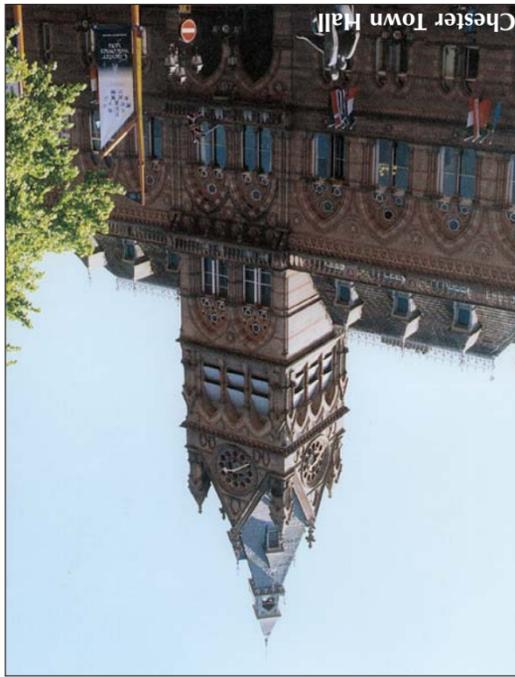




Chester Pebble Beds

This trail will encourage you to look up, down and across at different scales; small grains, medium kerstones and large buildings. Examples of exotic rocks are the vast intrusions of molten magma known as batholiths, which rose close to the earth's surface and cooled slowly, creating granites. You will see slates, which began as muds deposited in deep oceans, became solid, and then changed through heat and pressure. The Chester Pebble Beds are also visible. The more pebbles present in the rock the harder the stone is to work. So, where are all the pebbles? This widespread rock takes its name from the City and was the original building stone used for the walls and cathedral.

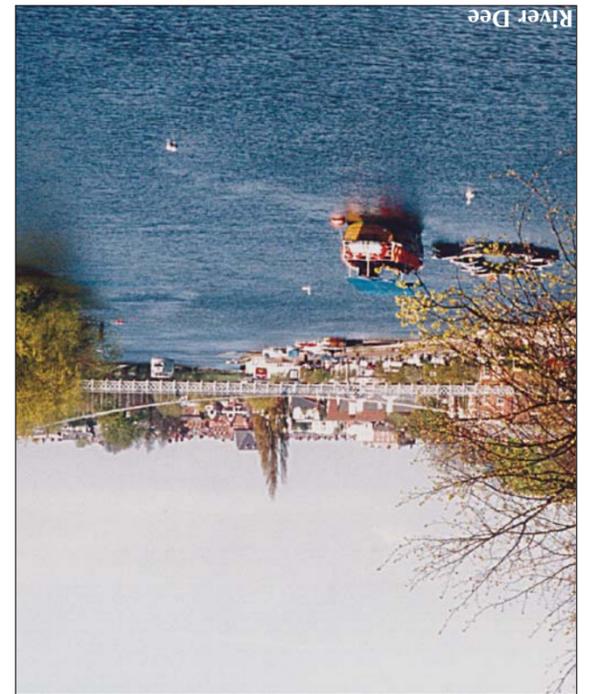
As transport improved, imported rocks of a more attractive and hardened nature were used in building work, as shown at sites around the trail. This was also necessary as the nearby red sandstone reserves were depleted. Come on our trail and you will see the extensive use of different types of red sandstone throughout Chester. We will highlight the use of less local rocks for decorative and practical purposes and explain their different origins.



Chester Town Hall

The Romans, and generations since, used the most accessible rock for building, as transport was limited and the red sandstone was extensive throughout Cheshire being easy to cut and work. Unfortunately, due to the coarse, acidic nature of the rock, body fossils are dissolved and not usually found. However, dinosaur footprints have been preserved and can be seen in the Grosvenor Museum.

