a grey Jurassic **limestone**, like that seen earlier.





Grave slabs by the porch



Clitherow family crest

Three slabs are late 17th century, and one is 1701. They are of Carboniferous **Limestone**, laid down in warm shallow seas between c. 350 and 330 Ma. Then, 'Britain', owing to tectonic plate movements, was close to the Equator. The limestone of the darker slabs contains impurities of mud and organic carbon and would polish black.

The slabs are to gentry who lived in a mansion (demolished) on Pinner Hill at various times in the 17thC. The parallel ones are to Thomas and Christopher Clitherow (London merchants) **and?** The fourth (top left) is to Bartholomew Shower (London judge and politician). As the Clitherow surname originates from Clitheroe in Lancashire, it raises the possibility that the dark grey limestone came from there, where similar limestone outcrops. The provenance of the paler limestone is unknown. Transport would have been down-river and by sea to London.

The Loudon Memorial



The most prominent feature of the churchyard is the Loudon Memorial erected in 1809 by John Claudius Loudon. He was a horticultural writer who greatly influenced London's great squares and who created the definitive Victorian villa of suburban London. John Loudon erected it to make the grave of his father, William. For a time, William held the lease of Woodhall Farm, Pinner (where he lived with his wife Agnes who died in 1841) and the lease of another at Kenton Lane, on the other side of Harrow.

The memorial is of brick and coated in stucco. The **limestone** 'coffin' projecting through the monument sparked local legend: picture postcard descriptions of the memorial stated that *'William Loudon and his wife inherited some money under a will which stipulated that they should receive a certain sum so long as their bodies were above the ground. By burying his parents above the ground, a son sought to keep a bequest in the family'**. In reality William and Agnes lie in a vault below the memorial. John Loudon lies at Kensal Green, West London.

*Source: *Pinner through the Ages* by Walter Druett.

Woodbridge family grave

The sides of this 1850s tomb is in **slate** probably from the Penrhyn or Dinorwig Quarries in the Bethesda-Llanberis area of North Wales.

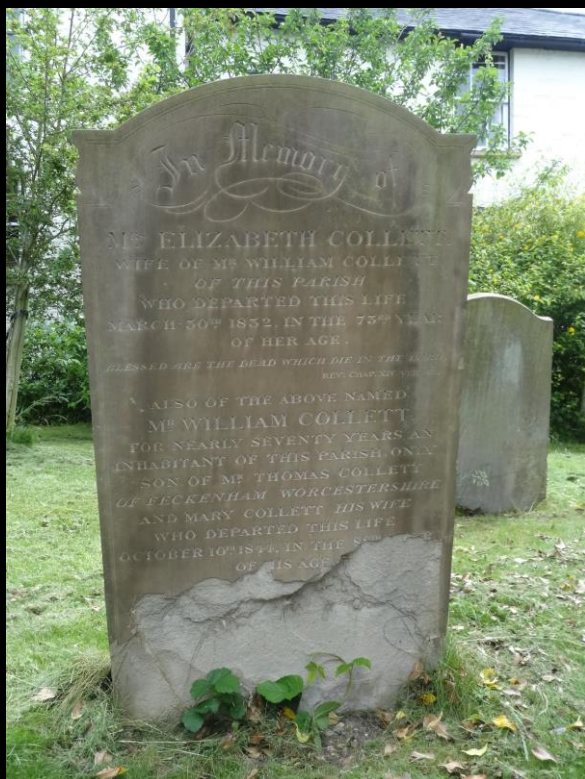
The colour of the slate is characteristic of the Cambrian Llanberis Slate Formation. Over 500 million years old, these sedimentary rocks are marine in origin. They accumulated from slurries of debris from the continental shelf flowing into the deep ocean. Heat and pressure generated by subsequent earth movements has metamorphosed the original mudstone into slate.

The headstones are of an unidentified **sandstone** in which faint traces of bedding (L-R downwards) are visible.



Examples of other gravestones in the churchyard

Mid-19thC. Upper Carboniferous micaceous sandstone similar to the Elland Flags from West Yorkshire. From the Coal Measures, much of the Elland Flags was mined. Spalling at the base.



