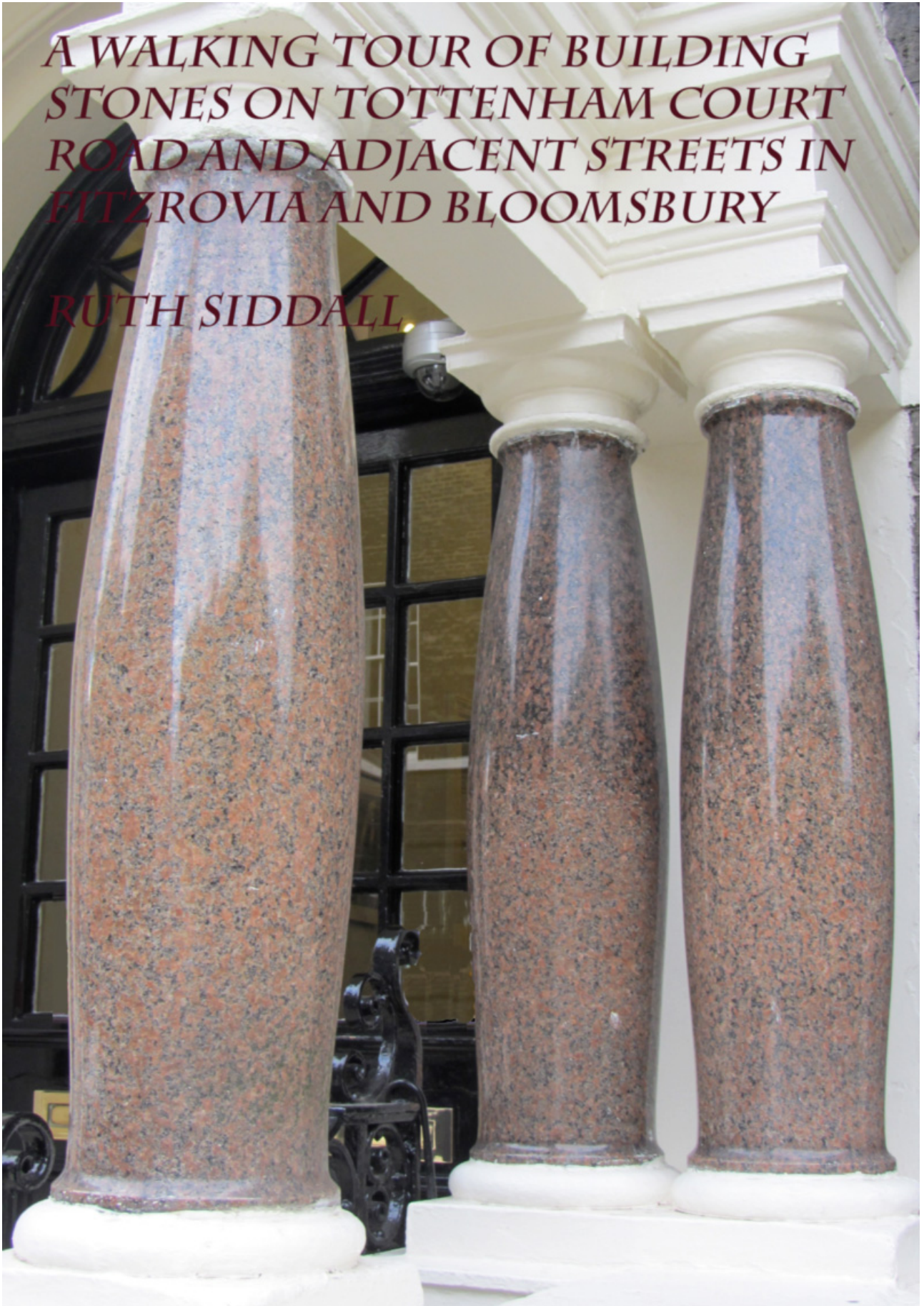


A WALKING TOUR OF BUILDING
STONES ON TOTTENHAM COURT
ROAD AND ADJACENT STREETS IN
FITZROVIA AND BLOOMSBURY

RUTH SIDDALL



Peterhead Granite pilasters, 39 Bedford Square

A Walking Tour of Building Stones on Tottenham Court Road and adjacent streets in Fitzrovia and Bloomsbury

Ruth Siddall

Tottenham Court Road is named after Tottenham Court (formerly Totehele Manor) which lay in fields to the north, now occupied by West Euston and Regent's Park. Until the late 18th Century, this was very much a rural area, with farms and a windmill. This history still lives on in the names of streets recalling landowners and farmers such as Goodge and Capper, and Windmill Street was the track to the windmill. The road became built-up during the 19th Century, famous for its furniture stores, and now it forms the boundary between the districts of Fitzrovia to the west and Bloomsbury to the east. This guide is an update of Eric Robinson's walking tour, originally published in 1985. Tottenham Court Road has transformed since then, but many of the stones still remain and there are a few new additions.