The City of Chester conjures up images of Roman walls and culture, Medieval defences and architecture. This would probably include images of buildings and artefacts built of a warm red coloured stone. In fact the warmth of these stones reflects the environment in which they were formed 225 million years ago, during the Triassic period, when dinosaurs roamed across the desert plains. During this time Britain had a hot, dry climate. The shifting of sand by the wind was frequently interrupted by flash floods. Much later, Cheshire was in the grips of an Ice Age which forced the River Dee to change direction once the ice had melted. When the Romans built Chester this red sandstone was at the surface following many years of weathering and erosion due to ice sheets. Several of the sandstone outcrops will be pointed out on the trail.



River Dee

## The rocks you will see around Chester

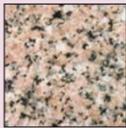
### SEDIMENTARY ROCKS

(from "to settle") These rocks were formed through the accumulation of material derived from weathered fragments of other rocks, plants and animals. Often deposited in a layered sequence by seas, rivers, deserts and beaches. Usually distinguishable by the presence of grains in a 'cement' matrix.



### IGNEOUS ROCK

(from the word "fire") This rock was formed by molten rock (magma) rising near to the earth's surface, or onto the surface as lava. It then cooled and became solid forming different crystal sizes and types depending on cooling rate and mineralogy (chemical composition). Can be identified by the interlocking mosaic of crystals, like a jigsaw puzzle.



### METAMORPHIC ROCK

(from words meaning "changing form") These rocks have been altered from their original state by heat and/or pressure, but the minerals never melt. Generally they are a result of the pressure created during mountain building and heat from intrusions of magma. Changes in texture and chemical composition are usual and vary depending on the degree of metamorphism. i.e. more heat closer to molten rock therefore more changes.



### MAN-MADE ROCKS

These include clays, which have been baked to form bricks and also concrete from limestone.

## What Are RIGS ?

Regionally Important Geological/Geomorphological Sites (RIGS) are any sites, excluding SSSI's (Sites of Special Scientific Interest) that are protected for their educational, research, historical or aesthetic importance.

## RIGS Groups

Any member of the public with an interest in Earth Heritage conservation can join a RIGS Group. They choose sites, which are then protected by local authorities. With the co-operation of owners, some sites are developed for educational use.

If you would like to join RIGS in the Chester area please contact :

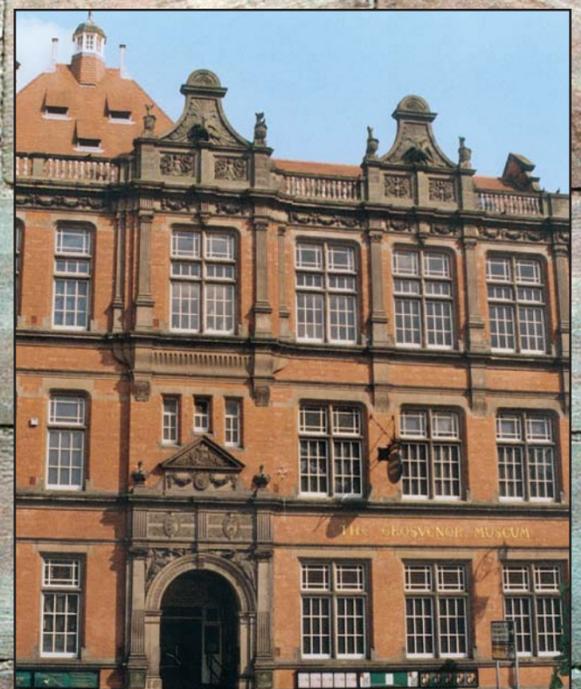
Dr. Cynthia Burek or Dr. Derek France  
Environment Research Group  
Chester College, Parkgate Road,  
Chester CH1 4BJ

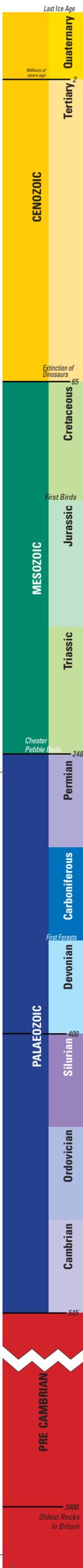
email: [c.burek@chester.ac.uk](mailto:c.burek@chester.ac.uk)

email: [d.france@chester.ac.uk](mailto:d.france@chester.ac.uk)



## Walking through the past: A geological trail around Chester





**1 Grosvenor Museum (cover picture)**

Inside the entrance to the museum are granite columns from Shap Fell in Cumbria.

