The impressive south face of King's College Chapel, Cambridge (built 1446 to 1515) mainly from Magnesian Limestone from Tadcaster (Yorkshire) and Kings Cliffe Stone (from Northamptonshire) with smaller amounts of Clipsham Stone and Weldon Stone
Introduction

The geology of Cambridgeshire can be regarded as an extension of that of the adjoining parts of neighbouring Lincolnshire, Northamptonshire, Bedfordshire and Norfolk. This is reflected in the building stone usage within the county.

In the north and west of Cambridgeshire, most of the Huntingdonshire District sits on Jurassic clays overlain by glacial till. A small area in the north western corner of the county, to the west of Peterborough, is underlain by Middle Jurassic limestones.

The geological succession here includes the Lincolnshire Limestone Formation, which is the source of a variety of attractive building stones much used throughout Cambridgeshire. ‘Lincolnshire Limestones’ are characteristic of the built heritage of many villages and small towns in this north western part of the county. The same Formation also supplied stone for cathedrals and high-status buildings in Peterborough and Ely and for many of the college buildings in Cambridge. In many cases, supplies of locally worked Lincolnshire Limestone were supplemented by supplies of very similar limestones imported from Northamptonshire and Lincolnshire.

Much of central and eastern Cambridgeshire is dominated by the distinctive low-lying and flat landscape of the Fens and the bedrock geology here mainly comprises Upper Jurassic clays. Occasional outcrops of Lower Cretaceous sandstones and ironstones have yielded workable stone for local construction purposes, but much of the stone employed in buildings in this area has been imported from north-west Cambridgeshire, Northamptonshire and Norfolk via the regional network of waterways. The gently rolling and hilly landscape of South Cambridgeshire is formed from Upper Cretaceous Chalk and Flint, overlain in places by boulder clay and fluvioglacial gravel deposits containing various pebbles and cobbles. Chalk, Quarry Flint, Quaternary Flint and harder Pebbles and Cobbles have been widely used for local building purposes in this area.

The modern administrative county of Cambridgeshire was formed in 1974 by the amalgamation of the former county of Cambridgeshire and Isle of Ely with the county of Huntingdon and the Soke of Peterborough. Between 1898 and 1965, the Isle of Ely formed an administrative county on its own. Cambridgeshire and the Isle of Ely were merged in 1965. The Soke of Peterborough was historically associated with and considered part of Northamptonshire until it became a separate administrative county in 1888. The area was merged with the neighbouring small county of Huntingdonshire in 1965. In 1974, the City of Peterborough became a district of the non-metropolitan county of Cambridgeshire.

From 1998, local government has been divided between Cambridgeshire County Council and Peterborough City Council, a separate unitary authority. Under the County Council, there are five district councils, Cambridge City Council, South Cambridgeshire District Council, East Cambridgeshire District Council, Huntingdonshire District Council and Fenland District Council.

The Cambridgeshire and Peterborough Combined Authority was established in 2017 as part of a devolution deal made with Central Government. The Authority is made up of representatives from the County, Unitary and District Authorities under a single Mayor.

Building stones in this Atlas are treated as either ‘Indigenous’ or ‘Imported’ and are described in stratigraphic order. To assist the reader in navigating around the Atlas, entries in the stratigraphic table and the corresponding descriptions are interactively linked (by means of small coloured triangles located in the upper right-hand corner of the relevant pages).

For parts of the following nine National Character Areas extend into Cambridgeshire:
- NCA 46 The Fens
- NCA 75 Kesteven Uplands
- NCA 85 Brecklands
- NCA 86 South Suffolk and North Essex Clayland
- NCA 87 East Anglian Chalk
- NCA 88 Bedfordshire and Cambridgeshire Claylands
- NCA 89 Northamptonshire Vales
- NCA 90 Bedfordshire Greensand Ridge
- NCA 92 Rockingham Forest
Cambridgeshire Superficial Geology

BUILDING STONE SOURCES

- TUFA - TUFA, CALCAREOUS
- ALLUVIUM AND TIDAL FLAT DEPOSITS - CLAY, SILT, SANDS AND GRAVELS
- HEAD - SANDS, GRAVELS, SILT, AND CLAY
- LACUSTRINE DEPOSITS AND PEAT - CLAY, SILT AND PEAT
- RIVER TERRACES - SANDS, GRAVELS AND CLAY
- GLACIOFLUVIAL AND GLACIOLACUSTRINE DEPOSITS - SANDS, GRAVELS, SILTS AND CLAY
- GLACIAL TILLS - CLAYS, SANDS, GRAVELS, BOULDERS
### Stratigraphic Table

<table>
<thead>
<tr>
<th>EPOCH/PERIOD</th>
<th>GROUPS</th>
<th>FORMATIONS</th>
<th>BUILDING STONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUATERNARY</td>
<td>Variously subdivided</td>
<td>Variously subdivided</td>
<td>Pebbles and Cobbles (Fieldstone)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quaternary Flint (Field Flint, Brown Field Flint, Clay-with-Flints)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sarsen Stone (Silcrete)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chalk (Chalk Block, Clunch)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quarry Flint (Fresh Flint)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Melbourn Rock</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Totternhoe Stone (Burwell Rock, Burwell Stone, Cambridgeshire Clunch)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Woburn Sandstone (Sandrock, Ironstone, Ragstone, Carstone, Carrstone, Fenstone)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ely Sandstone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cottenham Sandstone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upware Limestone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cornbrash</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alwalton Marble</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lincolnshire Limestone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper Lincolnshire Limestone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Barnack Stone (Barnack Rag)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Lincolnshire Limestone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wittering Pendle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Great Oolite Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inferior Oolite Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grantham Formation</td>
</tr>
</tbody>
</table>

*Table 1. Summary (Interactive) of stratigraphical and building stone names applied to sediments and sedimentary rocks in Cambridgeshire and Peterborough UA*
Background and historical context

There are over 7300 listed buildings and 223 Conservation Areas in Cambridgeshire. Over 1100 of the listed buildings lie within the City of Cambridge.

Timber was the main material used for the construction of secular buildings of all sizes throughout the Medieval period, except in the Middle Jurassic limestone outcrop area to the north-west of the county and the Soke of Peterborough. Despite the dominance of timber frame and limited quantities of building stone, there is a long history of the use stone in castles, large houses, ecclesiastical buildings, the college buildings of Cambridge University and in the construction of river bridges and railway stations.

Chalk was available in south Cambridgeshire, with occasional outcrops of sandstones and ironstones occurring within and south of the Fens and from the Bedfordshire Greensand Ridge in the far south west of the county. Quarry Flint, Quaternary Flint and glacial and riverine Pebbles and Cobbles were widely used in the south and along the valley of the Great Ouse. In the Middle Jurassic limestone area west of Peterborough, building stone was quarried around Barnack. It was exploited from the Roman period, although by 1460 the best of the stone had already been exhausted.

From an early date, various types of Lincolnshire Limestone were transported from nearby Northamptonshire and Lincolnshire to all parts of the county and beyond via the River Nene, Fenland drains and rivers. This limestone was widely employed in monasteries, churches, Cambridge colleges and other prestigious buildings across the county. In the Middle Jurassic limestone area, Barnack Stone and other Lincolnshire Limestones were used in a wide range of buildings and walls. Villages with historic buildings constructed entirely of buff-coloured Lincolnshire Limestone are characteristic of the area.

From at least the C10th, religious communities had a significant influence on the landscape, economy and the extraction and
use of building stone. Abbeys on the edge of the Fens were
established at Peterborough (c.650), Ramsay (969) and on the
fen islands at Ely (673) and Thorney (c.670). Peterborough
Abbey owned quarries at Barnack and at times Ramsay and
Thorney abbeys also had quarrying rights. Stone from Barnack
was widely used across the county and beyond in monastic
and church buildings; it was also employed in the C12th con-
struction phases of Peterborough and Ely cathedrals.

The City of Cambridge has a particularly rich architectural
history and has the second-oldest university (founded in 1209)
in the English-speaking world. Much of the stone employed in
the Cambridge colleges was imported and this is detailed later
in this Atlas.

There are at least 580 churches in Cambridgeshire. In many
areas of the county they are the most significant stone-built
structures. Most of the pre-Reformation churches developed
piecemeal over the centuries and exhibit a mixture of features,
fabrics and building materials. Following the Norman invasion,
there was a massive expansion in church building. The wealth
of the Abbey estates and Cambridge colleges enabled them to
generously support the construction of churches in the manors
they held, and by the C13th churches had been built in many
villages.

Despite the impacts of economic collapse and the Black Death
during the second half of the C13th, church building and
alteration continued. Increasing economic wealth in the late
C14-C15th, combined with changes to religious practices and
beliefs, led to new work being undertaken on most churches.
Fine towers and clerestories were added in many places and
C14th ashlar broach spires are a landmark feature of Cam-
bridgeshire west of the River Cam. The rapid population
increase in the C19th led to the construction of new churches.
Some 36 new parishes were created between 1845 and 1897,
especially in Fenland towns such as Chatteris, March and
Wisbech. The by-now extensive railway network allowed the
importation of building stone from a wider area, though much
use was made of brick.

Apart from churches and monastic buildings, the earliest
stone-built structures in Cambridgeshire were castles, fortified
manors and Bishop’s palaces. Little remains of the county’s
Norman castles other than earthworks, but elements of fortified
manors remain at Hemingford Grey, Northborough and
Longthorpe Tower (c.1263), Peterborough.

By the late C14th, sheep farming had become extremely
profitable, and as a result, high quality buildings started to be
erected across the county; in the Middle Jurassic limestone
area to the north-west of the county they were frequently built
of stone. During the period 1580 to 1640 many village houses
were transformed from medieval open hall buildings into more
comfortable homes by having chimneys inserted and an upper
floor added. In the north-west of the county stone buildings,
constructed of locally occurring limestones, dominate villages
such as Barnack, Elton, Eye and Helpston. Roofs were generally
constructed of Collyweston Stone-slate.

From the middle of the C17th, houses were increasingly built in
a classical style. In the north of the county, stone was used for
many such buildings, including Walcot Hall, Southorpe (1678)
and Thorpe Hall, Longthorpe (1653-56). Many older houses in
the area were remodelled during the C18th, including Elton
Hall, Milton Hall Castor and Kimbolton Castle mainly using
imported Weldon and Ketton limestones. Few major new
mansions were constructed in Cambridgeshire during the C19th,
though many houses were modified, rebuilt and extended, such
as Anglesey Abbey.
During the first half of the C19th the population in general and that of individual villages greatly expanded. Brick production rapidly increased to meet the demand for materials, although the use of Clay Bat, Chalk Block, rubble and lightweight timber frame for lower quality buildings also increased. Stone continued to be used in towns for prestigious civic, commercial and other buildings including the Cambridge colleges.

