Introduction

With the exception of the superficial cover of Quaternary deposits, all the rocks that occur at the surface in Northamptonshire are marine sediments of Jurassic Age, approximately 190 to 145 million years old. They consist of a variety of sandstones, ironstones, limestones, clays and mudstones. Although rocks suitable for building are limited to a part of this succession, there is a considerable diversity of building stones present with many local varieties, especially amongst the Middle Jurassic pale or yellow coloured limestones and sandstones belonging to the Northampton Sand and Lincolnshire Limestone formations. These provide sources of rubblestone, freestones suitable for ashlar and mouldings, as well as roofing ‘slates’ and paving.

The county may be divided into four broad areas that reflect variations in the geology and consequently, that of the building stones locally quarried and used:

- The western margin of Northamptonshire containing escarpments and benches in the upper Nene and Cherwell river valleys. These are mainly formed in the Marlstone Rock Formation and provide the source of a variety of different hues of ironstone used for rubblestone, ashlar and other dressed freestones.

- The plateaus and valleys of central and northern Northamptonshire, where the Northampton Sand Formation consists of richly coloured ironstones and sandstones, with some sandy limestones (called ‘Pendle’) that show marked lateral variation from southwest to northeast. These provide a variety of characteristic and locally used rubblestones, ashlars and freestones.

In north east Northamptonshire the Lincolnshire Limestone Formation is thinly developed, and then progressively thickens towards Rutland and Lincolnshire. It consists of ooidal, shelly or sandy limestones, commonly creamy or buff in colour that have been used for rubblestone, ashlar and freestone. The lowermost unit of the formation is the source of the Collyweston Slates used in the past extensively for roofing.

Stretching in a broad ribbon along the south-eastern side of Northamptonshire, the Blisworth Limestone Formation consists of pale coloured micritic, ooidal or shelly limestones that have served as rubblestone, ashlar and freestone. They also include coarse, well cemented, shelly limestones that have been polished and used as internal ornamental ‘marbles’.

Locally sourced building stones have been utilised in Northamptonshire since Saxon times when ferruginous sandstones of the Northampton Sand Formation were used in the construction of Brixworth church (Sutherland 2003), whilst the Romans may have worked Collyweston Slate and Cosgrove Stone. Until the latter part of the 19th century a variety of local stones were used in the construction of many of the county’s villages and towns, and these provide a strong local distinctiveness and character. Today many former quarries are long abandoned and have become infilled and the underground mining of Collyweston Slate has virtually ceased altogether.
**Lower Jurassic**

**Lias Group**

**Marlstone Rock Formation**

The Marlstone Rock Formation has been utilised as a building stone over much of the western part of Northamptonshire where it is a characteristic and dominant building stone of many villages, including (from south west to north west) Kings Sutton, Middleton Cheyney, Chipping Warden, Badby, Staverton, Daventry, Watford and Crick. Villages situated along the Nene Valley, such as Bugbrooke, Milton Malsor and Harpole are also constructed from the Marlstone, often with a significant amount of other stone, especially sandstones from the Northampton Sandstone Formation.

The Marlstone Rock Formation is variable in composition, and consists of sandy, shelly or ooidal iron-rich limestones and calcareous sandstones, that are often blue-hearted when fresh, but when weathered display a plethora of rich hues of ochreous yellow, orange and brown; some local variants may be darker. Their ferruginous nature contributes to their characteristic colours. The Marlstone often contains fossils that characteristically include belemnites, brachiopods, bivalves and crinoid ossicles. These typically occur in clusters and may only be visible in a few blocks within a structure, but where present they provide an important means of distinguishing between Marlstone and building stones attributed to the Northampton Sand Formation, particularly in areas where both have been used in construction. Other textures seen in the Marlstone Rock Formation include mottling caused by burrowing organisms, and sedimentary features such as laminations and cross-bedding formed by sand-ripples migrating across the ancient sea floor.

The Marlstone has been used predominantly as a rubblestone in villages along the outcrop, particularly for the construction of cottages and larger houses, although it has also been employed for paving, ashlar and as dressed stone. Marlstone used in a single wall may be surprisingly variable in its range of hues, and reflects the variability of the rock from bed to bed, as well as laterally within a single bed.

The exact sources and locations of many of the former Marlstone quarries and stone variants are now uncertain.

**Badby Stone**

Badby Stone was quarried around the village of Badby during the 18th and 19th century; it is a hard, durable blue-grey stone which was used for paving as well as building.

