Barkingside: A Suburban Urban Geological Town Trail

Ruth Siddall

Part of the reason for writing this guide to the urban geology of Barkingside is for it to stand as a 'model answer' for readers who want to make their own town trail from their own observations. As such it is particularly aimed at pupils studying A-level Geology where such an exercise is good practice for improving and building confidence in identifying and describing rocks and minerals. Most urban areas can furnish enough examples of masonry, monumental or decorative stonework to put together a short guide. As has been pointed out by other authors, before any of us write such a guide, we need to think about our readership (see Bürek & Hope, 2006). Are we going to target the guide at knowledgeable amateur or professional geologists? Or is the intention to pitch it at non-specialist audiences? If the latter it is useful to combine the geology with some elements of history or architecture, or indeed other elements of natural history in the area. It is also important to think about the language we use to suit our audience. It is important to define any technical terms. However never underestimate the intelligence of your audience!

Barkingside is a suburban area, historically in Essex, but now located in the London Borough of Redbridge. Most of my urban geological guides are focused on city centres where there is abundant use of stone in a wealth of buildings[1]. I wanted to choose somewhere that was not awash with stone-built monuments, civic buildings and a wide variety of decorative stones used in shops and shopping malls. Barkingside is a fairly average place, with a typical history of development, with standard amenities and where normal people live. There is nothing particularly special about Barkingside and like many small towns and suburbs in the UK it has a shopping street, a church, a cemetery, a war memorial and a park. All good hunting grounds for urban geology. This is precisely why I chose this place. Many of Britain's inhabitants live in places like Barkingside, and I wanted to show that you don't need to go to big cities and downtown districts to make an urban geology trail. I also wanted to make a guide of an area I did not know so I would not go with any specific preconceptions of what and how much stone would be in use there. I was not expecting lots of stone buildings but I was able to collect enough data to write this short guide of the centre in around one-and-a-half hours and find good examples of igneous, sedimentary and metamorphic rocks used as building, monumental and/or decorative stone.

Historical Background

There is evidence that there have been settlements at Barkingside since the Medieval period, however apart from some place names (i.e. Fullwell Cross), there is little evidence of this. Barkingside became a civic centre in the mid to late 19th Century, though much of the urban development here took off after the coming of the Central Line and the opening of Barkingside Tube Station in 1903. Hence, most buildings date from the 20th Century.

Local Geology

This area of London is characterised by geologically young deposits. These include clays, gravels and the so-called brickearths. As the name suggests, the latter were worked for making bricks and they are some of London's youngest geological strata. Brickearth is actually fine-grained wind-blown clay and silt called 'loess', and it has the perfect natural composition for moulding and firing bricks. The remains of a large variety of Ice Age animals were found whilst excavating the nearby Ilford Silt brickearths in the 19th Century. Dating from 200, 000 years ago, these included bones belonging to woolly rhinos, giant deer, bears, muskox and the almost complete skull and tusks of a steppe mammoth (*Mammuthus trogontherii)* which was discovered in 1864. These finds represent a slightly warmer period – an interglacial - between glaciations. The mammoth skull is in the Natural History Museum in South Kensington and is the best-

[1] My #UrbanGeology guides can be downloaded from http://www.ucl.ac.uk/~ucfbrxs/Homepage/UrbanGeology.htm

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preserved mammoth skull found in the UK. A plaque commemorating the site of the discovery can be found outside Ilford Methodist Church on Ilford Lane, the site of Uphall Brick Pit[2].

Most of Barkingside, however, is built on Boyn Hill Gravels. These are deposits left by the ancestor of the River Thames, which formed around 350,000 years ago in a time period dominated by the Pleistocene Ice Ages. These overly the London Clay which was deposited in the Eocene period, around 50 million years ago. London Clay was also worked in the area for making bricks.

I have to confess that a major factor in my choice of Barkingside is that it is the final destination to Transport for London bus route 275. This bus goes past the end of my road, so I made it an adventure, got on the bus and got off at the last stop, which is at the local branch of Tesco's on Cranbrook Road. From there I crossed the road and headed for Barkingside Park. Parks are good places to look for stone as they often have drinking fountains and public sculpture. Unfortunately, the drinking fountain here in Barkingside park is built of concrete-clad brick. However, a small stone monument is located in the car park entrance on Mossford Green, and this is our first location.

