GLASTONBURY BUILDING STONES TRAIL

This guide covers the ruins of Glastonbury Abbey (charges apply) and other buildings in the centre of the town as two trails which you can combine if you wish. Details of the main building stones are given at the end. If you are just doing the town trail start at the abbey gatehouse, otherwise proceed to the abbey entrance.

Introduction

Glastonbury developed around its Benedictine abbey which dominated the town and the region from the early Middle Ages up to the Dissolution in the 1530s. The wealth of the abbey was reflected in the quality of the building stones used in its construction. After the Dissolution the abbey passed into private hands and was a source of building stone, in addition to the use of new stone from local quarries. As transport links improved through the 19th century stone could be imported from further afield as well.

The main types of stone visible in the abbey and the town's older buildings are Blue Lias, Tor Burr (Marlstone) and Doulting Stone. Later building added Bath Stone, Ham Hill Stone, and Dolomitic Conglomerate. They are predominantly marine limestones from the Jurassic period, laid down between 210 and 160 million years ago (mya) in a warm, subtropical sea. Dolomitic Conglomerate is older and terrestrial, being deposited 240 to 210 mya in a desert environment.

Why a Building Stones Trail? There are two main reasons why the study of building stones is important and relevant today. Firstly, for conservation it's important to know the type of stone when planning repair and conservation of historic buildings to ensure that the character of the building is retained. Secondly, many stone types that are no longer visible in the field can easily be seen in older buildings for education and scientific purposes. The variety of stone used reflects changing sources over the centuries.

Glastonbury Abbey Stone Trail

When you emerge from the museum building **(1)**, you will see the Lady Chapel in front of you, with the rest of the of the abbey church extending to your left. The walls of the church buildings are faced inside and out with **Doulting Stone**.

Approaching the Lady Chapel **(2)**, you will see the grey carved capitals of the columns that used to adorn the outer and inner walls. The Lady Chapel was built shortly after the catastrophic fire of 1184 and used some exceptionally fine, hard **Blue Lias** for carved work. You can see examples in the museum later. Otherwise, almost all the carved stone in the ruins is Doulting Stone.

Cross the bridge through the Lady Chapel. Take the path along the south side of the Lady Chapel to the next, isolated, standing wall **(3)**. At the far end of this wall is an area where the Doulting Stone has been removed you can see the rubble used as infill in the walls. This is predominantly grey Blue Lias, brown Tor Burr (see below) and some irregular pieces of yellow-grey Doulting Stone.

Carry on up the path to the next set of standing ruins. The second arch here is filled with Doulting Stone **(4)**. Looking up at the top, you will see some large blocks of stone resting on the arch. This is **Tufa**, a highly porous and therefore lightweight stone, used for the interior ceiling vaults of the church between the structural Doulting Stone elements.

To get a better view of Tufa, cross through the ruins and bear left under the trees to the stone wall beyond **(5)**. This wall has the usual mix of rubbly Blue Lias, Tor Burr, and Doulting Stone but also frequent blocks of pale Tufa with their many cavities. To your left you will see the original boundary wall **(6)** with a small gate (normally locked) leading into the High Street. This is the best place to see **Tor Burr**. Some of this wall is believed to be older than the standing ruins and is severely weathered. The fossils are more resistant to weathering, so they stand out here. The most common fossils are belemnites. These are cigar-shaped internal shells from a squid-like animal. ammonites, another squid relative, are also common with their iconic spiral shells. Bivalve shells may also be found here. You may also notice the great range of colours in the Tor Burr from yellow through brown to rust-red and even purple caused by variable amounts of iron oxide.

