Historic England

Somerset and Exmoor

Building Stones of England

The Building Stones of England

England's rich architectural heritage owes much to the great variety of stones used in buildings and other structures. The building stones commonly reflect the local geology, imparting local distinctiveness to historic towns, villages and rural landscapes.

Historic England and the British Geological Survey (BGS), working with local geologists and historic buildings experts, have compiled the Building Stones Database for England to identify important building stones, where they came from and potential alternative sources for repairs and new construction.

Drawing on this research, plus BGS publications and fieldwork, guides like this one have been produced for each English county. The guides are aimed at mineral planners, building conservation advisers, architects and surveyors, and those assessing townscapes and countryside character. The guides will also be of interest if you want to find out more about local buildings, natural history, and landscapes.

This guide is based on original research and text by Andy King (Geckoella Ltd).

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Front cover: Rotunda Pool, Hestercombe Gardens, Cheddon Fitzpaine. Morte slates with Ham Hill Stone dressings. © Terry Mathews / Alamy Stock Photo.

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How to Use this Guide

Each guide describes the local building stones in their geological timescale order, starting with the oldest layers through to the youngest. The guide ends with examples of other notable building stones from other parts of England and further afield.

Geological time periods, groups, formations and building stones

Each building stone is listed under the relevant geological timescale, group and formation. A formation may be divided into members and where relevant these are referenced in individual building stone sections.

Middle Jurassic
↑ geological time period

Inferior Oolite Group, Lincolnshire Limestone Formation
↑ geological group ↑ geological formation

Lincolnshire Limestone
↑ building stone (alternative or local name)

Bedrock geology map and stratigraphic table

To help you with the geology of the area, there is a bedrock geology map and a stratigraphic table which shows the layers of rocks and the associated building stones in this geological timescale, group, formation order.

Page numbers for each building stone are included in the stratigraphic table for ease of reference. The page numbers are inverted to correspond with the geological age order.

Contents list

If you click on the page number for a building stone in the Contents list, you will go straight to the relevant section in the guide.

Building stone sources and building examples

A companion spreadsheet to this guide provides:

- More examples of buildings. Information is included on building type, date, architectural style, building stone source, and listed/ scheduled status
- A list of known (active and ceased) building stone sources such as quarries, mines, pits and delphs
- Additional information on building stones including lithology, grain size, sedimentary structures, key identification features, and notes on failure/weathering, and use.

The Building Stone GIS map allows you to search the Building Stones Database for England for:

- A building stone type in an area
- Details on individual mapped buildings or stone sources
- Potential sources of building stone sources within a given proximity of a stone building or area
- Buildings or stone sources in individual mineral planning authority area.

Further Reading, Online Resources and Contacts

The guide includes geological and building stone references for the area. A separate guide is provided on general Further Reading, Online Resources and Contacts.

Glossary

The guides include many geological terms. A separate Glossary explaining these terms is provided to be used alongside the guides.

The guides use the BGS lexicon of named rock units.

Mineral and local planning authorities

This guide covers the mineral planning authority areas of Somerset County Council and Exmoor National Park, the local planning authority areas of South Somerset, Somerset West and Taunton, Sedgemoor and Mendip, and the unitary authority area of North Somerset, and the national park. The unitary authority area of Bath and North East Somerset is covered in the *Bristol, Bath and Surrounding Areas* guide.

Contents

1 Introduction

Geologically speaking, Somerset and Exmoor are extremely diverse areas with rocks dating back to the Silurian period. Virtually all the rocks are sedimentary metamorphic in origin, with only a few localised occurrences of intrusive or volcanic rocks. This provides a considerable variety of building stones, ranging from extremely hard, highly resistant, siliceous flints, cherts and quartzitic sandstones, to softer, sandy limestones and fissile slates useful for roofing and walling. In general terms, the geology and occurrence of Somerset and Exmoor's main building stones can conveniently be considered in four groups.

To the west of the area lie the rolling hills of Exmoor: the Brendons and the Quantocks. These are mainly formed of purple-red Devonian sandstones.

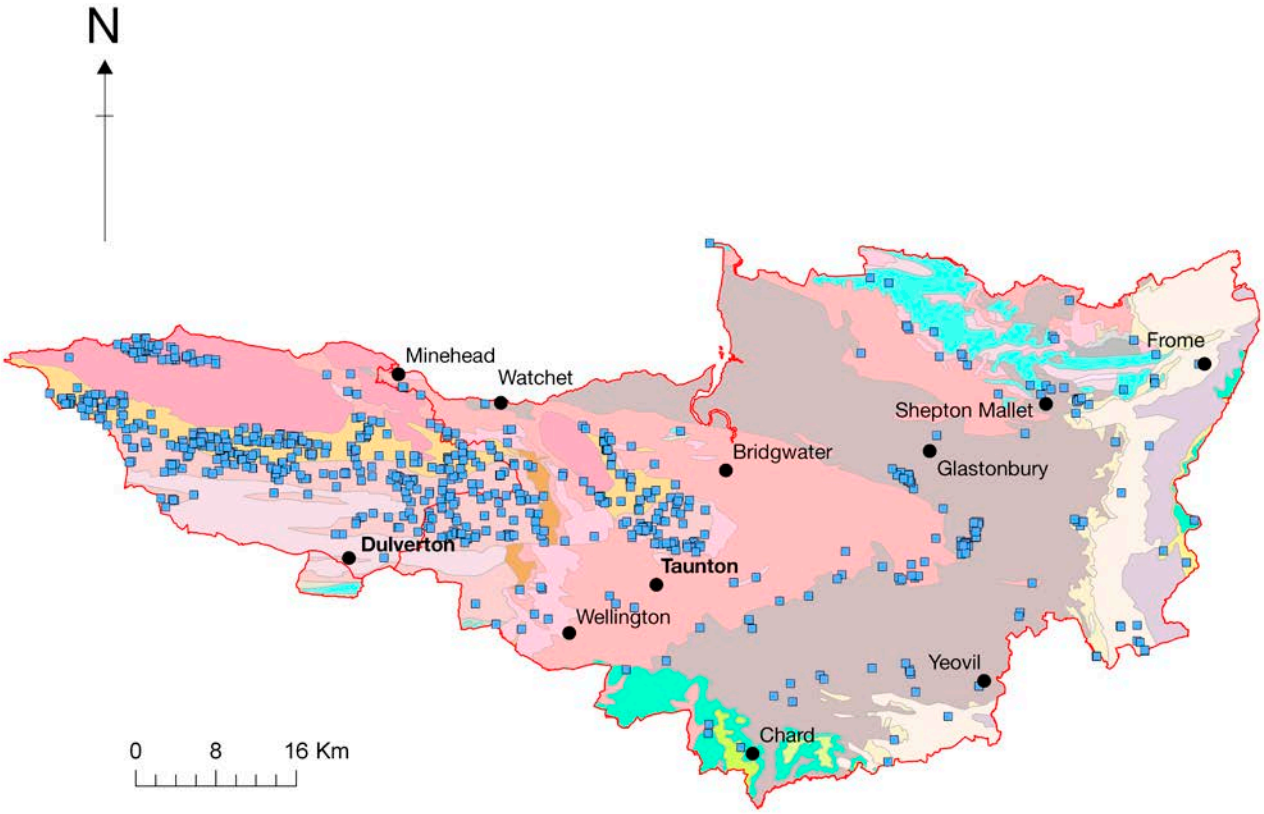
The northern edge of the county is marked by the dissected ridge of the Mendip Hills, formed from grey and reddened Lower Carboniferous limestones.