The C20th saw major changes to the Cambridgeshire landscape, including the construction and widening of major roads such as the A1 and the A14, industrial-scale gravel extraction along the Ouse Valley, the establishment of several large wartime airfields, the creation of Grafham Water, the development of Peterborough New Town (from 1967) and the expansion of Cambridge and market towns and villages across the county. The use of stone in connection with such projects was often limited to municipal and commercial buildings constructed during the Edwardian period, and more specifically to the dressings of brick buildings. In Cambridge, the University authorities often insisted on street-facing elevations being built entirely of stone. Stone was used to clad new University and commercial buildings in the City throughout the C20th and it continues to be used in the C21st. In the northwest of the county, limestone is still used for the cladding of new housing.

The Fens

The Fens cover large areas of central and northeastern Cambridgeshire and southeastern Lincolnshire. The great ‘Fenland island’ abbeys of Ely and Thorney and the fen-edge abbeys of Peterborough and Ramsey became important economic centres that managed the draining of substantial areas of the Fens. The wealth generated from cattle and sheep farming is reflected in the fine medieval buildings of Peterborough, Ely and Cambridge and the churches of the Fenland edge settlements, such as St Ives and Burwell.

The only building stones available within the Fenland area came from the ‘island’ outcrops. On the Isle of Ely, Lower Cretaceous Ely Sandstone was used extensively in the C12-14th monastery buildings. Chalk and Totternhoe Stone were brought from the southern margins of the Fens from quarries such as those at Burwell, Swaffham Bulbeck and Reach. Chalk was used in Ely Cathedral, Denney Abbey and many other medieval churches and buildings. Lincolnshire Limestone, including Barnack Stone, was transported via the River Nene, the Car Dyke and Fenland drains. Ely Cathedral is primarily built of Barnack Stone and hosts many decorative elements carved in Chalk and Purbeck Marble. Barnack Stone and Collyweston Stone-slate (the latter used for roofing) were also widely employed in churches and monastic buildings of the Fen Island settlements.

Throughout the Mediaeval period, timber-frame, mostly rendered, was largely used in town houses, farms and cottages. From the C14th, brick was used for refacing, repair and extension works and from the C17th was extensively employed for a range of secular buildings, from cottages to substantial town houses.

From the C17th, the comprehensive draining of the Fens transformed them into rich agricultural lands. Parliamentary enclosure of the C18-19th enabled large tracts of the still open-fen to be drained and divided into fields. The larger Fenland settlements expanded, and a substantial number of new, small churches and farmsteads were built. These were generally constructed of brick, but some made use of stone such as the Church of St. Ethelreda in Coldham (1876), which employs coursed Carrstone from Norfolk. Other imported stones employed were Ancaster Stone and Bath Stone. Flint was used occasionally for churches such as St. Peter’s Church at Prickwillow (1866) and the Church of St. John the Evangelist at Littleport (1869). A range of imported stone was also used for dressings to brick buildings in Fenland towns and occasionally for entire buildings. This mix of imported materials reflected the increasing ease of transport by railway.
South Suffolk and North Essex Clayland

The NCA covers much of Suffolk, Essex, east Hertfordshire and a relatively small part of the south-east of Cambridgeshire; it includes the villages of Balsham, Bartlow, Carlton, Castle Camps, Horseheath, Linton, Shudy Camps, West Wickham, West Wratting and Weston Colville. The area was well wooded and sparsely settled well into the late Medieval period, even until the C19th in places. The main villages appear to be Saxon in origin; most of the parishes consist of long strips of land extending from the chalklands to the north-west into the claylands to the south-east.

Only on section of rubblestone masonry from the Norman castle at Castle Camps remains, though some of its stone was reused in Castle Farmhouse (C18th). Kirtling Tower was a moated castle dating from the C12th but was rebuilt in the C15th. In the C16th, a Tudor house replaced the earlier buildings. The main house was demolished in 1801, but the red brick gatehouse of c. 1530, with its limestone dressings, remains.

The churches of the area are generally built of Quarry Flint or Quaternary Flint with pebble rubble and sometimes chalk, such as All Saints’ Church at Kirtling (C12-13th), St. Mary’s Church at Bartlow (C12-15th) and St. Mary’s Church at Woodditton (C13th). The Church of St Mary Ashley (1845) is built of large flint pebbles, some knapped, with Bath Stone and Gault brick dressings. St Mary’s Church at Weston Colville is unusual in having (Gault) brick framing to the flint chancel which was rebuilt in 1825.

Few village buildings survive in the area from before the C16th; most date from the C17th onwards. One-and-a-half or two storeyed buildings of plastered timber-frame construction are characteristic. Long straw thatch or plain clay tiles were mainly used for roofing until the C19th. Brick was used from the late C16th for ridge and side stacks to repair or encase timber-frame buildings. Welsh slate became available in the C19th.

Local brick works are recorded in many places from the C18th. Flint with brick and weather boarding was used for a wide range of buildings including houses, schools, cottages and farm outbuildings built after enclosure during the late C18th or early C19th. Welsh slate became available in the C19th.

Kirtling former School and School House (1850) is built of local Quaternary Flint nodules and brick
East Anglian Chalk

In Cambridgeshire and adjoining areas, the East Anglian Chalk ridge extends from east of Ashwell, in Hertfordshire, south of Cambridge, past Newmarket and further to the east into Suffolk. The Chalk hills and plateau ridge are largely capped by boulder clay. The west of the area is drained by the rivers Rhee and Granta which converge to form the River Cam just south of Cambridge which then flows via Cambridge into the Fens to join the Great Ouse. Much chalk was extracted from settlements such as Burwell, Swaffham Bulbeck and Swaffham Prior that developed along the spring line east of Cambridge where the chalk drops to the Fen margin.

Buildings in the Cam Valley and western chalklands utilise a mixture of materials including timber-frame, red and gault brick, flint and chalk under thatched and tiled roofs. Brick had been used from the C16th but was used extensively from the C18th. Chalk, Totternhoe Stone and Melbourn Rock were widely extracted for building at many locations including Barrington, Hinton, Cherry Hinton, Eversden, Foxton, Haslingfield, Melbourn, Meldreth and Orwell. Chalk was used extensively in the Medieval period and large quantities were transported to Cambridge in the C13-14th for use in the construction of the colleges and for decorative features. Chalk rubble was used in a wide range of buildings from churches to footings, chimneys, boundary walls and small farm buildings.

Churches of the area use a wide range of materials. For example, All Saints’ Church, Melbourn (C13th) and Church, Orwell (C12th) are built of knapped Quarry Flint nodules, Quaternary Flint, Melbourn stone, Lincolnshire Limestone and brownish quartzite pebbles. The Church of St. Vigor, Fulbourn (C13th) is constructed of Quaternary Pebbles and Cobbles with some Quaternary Flint and Chalk ashlar; the dressings are of Lincolnshire Limestone and Bath Stone. All Saints Church at Barrington (C13th) is built primarily of dressed Chalk Block and Totternhoe Stone.

The area along the fen margins has been a source of Chalk and Totternhoe Stone (locally known as Burwell Stone) and quarries at Burwell, Reach and Swaffham Bulbeck have been worked since Roman times. Settlements in this area include Bottisham, Burwell, Swaffham Bulbeck, and Swaffham Prior.
During the C12-13th, relatively small monastic foundations were built at Burwell, Fordham, Lode, Isleham and Swaffham Bulbeck. At the Dissolution, the majority were converted to houses such as at Anglesey Abbey, Lode (where some walls of coursed chalk with Barnack Stone survive) and Swaffham Bulbeck (where the C13th undercroft of the Priory survives below a C18th brick house built on the site. It has original walls of coursed Chalk with finely jointed and coursed knapped flint).

The C12th Priory Church of St. Margaret of Antioch at Isleham is one of the best examples in the country of a small Benedictine priory church that has remained substantially unaltered. It is built of Burwell Stone with some herringbone masonry with Quaternary Flint nodules and some Quarry Flint. The plinth and dressings are of Barnack Stone.

Swaffham Prior is unusual in having two churches established within one churchyard, St. Mary’s and St. Cyriac and St. Julitta. St. Mary’s Church has a C12th chancel and a massive octagonal tower composed of brown quartzite pebbles with Chalk ashlar and Quaternary Flint nodules; the dressings are of various types of Lincolnshire Limestone. Large blocks of Sarsen Stone have been used in places such as in the east wall of the C14th chancel.

A few houses survive from before 1500, such as Lordship House in Swaffham Bulbeck (C13th). It is built largely of chalk. More modest houses were often one storeyd and built of local chalk blocks. Houses erected between 1700 and 1820 which survive are mostly of chalk but dressed or fronted in brick.
Further drainage of the Fens, enclosure and rapid population growth in the C19th led to the construction of new cottages, houses, farmsteads and agricultural buildings. Occasionally these were built of Chalk, often faced in gault bricks. Burwell Stone was used for the Baptist Chapel and dovecotes at Crowland and Stevens Mill, a C19th tower windmill. Clay Bat was used for many structures from walls to houses and warehouses.

The eastern uplands of the area include the villages of Dullingham, Stetchley and Stetchworth which lie close to the boundary with the South Suffolk and North Essex Claylands. St. Peter’s Church at Stetchworth shows the development that is typical of many churches in the south east of Cambridgeshire; namely the chancel is C13th, the nave was rebuilt in the C15th. Also, in common with many other churches, it is constructed of Quaternary dressings. The tower parapet has flint flushwork more typical of Suffolk churches.

Bedfordshire and Cambridgeshire Claylands

The Bedfordshire and Cambridgeshire Claylands form a large area of low-lying land that runs through south central England, from Somerset to Lincolnshire. Nearly half of present-day Cambridgeshire lies within this NCA which includes the major settlements of Cambridge, Grantchester, the Gransdens, St. Neots, Huntingdon, St. Ives and Peterborough.

