Strategic Stone Study
A Building Stone Atlas of Leicestershire

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Introduction

Leicestershire contains a wide range of distinctive building stone lithologies and their areas of use show a close spatial link to the underlying bedrock geology.

Charnwood Forest, located to the north-west of Leicester, includes the county’s most dramatic scenery, with its rugged tors, steep-sided valleys and scattered woodlands. The landscape is formed principally of ancient volcanic rocks, which include some of the oldest rocks found in England. To the west of Charnwood Forest, rocks of the Pennine Coal Measures crop out around Ashby-de-la-Zouch, representing the eastern edge of the Derbyshire-Leicestershire Coalfield. To the north-west of Charnwood lie the isolated outcrops of Breedon-on-the-Hill and Castle Donington, which are formed, respectively, of Carboniferous Limestone and Triassic (Bromsgrove) Sandstone. South of Charnwood Forest, a line can be drawn from Leicester to Lutterworth. To the west of this line, the rocks that give rise to the gently undulating landscape are almost all of Triassic age, and comprise sandstones and red mudstones deposited in fluvial and semi-arid desert environments. To the east, meanwhile, marine sedimentary rocks of Jurassic age crop out, the erosion of which has formed ridge and vale scenery, with limestones and ironstones capping the hills and softer mudstones cropping out in the valley floors.

During the early Pleistocene, around 2 million years ago, modern day Leicestershire lay within the drainage basin of a major river system – the Bytham River – which flowed eastwards to Norfolk and out into the present North Sea area. By the middle Pleistocene, glaciers advanced and retreated over the whole county, depositing sands and gravels, laminated clays and unsorted till, forming a blanket over the older rocks. New river channels later cut through these unconsolidated glacial deposits, locally exposing the older harder rocks, and ultimately giving rise to the distinct topographic features we see today.

As noted at the outset, there is a close relationship between the local geology and the selection of building materials. Generally, stone has been used close to its source, especially in the case of older buildings.

This is particularly true for the less common stone types. In some parts of the county showing considerable geological variability, especially around Charnwood and in the north-west, a wide range of lithologies may be found in a single building. Even the cobbles strewn across the land by the Pleistocene rivers and glaciers have occasionally been used as wall facings and for paving, and frequently for infill and repair work.

The county has few freestones, and has always relied on the importation of such stone from adjacent counties (notably for use in the construction of its more prestigious buildings). Major freestone quarries are found in neighbouring Derbyshire (working Millstone Grit), Rutland and Lincolnshire (both working Lincolnshire Limestone), and in Northamptonshire (working Northampton Sand). Triassic Bromsgrove Sandstone was extensively worked in some northern and western parts of the county, but additional stone may have come from Warwickshire and Staffordshire. The only other freestone occurs in the east – the ochreous brown ‘ironstones’ of the Middle Lias (mid-to-upper Lower Jurassic), used in abundance in local vernacular architecture.

There are no active building stone quarries in Leicestershire, and the county has never been a net exporter of building stone. The county’s hard igneous rocks are a noteworthy exception, however, these being supplied mainly for kerbstones and paving setts – and also a minor amount of building stone – from the early 19th century. Today, four quarries continue to supply aggregate for use throughout southern Britain, and one of them (Buddon Wood Quarry) will still provide small quantities for building and decorative use.

The diversity of Leicestershire’s building stone heritage is reflected in its Roman architecture. Leicester was an important Roman town, and has one of the finest surviving Roman structures in Britain - the Jewry Wall. Decoratively built of courses of thin, locally-made Roman clay bricks and at least eight types of locally sourced rubblestone, it is an architectural catalogue of the local stone resources.
Precambrian (Neoproterozoic)

Charnian Supergroup

Charnwood Forest is an area of craggy hills, about 10 km wide, located to the north-west of Leicester. Its relatively small outcrops represent the exhumed topography of an ancient mountain range, the lower slopes of which remain buried beneath the Triassic strata that now surround it. The rocks are largely the products of explosive volcanic eruptions, and include lavas, volcanic breccias, conglomerates and tuffs. Several igneous intrusions are also present. They were formed between about 650 and 540 million years ago, and have been divided into three major stratigraphical units: the Blackbrook, Maplewell and Brand groups. These collectively make up the Charnian Supergroup.

The older buildings, especially the medieval churches, tend to include a wide variety of Charnian rock types. There are few pre-Victorian buildings in the centre of Charnwood, as the Forest was originally a hunting reserve dating back to medieval times. With the exception of Ulverscroft Priory, all the medieval churches and other structures are located on the periphery of the park. Only the Victorian and later churches tend to display a single stone type in their wall fabrics.

The Charnian rocks are very hard and are almost invariably used in buildings and walls as uncoursed, angular rubblestone. All of them are cleaved to some extent. The cleavage and joint planes determine the shape of the blocks, and these surfaces often weather to shades of red, brown or cream, quite different from the common greys and greens of the fresh stone. A single wall can, consequently, appear to be composed of several different stone types when it is actually built of just one or two with varying degrees of weathering.

When used as building stone, the ‘magmatic lithologies’ (lavas and intrusive rocks) are easier to identify than most of the varied fragmental volcaniclastic lithologies of the Charnian sequence. For this reason, the ‘magmatic’ stones have been named and described individually, while the volcaniclastic stones have been grouped by lithological type.

Lavas & Lava-Breccias

The volcanoes that formed the rocks of Charnwood are thought to have had their magmatic centre close to the present day Bardon Hill in the west of the forest. There are two associated volcanic complexes, each now the site of a large quarries, at Bardon and Whitwick. The lavas are of andesitic or dacitic composition, and have been quarried primarily to supply aggregate to the south and east of England. This practice has been going on for well over a century, but these rocks have also been used locally as a building stone (albeit to a limited extent) for much longer.

Bardon Hill Volcanic Complex

Bardon Breccia

This is best observed in the ornate 19th-century Bardon church, where it has been used as an angular rubblestone, (with Lincolnshire Limestone dressings), known to the quarrymen as the ‘good-rock’. It is a dark green-grey, fine-grained stone (andesite) that is indistinctly mottled in parts (owing to its brecciated state). Staining of the joint surfaces, gives the occasional block a dull dark red colour. Bardon Breccia is the building stone used at Bardon Church (below).
Whitwick Volcanic Complex

Grimley Andesite
This andesitic lava occurs as a massive, weakly cleaved rock in and around Whitwick, and is exposed in small quarries in the centre of the village. The nature of the stone can be more easily examined at the Old Convent in Whitwick. Some enormous blocks have been used in the walls. The stone is very hard and fine-grained, and it commonly weathers to a strong red colour, although it may be mottled with the original dark grey-green shades still visible. It is used as rubblestone, in association with other local Charnian rocks, in building and boundary walls up to four kilometres away from its outcrop.

