

*Building Stones at Regent's Place  
an urban geological walk*



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## Building Stones at Regent's Place: An Urban Geology Walk

At the time of writing, the Regent's Place development is nearing completion with the office blocks in the North East Quadrant (NEQ) almost ready for their new occupiers and new paving laid on Hampstead Road and on Drummond Street. The site is owned by British Land and occupies 13 acres and comprises offices, restaurants and bars as well as residential buildings and social spaces. The developers pride themselves on their use of natural materials and a number of stones are used here. This guide introduces the geology of the main stones used in the site.

Regent's Place is best accessed from Warren Street Station. Cross over the road towards the north and turn left at Regent's Tower following the building round into Regent's International Plaza where this geological tour will start.



### Regent's Place Plaza

An innovative series of seating, inspired by the Giant's Causeway in Northern Ireland occupies the Plaza. It is built from blocks of granite of variable height which have been hollowed out and set on a steel frame.

The granite used for the Causeway comes from central Spain in the remote and sparsely populated province of Extremadura. Stone extraction is one of the most important industries in Extremadura and in fact Spain is the top European producer of granite, with the provinces of Extremadura and Galicia being the main suppliers. At least forty varieties are quarried in Extremadura from a 250 km long massif of granitic rocks called the Central Extremadura Batholith which was intruded into metasedimentary rocks between 400-500 million years (Ma) ago. Evidence of the metasediments, 'schists', can be seen in the granite blocks as black streaks and blobs. These features are known as 'xenoliths', literally 'strange rocks' which become incorporated into the molten granite as it rises through the Earth's crust. These rocks show the classic mineralogy of granites; quartz, feldspar and mica. The mica is the black mineral, the feldspars are white and the quartz is grey. This particular variety is called Azul Extremadura and comes from quarries near the village of Salvatierra de Santiago near the town of Caceres. The intrusion is called the Zarza de Montánchez Granodiorite. The stone contractors for this project and for many other structures in the landscaping of Regent's Place were BBS Granite Concepts.



*The Giant's Causeway seating blocks and a close up of Azul Extremadura granite showing a small xenolith of black schist. The field of view (FOV) is 5 cm.*

The sculpture housed in the concrete block on stilts in front of 2 Triton Square (Santander Bank) is by Edward Hodges Baily (1788-1867). The relief depicts the Lord Nelson accepting the surrender of the Spanish Admiral Don Francisco Xavier Winthuysen after his defeat at the Battle of St Vincent in 1797. The relief is carved from white marble. The elevated position of the scene makes identification difficult (and white marbles are notoriously difficult to identify by eye) but this is probably carved from Carrara statuary marble.

*Continue on to 2 Triton Square, behind the sculpture.*

### **2-3 Triton Square**

Built in 2002 by architects Shepherd Robson, 2-3 Triton Square is clad in the black stone Nero Assoluto Zimbabwe. The stone was supplied by Gormley Group. On the elevation of the building on the Euston Road it is spectacularly used to clad the elliptical towers. Nero Assoluto Zimbabwe is well named being absolutely black, but taking a high polish. It is a medium to coarse grained dolerite belonging to a suite of igneous intrusions known as the Mashonaland Sill Complex. At 1.87 billion years (1870 million years) old, this is by far the oldest rock encountered at Regent's Place.



