



St Pauls to Southwark Cathedral: A Virtual Building Stone Walk

“June 2019”
Postponed



1 St Pauls Cathedral Sir Christopher Wren – Portland Stone 1675 -1710
(Banqueting Hall – Inigo Jones Chief Architect & Surveyor to James 1)
Inigo Jones restored N & S fronts of old cathedral in 1631



Portland Stone became the building block of London, but does it have a place in modern British architecture?

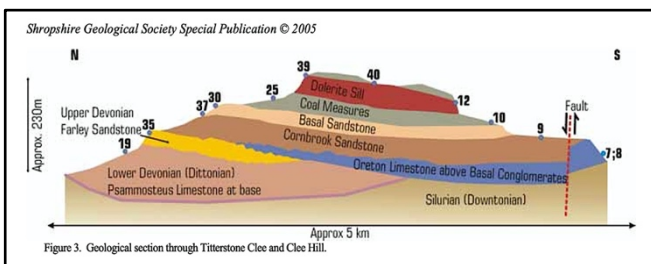
By Melissa York – blog on Monday 7 January 2019 4:42 pm



<https://www.cityam.com/portland-stone-became-building-block-london-but-does-have/>



a) Top of stairs - Chequer Board white Carrara marble
Black Carboniferous Limestone from Belgium or Ireland 380-350 Ma
Wirksworth – Kilkenny – Isle of Man
Tension gashes are calcite filled. Sometimes burrowed.
Stylolites present due to compression



b) Topmost step
Limestone with small crinoid ossicles & shell debris worn badly - slabs turned and replaced on steps by dressed dolerite from a dyke feeder pipe
Called pepper & salt - black feldspar & pyroxene (Fe, Mg rich mineral).
Occurs at Titterstone Cleve (see Cross Section) or Midland Valley.



c) Mid-level steps

Chequer board red & grey-blue orthoceras limestone from the black Ordovician (500 Ma)
mudstones from Island of Orland Baltic Sweden, in places the tops of fossils have been scoured.
Red limestone has polygonal shrinkage cracks. Grey cut across beds.

Orthocone Nautilus predecessor; curled variety of ammonite show lunar month growth rings.
‘Some ammonoid conchs show distinct growth increments (rings) and recurring narrowing and widening of the growth increments e.g. Devonian Protoxyclymenia. a group of narrow rings alternates with a group of wide rings every 13-17 rings, an average 15 believed to represent half of the lunar month which was probably 30.5 days instead of 28 as now with possibly 13 lunar months and 396 days. These data agree with the geophysical duration of a Devonian year - the correlation between the regular repetition of the picks in growth curve and a number of septa in the preceding whorl points out a distinct correlation of the two processes - shell tube secretion and septum secretion. Narrowing of the growth increments is considered to be connected in time to formation of a septum. It is suggested that the ammonites lived several (4-5) years.’ https://www.researchgate.net/publication/288004678_How_long_did_ammonites_live



d) Bottom steps - granite from SW England
 Light grey, flow-aligned, comprising mica; feldspar; quartz.
 Orthoclase present = granite; Plagioclase present = granodiorite; if both occur = adamellite
 Mica & feldspar breakdown into clay.
 Late Carboniferous / Permian in age and emplaced during the Hercynian Orogeny when Africa & Europe collided – part of the closure of Pangaea



e) Paving is made of Uppermost Jurassic terrestrial limestones.
 Swanage stone with bivalve clasts and Purbeck Marble which often has clasts of viviparous, a freshwater gastropod.
 Also erratics of marble etc.



f) Queen Anne's Statue
 Original Francis Bird 1712 - Italian marble badly weathered
 Replaced 1866 Carrara marble – badly weathered
 Around base – Purbeck marble

https://en.wikipedia.org/wiki/Statue_of_Queen_Anne,_St_Paul%27s_Churchyard#/media/File:Statue_of_Queen_Anne_at_St._Paul's.jpg



g) Bollards - Shap granite
 Pink orthoclase phenocrysts in a background of quartz –plagioclase – mica.
 “Spam” rock – it acts as a marker for glacial deposits through the Stainmore gap to East coast
 Phenocrysts grow in the liquid granite magma, but large feldspar crystals in granites can also be xenoliths - porphyroblasts (large crystals which are recrystallized grains with a metamorphic origin)

Front view of Cathedral (see as part of the title)

The Portland Stone is a marine Jurassic limestone 150 Ma old, it is a fine grained lime mud which had precipitated on sea floor in a Mediterranean sub-tropical climate. The lime muds comprise shell debris & ooliths.