The Walk

Start Point: *Warren Street Tube Station, Tottenham Court Road. Turn south (right as you come out of the station) and cross Warren Street. The first building encountered, on the corner of Warren Street and Tottenham Court Road is MacDonald's 'Restaurant'.*



1. MacDonald's; 134, Tottenham Court Road

The corporate style of McDonald's chain of 'restaurants' extends not only to its food, logo and staff uniforms but also to the architectural details of its buildings. The materials of choice for facing branches of MacDonald's, and that on Tottenham Court Road is not an exception, are white-cream travertine and black Rustenburg Gabbro. The layers within the travertine are aligned vertically as facing on the pilasters surrounding the windows. This stone takes a good polish in addition to being highly decorative. The greyish layers identify this as St John's Travertine, coming from Terme di San Giovanni near Siena. The Rustenberg Gabbro, from South Africa, forms the skirting to this at street level.

A little further along is the Grafton Hotel, and next door to this (128 Tottenham Court Road) was once a tobacconists and the original home of the dummy Highlander, now familiar to UCL students as Phineas, who now resides in UCL Union, having been donated to the institution by the tobacconists after he was repeatedly stolen by students. Nevertheless we should cross over Tottenham Court Road via the crossing in front of McDonalds to Maple House.

2. Maple House; 149, Tottenham Court Road

Maple's was the largest furniture store in the world in 1905, but the present building was built for the company in 1973 by Richard Seifert. Sadly Maples has now gone, but the name lives on in the building which is occupied by offices, Sainsbury's and PC World. The building is faced with coarse grained, Rivière-à-Pierre Granite, a billion-year old charnockite from Quebec, which is best seen at the entrance to the building at the southern end, next to UCH. The large feldspars are obvious, quartz and amphibole are also present.

Continue southwards along the east side of Tottenham Court Road, crossing Grafton Way and University Street. Pause at the Santander Bank on the corner of University Street and Tottenham Court Road.



3. Santander Bank and The Futon Company; 164-169, Tottenham Court Road

The row of shops between University Street and the passageway to Mortimer Market are predominantly faced with multi-coloured Dakota Mahogany Granite, one of the most ancient rocks on Tottenham Court Road at 2.7 Ga, it comes from South Dakota in the North American Craton. An exception to this façade is the right hand doorpost of The Futon Company which is constructed of red, probably Permian, sandstone.



Just after The Futon Company's store, turn left into the passage leading from Tottenham Court Road to Mortimer Market.



4. Mortimer Market

Named after H.W. Mortimer, MP for Shaftesbury (1774-90), who set up housing and a street market here, the horseshoe-shaped street is now part of UCL Hospitals and currently houses at its centre the phlebotomy unit, amongst other clinics. The entrance to the building, as viewed from the passage leading from Tottenham Court Road is clad with ornamental green slates from the Lake District. These show a textbook set of sedimentary structures, formed during the deposition of these volcanic ashes in a crater lake. These include ripples, slumps and syn-sedimentary faults.

Return through the passage to Tottenham Court Road and continue southwards to the Royal Bank of Scotland.

5. Royal Bank of Scotland; 171, Tottenham Court Road

The RBS frontage is clad with one of the most popular and recognisable architectural stones, larvikite. This is the Blue Pearl variety and it is clear to see how it acquired this name with its shimmering schillerent feldspars. The play of colours occur because of refraction of light between very thin films of translucent feldspar, separated by cleavage planes. Therefore the colours observed are in fact an optical illusion, analogous to the effect seen on the feathers of some birds and the wings of certain butterflies. Some

panels have been replaced with a darker blue variety of larvikite. These rocks are ~ 275 Ma and derived from southern Norway, in the Vestfold, SW of Oslo.



6. 172 Tottenham Court Road

Directly next door to the RBS is the entrance to a rather anonymous office block. Nevertheless it is worth a pause as the porch is clad in mottled green Ardosio Verde 'slate' from Brazil. These were fine grained sands deposited in shallow seas in the late Proterozoic. Close inspection reveals this slate to have a subtle but beautiful mottled texture.

Continue south along the east side of Tottenham court Road, and turn left into Torrington Place.