1. Barkingside Park

A rough boulder is set with a metal plaque inscribed by the Fields In Trust organisation. This is a coarse-grained, intrusive, igneous rock, with grainsize of ~ 1 cm. It is composed of pale pink feldspar and quartz, indicating that this is a granite. Some dark green minerals with a prominent cleavage are also present. These are probably the minerals hornblende and biotite mica. There is also some staining of pink-red iron oxide (hematite).



The identification and provenance of this rock is unknown. However, it is very possibly a glacial erratic, and this is supported from its natural boulder shape. Such stones are acquired from deposits in Scotland and southern Scandinavia.

Leave the park onto Mossfield Green and turn left and walk to Trinity Hall.

2. Trinity Hall

Trinity Hall is built of brick, but to the right-hand side of the main entrance is a dedicatory plaque (beneath a fine architectural terracotta plaque of Queen Victoria which has been recycled from an older building, presumably the old National School alluded to in the plaque). The plaque is made of a pale grey limestone and was installed in 1969. Close inspection shows that this is packed with fossil fragments, which are a slightly darker grey than the limestone matrix. The fossils are so broken up, they are impossible to identify.

[2] BGS; Ilford Excavations: http://www.bgs.ac.uk/discoveringGeology/newsAndEvents/iceAge/background.html

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However, this rock could be described as a calcarenite, a limestone that has formed from the erosion, transportation and deposition of clasts of carbonate material. In effect, a limestone that has formed like a sandstone.



Once again, the name and provenance of the stone is unknown.

Continue along Mossfield Green and turn into the burial ground of Holy Trinity Church. Graveyards are always good places to look at stone as headstones, tombs and memorials are almost always made of stone of many varieties. Limestones, sandstones, granites, marbles and slates can often be found. Some exotic stones can be used for modern graves. A small selection of stones are described in Holy Trinity Churchyard and Barkingside Cemetery.

Holy Trinity Church Graveyard
Three monuments have been selected from the churchyard, two are igneous rocks and one is sedimentary.



3. The first is an old and very weathered headstone, probably dating from the 18th Century, although the inscription is barely legible. The weathering can tell us something about the stone. There are clearly streaks that have weathered more deeply than the rest of the fabric and run parallel to sedimentary bedding or cross-bedding. These can be seen running at an angle of ~ 20° to the horizontal across the slab. The stone is a pale grey-yellow limestone. Close inspection shows it to be rich in fossil shell debris and ooids, with the flakes of shells also aligned parallel to bedding. Once again, this stone can be described as a calcarenite.

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This stone is so weathered that it is very difficult to identify. However, I suspect it is one of the Lincolnshire Limestones and probably **Ancaster Stone**. The streaky bedding and cross-bedding, which has weathered out here is very characteristic of this stone.



4. A prominent obelisk in a metal-fenced plot commemorates Elizabeth Philip Chalmers and her family and was erected in the 1890s. It is made of a medium-coarse grained, intrusive igneous rock composed of pink feldspar, dark grey, slightly translucent quartz and black biotite mica. Grain size is homogenous and ~ 5 mm. This mineralogy confirms that this stone is a granite. It is in fact **Peterhead Granite** which was very popular as a building and monumental stone in the later 19th Century. It comes from the quarries at the village of Stirlinghill near Peterhead in Aberdeenshire. It is 400 million years old, and always seems to resemble a coarse, Ardennes paté.



5. Turn to your right and you will see another obelisk commemorating George Brown of Caysham Hall and erected in 1905. This is slightly more orange-pink in colour than the previous obelisk. It is a medium grained intrusive igneous rock with grains ~ 2-3 mm. It is composed of pink-orange feldspar, grey to pale grey quartz and flecks of black biotite mica. Once again this is a granite, but it is slightly finer-grained than the Peterhead Granite described above. This is **Corennie Granite**, also from Aberdeenshire, but quarried at Tillyfourie west of the city of Aberdeen. It is 450 million years old.

Pass through the churchyard into the modern cemetery.

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Barkingside Cemetery

6. Barkingside's War Memorial is located on the south side of the cemetery. It is built of a pale-grey limestone. The weather-beaten surface shows up the texture of this stone very well. Observation with either the naked eye or a hand-lens reveals this to be an oolitic limestone, with the tiny spheres - ooids (or ooliths) – around 0.5 mm diameter. Also present are fragments of fossil oyster shells with their characteristic, well-preserved, laminated shells. These weather slightly proud of the surface.