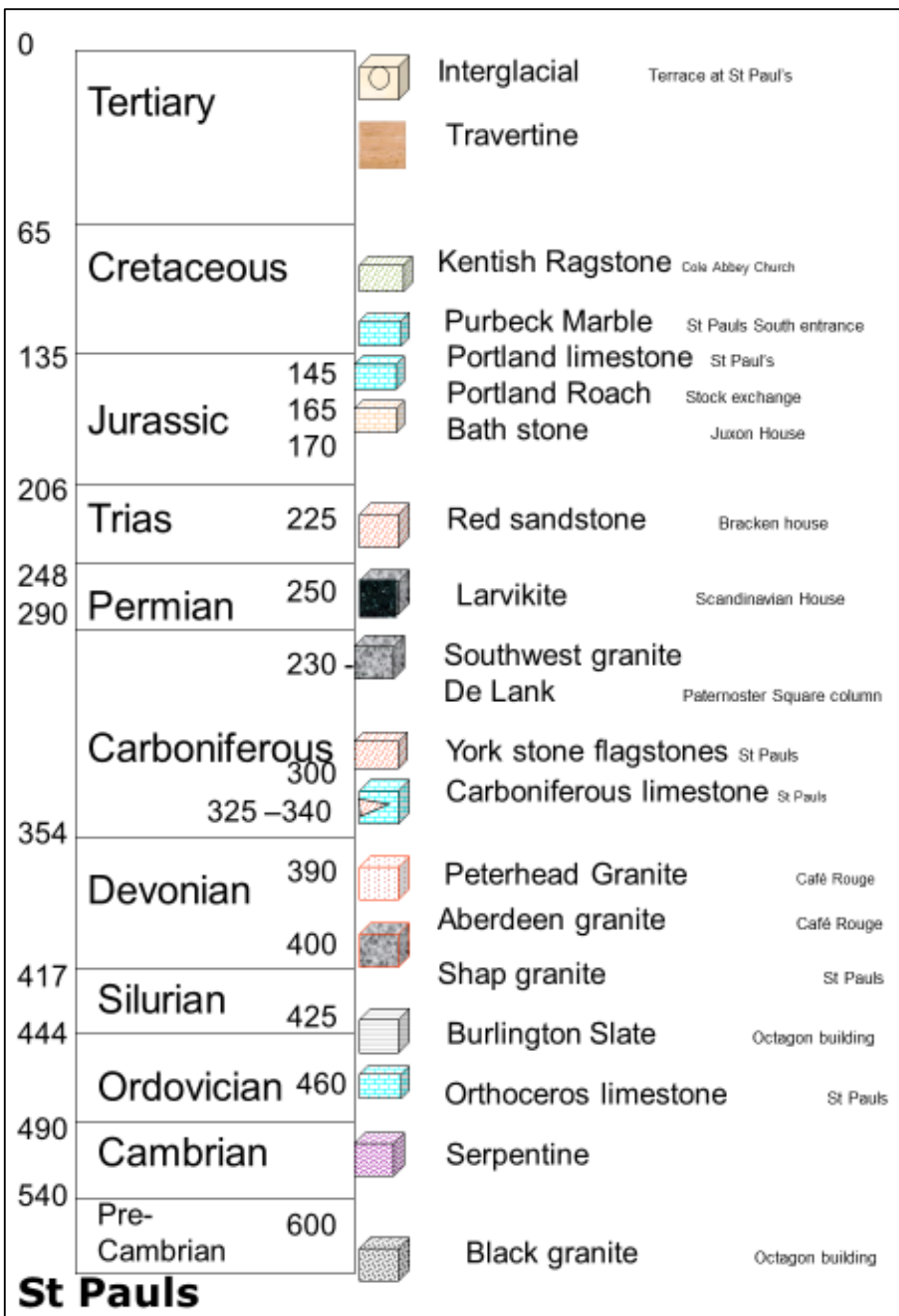
Imports prior to Portland – Kentish Rag Romans or Caen Normans (French equivalent) – the stones weather with blistering and scabbing



They have become black from the carbon in the smogs of London and are cleaned by water. Oil seeps into the rock giving a nicotine colour as seen on north side, now cleaned. There is also some copper staining

2 Pavement - York stone – generic term for upper Carboniferous deltaic sandstone. They have a natural non-slip surface with mica & quartz.

Colouring & staining is from the iron content.



3. Statue by Sir Francis Bird in 1725 of St Andrew, it is weathered and replaced in 1923 to NHM Railings are made of Wealden Iron, they weigh over 200 tons and were installed in 1714 at a cost of £11,200.6s.6p.