The use of building materials in this NCA is complex, with considerable variation being evident in different geographical areas relative to the River Great Ouse. However, in general terms, rendered timber construction with thatch or plain tiles were the main materials used for more ‘lowly’ houses and cottages until the early C19th. Brick was used for larger houses and farmhouses from the C17th and generally became the dominant form of construction from the C18th. Weather boarding was often used as the cladding for farm buildings from the C17th. Welsh Slate became widely available from the 1850s following the construction of the railways.

Churches north and west of the Great Ouse typically employ Flint, Quaternary Pebbles and Cobbles, and Lincolnshire Limestone in their construction, many have stone spires or towers. Fine examples occur at Alconbury (the C13th Church of St. Peter and St. Paul) and Great Stukeley (the C15th Church of St. Bartholomew). Much use was made of Lincolnshire Limestone from Barnack and imported varieties from Northamptonshire, in addition to Collyweston Stone-slate for roofing. Imported varieties of Lincolnshire Limestone were also employed in some C18th grand houses such as Kimbolton Castle which is ashlar-faced in Weldon and Ketton stones.

The Bell Inn, Stilton dates from 1642 and is constructed of Lincolnshire Limestone with Collyweston Stone-slate roof.
In Peterborough, much use of Lincolnshire Limestone (including limestone from Barnack) was made in prestigious buildings dating from the Medieval period to the C20th. Many examples can be seen in Priestgate and Peterborough Cathedral itself is largely built of Lincolnshire Limestone from Barnack.

The principal remains of Ramsey Abbey include the Lady Chapel (C13th), the gatehouse (C15th) and part of the precinct wall. They are built of Lincolnshire Limestone rubble including Barnack Stone. Stone from the Abbey was re-used in Cambridge colleges in the C16th; such stone was also re-used in the towers of Ramsey, Godmanchester and Holywell churches.

There are occasional examples of historic limestone buildings occurring in the western part of the area, such as at Stilton. Here the Bell Inn (1642) is built of coursed Lincolnshire Limestone rubble with Ketton Stone dressings and Collyweston Stone-slate roof.

Within and close to the valley of the Great Ouse many of the churches are built of Quaternary Pebbles and Cobbles, often with Chalk and other limestone, either coursed or as random blocks. Barnack Stone ashlar and dressings are common.

Woburn Sandstone bought from the Bedfordshire Greensand Ridge NCA was often employed in towers and spires. Good examples include the Churches of St. Mary at Eaton Socon (C14-15th) and St. Mary at St. Neots (C15th). Random knapped Flint rubble and pebbles was also used in some churches and school buildings such as at Eynesbury and in the C19th vicarage at St. Neots (C19th). Fine examples of C14-15th stone-built bridges (constructed of Lincolnshire Limestone including Barnack Stone ashlar) remain at Huntingdon and St. Ives.

South and east of the Great Ouse, west of Cambridge, Chalk was often used in ecclesiastical buildings. The Church of St. Andrew and St. Mary at Grantchester has a C14th chancel built of dressed Chalk ashlar with Chalk rubblestone and dressings. Chalk was also employed for the west end of St. Andrew’s Church Wimpole (1749). Chalk was occasionally used in the area for chimney sacks and fireplaces and for infill in timber-frame buildings. During the C18-19th, where Chalk was locally available, it was often used for cottages and extensions to larger houses.

Quaternary Flint was utilised in many churches, such as St. Mary’s Church at Ickleton (C11th), where there is an early use of Barnack Stone for dressings. Barnack Stone was also used for walling, for example, in St. Andrew’s Church at Histon (C13th). Quaternary Pebbles and Cobbles are widely employed including, for example, in the Church of St. Pandonia and St. John at Eltisley (C13th) and the Church of St. Michael at Toseland (C12th). The latter was rebuilt and extended using Norman masonry in 1873-97.
South of the Great Ouse the area north of Cambridge lies partially on an outcrop of Lower Greensand. The local, dark-brown coloured, pebbly Cottenham Sandstone (‘Pudding-stone’) was used in several churches in the area. In All Saints’ Church at Cottenham, the C15th nave contains blocks of Cottenham Sandstone, Upware Limestone and Lincolnshire Limestone with Quaternary Pebbles and Cobbles (mainly quartzite and chert pebbles); the lower stages of the C13th tower incorporates occasional ashlar and blockwork of Barnack Stone. The C12-15th Church of All Saints at Rampton is similarly constructed of a mixture of materials including irregular blocks of various Lincolnshire Limestones along with Upware Limestone, brownish quartzitic pebbles and scattered blocks of Cottenham Sandstone along with some bricks; the dressings are of Lincolnshire Limestone and chalk.

In the far south west part of the NCA, close to the Bedfordshire Greensand Ridge, Woburn sandstone was employed in several churches, such as St. Bartholemew’s Church at Great Gransden (C15th) and St. Mary’s Church at Longstowe (C19th with a C14-15th west tower) along with Lincolnshire Limestone rubble, Quaternary Pebbles and Cobbles. The dressings are typically of Chalk and Lincolnshire Limestone freestones.

Kesteven Uplands

The Kesteven Uplands NCA lies at the junction of Lincolnshire, Cambridgeshire, Northamptonshire, Leicestershire and Rutland although only a small area of Cambridgeshire, lying west of Peterborough along the County boundary with Lincolnshire, falls within the NCA.

The area includes the villages of Bainton, Etton, Helpston, Glinton and Maxey sited above the floodplain of the River Welland. Many buildings are constructed of Lincolnshire Limestone with Collyweston Stone-slate roofing and some thatch. Village walls are frequently built of limestone rubble. Brick was increasingly used from the C18th for houses and non-conformist chapels. Many of the villages have grown substantially in the C20th-21st and much new housing has employed limestone cladding.

The churches of the area share characteristics with those in Northamptonshire. The Church of St. Stephen at Etton (1220-1260) is one of the most complete Early English churches in the country. It has a stone broach spire in Northamptonshire style.
and is constructed of coursed Lincolnshire Limestone with lead and slate roofs. The Church of St. Benedicts at Glinton (C12-15th) also constructed of Lincolnshire Limestone, has one of finest C15th octagonal recessed needle spires in England.

Significant fortified medieval residences survive at Woodcroft Castle, south-east of Helpston, and at Northborough. At Woodcroft Castle (C13th), the limestone ashlar west side of the original building, the central gateway, the north round tower and moat survive. At Northborough Manor (c1330-40) only the hall and gatehouse of a large manor house remain.

Burghley House is one of the largest and grandest houses of the first Elizabethan Age, built by William Cecil, Lord High Treasurer to Queen Elizabeth I, between 1555 and 1587. It was constructed of oolitic Lincolnshire Limestone from Kings Cliffe, Northamptonshire and has Collyweston Stone-slate roofs.

The River Welland is crossed by a series of stone bridges constructed of various types of Lincolnshire Limestone. Examples of these include the three-arched bridges at Stamford (C19th) and Deeping Gate (1651), and the C17th bridge between Uffington and Barnack.

**Northamptonshire Vales**

Two small areas of this NCA occur in Cambridgeshire. The main area is essentially the valley of the River Nene and includes the villages of Elton, Stibbington, Water Newton, Sibson, Wansford, Ailsworth, Sutton and Castor. A very small area of the NCA east of Thrapston and Raunds in Northamptonshire also falls within Cambridgeshire including the villages of Keyston and Bythorn.

The River Nene has been used as a transport corridor for thousands of years. Large quantities of building stone from quarries upstream in Northamptonshire and from Barnack have been transported by this route since Roman times.

The use of various forms of Lincolnshire Limestone (and Collyweston Stone-slate or thatch for roofing) is characteristic of the area. In addition to dwellings ranging from cottages to stately homes, the limestone is used for village walls, bridges, agricultural buildings and water mills. The use of other building materials was rare until the C19th when brick started to be used in a range of buildings.

Wansford is the largest settlement within the area and has many buildings constructed of limestone. An example is provided by the C17th Haycock Inn constructed in coursed limestone rubble with freestone and ashlar dressings with Collyweston Stone-slate roofs and limestone ashlar ridge stacks. The 12-arch Wansford Bridge (1577) is built of Barnack Lincolnshire Limestone.

The C13th Church of All Saints at Elton (with the west tower, clerestory, south aisle and south porch added in c.1500) is mainly constructed of Lincolnshire Limestone from Kings Cliffe and Barnack; the west tower and south porch are of Ketton ashlar with dressings of Barnack and Ketton limestone.

In the southern area of the NCA the use of stone is far less common. Many of the buildings in Keystone and Bythorn were constructed of rendered timber-frame or brick with thatch or plain tile roofs. Occasional use of types of Lincolnshire
Limestone was made for houses, for example the C17th Stone House at Keystone is built of limestone rubble with a plain tiled roof. Stone was also used for outbuildings to C19th brick houses. The C13th churches of St. John the Baptist at Keystone and St. Lawrence at Bythorn both have C14th west towers with octagonal broach spires. They are mainly constructed of Weldon and Barnack Lincolnshire Limestones which have been employed as rubblestone and squared blocks and ashlar.

**Bedfordshire Greensand Ridge**

The Ridge is a narrow outcrop of Lower Cretaceous sandstone and ironstone that extends from Gamlingay in Cambridgeshire to Leighton Buzzard in Bedfordshire. In Cambridgeshire it forms a small area of high ground around Gamlingay.

Where present, Medieval period buildings were constructed of rendered timber-frame, but most of the other surviving historic buildings in the area date from the C16th century onwards. The use of brick became increasingly dominant from the C17th for a wide range of buildings (such as Gamlingay Almshouses constructed in 1665), for re-fronting timber framed buildings and for inserted chimney stacks. By the C19th, gault brick with Welsh Slate roofing tended to be the main choice of materials for the construction of farm buildings.

The NCA’s building stones, gravels and clays have long been exploited as mineral resources. Woburn Sandstone was quarried from at least the Medieval period. Its use was largely confined to the construction of high-status buildings such as parish churches and bridges, due to its high variation in quality and it’s susceptible to weathering and erosion. The extraction of this sandstone as a building material was often secondary to the quarrying of sand, gravel and ‘Fullers Earth’.

The Church of St. Mary in Gamlingay provides an attractive example of the use of local stone. It was extensively rebuilt in the C14-15th using Woburn Sandstone and Quaternary Pebbles and Cobbles with chalk and Lincolnshire Limestone dressings.
Rockingham Forest

Only the eastern part of this NCA is present in Cambridgeshire. It lies west of Peterborough on the northern side of the Nene Valley and extends from Wothorpe and Wittering (in the west) to the boundary of Peterborough City in the east. The villages of Sutton, Ailsworth, Castor, Thornhaugh, Wittering, Wothorpe, Barnack, Southorpe, Ufford, Marholm and Werrington are all located on the undulating limestone plateau that characterises this area.