This Shap granite is an attractive, popular facing stone. The large pink crystals, called phenocrysts, are the mineral Orthoclase Feldspar. The black minerals are Biotite Mica, white are Plagioclase, and transparent are Muscovite Mica and Quartz.



**2 Castle Entrance**

The massive columns were brought from Manley quarry, eight miles from Chester. Special wagons had to be built to carry them and teams of sixteen horses had to be assembled to tow such a heavy load. Although a local sandstone, it is unusually pale and quite hard. The pale colour is due to the absence of hematite, an iron mineral that gives many sandstones their characteristic red colour. The columns at the front are more weathered and contain random pebbles.



**3 Base of the Stapleton Cotten Statue**

The statue of Stapleton Cotten is on an island in the middle of the road. It can be seen without having to cross the road. As in the museum, granite is used for its attractiveness. The base of the statue is almost pure white (the mineral Plagioclase Feldspar) and is probably from Wicklow in Ireland.



**4 The Walls**

Turn left at Castle Drive and walk down the hill. Seen from the roadside the walls are red sandstone, but the quality of the stone blocks varies widely. The walls and repairs are a record of the development of the city.

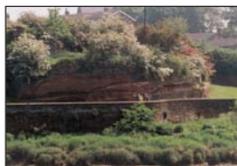


They reflect both the quality of rock used in their construction and development of masonry skills through time. The more weathered rocks contain bands of light material, which are crumbly in nature and can be seen in the quarry faces at Handbridge and Edgar's Field.

At the corner of the wall opposite the car park entrance you can see the thin, yet distinct, bedding on certain blocks which relates to the desert environment in which the rock was formed. This corner of the wall has been built on top of a natural outcrop of rock. Compare the similarities of stones used in the wall with the local bedrock.

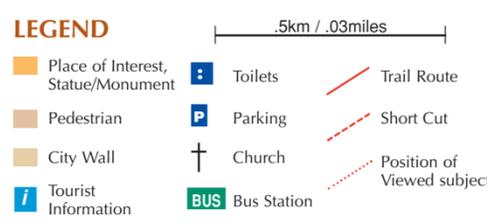
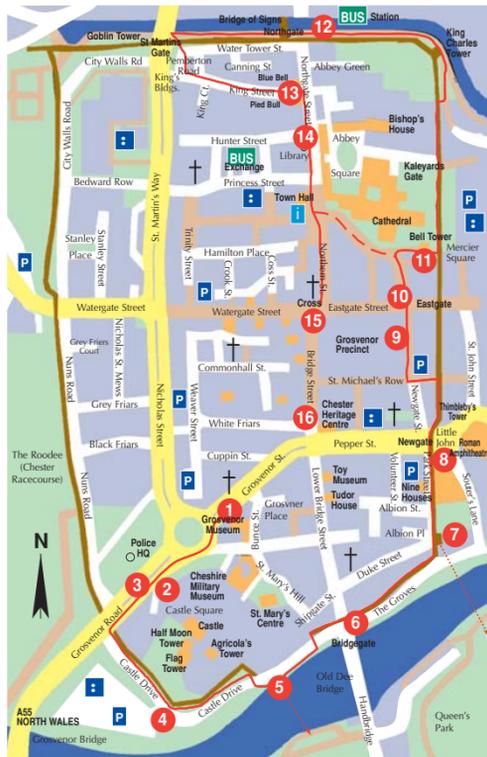
**5 Edgars Field from the Riverside**

Even from a distance across the Dee certain geological structures can be seen on the rock face of this former quarry. The layers in the rock (bedding) and occasional distinct bands of pale material correspond with events during deposition. This rock was probably quarried during medieval times and used to build parts of the wall. Cross bedding as shown in the photo is commonly found on blocks in the wall.