1798 headstone, of yellow-brown Carboniferous sandstone, probably 'York Stone'. Also from the Coal Measures, this stone comes not from York but from West Yorkshire and Lancashire.



Churchyard paths

The paths are of York Stone. As just mentioned, it is an Upper Carboniferous sandstone from the Coal Measures and younger than the limestone seen earlier. This sandstone was laid down by rivers crossing coastal plains occasionally inundated by the sea.

Some surfaces show ripple marks. The rock flakes along the bedding planes and so provides a safe, rough surface for walking on. It is still quarried in West Yorkshire and Lancashire.



Lych Gate

The lych-gate was built as a memorial to those who served in the First World War.

The walls are of grey Kentish Ragstone with a capping of yellowish Bath Stone.



The High Street



Commemorative Stone

This stone on the green is of an igneous rock, **granite**. Igneous rocks are formed from molten material beneath the Earth's crust and can generally be recognised by the several different-coloured and variously shaped crystals that were formed as the rock cooled. The granite here consists of crystals of grey, glassy quartz, white feldspar and black mica.

Granite is often used for monuments because it is very hard wearing and resistant to weathering. It can be smoothed to a highly polished surface, but here the surfaces have been left rough.

The granite shown here resembles that which comes from De Lank Quarry on Bodmin Moor, Cornwall.



War Memorial

Erected in 1921, the column and upper plinth is made of Darley Dale Sandstone from Derbyshire. The sandstone belongs to the Carboniferous Millstone Grit Group (age c. 320 million years) and is rich in feldspar.

The sandstone was deposited by large river systems flowing from the direction of what is now Scandinavia.



War Memorial

The Memorial has a **granite** plinth and is surrounded by setts of different igneous rocks.

The granite contains a number of large white feldspar crystals (phenocrysts) and is most likely from SW England.

The setts are mainly **diorite** and **granodiorite** (pink & grey) from the Midlands, such as Charnwood Forest in Leicestershire.

Diorite is mainly feldspar and ferromagnesian minerals with little quartz.
Granodiorite is between granite and diorite in composition.
Dolerite (fine-grained **gabbro**) contains mainly ferromagnesian minerals.