Peldar Dacite Breccia
The large quarry at Whitwick, west of the village, is the source of two distinctive stones: Peldar Dacite Breccia and Sharpley Porphyritic Dacite. The former is a dark grey to greenish grey, fine-grained lava enclosing ‘blobs’ of very similar coarser-grained lava with large crystals (phenocrysts) of quartz and cloudy grey feldspar. The quartz crystals are unusually dark and full of fractures. Weathered surfaces can appear uneven, showing a corrugated texture. Joint surfaces often weather to a cream or rusty brown colour. Both stones have been used with other local stones across north-west Charnwood. Peldar Dacite Breccia is conspicuous in the lower stage of the tower at Osgathorpe church, and is also seen in nearby houses (up to several kilometres from Whitwick). It is also one of the stones used in the walls of Mount St Bernard Abbey (above).
Sharpley Porphyritic Dacite
This is best seen in the walls of Belton church. It is a fine-grained, pale grey to pale purple stone with large (up to 5 mm) phenocrysts of grey transparent quartz and cloudy grey feldspar. The distinctive features of this stone are the purple hues and preferential weathering of the matrix, which leaves the larger crystals upstanding. Joint surfaces may be a cream or brown in colour.

Charnian - Extrusive Volcaniclastic Rocks
The Charnian volcanoes formed part of an island arc, and were explosively active (albeit intermittently) for several tens of millions of years. Huge volumes of pyroclastic debris - ash, tuff, and other fragmentary volcanic rocks – were erupted and deposited in the surrounding sea. Together with finer sediments eroded from the flanks of the volcanoes, these built up a great thickness of volcaniclastic sediments. Much of the material was sorted by grain size as it settled, giving a banded appearance to the rocks (particularly the finer beds of sandstone and tuff).

Blackbrook Group
‘Charnian volcaniclastic sandstone’
The oldest volcaniclastic rocks crop out in central and north-west Charnwood. These are assigned to the Blackbrook Group. The term ‘Charnian volcaniclastic sandstone’ has been applied to any sandstone, arenaceous mudstone or siltstone from this unit. The stones are particularly dense, and show graded bedding and banding related to particle size variation (mud to sand-grade), which can result in colour banding, from pale grey to greenish-grey and dark-grey. They are a darker colour overall than the other striped Charnian stones, including the ‘banded tuffs’ (described on p. 7). Use of Charnian volcaniclastic sandstone is notable in and around the village of Shepshed, where the stone probably came from local quarries at Morley, Blackbrook and Newhurst. Charnian volcaniclastic sandstone is used in Blackbrook Farmhouse (above) and at St Marys Church in Nanpantan.
Blackbrook & Maplewell Groups

‘Charnian volcaniclastic breccias’
Interbedded with the finer Charnian units are occasional beds containing abundant angular to sub-rounded volcaniclastic rock fragments (2cm to >10 cm in size) set within a matrix of finer debris.

A few angular blocks of such breccia can be seen in most building and field walls built of mixed Charnian rocks. The colour of these stones varies, depending on the source, but they are often grey or greenish-grey. The larger clasts can be prominent owing to differential weathering of the components.

‘Charnian crystal tuffs’
The fine-grained debris of a volcanic explosion can produce a rock comprising crystals and crystal fragments set within a finer-grained matrix. Variable weathering of the mineral components may produce a speckled appearance, although the overall colour is usually grey or grey-green. The general term ‘Charnian crystal tuff’ has been used in this study for any such stone, the precise geological source unit of which cannot be determined when blocks are seen in isolation in a building.

‘Crystal tuffs’ are found throughout the Maplewell and Blackbrook groups (and therefore right across Charnwood), although many are not strictly true crystal tuffs as they may also contain lithic or glassy fragments. The only ‘crystal tuff’ that has been identified and named in a building is the St Bernard Tuff, which was quarried on site and used extensively in the Mount St Bernard Abbey and older surrounding buildings.

Maplewell Group

Charnwood Lodge Volcanic Formation

ST BERNARD TUFF MEMBER

St Bernard Tuff
This is a grey, massive, lithic-crystal tuff, used in the walls of Mount St Bernard Abbey into sub-angular slabs from 20cm to 90cm long. At outcrop, the rock unit passes up vertically into a volcanic breccia and a thinly bedded, graded crystal tuff, but these lithologies are not evident in the abbey building stones. Weathered joint surfaces are cream and pale brown coloured. There is a small quarry adjacent to the abbey and other small pits in nearby fields.

Mount St Bernard Abbey, built of Peldar Dacite Breccia and Mount St Bernard Tuff.
‘Charnian banded tuffs’
These are very hard, fine-grained, volcaniclastic rocks, made up of andesite and dacite clasts, with some volcanic ash. They are pale in colour, light grey or green when fresh, but often seen weathered to a creamy white or pale pink. At outcrop, they are typically thinly bedded or laminated, although massive in parts, and show a slight colour banding reflecting the grain size variation. The stone is poorly cleaved, and is sufficiently well indurated that it can only be broken along joint and cleavage planes to produce a sharply angular rubblestone. It is used in vernacular buildings and dry stone walls along with other Charnian rocks throughout the Charnwood area. The crags of Beacon Hill are a good place to see ‘Charnian banded tuffs’ at outcrop (top right).

Charnian - Intrusive Igneous Rocks

During the later stages of the Charnian volcanic activity, or shortly afterwards, two contrasting suites of igneous bodies were intruded into the accumulated volcaniclastic debris. In north Charnwood relatively thin (up to 60 m wide), near-vertical sheets of diorite (the North Charnwood Diorites) form NW–SE trending ridges in today’s landscape. The younger intrusions (the South Charnwood Diorites), solidified from a more silicic and calc-alkaline magma, and form a general mass several kilometres in extent around the southern edge of Charnwood, flanking the route of the A50 between Leicester and Coalville.

North Charnwood Diorites
This very hard, dense rock forms the elongate hill tops west of Copt Oak, north of Bawdon Castle Farm, and at Buck Hill near Nanpantan. The northern-most outcrops were worked in Longcliffe and Newhurst quarries near Shepshed, where the stone can be seen as a minor component of the parish church walls. It is a very dark grey rock with abundant large, grey feldspar crystals set within a fine to medium-grained matrix, giving an overall mottled texture. North Charnwood Diorite is a minor component in the walls of St Botolph’s Church in Shepshed (middle and bottom right).
South Charnwood Diorites
(‘Markfieldite’ & ‘Groby Granite’)

The South Charnwood Diorites were quarried at several sites near Markfield and also a few kilometres to the south-west, near the village of Groby. The worked stone is a hard, massive, medium to coarse-grained igneous rock with a speckled appearance. From the mid-19th century, it has been principally quarried for and exported across southern England as aggregate, small paving setts and kerbstones. Locally, it was also used for building foundations, and as angular rubblestone, occasionally squared, in boundary walls, cottages and the two village churches, where differences between the stone from the two centres can be observed.

The church at Groby was built in 1840, when there was a small, busy quarry located immediately opposite (on what is now an industrial site). The main quarry at Groby, north-east of the village, was opened around 1880 by the Groby Granite Company Ltd, when the village quarry was worked out.

The stone in Groby church is predominantly dark pink in colour, comprising pink to red feldspars, grey to colourless quartz and minor amounts of dark ferro-magnesian minerals. South Charnwood Diorite from Groby was used in a cottage in Newtown Linford and in Groby church tower.