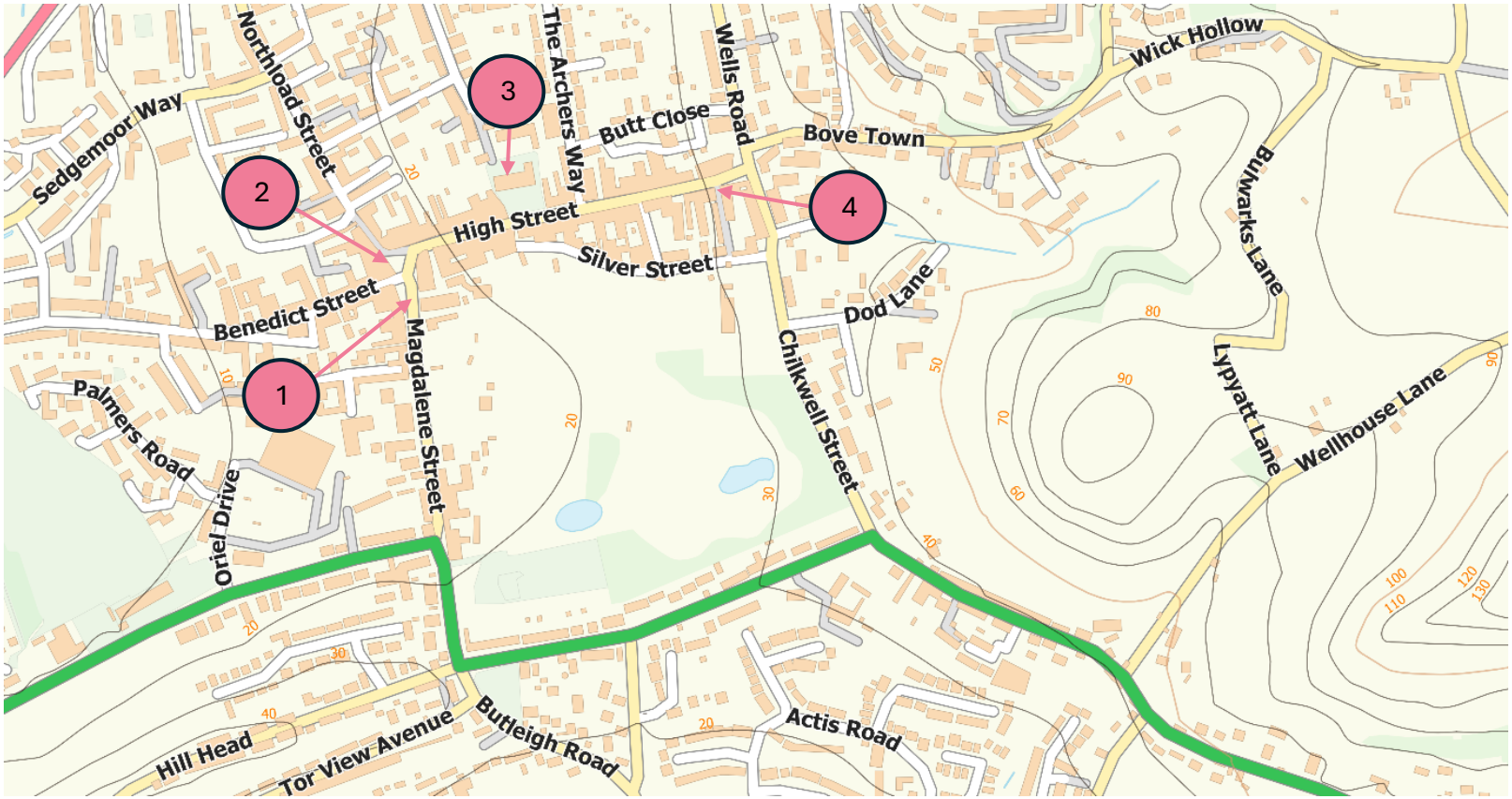
Once you've seen enough Tor Burr, make your way back to the museum **(1)**. Here you will be able to find examples of carving in Doulting Stone, Blue Lias and White Lias. The exquisite carving in Blue Lias would astonish anyone familiar with more recently quarried material. **White Lias**, represented by two carved heads here, is a hard, pale limestone underlying the Blue Lias, dating from the late Triassic period. It outcrops in small areas on the summit of the Polden Hills and west of Shepton Mallet. It is found more extensively around Langport.