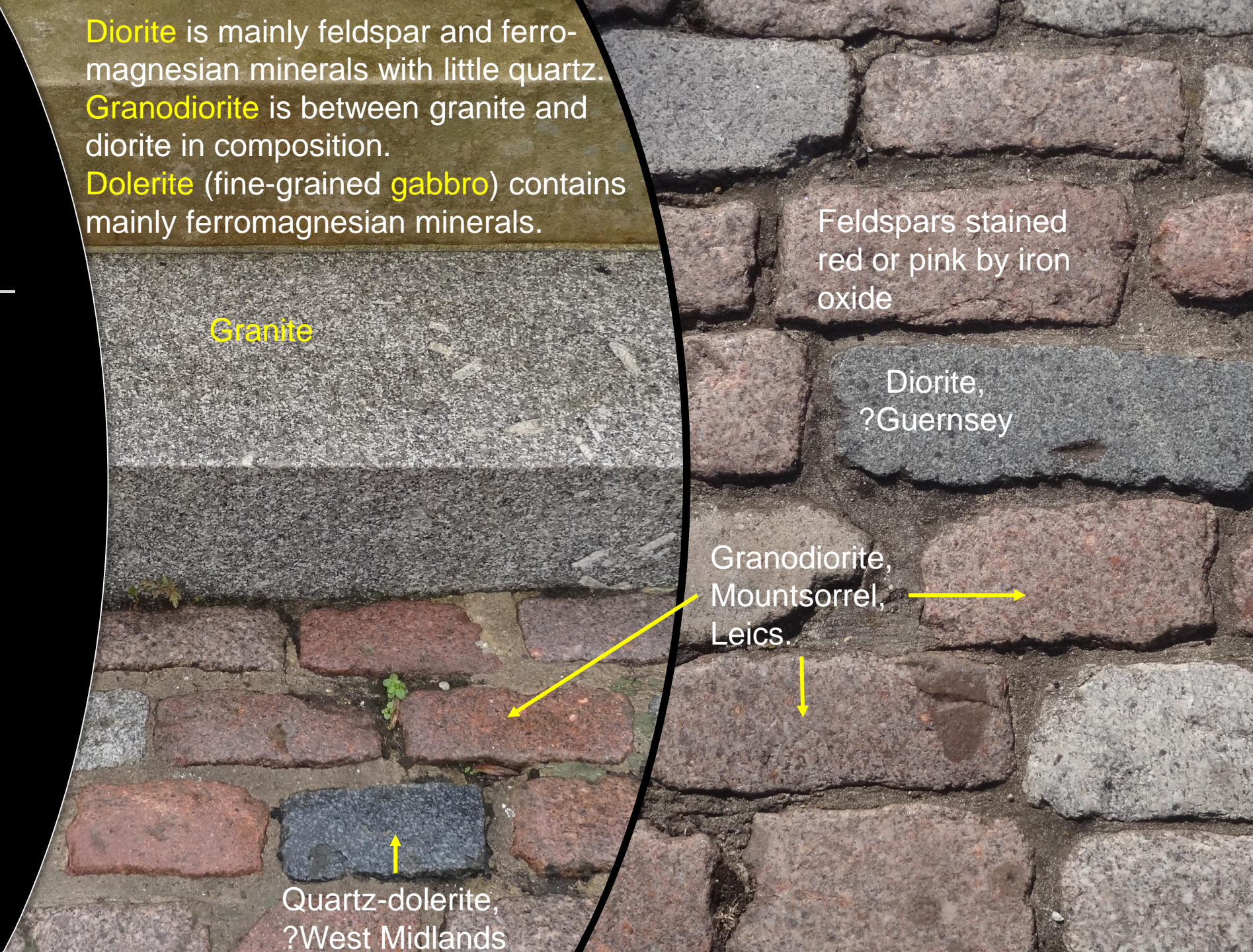
Granite

Feldspars stained red or pink by iron oxide

Diorite,
?Guernsey

Granodiorite,
Mountsorrel,
Leics.