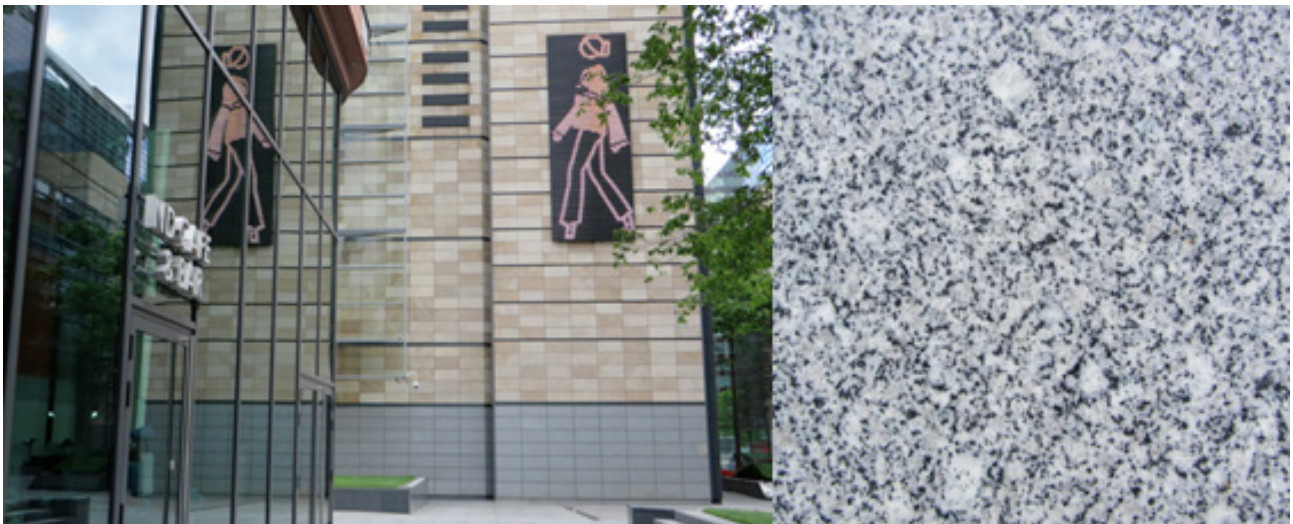


*Nero Absolute Zimbabwe on the elliptical towers along the Euston Road side of 2-3 Triton Square.*

There are many sills (sheet-like igneous intrusions) outcropping in western Zimbabwe in the region to the west and south-west of the capital Harare. Dolerites are typically dark or 'mafic' in colour being dominated by the major rock forming mineral pyroxene. In this example, large quantities of the black iron oxide magnetite add to deepen the colour. Plagioclase feldspar is also present. Walk around the building and try to find a shady corner where there is not much reflected light to examine the rock with a hand lens, the grain size is 2-3 mm. Nero Zimbabwe was first marketed commercially in the early 1970s and continues to be a popular stone and a major export of Zimbabwe to the present day.

### **1, 4 & 7 Triton Square**

The large block occupying Triton Square was designed and built by Arup Associates in 1997. Although the main entrance on Regents Plaza is all glass fronted, walking round the building towards the west shows a distinctive grey granite at pavement level. The granite is mainly medium grained but contains sparse rectangular and square phenocrysts (that is crystals larger than the groundmass of the rock) of white feldspar. This is Barre Grey Granite from Vermont, USA. Vermont is known as 'The Granite State' and the town of Barre was once 'the granite capital of the World'. Commercial production began in 1830 and Barre attracted immigrants from Old World stone production areas such as Italy, Scotland, Spain and Scandinavia. An observer in the late 19<sup>th</sup> Century noted "many Scotchmen have come here from the granite industry in Aberdeen, Scotland. Some of these express the opinion that as compared with the old country the men here work harder, receive higher wages, spend more money and are no happier." (Seager, 2001). Only one quarry is still in production, the Rock of Ages Quarry near the village of Upper Graniteville. The Barre Granite is Devonian in age, intruded at 380 Ma during the Acadian mountain building event of the northern Appalachians.



*Left: 4 Triton Square, with Julian Opie's installation. Right: close up of the grey granite at pavement level.*

The upper part of the building is clad in a buff sandstone. According to Arup Associates, this is called 'Pierre du Nod', a Mid-Jurassic calcarenite from the Côte D'Or region of Burgundy. Unfortunately, on the external walls of the building, the stone is several metres above pavement level and not readily examined. However it is iron rich and the ivory-coloured stone is mottled with rusty-brown patches and shows 'liesegang banding', a phenomena caused by iron-rich waters percolating through the rock. The light installation 'Ruth walking in Jeans' on the west-facing side of the block is by Julian Opie (b. 1958).

*Walk along the west side of 4 Triton Square to Longford Square on the N side of the development.*

### Drummond Street and Longford Square

Granite clad planters and seating blocks are located on Hampstead Road and on Drummond Street. These are made of a beautiful blue-coloured granite from Brittany, NW France. The quarries at Lanhelin are situated in the Bonnemain Granite which lies a few kilometres south of the town of St Malo in Brittany. Most of the rocks of western France, known as the Armorican Massif to geologists, are related to and the same age of those in Cornwall and Spain and were formed during a major mountain building episode called the Variscan (or Hercynian) Orogeny which reached its final stages ~ 300 million years ago. However in the area around St Malo and the adjacent Channel Islands are formed of rocks which belong to an older event known as the Cadomian Orogeny. The Bonnemain granite has been dated to 527 Ma (Dallmeyer *et al.*, 1993).

The paving on Drummond Street is of grey Whitworth Stone. This is a fine grained sandstone from the moors of the Pennines between Lancashire and West Yorkshire. This is one of the stones used for paving which belongs to the group known generically as York Stone, though none of it comes from anywhere near York. They are derived from the many beds of flagstones found within the Pennine Lower Coal Measures Group of Carboniferous age. Varieties of York Stone are ubiquitous on the pavements of London. This particular variety is rather unusual in that it is dove grey in colour, with patches and bands stained pale orange by iron. The original sediments were laid down in major river systems flowing over the Carboniferous continent. The associated coals were formed from peats and plant material preserved in swamps and stagnant waters. Evidence of this is also seen in the Whitworth Stone flags; particles of black organic material are seen concentrated along fossil ripples and other sedimentary structures



Left: Longford Square. The planter on the far left is Blue Lanhelin Granite with paving of pale grey Whitworth Stone. Right: Whitworth stone showing black flecks of organic matter concentrated along fossil ripples, FOV 30 cm.