7. UCL; 1-19, Torrington Place, 'Mullard House'



Bastite serpentinite slabs are used to clad the lower wall below the vitrines at 1-19 Torrington Place and also makes up an attractive decorative panel between the main entrance and the entrance to the car park. Here the stone slabs have been separated like opening a book, creating a Rorschach pattern in the rock. Close inspection shows the silvery-green bastite porphyroblasts set in a fine grained black matrix. The rock is chaotically veined with white calcite or dolomite.

An unidentified, but beautiful, polished, fossiliferous limestone lines the recessed porch to the building.

Cross over Torrington Place and return to Tottenham Court Road.

8. Habitat and Heal's; 196, Tottenham Court Road



Habitat is on the corner of Tottenham Court Road and Torrington Place and the façade continues to Heal's next door. Although established in 1840, the Heal's building as it stands today was built in 1916, selling the arts and crafts furniture and mattresses and other bedding material of Ambrose Heal. The business was sold to Terence Conran in 1983 and it is now the only remaining furniture stores founded in the 19th Century to survive on Tottenham Court Road. The main building is built of Portland Stone, designed by Smith and Brewer in 1916, but it is the arcade in front of the display windows which is of more interest. There is a decorative floor with a chequer-board pattern with squares of green Connemara Marble, surrounded by borders of an unidentified white marble with small squares of black Carboniferous Limestone, probably Belgian Black Marble. The columns supporting the façade are

of Carboniferous Hopton Wood Stone from Wirksworth, Derbyshire, a limestone is packed with fossilised shell fragments and crinoid ossicles. However the columns of Habitat next door are made of a Jurassic Limestone of unknown (but possibly French origin), also packed with shell fragments. The joint entrance to Habitat and Heal's, which houses bakers Peyton & Byrne, is faced with Tivoli Travertine.

Cross over Tottenham Court Road by the crossing to the American Church in London, originally the site of Whitefield's Tabernacle (1756) and once the largest nonconformist church in the world, it was known colloquially as 'Whitefield's Soultrap' Whitefield was as famous as John Wesley in his day and fittingly for this tour, Reverend Augustus Toplady (d.1778), the composer of Rock of Ages was buried here.



Turn left (south) and continue past Goodge Street Station.

9. Catesby's Building; 64-67, Tottenham Court Road

The building at the corner of Tottenham Court Road which now houses Le Pain Quotidien, Ryman's, Holland & Barnett and Pret-a-Manger was once Catesby's Furniture Store and the 'home of cork lino', was an establishment to rival Maple's.

An Edwardian confection built of red brick and Portland Stone, of geological note are the bold red columns supporting the window arches which are made of striking, plum-red Swedish Imperial Red with large plum red feldspars and repairs of Tranås Granite, with its intense red feldspars and opalescent-like bluish quartz. These are supported on podia of a black larvikite.

Cross Goodge Street and continue south along Tottenham Court Road until you reach the Rising Sun Pub on the corner of Windmill Street.

10. The Rising Sun Public House; 46, Tottenham Court Road.

A fairy-tale, 'Fanciful Art Nouveau Gothic' Building, the Rising Sun Pub was designed by Treadwell & Martin in 1897. The upper part of the building is all white-painted stuccowork. The lower part of the façade at pavement level is faced with a bronze variety of larvikite, with distinctive schillerescient antiperthitic feldspars. This cladding is original and is one of the earliest uses of this now ubiquitous stone in London.

A windmill once stood in the fields close to where the Charlotte Street Hotel stands today, and Windmill Street follows the line of the track that led to it. Cross over Windmill Street and turn right. Look out for the inset porches to the facilities entrances to Metropolis House on your left, before reaching the gates to the car park.

11. Metropolis House

Metropolis House is a largely unprepossessing building in terms of both its architecture and use of geological materials. However lining the porches to the service doors on Windmill Street are slabs of a beautiful metamorphic rock, 400 Ma Otta Schist from Norway. Slabs are laid parallel to the schistosity defined by fine, silky micas. Prominent matchstick-like phenocrysts of actinolite are present, sometimes showing variolitic 'bow-tie' textures.

Return to Tottenham Court Road and continue southwards to the arcade under the sprawling Centre Cross complex which starts with the Odeon Cinema.



Metropolis House

{12. Central Cross

The enormous Central Cross complex, built in the 1970s forms two blocks on the west side of Tottenham Court Road, it bridges Stephen Street and extends back to Gresse Street behind. It is currently owned by Derwent London property developers, and houses offices, retail space and the cinema. It was once the EMI building and is locally considered to be an eyesore. The arcade at street level is supported by rectangular columns faced with Finnish Baltic Brown Granite. This is a familiar building stone but an unusual rock known generically as rapakivi granite. Their distinctive feature is the presence of large, rounded, pink phenocrysts of orthoclase feldspar, often rimmed with green plagioclase. Looking up, this dark brown granite is offset by pale brown, Variscan age (300 Ma) Sardinian Beige Granite, with its pale brown K-feldspar phenocrysts.}

This building is undergoing redevelopment from Summer 2014. It is not known what will replace it or whether the stone cladding used will be recycled.