**Byfield Stone**

In several other villages including Byfield, darker coloured Marlstone (Byfield Stone) was used as ashlar and dressed stone in the churches as well as in several houses. A further variant of Marlstone is the paler coloured Staverton Stone (which may be fossiliferous or show clear evidence of burrows) and has been used both for ashlar and as a dressed stone in buildings in and around Staverton and Daventry.
Inferior Oolite Group

Northampton Sand Formation

Although heavily exploited as a source of iron ore during the 20th century, the Northampton Sand Formation and both its main constituent facies (ironstones in the Corby Ironstone Member, and ferruginous sandstones in the Duston Member), were historically widely used as building stones in Northamptonshire. The outcrop of formation extends from north of Lincoln, southwards into Leicestershire, and then into Northamptonshire where a broad outcrop is present through the central part of the county extending from the northeast to the southwest.

The formation provides some of the most important and distinctive stones within Northamptonshire, and these are employed for a variety of building purposes from rubblestone to dressed stone. The range of rich yellow, ochre and brown colours and variations in lithology, have produced a diversity of stones that create much character and distinctiveness in local villages and towns. Broadly, the formation comprises the following lithologies:

- **Ironstones.** These were originally oolites in which the ooids were composed of berthierine (a form of the iron silicate) and siderite (iron carbonate). Weathering of the siderite resulted in its oxidation to the mineral limonite and it is this process which contributes much of the ferruginous colour to the stone. Secondary carbonate cement filled the pore spaces between the remaining ooids, thereby increasing the strength and durability of the stone. Where replacement by limonite has been extensive, individual stone blocks often show a characteristic concentrically layered ‘box-stone’ weathered texture.

- **Sandstones:** These are composed mainly of quartz grains cemented together in a matrix of limonite. The sandstones often exhibit a range of sedimentary structures including parallel and ripple lamination, cross-bedding as well as mottling and disrupted laminations caused by burrowing organisms.

- **Limestones and ‘Pendle’:** Considerable quantities of limestone occur within the Northampton Sand Formation, especially in the central part of the outcrop and in the extreme southwest of the county. These include oolites and calcareous sandstones (often strongly cross-bedded); the more fissile limestone and calcareous sandstones were commonly referred to by quarrymen as ‘Pendle’ some of which could be split into sufficiently thin slabs to be used for roofing and others for paving (e.g. Wittering Pendle) (but note quarry site in Peterborough),

The ironstones are best developed in central and northeastern Northamptonshire. Their quality is quite variable depending upon which ferruginous cements are developed during weathering, and consequent on this, the stone may be suitable as a rubblestone, an ashlar or as a freestone. Although in some cases the stone can be intricately carved (e.g. the west doorway of the parish church at Rothwell), these stones may not weather well.

Wellingborough Stone

There are many local variants of the ironstone that exhibit subtly different colours or textures. In the area around Wellingborough, the ironstone (Wellingborough Stone) was used and although many of the older buildings in Wellingborough were lost in the ‘Great Fire’ of 1738, a few including the Old Grammar School and the Hind Hotel survived.
Later buildings include the 19th-century church of All Saints and the 20th-century church of St. Ninian, as well as the United Reformed Church on the High Street. The former shows the use of Lincolnshire Limestone and ironstone in a polychrome fabric where the ironstone has been carved for the windows. The walls and tower of St. Ninian consist of local ironstone, whilst the windows and doors were constructed from Weldon Stone (Lincolnshire Limestone). Much of the ironstone for the buildings in Wellingborough was obtained from the outcrop of the Northampton Sand in the immediate vicinity of the town. The expansion of Wellingborough during the 20th century has resulted in the disappearance of the small quarries that supplied this stone. The use of the ironstone may be seen (often in combination with Lincolnshire Limestone) in the villages surrounding Wellingborough, as well as further afield in east and south-east Northamptonshire.

**Finedon Stone**

At Finedon, the ironstone was also used as a building stone, for example at Abbingdon Cottage, Finedon (below) built of bright ochreous Finedon Stone ashlar (Northampton Sand Formation) with Weldon Stone (Lincolnshire Limestone Formation) used for mullions, window frames and decorative tracery. The 14th-century parish Church of St Mary (top right) provides a fine example of local oolitic ironstone (Finedon Stone from the Northampton Sand Formation) with dressings of Weldon Stone (Lincolnshire Limestone Formation).