To the south, bordering on Devon and Dorset, are the Blackdown Hills, formed of Cretaceous glauconitic sandstones with chert and chalk-with-flints.

Between these upland areas are the lower-lying vales of Taunton Deane, the Somerset Levels and South Somerset. The rocks here range from reddish Permo-Triassic sandstones, breccias and conglomerates in the west, through a central belt of Lower Jurassic (Lias Group) blue-grey and creamy limestones, to Middle Jurassic pale yellow and grey limestones (Inferior Oolite and Great Oolite groups) that occur towards the east and south-east borders of the county.

Quarrying for building stones has occurred in Somerset since at least Roman times, and traces of this activity can be seen in the Mendip Hills. Today, the Mendip area still contains very large, active limestone quarries, although the stone is extracted mainly for aggregate rather than for building purposes. The current need for local stone for either conservation repair or to maintain traditional character in new buildings seems to be increasing, but the number of pits and quarries available for these stones is only a fraction of those worked in former times.

Bedrock Geology Map



Building stones in geological order from the oldest through to the youngest layers.

Key

Building stone sources

Bedrock geology

Mafic Igneous Rock

White Chalk Subgroup — chalk

Grey Chalk Subgroup — chalk

Gault Formation and Upper Greensand Formation — mudstone, sandstone and limestone

Corallian Group — limestone, sandstone, siltstone and mudstone

Kellaways Formation and Oxford Clay Formation — mudstone, siltstone and sandstone

Great Oolite Group — sandstone, limestone and argillaceous rocks

Inferior Oolite Group — limestone, sandstone, siltstone and mudstone

Lias Group — mudstone, siltstone, limestone and sandstone

Triassic Rocks — mudstone, siltstone and sandstone

Triassic Rocks — sandstone and conglomerate, interbedded

Permian Rocks — mudstone, siltstone and sandstone

Permian Rocks — sandstone and conglomerate, interbedded

Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation — mudstone, siltstone, sandstone, coal, ironstone and ferricrete

Warwickshire Group — mudstone, siltstone, sandstone, coal, ironstone and ferricrete

Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation — mudstone, siltstone, sandstone, coal, ironstone and ferricrete

Holsworthy Group — mudstone, siltstone and sandstone

Dinantian Rocks — limestone with subordinate sandstone and argillaceous rocks

Teign Valley Group — mudstone, siltstone and sandstone

Upper Devonian Rocks — mudstone, siltstone and sandstone

Upper Devonian Rocks — sandstone and conglomerate, interbedded

Middle Devonian — mudstone, siltstone and sandstone

Middle Devonian — sandstone and conglomerate, interbedded

Lower Devonian Rocks — mudstone, siltstone and sandstone

Unnamed Extrusive Rocks, Silurian — mafic lava and mafic tuff

Stratigraphic Table

Geological timescale	Group	Formation	Building stone	Page
Cretaceous	Chalk Group	various		
	Selborne Group	Upper Greensand Formation	Chert Calcareous Grit Shaftesbury Sandstone (Ragstone)	29 29 28
		Gault Formation		
Middle and Upper Jurassic	Corallian Group	Stour Formation	Cucklington Oolite	28
	Ancholme Group	Kellaways Formation, Oxford Clay Formation		
	Great Oolite Group	Cornbrash Formation	Cornbrash	28
		Forest Marble Formation	Forest Marble	27
		Frome Clay Formation		
		Fuller's Earth Formation	Fuller's Earth Rock	26
	Inferior Oolite Group	various	Inferior Oolite limestones Doulting Stone Hadspen Stone	24 25 26
Lower Jurassic	Lias Group	Bridport Sand Formation	Ham Hill Stone	23
		Beacon Limestone Formation (including the Marlstone Member)	Yeovil Stone (Upper Lias) Marlstone (Moolham Stone, Petherton Stone)	22 21
		Dyrham Formation		
		Charmouth Mudstone Formation		
		Blue Lias Formation	Downside Stone Blue Lias	20 19
Triassic	Penarth Group	Lilstock Formation	White Lias	18
		Westbury Formation	Wedmore Stone	18
	Mercia Mudstone Group	Blue Anchor Formation		
		Branscombe Mudstone Formation		
		Arden Sandstone Formation	North Curry Sandstone	17
		Sidmouth Mudstone Formation	Sandstone	
	Sherwood Sandstone Group	Helsby Sandstone Formation	Otter Sandstone Lydeard Stone	16 16
		Dolomitic Conglomerate	Draycott Marble	16
		Chester Formation	Budleigh Salterton Pebble Beds	16
	not defined	Luccombe Breccia Formation	Luccombe Breccia	15
Permian	Aylesbeare Mudstone Group	Littleham Mudstone Formation		
		Vexford Breccias	Vexford Breccias	15
	Exeter Group	Halberton Breccia Formation (including the Tidcombe Sand Member)	Wiveliscombe Sandstone	15
	South-west England Minor Intrusive Suite		Hestercombe Diorite	14

Geological timescale	Group	Formation	Building stone	Page
Upper Carboniferous	Warwickshire Group	Pennant Sandstone Formation	Pennant Sandstone	14
	South Wales Coal Measures Group	South Wales Lower and Middle Coal Measures formations		
	Marros Group	Quartzitic Sandstone Formation		
		Rodway Siltstone Formation		
Lower Carboniferous	Pembroke Limestone Group, Avon groups	various including Oxwich Head Limestone, Clifton Down Limestone and Vallis Limestone formations, and Burrington Oolite and Black Rock Limestone subgroups	Carboniferous limestones (Hotwells Limestone, Clifton Down Limestone (Cheddar Limestone), Chinastone limestone, Cheddar Oolite, Burrington Oolite, Cannington Park Limestone, Vallis Limestone, Black Rock Limestone)	13
	Teign Valley Group	Bampton Limestone Formation, Westleigh Limestone Formation	Westleigh Limestone	12
		Doddiscombe Formation	Doddiscombe Limestone	11
Devonian	Upper Old Red Sandstone Group	Portishead Formation	Portishead Sandstone	11
	Exmoor Group	Baggy Sandstones Formation		
	not defined	Upcott Slates Formation		
		Pickwell Down Sandstone Formation	Pickwell Down Sandstone	11
		Morte Slates Formation	Morte Slates	10
		Ilfracombe Slate Formation	Cockercombe Tuff Devonian limestones (Rodhuish, Roadwater, Aisholt, Holwell and Leigh Barton limestones) Ilfracombe Slate	9 9 8
		Hangman Sandstone Formation	Hangman Sandstone (Hangman Grits)	6
		Lynton Formation		
Silurian	not defined	Coalbrookdale Formation		

Building stones in geological order from the oldest through to the youngest layers.