Quartz-dolerite,
?West Midlands



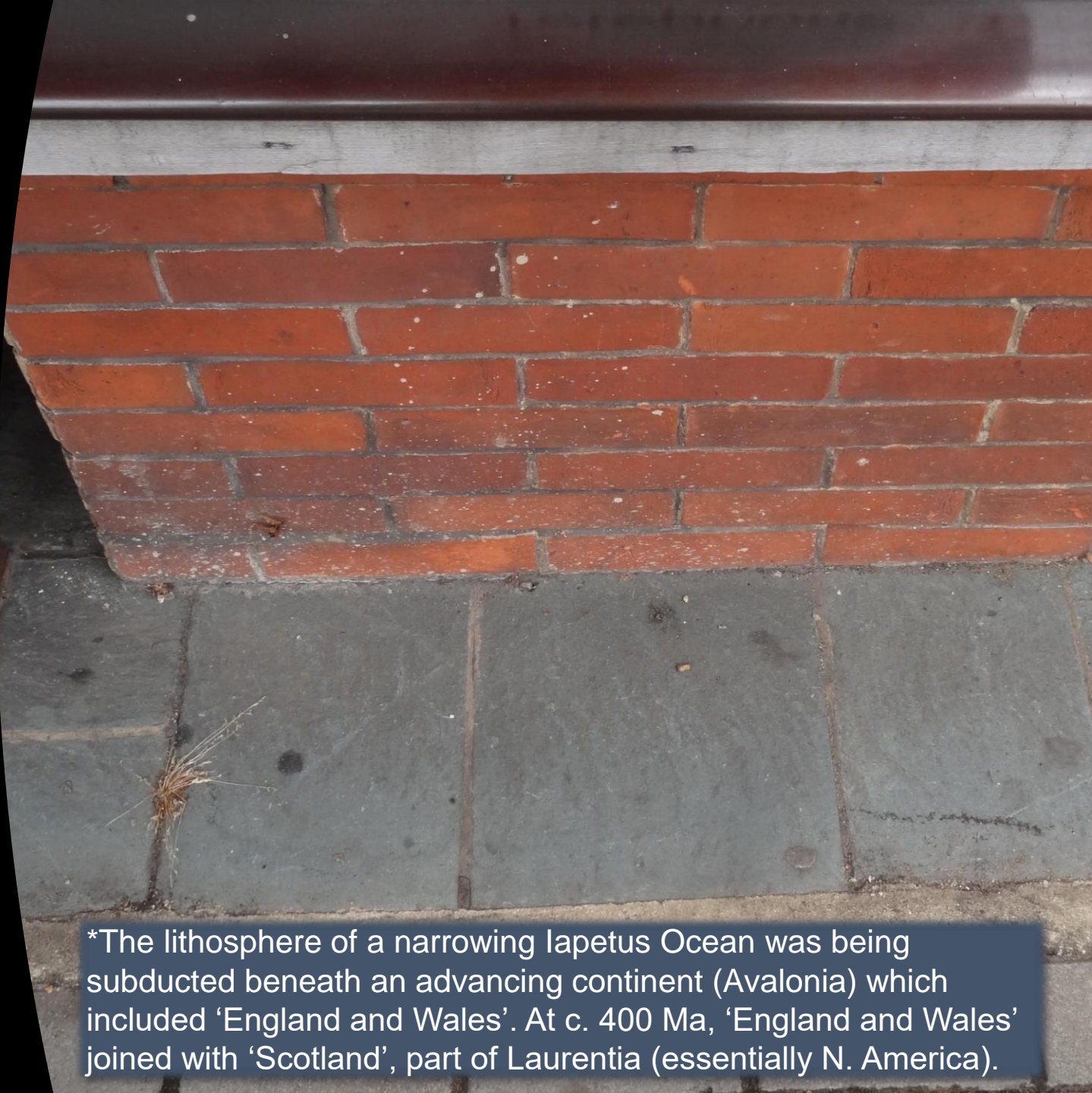
Angie's Chemist

Near the bottom of the High Street, another slate is used as floor paving in the shop entrance.

This is a greenish **slate** from the Lake District and is of late Ordovician age (c. 450 Ma).

It was deposited on the sea floor as ash (**tuff**) produced by explosive volcanic eruptions in an island arc situation over a subduction zone*.

It was hardened and deformed (like the Welsh Slate we saw in the churchyard) during later continental collision*.



*The lithosphere of a narrowing Iapetus Ocean was being subducted beneath an advancing continent (Avalonia) which included 'England and Wales'. At c. 400 Ma, 'England and Wales' joined with 'Scotland', part of Laurentia (essentially N. America).

Robson's Estate Agents

In the shop doorway is Kolmåden Marble from Sweden which was very fashionable in Art Nouveau buildings around the end of the 19th century.

It is not true marble* but **serpentinite** of age 1,900 Ma. It was quarried extensively in an area S and SW of Stockholm.

Serpentinite is produced in an oceanic setting by the hydrous alteration of upper mantle ferromagnesian rocks, i.e. **peridotite**, which comprises the minerals olivine and pyroxene. The rock has been forced above sea level by colliding plates.

*True marble is metamorphosed limestone.





Bridge Street

Halifax Bank & Unique Nails

The **granite** cladding at the entrances to these two premises closely matches Rosa Sardegna Beta Lucido from Sardinia.

It features pink feldspar crystals with grey crystals of quartz and black ones of biotite mica.

This granite is of a similar age to the SW England granite – c.300 Ma.



Larvikite. From Larvik near Oslo in Norway, this igneous rock is popular for cladding shop fronts, office buildings and pubs and is also used in kitchens and bathrooms. Larvikite is a local name and the rock is classified as a **monzonite***. What we see here is a coarse-grained rock cooled from magma in the early Permian between 300 and 290 Ma. This variety of larvikite is called 'Blue Pearl' in the stone trade. The large crystals of feldspar give the multi-coloured 'butterfly wing' (Schiller) effect due to light refracted at different angles by thin films within the feldspar crystals.