The famous Lincolnshire Limestone quarries at Barnack were active from the Roman period until the C18th. Stone from these quarries was used for many fine ecclesiastical buildings (including Peterborough and Ely cathedrals). The stone was also transported by water to Cambridge and used in many buildings throughout East Anglia.

Many of the characteristic villages and buildings in this area are constructed from locally sourced Barnack stone; they also often employ roofs of Collyweston Stone-slate. Lincolnshire Limestone, including Barnack stone is extensively used in a wide range of farmhouses, village houses, cottages, agricultural and other buildings such as Village Farmhouse Dovecote, Castor (C18th), Barnack Windmill (late C18th), Barnack Watermill (C18th) and Castor Watermill (C19th). It is also used for field and garden boundaries, particularly in Barnack and Ufford.

The Church of St. Kyneburgha at Castor (C12th) is one of the most important Norman churches in the county. It has a Norman crossing tower, and Norman north and south transpets, nave and chancel. The Church of St. John the Baptist at Barnack has a C11th nave and tower, C13th south aisle and porch and early C14th chancel; it is built of the local limestone and has Collyweston Stone-slate roofs. The tower with its Saxon ‘long and short’ stone work and short spire, is one of the oldest towers in England.
Landed estates and their associated houses and parks are also a feature of the area. For example, Walcot Hall at Southorpe is a grand Carolean house (c. 1674-8), built of Lincolnshire Limestone ashlar with Collyweston Stone-slate roofs.

**Brecklands**

A very small part of the Brecklands NCA is found in the far east of Cambridgeshire to the east of Newmarket. Only the village of Kennett and part of Chippenham Parish including the hamlet of Badlingham fall within the area.

The Church of St. Nicholas, Kennett (C12th) is built of Quaternary Flint and pebble rubble with Lincolnshire Limestone dressings. Kennett School and School House (1865) are built of knapped flint with Gault brick quoins and red brick banding and decoration to the window arches, with a slate roof.

**Clay Bat, Chalk Cob and Cob**

Clay Bat buildings are mainly found in the East Anglian Chalk area to the south of the county, with occasional buildings also found in the south and east of the Bedfordshire and Cambridgeshire Claylands. Clay Bat is made from a mixture of clay, chalk and straw moulded into blocks and allowed to dry in the sun. The clay was dug in local pits, such as that at Little Shelford, from the Boulder Clay that overlies the Chalk. Clay Bat is the local name; the term ‘Clay Lump’ is commonly used for the same material in East Anglia.

Buildings were usually lime-rendered, although more prestigious buildings were occasionally stuccoed. Sometimes the buildings are fronted by brick elevations while the remaining walls are in Bat. Brick footings were often used. Clay Bat was largely used in the C18th and C19th in response to population growth particularly for outbuildings and smaller cottages. Villages such as Melbourn, Meldreth, Shepreth, Thriplow, Fulbourn (in the East Anglian Chalk NCA) and Cottenham and Bourn (in the Bedfordshire and Cambridgeshire Claylands NCA) possess smaller cottages and outbuildings constructed of Clay Bat; these date mainly from the late C18 - C19th.

Chalk Cob is a mixture of clay, chalk and straw that resembles Clay Bat, but the structures are made monolithically. Walls are built ‘wet’ by raising in stages when the bottom layer is dry enough to hold the next. It was used quite extensively during the Medieval period, and few Chalk Cob buildings and walls survive in the south of the county.

Cob is made from clay mixed with chopped straw and a little water which has been built up in lifts without formwork or support. The walls are built on a footing of either stone or brick. They are usually protected by copings of pantile, timber boarding or thatch. Such walls are typically 35-40 cm in width and between 1.5 metres to just over 2 metres in height.

Whittlesey lies 5 km to the east of Peterborough on the edge of the Fens (in the Fens NCA). It is one of the few places in Cambridgeshire where Cob walls (also called Mud walls) are found. Twenty-eight sections of historic mud walls are found around Whittlesey; they were constructed in the late C18th and mid C19th using the surface clays found around the town.
Stones in walls

Cambridgeshire’s built heritage displays a diverse range of stones and styles of usage in walls; representative images of the county’s indigenous building stones are provided on the following pages.

Roughly coursed, irregular blocks of Cornbrash from a cottage wall in Longthorpe, Peterborough

Mixed roughly squared and tabular, irregularly coursed blocks of Lincolnshire Limestone varieties, included Ketton and Barnack Stones, wall adjoining Ramsey Gatehouse

Blocks of Woburn Sandstone, Church of St. Mary the Virgin, Gamlingay

Coursed, tabular blocks of Wittering Pendle in front wall of 51, Priestgate, Peterborough

Irregular blocks of coarse-grained and pebbly Ely Sandstone in walls by The Bishop’s House, Minster Place, Ely
Sarsen Stone (25cm diameter) in wall of tabular Lincolnshire Limestone, Church of St. Mary, Swaffham Prior

Irregular blocks of dark, coarse-grained and pebbly Cottenham Sandstone, All Saints’ Church, Cottenham

Random Quarry Flint nodules (some knapped), Quaternary Flint nodules, squared blocks of Lincolnshire Limestone and brown quartzite and chert Pebbles and Cobbles, All Saints’ Church, Melbourn

Brown quartzite and chert Pebbles and Cobbles, with occasional irregular Quaternary Flint nodules and small lumps of Woburn Sandstone, All Saints’ Church, Gamlingay

Neatly coarsed blocks of Totternhoe Stone (Cambridgeshire Clunch) in the wall of All Saints’ Church, Barrington

Quaternary Flint pebbles in walls of the Church of St. Mary, Ashley
Middle Jurassic
Inferior Oolite Group

*Lincolnshire Limestone Formation*

**Lincolnshire Limestone**

The Lincolnshire Limestone Formation embraces a ‘suite’ of highly variable, pale grey to yellow-buff, commonly ooidal and bioclastic, limestones of Middle Jurassic age. Many varieties have previously been identified and named as distinct building stones, their names usually being based on their historical source locations.

A comprehensive survey and analysis of the ‘suite’ of Lincolnshire Limestones and the variation they display in their source areas is unfortunately beyond the scope of this atlas. Therefore, for reasons of maintaining consistency with historical records, previous published literature and building stone names employed in other atlases within this series, some of the ‘traditional’ stone names have been retained here. However, it should be appreciated that unambiguous identification and discrimination of many Lincolnshire Limestone varieties is often not possible, especially when blocks are seen in isolation (and potentially intermixed) at some distance from their source(s).

The new name ‘Rockingham Forest Lincolnshire Limestone’ is introduced here for imported varieties of Lincolnshire Limestone which have been employed in Cambridgeshire. This conveniently embraces several formerly-named varieties of Lincolnshire Limestone - such as Weldon Stone, Stanion Stone and Kings Cliffe Stone - which even in their ‘type areas’ clearly exhibit heterogeneity (reflecting bed-by-bed variation in their source quarries). As such Weldon Stone, Stanion Stone and Kings Cliffe Stone should be regarded as intergradational in terms of their composition, texture and appearance.

In individual buildings, a general distinction can often (and relatively reliably) be made between the homogeneous, fine-grained, calcilutitic, tabular limestones that occur in the Lower Lincolnshire Limestone Member and the more varied, coarser-grained, calcarenitic (often ooidal or bioclastic), massive or cross-bedded limestones that form the bulk of the Upper Lincolnshire Limestone Member. This basic distinction between ‘Upper’ and ‘Lower’ varieties of Lincolnshire Limestone is followed in this atlas with respect to the indigenous Lincolnshire Limestone, and we have retained Barnack Stone and Wittering Pendle as distinguishable varieties. However, we are employing the name Barnack Stone in a very broad sense and even when applied to stone used in buildings in Barnack village (and presumably sourced from local Barnack quarries), it encompasses a continuum of limestone lithologies that elsewhere might be (erroneously) named Ketton Stone, Kings Cliffe Stone or Weldon Stone, for example.

**Indigenous building stones**

Ely Cathedral built from 1063, primarily in Barnack Stone
Lincolnshire Limestone Formation (Lower Lincolnshire Limestone Member)

Lower Lincolnshire Limestone

The Lower Lincolnshire Limestone Member comprises pale grey, buff to mustard-yellow, fine-grained, calcilutitic limestones. Some beds may be sandy and/or contain dispersed ooids and bioclasts, but these do not usually display the conspicuously ooidal and/or bioclastic textures that are characteristic of limestones from the Upper Lincolnshire Limestone Member. Limestones from the Lower Lincolnshire Limestone Member are typically thinly-bedded and tabular compared to those of the Upper Lincolnshire Limestone Member.

Wittering Pendle (Wittering Pendle Flagstone)

Wittering Pendle is a fine-grained, thinly-bedded, golden-yellow to buff-yellow coloured sandy limestone. It is very hard and crystalline compact and sparsely fossiliferous. It is similar to Collyweston Stone-slate (see page 33) but is less fissile.

The source quarries at Wittering were shallow and had been filled-in and ploughed over by the end of the C19th. Historically, the limestone was excavated in large irregular slabs which ranged in thickness from 2 to 5cm; it was sufficiently hard and impermeable to have been utilised as flooring in stables, cottages and back-kitchens. It has a restricted area of usage to the west of Peterborough and is seldom encountered as an external building stone; the best examples of this latter use are found in the Priestgate and Cathedral Square (Cumbergate) areas of Peterborough (see page 18).

Lincolnshire Limestone Formation (Upper Lincolnshire Limestone Member)

Upper Lincolnshire Limestone

The Upper Lincolnshire Limestone Member comprises pale grey, buff to pale-yellow, medium to coarse-grained, calcarenitic
limestones. These are often distinctly ooidal and/or bioclastic and they can be massive or cross-bedded. Weathered surfaces often, but not always, take on a paler colour. Most of the Lincolnshire Limestone ‘freestones’ originate from the Upper Lincolnshire Limestone Member.

Barnack Stone (Barnack Stone, Barnack Rag)

Barnack Stone is a hard, pale buff coloured, coarse-grained, ooidal and bioclastic (shelly) limestone cemented with sparry calcite. The stone usually displays cross-bedding and differential weathering of the cross sets imparts a ‘rough’ appearance and feel to exposed surfaces.