**Cottingham Stone**

Although there is plenty of ironstone in the areas to the north and west of Kettering, most was extracted for steel making. Buildings in this area that are built from the sandstones of the Northampton Sand Formation, extracted it from below the ironstone, mainly from a unit of calcareous ironstone (sideritic, sandy limestone). This stone has been variously referred to as Cottingham Stone (or Desborough Stone or Glen Hill Stone). When unweathered, it is greenish grey or blueish grey, but when seen in buildings, the edges of individual stones are of a medium light brown, whilst the cores may be purple, coloured or grey. Fossil bivalves, brachiopods and ammonites occur but these differ from the forms seen in the Marlstone Rock. The stone is sometimes soft and crumbly, especially when old (as in Rothwell parish church), but it has been used for centuries for religious buildings (e.g. St. Giles in Desborough, Lodddington Church and Thorpe Malsor Church).
In these and other villages, the stone was also used for dwellings, farms and walls. The stable buildings of Ruston Hall consist of large ashlar blocks of this stone combined with dressings of paler Weldon Stone. With the exception of a site south-west of Geddington, this stone is no longer worked, but was probably extracted in small local pits for rubblestone, whilst there are records of large stone pits near Desborough, Rothwell and Faxton.

To the north of Corby, along the southern side of the Welland Valley, ferruginous sandstone from the Northampton Sand Formation has been used in a number of villages, including East Calton, Middleton, Cottingham and Gretton, but is exemplified by the main street in the village of Rockingham, in northern Northamptonshire (above), with houses built of local calcareous and sandy ironstone (with Cottingham Stone from the Northampton Sand Formation).

Roofs are varied, and include Collyweston Slate and thatch. In this area, the Cottingham Stone is accompanied by a particularly ochreous, rust-coloured, sandy ironstone. Although large pits were recorded during the 19th century in the vicinity of Uppingham (Leicestershire) and Cottingham, no quarries working this stone remain today.

**Brixworth Stone**

In an area to the north and west of Northampton, the ironstone has been used as a rubblestone at Brixworth and Mears Ashby. At Brixworth, the Brixworth Stone was of a better quality and used for the stables at Brixworth Hall and the Workhouse. Ironstone from New Duston was known as the Rough Rag and may have been used as the dressed stone seen locally in gateways, doorcases or quoins.
The sandstones of the Northampton Sand Formation played a substantial role in the buildings of early (Norman and medieval) Northampton, supplying the stone for the walls, castle, several churches, and many of the buildings. The surviving remnants of the medieval town include the round Church of the Holy Sepulchre, and St. Peter’s. The former consists of brown sandstone, some of which was replaced by Harlestone Stone in the 19th century; St. Peter’s is a polychrome building consisting of brown sandstones, ironstones and pale Blisworth Limestone. The sources of the stone have long since disappeared, but much of it probably came from quarries that now lie below the old town. The fire of 1675 destroyed much of Northampton, and parts of the town were rebuilt partly using stone imported from beyond the county. But for many of the buildings a paler coloured freestone of sandstone origin, said to have come from near Northampton, was used. Only All Saints church and a few other buildings such as the Judge’s House (above) provide examples of its use.

Later Georgian buildings constructed of Northampton Sand ironstone include Beethoven House in the Market Square (left), built after the Great Fire of 1675 using local cross-bedded and ferruginous Northampton sandstone (Northampton Sand Formation) quarried from Northampton Fields close to the town.
Harlestone and Duston stones

Stone supplied to Northampton, as well as to the parishes of Harlestone and Duston and the surrounding area, came from local quarries within these parishes. Some stone is still quarried at Harlestone. Varieties of Duston Stone and Harlestone Stone from these quarries were probably used for Dallington Hall. Stone from the same sources included the richly coloured, mottled or even-textured sandstones used for ashlar, mullions and door frames seen in buildings around the Althorp Estate. Some of these sandstones are susceptible to weathering, occasionally resulting in the spalling of ashlar faces.

Eydon Stone

The villages west of Northampton contain many buildings where these sandstones have been used. Most characteristic of these is Eydon, where the local freestone (Eydon Stone) was used in the construction of Waklyn Manor and Eydon Hall, and is almost ubiquitous throughout the village. This stone served for ashlar and mouldings, and has also been carved. No quarries supplying this stone remain.

Duston Pendle

Within central Northamptonshire, and particularly in an area stretching from the north and west of Northampton across to the western margins of Wellingborough, limestones (termed ‘Pendle’) are present within the Northampton Sand Formation and have been used in buildings across much of this area. The limestones typically occur between the lower and upper sandstones of the Duston Member. Around Duston, the limestones may be divided into two informal units. The upper is the Duston Pendle and consists of cross-bedded calcareous sandstones to sandy limestones with ooids and shell debris, and may become an ooidal limestone. It was worked mainly in the 19th century and used in pale, brick-sized blocks in local terraced cottages and some Victorian churches (e.g. St. Matthew’s, Northampton).

The lower unit, or lower bed of the Pendle, has similarities with the Collyweston Slate and consist of cross-bedded units which split along the laminae formed by the fore-sets to form ‘slates’ that are generally thicker and therefore heavier than those from Collyweston. As with Collyweston Slates, they required winter frosting in order to split the rock. The laminae consist of layers that are alternatively sand-rich, or rich in shell debris, or ooids. This results in differing porosities in each layer, making some more susceptible to splitting after wetting and freezing.