Central Cross, 2012

Cross over Tottenham Court Road at the crossing in front of the cinema and turn into Bayley Street into Bedford Square.

13. Bedford Square

Bedford Square was laid out and built between 1775-1780 to an overall design by Thomas Leverton. The square was envisioned by the 4th Duke of Bedford, who died before work started in 1771. Nevertheless, all property was subsequently leased by the 4th Duke's factotum, Robert Palmer and the Duchesses of Bedford and Marlborough.



Bedford Square

All was intended to be refined, respectable and orderly and the square was built of the highest quality materials; including sills and balustrades of Portland Stone, roofs of Welsh Slate, pavements of York Stone

and kerbs stones of Mountsorrel Granodiorite (dull red) and Channel Islands Diorite (grey). Uniformly the doorways were decorated with the architectural ceramic, Coade Stone. It was certainly intended to be the residence of the aristocracy and many well known people have lived here as the rash of blue plaques testify. Of particular interest geologically is number 39 in the south west corner with its ornamental pilasters of red Peterhead Granite from Aberdeen (see front cover).

Return to Tottenham Court Road via Bayley Street, and turn right and continue north for one block. Turn left into Store Street and the cross over and turn left into Albert Place and head for Whittington House on the right hand side, at the corner of Albert Place and Chenies Street.

14. Whittington House; 19-30, Albert Place

Whittington House was constructed in 1970-72 by architect Richard Seifert, also famous for Centrepont at the south end of Tottenham Court Road and Maple House at the north end. This beautiful building is faced with close-fitted, highly polished, black Rustenburg Bon Accord Gabbro from the Bushveld lopolith in the Transvaal, South Africa. The reflective nature makes both the colour and the texture of this rock easy to miss, but close inspection shows this to be a gabbro composed of interlocking crystals of white feldspar and black pyroxene.



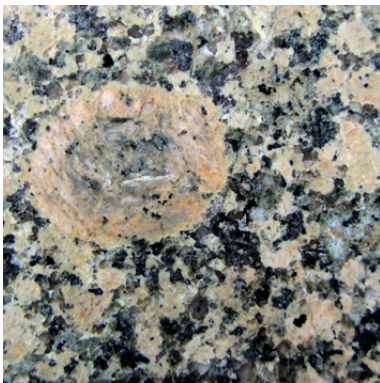
Return along Chenies Street to Tottenham Court Road. Cross over to access public transport links from Goodge Street Station.

Finish Point: Goodge Street Station.

The Stones

Ardosio Verde

This green 'slate' is in fact a fine grained, weakly metamorphosed phyllite. It breaks naturally along bedding planes rather than along a cleavage. It comes from quarries near Felixlandia in Minas Gerais Province, Brazil. In the quarry, it is bedded horizontally and the slabs are simply lifted out and then honed to give it a polish which shows up the mottled texture. The green colouration is imparted by the mineral chlorite. Although marketed under the name Ardosio Verde, the stratigraphic unit is the Sta. Helena Formation of the Bambui Group; 800 Ma sediments deposited on the passive margin of the San Francisco Craton of eastern Brazil.

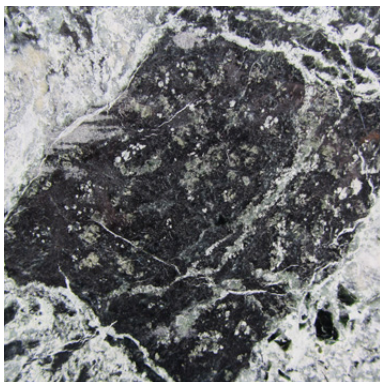


Baltic Brown

This is a very distinctive variety of granite known as rapakivi granite; *rapakivi* means mud-ball in Finnish, and the large, round feldspar phenocrysts are distinctive, set in a dark biotite and hornblende-rich groundmass. Careful examination of the phenocrysts shows them to have large cores of pink orthoclase, surrounded by a rim of greenish plagioclase. Because plagioclase forms at higher temperatures to orthoclase, its presence on the rims indicates a later influx of magma into the crystallising magma chamber. This, like all the granites of the 'rapakivi' suites were intruded in the Late Archaean and early Proterozoic. They are known as the A-type or Anorogenic Granites and indicate the

beginnings of plate tectonic process that we recognise today. These are found on several continents, notably in North America and on the Fenoscandian Shield. Baltic Brown comes from the Vyborg Massif of southeast Finland and was intruded c. 1.6 billion years ago.