Note: The geology in Somerset varies and the stratigraphy of each area is distinct. This table is intended only to be used a reference for this guide.

2 Local Building Stones

Devonian

Group not defined, Hangman Sandstone Formation

Hangman Sandstone (Hangman Grits)

Geologically, the purplish-red and green sandstones of the Hangman Sandstone Formation are the oldest widely used building stones within northern Exmoor and western Somerset. These rocks form much of the dramatic cliff scenery between Combe Martin Bay and Minehead. The formation consists of a variety of rock types, ranging from siltstones and sandstones to fine pebble conglomerates. Historically, lithological differences and geographical occurrence have been used to subdivide the very thick sequence of rocks, which has led to a multitude of different local names being applied to the rock units most widely used. For building purposes, the stone comprises hard quartzitic sandstones, which are typically homogeneous and difficult to dress.

There is an abundant supply of weathered rubbly surface stone from this formation across much of the outcrop area, and many of the farm and village buildings within Exmoor National Park use Hangman Sandstone for walling and rubblework. These medium-grained, massive to well-bedded sandstones show some colour variation, from red to purple to grey and greenish grey, although they are typically red. They occur in ‘channelised’ beds of up to 4m in thickness or as sheet-like bodies in units mostly less than 1m thick. Much of the rest of the Hangman Sandstone Formation (Eifelian to Givetian) comprises reddish-brown mudstone. Occasionally, it is employed as ashlar, as seen in Victorian and Edwardian houses in Minehead. Within the Quantock Hills, especially north of a line stretching from Triscombe to Holford, these sandstones are used for a range of building purposes, and numerous small derelict quarries remain. Some, such as those in Halsway Combe, were probably opened primarily to provide stone for the construction of Halsway Manor, dating from the 15th century. The older east wing is built mainly of sandstones from the Hangman Sandstone Formation; the western end was added in the 19th century and mostly uses Otter Sandstone.

Figure 1: Halsway Manor House. Hangman Sandstone and Otter Sandstone.

Figure 2: Clock tower, Nether Stowey. Ilfracombe Slate, Hangman Sandstone and Otter Sandstone. Doulting Stone quoins and tracery.

Figure 3: Cottages, East Quantoxhead. Hangman Sandstone and Blue Lias.

Group not defined, Ilfracombe Slates Formation

Ilfracombe Slate

Overlying the Hangman Sandstone Formation and occupying a similar extensive outcrop pattern across Exmoor and the Brendon and Quantock Hills is the Ilfracombe Slates Formation. Typically, this comprises greyish or brownish cleaved slates with thin siltstone or fine-grained sandstone units, which contrast with the massive sandstone units of the Hangman Sandstone Formation. Harder sandstones within the Ilfracombe Slates Formation were dug throughout the outcrop from Kentisbury to Holford, and were used locally for buildings and occasionally walling.

At Treborough Quarry, the Ilfracombe Slates were worked for nearly 500 years, and although the wavy cleavage surfaces were too crinkled and folded to produce best quality slates, they were sufficiently durable to be used for roofing, with thicker slabs utilised for doorsteps, cisterns and flooring. The quarry was certainly in use in 1426, when slates were purchased for Dunster Castle near Minehead, and it remained active until the 1900s. A period of intermittent working between the World Wars followed, and the quarry finally closed in 1938. Within the Ilfracombe Slates Formation are relatively thin sandstone horizons, which have been used locally to source building stone.

The clock tower at Nether Stowey was constructed in 1897 (and re-conditioned in 1969) from a mixture of dressed sandstone blocks from the Ilfracombe Slate and Hangman Sandstone formations, with some Otter Sandstone. The quoins and tracery are mainly of Doulting Stone.

Devonian limestones (Rodhuish, Roadwater, Aisholt, Holwell and Leigh Barton limestones)

Slightly higher within the formation is a series of thin limestone horizons, which can be traced as a line of small quarries stretching from Exmoor through the Brendon Hills onto the central Quantock Hills.

There are at least five different limestone units, the Rodhuish, Roadwater, Aisholt, Holwell and Leigh Barton limestones. In the field, the presence of interbedded siltstones or sandstones often helps to distinguish which limestone unit is which, although lithologically they are all quite similar and comprise grey or pinkish-grey, recrystallised, bioclastic limestones, often containing fossil corals. These limestones were formerly worked extensively all along the outcrop strip for the production of lime and for the local rough walling stone used in farms and villages. Assigning individual limestone blocks or hand specimens to specific units is very difficult.

Cockercombe Tuff

The very distinctive Cockercombe Tuff is a fine-grained, grey-green, volcanic lithic tuff, confined to a small outcrop area in the northern Quantock Hills around Cockercombe, Keepers Coombe and Plainsfield. It was mainly used for local ashlar and rubblestone, notably for the construction of Quantock Lodge and its Gatehouse near Aley on the Quantock Hills. The latter is built mainly of grey/green Cockercombe Tuff, with dressings of Bath Stone and Otter Sandstone within the archway interior.

Figure 4: Gatehouse, Quantock Lodge, Over Stowey. Cockercombe Tuff with Bath Stone and Otter Sandstone dressings.

Group not defined, Morte Slates Formation

Morte Slates

The Morte Slates Formation overlies the Ilfracombe Slates and crops out across the southern parts of Exmoor and the Brendon and Quantock Hills. The formation comprises a thick, rather monotonous sequence of silvery green, thickly cleaved slates, interbedded with occasional fine-grained sandstones. The silver surface lustre of the slates is often apparent and is a useful distinguishing character. Where interbedding with sandstones has prevented the development of closely spaced cleavage, the formation has provided rough building and walling stone. Numerous local, small-scale quarries existed along the outcrop where this poorer quality stone was dug on site to avoid transport costs. Villages and houses built of these slates are an important element in the landscape character of the southern Quantocks and they were widely quarried in this area, notably at West Monkton and Kings Cliff near North Petherton.

The Morte Slates used for building around Wiveliscombe generally lack sandstone bands and exhibit regular planar cleavage. It is probable that this variety of slate comes from Oakhampton Quarry, which produced the best quality roofing slates along with a range of slabs, sills and flooring.

In 1754, nearly 1,000 loads of stone were sent from Hestercombe to build Taunton gaol. Hestercombe Gardens, just north of Taunton, remains one of the best places to see Morte Slates employed as a building stone. Sir Edwin Lutyens used Morte Slates (and Lower Jurassic Ham Hill Stone) in his inspired design for the garden, which includes stone columns, paving, walling, water channels and a rotunda pool. The pool comprises Morte Slates Formation surrounds and paving setts, with Ham Hill Stone dressings.