By comparison, the ‘Markfieldite’ stone in the 12th-century church at Markfield (extended and restored in 1865 after Markfield Quarry opened) is an overall darker grey colour. It is composed of green to grey feldspars set within a pink to grey matrix, and contains about 40-50 % dark-green to black ferro-magnesian minerals. The stone is now worked at the much larger Cliffe Hill Quarries nearby.
Cambrian

The Cambrian rocks of Leicestershire are found on the eastern and southern fringes of Charnwood Forest. They are assigned to the Brand Group (the uppermost part of the Charnian Supergroup), which is sub-divided into the Brand Hills and Swithland formations.

Brand Group

Brand Hills Formation

STABLE PIT (QUARTZITE) MEMBER

South-west of Leicester itself and across south-western Leicestershire generally, a hard, medium-grained quartz arenite is infrequently seen in building walls (and even then, it tends to be a minor constituent). It is used in small, squared rubblestone blocks of uniform texture and pale grey colour.

Close to Leicester, where the stone may have a dull brown tint, it is thought that the stone came from the Stable Pit Quartzite, of which there are very small outcrops in Bradgate Park and near to the villages of Groby and Field Head. In the south-west of the county, the blocks are more likely to have been sourced from the broadly contemporaneous Hartshill Sandstone Formation of neighbouring Warwickshire.

Swithland Formation

Swithland Slate

The youngest unit of the Brand Group – the Swithland Formation, but more commonly known as the ‘Swithland Slates’ - formed the basis of a thriving local industry during the 18th and 19th century. It consists of mildly metamorphosed silty mudstones and siltstones with an irregular, but closely-spaced cleavage, which allows the stone to be split. The less silty horizons were selected for thick, size-graded roofing slates, which were used county-wide and a little beyond. The remainder (and, in fact, the bulk) of the formation was used locally as a slabby rubblestone in building and boundary walls. The stone is dark grey, dark purple, dark green-grey and very occasionally pale green where silty laminations occur in the mudstone. The main quarries were near to the villages of Swithland and Woodhouse Eaves in east Charnwood, and in south-east Charnwood at Groby. The industry declined with the arrival of the railways during the mid-1800s, which led to the import of cheaper and lighter Welsh slate. The last Swithland Slate quarry had closed by 1888. This attractive stone is still in demand today, but at present can only be obtained from recycled sources. Entire houses are built of Swithland Slate in the villages of Swithland, Woodhouse, and Woodhouse Eaves.
The church at Woodhouse Eaves stands directly above the historic Woodhouse Eaves Quarry (left). Thick Swithland Slates were commonly used in diminishing sized courses for roofing because the quarries were unable to produce sufficient single-sized slates. They therefore had to make full use of the variably-sized random slates available (middle left). This roof shows the contrast between Welsh slate at the top and Swithland slate lower down.

**ORDOVICIAN**

**Mountsorrel & South Leicestershire Diorite Complexes**

Plutonic igneous rocks of Ordovician age, which are believed to be representative of a single intrusive episode, occur both to the north and south of Leicester. The magma chemistry seemingly evolved through time, such that the resultant rocks are of variable composition, (ranging from granodiorite to diorite, and even gabbro in one quarry). They are referred to either the Mountsorrel (Granodiorite) Complex or the South Leicestershire Diorite Complex. These two intrusive complexes comprise medium to coarse-grained, hard, massive, crystalline rocks. The Mountsorrel Granodiorite (frequently, but inaccurately, known as ‘Mountsorrel Granite’) crops out to the east of Charnwood near the village of Mountsorrel, where there is a large active quarry (the stone being worked primarily for aggregate).

The South Leicestershire Diorites have relatively small outcrops to the south-west of Leicester, forming a line of hills from Enderby to Sapcote. Of these, only the Croft outcrop is still being exploited, and the extraction is in the floor of the exceptionally deep quarry. Several quarries have been infilled or flooded, while others have been abandoned or enclosed by urban development.
The relative proportions of quartz, feldspar and ferromagnesian minerals, and also the size of the constituent crystals, control the colour and texture of these speckled rocks. When seen as a building stone, the Mountsorrel rocks tend to be pale pink to dark red, while the South Leicestershire Diorites range from pink to purplish-grey. They are used as angular rubblestone, giving rise to a ‘crazy paving’ effect, although the blocks were occasionally squared. The stone is very hard, and has commonly been used for footings and foundations, but never for decorative carvings. In the 19th century, paving setts and kerbstones made of ‘Mountsorrel Granite’ were exported to towns across England. Many Victorian churches, village halls and houses were built or restored using these stones, and even in recent years they have been used for church extensions. The Mountsorrel stone is used in central north Leicestershire, and the quarries at Croft, Enderby and Sapcote supplied stone to the south and south-west of the county.
Carboniferous rocks are found in the north-west of the county. Inliers of the Lower Carboniferous Peak Limestone Group form the hills at Breedon and Castle Donington, while Upper Carboniferous Coal Measures Group strata occupy much of the area around Ashby-de-la-Zouch (representing part of the Derbyshire-Leicestershire Coalfield). The limestones have been used only to a very limited extent as a building stone, and although sandstones do occur within the restricted Millstone Grit and Coal Measures sequences, none are known to have been worked locally for building stone.

**Peak Limestone Group**

Carboniferous Limestone has been used as dressed rubblestone in the church at Osgathorpe, at Grace Dieu Priory (ruinous), and in vernacular buildings in the village of Breedon on the Hill and the nearby hamlets of Tongue and Isley Walton. It is given several local names, depending on the area where it has been quarried and used. Carboniferous limestones in Leicestershire are mostly dolomitic, unlike those of Derbyshire.

**Milldale Limestone Formation**

‘Breedon Stone’

There are large, working aggregate quarries at Breedon on the Hill and at Cloud Hill, yet there has been only limited use of the stone in local boundary walls and buildings. It is a hard, fine-grained, often red, dolostone with some fossil casts and rare traces of shell debris. It is used as an angular rubblestone and as squared, variably-sized dressed blocks, notably in a few decorative ‘rustic’ buildings. Although the stone is cream to pale fawn in colour when first quarried, coatings of lichen often make buildings look grey. Despite being perched on the hill directly above the quarry, the church at Breedon is built of Millstone Grit. Bromsgrove Sandstone and Bulwell Stone have also been used in its construction and conservation. Breedon Stone was used for a small memorial building on the green at Breedon on the Hill (right).

‘Grace Dieu Stone’

There is a very small outcrop of the Ticknall Limestone Formation near to Grace Dieu Priory. This appears to have been worked and used to a minor extent, along with Charnian rocks, in the old chapel walls of the building. The stone itself is a very fine-grained, grey, massive limestone. Large bivalve fossil fragments are common. It is simply used as an angular rubblestone.