Where? Pillars supporting the arcade of Central Cross



Bastite Serpentinite

Serpentinites are frequently used as architectural stones as they are highly decorative, easy to cut and take an excellent polish. However the latter two characteristics are also their disadvantage as these stones weather rapidly and need either resurfacing or replacing. A serpentinite is an altered ultrabasic rock, forming at high pressures in the lowermost part of the Earth's crust or the top of the mantle. To emplace these rocks on the surface requires major plate collisions and bodies of serpentinite-rich rocks are called ophiolite complexes. Ultrabasic rocks are composed of primarily olivines and pyroxenes once they are emplaced in the low-temperature and low pressures of the upper crust they increase in

volume and alter to the serpentine group clay minerals, iron oxides and other minerals including talc and tremolite. Bastite serpentinites contain porphyroblasts of 'bastite', a name for an intimate intergrowth of tremolite and talc replacing orthopyroxene. The talc-tremolite intergrowths are so fine that they 'pseudomorph' the orthopyroxene; replacing its shape and internal structure. This spotted texture indicates an igneous protolith, these rocks were originally formed as ultrabasic igneous cumulates at the very base of the crust. Serpentinites are actively quarried where they occur and are difficult to identify to source. The Bastite serpentinite on Torrington Place is probably Vermont Verde Antique from Cavendish in Vermont, but it may also be derived from the European Alps or Tinos. It is also worth noting that mixed serpentinite blocks can be reconstituted and slabbed to fool the keen rock-watcher.

Where? Mullard House, 1-19 Torrington Place

Belgian Black Marble

The black 'marbles' are actually limestones, coloured by the presence of bitumen. They come from two main localities, in Namur and at Tournai in Hainault. These are extremely fine grained, often siliceous limestones of Devonian-Carboniferous age. They contain rare fossils, particularly of crinoids, but these are often only observed if the stone is used in large slabs. Otherwise it is homogeneous black limestone which keeps its

colour, takes an excellent polish and is also a freestone. The quarries are small scale, though active today and have been worked since at least the early Mediaeval period. The stone was also known as 'Touch' as it was used as a touchstone for testing precious metals. In architectural contexts, Touch was most often used in paving routinely in conjunction with white marble.

Where? Paving in Heal's arcade



Coade Stone

Coade Stone is in fact an artificial stone which was extremely weather-proof and imitated natural stone-work well, with the advantage that it could be cast into the required shape, be that architectural ornaments or statues. The material is a ceramic which was developed and patented by Richard Holt of Lambeth in the 1720s. However the material did not take off and the patent lapsed. In the 1760s, Holt's yard was bought out by Mrs Eleanor Coade who improved the recipe and set up the Coade Artificial Stone Manufactory. Coade Stone was not a concrete but a ceramic, in fact a high-fired (c. 1100-1150°C) stoneware made from ball-clay tempered with grog (crushed pre-fired ceramic), crushed flint, quartz sand and crushed soda-lime-silica glass; this latter helped the vitrification of the clay resulting in a hard, weather-resistant material. The temper represented c. 40% of the body which meant that the material would not have been very plastic; better for moulding rather than sculpting. Mrs Coade referred to her material as *lithodipyra*, suggesting that it may have been twice fire, or alternatively this may have also referred to the use of grog as a temper.

Where? Masks and other architectural details in Bedford Square.



Connemara Marble

Also known as 'Irish Green Marble', this stone comes from several quarries surrounding Clifden, Connemara in County Galway, Ireland. The quarries have been worked from the 19th Century and is quarried to the present day. The marbles are composed of calcite and dolomite with the green colour imparted by tremolitic amphiboles, serpentinite group minerals and occasionally forsterite and diopside. These rocks have also undergone two phases of folding and this is visible in some examples as crenulations in the banding. The protoliths of these rocks belong to the Late Proterozoic Dalradian Supergroup and are correlatable with limestones and dolomites elsewhere in Ireland and in west Scotland. They

were transformed to marbles by tectonometamorphic events c. 480 million years ago.

Where? Paving in Heal's arcade



Dakota Mahogany Granite

Derived from Millbank, Grant County in South Dakota, USA, Dakota Mahogany is an attractive and colourful granite composed of pink orthoclase feldspar, bluish quartz, brown biotite and hornblende, with cherry pink smudges of hematite. It was discovered by Alex Dewar in 1917 and he subsequently set up the quarries of the Dakota Granite Company in 1925, turning a healthy profit out of what was otherwise unproductive farmland. The stone was initially used for gravestones and monuments, but was also shipped world-wide and became popular as a facing stone. Its geological origin is the North American Precambrian Shield, intruded at 2.7 Ga.

