

The Stones of Osterley Park House

Ruth Siddall



Osterley Park House was designed and built by Robert Adam (1728-1792) in the late 18th Century, between 1761 and the 1780s. It was commissioned by the Child Family and superseded a Tudor Mansion on the same site. Adam had 'total design' control of the construction and interior decoration of the house. This assumes that Adam also had a hand in overseeing if not selecting the building materials used.

This brief report summarises the building and decorative stones used in the building, as observed following a visit to Osterley Park House in June 2017.

Portico and Courtyard

Portland Whitbed is used for the pediment, balustrade, quoins and other stone dressings on the exterior of Osterley Park House. It is also used for paving and for the columns supporting the pediment. This stone is identified by the pale grey colour with darker fossilised shells of oysters, which now weather slightly proud of the surface. Sedimentary bedding alignment can be detected in both columns and in some flagstones due to the concentration of shell beds. Portland Whitbed is the most commonly used of three main building stones extracted from the Portland Limestone Formation which occurs in outcrop and subcrop on the Isle of Portland, a peninsula on the Dorset Coast. Whitbed contains variable fossil content, predominantly in the form of oyster shells with well-preserved, laminated shells and also fragments of the reef-forming algae *Solenpora portlandica*. Two other units are also extracted as building stone; the Basebed and the Roach. Basebed contains finely comminuted fossil fragments and the Roach is a cavity rich limestone with casts and internal moulds of otherwise leached out fossils. The Portland Limestones are of latest Jurassic Tithonian Stage (known locally by some authors as Portlandian; see Cope, 2012), dating to ~ 145 Ma. They pass upwards into the lowest Cretaceous, freshwater, brackish and marine facies of the Purbeck Limestone Group. The Purbeck beds are also quarried for building and decorative stone (see Westhead & Mather, 1996).

The Portico is paved with a mixture of Portland and Purbeck Stone. There is a slight colour contrast between these varieties which gives a first-pass method to differentiate them; the Purbeck Stone is slightly darker in colour. The cream-coloured varieties of Purbeck Stone used here are those currently marketed under the trade names of Purbeck Grub, Purbeck Thornback and Purbeck Whetson, all derived from the Stair Hole Member. They are crammed with fossil fragments including oysters (*Praeexogyra* sp.) and detrital algal material.

The Purbeck Group outcrops primarily on the Isle of Purbeck, south and south west of Swanage and it is here that the main quarries are sited today. However it also overlies the Portland Limestone Formation on the Isle of Portland and could well have been extracted from the same quarries as the Portland Stone used here.



Portland Whitbed with oyster-shell fragments sub-aligned parallel to bedding, which runs vertically across this image.



Two varieties of Purbeck Stone in the courtyard paving. Left; a variety rich in the oyster *Praeexogyra* sp.; Right; a variety rich in finer shell fragments.

Entrance Hall

The Entrance Hall at Osterley is paved in Portland Stone and red sandstone flagstones, laid in a geometric pattern which echoes the stuccowork décor on the ceiling.

Portland Stone Whitbed and Basebed are used here, varying slightly in colour from ivory to grey. All stones look very different when polished in comparison to a cut surface. Confirmation that this is indeed Portland Stone is based on the occurrence of the fossil algae *Solenopora portlandica* which occurs in these stones. However most of the stone is free of fossil debris, suggesting that this is mainly Portland Basebed.

Red sandstone flagstones are relatively unusual (in my experience), especially in such a formal, interior setting, and therefore this stone is more problematic to provenance. The stones used here in the entrance

foyer at Osterley are liver-coloured and clearly fissile, splitting along bedding laminations. Compositionally they are composed of iron-coated fine grained quartz grains and white mica (muscovite). The latter can be seen sparkling on the bedding planes.

Red sandstones used in building contexts are primarily derived from the Silurian-Devonian Old Red Sandstone (ORS) series which is quarried in Herefordshire, Gloucestershire (The Forest of Dean) and elsewhere in the West Midlands and Welsh Borders. The Permian-Triassic New Red Sandstones (NRS) also outcrop in the English Midlands, Cheshire, Cumbria and in Dumfriesshire. In addition, dolomite-cemented red sandstones were quarried from the Permian Cadeby Formation in the town of Mansfield. These stones can be difficult to distinguish out of their geological context. Nevertheless, the mid 18th Century date of construction, the flaggy nature of these slabs and the presence of mica allow us to rule out some contenders.