Barnack Stone is one of the most important and widely used building stones in Cambridgeshire. It has been extensively employed in many prestigious and ecclesiastical buildings throughout the county and has been used for rubblestone walling, window and door dressings and high quality ashlar. The presence of Barnack Stone is a characteristics feature of many older churches in the county, although the best quality stone occurring in the original quarries at Barnack had already been exhausted by 1460. Thereafter, Barnack Stone was either reused from pre-existing buildings or alternative varieties of Lincolnshire Limestone were sourced and employed.

Great Oolite Group

Blisworth Limestone Formation

Alwalton Marble

Alwalton Marble is a very distinctive pale grey to orangish or brownish coloured limestone which is packed with the fossil remains of thick-shelled oysters and other bivalves. It was

The late C15th Gatehouse to Ramsey Abbey is constructed from a range of Lincolnshire Limestones, mainly varieties sourced from the Upper Lincolnshire Limestone Member, including Barnack Stone

The Impressive C13-C14th West Front of Peterborough Cathedral was completed in 1237 and was constructed mainly from locally sourced Barnack Stone

Pillars of Alwalton Marble in a doorway in the C13th West Face of Peterborough Cathedral
quarried along the Alwalton Lynch escarpment adjacent to the River Nene (near Peterborough) during the C12th and C13th. Its main use was as a polished limestone (‘marble’) for interior decorations in large prestigious houses, churches and cathedrals, including Peterborough and Ely cathedrals. Occasionally, it was used externally, such as for the shafts of the C13th doorway in the West Face of Peterborough Cathedral.

**Cornbrash Formation**

**Cornbrash**

The Cornbrash Formation comprises mainly thinly to poorly bedded bioclastic limestones which are generally pale grey when fresh but quickly weather to a buff-brown or yellowish colour. Many beds are sandy and some exhibit a distinctly laminar fabric. Some beds were evidently richly fossiliferous, and individual blocks of this stone can be packed with thick-shelled bivalve and brachiopod fossils.

Use of Cornbrash as a building stone is mainly confined to the north-west corner of Cambridgeshire, including Peterborough. It readily lends itself to being roughly dressed into thin tabular blocks. Examples of its use (in association with Barnack Stone and other Lincolnshire Limestones) can be seen in several villages located on or close to its outcrop, such as Upton and Helpston. Particularly fine examples of the use of Cornbrash limestone can be seen in the Priestgate and Longthorpe areas of Peterborough, including Longthorpe Tower and nearby cottages along Thorpe Road.
Upper Jurassic
Ancholme Group
West Walton Formation
(Upware Limestone Member)

**Upware Limestone**

Upware Limestone is a medium-to coarse-grained, light grey to buff coloured, calcareous sandstone or sandy limestone which is occasionally ooidal or contains fossil molluscs, echinoids and corals. It weathers to a dull yellow-brown or yellow-orange colour due to the presence of a ferruginous (iron-bearing) calcite cement.

Upware Limestone has a rather limited and localised use as a building stone in Cambridgeshire which is mainly restricted to the area between Little Thetford, Barway, Upware and Stretham. Here, it is employed as an occasional rubblestone, the best examples of which can be seen in church walls at Little Thetford (St. George) and Stretham (St. James).
Lower Cretaceous
Lower Greensand Group

Woburn Sands Formation

Woburn Sandstone (Ironstone, Sandrock, Ragstone, Carstone, Carrstone, Fenstone)

Woburn Sandstone is a fine-to medium-grained, ferruginous sandstone. It has a very distinctive, dark purplish-brown to deep orange-brown or dark buff colour, which typically becomes greenish-grey upon weathering. Darker patches of iron oxide staining, often forming intricate banded patterns (Liesegang bands), are commonly developed in individual blocks. Fossils are scarce and mainly represented by non-marine bivalves and gastropods – they are usually preserved as internal moulds (voids) within the rock.

Woburn Sandstone is easily recognisable even from a distance. It has seen use all along its outcrop in central Cambridge, which extends north eastwards from Gamlingay to Ely.

Particularly good examples of its use are provided by the churches at Gamlingay (St. Mary the Virgin), Great Gransden (St. Bartholomew) and Longstowe (St. Mary). It usually takes the form of roughly dressed, tabular blocks in walls, and is variously coursed.

Ely Sandstone

Ely Sandstone is the new name adopted herein for distinctive yellow-buff coloured sandstones commonly employed as building stones in walls around Ely, but especially in the vicinity of the Cathedral and along Minster Place. The sandstones are porous and coarse-grained; many blocks contain small, 2-4mm sized, sub-angular quartz clasts, and some are conglomeratic and contain sub-angular to sub-rounded clasts of whitish, yellow, brown or dark grey quartzite and dark brown-blackish phosphatic nodules. Apart from faint cross-lamination in some blocks, the sandstones are structureless and lack fossils. They are relatively soft and readily spall upon weathering, although the harder clasts stand proud of the rock surface in the coarser-grained pebbly blocks.

The attractive C14 - C15th Church of St. Mary the Virgin at Gamlingay is built mainly of coursed blocks of Woburn Sandstone, with some Quaternary Pebbles and Cobbles and dressings of Chalk and Lincolnshire Limestone.
The sandstones are thought to originate from within the Woburn Sands Formation, and appear to be restricted to the Ely area of Cambridgeshire. In Ely itself, the stone is typically used for walling, with individual blocks being employed in a rough, undressed form as general rubblestone. Particularly good examples of its use occur in walls along the Minster Place, especially near The Bishop’s House and eastwards towards Walpole’s Gate.

**Cottenham Sandstone (‘Puddingstone’)**

Cottenham Sandstone is the new name assigned to a very distinctive dark brown, ochreous, pebbly sandstone which typically takes on mottled appearance with patches of black iron-rich staining upon weathering. Lithologically, the stone exists as either a coarse-grained sandstone or conglomerate. The clasts within the conglomeratic blocks are sub-angular to elliptical and largely composed of pale buff coloured sandstone; pieces of greyish quartzite are also commonly seen. The stone is devoid of fossils; some blocks display an alignment of the elliptical clasts, whereas in others the fabric is random.

Cottenham Sandstone has a very limited occurrence in Cambridgeshire and appears to be restricted to the area north of Cambridge around Cottenham and Rampton. It has been employed sparingly as isolated blocks or clusters of blocks in walls in several local church walls, the best examples being at Cottenham (Church of All Saints) and Rampton (also Church of All Saints).

Walpole’s Gate or Ely Porta, the late C14th gateway to the former Ely Monastery (now King’s School) in Ely, is constructed mainly of blocks of Ely Sandstone and varieties of Lincolnshire Limestone.

The much restored C12th Church of All Saints, Rampton is built of locally sourced Pebbles and Cobbles (‘Field Stone’) and blocks of Cottenham Sandstone, along with Chalk and Lincolnshire Limestone rubblestone. The dressings are mainly of Barnack Stone and Chalk.
Upper Cretaceous
Chalk Group – Grey Chalk Subgroup
Zig Zag Chalk Formation
(Totternhoe Stone Member)

Totternhoe Stone (Burwell Rock, Burwell Stone, Cambridgeshire Clunch)

The Totternhoe Stone Member is at most a few metres thick in Cambridgeshire (although the base and top of the unit locally grade into the associated chalk deposits, thus making the boundaries difficult to recognise). The unit reaches its full thickness of nearly 7m in the Swaffham Prior area. Totternhoe Stone is a distinctly harder unit of chalk within the Grey Chalk Subgroup and typically comprises, creamy to pale brownish-grey, chalky calcarenites. It often appears sandy due to the presence of coarse fossil fragments. The lower beds (known as ‘brassil’ to the quarryworkers) may contain small pinkish brown (though green-coated) phosphatic nodules; the upper beds (locally known as ‘bond’ rock) comprise a pale brown, gritty chalk devoid of nodules. The nodule-free chalk of the upper beds has been extensively used for building.

Totternhoe Stone has been employed as a building stone wherever it occurs in Cambridgeshire. Particularly fine examples of its use can be seen in the villages of Burwell, Barrington, Fordham and Isleham.

Chalk Group - White Chalk Subgroup
Chalk (Chalk Block, Clunch)

The white chalky limestones of the Upper Cretaceous White Chalk Subgroup are amongst the most distinctive and easily recognised building stones employed in Cambridgeshire. They are white to very pale grey or pale buff, typically structureless limestones, which in places contain fossil oysters (inoceramids) and echinoids, and occasionally crinoids, brachiopods and belemnites. Chalk is generally unsuitable for exterior masonry as repeated wetting and drying (coupled with frost action), causes the relatively soft rock to powder and disintegrate into small angular brash. Softer forms of the stone, when used externally, may show concave weathering away from mortar lines.

Cambridgeshire has a long history of quarrying and mining for Chalk and Flint, and there are a considerable number of mediæval to C19th quarries in the county. The mining of chalk was particularly common from the C18th to the C20th, usually for agricultural lime and lime mortar and for use in the production of bricks. The harder varieties were also employed as building stone.

In south and east Cambridgeshire, Chalk is typically used as a rough walling stone (often accompanying other stone types, especially various forms of Flint and Quaternary Pebbles and Cobbles) or for decorative purposes including window or doorway dressings (for example, the Norman-style doorway of St. Michael’s Church, Toseland). A particularly attractive example of the use of Chalk and Totternhoe Stone blockwork is provided by the Church of All Saints, Barrington.
Melbourn Rock

Melbourn Rock is a hard variety of chalk which is off-white to buff in colour and exhibits a blocky, fractured texture. Thin, anastomosing, marl bands are often present. The Melbourn Rock Member ranges in thickness from about 3m in the Chiltern Hills area to between 2 and 7m thick around Hitchin. It can be difficult to distinguish from other Chalk Block when employed as a building stone, but its use is seemingly fairly limited in Cambridgeshire. It features in All Saints Church, Melbourn, for example.

Quarry Flint (Fresh Flint)

Quarry Flint occurs as bands or isolated nodules within the chalky limestone beds of the White Chalk Subgroup. It is an extremely fine-grained (cryptocrystalline) and hard form of silica containing microscopic, quartz-crystal aggregates. Quarry Flint usually occurs as irregularly-shaped nodules that are 10-20 cm across, or as (sub-)rounded pebbles or cobbles; occasionally, it is also found as weakly banded tabular sheets or layers up to 20 cm thick. The colour is very distinctive; fresh nodules have a white outer cortex with a black or dark grey interior.