These slates were worked underground, and there are 17th-century references to workings at ‘Slate-pitt Piece’ and around Harlestone and Duston in the 18th century.

Kingsthorpe Pendle

In the quarries in the vicinity of Kingsthorpe, the limestones reached 4 metres in thickness and provide a source of pale, sandy cross-bedded limestone used in several late 19th-century churches designed by Matthew Holding (e.g. St. Matthew’s, Northampton) in combination with stone from Duston. This, the Kingsthorpe Pendle contains shell debris, including the remains of crinoids, which the fragments of the stem may be star-shaped in cross-section.

A different, strongly cross-bedded variety of Kingsthorpe Pendle was used in the construction of the Roman Catholic Cathedral House and St Andrew’s chapel in Northampton. It differs from typical Kingsthorpe Pendle in its lighter colour and relative paucity of crinoid remains.
Around the old Kingsthorpe village area, a number of other stones occur in the walls. One of these is a spotted rock consisting of a brown sandstone with pale yellow or white blotches formed by small calcite cemented concretions. This occurs in the lower part of the Northampton Sand Formation, and may be seen along the south side of Hugh Street, in Kingsthorpe.

The ancient quarries that now form Bradlaugh Fields Local Nature Reserve may have supplied Pendle to the former parish of Abington. Abington Manor House (now Abington Museum) provides one of the few remaining examples of the buildings that once comprised Abington village, and although partially rebuilt, the stone consists of a pale sandy limestone with streaks of limonite and shell debris, including crinoid fragments.

The use of Pendle extends through the villages of Boughton (top right), constructed mainly of local ‘Pendle’ rubblestone (Boughton Stone, Northampton Sand Formation) often roughly dressed as ashlar or characteristic flat blocks; Pitsford and Moulton, where the cottages and church are built of a pale brown calcareous sandy stone (including Boughton Stone) that form flat blocks of rubblestone; and the parish church at Moulton (bottom right), built in the 13th century from local, rough-coursed Moulton ‘Pendle’ (Northampton Sand Formation).

The Pendle limestone reaches five metres in thickness in and around Pitsford where it is currently worked for aggregate. Pendle is also seen in field walls around Overstone and Sywell, but northwards, towards Brixworth local ironstones and sandstones become more conspicuous in buildings.

**Mears Ashby Stone**

Although only one metre thick, the limestone at Mears Ashby (Mears Ashby Stone) forms a good freestone. Consisting of a pale yellow, cross-beded oolite containing sand grains and some crinoid debris as well as streaks of limonite, the Mears Ashby Stone is less flaggy and more thickly bedded than ‘typical’ Pendle. It is best seen in Mears Ashby Hall where it was used in large ashlar blocks and is relatively intricately carved in the porch.
The stone was also used for the vicarage, the manor house and the Cellis family farmhouse, but many of the buildings in Mears Ashby consist of rubblestones that are represented by a mixture of ironstones, limonitic sandstone as well as Mears Ashby Stone. Mears Ashby Stone has been used been used for a number of mansions in the surrounding area and also appears further afield in the 17th-century portion of Delapré Abbey, Northampton.

Around Newbottle and Thorpe Mandeville in southwest Northamptonshire, the Northampton Sand Formation contains up to 1.5 metres of sandy and ooidal limestones which were used as rubblestone in the villages of Charlton and Thorpe Mandeville.

**Lincolnshire Limestone Formation**

Although well developed in Lincolnshire (where building stones such as Ancaster Stone, Clipsham Stone, Ketton Stone (Rutland) and Barnack Stone (Peterborough) are famous for their use in many buildings, such as the Cambridge colleges), the Lincolnshire Limestone Formation extends only into north-eastern Northamptonshire, the outcrop thinning and finally dying out at Maidwell, west of Kettering. Over much of this area only the Lower Lincolnshire Limestone Member is present; the Upper Lincolnshire Limestone Member, from which most of the freestones originate, is much more limited in its distribution in Northamptonshire.

**LOWER LINCOLNSHIRE LIMESTONE MEMBER**

In many of the villages along its outcrop, the creamy coloured Lower Lincolnshire Limestone Member has been used as a rubblestone forming tabular to brick-shaped blocks with clean edges. The stone itself is a fine-grained, sandy limestone that may contain dispersed ooids. It has been used in combination with sandstones and ironstones from the Northampton Sand Formation, whilst the quoins and any dressings may consist of stone from the Upper Lincolnshire Limestone Member.