4. Paternoster Square



Warwick Court. Building 1

Architects: MacCormac Jamieson Prichard: Portland stone reconstituted stone (red)

10 Paternoster Square. Building 2 Portland Whitbed; Portland Roach

Architects: Eric Parry Architects/Sheppard Robson.

St Martin's Court. Building 3.

Architects: Allies and Morrison

Buildings along St Paul's Churchyard

Architects: Whitfield Partners with Sidell Gibson (Buildings 4 and 5) and -Sheppard Robson (Building 6).

1-2 Paternoster Square Portland Grove Whitbed; Portland Roach Plinth & caps DeLank granite
Juxon House Natural Stone Bath & Portland & Reconstructed Stone
Architect: Sidell Gibson

Paternoster Building is an ancient site with Roman origins and in respect of this a Roman size brick was used, 240 x 115 x 40 mm and to further emulate the language monk bond was used with a flush mortar consisting of equal parts of sand and grit. As the building matures over the next ten years, the grit in the mortar will become more exposed and a realistic modern interpretation of Roman brickwork will be revealed.

Bishops Court Thomas Heatherwick sculpture – cooling tower for generators

5. St Vedast alias Foster

Rebuilt by Wren 1666 Portland stone outer skin with Lower Cretaceous Greensand (Surrey); Pale Kentish Rag (Medway Valley). They have again used Roman brick tiles and flints.



The glauconitic Lower Greensand was deposited toward the end of the Early Cretaceous Period, often unconformably overlying Jurassic rocks. Kentish Ragstone is a limestone in the Hyte Formation which in turn is part of the Lower Greensand Group. It was deposited in a shallow marine environment with glauconite and a few fossils. Glauconite is iron and part of the mica group – it usually occurs as pellets.

6. Octagon

1st Floor – Black Granite, part of the Precambrian Shield; Slate, part of the Burlington Slate from the Lake District and Portland Roach Stone.

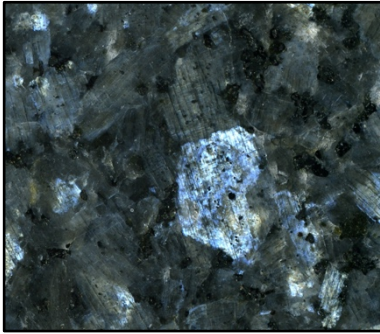
This Portland rock is packed with bivalves, gastropods and oolites making it a good building stone. The rock is a bit like 'fish roe' which allows it to be cut or carved in any direction; an essential quality of a building stone.

7. St Paul's Choir School

Portland Roach with Selenapora Jurassic Algae and Shells composed of calcite or aragonite (Mother of Pearl). The aragonite is often dissolved from the fossil, leaving casts, but the calcite shells remain intact. Note cladding thickness compared to ashlar blocks

8. St Augustine Tower

Bombed during war



9. Scandinavian House

Larvikite is a specific rock and can be polished or unpolished. It is an intermediate igneous intrusive rock, a type of syenite - containing equal amounts of plagioclase (plagioclase) and alkali feldspar, and <5% quartz with some hornblende and biotite.

It is Late Carboniferous to early Permian and is found at Larvik near Oslo, Norway.

It is very popular and used as building facings due to the schiller effect from the multi twinned plagioclase crystals.

9a. St Lawrence & Mary Magdalen Fountain. Victorian

Gothic drinking fountain, now restored to full working order, once stood in front of the church of St Lawrence Jewry in Guildhall Yard. It was dismantled in the 1970s and the blocks were put into storage.



https://en.wikipedia.org/wiki/Smoky_quartz

The main body of the fountain is carved from Portland freestone, but small granite pilasters support the canopy. They are made of a striking and unusual granite with particularly dark, smoky quartz, set with pale and darker, salmon pink feldspars, the larger of which show well-developed Carlsbad twins. The origin of this granite is unknown.

The water basins are supported by half-drums of pink Peterhead Granite from the coast north of Aberdeen.

10. Bracken House / Flagstaff House Triassic sandstone from Hollington



The quartz rich sandstones were formed in desert conditions with mudstones. They have calcium carbonate cement which hates acid rain, the cement crumbles and the sandstones become pitted.

They were deposited in flash floods and show current (cross) bedding, which shows that the rock is upside down in the pillar near end.

The rocks match with the red brick of the Former FT building. The pink and green rock, when cut, needs to dry out. There

is no plinth – separated by deep crack? Covered by pathway.

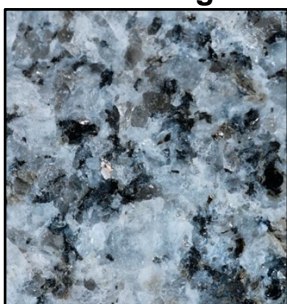
Patches are repairs from scaffolding. Wall shows scabbing (salt leaching out).