Quarry Flint breaks with a characteristic conchoidal fracture, producing razor-sharp, fine edges; the cleaved surfaces may exhibit banding resulting from the alternation of layers of slightly different composition. Flint nodules may contain cavities lined with translucent botryoidal chalcedony or small transparent quartz crystals. Some nodules contain well preserved fossils, with echinoids, sponges, bivalves, burrow-structures and occasionally belemnites being encountered.

Quarry Flint is used occasionally in Cambridgeshire, often in association with Quaternary Flint. It was employed in a variety of ways, including as knapped, faced, trimmed or ‘cleaved-faced’ stone and sometimes in squared chequerwork. Examples of it’s use can be seen in the village of Woodditton and Melbourn.
Quaternary Flint (Field Flint, Brown Field Flint, Clay-with-Flints)

Quaternary Flint typically occurs as irregularly-shaped nodules which are found lying on the surfaces of fields or within deposits of ‘Clay-with-Flints’, or as pebbles within fluvioglacial sands and gravels. The size of the nodules typically ranges from 10-30 cm. The colour is variable; less weathered flint nodules or pebbles have a cream outer cortex with darker coloured (greyish) interior; weathered flints, in contrast, or those that have lain in soil or superficial deposits for a long period of time, may be variously discoloured or bleached, and often have brown stained interiors due to the precipitation of iron hydroxides from percolating ferruginous waters. This ‘weathered’ appearance helps distinguish Field Flint from the much ‘fresher-looking’ Quarry Flint.

A combination of its hardness, durability and resistance to weathering has resulted in Quaternary Flint being much used as a building stone wherever it is encountered in Cambridgeshire. Many walls and buildings throughout the county employ Quaternary Flint in one form or another, and the stone has been used extensively in many towns and villages.

As a walling stone in Cambridgeshire, Quaternary Flint was mainly employed as nodules or pebbles laid randomly or roughly to course, but occasionally as knapped, faced, trimmed or cleaved faced stone in random or decorative arrangements. The stone can be seen in many churches and walls in towns and villages, especially in the southern half of the county. Particularly fine examples of its use can be seen in the village of Ashley, the C19th Parish Church of St. Mary is built mainly of Quaternary Flint nodules with elaborate Bath Stone dressings.

Sarsen Stone

Cambridgeshire Sarsen Stones occur as rounded or elongate cobbles or boulders of up to 60cm in length. They are grey to pale brown in colour, becoming creamy-buff on weathered surfaces; they possess a very fine-grained saccharoidal (‘sugary’) texture comprising sub-rounded quartz grains set within a silica matrix which is visible on fractured surfaces. Sarsen Stones are very hard and resistant to weathering. Their surfaces are often smooth and may occasionally show poorly-defined bedding structures.

Sarsen Stones are seldom encountered in Cambridgeshire, but isolated examples can be seen in the walls of St. Mary’s Church, Swaffham Prior and as footings at St. Michael’s Church, Toseland.

The C12th Church of St. Mary in Swaffham Prior is constructed mainly of Chalk, Lincolnshire Limestone and Quaternary Pebbles and Cobbles, with occasional blocks of Sarsen Stone
Pebbles and Cobbles (Field Stone)

Accumulations of Quaternary-aged fluvioglacial deposits in Cambridgeshire encompass a diverse range of poorly sorted, relatively soft and unconsolidated sediments. These vary in composition, but sometimes contain harder pebbles and cobbles which mainly comprise various forms of weathered, grey-coloured flint along with orange-brown to brown coloured chert and quartzite. The latter are typically encountered in walls as hard, well-rounded, ovoid pebbles that may have been derived from the Triassic Chester Formation of the West and East Midlands. Pebbles and cobbles of other compositions also occur and include various sandstones and limestones (some Jurassic), Lower Cretaceous ironstone (‘Carstone’), together with occasional metamorphic, igneous and volcanic rocks including basalt, rhyolite and tuff.

Cambridgeshire’s fluvioglacial deposits were formerly exploited for construction materials on mainly a local scale and the harder Pebbles and Cobbles yielded as a by-product of this activity served as a convenient source of stone for nearby buildings.

The use of pebbles and cobbles in buildings in Cambridgeshire (especially church walls) is quite widespread. Particularly good examples can be seen in churches at Fulbourn (St. Vigor), Gamlingay (St. Mary), Great Gransden (St. Bartholomew), Isleham (St. Andrew), Melbourn (All Saints), Orwell (St. Andrew), Toseland (St. Michael) and Trumpington (St. Mary & St. Michael).
Imported building stones

Although the Middle Jurassic to Upper Cretaceous bedrock succession of Cambridgeshire has yielded a variety of indigenous building stones, ready supplies of good quality building stone are limited in some areas and extensive use has therefore been made of stones imported into the county from other parts of England.

A summary of the main imported building stone types which have seen use in the county follows below. Additional descriptions of imported stones relevant to Cambridgeshire can be found in the references listed in the Further Reading section of this Atlas and in the Strategic Stone Study atlases covering the source areas of these various stones. A section dedicated to the building stones of Cambridge colleges is also provided below and further examples of the use of imported stones are provided in the 'use of stone in Cambridgeshire’s buildings' section of this Atlas.

Sedimentary stone types

Naylor Hill Gritstone
West Yorkshire

‘Upper’ Carboniferous
Millstone Grit Group

A hard, medium- to coarse-grained sandstone, sometimes pebbly and feldspathic, with a distinctive granular appearance (arising from sugar-like, grey quartz grains) and occasional small flakes of white mica. It exists in various colours, ranging from pale grey to a buff or pale brown colour (particularly when weathered). Patches and bands of orangish iron oxide staining (expressions of Liesegang banding) are commonly developed. It is a very durable stone, with good abrasion resistance and is consequently employed mainly for flooring and paving.

Iron-stained and banded paving slabs of Naylor Hill Gritstone adjacent to the early C15th Church of St John the Baptist in Cathedral Square, Peterborough

York Stone (general sense)
West/South Yorkshire

‘Upper’ Carboniferous
Elland Flags, Pennine Coal Measures Group

Buff to pale grey or greenish grey, typically fine-grained sandstones, which are often micaceous and laminated, but occasionally show small-scale cross-bedding features. Usually weathers evenly but may separate along mica-rich horizons. Little used as a building stone in Cambridgeshire, being employed mainly as flagstones, paving stones or as plinths.

Grey-buff York Stone paving stones alongside Garrett Hostel Bridge, Cambridge
Magnesian Limestone  
*North Yorkshire*  
**Permian**  
Cadeby Formation, Zechstein Group  
Grey-buff to pale yellow-white, fine- to medium-grained, crystalline dolostone, commonly displaying vestiges of an ooidal and bioclastic fabric. It was most impressively used in the construction of Kings College Chapel, Cambridge, which features the world’s largest fan-vaulted ceiling.

*Magnesian Limestone from Tadcaster in Yorkshire was used extensively in the construction of King’s College Chapel, Cambridge which began in 1446 (viewed here from The Backs)*

Mansfield Stone (White Mansfield Stone)  
*Nottinghamshire*  
**Permian**  
Cadeby Formation, Zechstein Group  
A distinctive, often uniform, buff-white, sandy dolostone or dolomitic sandstone. Thin seams of pale green clay are present in some blocks. It is employed very occasionally in Cambridgeshire as a facing and decorative stone. One of the best examples of its use is provided by the HSBC Bank in Wisbech.

*The HSBC Bank in Corn Hill, Wisbech was built in 1921 in a Neo-Classical style using White Mansfield Stone*

Hollington Stone (White Hollington Stone)  
*Staffordshire*  
**Triassic**  
Helsby Sandstone Formation, Sherwood Sandstone Group  
The pale-yellow or creamy-buff coloured variety of the normally pale-red or red-brown, fine- to medium-grained sandstone. It characteristically displays expressions of cross-bedding – these features are observed in many blocks seen in buildings. Employed only occasionally in Cambridgeshire; an example of its use is provided by the columns in the Town Hall, Peterborough (1928).

*The front columns of the Town Hall in Peterborough (1928) are built of White Hollington Stone from Staffordshire*
Ham Stone (Ham Hill Stone)
Montacute, Somerset

Lower Jurassic
Bridport Sand Formation (‘Ham Hill Member’), Lias Group

A coarse-grained shelly limestone which is readily sawn and dressed. When freshly cut the stone has a light golden yellowish-brown colour which darkens with age and weathering. The latter picks out the weaker, less well cemented seams and cross-bedding features which are characteristic of this sandy limestone. Relatively little employed in Cambridgeshire – the best examples of its use are provided by the Masters Lodge, Trinity Hall and dressings on Westcott House, Theological College in Cambridge.

The C19th renovation works at the Masters Lodge, Trinity Hall, Cambridge by A Salvin included the use of Ham Stone

Doulting Stone
Somerset

Middle Jurassic
Inferior Oolite Group

A cream-coloured, cross-bedded fossiliferous limestone with a uniform, coarse ‘sugary’ texture formed by abundant crinoid debris set in a matrix of calcite. Rarely used in Cambridgeshire – the best example is provided by the New Court, Pembroke College, Cambridge.

New Court at Pembroke College, Cambridge, constructed in 1883 from Doulting Stone by G.G. Scott (junior)

Collyweston Stone-slate (Collyweston Slate)
Northamptonshire

Middle Jurassic
Lincolnshire Limestone Formation (Lower Lincolnshire Limestone Member), Inferior Oolite Group

Collyweston Slate originates from a cross-bedded, sandy limestone horizon (ranging from a few centimetres to nearly a metre in thickness) within the Lower Lincolnshire Limestone Member. The slates are worked by splitting along the cross sets, which are defined by enrichments of mica flakes and shell fragments.

Although the renowned source area of Collyweston Stone-slate is around Duddington, Collyweston and Easton in north Northamptonshire (and much of the stone used in Cambridgeshire likely originated from underground workings in this area), there is some evidence that Collyweston Slate may also have been obtained as a ‘by-product’ at old Ironstone and Wittering Pendle quarries at Burghley Park and Wittering, respectively.