Figure 5: Old Municipal Buildings, Taunton. Morte Slates with Ham Hill Stone windows, dressings and buttresses.

Group not defined, Pickwell Down Sandstones Formation

Pickwell Down Sandstone

The Pickwell Down Sandstones Formation represents the youngest of the four main Devonian rock types occurring across Exmoor and the Brendon Hills. It crops out in a west–east trending belt through Dulverton to Wiveliscombe. These sandstones resemble some rocks in the older Hangman Sandstone Formation and Ilfracombe Slates Formation, but they can often be distinguished by their characteristic red to purple colour. A persistent band of massive hard volcanic tuff marks the base of the formation. The formation has been extensively worked for use as a local building stone, providing colourful ragstone walling and some ashlar, at Dulverton, for example. Pickwell Down Sandstone can be seen in walls along the approach road to Wimbleball reservoir, and the basal tuff layer, in particular, has been used locally as a walling stone.

Upper Old Red Sandstone Group, Portishead Formation

Portishead Sandstone

Within the core of the Mendip Hills, and exposed in a series of eroded, large-scale folds surrounded by Carboniferous limestones, is the Portishead Formation. The outcrop of these dominantly feldspathic and quartzitic sandstones stretches from Black Down (just north of Cheddar) eastwards to Beacon Hill (north of Shepton Mallet). Some pebbly sandstones and sandy quartz conglomerates occur in the lower part. The upper sandstones are often greyish in colour, giving way in lower parts of the succession to the typical red and purple colouration caused mainly by the iron mineral haematite. The Portishead Formation sandstones have a limited outcrop and are mostly used locally for drystone field walls.

Lower Carboniferous

Teign Valley Group, Doddiscombe Formation

Doddiscombe Limestone

This formation crops out around Appley and Tracebridge, where there are many abandoned slate quarries. However, the main outcrop of these hard black slates and cherty mudstones lies within Devon. The rocks are used locally for roofing slates and walling.

Teign Valley Group, Brampton Limestone Formation, Westleigh Limestone Formation

Westleigh Limestone

Small outcrops of the Westleigh Limestone Formation occur in the far south-west corner of Somerset, west of Wellington. The main quarrying area for the finest of the Westleigh Limestone Formation used in Somerset was at Westleigh and Holcombe Rogus, just over the Devon border. These limestones are typically greyish and uniformly well bedded, although their rather sombre appearance is made far more interesting by the presence of interbedded bands, nodules or elongated lenses of very hard black chert. The limestones are very resistant and used locally as ashlar and rubblestone walling, especially around the source quarries near Burlescombe on the Somerset–Devon border. Westleigh Limestone is also frequently encountered in public buildings in the Vale of Taunton Deane, including Taunton's Municipal Buildings. The main frontage of the Old Municipal Buildings is built with Westleigh Limestone along with Morte Slate, and Ham Hill Stone is used for the windows, dressings and buttresses.

After the Great Western Railway opened in the 19th century, Westleigh Limestone was also the favoured choice for foundation and building stones for railway stations within the area.

Figure 6: Old Municipal Buildings, Corporation Street, Taunton. Westleigh Limestone, Morte Slates and Ham Hill Stone.

Pembroke Limestone Group, Avon Group, various formations

Carboniferous limestones (Hotwells Limestone, Clifton Down Limestone (Cheddar Limestone), Chinastone Limestone, Cheddar Oolite, Burrington Oolite, Cannington Park Limestone, Vallis Limestone, Black Rock Limestone)

Lower Carboniferous limestones represent one of the most extensively quarried stones within Somerset, and large amounts (nearly 12 million tonnes) are extracted annually from quarries, especially in the eastern Mendip area. However, this stone is primarily crushed and used as aggregate and roadstone, and today it is difficult to obtain dressed Lower Carboniferous limestone blocks for building purposes.

The limestones have a large outcrop area right across the Mendip Hill ridge, extending from Brean Down to the eastern Mendips near Frome and Shepton Mallet. A continuous limestone belt with extensive quarries occurs around Merehead, Cloford, Whatley, Holwell (now in Dorset), Mells and Vallis Vale. A small inlier of Lower Carboniferous limestone is also present at Cannington Park, near Bridgwater. The 19th-century Cannington Cemetery gate is constructed of roughly squared Lower Carboniferous limestone, sourced from nearby Cannington Park Quarry. Quoins and ornament are of Doulting Stone and red Otter Sandstone; the detailed tracery is carved Bath Stone.

Figure 7: Gate, Cannington Cemetery. Lower Carboniferous Limestone with Doulting Stone and Otter Sandstone quoins and ornament, and Bath Stone tracery.

A complex varied group of different limestone types are included within the term ‘Lower Carboniferous limestones’, and the various rock types have been given different local names along the outcrop. Many of the limestones are highly fossiliferous, notably containing brachiopod shells and corals, which can be helpful in distinguishing the different lithologies.

Hotwells limestone is a massive, grey, crinoidal, bioclastic fine-grained stone.

Clifton Down Limestone includes dark grey, granular limestones such as Cheddar Limestone, fine- to very fine-grained limestone (Chinastone limestones) with calcareous mudstones, white oolitic limestones (Cheddar Oolite) and dark, splintery limestones.

Burrington Oolite is a massive, light grey oolitic and crinoidal limestone, often with well-marked dolomitic bands. Vallis Limestone is a pale-grey, coarse crinoidal facies variant of the Burrington Oolite.

Black Rock Limestone is a dark grey to black, fine-grained limestone with abundant crinoidal debris. The bedding varies from thin to massive, and shaly partings occur in the lower and middle parts of the sequence, along with two characteristic cherty horizons.

Warwickshire Group, Pennant Sandstone Formation

Pennant Sandstone

A small outcrop of Pennant Sandstone is present within the north-east Somerset area, along the fringes of the former Somerset Coalfield. The succession is represented by grey to pinkish-grey, cross-bedded, lithic sandstones, with minor beds of sandy shales, mudstones and thin coal seams. The sandstones are used locally for rubblestone walling, mainly in and around the Somerset Coalfield to Mells area. The largest former quarries for the Pennant sandstones were at Temple Cloud (Bath and North East unitary authority area).

Permian

South-west England Minor Instrusive Suite

Hestercombe Diorite

Associated with the Morte Slates at Hestercombe, and confined to one small area, is the rather unusual, reddish-brown Hestercombe Diorite. This igneous rock has a speckled appearance caused by the interlocking coarse crystals of two minerals: pale feldspar oligoclase and dark, fibrous, greenish chlorite. It is younger than the Morte Slates (probably of Permian age) and formed from magma injected into the Devonian slates. The diorite was quarried within the combe at Hestercombe and it is used very locally for ashlar and rubblestone, as seen in the walls of Hestercombe House and nearby Bampfylde Hall.

Permo-Triassic

Within the Vale of Taunton Deane, a number of Permo-Triassic formations are represented by reddish-brown conglomerates, breccias and sandstones.