1 Lady Chapel	4 Tufa in boundary wall
2 Exposed rubblestone	5 Boundary wall with fossils
3 Arch with tufa blocks above	6 Museum

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Glastonbury Town Stone Trail



1 Abbey Gatehouse
2 Market Place
3 St John's Church
4 Former Queen's Head

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Glastonbury Town Stone Trail

This trail starts by the gatehouse at the entrance to Glastonbury Abbey **(1)**. Please be aware of traffic and other pedestrians while following this trail.

The gatehouse is a late medieval building which was converted to a house after the Dissolution. Like the abbey, this building is faced with **Doulting Stone**. Inside the large gateway the walls are made of a brown stone – **Tor Burr** or Marlstone. Tor Burr is the only stone used for building that was quarried in Glastonbury, although local clay was used at several brickworks along Wells Road. These had all closed by the 1950s.

The wall of the shop on the left of the gatehouse initially looks similar, if a little paler. This is **Bath Stone**. It is less strongly cemented by calcite than Doulting Stone. Comparing these two stones with a 10x hand lens makes the difference very clear or see the photographs in the final section below.

Next, cross over the road to look at the pedestrianised Market Place **(2)**. Some of the buildings around the cross still show a typical medieval layout with the gable wall facing the street, for instance, 1a and 2 Market Place. These are timber-framed late mediaeval buildings with Doulting Stone party walls. There are two fine carvings here just above head height, a dancing couple and a grotesque figure. The cross itself, despite its medieval look, dates from 1846 and is made of Bath Stone.

Just up the High Street is the George and Pilgrims Inn (it is easiest to see the whole building from the other side of the road). This was built by the abbey in the late 15th century as a hostel for pilgrims and other visitors. It is again of Doulting Stone, although it has been unsympathetically rendered in places. On either side are Victorian buildings, both originally banks. The upper stories of the building below the inn are of Bath Stone, but the ground floor uses a stone with a notably richer yellow-brown hue. This is **Ham Hill Stone**. Diagonal lines can clearly be seen across these blocks, especially around the door. This is cross-bedding (see the section on Ham Hill Stone below).

Above the inn looms the former Lloyds Bank, now Nationwide. This is entirely faced with Ham Hill Stone. A closer look at the stone reveals a biscuity texture with many broken shells and erosion along the cross-beds.

The next stop is The Tribunal, a little further up the High Street on the same side. It houses the museum of the Glastonbury Lake Village. It is a 15th century house given a new frontage, of Doulting Stone, believed to have been taken from the disused Abbot's Lodging in the early 18th century. **Blue Lias** can be seen in the massive wall to the right of the frontage and along the base of the front wall. Blue Lias steps and flagstones can be seen here and in other passageways off the High Street.

Further up the High Street, on the left, is the main parish church of St John the Baptist **(3)**. As befits the status of the abbey, this has the second-highest tower in Somerset at

41 metres (135 feet). The tower, windows and most of the walls are Doulting Stone. The wall below the windows is of rubbly Blue Lias and Tor Burr. This might be the remains of an earlier phase of building. The projecting South Transept and the clerestory are entirely of Blue Lias.

Leave the churchyard by the side gate into Church Lane. In the car park entrance, you will see an enormous Doulting Stone lintel, originally over a fireplace in the church hall which once stood here. There are further examples of Blue Lias and Tor Burr further along the lane, past the bend, in the rubblestone wall on your left. It is mainly composed of Blue Lias and Tor Burr. In this wall you should be able to find belemnite and ammonite fossils (see the section on Tor Burr below).

Tufa is much more rarely seen around the town, but there is one piece high up at the end of the wall nearer the church. It is pale and full of cavities. It is a very lightweight stone and was originally used for the internal ceiling vaults of the abbey church. Some blocks remain in situ in the ruins.

Returning to the High Street, continue up the street until you reach the zebra crossing. On the left is the Tudor-style Post Office (dating from 1938), built of Bath Stone with granite along the base. The nearest granite outcrops are on Dartmoor, although it may have come further than that.