Where? Santander Bank and the Futon Company

Guernsey Diorite

Guernsey Diorite comes from Les Vardes Quarry in the north of the island. This quarry is still active, operated primarily for aggregate by Ronez, but resources are currently fast running out. The diorite is

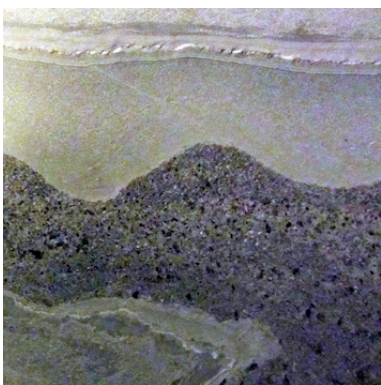
composed of plagioclase, hornblende and biotite is part of the 560 Ma Cadomian North Guernsey Igneous Complex.

Where? Kerbstones in Bedford Square.

Hopton Wood Stone

A buff-coloured Carboniferous limestone, quarried from near Wirksworth in Derbyshire since the 1750s, Hopton Wood Stone is one of the UK's best freestones. It is also decorative particularly with the ring-shaped ossicles of crinoid stems. Like all carbonate rocks, this stone takes a good polish. Similar bioclast-rich limestones are frequently used as both building and decorative stones. Identifying them is not an easy task, though well-preserved examples of certain fossils are certainly useful. The main fossiliferous limestones used are Carboniferous in age like Hopton Wood and Belgian Black Touch (above), Jurassic and Cretaceous stones from France, Italy and the Punjab and Tertiary stones, rich in fossil foraminifera from Italy and other Mediterranean locations.

Where? Heal's, Tottenham Court Road, Habitat and Mullard House Torrington Place.

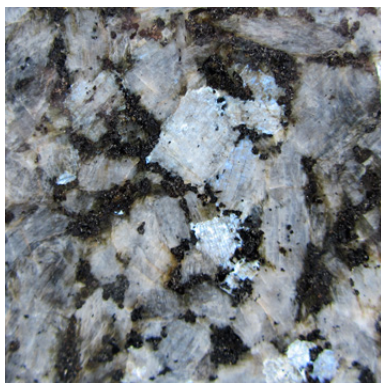


Lake District Green Slate

This name encompasses a variety of slates from the Southern Lake District Slate Belt derived from quarries such as the famous Burlington Quarries near Ambleside and at Honister and Seathwaite. These slates, originally mudstones, siltstones and fine sandstones, were formed during the Ordovician as a product of air fall ash from large pyroclastic eruptions, 'tuffs', derived from the Borrowdale Volcano. The ash accumulated, probably in a crater lake setting and were subsequently reworked by currents and deformed by seismic activity which resulted in complex and attractive layers giving these rocks the popular name of the 'ornamental tuffs'. They were formed into slates during transpressive tectonic events

affecting the Lake District at the end of Caledonian collision in the Silurian. The characteristic blue-green colour of the slates is a result of hydrothermal alteration and low-grade metamorphism promoting the growth of minerals such as chlorite and epidote.

Where? Mortimer Market Clinic



Larvikite

Larvikite is named after its source in Larvik, Vestfold, Norway in the geological feature known as the Oslo Graben. Used locally for millennia, Larvikite has been quarried on a commercial scale since the 19th Century and is now a very popular stone worldwide due to the spectacular 'stiller' shown by the feldspars which has given varieties of the stone commercial names including *blue pearl*, *green pearl* and *royal blue*. There is variation in colour, echoed by these names, from blue varieties through to bronze-dark green varieties. 'Schiller' or 'schillerescence' is an effect observed in several varieties of feldspars and is the play of colours observed in moonstone and gem-quality labradorite. In this case the feldspar is an

oligoclase antiperthite. The rock is a monzonite-syenite and also contains the pyroxene variety titanite, black-bronze lepidomelane mica and magnetite. It was intruded c. 275 Ma as part of the last phase of magmatism in the Oslo Graben.

Where? Royal Bank of Scotland, The Rising Sun Public House

Mountsorrel Granodiorite

Located near the village of Mountsorrel in Charnwood, Leicestershire, the granodiorite quarry is the biggest granite quarry in Europe, worked predominantly for aggregates and roadstone and currently operated by Lafarge Aggregates Ltd. It has been in production from at least Roman times, but industrial-scale quarrying began in the early 1800s. The Mountsorrel Granodiorite has been argued to be 400 Ma, but there is compelling evidence that it may belong to the older suite of 'Charnian' igneous rocks at c. 600 Ma. It

contains quartz, orthoclase, plagioclase, biotite and brown hornblende. The red colour is imparted by the presence of iron oxides.