The War Memorial is of the 'Cross of Sacrifice' type, designed in 1918, at the end of World War I by Sir Reginald Blomfield. Blomfield called his design the 'Ypres Cross'. This design incorporates a cross with a metal broad sword attached to one side. Such crosses were erected in many commonwealth war cemeteries, including those at Ypres and at Tyne Cot at Passchendaele, as well as many town war memorials, as seen here in Barkingside Cemetery. These memorials were erected by the Commonwealth War Graves Commission, and are always constructed of **Portland Stone**, a stone also used for many Commonwealth War Graves.

7. Barkingside's claim to fame is that it is home to the head offices of the Children's Charity, Barnardo's, founded here by Thomas John Barnardo in 1866. Barnardo's owned a plot in the cemetery and there is a memorial here to Barnardo's children and staff, with over 600 names. It was installed in 2008.





The memorial is constructed of four slabs of a black, medium- to fine-grained intrusive igneous rock. The front has a mat-finish (known as 'honed' in the building trade) except for the raised letters of the names. The textures of the rock are easier to see on the backs of the slabs. The stone used takes a very high, mirror-like polish and is very difficult to photograph without reflections. Look closely and the rock is made up of randomly orientated black and (fewer) white grains. This rock is composed of black pyroxene and

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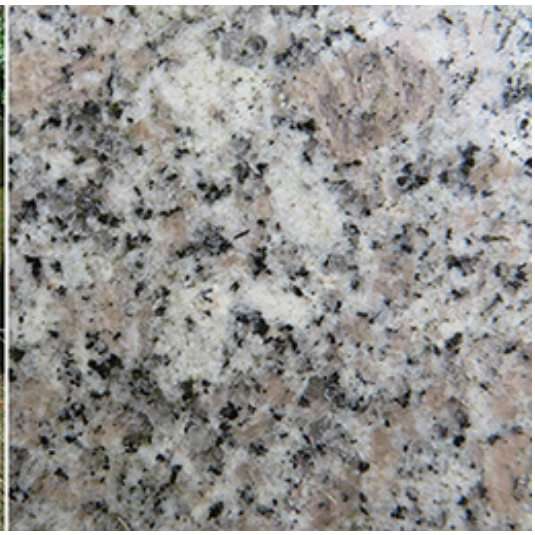
white or grey plagioclase feldspar. The 'blackness' is enhanced by the presence of the iron oxide mineral magnetite. This rock is a dolerite.

This stone is provenanced from Zimbabwe and is marketed under the trade name **Nero Zimbabwe**. Dolerites typically form high-level, sheet-like igneous intrusions, dykes and sills. This stone is quarried from a series of dolerite sills intruded into the Mashonaland region in western Zimbabwe. It is an ancient rock, almost 2 billion years old.

8. An impressive, modernist grave monument to Percy Edward Brand (1870-1955) and his wife, Eleanor (1870 to 1963), stands across the path from the War Memorial. It is made from a medium to coarse grained granite, with pink and white feldspar crystals, grey quartz and flecks of black biotite mica. Some of the pink feldspars show evidence of zoning and hornblende is also present. The overall colour of the stone is a pinkish-grey.

This is Craignair Granite from Dalbeattie in the Southern Uplands of Scotland. The Dalbeattie Granite was intruded at 391 Ma, one of the so-called Newer Granites intruded during the Lower Palaeozoic Caledonian mountain-building phase. This stone has been in production since 1810, and Newall's, the company operating the quarry, were the first to discover how to polish granite (in the 1840s).





Leave the cemetery and return to Mossfield Green and turn right towards Barkingside High Street. At the junction, turn left towards Fullwell Cross and walk along the west (left) side of the high street until you come to the intersection with Fremantle Road.