Across the road is the Avalon Club, a late Victorian building. A close look at the stones shows a reddish colouration quite different to all the previous stones. Within the blocks you should be able to see angular pieces of grey Carboniferous Limestone. This is **Dolomitic Conglomerate**, from the southern edge of the Mendips between Cheddar and Wells.

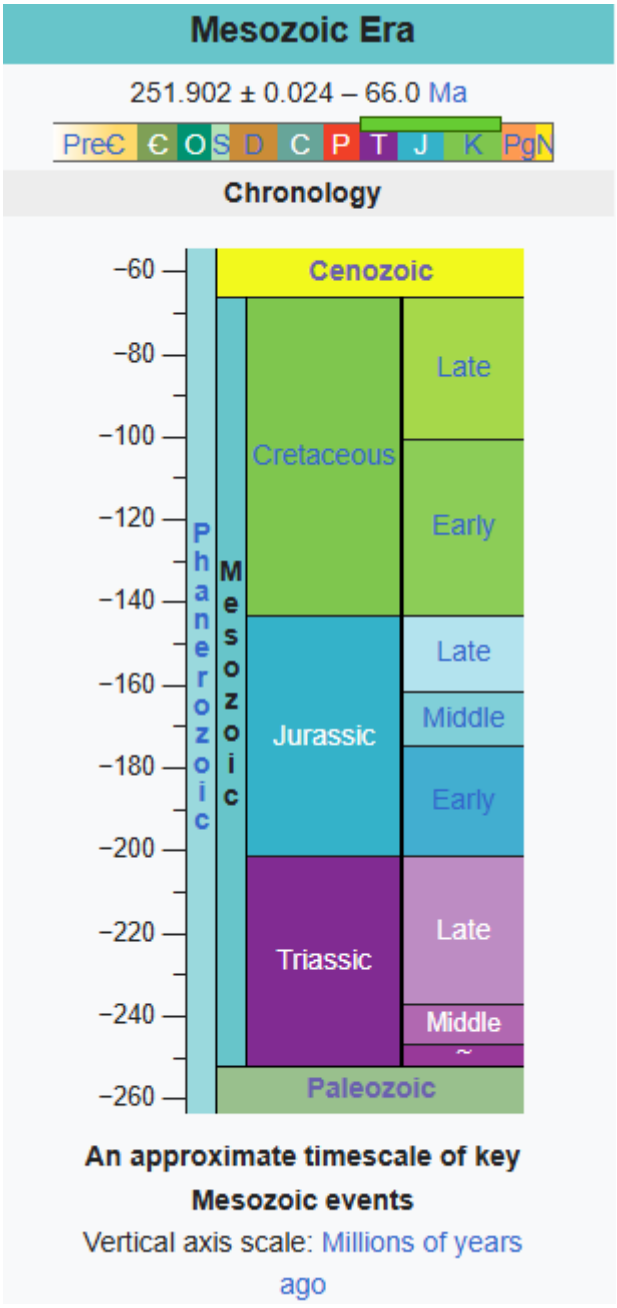
Moving up the right-hand side of the High Street you will cross a side road. The building on the upper corner has been faced with Bath Stone that shows how vulnerable it can be to erosion.

Further up again, near the bus shelter, is the former Queen's Head pub **(4)** which again uses Dolomitic Conglomerate. A shop, slightly lower down on the opposite side of the street, also uses this stone. The stones below the window of this shop are heavily weathered: it is gradually returning to its original state as a jumble of Carboniferous Limestone fragments.

This ends the town trail but it you would like a more extended walk you can carry straight on up Bove Town to see enormous Blue Lias slabs used as a retaining wall, and Wick Hollow, a deeply incised lane with exposed sandstone. Alternatively, you can turn right along Lambrook Street and Chilkwell Street towards the Abbey Barn. Either route will eventually bring you to Glastonbury Tor with its wide views across Somerset.