Although the main conglomerate- or breccia-dominated formations may often be readily distinguishable by the size and form of their pebble or cobble clasts, they also frequently contain relatively finer grained units of pebbly sandstone. Confusingly, the sandstone-dominated formations may also contain relatively coarser grained pebbly sandstone beds. Consequently, it may be extremely difficult to assign individual blocks of Permo-Triassic pebbly or coarse-grained sandstone to a specific formation, although the location and known outcrop extent of the various formations can assist in determining provenance.

Exeter Group, Halberton Breccia Formation

Wiveliscombe Sandstone

The Wiveliscombe Sandstone outcrops mainly in an approximately north–south trending zone, stretching from Stogumber through Wiveliscombe to Bathealton. They usually comprise red to reddish-brown (occasionally buff or yellowish) thinly bedded to massive sandstones. The harder, better quality building stones are obtained from the sandstone beds that have a calcareous cement. Sandstones that are poorly cemented tend to be relatively soft, friable and easily eroded. The harder sandstones are cut into ashlar or square blocks and used locally as building stone in Stogumber, the brewery maltings at Williton, and in villages around Langley and Wiveliscombe. The 19th-century former police station in Williton is built mainly of local red Triassic sandstones, including Otter Sandstone and Wiveliscombe Sandstone, with some older Devonian Hangman Sandstones.

Aylesbeare Mudstone Group, Vexford Breccias

Vexford Breccias

Running in a north–south trending outcrop pattern immediately east of the Wiveliscombe Sandstone are the Vexford Breccias. These purple and red-brown breccias typically contain subangular to angular clasts of sandstone, slate and quartz, with some rounded fragments of Carboniferous limestone or Culm chert. In the field, the strongly cemented Vexford Breccias often form prominent scarps, especially where they overlie the relatively soft-weathering sandy facies of the Wiveliscombe Sandstone. The Vexford Breccias have been used locally as a general building stone in farm walls and outbuildings, but the former quarries that supplied these rocks are long disused.

Group not defined, Luccombe Breccia Formation

Luccombe Breccia

The Luccombe Breccia Formation is confined to the Porlock area of north-west Somerset and consists of reddish-brown, well-cemented, sandy breccias, with medium to large-sized clasts, typically of platy dark slates and mudstones but lacking limestones. The formation is often very calcareous, with abundant calcite veining in places. The formation gives rise

to a distinctive topography of small, steep-sided knolls. The well-defined ridge running from Copperclose Wood to near Luccombe is formed by the Luccombe Boulder Bed: a particularly coarse conglomeratic unit containing cobbles and boulders up to 500mm in diameter. The breccias are used locally for all kinds of building.

Sherwood Sandstone Group, Chester Formation

Budleigh Salterton Pebble Beds

The Budleigh Salterton Pebble Beds stones are various red conglomerates, breccias and pebbly sandstones containing small pebble to cobble-sized clasts composed of rock types derived from the underlying folded Devonian and Lower Carboniferous limestone sequences. Both rounded and angular clasts are present, in some cases in the same bed. Limestone clasts are usually well rounded, and in places they are abundant enough to have been collected for lime burning.

Mercia Mudstone Group, Dolomitic Conglomerate

Draycott Marble

Draycott Marble is not a true marble (a type of metamorphosed limestone), but a dolomitic conglomerate that formed during the Permo-Triassic in eroded gorges along the flanks of the Mendip Hills. It was mainly quarried on the southern flanks of the Mendips between Shipham and Wells. The lithology is very distinctive, comprising a clast-supported breccia or conglomerate composed of grey angular to subangular fragments of Carboniferous limestone set in a reddish-brown matrix. The overall effect gives the stone a marble-like texture with an attractive pinkish or pinkish-grey hue. Draycott Marble could be worked readily into long pieces and was used as lintels, chimney pieces, gateposts, paving stones and rubblestone walling in numerous villages and towns to the south of the Mendip Hills.

Sherwood Sandstone Group, Helsby Sandstone Formation

Lydeard Stone, Otter Sandstone

This formation is widely used for all parts and all kinds of buildings in the Vale of Taunton Deane, especially Bishop's Lydeard and Cotford St Luke and northwards to Williton and Minehead. Red or pink and fawn, mottled, even-grained sandstones are characteristic. The best quality, most uniform stone is used for quoins and dressings; poorer quality stone is used as rubble for the walls of buildings. The softer blocks of sandstone tend to show rounded edges and corners. The almshouses in Bishop's Lydeard are built almost entirely from local, reddish, cross-bedded Otter Sandstones.

Figure 8: Former Police Station, Priest Street, Williton. Otter Sandstone, Wiveliscombe Sandstone and Hangman Sandstone.

Figure 9: Almshouses, High Street, Bishop's Lydeard. Otter Sandstone.

Mercia Mudstone Group, Arden Sandstone Formation

North Curry Sandstone

The North Curry Sandstone is one of the lesser known building stones in Somerset, but it is nonetheless important. It occurs on the rising ground between Curry Moor and West Sedgemoor on the Somerset Levels and in the Vale of Taunton Deane. North Curry Sandstone is a distinctive, grey-green, coarse siltstone or fine sandstone, often with small-scale, cross-bedding structures. Beds rich in calcareous siltstone tend to be weathered out. Although thin bedded, the stone offered good quality building blocks of variable size. Very large slabs appear to have been much in demand from medieval times for the quoins and dressings of churches and other high-

status buildings in and around Taunton. The main 19th-century building of Queen's College is built of North Curry Sandstone ashlar. East of Taunton, the North Curry Sandstone is more widely used in conjunction with Blue Lias for walling in all kinds of buildings.

Figure 10: Manor Farm, Thornfalcon. North Curry sandstone.

Penarth Group, Westbury Formation

Wedmore Stone

Wedmore Stone is confined to the higher ridge around Wedmore and adjoining villages. It is a hard bioclastic or shelly (that is, whole shells rather than comminuted fragments) limestone, pale grey on fresh surfaces, but weathering to a honey-brown colour that gives a warm glow to the streets of Wedmore in the sunlight. The limestones usually occur in tabular beds, around 100mm thick, which in cross-section show current-orientated thin bivalve shells. A variant occurs around the aptly named hamlet of Sand, where the limestone passes into sand and cemented sandstone, which tends to be friable and may show signs of honeycomb weathering effects. Wedmore Stone is widely used in the local area in buildings and walls.

Lilstock Formation, Langport Member

White Lias

The uppermost Triassic limestone, traditionally called the White Lias, is a whitish to pale grey, very fine-grained (porcellaneous) to granular limestone that occurs below the Lower Jurassic Blue Lias succession. Some layers are tabular and uniform, with flat to undulatory upper and lower surfaces. Other beds exhibit fine parallel lamination, often more discernible on weathered blocks. The limestone generally lacks obvious fossils.