The kerbstones are of Portuguese Alentejo Dark Grey Granite. This is a dense medium-fine grained granite with a 'salt & pepper' speckled effect, from west-central Portugal. This granite is similar in age and origin to the Azul Extremadura used in Regent's Place Plaza.

*Return to Triton Square, and turn left and pass the New Diorama Theatre onto Triton Street.*

### 20 Triton Street

20 Triton Street marks the western end of the Regent's Place development. This large building, by Terry Farrell & Partners, 2010, houses an Italian Restaurant and office accommodation. A two-

storey arcade runs around the building from Triton Street onto Osnaburgh Street supported by pillars clad in red stones. At pavement level, the foundations are of a red granite. This is Vånga Granite from near Kristianstad in southern Sweden. This is an ancient stone, over 1.4 billion years old. Like the granites in Regent's Plaze, it contains the defining minerals quartz, feldspar and mica. Here, the feldspar is rich in potassium and a deep orange-red colour. The mica, the variety biotite, is black and once again the grey mineral is quartz. The Vånga Granite was part of a group of granites known as the Karlshamm Suite which were intruded into the Blekinge and Skåne geological terranes of southern Sweden. For the most part these intrusion show typical granite textures with randomly orientated crystals, but the westernmost Vånga granite was deformed; it was intruded next to a belt of deformation and as a consequence we can see that the feldspars have been stretched and aligned to form a strong foliation. The biotite has also been concentrated together in streak-like features called 'schlieren'.



Left: 20 Triton Square, the red granite is at pavement level. Right: close up of the granite, FOV 5 cm.

The well colour-matched stone cladding the upper parts of the pillars and the rest of the building is above most people's head-height on Triton Street, but slightly lower and easier to observe on Osnaburgh Street. From a distance the stones look very similar but the upper stone is not a granite but a sandstone. It is from Wüstenzell in Central Germany, a village situated midway between the cities of Frankfurt and Nuremberg. Wüstenzeller Stone is Triassic in age, around 250 million years old. It comes from an extensive series of sandstones called in German *Buntsandstein*. 'Bunt' means coloured or variegated and colours vary from red through buff and yellow to green. However most are red and Wüstenzeller Stone comes from a unit called the *Roter Mainsandstein* which forms the uppermost part of the succession. The Buntsandsteins or Bunter Beds as their English equivalents were known, filled an arid continental basin – a desert – which stretched from England across central Europe. Striking in this stone are the flecks of the white mica, muscovite, which reflect the sun and sparkle on the surface. Other minerals present are quartz and feldspar (these sandstones represent eroded remains of granites and therefore have the same mineralogy) and the red colour is imparted by iron oxides. Notably absent from these sandstones are clay minerals. Clays require water to form from the chemical weathering of mica and feldspar, and their absence in these sandstones indicates an extremely arid climate at the time of their deposition. The stone for 20 Triton Street was supplied by German contractors Hofmann Naturstein.

10 Triton Street opposite is clad with a synthetic material, reconstituted limestone, intended to imitate Portland Stone.



The paving on both sides Osnaburgh Street appears identical to British York Stone. However, despite the reassuringly 'northern'-sounding name, this stone is not from the British Pennines. The origin of the stone is unknown. It is probable that it is from India. Fluvial flagstones crop out and are extensively quarried in the region of Bundi in southeastern Rajasthan, which despite being Proterozoic in age, are indistinguishable from York Stone, but considerably cheaper! Flagstones and setts are used to create pavements.

### Regent's Place Pavillion

Between 10 and 20 Triton Street is an art installation and seating area, the Regent's Place Pavillion by Kevin Carmody (b. 1975) and Andrew Groarke (b.1972).



Left: Regent's Place Pavillion. Right: the green gabbro used on the seating.

The Pavillion features small paving setts and block seating of stone. This is a dark, grey-green gabbroic rock with fuzzy, equigranular crystals. The diffuse margins of the crystals suggest that the rock is slightly altered and minerals are beginning to break down to form clays. However the main mineralogy is a pale grey-green plagioclase feldspar plus a dark brown pyroxene or hornblende. Once again the origin of this stone is unknown and it could have been derived from many sources.

*This is the end of this walk. Turn left (south) along Osnaburgh Street which leads back onto Euston Road and Great Portland Street Underground Station.*

### Sources and Further Reading

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