The Bell Inn, Stilton was constructed in 1642 using Lincolnshire Limestone; it has a Collyweston Stone-slate roof
The name ‘Rockingham Forest Lincolnshire Limestone’ is introduced here as a general term that applies to a variable ‘suite’ of Lincolnshire Limestones imported into and used widely in Cambridgeshire. The new name encompasses several named varieties of Lincolnshire Limestone (including Weldon Stone, Kings Cliffe Stone, Stanion Stone and Casterton Stone) which cannot reliably be distinguished for a number of reasons. The rationale for this approach is explained further under the ‘Lincolnshire Limestone Formation’ entry in the Indigenous Stones section of this Atlas. Ketton Stone, Clipsham Stone and Ancaster Stone are provisionally retained as distinct, named varieties of Lincolnshire Limestone (and are described separately below) on account of the features they typically and ‘consistently’ exhibit when seen as isolated blocks in buildings. However, further analysis may demonstrate that their distinction also cannot be justified.

Rockingham Forest Lincolnshire Limestone incorporates a continuum of pale cream to pale grey coloured limestones, which weather to shades of buff-yellow; textures may be ooidal and/or bioclastic. The stone may or may not display cross-bedding features, and it is variably porous. Rockingham Forest Lincolnshire Limestone has been very widely and commonly employed throughout Cambridgeshire and is suitable for a wide range of uses, including ashlar and decorative work.

*The impressive Elizabethan Burghley House (1555 - 1587) is constructed of Rockingham Forest Lincolnshire Limestone sourced mainly from Kings Cliffe in Northamptonshire (‘Kings Cliffe Stone’)*

**Ketton Stone**  
*Northamptonshire*

Middle Jurassic  
Lincolnshire Limestone Formation (Upper Lincolnshire Limestone Member), Inferior Oolite Group

Ketton Stone is a porous, cream to pale yellow coloured (occasionally pale pink-stained) ooid-rich limestone with a well sorted texture. It lends itself to being quarried in large blocks and is regarded as a high-quality freestone. It has been described as the “perfect oolite” because of its uniform texture.

Widely employed throughout Cambridgeshire, one of its best known and documented uses is in the Wren Library at Trinity College, Cambridge (designed by Sir Christopher Wren in 1676 and completed in 1695).

*The Wren Library at Trinity College, Cambridge, built of Ketton Stone*
Clipsham Stone
Clipsham, Rutland / Lincolnshire

Middle Jurassic
Lincolnshire Limestone Formation (Upper Lincolnshire Limestone Member), Inferior Oolite Group

A rather poorly sorted, medium- to coarse-grained, ooidal, peloidal and bioclastic limestone. It is usually pale cream or greyish buff in colour but features sporadic blue patches. A high-quality relatively fine-grained silver-white coloured variety is used for internal features such as fireplaces. ‘Blue-hearted’ blocks weather over time to the more typical greyish buff colour. Occasionally encountered in Cambridgeshire, Clipsham Stone was used in the dressings of churches and other ecclesiastical and civic buildings. It was widely used as a substitute for Barnack Stone when repairing older buildings.

The front walls of Peterborough Museum (built in 1861) are constructed of shelly Clipsham Stone ashlar, quarried from Clipsham, near Stamford

Ancaster Stone
Ancaster, Lincolnshire

Middle Jurassic
Lincolnshire Limestone Formation (Upper Lincolnshire Limestone Member), Inferior Oolite Group

A medium- to coarse-grained, creamy-white to pale yellow coloured (though rather ochreous in places) ooidal and bioclastic limestone. Weathered surfaces commonly display a distinctive ‘streaky bacon-like’ patterning. In Cambridgeshire, Ancaster Stone, along with other imported Inferior Oolite limestones, tends to have been used in the construction of prestigious buildings, especially in the construction of colleges, or for the dressings of churches or chapels.

The buildings around the First and Second Courts of St. John’s College, Cambridge are constructed of a mixture of stones including Clipsham Stone and Ancaster Stone

Bath Stone
Bath, NE Somerset and possibly Corsham area, Wiltshire

Middle Jurassic
Chalfield Oolite Formation, Great Oolite Group

A creamy-white to buff-yellow, ooidal limestone (freestone). Used occasionally in Cambridgeshire and typically encountered in association with Victorian new-build and church refurbishment schemes, especially as ashlar and window and door mouldings. A particularly noteworthy example of its use as ashlar is the Church of St. Mary and St. Nicholas, Trumpington, near Cambridge, which dates from the C14th. Its window mouldings were replaced and the building largely re-clad in Bath Stone by Butterworth in 1858 and 1876-7.

The Church of St. Mary & St. Nicholas, Trumpington largely re-clad in the C19th with Bath Stone ashlar
Portland Stone
(including Whitbed and Roach varieties)
Isle of Portland, Dorset

Upper Jurassic
Portland Stone Formation, Portland Group

A near-white or very pale coloured limestone that (in its ‘Basebed’ guise at least) is typically a fine- and even-grained freestone. It has seen widespread use across Cambridgeshire, especially in urban areas in carved form. It has been used for milestones, obelisks, monuments, war memorials, gravestones, fountains and columns. Portland Stone is also employed as a high-quality walling stone for ashlar and cladding panels, notably in several university buildings and administrative centres in Cambridge.

*The Cripps Building, St. John’s College, Cambridge was built in 1967 using cladding of a variety of Portland Stone that contains many shells and voids (Portland Roach)*

Purbeck Stone
Dorset

Lower Cretaceous
Purbeck Group

A dark grey-green, shelly limestone, often containing pale coloured sections of fossil gastropods and oysters. It has been used mainly internally for ornamental work, but has seen occasional use externally as flagstone and walling stone.

*Purbeck Stone paving slabs in the First and Second Courts of St. John’s College, Cambridge*

Small Carr (Block Carr)
West Norfolk

Lower Cretaceous
Woburn Sands Formation, Lower Greensand Group

A hard, fine- to coarse-grained ferruginous sandstone, varying in colour from very dark purplish-brown to yellowish-brown (which is sometimes evident in a single building). Typically it is employed in a tabular form, with individual blocks varying from 2 to 5 cm in thickness, but occasionally reaching 10 cm. It is used to a limited extent in eastern Cambridgeshire, mainly around March and Ely. It is highly distinctive and easily recognised wherever employed.

*C19th cottage in Cambridge Road, Ely, built of Small Carr imported from west Norfolk*
Big Carr (Snettisham Carr)
*West Norfolk*

Lower Cretaceous
Woburn Sands Formation, Lower Greensand Group

A rich orange, dull orange or yellowish brown, medium- to coarse-grained ferruginous sandstone, commonly featuring irregular veins and joint-coatings of brownish-black iron oxide. It is typically seen as tabular blocks (thicker than Small Carr) and set in regular courses (for example St. Peter’s Church, Wimblington) or used in randomised fashion (for example, Methodist Chapel, St. Ives). Like Small Carr, Big Carr has a restricted distribution of use in Cambridgeshire, being mainly confined to C19th buildings located in eastern parts of the county.

*The Church of St. Peter, Wimblington, built in 1874 of coursed Lincolnshire Limestone rubble with bands of Big Carr*

---

Igneous stone types

**Cornish Granite**
*Cornwall*

Late Carboniferous to early Permian

A light coloured, usually pale grey, granite with a ‘mottled’ appearance caused by the intergrowth of grey quartz and white feldspar crystals (phenocrysts); small amounts of darker iron-magnesian minerals scattered throughout the rock. Occasional larger feldspar crystals are also present but they are fewer and less obviously aligned than as in Devon Granite (described below). It is usually seen dressed and polished and employed as a facing stone or ornamental stone on buildings including banks, offices etc.

*Polished facings of Cornish Granite on the front of HSBC Bank, Cathedral Square, Peterborough*

**Dartmoor Granite (Blackstone Granite)**
*Devon*

Late Carboniferous to early Permian
Dartmoor Intrusion

A coarse-grained igneous rock comprising an interlocking network of grey coloured quartz crystals with (often larger) white coloured feldspar crystals and small amounts of darker iron-magnesian minerals. Small ‘speckly’ flakes of mica are also present. The large white feldspar crystals (phenocrysts) are sometimes preferentially aligned and may display good crystal shapes. Dartmoor Granite is a very hard-wearing, durable stone which is usually employed in Cambridgeshire for paving setts, kerb stones and occasionally memorial stones.

*The War Memorial in Elton churchyard is constructed of Dartmoor Granite which displays large, flow-aligned crystals of white feldspar*
Granodiorites and Diorites
Various sources including Leicestershire

Neoproterozoic and Palaeozoic
Various including South Charnwood Diorites

Variously coloured, medium- to coarse-grained igneous rocks comprising a network of interlocking crystals of quartz (typically pale grey coloured) and feldspar (often white or pink-red coloured) with varying amounts of ferromagnesian minerals (black or dark green coloured). A range of granodiorites and diorites from various sources are employed in Cambridgeshire for different purposes including ornamental stonework but they are durable and hard wearing and thus often used for paving setts or kerb stones.

Top: A granodiorite kerbstone in Priestgate, Peterborough
Bottom: A diorite paving sett in the Cathedral Precinct, Peterborough

Metamorphic stone types

Roofing slates

Several different types of metamorphic slate are known to have been imported into and used in Cambridgeshire for roofing purposes. Welsh Slate, for example, was commonly employed in many of the county’s villages, towns and cities; good examples of its use can be seen in Cambridge city centre and along Wentworth Street in Peterborough. Other types of metamorphic roofing slate used in Cambridgeshire include Westmorland Slate.

The White Horse, Stretchworth was rebuilt for the Earl of Ellesmere by C. F. A. Voysey in 1905 in his characteristic style with white rendered walls, Bath Stone dressings and a Westmorland Slate roof. It ceased to be a public house in the 1930s.
Supplies of good quality building stone have always been limited around Cambridge. The university colleges have thus relied on imported stone and, from the early C14th, local brick. There is a wealth of documentary evidence concerning the source of the materials that were used in Cambridge colleges.

The first college, St Peter’s or ‘Peterhouse’, was founded in 1280 by Hugh Balsham, Bishop of Ely. Its first building, the Hall, was constructed in 1286. Over the next 100 years ten colleges followed. Most large college buildings were built mainly of brick until the Classical Revival of the C17th and C18th.