The White Lias was formerly exposed in the base of many Blue Lias quarries on the escarpment to the south of the Vale of Taunton Deane and the Somerset Levels. Historically, the main centre of production was around Curry Rivel and Langport; currently, the stone is only worked at Bowdens Quarry, near Langport. Although the fine-grained limestones are very hard, the White Lias does not generally lend itself to building in courses like the well-bedded Blue Lias. In many cases, it is laid as random rubble with a crazy paving effect; occasionally, it is employed as ashlar. White Lias was favoured by Victorian builders and used in some buildings to create a decorative polychrome effect in combination with Blue Lias.

Lower Jurassic

Lias Group, Blue Lias Formation

Blue Lias

Blue Lias limestones are possibly the most widely used building stones in Somerset. Fresh surfaces of the limestone live up to its name, being a characteristic steely grey-blue colour. However, the stone oxidises to a rather drab, pale grey colour and eventually weathers to a yellow-brown on exposed surfaces, especially along joints. This typically gives rise to 'blue-hearted' forms of the stone in buildings and walls, which exhibit fresh blue-grey centres with a yellow-brown oxidised 'outer skin' to individual blocks. Some buildings display weathered and unweathered faces of Blue Lias side by side to produce a patchwork effect.

At the outcrop, the limestone beds are tabular (100 to 300mm thick), closely packed, but separated by thin layers of fissile mudstone, with planar top and bottom surfaces, and regularly jointed. This makes the beds ready for use with a minimum of cutting and trimming. Although the more even-grained crystalline beds produce good building stones, the limestones can be subject to frost splitting, and weathered blocks often show the laminated layers exfoliating. The finely disseminated iron sulphide compounds contained in the darker more organic-rich beds of limestone are prone to decay, and this can cause the stone to become friable and crumble. In spite of these defects, there remains considerable demand for Blue Lias for new buildings, extensions and restoration work, especially in conservation areas. Formerly, there were many local quarries stretching over the whole outcrop, from Watchet and Kilve via the Polden Hills to Street, and from the south side of the Vale of Taunton Deane and the Somerset Levels, around Langport, to Somerton and Shepton Mallet. These supplied many local churches with flooring slabs and walling stones.

Today, active quarries occur around Street and Somerton and they produce walling stone, harder polishable stone, flagstones and paving for internal use. Other quarries are worked at Charlton Adam and Keinton Mandeville. Some of the limestones have been worked for a considerable period, and mosaic tesserae and stone tiles found on Roman sites in Somerset can be

matched exactly with beds found at Charlton Mackrell. Kilve Court, between Bridgwater and Minehead, was constructed 1702–05 and is built mainly of pale grey and buff weathering Blue Lias.

Figure 11: Kilve Court, Kilve. Blue Lias.

Figure 12: Village buildings, Somerton. Blue Lias, some Doulting Stone or Ham Stone dressings.

Downside Stone

A particular type of limestone from the Blue Lias Formation, called Downside Stone, is present within the Mendip area. The thickest beds occur around Shepton Mallet. Downside Stone represents a littoral facies (that is, near shore, very shallow water) variety of the Blue Lias. It is a distinctive stone and comprises grey, coarse-grained, fossiliferous, pebbly limestones—in places becoming conglomeratic. The pebbles consist of limestone, chert and occasionally quartz, derived from the Carboniferous limestone and Devonian Portishead beds. The Downside Stone is generally harder and better

weathering than the ‘normal’ Blue Lias; pebbles within the conglomerates tend to weather out producing a honeycomb effect. Downside Stone is used within the Mendip area for walling, and the coarse conglomeratic variety is employed in Wells, in particular, around Cathedral Green. Unlike the Blue Lias, Downside Stone is no longer quarried.

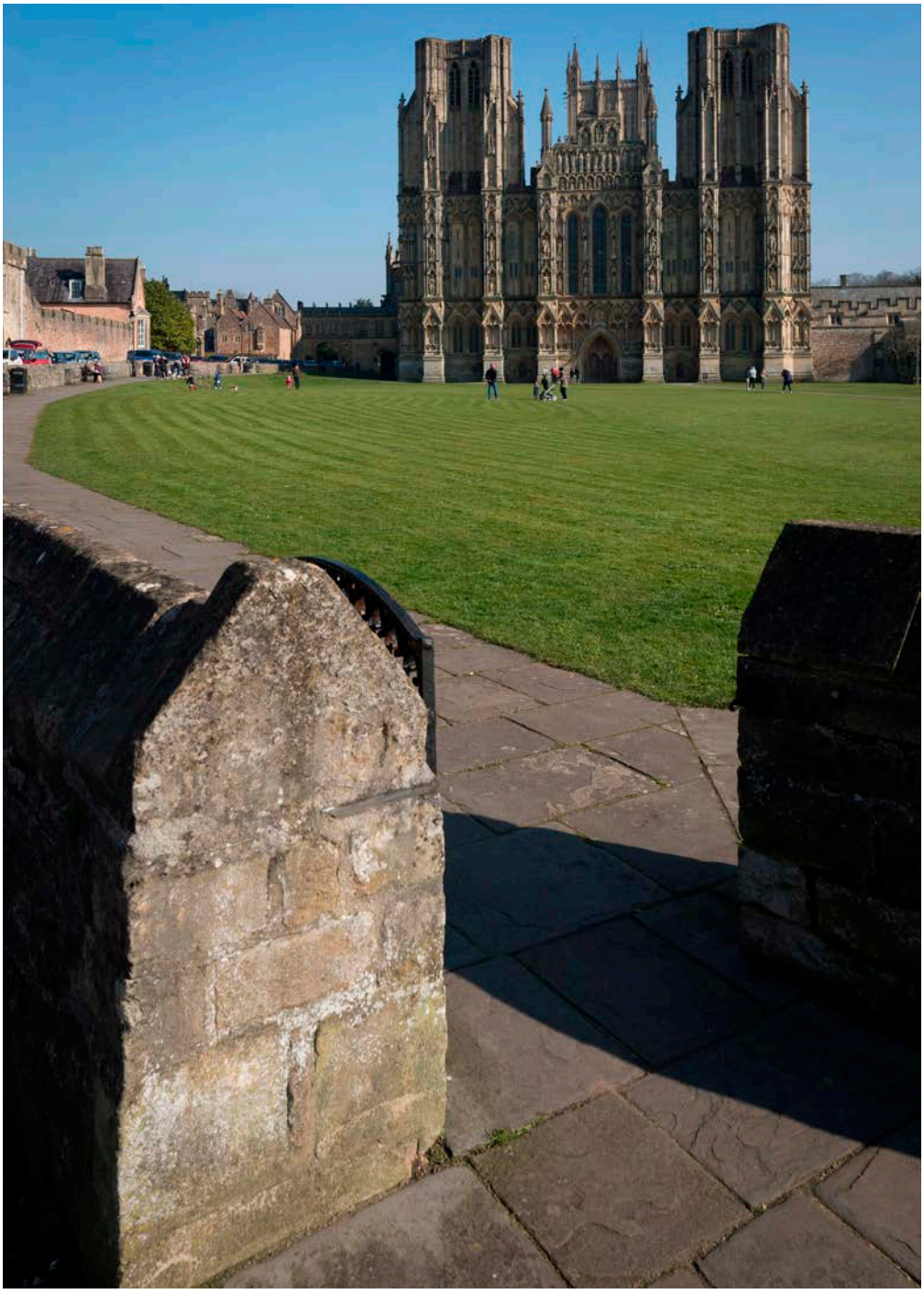


Figure 13: Cathedral Green wall, Wells. Downside Stone.