It is my hunch that these flags are from the Old Red Sandstone. This is based largely on the colour; on the whole, the quarried facies of NRS are brighter, orange-reds. However, such a differentiation cannot be altogether precise. A possible contender are the ORS sandstones of Herefordshire which were being actively quarried during the 18th Century and (unlike many sandstones at the time) were exported for use outside the local area. The so-called 'Tilestones' of the Raglan Mudstone Formation (Pridoli, Late Silurian; 423-419 Ma) were fissile, liver-coloured and micaceous. These sandstones were also capable of being slabbed and used as roofing slates and so a use as flagstones is also possible (see Lott, 2013; Jenkinson, 2012, Rosenbaum, 2007). It is possible that these stones are the stones used at Osterley. However it cannot be discounted that Adam used stones sourced from his home area of SE Scotland, with which he was familiar; Paxton House designed by Adam's father uses a red sandstone sourced from the local estate. Further testing would be required to resolve the provenance of this sandstone.



The foyer of Osterley Park House with the floor paved in red sandstone and white Portland Stone. Note the fireplace in the apse. The stone used for this has not yet been identified, but it is possible that it is a compact, fine-grained variety of Bath Stone.



*Detail of the foyer paving; on the left of the image, the white Portland Stone contains debris of the alga *Solenopora portlandica*. Liver-coloured red sandstone is on the right.*

Servants Hall

The servants hall in the basement is paved with black-and-white, chequer-board stone. Architectural evidence suggests that this floor is a remnant of the original Tudor house on the Osterley Park site. The black stones is a fossiliferous, bituminous limestone, rich in crinoids and both solitary and composite corals. The fossils present indicate that it is Lower Carboniferous in age. The fossils are white or grey in colour. Such stones were probably derived from the Low Countries and specifically Belgium. Several similar stones are quarried in the provinces of Namur and Hainault in the south of the country. However this is a facies known as **Petit Granit** of Upper Tournaisian age. It is known that this stone had been quarried since the Medieval period and would have been available to 16th Century paviours in England.



The Tudor Floor in the Servants Hall. The Portland Stone Columns are later.

The contrasting cream to pale-brown coloured flags are composed of a sandy limestone, a litharenite. A few examples show evidence of liesegang banding, wherein iron-oxide rich fronts have been chemically precipitated in the rock. The rock is heavily bioturbated with long, broad (2 cm wide) burrows of the variety *Thalassinoides* and/or *Ophiomorpha*. This is **Gobertange Stone** from the Eocene strata of Brussels which in Belgium is frequently seen as a paving stone, paired with Petit Granit (Michiel Dusar, *pers comm*).

Restoration stone paving in the Servants Hall (installed when the rooms were converted to toilets in the 1950s) employ a matching black, crinoidal limestone, probably also Tournai Stone. The White stone is a limestone of unknown origin.

Columns are of **Portland Stone Whitbed** and the fireplace is probably a variety of **Purbeck Marble**.



Kitchen

The kitchen is paved with red and green flagstones. The green flags are bioturbated and the red have the odd fossil of white *Orthoceras* sp. molluscs. This stone is Swedish **Öland Limestone** from the Island of Öland which lies adjacent to the Kalmar Coast of Southern Sweden in the Baltic Sea. These Lower – Middle Ordovician limestones are alternatively red and green in outcrop and so both varieties can be extracted from the same quarry. A number of quarries work these strata across the island. They have been quarried for over 1500 years, however they were extremely popular in British architecture of the 17th and 18th Centuries.

Left: an *Orthoceras* fossil in red Öland Limestone



The Kitchen

Servants Entrance and Passages

Portland Stone Whitbed is used for paving through most of the passage ways of the upper stories of Osterley Park House. However in the basement an assortment of stones are used, many of rectangular shape but irregular sizes. These appear to have been recycled from either earlier building phases of the house or from leftovers of other paving schemes. These slabs also contain what appear to be trimmed down stones, probably because the original slab broke during transport or paving. The stones are obviously very weathered and are difficult to distinguish.