**Collyweston Slate**

The Lower Lincolnshire Limestone Member includes the famous Collyweston Slate which has been quarried from around Collyweston and Easton-on-the-Hill since Roman times. Collyweston Slate is a cross-bedded, sandy limestone that ranges from a few centimetres to nearly a metre in thickness. As with the Duston Slates of the Northampton Sands Formation, the Collyweston Slates are worked by splitting along the laminae of the cross-bedded foresets that are enriched in mica-flakes and shell fragments. Frost is a key factor in achieving the splitting, and the earlier sources of slate were close to the surface where frosts had already split the rock. From the 16th century onwards, the technique of frosting appears to have been used and the slates were mined via shafts which extended down into the soft sands of the underlying Grantham Formation; these sands were then mined outwards from the base of the shafts and the overlying stone supported with pillars of stone blocks.
Once the overlying bed could be heard to be moving, the miner withdrew and removed the pillars allowing the Collyweston Slate bed to give way. The released blocks (termed ‘logs’) were then collected, kept damp and then exposed on the ground surface to frost which caused them to split into thin layers. These layers were then shaped to a variety of different sized slates, which when used on the roof are seen in diminishing courses, grading in size from the smallest at the ridge to the largest at the eaves.

It is estimated that Collyweston Slates roof at least 1500 buildings in northern Northamptonshire alone, and their use extends into adjoining counties.

Fourteen thousand slates were used in the construction of Rockingham Castle during the 14th century. Collyweston Slate is almost ubiquitously used for the roofs of all the older buildings of surrounding villages; Duddington, Easton-on-the-Hill, Harringworth, King’s Cliff and Laxton also provide good examples.
The extensive recently restored roofs of Apethorpe Hall (the reconstruction of the roof is shown above) are of Collyweston Slate as is the fine roof of the Guildhall in London. Today, the mining of Collyweston Slate has virtually ceased, although the slate is so durable that it can be re-lain on a conserved frame or recycled from other buildings.

**UPPER LINCOLNSHIRE LIMESTONE MEMBER**

The Upper Lincolnshire Limestone Member occurs in the vicinity of Stanion, Weldon and King’s Cliffe where it is present in as a massive channel system that cuts down into the Lower Lincolnshire Limestone Member and occasionally into the Northampton Sands Formation beneath.
Stanion Stone

Stanion Stone, named after a local village, is a yellowish oolite with some shell debris, all set in a cement of sparite. Although Stanion Stone appears to have been used fairly widely, there are no structures in which it was used exclusively. Examples of its use may be seen in the tower of Stanion parish church, in the aisle windows, upper tower and spire of the Saxon church at Brigstock, in the Eleanor Cross at Geddington, and in the Church of St Mary and All Saints at Fotheringhay (below), constructed in 1434 by Richard, Duke of York. The stonework includes Upper Lincolnshire Limestone rubblestone, Stanion-like stone for the walls and buttresses, with a paler oolitic limestone (similar to Weldon Stone) used for the windows. King’s Cliffe Stone also occurs as blocks in the parapet and north porch. All these lithologies are from the Lincolnshire Limestone Formation.

Further afield, Stanion-like stone has been used for the dressings of the Bede House at Higham Ferrers, and for the tower of St Giles Church in Desborough. The most recent record of the extraction of this stone was in 1725, and old quarries were present on the north side of the road from Stanion to Brigstock before the re-routing of the A43.
Weldon Stone

Within the village of Weldon (near Corby), grassed-over and wooded hills and hollows reflect the existence of a stone industry that may date back to the 11th century, although the supply of Weldon Stone, quarried around the village, was largely exhausted by the mid-1980s. It is a pale ooidal limestone that has been used as a freestone both for ashlar and carving. The stone is pale cream when fresh, weathers to a light grey, and may show cross-bedding with a few fossil shell fragments. Weldon Stone is quite porous and remarkably weather resistant, and has been used widely beyond Northamptonshire (probably in the earlier 11th-century St. Paul's Cathedral, London, and certainly for King's College Chapel, Cambridge).