Lias Group, Beacon Limestone Formation

Marlstone (Moolham Stone, Petherton Stone)

The Marlstone Rock Member (also known locally as Moolham Stone or Petherton Stone) is the lower part of the Beacon Limestone Formation. This formation was formerly known as the Junction Bed, so named because it encloses the ‘junction’ between the Middle and Upper Lias rocks. Typically,

the Marlstone is a dull, rusty-brown, ferruginous, limestone, locally iron shot and ooidal. It is highly fossiliferous, and some beds are crowded with belemnites, brachiopods and bivalves. Charles Moore, a well-known Victorian geologist who lived in Ilminster, found the iron content of the Marlstone to be around 15 per cent, which was almost, but not quite, high enough to make smelting for iron a viable prospect. In 1867, he wrote that had it been otherwise, the '... pretty little town [Ilminster] would have been extended in every direction ... railways would long have contended for its traffic ... the clang of the forge would have resounded, and its hills lit up by the lurid glare of blast furnaces'.

The Marlstone beds are massive and appear to lack an orientated fabric. The stone is used as ashlar and rubblestone walling for local buildings, church walls, quoins and buttresses, in a well-defined zone extending from Broadway and Horton in the west to Yeovil in the east. However, the thickest development and main use of Marlstone is in the Ilminster, South Petherton, Shepton Beauchamp and Glastonbury areas, including Barrington Court, north of Ilminster, and Glastonbury Abbey, for example. There are many former Marlstone quarries around Ilminster and at Pennard Hill, but these have all long since closed.

Figure 14: Hill Farm, Shepton Beauchamp. Fossiliferous limestone.

Yeovil Stone (Upper Lias)

Above the Marlstone, and forming the upper part of the Junction Bed, is the Barrington Member. The stone is known as Yeovil Stone or Upper Lias. This crops out in a discontinuous belt extending from Ilminster to just north of Yeovil, and sporadically along the South Somerset/Dorset border.

The Barrington Member is closely associated with the underlying Marlstone, and together these rocks form a very distinctive flat-topped platform of low hills, especially around Ilminster. The Barrington Member comprises a condensed sequence of cream-coloured, poorly bedded, rubbly or earthy

limestones, often iron stained with blackish or limonitic hues. The limestones are highly fossiliferous and contain ammonites, crinoids and shell debris. Unlike the underlying Marlstone, fossil belemnites are rare. These limestones are a rather unusual and understated building stone, used mainly as rough-faced rubblestone walling in Yeovil, especially at St John's Church, and in buildings on the outskirts of Preston. The Barrington beds can also be used as roughly squared blocks but are quite unsuitable for carved mouldings. Formerly, these limestones were dug extensively in many shallow quarries along the outcrop.

Lias Group, Bridport Sand Formation

Ham Hill Stone

Ham Hill Stone is one of the most renowned and distinctive building stones in Somerset. This coarse, shelly limestone is readily sawn and dressed to provide ashlar, split to form roughly squared blocks and tooled to provide door and window surrounds and sills. When freshly cut, it has a light golden yellowish-brown appearance, which darkens with age and weathering. Weathering picks out the weaker, less cemented seams and the cross-bedding features that are so characteristic of this sandy limestone. The Ham Hill Stone crops out in a narrow belt west of Yeovil. The beds are still actively worked at Ham Hill, where former quarry workings are now a country park. Montacute and other nearby villages are built largely of Ham Hill Stone, and the rock is in considerable demand for new buildings, extensions and restoration work, especially in conservation areas in South Somerset. Montacute House and Brympton House, both near Yeovil, are outstanding examples of the beauty and weathering capabilities of Ham Hill Stone, although prestigious buildings further afield, such as Barrington Court near Ilminster, also make use of the stone.

Ham Hill Stone has a long history of use. It is frequently found on Roman sites, and the Normans are also known to have used the stone. In medieval times, it was transported by horse and cart to the River Parrett, when it was shipped to Taunton. One of the advantages of Ham Hill Stone is that it can

Figure 15: Montacute House. Ham Hill Stone.

be readily sawn and dressed to provide ashlar and tooled to provide door and window surrounds and sills. Consequently, many medieval churches in Devon, Dorset and western Somerset have Ham Hill Stone door and window surrounds. The advent of the railways enabled the Victorian church restorers to use the stone extensively.

Figure 16: Slabs. Ham Hill Stone.

Middle and Upper Jurassic

Inferior Oolite Group, various formations

Inferior Oolite Limestones

The Inferior Oolite Group is part of an important belt of limestones that extends from the Dorset coast through Bath and the Cotswold Hills into the Midlands. The term 'Inferior' refers to the stratigraphic position below the Great Oolite, not the quality of the stone. Within Somerset, the Inferior Oolite Group has a fairly extensive, but scattered, broken outcrop in the east and south-east of the county, running from Seavington St Mary through Crewkerne, along the edge of the Somerset–Dorset border, and then northwards to Doulting and the edges of Kilmersdon and Radstock. The rock type varies considerably, from hard, yellow or ochreous, rubbly, ooidal limestones to thinly bedded, fossiliferous, iron-shot, glauconitic limestones.

The limestones of the Inferior Oolite Group were widely quarried and used for rubblestone walling and ashlar. Towns and villages along the outcrop, such as Seavington St Mary, Seavington St Michael, Hinton St George, Castle Cary and Crewkerne, are built substantially from local Inferior Oolite limestones.

Figure 17: Thatched cottages, Hinton St George. Inferior Oolite Limestone.

Doulting Stone

Doulting Stone is the best known of the building stones belonging to the Inferior Oolite Group within Somerset. It has been quarried since Roman times and is used in many medieval churches for mouldings and surrounds. It is widely employed as building stone, for rubble walling, copings, plinths, window surrounds and dressings in many towns and villages. Doulting Stone is a creamy, cross-bedded, crinoidal limestone, with a uniform, coarse 'sugary' texture formed by abundant crinoidal debris set in a matrix of calcite. The outcrop extends from Doulting (east of Shepton Mallet) to Nunney, but the best building stone seems to be confined to a small area between Doulting and Chelynch, where quarrying is still active today.
The stone quarried in early medieval times was rather fine grained; stone quarried later tends to be coarser grained, with conspicuous, more abundant crinoid ossicles.

Figure 18: West front, Wells Cathedral. Doulting Stone.

Doulting Stone was used extensively in the construction of the magnificent west front of Wells Cathedral, completed in *c* 1250. The smaller Church of St Etheldreda at West Quantoxhead was built in 1854–6 of squared and coursed Doulting Stone, with Bath Stone dressings and tracery.