**Cloud Hill Dolostone Formation**

‘Osgathorpe Dolomite’

A very fine-grained, cream-coloured dolostone with fossil casts and many small voids, it is used in association with a conglomeratic stone containing dolostone pebbles in the church at Osgathorpe. Both stones are believed to have come from the quarry on Barrow Hill, just above the village. The latter is described with the Triassic rocks.
Millstone Grit Group

Morridge Formation sandstone
This is a hard, massive, medium to coarse-grained, grey to fawn coloured, fluvial sandstone, composed mainly of rounded grains of quartz and feldspar, with scattered mica flakes. It is variably cross-bedded and may show banding as a result of grain size variation. Breaks in sedimentation are indicated by very small quartz pebbles and rare thin layers of ferruginous grains, which can give rise to a weak brown staining. The stone may have a speckled appearance.

Millstone Grit sandstone has been used as a durable freestone, the ashlar blocks of which have sometimes been given a decorative tooled finish. It is used extensively in all but the eastern parts of the county for dripstones and for repairs, particularly on quoins, buttresses and other exposed elevations.

The sandstone crops out near the village of Thringstone, but there is no evidence of it having been put into use there. It was quarried just over the county boundary in South Derbyshire, around Melbourne, Stanton by Bridge and at Dawson’s Rocks, to the north of Ashby-de-la-Zouch, but these sources are probably too far removed for it to have been used as a primary building material in Leicestershire during the medieval period. Its use in the county increased in the 19th century, and several Victorian churches and extensions in north and north-west Leicestershire are built entirely of Millstone Grit sandstone. The church at Old Dalby (left) and Emmanuel Church (below) in Loughborough are excellent examples of the use of imported Millstone Grit sandstone during the 19th century.
Triassic

Sedimentary rocks of Triassic age accumulated, for the most part, in a semi-arid desert environment, within an area of significant, but reducing, topographic relief. They crop out across western Leicestershire and comprise the Sherwood Sandstone, Mercia Mudstone and Penarth groups.

At the end of the Carboniferous, substantial earth movements resulted in the folding, faulting and uplift of the Carboniferous succession. Subsequently the Permian was a time of intense erosion across Leicestershire, although marine conditions prevailed to the north of Nottingham. Thereafter, when sedimentation resumed in the early Triassic, extensive river systems deposited the coarse gravels, and then sands, that now comprise the Sherwood Sandstone Group.

Sedimentation continued during the Middle and Upper Triassic, depositing the mudstone-dominated succession of the Mercia Mudstone Group. Gradually the upland areas of Charnwood and the isolated Carboniferous outcrops, with the highest points remaining as rugged, upstanding tors. Scree developed in places against the areas of high ground, while fluvial, lacustrine and aeolian deposits accumulated towards the basin centres. Erosion and burial of the upland areas was completed by late Triassic times, when marine and brackish water conditions prevailed during deposition of the marginal marine limestones and mudstones of the Penarth Group.

Sherwood Sandstone Group

Kidderminster Formation

‘Kidderminster Sandstone’

The Kidderminster Formation - formerly known as the Polesworth Formation, and itself the former ‘Bunter Pebble Beds’ – was probably the source of the large ‘Bunter’ pebbles that are seen in buildings across the county (see Quaternary section). The sandstones are yellowish-brown to brownish-red, medium-grained and friable. They crop out south-west of Ashby-de-la-Zouch, and are the probable source of red and yellow ashlar sandstone used in Ashby Castle (above) and for repairs to churches in south and west Leicestershire.
Bromsgrove Sandstone Formation

‘Bromsgrove Sandstone’
This is one of the most important building stones in the county. It is composed of fine to medium-grained, well-sorted quartz sand with small-scale sedimentary structures, including planar and cross-bedding and occasional convoluted bedding (probably the result of de-watering during compaction). It is generally pale green-tinted grey to fawn in colour, although some infrequently observed reddish-fawn to pale brick red sandstones may also be from this formation.

It can be easily sawn and provided a good ashlar stone in large blocks up to 90 x 35 cm. Blocks are usually used with a flat finish, but occasionally dressed to give a textured surface with a flat, un-tooled margin. It is used in all parts of a building, but may be susceptible to boring by insects and, in exposed places, to damp, frost penetration and wind erosion leading to exfoliation and extreme honeycomb weathering in some instances.

‘Bromsgrove Sandstone’ is extensively used throughout west Leicestershire, where it is the principal stone in many churches. It has been used for quoins and decorative work in many of the rubblestone churches, and for repair work over a wider area. Notable examples are the churches at Measham, Chilcote, Packington and Market Bosworth, amongst many others. Bromsgrove Sandstone was used for the beautiful carving at Ulverscroft Priory (bottom right), the walls of which are of Charnian stones. The stone for the small church at Chilcote was quarried just 100 metres away; the small quarry can be seen at the roadside opposite.

The sandstone crops out around the margins of the Derbyshire-Leicestershire Coalfield, and has been quarried in the north-west of the county at Castle Donington and Kegworth, where it was known as King’s Mill or Kegworth Stone. The King’s Mill Stone contains pebble bands making it unsuitable for decorative work. It can sometimes be difficult to distinguish Bromsgrove Sandstone from some of the finer-grained varieties of Millstone Grit, and locality of use offers no assistance since both stones would have had to travel some distance to be used in certain parts of Leicestershire. Generally, though, Bromsgrove Sandstone is finer-grained and a little more friable.
Shepshed Sandstone Member & Other Pebbly Sandstones

Pebbly sandstones are locally developed within the Bromsgrove Sandstone Formation. Lithologically, they are medium to coarse-grained, usually grey but occasionally pinkish sandstones, with sub-angular to rounded pebbles of a few millimetres to over a centimetre in size; these are compositionally variable, but mainly quartzo-feldspathic, and may be either randomly scattered or aligned in the cross bedding. The pebbly sandstones represent a marginal facies of the formation, deposited by tributary streams draining the Triassic mountains. One such pebbly sandstone horizon, containing small angular and rounded pebbles of Charnian rocks, is known as the ‘Shepshed Sandstone’. It is a very minor component of the church walls at Whitwick, Newtown Linford and Shepshed. Similar rock is used in Ibstock and Nailstone churches.

Mercia Mudstone Group

This thick, mudstone-dominated, red-bed sequence accumulated in a hot, arid desert with ephemeral rivers and extensive playa lakes. The area was subject to periodic flash floods, which deposited thin, laminated, very fine-grained sandstones known as ‘skerries’. These occur throughout the sequence, and were used extensively in the older buildings and vernacular structures.

Gunthorpe Formation

‘Osgathorpe Conglomerate’

The ‘Osgathorpe Conglomerate’, recognised only in Osgathorpe village church, comprises pale buff, sub-rounded dolomite pebbles set within a weakly cemented, gritty dolostone sandy matrix. It is believed to have come from Barrow Hill Quarry, together with the Carboniferous Osgathorpe Dolomite. It probably occurs as a breccio-conglomerate within the Gunthorpe Formation, the pebbles being eroded from and deposited against the Carboniferous limestone hills in the Triassic desert.