Where? Kerbstones in Bedford Square.

Otta Schist

This is a rather beautiful metamorphic rock comes from the Ordovician Caledonide nappes of Norway, near the town of Otta. It is a schist, with a well developed foliation defined by mica with prominent acicular porphyroblasts of actinolite, up to 3-4 cm in length. The lustrous surfaces are defined by the micas and the rock has an overall green-grey colour. It would once have been a sandstone, and was subsequently metamorphosed at moderate temperatures and pressures during the plate collision and mountain building processes responsible for forming the Caledonian mountains of Scotland and Scandinavia around 400 million years ago. The rock is actively quarried for a variety of interior and exterior decorative purposes by Minera Skifer quarries of Norway.

Where? Metropolis House, service and utilities entrances on Windmill Street.



Peterhead Granite

The Peterhead Granite comes from Stirlinghill, near Boddam, Aberdeenshire. Commercial-scale quarrying began in the 18th to 19th Centuries and the quarries continued in use until 16 June 1956, closing because they were unable to compete with granite sources from abroad. Nevertheless, Peterhead Granite was used throughout the 19th Century for monuments, architectural elements and facing stone throughout the world. The 'red' variety of Peterhead Granite is a dark red – coloured by blotchy phenocrysts of orthoclase feldspar, together with grey quartz and black hornblende. It is one of the Caledonian 'Newer Granities' intruded ~ 400 Myrs ago

Where? 39, Bedford Square; columns supporting porch, Jack Horner Pub and Myhotel; pilasters supporting window arches on the first storey facade.

Portland Stone

Portland Stone come from the Isle of Portland, near Weymouth in Dorset. It is of Upper Jurassic (Tithonian Age) and is the iconic building stone of post-Great Fire (1666) London. However the stone was pioneered by the architect Inigo Jones and he used it in London in the Banqueting House, Whitehall, completed in 1622. In fact there is so much building in Portland Stone that it is difficult to believe that the quarries of Portland alone could have produced all this stone, however it does and the quarries are still in production. Portland Stone is a freestone; the geological name for the lower section of this strata, the Whitbed or 'Best Bed' is from where much of the classic Portland Stone was derived. This is a thickly bedded, pale grey, oolitic limestone with a few sparse shell fossils. The ooliths, spherical particles of calcite, are about 0.5-1 mm diameter and are just visible to the naked eye on close inspection of the stone. The rock is dissected by widely spaced joints allowing blocks 3 m square to be extracted, making it excellent for ashlar. The properties as a freestone and uniform fine grained texture allow it to be carved. The three other important members are the Roach, which directly overlies the Whitbed, which is packed with moulds and casts of large bivalves and gastropods; The Curf or "bastard Roach" which resembles the Roach but is not such a hardwearing stone and therefore little used, and the Base Bed, which is very similar to the Whitbed in appearance, but does not contain the fossils.

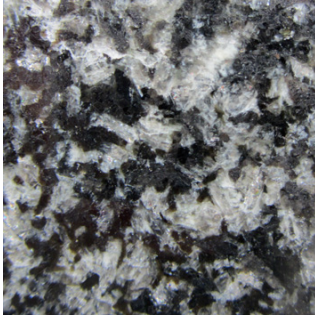
Where? Heal's, Catesby's, Bedford Square, UCL, Senate House, School of Hygiene and Tropical Medicine and the British Museum.

Rivière-à-Pierre Granite

The Rivière-à-Pierre Suite of granites belong to a series of rocks known as charnockites. These are essentially a variety of granite which contains the pyroxene hypersthene, which would normally be associated with rocks such as dolerites and gabbros. This rock is more typically a 'farsundite' with amphibole present rather than pyroxene; it contains quartz, orthoclase and plagioclase, hornblende and

biotite and shows a weak metamorphic foliation. These rocks are 1.1 billion years old and come from the pre-Grenvillian Basement of southern Canada. They are extracted from the Nara Quarry, near the town of Rivière-à-Pierre, Quebec, operated by Granicor Inc. and reputedly one of the most productive quarries in North America and are used for both interior and exterior decoration.