*Monzonite is an igneous intrusive rock. It is composed of approximately equal amounts of plagioclase and alkali feldspar, with less than 5% quartz by weight.

Granite and Larvikite

An empty shop opposite Coral features stone cladding down each side.

Most of it is dark red granite with bluish quartz crystals, known in the trade as 'Balmoral Red Granite' and is from Sweden and Finland.

In the 19th century Aberdeen stone yards began importing granites from Scandinavia but gave them local names supposedly to disguise their true provenance. Thus the trade name of a stone cannot always be taken as an indication of where it has come from.

Below the granite is an example of another commonly used larvikite, called 'Emerald Pearl'. The blue Schiller effect is more subdued in this variety.



Former Natwest Bank

This building is in brick with Portland **Limestone** window surrounds and plinth, with a lintel and carvings over the doorway. Weathered-out fossil shell fragments occur in this cream-white limestone, formed in warm shallow seas in the Upper Jurassic at c. 150 Ma.

The carved features have used the best quality stone in which fossils are almost absent.



St Luke's Hospice Charity Shop

The façade is clad on both sides with brecciated **serpentinite**.

It has a silvery sheen with fractured dark green blocks in a pale green matrix. Calcite veins have been stained orange by weathering of the surrounding rock.

As already mentioned, serpentinite is produced in an oceanic setting by the hydrous alteration of upper mantle ferromagnesian rocks, i.e. peridotite which comprises olivine and pyroxene. These have been forced above sea level by colliding plates.

Many countries on the north side of the Mediterranean have outcrops of this splendid rock which has been quarried as a decorative stone since Roman times.



Brook's Bookshop

This book, wine and coffee shop was originally Lloyd's Bank.

Emerald Pearl Larvikite, granite, and gabbro at pavement level, feature, but the façade is dominated by a dark green rock which may be **charnockite**. The provenance of this example is uncertain.

It is a high temperature/pressure metamorphic rock forming a complex series, being highly variable in composition. The rock pictured contains pale feldspars and streaks of dark pyroxene minerals including what appear to be garnet crystals.

It is named for 17thC East India Company employee Job Charnock, who some say founded Kolkata (Calcutta). His memorial slab there is made of it.



Nationwide

The sides and lower façade is clad in reddish-brown **granite**; this variety is a Precambrian rock from South Dakota in the USA called 'Dakota' or 'Imperial Mahogany' in the trade.

It is the oldest rock to be seen on this walk at 2.7 billion years. The granite has been metamorphosed and seen at a distance this produces streaky patterns in the rock. The quartz crystals are milky-blue from microscopic rutile (titanium dioxide) crystals, which are commonly found in higher grade metamorphic rocks.



Brickwork and roofing. Older buildings (19thC) are in yellow-brown London Stock bricks made locally from clay and solid refuse which aided firing. Red bricks and tiles on pre-1914 buildings such as the Police Station (R) were probably made from London or Reading Clay. The Oddfellows Arms is roofed with Welsh Slate. Post-WW1 buildings on Bridge Street and elsewhere in Pinner are mainly of bricks from the Oxford Clay belt NW of London.



Kerbstones

SW England Granite

... with large white feldspars, characteristic of a number of Cornish granites



The SW England granites were emplaced early in the Permian towards the end of the Variscan orogeny when the supercontinent Pangaea was assembling.

Shap Granite

... from Cumbria, well-known for its large pink feldspars in a finer grained matrix



The Shap Granite (397 Ma, Devonian) was one of a number of granite masses emplaced in northern Britain during the phase of the Caledonian orogeny which saw the two halves of 'Britain' coming together.

On the other side of the Metropolitan Line from Bridge Street is this ...



Sarsen Boulder

Pinner Memorial Park

This boulder is not in-situ but came from the banks of the River Pinn in Cannon Lane.

Cemented from sands of the Reading Formation by groundwater in a sub-tropical climate, there is plenty of evidence of root-holes in this boulder.

The End

A guide designed to be taken with you on a geological walk around Pinner [can be found here on the HHGS website](#). It is regularly updated.

Further walks in the Harrow and Hillingdon boroughs will be added as they are completed.