High Street

9. A remnant of what was once an early 20th Century shop parade remains, a polished stone pillar between Clinton's Cards (61-63 High Street) and Holland & Barnet (65 High Street), next door. It is inscribed 'This stone laid by Stanley Howard Burton 1938'. This gives us a clue as to the shop that stood here in the 1930s, it was a branch of Burton's, the gentleman's clothing store and tailors. Stanley was the son of Montague Burton and his wife, Sophie née Marks (she was the daughter of Maurice Marks, co-founder of Marks & Spencer's). Stanley was born in 1914 and would have been 24 at the time this foundation stone was laid. Montague Burton always had one of his children lay the foundation stone for his stores. Another example laid by Stanley is in Richmond and almost identical to this one. It was laid in 1928 when he would have been 14 (See London Remembers, link below), and there are many other examples around London.

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The foundation stone is a narrow, engaged pillar of a black, coarse-grained igneous rock, with crystals 1 to 1.5 cm. What is really distinctive is that many of these crystals appear iridescent, flashing blue and green colours as they catch the light. The crystals are large enough that cleavage planes can be seen with the naked eye. These minerals are not easily recognised by inexperienced petrographers, but once seen they are never forgotten. They are feldspars, more accurately oligoclase perthites, and the play of colours they show – more properly called 'schillerescence' - is exhibited by a range of feldspars. This feature is exploited in the gemstone known as 'moonstone'. Other minerals present are oxides, pyroxenes and biotite.

This rock type is known as Larvikite and it is a variety of intrusive igneous rock called a monzonite, which contains no quartz and more or less equal amounts of orthoclase and plagioclase feldspar. In this unusual case, these two feldspars are mixed together, to form one feldspar of dual composition, a perthite. Larvikite comes from quarries around the southern Norwegian town of Larvik and it is the only place in the world where it occurs. It has been worked commercially as a building stone since the 1880s and it is an extremely common building stone, frequently seen on buildings dating from the Late Victorian age to the present day. It comes in a range of colours from grey, through blue to a bronze-green. This almost black variety is marketed as '**Emerald Pearl**'. The Larvik Plutonic Complex was intruded 290 million years ago.



10. The window of Card Factory at 73 High Street is framed in a dark green and white breccia. This rock is sheared through and cross-cut with white veins at all scales. This unusual but distinctive texture is typical of rocks called **serpentinite**. These rocks are formed when oceanic sea-floor is tectonically emplaced on continental crust. This process causes expansion of the rock, which causes it to break up and fracture. The

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white veins infilling these farctures are composed of calcite and the dark green material is composed of serpentine group clay minerals.

Rocks of this variety are mainly quarried on an industrial scale in the Val D'Aosta in the Alps and also at several localities in Greece, Turkey and in Vermont in the USA.

11. Cross over the road to the Nationwide Bank at 108 High Street, on the corner with Westminster Gardens. The pillars between the windows are clad a grey-green riven slate. The surface of the stone with the curved ridges on the surface occurs when the slate is split. Looking more closely, the slate is quite coarse grained (for a slate!) and a slightly gritty surface can be observed.





Green slates are usually coloured by the presence of minerals chlorite and epidote, indicating that it has been subjected to Greenschist Facies metamorphic grade. Traditionally, green slates come from the Lake District, however these often show some evidence of sedimentary bedding and associated structures. Bedding is not particularly evident on these surfaces. It is much more likely that these came from Brazil, which is now the main global producer of slate.

12. Cross back over to the branch of Nat West Bank at 133 High Street. The ground floor of the bank is built from Portland Stone, which we have seen previously at the war memorial. Worth a look here is a nice fossil of a spiny oyster, *Spondylus*, which is exposed on the right-hand side door jamb, as seen entering the bank from the street. The thick laminated shell and the spines extending from the outer surface can been seen almost in 3D on the corner of the door jamb. The fossil is ~ 12 cm long.





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Portland Stone is an oolitic limestone was deposited in the latest Jurassic at ~ 147 million years ago. It is quarried only from the Isle of Portland, a peninsula on the Dorset coast of the south of England. Geologically it represents shallow, lagoonal tropical seas, rich in shellfish.

This is the end of the walk. Like me you can get the number 275 back to Walthamstow or go to Barkingside Tube Station (built of brick with Portland Stone dressings) on nearby Station Road.

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Portland Stone – War Memorial (6), Nat West Bank (12).

Serpentinite – Card Factory (10).



Holy Trinity Church, Barkingside

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How to cite this article:
Siddall, R, 2017, Barkingside: A Suburban Geological Town Trail., Urban Geology in London No. 38, 10 pp. , http://ruthsiddall.co.uk/Walks/Barkingside.pdf

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