‘Skerry’ sandstones

The thinly bedded ‘skerries’ are composed of pale grey, finely laminated, very fine-grained dolomitic sandstone with thin, greyish green clay partings. They are commonly finely cross-bedded and frequently show intense distortion and convolutions due to de-watering. The stone is used as thin rubblestone slabs.
Diseworth Sandstone

A ‘skerry’ sandstone cropping out locally to the north of Shepshed – the Diseworth Sandstone – has been used extensively as rubblestone in the church and village buildings in Diseworth, and in boundary walls towards Long Whatton. Stone for some of the village buildings is said to have been dug from shallow pits in fields on the north-east side of Diseworth. One exceptionally large block has been laid with the bedding plane vertical, showing superb ripple marks. Most of the houses on Grimes Gate, Diseworth (below) have footings and garden walls built of the Diseworth skerry.

A pale grey to yellow-grey, fine-grained sandstone has been used as a squared freestone in Diseworth church and in village buildings along Hall Gate to the west.

The grains are mostly of quartz with evenly scattered darker grains. The stone is largely planar-bedded, but often shows cross-bedding, with horizons of spheroidal cavities up to 10mm across, infilled with clear, crystalline gypsum.

Arden Sandstone Formation

‘HOLLYGATE SANDSTONE MEMBER’/ ‘DANE HILLS SANDSTONE MEMBER’

Small outcrops of a distinctive stone used in central Leicestershire can be seen where it was once quarried in what is now Western Park in the western suburbs of Leicester. It is a pale grey to almost white, fine-grained sandstone with rounded grains, which are almost entirely of quartz. It is either massive or weakly cross-stratified, yielding dressed blocks of up to 1.0 m x 0.4 m in size. The stone develops a mid to dark grey weathering crust.
When this crust is breached, the sandstone becomes very friable, and it was sometimes crushed to produce building sand. ‘Hollygate/Dane Hills Sandstone’ (also known as ‘New Parks Stone’ or ‘Upper Keuper Sandstone’) is found as a minor component in church walls from Rothley, just north of Leicester, to villages a few miles south-west of the city. It is best seen in Leicester itself, however, where it is a major component in St Nicholas Church and in the old castle walls. Exceptionally, it was used as the main building stone for the early 17th-century Cavendish House in Abbey Park (above), for which the stone is said to have been ‘recycled’ from the adjacent ruined abbey.

Penarth Group

Lilstock Formation

‘White Lias’

‘White Lias’ is the traditional name of the youngest limestone beds of the Triassic Penarth Group. The laterally impersistent beds range in thickness from a few centimetres to (exceptionally) 3 metres over short distances, and occur sporadically in the north of the county. Use of the ‘White Lias’ as a building stone is similarly sporadic: it is used as partly dressed rubblestone in buildings or as rubblestone in field walls within and between the villages of Cotes, Hoton and Wymeswold, where it may have been gathered from field brash.

JURASSIC

About 200 million years ago, sea levels rose, submerging the Triassic deserts of Leicestershire. Thereafter, marine conditions generally prevailed. At times, the water was sufficiently shallow to enable the deposition of limestones, many of which are the source of the building stones that characterise the architecture of the eastern half of Leicestershire.

Lower Jurassic

Lias Group

Scunthorpe Mudstone Formation/Blue Lias Formation

‘Blue Lias limestone’

‘Blue Lias’ is the traditional name for the basal strata of the Lias Group. These rocks are now assigned to the Scunthorpe Mudstone Formation to the north of a line running roughly from Loughborough to Melton Mowbray and to the Blue Lias Formation to the south of this.

Both units comprise alternations of fine-grained, blue-grey to dark grey, micritic limestones and mudstones. The clay content of the limestone varies, and those limestones with a high proportion of clay are slightly darker and weather with rounded corners.
At outcrop, the limestone beds frequently have regular, close-spaced joints. Some of these have pyritic/calcitic coatings, which, when used as facings, weather to a brown colour. More commonly, however, percolating iron-rich water forms patchy, pale cream coloured joint surfaces.

The more calcareous beds can be easily split by wedges. Weathering, often exposes sub-parallel lamination which is not visible in the fresh rock, but very evident in the weathered building stones. Fossils are small, and concentrated on the bedding planes. The limestone is easily dressed to provide a blocky rubblestone, comprising thin slabs, 10-15 cm thick, which are often coursed according to size in buildings.

The ‘Blue Lias’ limestone outcrop extends roughly north-south through Leicestershire, to the east of the River Soar and along its tributaries. It was extensively worked at Barrow-on-Soar and in the eastern part of Leicester for the manufacture of cement, and selected beds were quarried for diverse domestic uses: wallstones, floor slabs, even the carving of stone sinks.

It is not a major building stone in the county, and is rarely used for an entire building, but has been widely used for small scale repairs. Of the few houses in which ‘Blue Lias’ (in this case the lowermost Barnstone Member of the Scunthorpe Mudstone Formation) is the principal building stone, an outstanding example is Beveridge House in Barrow-upon-Soar (below).

Scunthorpe Mudstone Formation
Granby Member

‘Wreake limestone’
The name ‘Wreake limestone’ is herein informally applied to a series of dark grey, shelly (oyster-rich) limestones occurring within the Granby Member of the Scunthorpe Mudstone Formation around Hoby (in the Wreake Valley). These limestones contain very little clay matrix, and the shells stand proud on weathered surfaces. ‘Wreake limestone’ is used as a rubblestone, occasionally squared, in building and boundary walls, most notably in the church located within the grounds of Brooksby College and the church at Rotherby.
‘Sileby limestone’
This is a richly bioclastic, very pale grey to white limestone in which oyster shells again predominate. These form layers separated by thin, calcareous clay partings and scattered, thin layers containing brown limonite grains. Other fossils present include thin, finely grooved echinoid spines (up to 20 mm long) and pentacrinoid ossicles (2-3 mm diameter). The ‘Sileby limestone’ occurs in thin slabs and is a weak, poorly cemented stone, but is not, surprisingly, prone to surface weathering. Like the ‘Wreake limestone’, it is thought to come from within the Granby Member of the Scunthorpe Mudstone Formation, and has only been found used in the walls of Sileby church and in garden walls in Hoton.

In the villages of Hose and Redmile, a muddy micritic limestone with large Gryphaea (the ‘Devil’s Toenail’) is used in the boundary walls of the churchyards. It probably gives rise to the proximal escarpment which bisects the Vale of Belvoir and is thought to be the Fen Farm Limestone of the Granby Member.

Jurassic ‘ironstones’
Historically, the name ‘ironstone’ is applied to rocks, usually limestones or sandstones, which have a significant iron content (up to c. 30%). Leicestershire’s ironstones occur at two different stratigraphic levels. The older ironstones sit within the Lias Group (the Marlstone Rock Formation and the closely associated ‘Sandrock’ of the Dyrham Formation), which are extensively developed in the north-east of the county, capping the higher ground, including the Belvoir escarpment. The younger ironstones, meanwhile, lie within the Northampton Sand Formation of the Inferior Oolite Group, which is limited to small hill top outliers around Waltham on the Wolds, Loddington and Nevill Holt in the south-east. Both are major sources of building stone, and contain beds sufficiently enriched to have been worked as a source of iron.