Within Northamptonshire, Weldon Stone has been used in a variety of buildings at least since the 13th century. It was used in a number of churches, for window tracery, and in church towers such as at Titchmarsh. A Weldon-like stone was also used for the windows of the Church of St Mary and All Saints at Fotheringhay. The capacity of Weldon Stone to take intricate carving is demonstrated by the 13th-century Eleanor Cross erected by Edward I in Geddington. Several high status houses also made much use of the stone, and it was used for quoins and gables on the exterior of the Elizabethan Kirby Hall (now a partial ruin, above).
Dressed Weldon Stone may be seen in two buildings built by Sir Thomas Tresham in the late 16th century. Both the extraordinary Triangular Lodge at Rushton, and the uncompleted Lyveden New Bield outside Oundle used dressed Weldon Stone for the windows, quoins and gables. The 17th-century Lamport Hall, near Brixworth, and its 18th-century additions were constructed almost entirely of Weldon Stone. The stone is also much in evidence in Oundle, where it can be seen in the west door and porch of the parish church, and the Talbot Inn, Oundle (below) built in 1626 entirely of Weldon Stone ashlar with some tracery and finials (Lincolnshire Limestone Formation). The village of Weldon itself contains many cottages built of Weldon rubblestone and ashlar, whilst the 17th-century Haunt Hill House, by the master mason Humphrey Frisby is built entirely of Weldon Stone, with a roof of Collyweston Slate.

**King’s Cliffe Stone**

This stone is very similar to Weldon Stone but may be distinguished by its warm golden colour. It consists of cross-bedded oolite containing some laminae richer in shell fragments and a little cement, providing a high porosity. Stone exposed in the old quarries forming the ‘hills and holes’ of the former Cliffe Park also contains a very fine-grained porous oolite, and a coarse, shelly, sparite cemented rock containing sea-urchin spines and gastropod shells, with small fragments of limestone. Whilst King’s Cliffe Stone was quarried to supply the Cambridge colleges in the 15th and 16th century, and for Burghley House during the 16th century, many of the buildings in the village of King’s Cliffe (below left) consist almost entirely of the local stone, probably sourced from the old quarries at Cliffe Park. Here it has been used for rubblestone, ashlar, and as a dressed stone for windows. The 17th-century shop and houses along Park Street are built mainly of local King’s Cliffe Stone (Lincolnshire Limestone Formation).

King’s Cliffe Stone has also been used in nearby villages such as Apethorpe where the church tower is built of large ashlar blocks. It has also been recognised in the parapet and as blocks in the north porch of the Church of St Mary and All Saints at Fotheringhay.

**Great Oolite Group**

**Rutland Formation**

The Rutland Formation extends from Lincolnshire, through Rutland into Northamptonshire and southwards towards the Oxfordshire border. It consists largely of clays and mudstones, although thin limestones occur in the upper part and have been used for building purposes.

In the area around Kingsthorpe on the northwestern side of Northampton, pale grey or whitish fine-grained sandstones are developed within the Stamford Member of the Rutland Formation. This rock, known as the Kingsthorpe White Sandstone is a fine-grained, gritty, coarse sand component which may show wisps of clay and occasionally, traces of carbonaceous vertical rootlets visible on the surfaces of the ashlar blocks, indicating the swampy conditions in which the sediments were deposited.
Although soft when quarried, the sandstone hardens rapidly when exposed to air. Kingsthorpe White Sandstone was worked in a quarry on the north side of Kingsthorpe from the late 18th to the early 19th century. Stone from this quarry was used for a number of prestigious buildings in Northampton including The Infirmary (Northampton General Hospital) and the cavalry barracks. However, very little evidence of its use remains in the centre of Northampton today as these buildings have either been lost or much modified. In Kingsthorpe, the stone is still seen in the obelisk erected by William Wentworth of Boughton Hall (right). At 30 metres in height and built sometime after 1764, it was constructed of locally quarried Kingsthorpe White Sandstone (Rutland Formation, Stamford Member). Kingsthorpe Hall (in Kingsthorpe Park) provides a fine example of its use, whilst a single cottage in a terrace on the Harborough Road is also built of Kingsthorpe White Sandstone. Beyond Kingsthorpe, the church at Overstone and Little Horton House are both constructed of Kingsthorpe White Sandstone, although this once celebrated stone has now become a rarity.

Wellingborough Limestone
Occurring in the middle part of the Rutland Formation, the Wellingborough Limestone Member consists of a massive clayey, sandy limestone containing shell fragments, sometimes with rubbly, oyster-rich limestones. In south-western Northamptonshire the Wellingborough Limestone grades into the Taynton Limestone Formation (which consists of cross-bedded ooidal limestones with some shell debris).

Wellingborough Limestone has been used as a rubblestone in buildings and walls. This is seen in the parish church of Earl’s Barton, whilst the church at Isham contains flat blocks of rubblestone up to a metre in length. Further west, the limestone has been used in rubblestone walling in the churches at Dallington and Duston, whilst other buildings may consist of a mix of Wellingborough Limestone and Northampton Sand sandstones in alternating tiers. The church tower at Bugbrooke, south of the Nene is similarly banded, and houses with rubblestone walls of Wellingborough Limestone and quoins and dressings of brown Northampton Sand sandstones may be seen in the village of Gayton.