Calcium carbonate changes to calcium sulphate (gypsum) so swells & blisters

Cleaning breaks the scab.

11. Cole Abbey Church – note blistering on side

12. Café Rouge



Rubislaw grey granite Aberdeen; Peterhead pink granite. Very hard – difficult to work.

Kentish Rag – glauconitic – iron silicate grains – green colour.

Lower Greensand brought from Medway. Hassock crumbly sandstone Rag – limestone
Repairs – Portland screw

13 Millennium Measure



Scientific Instrument Makers. City of London; Church; Science and Instrumentation

The Concept The Millennium Measure takes the form of a "length standard" divided into 2000 mm symbolising 2000 years of history and bearing at appropriately marked intervals the dates of significance, from the birth of Christ to the year 2000, in the fields of science and instrumentation, the City and the Nation, and religious happenings. There are a number of happy coincidences, for example, the letters "mm" signify millimetres whilst "MM" is the Roman numeral equivalent of 2000 as well as the initials of the words "Millennium Measure". The design gives a sense of "building on the past" and an archaeological sense of time. We become aware of our foundations in the past as we build up on those into the future. The Measure takes the form of a stainless steel triangular standard with each face divided into 2000 mm surrounded by three toughened glass panels. The glass panels have the significant dates engraved upon them. The panels are edged

in bronze to allow for the edge lighting feature.

Tate Modern - chippings - contrast of flint & igneous / metamorphic



Bridge ramp – Kilkenny Limestone. Black muddy limestone – a Black Rock in Bristol area with tabulate corals, productid brachiopods.

Coral colonies are white against the black.

Paving is Millstone Grit with ripple marks

Southwark Bridge. 1912 – 21 Mott & Hay. Architect Sir Ernest George

Carboniferous Craigleith sandstone. from near Edinburgh. Whitish grey stone with fine quartz grains, siliceous cement, 98% silica.

Piers of Old Southwark Bridge constructed of the stone and mostly reset in new bridge, completed in 1921.

Granite has stringy feldspars.

Bridge history panel is Lake District slate. Gabbro backing? Black with brown specks

Cannon Street Railway Bridge_1963 – 6 John Hawkshaw & John Wolfe-Barry.

Widened 1886 – 93.

Coarse millstone grit.

Globe theatre - granite setts original 1598 - 99 demolished 1644. Rebuilt 1992

Red Lion Court - Red brick on Portland with Shap like granite base Caledonian 440 - 300 Ma
At rear MFL – light white granite (felsite) + metamorphic

Clink Prison Museum - paving - granite blocks from Portugal.

It was a small prison in Bishop of Winchester's Park 1509 - 1780.

Housed Protestant & Catholic prisoners of conscience. Bollards built 1812

Winchester Palace - London house of Bishop of Winchester 1150 – mid 17th C. 14th C
Beautiful rose window Chalk

Winchester House (Bishop of Winchester) 500 years 70 Acres

Golden Hinde - sandstone - poorly weathered not in bed.
Black limestone Belgian?

Hibernia wharf

Strips of granite for steel shod wheels - granite setts edged with granite kerbs

Southwark Cathedral (St Saviour's)



It is the 4th church on site - three earlier were destroyed by fire.

The 1st was in the 7th Century by a ferryman when there was no bridge between City and Southwark.

In 9th Century St Swithun rebuilt it adding a monastery. Replacing original convent.

In 12th Century it was rebuilt by Augustinians.

It was destroyed in 1212 and the new St Mary Overie was begun in 1220
Stone roof collapsed in 1469 and was rebuilt in wood.

It became a Cathedral in 1897 with tower added in 1689.

In early 19th C there was the restoration of tower & retro-choir.

Old unsafe roof was taken down in 1831 leaving nave open to heavens for seven years, then walls demolished.

In 1890 the nave was built to a new design.

It is built of flint also Chalk in crypt. There is Purbeck marble around South door, 135 Ma, which is well weathered.

Also Kentish Rag, Maidstone - Lower Cretaceous 130–100 Ma 16% - Silica; 75% CaCO₃; 6% alumina and iron oxide.

The Refectory is Portland and Bath Stone added in 2002

The surrounds to the Cathedral are in very fossiliferous Carboniferous Limestone 354-290 Ma old.

N.B The recce was carried out in 2015 so may be out of date. Additional information from: Urban Geology in London No. 12©Ruth Siddall, 2013; v.3 April 2014

©John Williams Farnham Geological Society 2020

Images are mainly from Google or Wikipedia

This document is for educational purposes only and there is no commercial gain to any of it.