Both of the Leicestershire’s ‘ironstone’ sequences were deposited as shallow-marine, sandy sediments in which original carbonate particles such as ooids and shell fragments were replaced by the iron minerals siderite (grey iron carbonate) and berthierine (a green iron silicate).
The unweathered ironstones have a greenish-grey colour, and, very rarely, ‘blue-hearted rock’ can be seen where the core of a block has been completely protected from effects of weathering. Secondary limonite (yellow-brown hydrated iron oxide) dispersed through the rock gives it a rusty appearance, or is concentrated in ramifying or concentric box-like veins.

Given that both ironstone sequences have a comparable genetic origin and mineralogy, it is not surprising that they yield building stones of similar appearance, which can be very difficult to distinguish when they are removed from their outcrop. Each encompasses several lithologies – the sandy ironstones may be found in association with ferruginous fossiliferous limestones and, occasionally, the concentrated iron-rich stones. The Marlstone and/or ‘Sandrock’-derived ironstones were principally used in the north-east of the county, whereas the Northampton Sand-derived ironstones tended to be used in the south-east, although the boundary between the two is difficult to define. Generally, the Northampton Sand Formation produces stones with a wider range of colours, including a distinctive purple-hearted variety. Both varieties may be found in some villages, and even in a single building, especially in the central-eastern parts of the county.

Further complications arise if an attempt is made to distinguish between the main building stones produced from the Marlstone Rock and Dyrham formations.

‘Middle Lias’ ironstones

Dyrham Formation ‘Sandrock’ & Marlstone Rock Formation

Formerly grouped together as the ‘Marlstone Rock Bed’, work carried out by the BGS during recent years has allowed separate Dyrham and Marlstone Rock formations to be defined. During the 19th century, the ‘Marlstone Rock Bed’ was described as a variable sequence of ooidal ironstones with bioclastic limestones, which overlay beds of sandy limestone known as the ‘Sandrock’. The upper part of the unit contained beds of iron ‘ore’ quality, while the ‘Sandrock’ beds were recognised as the ‘best building stone’.

In the current stratigraphical scheme, the ‘Sandrock’ is now separated and assigned to the Dyrham Formation, with the ‘upper’ part of the former unit being referred to as the Marlstone Rock Formation.
Dyrham Formation

‘Sandrock’

The ‘Sandrock’ has an impersistent outcrop, thinning to the south, which can be traced from Belvoir almost to Tilton on the Hill; it has not been recognised south of Tilton. It is a calcareous and ferruginous sandstone with interbedded shelly limestones which have a sideritic muddy matrix. Across north-east Leicestershire, the Sandrock and indeed the sandy limestones of the Marlstone Rock Formation have been used as building stone.

It has proved impossible to routinely differentiate the two stones during this survey of buildings, and the term ‘Sandrock’ has therefore been used for all of this stone, except where fossil evidence has been found to confirm that the stone is from the Marlstone Rock Formation (in which case, it has been referred to as ‘Marlstone Rock’). This method of differentiation can be successfully employed in the villages of Billesdon, Tilton on the Hill and Ashby Folville.

The dominant Sandrock lithology is a yellow-brown, fine to medium-grained, limonitic sandstone, very slightly micaceous, with scattered shell debris and narrow vertical burrow traces. Belemnites and small bivalves are sparsely present, and brachiopods, particularly terabratulids, occur in occasional clusters or ‘nests’; these sometimes stand proud of surrounding weathered stone by as much as 10 cm. The rock was used as a freestone, but it is porous and readily suffers from the effects of weathering in exposed settings. The stone was used extensively for dressings in ‘ironstone’ churches, but few window and door dressings survive, having commonly been repaired with Lincolnshire Limestone.

Marlstone Rock Formation

Both the ‘Sandrock’ and Marlstone Rock ‘ironstones’ were probably worked from numerous small pits for building stone, but subsequent exploitation of the iron-rich beds (which sit above the building stone units) during the 19th century, lowered the surface of the fields, obliterating all trace of many of the stone quarries. Nevertheless, a few of the original building stone workings are still visible e.g. at Stone Pits Farm near Wartnaby and in the fields east of Holwell. The Marlstone Rock Formation contains several lithological variants, which are found as minor components in buildings and are described below.

None of these building stones are worked in Leicestershire today. Consequently, repairs are usually undertaken with stone from the Marlstone Rock Formation quarries at Great Tew, near Banbury. This ferruginous limestone has a low iron content and weathers to a pale ochreous brown, but in texture it resembles Sandrock, with scattered shells, shell debris and burrow traces.
‘Marlstone ‘conglomerate’
There is a pebble bed at the base of the Marlstone Rock Formation which has occasionally found its way into rubble used as building stone. Well rounded, 1–7 cm diameter pebbles of limonitic and phosphatic mudstone, often slightly flat/discoidal in shape, occur within a finely comminuted shell-debris-rich, lime-matrix. The pebbles frequently have a thin dark brown rind. The stone can be seen as a very minor component in association with other Marlstone Rock lithologies in boundary walls in Tilton on the Hill and buildings in Harby.

Marlstone Rock ‘limestone’
A hard, bioclastic limestone is found as a minor component in association with other Marlstone Rock lithologies in villages between Harby and Tilton on the Hill, often occurring in lenses within a single building stone block. Abundant crinoid ossicles and other pale grey shell debris are set within a mid-brown, ferruginous matrix. Traces of cross-bedding are sometimes evident.

Marlstone Rock ‘ferruginous sandstone’
During the present survey, the name Marlstone Rock ‘ferruginous sandstone’ has been used for stone of similar texture to the ‘Sandrock’-like ferruginous sandstone, but with a higher iron content, yielding a darker, red-brown building stone. It is seen in the Methodist church at Holwell (below). In the cottages opposite the church, the contrast between this and the paler ‘Sandrock’ can be seen (above).

Marlstone Rock ‘ferruginous limestone’
Occasionally, small lumps of the ore-grade ‘ironstone’ may be found as rubblestone in building walls. This was originally a highly ferruginous ooidal limestone, which weathering has reduced to a mass of reddish-brown iron-oxide veins, with spheroidal ‘oo-moldic’ cavities.
Middle Jurassic
Inferior Oolite Group

Northampton Sand Formation

The Northampton Sand Formation crops out at the edge of the uplands around Waltham on the Wolds, and caps the steep-sided hill summits east of Tilton and the broader hill at Nevill Holt. Small quarries exist and it was substantially worked as an iron ore at Nevill Holt. There is no direct evidence that it was quarried for building stone in the county, but its use in association with Nevill Holt Stone (see below) suggests that they were extracted from the same locality. It is used extensively in villages in south-east Leicestershire, however, with most of the stone probably being imported from the nearby Uppingham district of Rutland and from north Northamptonshire.

The formation comprises a variety of decalcified ferruginous sandy limestones. The stones tend to be more vividly coloured (varying from the common yellow-brown to yellow-red, red-brown and purple-grey) and slightly coarser-grained than their Marlstone Rock Formation counterparts. Fossils, including large belemnites, are scattered throughout, and distinctive U-shaped burrows cross-cut its fabric.