Taynton Limestone Formation
Further southwest the Wellingborough Limestone becomes thicker and passes into the Taynton Limestone Formation, which includes the Helmdon Stone.

Helmdon Stone
This stone is a cross-bedded, sandy limestone which contains much broken shell including oyster debris and sea-urchin spines. Helmdon Stone was formerly obtained from quarries around Helmdon and supplied rubblestone for the local village church and buildings, but its use was more widespread, and Easton Neston House near Towcester, built in 1702 by Nicholas Hawksmoor is faced with ashlar from Helmdon whilst the Corinthian pilasters are also constructed from the stone. During the early 18th-century Helmdon Stone contributed to other structures such as Blenheim Place in Oxfordshire, but the Town Hall in Brackley (built from large ashlar blocks) and the conversions (possibly later additions?) to Cannons Ashby House also date from this period.
Evidence of an earlier (13th century) period of use of Helmdon Stone may be seen at Cannons Ashby, where the church, a remnant of an Augustinian Priory, has blank arcading on the west face, carved in a Helmdon-like stone. The Eleanor Cross, close to Delapré Abbey in Northampton is also constructed of Helmdon Stone (with the exception of the statues) and demonstrates the ability of the stone to take a fine and intricate carving.

**Blisworth Limestone Formation**

This formation crops out from north-eastern to south-western Northamptonshire, mainly along the valley sides of the rivers Nene and Tove and their tributaries. Some Blisworth Limestone also occurs further north in faulted outliers such as Church Stowe. Within Northamptonshire there are at least 80 villages and two small towns that lie on or close to the Blisworth Limestone outcrop and many of these settlements are built partly or largely of this limestone and each had their associated stone pits and quarries. The variation in the composition and fabric of the rock is reflected in many of these buildings.

Blisworth Limestone consists of a variety of rock types including: very fine-grained, micritic limestones lacking shelly material; cross-bedded limestones with poorly sorted, closely packed shell debris (the majority of which may be coated with micrite making the fragments look superficially like ooids); cross-bedded limestones with small shell fragments and micritic pellets; and shelly limestones with a well-developed sparite cement.

**Cosgrove Stone**

The Romans may have first worked the disused quarries and underground limestone workings around the village of Cosgrove, near the Buckinghamshire border. Cosgrove Stone may be seen in some of the older buildings of the village, and the church has a 14th-century tower with mouldings thought to be of Cosgrove Stone. The stone is a cream-coloured, cross-bedded limestone with granular shell debris and little matrix. Cosgrove Hall, built in the early 18th century is faced in ashlar composed of a similar material to that of the church. The bridge built over the Grand Union Canal in 1800 at Cosgrove may also be of Cosgrove Stone.

**Blisworth Limestone**

At Blisworth, the oldest buildings in the village typically date from the 17th century and are composed of a cross-bedded, cream, granular shelly limestone with a soft, powdery matrix which may sometimes be more sparry. The very distinctive polychrome cottages are built of Blisworth Limestone striped with courses of brown Northampton Sand ironstone: this pattern of construction may be for decorative reasons, but may also serve to strengthen the walls. The quoins were also made of local ironstone, but the mullions probably came from more workable sandstones of the Northamptonshire Sand in the vicinity of Duston. A 17th-century cottage in the High Street at Blisworth (below) shows attractive polychrome banding formed of alternating layers of pale Blisworth Limestone (Blisworth Limestone Formation) and darker ironstone (Northampton Sand Formation).

With the development of the Grand Union Canal at Blisworth, quarries were opened in 1821, close to the entrance of the Blisworth Tunnel. The Blisworth Stone Works was built here about 13 years later and supplied a variety of stone used for building and lime burning. The stone products included freestone used for floorings, window sills and chimney pieces, and may have provided the rubblestone for some of the 19th-century buildings in the village. However, by the early 20th century, the quarry was worked almost entirely for flux for the smelting of ironstone.
The 16th-century Castle Ashby House, to the southeast of Northampton, is largely built of Blisworth Limestone rubblestone, possibly from a stone pit on the estate. Blisworth Limestone also has been used extensively in the villages along the south side of the Nene between Wollaston and Raunds. There are records of many local stone pits and quarries, most of which supplied rubblestone. There are, however, examples of Blisworth Limestone used as a dressed stone at Stanwick church and the 13th-century parish church at Higham Ferrers.

**Raunds Stone**
The parish church of St. Mary at Raunds is built largely of Raunds Stone, used both as ashlar and for most of the mouldings (right). This stone is cross-bedded, shelly, and contains some ooids, as well as many tabular, micrite coated shells all set in a sparite matrix.