Stones used are **Purbeck Stone**, **Portland Whitbed** and a few slabs of **Tournai Stone**. Very weathered, red **Öland Limestone** is used in an entrance passage in the basement.

Fire surrounds



Fire surrounds were examined on all floors. On the ground floor, a grey marble fire place stands in the entrance hall on the east side of the building. This is made of a finely banded grey marble. The bands are folded. Both the inner and outer fire surrounds are grey **Dove Marble** from the Carrara region of Tuscany.

Also on the ground floor, A fine Victorian fire surround is located in the Steward's Room (left). The mantelpiece and legs are constructed from **Plymouth Marble**, possibly from Plymstock or Mill Quay quarries. These are Devonian limestones from the Plymouth Limestone Formation of the Tamar Group. The panel above the firebox is **Boulonnais Marble**, extracted from quarries

working the Calcaire Carbonifère inlier of the Pas-de-Calais in northern France. This variety is also known as Napoleon or Marquise Marble. The distinctive mottled markings are known as 'pattes d'alouettes' and are the fossil remains of the algae *Corydopodium*.

Two, pale-brown stone fireplaces are situated at either end of the Entrance Hall on the Principal Floor. These are not of polished stone. They are composed of a compact, calcarenitic limestone of unknown origin. The nature of the worked surface makes identification of textures extremely difficult. The only visible features are scarce grey-coloured, fossil bivalve-shell fragments. It is not impossible that this could be French Caen Stone, however macrofossils are very rare in this facies.

On the Principal Floor, fire surrounds in the Library, Breakfast Room, Long Gallery, Drawing Room, Etruscan and Tapestry Rooms are pure white, **Carrara Marble**. The latter example has cameo inserts in coloured resin (*scaglione*). White marbles are notoriously difficult to differentiate either on grounds of their appearance, geological textures or geochemistry. They can be obtained from Italy, Greece and Turkey as well as several worldwide locations. However at the time of building of Osterley, the quarries of Carrara was the main source of white marble available to builders and architects.

On the Upper Floor, white **Carrara Marble** is used in all the bedrooms. In Mr Child's Dressing Room, the inner section of the surround is in grey Carrara **Dove Marble** and in the adjacent Bedroom, a white marble with grey veins is used for the inner part of the fire surround. This is a variety of **Arabescato Marble**, also from the Carrara region.

Decorative items



Moroccan Onyx and Verde Antico framing the mosaic table tops in the Drawing Room.

In the drawing room, a pair of mosaic tables sit between the windows. The mosaic-work is primarily glass. However they have surrounds of red **Moroccan Onyx**. This stone was known in the Renaissance as *Alabastro a Pecorella* – meaning ‘sheep alabaster’. This odd name refers to the ‘woolly’, fleece-like appearance of the stone. The green stone used to edge the table is **Verde Antico**, a serpentinite and marble breccia. Both of these stones would have been procured from marble suppliers in Italy and would have originated in Roman period buildings, subsequently looted to supply the decorative marble trade. The location of the quarries had been lost in the dark ages that followed the fall of the Roman Empire. These quarries (and others exploited by the Romans) were rediscovered in the later 19th Century and some were reopened for modern stone production. Moroccan Onyx came from Hadjadja, in Eastern Morocco and is deposited in fissures. Verde Antico is from Chasanbali, near Larissa in Central Greece. It is a late Cretaceous to Early Tertiary so called ‘ophicalcite’ breccia.

On the Upper Floor, in the corner between Mr Child’s Bedroom and Mrs Child’s Dressing Room, a Victorian white **Carrara Marble** portrait bust stands on a column of white and orange-brown streaked **English Alabaster**. This stone is sourced from the Triassic Tutbury Gypsum Beds and has been quarried from mines in the Derbyshire-Staffordshire borders at Chellaston and Fauld.



English Alabaster used as a plinth.

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