The Northampton Sand ‘ironstone’ is almost invariably used as dressed stone, and less frequently as large ashlar blocks. It ranges from a poor to good quality freestone, and is generally less susceptible to weathering than Marlstone Rock. It is used in village dwellings, churches, large houses (such as Launde Abbey and Nevill Holt Hall), in restorations (for example at Stoughton church near Leicester), and for minor repairs. Launde Abbey (below) is built from Northampton Sand ‘ironstone’, with minor repairs using the Marlstone Rock from Oxfordshire.

A number of lithological variants may be seen in any one building, and all of these were probably obtained from a single quarry.

Launde Abbey.
Northampton Sand ‘ferruginous sandstone’
This ochreous brown, ferruginous sandstone can be confused with the dominant ‘Sandrock’ and Marlstone Rock lithologies. It is a porous stone, prone to exfoliation, producing rounded surfaces in extreme cases. The houses in Medbourne are built of Northampton Sand ‘ferruginous sandstone’, looking very similar to the ‘Sandrock’ of north-east Leicestershire (top right).

Northampton Sand ‘purple, bioturbated sandstone’
This is a purple- to purplish-grey hearted coloured, ferruginous, fine to medium-grained sandstone, characterised by darker, large U-shaped burrows of about 5mm in diameter. It may contain scattered bivalves, brachiopods, crinoid ossicles, calcareous ‘tubeworms’ (Genicularia vertebralis) and belemnites. This sandstone is seen in most of the Northampton Sand buildings examined, but only as a minor component. It is occasionally used decoratively e.g. for lintels and parapets, contrasting in colour with the walling stone, as at Nevill Holt school (bottom right).

Northampton Sand ‘shelly limestone’
This is a durable, shell debris-rich, dark buff limestone with a low iron content. It contains numerous crinoid ossicles, and occasionally shows thin, dark brown ferruginous partings. It is infrequently found as rubblestone in building walls, but is sometimes seen as dressed stone blocks.

Northampton Sand ‘ironstone’
Very rarely, this iron-rich stone is found as rubblestone. It displays a network of reddish-brown veins of iron oxide which traverse an ooidal, dark ochreous-brown ‘ironstone’ matrix.

Lincolnshire Limestone Formation
The Lincolnshire Limestone Formation is a very important source of building stone, which has been worked since Roman times. Quarries in both the Lower and Upper Lincolnshire Limestone members occur along the outcrop from Lincoln through Rutland into Northamptonshire. Only the lower member occurs in east Leicestershire, on the hill tops at Waltham on the Wolds in the north and Nevill Holt in the south.
The limestones of the Upper Lincolnshire Limestone Member are more massively bedded and ooidal than those of the Lower Lincolnshire Limestone Member, and are often better sorted and better cemented. They are used throughout Leicestershire for dressings, quoins, repair work and in a few cases for entire building fabrics, such as the house and church at Stapleford Park. Shelly, spar-cemented limestones are the most durable stones and are used for drip courses. Well-cemented ooidal limestones, some with shell debris, are used as ashlar and also for decorative work and window mouldings. No attempt has been made in this survey to name specific varieties of Upper Lincolnshire Limestone, except for the distinctive Ketton Stone, of Rutland - a fine, well-sorted, even-grained ooidal limestone. Ketton Stone is a high-quality freestone, much sought after for dressings and the most delicate carvings.

LOWER LINCOLNSHIRE LIMESTONE MEMBER

Whilst the widely-used limestones of the Upper Lincolnshire Limestone Member have had to be imported from just over the county border, those of the Lower Lincolnshire Limestone Member are quarried within the county and only used close to their source in east Leicestershire. Three locally sourced stones have been identified in this survey:

Collyweston Slate

This fine-grained, thinly-bedded, grey, sandy limestone is the source of the Collyweston ‘Slate’. The limestone is not a true slate, but is sufficiently thinly bedded to be split into suitable roofing stones. The limestones were dug from shallow mines, being brought to the surface in winter, wetted and exposed to the frost, which caused the stone to split into thin layers. The beds were quarried at Nevill Holt, where attempts to cut the stone mechanically failed. The main workings were around Collyweston in Northamptonshire, where a craft industry still produces small quantities of stone, but most tiles used now come from recycled sources. For roofing, the slates are rather heavy, so they are laid in diminishing courses, with the smallest at the ridge and the largest at the eaves. When weathered, the stone is pale greyish-yellow, often developing a patchy, darker grey lichen crust. Collyweston slates are found on a few houses in many villages in south-east Leicestershire, but are especially common in Medbourne, where the stone is also used in thin slabs for the church yard wall.
Nevill Holt Stone
Field evidence seems to suggest that this distinctive limestone overlies the basal Collyweston Slate unit, a supposition supported by its moderately extensive use in walls in Medbourne and Hallaton (near to Nevill Holt, where the Collyweston slates were once mined). It is found sporadically as far as Kibworth Harcourt, 12 km away. It is a fine-grained, sandy limestone with large ramifying, nodular burrows up to 20 mm in diameter. The unweathered matrix colour is a very pale grey-pink and the burrows are pale fawn. On weathering, however, shades of pale to mid brown develop, the matrix becoming distinctly ochreous.

Waltham Stone
This is a fine-grained, compact, pale yellow-buff coloured, micritic limestone with variable amounts of ooids, shells, burrow traces and finely comminuted bioclastic debris. It is extensively used in the village houses of Waltham on the Wolds, Stonesby and Croxton Kerrial, and for repairs in scattered locations across the north-east of the county. It is used in moderately-sized, roughly squared blocks with the surface left undressed.

In the church at Waltham on the Wolds, extensive use is made of another variety of Lincolnshire Limestone - a cream to buff coloured, medium to coarse-grained, bioclastic, micritic limestone. It is strongly biotubated, with the irregular ochreous brown burrows being infilled with a softer grey limestone that readily weathers out to leave a pitted surface. The stone is used in large dressed blocks in various buildings in Waltham and the nearby village of Stonesby.

QUATERNARY

PLEISTOCENE

Pebbles/cobbles
A variety of cobbles and pebbles have been transported into or across the county by palaeo-rivers and glaciers. They are used for minor infill and repairs in many of the older buildings, and sometimes for entire wall facings or as cobble paving. They were probably gathered from local fields, and can be up to 30 cm in diameter (although most are less than 15 cm).

The majority are large, highly rounded quartzite cobbles, with a brown rind, ‘generated’ originally in Triassic river systems and subsequently transported by glaciers during the Pleistocene. These very hard sandstones are occasionally face-dressed and rarely squared, exposing their pale grey interiors.

Some large sub-rounded cobbles of various Charnian lithologies and the Ordovician diorites are also found, these having been reworked and transported by ice. Rarely, small angular flints, ice-transported from further afield, have also been used as building materials.
The most extensive use of glacial erratics is in the south-west of the county, especially to the south and west of Leicester and south of Charnwood. Charnian cobbles are notable in garden walls in Newtown Linford and the church at Thornton. The villages of Kimcote, South Kilworth and Newbold Verdon illustrate the most striking use of Triassic pebbles (below).