Guide to the Main Building Stones

The building stones described here, in chronological order, are all from rocks of the Mesozoic Era (except Tufa which is a modern deposit), specifically the late Triassic and early to middle Jurassic Periods. All photographs courtesy of Val Graham.



An approximate timescale of key Mesozoic events

Vertical axis scale: Millions of years ago

This timescale is from the Wikipedia article "Mesozoic" which is released under the Creative Commons Attribution-Share-Alike License 4.0.

Dolomitic Conglomerate consists of irregular pieces of grey stone, of varying sizes, set in a reddish matrix of mudstone. It was quarried along the edge of the Mendips, between Cheddar and Wells. Once exposed to the weather the red colour fades to a pinkish grey. Unlike the other rocks described here this was laid down on land, in the Triassic period (240-210 mya). At this time, Britain was within the giant continent of Pangaea under hot desert conditions like the American south-west today. The stone fragments are mainly Carboniferous Limestone (359-329 mya) eroded from mountains of which the present Mendip Hills are a small remnant. Hot deserts are subject to rare but intense flash floods which wash away accumulated rock debris creating these unsorted sediments. There are also occasional dark red pieces of Devonian Old Red Sandstone which is even older (372-359 mya).



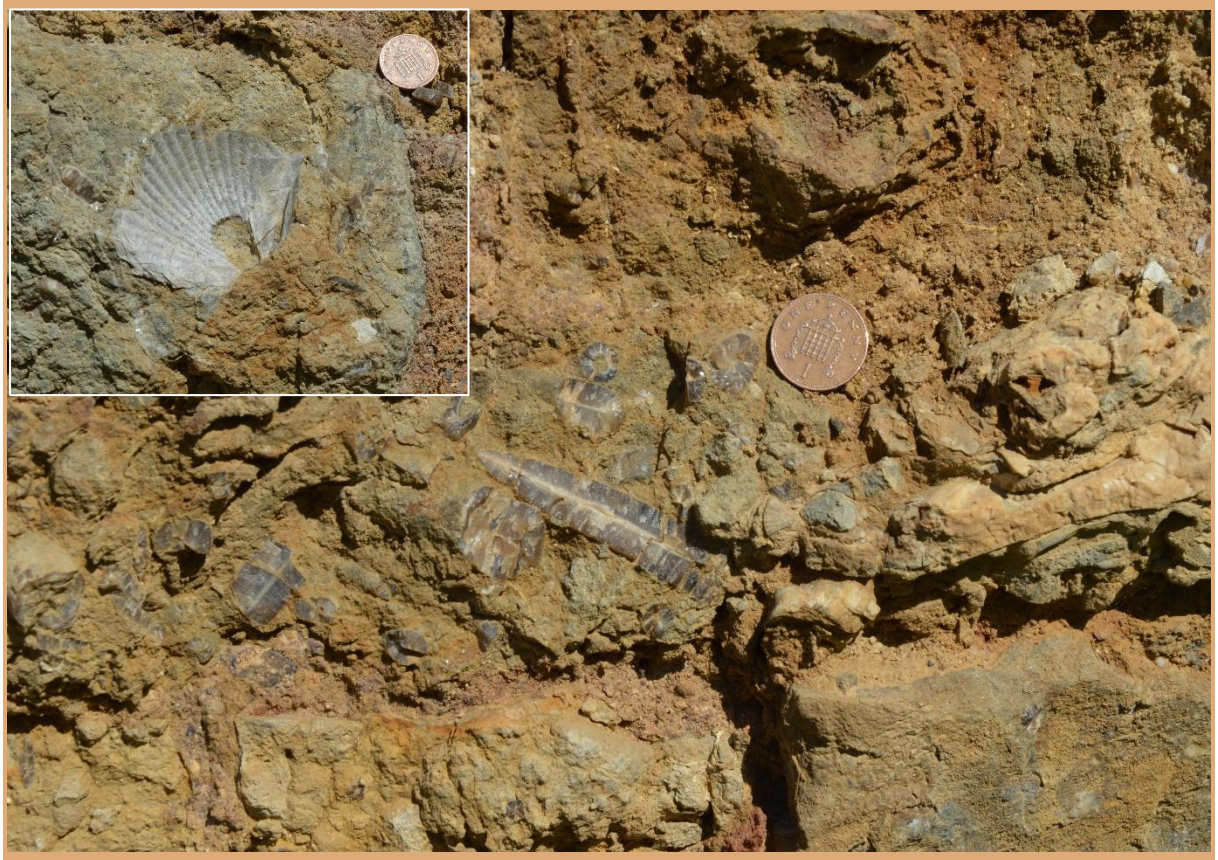
Dolomitic Conglomerate with Carboniferous Limestone fragments of all sizes and shapes.