Where? Maple House



Rustenburg Gabbro

The Rustenburg Gabbro is derived from the gabbros of the Bushveld Igneous Complex, an enormous 'lopolith' basic intrusion in the Central Transvaal, South Africa. Located in the South African Craton, the Bushveld gabbros are dated to 2 Ga. There are two main varieties, one known as simply Rustenburg and also *nero impala*, the second is known as Bon Accord named after the adjacent town to the quarry. Both show all the classic features of gabbros; these a dark coloured rocks, with a 'salt and pepper' effect of equally sized calcium-rich plagioclase feldspar and pyroxene. Rustenburg Gabbro takes a high polish and it became a very popular stone after World War II and is commonly seen as a

facing stone on many buildings of the 50s, 60s and 70s.

Where? Whittington House, Albert Place; MacDonald's, Tottenham Court Road; and also Grant Thornton House, 40 Melton Street at Euston Station.

Sardinian Granite

A suite of late-orogenic granites were intruded during the late phase of the Variscan Orogeny which affected a belt running from Cornwall eastwards through Europe. Examples of these are well exposed in the massifs of Corsica and Sardinia, the latter being the origin of Sardinian Beige Granite. More specifically this is derived from the monzogranitic – granodioritic Arzachena Pluton, which includes suite of pale coloured 'leucogranites' in a variety of shades from grey, through beige and pinkish varieties. The pluton was emplaced ~ 310 Ma and the leucogranites contain quartz, plagioclase, K-feldspar perthite, biotite ± muscovite as well as hornblende. A number of active quarries are located around the 'granite town' of Arzachena.

Where? Central Cross.

Travertine

Travertine is a freshwater limestone, composed predominantly of the mineral calcite. Its deposition requires geothermally heated groundwaters, associated either with volcanism or by fault zones allow



heated waters to flow to the surface. Therefore the stone is inextricably linked with hot springs. These are by far some of the youngest stones to be used in buildings, being only a few tens of thousands of years old. Travertines make beautiful building stones; they take a good polish, and they are decorative as they are often attractively layered, sometimes complexly with contorted and stalagmitic mineral growths and they occasionally contain plant fossils.

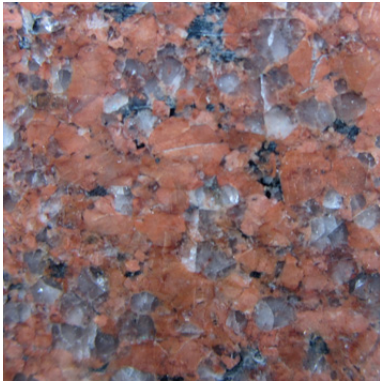
However caution is required in seeing plant fossils all too easily in these stones, dendritic growths of calcite within the travertine are often misinterpreted as fossil mosses. Travertines are soft and relatively easy to quarry out but they weather and mature to surprisingly strong stones.

Travertino di Tivoli (Tivoli Travertine) is formed with warm waters derived with the Roman Volcanic Field and associated hot springs which flooded the area, deposition occurred between c. 115 – 30 ka. There

are numerous quarries which have been worked since ancient times. Modern workings are located around Bagni di Tivoli and Guidonia.

Travertino di San Giovanni (St John's Travertine) formed in association with faults at Terme di San Giovanni near Raplano in the region of Siena, c. 24 ka. The faults provide a conduit for warm geothermal waters (temperature c. 40°C) to flow to the surface, dissolving calcium carbonate-rich rocks; limestones and older travertines as they do so. When the waters emerge at the surface, they cool rapidly and the calcium carbonate precipitates out forming beautiful and finely layered rocks, the resulting warm pools were attractive to ecosystems of algae and bacteria, and grey and greenish layers within the rock indicate such biological activity.

Where? Senate House - Tivoli, MacDonald's Restaurant – San Giovanni.



Tranås Red Granite

A suite of alkaline granites were emplaced in Southern Sweden at the end of the Sveco-Fennian Orogeny, c. 1.8 Ga, forming the Småland and Värmland Massifs and also referred to as the Trans-Scandinavian Belt. The Småland Massif has quarries producing the red Västervik and Tranås Granites. Tranås Red Granite is named after a town in Jönköpings Province and is composed of characteristic intense red feldspars, biotite and blue-grey quartz. The current quarries are near the village of Askeryd and have only been in production since the 1930s however older, now flooded, quarries also exist indicating earlier extraction industries, also testified by late 19th Century churches and other buildings in this region. A similar granite, but not so fine, is extracted from quarries at Solberga, near Nässjö.

Where? Catesby's Building, corner of Godge Street & Tottenham Court Road.

York Stone

York stone is a rather generic name referring to flag stones derived from the Carboniferous Coal Measures from the Central Pennines. These are laminated fine sandstones and siltstones, often showing ripples and other sedimentary structures. When fresh, they are a golden brown, whereas when weathered they are a dull brown colour. These stones are ubiquitous as flagstones in the older streets of London.

Where? Bedford Square.

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