**Calcareaous Tufa**
This is a highly porous, vuggy, low density, grey, freshwater limestone, which has fairly good load-bearing qualities. Tufa comprises a network of casts, formed by the precipitation of calcium carbonate (from spring water) around plant stems, commonly reeds, or any other organic or inorganic fragments in the vicinity. It is rare in Leicestershire, and of very localised occurrence. It forms most of the facing and infill of the walls of the church ruins at the abandoned village of Knaptoft, south of Leicester. It was also used at Horninghold in the far east-south-east of the county, where it is clearly visible in the cottage adjacent to the churchyard and is abundantly used in the church itself (although somewhat obscured by a partly removed lime render). In both cases, the source is unknown.

**Cob**
This ancient building material is formed of mud and gravel with binding material such as chopped straw or animal hair. It has been used for barn and boundary walls in a number of villages in south Leicestershire, and in Long Clawson in the north-east of the county. Cob is prone to swelling if it gets wet, so walls are commonly given a capping of thatch or tiles, as seen in the village of Laughton (below).
**Imported Stone**

As already observed, the stone types most commonly used in Leicestershire as ashlar and for dressings are in short supply, and much of what has been used has almost certainly been imported from neighbouring counties. Notable examples are Millstone Grit from Derbyshire, Bromsgrove Sandstone from Warwickshire and Staffordshire, Upper Lincolnshire Limestone from Lincolnshire and Rutland, and Northampton Sand from Rutland or Northamptonshire. One other relatively local stone has come in in smaller quantities from Nottinghamshire viz. Bulwell Stone.

**Cambro-Ordovician**

**Welsh Slate**

The only relatively far-travelled import that is used to any great extent in Leicestershire is Welsh Slate. It was used for roofing buildings throughout the county during the 19th and 20th century, replacing the local Swithland Slate.

**Late Permian**

**Zechstein Group**

**Cadeby Formation**

**Bulwell Stone**

Formerly known as the Lower Magnesian Limestone, this rock was quarried extensively at Bulwell, immediately north-west of Nottingham. Urban growth resulted in the closure of the quarries, however, and the limestone is now worked at only Linby, a few miles to the north.

The stone was, and still is, supplied as either rubble-faced or sawn ashlar blocks. In colour, it is pale yellow with orange tints, and can easily be recognised by virtue of its porous, sacharoidal texture comprising coarse, rhombohedral crystals of dolomite. It is durable, and is used for repair work and for domestic garden walling at a few locations in the north of the county, and for the entirety of St Stephens Church in Leicester.
Glossary

**Ashlar**: Stone masonry comprising blocks with carefully worked beds and joints, finely jointed (generally under 6mm) and set in horizontal courses. Stones within each course are of the same height, though successive courses may be of different heights. ‘Ashlar’ is often wrongly used as a synonym for facing stone.

**Breccia**: A sedimentary rock made up of angular fragments of rock set within a finer-grained matrix.

**Buttress**: A projection from a wall and bonded to the wall to create additional strength and support.

**Calcareous**: A rock which contains significant (10-50%) calcium carbonate, principally in the form of a cement or matrix.

**Cobbles**: Rounded rock clasts (of any lithology) between 64 mm and 256 mm in size.

**Conglomerate**: A sedimentary rock made up of rounded pebbles (>2mm), cobbles and boulders of rock set within a finer-grained matrix.

**Cross-bedding**: A feature principally of sandstones formed by the movement of sand grains in currents to produce layering oblique to the margins of the beds.

**Dressings**: To say a building is constructed of brick with stone dressings means that worked stone frames the corners and openings of the structure.

**Dolerite**: Medium-grained basic igneous rock found as small to medium sized intrusions.

**Dolomitic, dolomitised limestone**: Descriptive term for a limestone that has had some or all of its calcium carbonate replaced by calcium magnesium carbonate.

**Drip-mould**: The projecting edge of a moulding, channelled, or throated beneath, so that the rain will be thrown off.

**Facies**: A term describing the principal characteristics of a sedimentary rock that help describe its mode of genesis e.g. dune sandstone facies, marine mudstone facies.

**Feldspar**: A commonly occurring aluminosilicate mineral variably containing potassium, sodium and calcium.

**Ferruginous**: Containing iron minerals usually in the form of an iron oxide which gives the rock a ‘rusty’ stain.

**Fossiliferous**: Bearing or containing fossils.

**Freestone**: Term used by masons to describe a rock that can be cut and shaped in any direction without splitting or failing.

**Igneous rock**: Rocks formed when molten magma cools and solidifies. It includes extrusive rocks erupted from volcanoes (e.g. basalt) and intrusive rocks that cool beneath the Earth’s surface (e.g. granite, gabbro, granodiorite, dolerite).

**Ironstone**: Sedimentary rock which is composed of more than 50% iron-bearing minerals.

**Lancet**: A tall narrow window with a sharply pointed arched head. A lancet window was a common feature of First Pointed or Early English Gothic architecture.

**Limestone**: A sedimentary rock consisting mainly of calcium carbonate (CaCO3) grains such as ooids, shell and coral fragments and lime mud. Often highly fossiliferous.

**Lithology**: The description of a rock based on its mineralogical composition and grain-size e.g. sandstone, limestone, mudstone etc.

**Micaceous**: Applied to a rock which contains a significant proportion of mica, usually muscovite and/or biotite.

**Mudstone**: A fine-grained sedimentary rock composed of a mixture of clay and silt-sized particles.

**Ooid**: A spheroidal grain of calcium carbonate formed by precipitation (by algae) of calcium carbonate in concentric layers.

**Quartz**: A commonly occurring crystalline form of silica (silicon dioxide, SiO2).

**Quoin**: The external angle of a building. The dressed alternate header and stretcher stones at the corners of buildings.

**Rubble**: Rough, undressed or roughly dressed building stones typically laid uncoursed (random rubble) or brought to courses at intervals. In squared rubble, the stones are dressed roughly square, and typically laid in courses (coursed squared rubble).

**Sandstone**: A sedimentary rock composed of sand-sized grains (i.e. generally visible to the eye, but less than 2 mm in size).

**Sedimentary rock**: A rock that is commonly formed by the binding together (lithification) of sediment particles (e.g. sandstone, siltstone, mudstone, limestone).

**Siltstone**: A sedimentary rock composed of silt-sized grains (i.e. only just visible to the eye).
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Further Reading


British Geological Survey Maps & Brief Sheet Descriptions

Geology of the Loughborough District, brief explanation of the geological map Sheet 141 Loughborough. (2002) BGS.

Geology of the Melton Mowbray District, brief explanation of the geological map Sheet 142 Melton Mowbray. (2002) BGS.

Geology of the Leicester District, brief explanation of the geological map Sheet 156 Leicester. (2002) BGS.

Geology of the Coalville District, brief explanation of the geological map Sheet 155 Coalville. (2002) BGS.