Figure 19: St Etheldreda's Church, West Quantoxhead. Doulting Stone with Bath Stone dressings and tracery.

Hadspen Stone

This stone, found around the Castle Cary area, is a more massive, ferruginous and harder variety of inferior Oolite limestone. It exhibits a characteristic warm brown colour.

Great Oolite Group, Fuller's Earth Formation

Fuller's Earth Rock

This formation contains a few poor quality limestones that are used for local rubblestone walling. It comprises grey argillaceous limestones, typically rubbly in the lower parts of the sequence and nodular at other levels. Fossil terebratulid brachiopods are distinctive and abundant in some beds. The stone is used locally along the outcrop, mainly as rubble walling, as seen, for example, at Bruton.

Great Oolite Group, Chalfield Oolite Formation

The Great Oolite Group includes three other Middle Jurassic formations, Fuller's Earth, Forest Marble and Cornbrash, which crop out in east and south-east Somerset, typically in rather narrow discontinuous bands from east of Frome, through Bruton to the Wincanton area, and along the Somerset–Dorset border. With the exception of the Forest Marble limestones, these have a relatively limited, very local use as building stones.

Great Oolite Group, Forest Marble Formation

Forest Marble

In 1799, William Smith (known as the Father of English Geology) named the Forest Marble after Wychwood Forest, Oxfordshire, where the rock was once used in a polished form as a marble. It is not actually a marble, but a flaggy limestone that, typically, is hard, blue hearted and occasionally sandy. It contains many shell fragments, particularly ostreids. A freshly cut block shows a coarse texture, sparkles and has a bluish tinge; weathered surfaces are shades of brown or buff.

The western edge of the Forest Marble Formation outcrop is often marked by a prominent scarp. Although, as a unit, it has the most uniform thickness (up to 40m) of all Jurassic formations in south-east Somerset, there is a good deal of local variability in the thickness and nature of the beds that are suitable for building stone. Historically, there were many small quarries along the outcrop. Some are still active today, notably close to the border with Dorset. Here, the Forest Marble is hard-wearing and weather resistant. It is currently used for extensions, new buildings and restoration work. Riven slabs of a rich brown colour were employed for paving and coping stones, whereas larger flagstones were used for bridging ditches. Traditionally, the thinner, high-quality, flaggy limestone and sandy beds were used for roofing.

Although Forest Marble does not have the visual impact or versatility of Ham Hill Stone, its use enhances the character of many important buildings and villages. The villages of Upton Noble and Norton St Philip show the extensive use of Forest Marble at its best. The row of cottages adjoining St Mary's Church at Witham Priory date from about 1750 and are constructed from local Forest Marble with red brick ornament.

Figure 20: Cottages, Witham Friary. Forest Marble.

Great Oolite Group, Cornbrash Formation

Cornbrash

The Cornbrash Formation is conventionally divided into two main limestone units: the Lower Cornbrash, comprising pale cream, shelly, flaggy or nodular bioclastic limestones; and the Upper Cornbrash, comprising pale brownish-grey, sandy, bioclastic limestones with fine-grained, calcareous sandstone beds. Fossils, especially bivalves and brachiopods, are common. The Lower Cornbrash is employed mainly for lime burning, whereas the Upper Cornbrash is used for local rough (walling) work along the outcrop but is generally difficult to dress.

Corallian Group, Stour Formation

Cucklington Oolite

The youngest Jurassic building stone encountered in Somerset is the Cucklington Oolite Member, which is confined to the far south-east corner of the county, east of Wincanton. It consists of pale grey to creamy-yellow, very rubbly to flaggy, shelly ooidal limestones. Fragmentary fossils, especially bivalves and echinoids, are common. It has a very local use as rubblestone walling in the Cucklington and Stoke Trister areas, and its flaggy nature is particularly suited to walling.

Cretaceous

Selborne Group, Upper Greensand Formation

Shaftesbury Sandstone (Ragstone)

The Shaftesbury Sandstone Member consists of alternating beds of coarse glauconitic siltstones to fine-grained sandstones and weakly calcite-cemented sandstone, capped by a hard, shelly, calcite-cemented, glauconitic sandstone. The uppermost shelly beds (Ragstone) are rubbly and nodular and have been used for building. The Shaftesbury Sandstone Member caps the Upper Greensand escarpment that runs from King Alfred's Tower near Penselwood to Longleat and into Wiltshire. The Ragstone unit was formerly worked east of Penselwood at White Cross, and elsewhere along the Somerset–Wiltshire border. The formation at Pen Pits, near Penselwood, was an important medieval source for millstones. The church at Penselwood is constructed of local Ragstone however Shaftesbury Sandstone is best seen in Dorset at Shaftesbury, and in Wiltshire at Stourhead and Longleat.

Figure 21: Church of St Michael and All Angels, Penselwood. Ragstone.

Calcareous Grit

Calcareous Grit sandstones crop out in the Blackdown Hills, extending from Whitestaunton in the west to Chaffcombe and Winsham in the east. These are hard, nodular, calcareous sandstones with poorly sorted grains of translucent quartz and chalky calcite set in sparse, powdery, calcite cement. Green glauconite grains and black iron oxides derived from it are conspicuous. The presence of fine-grained carbonate cement encourages the growth of a characteristic crimson lichen, especially on north-facing walls.

In addition to their use as a main building stone, ashlar, dressings and rubblestone, close to the source quarries, these sandstones are also widely used for the quoins and dressings of medieval churches and other high-status buildings throughout the Blackdown Hills, extending north into the Vale of Taunton Deane.

Chert

The main source of chert nodules on the Blackdown Hills is the Upper Greensand Formation. As they are extremely durable, they persist in abundance in material derived from this formation. Consequently, much of the chert used in buildings in this area is probably from secondary sources, such as superficial alluvial and fluvio-glacial deposits, for example. Some, possibly most, chert for building was formerly collected during the course of clearing stone from the fields prior to ploughing. On the Blackdown Hills, chert occurs as irregular nodules with whitish outside crusts and interiors in various shades of grey, brown, orange or black. It is extremely fine grained, has a conchoidal fracture and, being composed of chalcedony (a form of cryptocrystalline silica), is extremely hard. Chert forms the predominant stone used for all kinds of buildings in the central Blackdown Hills. It may be roughly squared or knapped and laid in courses in Victorian and more recent buildings. It is also used without knapping, for example as pebbles for rubblestone walling. The oldest parts of St George's Church at Wilton, Taunton, date from Saxon times.

However, most of the tower and nave are Victorian and are constructed mainly of chert sourced from the nearby Blackdown Hills. Ham Hill Stone is used for the window and door tracery, tower ornament and quoins.

Figure 22: St George's Church, Wilton. Chert with Ham Hill Stone tracery, tower ornament and quoins.

3 Further Reading

The Further Reading, Online Resources and Contacts guide provides general references on:

- Geology, building stones and mineral planning
- Historic building conservation, architecture and landscape.

There is also a separate glossary of geological terms.

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Figures

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