Blue Lias is a limestone from the early Jurassic period (199-190 mya) with a distinctive blue-grey colour, occasionally weathering to brown. It is one of the commonest building stones in Somerset. It has been used widely in all sorts of buildings and as flagstones, kerbstones, walls, and even, in the quarry villages, boundary fences. Blue Lias in Glastonbury came from quarries in the villages along the Polden Hills such as Street, Butleigh and Keinton Mandeville. Blue Lias occurs as narrow layers of limestone separated by shaly mudstones. The limestone has a variable clay content which means its response to weathering is also highly variable, due to the expansion and contraction of the clay minerals as moisture levels vary. Fossils, particularly ammonites, are quite frequent in the Blue Lias. The Shoemakers Museum in Street has a display of fossil ichthyosaurs (marine reptiles) found in the local Blue Lias quarries.



Typical rough wall mainly of Blue Lias with a mix of sizes and shapes and one heavily eroded block.

Tor Burr or Marlstone, as it is more generally known (implying a high clay content), is part of the Beacon Limestone. It was quarried on Stone Down, on the plateau below Tor Hill. It contains large numbers of fossils though they are often broken up.



Heavily eroded Tor Burr from the abbey boundary wall showing belemnites. Some are in cross-section, near the coin, some are split longitudinally. Inset shows a large bivalve shell. Better preserved Tor Burr can be seen in the abbey gatehouse, Abbey Barn (now part of the Somerset Rural Life Museum) and the church tower on Glastonbury Tor. It is also used for building in south Somerset, particularly in Yeovil and Ilminster.

Ham Hill Stone is a limestone containing large quantities of broken shell debris. It has been quarried for centuries at Stoke-sub-Hamdon, west of Yeovil. It is widely used, particularly in south Somerset and Dorset, for high-quality building, carved work and roof slates. This stone only occurs at Ham Hill and a few other, smaller, outcrops nearby. It often exhibits cross-bedding, that is short, repeated sets of beds inclined to the main bedding planes – representing waves or ripples in the original sediment. It is part of the Bridport Sand, which also forms the highest part of Glastonbury Tor. Ham Hill Country Park is well worth visiting to see the rock in situ on their geology trail.



A decorative block giving a 3-dimensional view of cross bedding in Ham Hill Stone.

Doulting Stone is a limestone from the Inferior Oolite (174-168 mya). The quarries at Doulting, east of Shepton Mallet, were owned by the abbey. It was the preferred stone for all the high-status buildings in Glastonbury, Wells and the wider area until improved transport links made it feasible to use stone from more distant places such as Bath and Ham Hill. It is classed as a freestone, meaning it can be cut in any direction making it suitable for ashlar walls and carved decoration.