**6 Flagstones on the Bridgegate**

Millions have trodden the rock used to build the steps and the paving of the Bridgegate. It is gritstone, as the grains in the rock are larger and more angular. The characteristic of this rock is its durability, which makes it very useful for this purpose. This gritstone was brought from a quarry in the Pennines. Certain layers of this rock were named Millstone Grit, due to its former popularity in grinding cereal to produce flour in mills.



**7 The Watchtower**

From here you can see an imposing modern building on the opposite side of the river with large neo-classical style columns. The pillars look like a gritstone or sandstone, but are actually man-made alternative to quality natural building stone.



Along the wall to the Newgate, the terraced houses on the left have slate roofing probably quarried in Wales. This dark purple slate is a different colour from that of the Addleshaw Tower (see site 11). Slate is a metamorphic rock.

**8 The Newgate**

The Newgate was built in 1937. Red sandstone from Runcorn was used to keep it in character with the City walls. The angular, less weathered blocks, lack of lichen and lighter colour show that it is more modern. Compared with the walls' sandstone the pale layers are more pronounced. This sandstone forms the background of the front cover.



**9 Grosvenor Shopping Centre**

Turn left off the walls, across a concrete bridge into the shopping centre. The tiles on the floor look like pale marble but are actually ceramic. Turn right and walk down towards the Eastgate exit. On the left, the Capital Bank has a marble (metamorphosed limestone) facade, probably from Italy. The Bank steps are made of Diorite, a dark, basic igneous rock formed from molten material and cooled quickly close to or on the surface.



**10 National Westminster and Barclays Banks**

Opposite, as you leave the precinct, both buildings are made from Pennine gritstone. Barclays also has a pink granite base wall. These rocks are particularly durable, and were possibly used to create the strong, safe image – these buildings portray. The use of rock (particularly hard gritstone) to build valuable and important structures can be seen at various financial institutions and churches throughout the City.



**11 The Addleshaw Tower**

The Tower was completed in 1975 using red sandstone in keeping with the Cathedral. This sandstone was quarried in Uttoxeter, Staffordshire and shows pale bands. It is Triassic (225 million years old) and was a wind blown deposit. The slate used to clad the Tower is from Westmorland in the Lake District. It is a popular rock type for roofing, due to its cleaved, durable nature.



To reach points 12 and 13 pass the Tower and turn left along the walls up to the King Charles Tower. To take the shorter diversion to point 15 walk left from the Tower alongside the Cathedral and into the Town Hall square. You will pass two of the largest and most significant buildings in Chester. The Town Hall and the Cathedral, are both built from red sandstone, reflecting the value and use of the native rock.

Turn right up Northgate Street to reach the Odeon cinema (14).

**12 Canal Cutting at Northgate**

This site is best viewed in sunlight, and we recommend that for further appreciation you double back and view from the walls above.



This is a designated RIGS site. It is important for the massive cross bedding of sandstone showing dune structures, exposed by the cutting of the canal. These structures prove we were once much closer to the equator.

**13 Northgate Street Kerbstones**

As you walk down Northgate towards the Town Hall square you will see nice examples of granite kerbstones with large white Feldspar crystals in places.



**14 Odeon Cinema**

The green coloured flagstones outside the entrance to the Odeon cinema are from the Borrowdale volcanics in Cumbria. They were erupted from active volcanoes during the Ordovician period, 450 million years ago.



**15 Chester Cross**

In typical Chester fashion, the Cross is made from local red sandstone. It was originally built by the Romans as a surveying instrument, and the city planned around it. The Cross was rebuilt as a religious monument in medieval times. Today, only the top is medieval. The rest was rebuilt in 1975. Comparisons can be made between the rock used by different generations and their masonry skills. This is another example of the importance of geology in the historical heritage of Chester.



**16 Bridge Street**

As you walk back down the road to the museum you are walking over recently laid granite sets from Portugal.