Chalk was available from several sites within a 10-mile radius of Cambridge. It was used extensively in the C14-15th. Chalk was brought by water from Burwell and Reach on the fen edge and overland (and possibly by river) from quarries to the west, such as Barrington, Eversden and Haslingfield. Chalk was mainly used as roughly coursed rubblestone. However, as it weathers quickly, external walls were often faced (and later re-faced) with brick or imported stone, or rendered. During the C14th, it was often used for elaborate tracery, doorways and sculptured details.

The Lincolnshire Limestone quarries of Northamptonshire, Rutland and Lincolnshire supplied stone to Cambridge from the early medieval period. During the Middle Ages, Barnack and Weldon stones were frequently used. After the Dissolution, Barnack rubble and ashlar were brought to Cambridge from the former Ramsey Abbey and Thorney Abbey sites for reuse. More local sources were also exploited, such as Barnwell Priory, the Castle and Friars’ houses in Cambridge. After the Dissolution, three foundations, Jesus, Christ’s and St John’s, were constructed on the sites of small religious houses in the town. The best quality Barnack Stone was worked out by about 1460 leading to the importation of a wide range of other stones. Magnesian Limestone from Tadcaster in Yorkshire was used extensively in the construction of King’s College Chapel, which began in 1446. From 1460 Kings Cliffe Stone from Northamptonshire was also used. By the time the Chapel was completed in 1515, a range of other imported stones sourced from Clipsham, Peterborough, Hasilborough, Huddlesstone, Hampole (Yorkshire) and Weldon had also been employed.

During the C17th, the Classical style came to prominence with the construction of, for example, Clare College Bridge (1639) and Wren’s Pembroke Chapel (1663). Ketton Stone and Portland Stone were used frequently for college buildings from the early C17th. During the C18th, the more public façades of college buildings were often refaced with stone, as demonstrated by Peterhouse, Trinity Hall and Christ’s, Pembroke and Emmanuel colleges.

After the Napoleonic wars, many colleges undertook large building schemes in the fashionable neo-gothic style. From 1850, the rapid growth of the teaching of science led to a further substantial expansion. Several new colleges were founded, including Girton (1869) and Newnham (1871).
Between 1882 and 1914 a range of new buildings were constructed, including the Sedgwick Geology Museum. One of the finest of these is the Medical School (1901-4, designed by E. S. Prior). It was built of Ancaster Stone ashlar in a Free Classical style. Ketton Stone, Ancaster Stone and Clipsham Stone were also commonly employed in construction during this period, with Ancaster Stone becoming particularly favoured in the later C19th. Jurassic limestones from Somerset also saw use during the C19th; for example, Ham Stone was used in the renovation to the Masters Lodge at Trinity Hall by A Salvin (1852) and Doulting Stone was employed in the construction of the New Court at Pembroke College (1883).

The University has continued to expand since World War II with new colleges, including Churchill (1960), Darwin (1964) and Robinson (1974), being founded and built. Stone continues to be used, largely as cladding, such as in the influential Cripps Building, St John’s College (1967) and the McGrath Centre, St Catherine’s College (2013). Both used Portland Stone (Portland Roach) panels.
**Ashlar:** Stone masonry comprising blocks with carefully worked beds and joints, finely jointed (generally under 6 mm) and set in horizontal ‘courses’. Although the blocks comprising each course are of the same height, successive courses may be of different heights. ‘Ashlar’ is often wrongly used as a synonym for facing stone.

**Bioturbated:** Sediments that have been reworked or disturbed by burrowing organisms such as worms.

**Bivalve:** A mollusc with two shells, which may be marine or freshwater. Examples are cockles, clams, scallops, oysters.

**Breccio-conglomerate:** A type of conglomerate (see below) that contains a mixture of angular and rounded rock fragments or clasts.

**Calcarenitic:** A term applied to lime-rich carbonate sedimentary rocks which are medium-grained.

**Calcareous:** A sedimentary rock containing a significant amount (10–50 %) of calcium carbonate.

**Calcilutitic:** A term applied to lime-rich carbonate sedimentary rocks which are very fine- to fine-grained.

**Chalk:** A soft, white limestone, sometimes powdery, which was formed at the bottom of a sea during Late Cretaceous times.

**Chert:** An opaque, extremely fine-grained sedimentary rock composed of silica (quartz). It occurs as nodules (Flint), concretionary masses, or occasionally as layered deposits.

**Conchoidal fracture:** A smooth fracture surface, often occurring in a fine-grained rock such as flint, which shows a curved pattern of fine concentric rings or ripples.

**Conglomerate:** A sedimentary rock that comprises broken up, rounded rock fragments, pebbles (>2 mm), cobbles or boulders set in a finer-grained matrix.

**Cretaceous:** A period of geological time that lasted from approximately 145 million to 65 million years ago. Sedimentary rocks of this age are the source of a number of important types of building stone such as Greensand, Flint and Chalk.

**Cross-bedding:** A structure in the layers (beds) of a sedimentary rock formed by the movement of water or air. The term is usually applied to sandstones and the feature itself typically resembles sets of lines which are inclined with respect to the bedding planes or form regular arc-shaped patterns.

**Dolostone:** A carbonate sedimentary rock that contains a high percentage of dolomite (a calcium and magnesium-bearing carbonate mineral).

**Echinoid:** A type of marine organism formed of calcareous plates, commonly called a sea urchin. Often found in Chalk sediments.

**Exfoliation:** A type of weathering pattern, often seen in sedimentary rocks, in which the surface layers of rock are weathered and split away as thin layers.

**Feldspar:** A tectosilicate mineral like quartz but slightly softer and often coloured white or pink depending on its chemical constituents. Occurs in both sedimentary rocks (e.g. sandstones) and igneous rocks (e.g. granites).

**Flint:** A form of very hard, micro-crystalline quartz. Typically occurs in Chalk deposits as rounded or irregular shaped masses (nodules) and has a dark grey or black coloured inner ‘core’, with a white outer ‘skin’.

**Fluvioglacial:** A term applied to gravel and sand deposits that are related to flowing meltwater from ice sheets.

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

**Glauconite:** A mineral composed of iron and silica. It often occurs in Cretaceous and Tertiary sedimentary rocks as small greenish coloured specks or grains. It gives the green colour to the rock type Greensand.

**Ironstone:** A hard sedimentary rock cemented by iron oxide minerals. Often dark brownish or rusty coloured.

**Knapped flint:** Worked flint which has been fractured (cleaved) to reveal the interior of the nodule.

**Lamination:** A small scale sequence of fine layers that occur in sedimentary rocks.

**Liesegang banding:** A type of banded structure that can be present in sandstones, for example, that is linked to the precipitation of iron oxide minerals by groundwaters. In individual stone blocks it is often seen as different colour patterns, typically shades of red, orange, brown or purple.

**Massive:** Describes a sedimentary rock which is homogeneous and lacks any internal structures (such as cross-bedding or ripple-marks).
**Nodule:** A small, hard, rounded or elliptical mass within a sedimentary rock. Resembles a pebble or larger cobble.

**Ooidal (Oolitic):** A type of limestone that contains ooids (or ooliths) which are sand-sized (<2mm) rounded grains composed of concentric layers of calcium carbonate.

**Quaternary:** A period of geological time that lasted from approximately 2.6 million years ago to the present. It includes the last Ice Age.

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

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

**Sarsen Stone:** A very hard sandstone formed mainly of silica-cemented quartz grains. Often found as boulders or rounded pebbles.

**Superficial deposits:** Largely unconsolidated surface deposits of various types formed during the Quaternary period.
This study, written by Dr Andy King (Geckoella Ltd., andy@geckoella.co.uk) and Phil Collins (Phil Collins Associates, phil@phil-collins.co.uk), is part of Cambridgeshire’s contribution to the Strategic Stone Study, sponsored by Historic England.

This report incorporates data from several sources, including local geologists (GeoPeterborough), heritage building specialists, BGS memoirs and references (listed below) along with independent fieldwork by the authors and BGS. Use has also been made of the BGS on-line lexicon of named rock units (www.bgs.ac.uk/lexicon).

We are particularly grateful to Dr Colin Prosser for his assistance with data on various stone types and provision of several images, and to staff at the Cripps Building, St. John’s and Gonville & Caius colleges, Cambridge for granting access and photographic permissions.

We also thank Mike Shearing and the Whittlesey Mud Walls Group (whittleseymudwalls@gmail.com) for additional information about these mud walls and for permission to reproduce the image on page 17; Dr Steve Parry, BGS, kindly provided the image of Ely Cathedral used on page 20.

Designed by Colin Matthews (PaperPixels.ink).

Technical advice and editorial comments were kindly provided by the following (in alphabetical order):

Don Cameron, British Geological Survey
Trudi Hughes, Historic England
Dr Steve Parry, British Geological Survey
Dr Colin Prosser, Geologists’ Association
Clara Willett, Historic England

Acknowledgements and References

BGS Memoirs, Sheet Explanations and Mineral Resource Reports


Further Reading


Websites

Cambridgeshire Historic Environment Record (webpage accessed 26 November 2018)
Links to the register of all known archaeological and historical sites (including listed and heritage buildings) in Cambridgeshire.
https://www.cambridgeshire.gov.uk/residents/libraries-leisure-&-culture/archaeology/cambridgeshire-historic-environment-record-cher

GeoPeterborough (webpage accessed 26 November 2018)
A developing website but includes the Peterborough City Geological Trail.
http://www.geopeterborough.org.uk

Cambridgeshire Geological Society (webpage accessed 26 November 2018)
Various reports including references to building stones.
http://www.cambsgeology.org

Selected reports of pre C12th to C14th buildings in Cambridge.
http://gwydir.demon.co.uk/jo/walks/old.htm

Building Stones of Cambridge (webpage accessed 26 November 2018)
Brief report of a building stones walking tour around Cambridge City.

John Watson Building Stones Collection (webpage accessed 26 November 2018)
Major collection of building stones available to view (by appointment) in the Sedgwick Museum of Earth Sciences, University of Cambridge.

Stone Roofing Association (webpage accessed 27 November 2018)
Historic sources of Collyweston Slate.
http://www.stoneroof.org.uk/historic/Historic_Roofs/Collyweston_Slate.html

Victoria County Histories (VCH):
Cambridgeshire (webpage accessed 28 November 2018)
https://www.british-history.ac.uk/vch/cambs

Huntingdonshire (webpage accessed 28 November 2018)
https://www.british-history.ac.uk/search/series/vch--hunts

Northamptonshire including the Soke of Peterborough (webpage accessed 28 November 2018)
https://www.british-history.ac.uk/vch/northants/vol2