Villages built largely of Blisworth Limestone stand on the edge of the high ground to the east of Kettering and in the valleys leading to the Nene. The limestone was used extensively as a rubblestone for walls and in buildings in the village of Cranford St. John. The 13th-century castle at Barnwell, to the north of Thrapston, and the later cottages in the village, were all constructed from limestone rubblestone. By contrast, the 17th-century Lilford Hall south of Barnwell, was built of high quality ashlar from the Blisworth Limestone, with the gables, bay windows and window cases constructed from Weldon Stone.

**Oundle Stone**
This stone is a close packed shelly limestone possessing a well-developed sparite cement. The quality of the stone is such that it has provided much of the stone for the town buildings of Oundle, which came from the many quarries in the vicinity. Terraced cottages in the centre of Oundle (below), are constructed of Oundle Stone rubblestone with ashlar dressings around the windows (Blisworth Limestone Formation); the larger ornate house in the foreground is built mainly of Weldon Stone ashlar (Lincolnshire Limestone Formation). Although many buildings were embellished with Lincolnshire Limestone (often in the form of Weldon, Ketton, or Barnack stones), Oundle Stone rubblestone is much in evidence in many of the buildings. Others, such as the 18th-century Copthorne Inn are faced with Oundle Stone ashlar, combined with dressings of Weldon Stone. The 18th-century Georgian house in the churchyard, as well as the ‘New’ schoolhouse at Oundle School are also faced with Oundle Stone ashlar.
Glossary

Arcading: A series of arches carried on columns, piers, or pilasters, either free-standing or attached to a wall to form a decorative rhythmic pattern: in the latter case it is referred to as a blind arcade.

Ashlar: Cut stone, worked to even faces and right angled edges. Used on the front of a building and laid in horizontal courses with vertical joints.

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

Carbonaceous: Consisting of, containing, relating to, or yielding carbon.

Cement: The materials which bind the grains and/or fossil components together to form a rock.

Clay: Sediment of very fine-grained particles less than 2 microns in size (in reality pure clays are rare, most fine-grained sediments are muds (mudstones) which are a mixture of clay and coarser silt-grade particles).

Corinthian: The most ornate of the three main orders of classical Greek architecture, characterized by a slender fluted column having an ornate bell-shaped capital decorated with acanthus leaves.

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.

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

Finials: An ornament terminating pinnacles, canopies, pediments, gables, spires, or the tops of bench-ends.

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

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

Lamination: The thinnest type of layering in sedimentary rocks, less than 1 cm in thickness.

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

Limonite: A hydrated iron oxide ore that varies in colour from dark brown to yellow.

Lintel: A horizontal beam over an opening to support the wall over it.

Lithology: A basic description of the material features of a rock, generally as seen with the naked eye, but also including microscopic features. Commonly occurring sedimentary lithologies are sandstone, siltstone, mudstone and limestone; commonly occurring igneous lithologies are granite, diorite, dolerite and basalt.

Mica: Group of silicate minerals composed of varying amounts of aluminum, potassium, magnesium, iron and water. All micas form flat, plate-like crystals. Crystals cleave into smooth flakes. Biotite is dark, black or brown mica; muscovite is light-coloured or clear mica.

Micritic: The texture or matrix of a sedimentary rock or clast, often applied to a limestone or limestone pellet, which is composed of extremely fine grained lime-rich mud.

Mouldings: Anything with a contour or section, either projecting or inset, to give emphasis, usually to horizontal and vertical lines.

Mudstone: A fine-grained sedimentary rock composed of a mixture of clay and silt-sized particles.
Mullions: A vertical, slender pier which forms the division between the lights (glass) of a window.

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

Pilasters: Conform exactly to the details of the columns, except that they are rectangular, projecting only slightly from the wall, are not curved or free standing.

Polychrome: The decoration of exteriors, and interiors of buildings with several colours. Structural polychrome decoration means that the colour is not applied but is in the bricks, tiles or stones used in the construction.

Porosities: The ratio of the fraction of voids to the volume of rock in which they occur.

Quartz: The crystalline form of silica (silicon dioxide, SiO$_2$).

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

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

Sideritic: Iron carbonate (FeCO$_3$), a widespread carbonate mineral that can be an ore of iron. The mineral commonly occurs in thin beds with shales, clay, or coal seams (as sedimentary deposits) and in hydrothermal metallic veins (as gangue, or waste rock).

Spalling: Deterioration in the form of detaching flakes, scales or lens-shaped fragments from a generally sound surface.

Sparite: Sparry calcite, occurring as the cement in some limestones and formed by nucleated precipitation and growth in the pore space.

Tracery: An architectural term used primarily to describe the stonework elements that support the glass in a Gothic window. The term probably derives from the ‘tracing floors’ on which the complex patterns of late Gothic windows were laid out.
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Further Reading


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