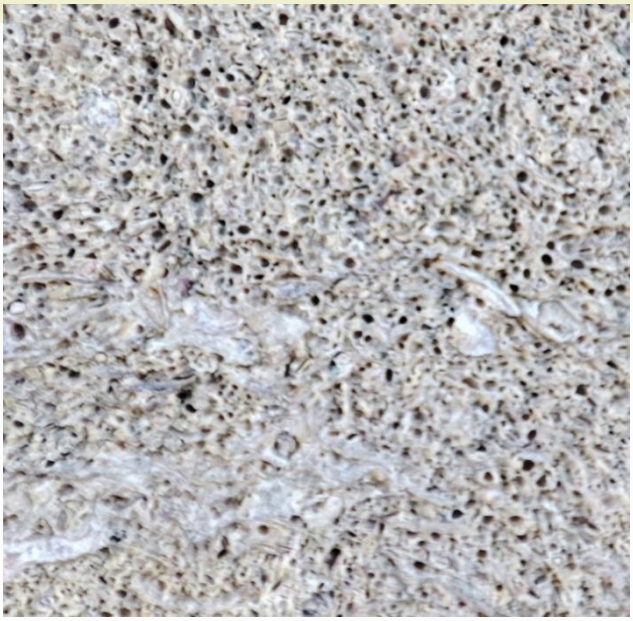


A piece of recently broken Doulting Stone which shows its original colour, grainy texture and a rather grey weathered appearance. The inset picture shows the fine detail of the stone with dense interlocking crystals of calcite. It is this matrix of binding crystals which makes it resistant to weathering.

Bath Stone is a limestone from the Great Oolite and is the youngest of the Jurassic rocks described here (around 166 mya). It was used to face several buildings in Glastonbury High Street. Oolites are formed in warm subtropical conditions, like the Bahamas today, as calcite crystals form on tiny shell fragments or other debris. As the sediment is gently moved back and forth by water movement tiny, rounded balls of limestone develop which are known as ooliths.



Bath Stone showing its typical pale colour and linear weathering pattern.



Close-up of Bath Stone showing some shelly debris and numerous holes surrounded by calcite from which the limestone ooliths have fallen. Doulting Stone by contrast typically has larger interlocking calcite crystals and is only occasionally oolitic.

Tufa is a limestone, i.e. it is composed of calcium carbonate, but it was created in a completely different way than the other rocks in this guide, and much more recently. Rainwater, which is slightly acidic, passing through limestone dissolves calcium carbonate. When the water emerges at a spring, carbon dioxide in the water is lost to the atmosphere which reduces acidity and causes the calcium carbonate to precipitate. Vegetation (or anything else) in the spring gets coated in calcium carbonate. The vegetation will eventually decay leaving just a porous body of limestone. It is not known where the tufa was quarried but the Polden or Mendip Hills would be possible sources.



Tufa blocks in the abbey boundary wall

Further Reading

1. 2022 ***G.J. Dawson and P. Wright.*** *A new methodology for collecting and analysing building stone information and its potential benefits to local planning and geology*. Proceedings of the Ussher Society Vol 15 Part 1 http://ussher.org.uk/wp-content/uploads/journal/2022/Dawson-Wright-1-11.pdf

2. British Geological Survey Maps https://webapps.bgs.ac.uk/data/maps/maps.cfc?method=viewRecord&mapId=10062

3. *2015* ***C.R. Bristow and D.T. Donovan.*** *The Litho- and Biostratigraphy of the Lias Group of the Glastonbury-Shepton Mallet Area, Somerset.* Geoscience in South-West England 13, 377-391. This paper provides more information about the geology underlying Glastonbury itself and the wider area from which several local building stones were sourced.

4. 2015 **R. Gilchrist and C.D Green**. *Glastonbury Abbey: Archaeological Excavations 1904 - 1979*. Society of Antiquaries of London Monograph. The section on the "The Post-1184 Stone Corpus", p18-49 provides a detailed analysis of all the stone types from the abbey buildings or found as fragments, including small amounts of Dundry Stone, Beer Stone, Bath Stone, Dolomitic Conglomerate, Downside Stone, Yeovil Sandstone, Purbeck Marble, Portland Stone and Ham Hill Stone

5. Somerset Geology Group (SGG) https://somersetgeology.org.uk/

6. Somerset Heritage Centre (SHC)/Somerset Geology Group Building Stone Survey https://swheritage.org.uk/historic-environment-service/built-heritage/traditional-building-stone-research/