## Wells

The area is well served by public transport and ample parking is available in Wells.

The city of Wells nestles at the foot of Pen Hill, one of the four periclines that form the backbone of Mendip. The area has a good range of geological interest and a superb cathedral that acts as a showcase for local building stone.

Wells is named after the springs that rise here. It is the smallest city in England, and is dominated by its cathedral [104] [ST 55092 45887]. The building of the present-day cathedral was started in the 12th century using mostly local stone and is an excellent place to examine the local geology!

The west front is composed of the beautiful yellow ‘Doulting Stone’. This rock, part of the Middle Jurassic Inferior Oolite, was quarried from Doulting Quarry about 10 km to the east, near Shepton Mallet (see eastern Mendip guide). Close inspection shows that it is a shelly oolitic limestone, with crinoid ossicles and trace fossils of burrows.

When first quarried, it is a brownish colour, but this gradually develops to a cream colour. Much of the cathedral, including the nave, has been built with this stone, although tufa was used for the vaults because of its lightweight porous nature. Tufa is a very light rock formed of calcium carbonate deposited by lime-rich springs and streams, and probably came from Chilton Polden.

Later in the 12th century, local Chilcote Stone was used as a replacement when the Doulting quarries were under the control of Glastonbury Abbey and unavailable. This calcareous conglomerate, from the littoral (near-shore) Lower Jurassic Lias Group sediments, was obtained from small quarries between West Horrington and Shepton Mallet, and can be seen in walls around Horrington [105] [ST 57482 47361]. The Chilcote Stone forms a prominent topographic bench, best viewed from the A39 [106] [ST 56507 47529], between here and Shepton Mallet where it is known as the Downside Stone South of the west front, the west wall of the west cloister is formed of rubble blocks of the Triassic Dolomitic Conglomerate. On close examination these can be seen to be composed of angular limestone chips in a red sand matrix. Known locally as Draycott Marble, this rock has often been used as a building stone locally and can be seen in many of the houses and churches in the area. This rock underlies part of the city and can be seen outcropping in Milton Lane, just north of the A39 relief road [107] [ST 54771 46188].

The Jurassic Blue Lias Formation has been used extensively for paving and tombstones. This greyish blue rock, which contains scattered bivalve shells can be split easily and is often used for flagstones, but suffers from frost heaving. Dark reddish brown Carboniferous Pennant Sandstone slabs have also been used for paving and in some of the gravestones.

The grey columns, on the west front are of ‘Kilkenny Marble’.

Marble is a term used by quarrymen for any rock that can be worked and takes a polish. This ‘marble’ is actually a fine-grained Carboniferous limestone, which can easily be worked to produce the columns. These columns, shipped in from Ireland in 1872, replaced earlier columns made from the local Jurassic Blue Lias limestone, which weathers easily and had to be replaced.

Inside the cathedral, the Jurassic Great Oolite Limestone, a golden-yellow oolitic limestone, was used for fine carved work such as the font and the pulpit. This oolite is better known as Bath Stone, and was also used during the Anglo-Saxon period. The tombstones have been made from a variety of materials including local red Dolomitic

Conglomerate and fine-grained grey Purbeck Marble that is crowded with freshwater bivalve shells.

One of the well-loved features of Wells is the conduit on the corner of the Market Place [108] [ST 55071 45727] from which water flows down the High Street in stone gutters made from the Blue Lias Formation limestone. This conduit dates from 1799 and is fed from the Scotland Spring, one of the group of springs that form St Andrews Risings in the Bishop’s Palace gardens [109] [ST 55281 45813]. Four other springs rise up in the floor of the ornamental lake. Dye

tracing proves that all these springs are fed by a single underground conduit in the underlying Carboniferous Limestone, which bursts up through the overlying Triassic strata. These springs are fed by stream sinks on the slopes of Beacon Hill to the north-east of Wells.

Adjacent to the cathedral on Cathedral Green is the Wells and Mendip Museum [110] [ST 55076 45946]. Founded in 1893, it houses a fine collection of local rocks, fossils and minerals and even an Elizabethan mining map of Mendip. It is a good starting point to learn about the geology of the region. The museum's founder, Herbert Balch (1869–1958), held a lifelong interest in the geomorphology and history of Mendip. He was a pioneering caver and amateur archaeologist, and was responsible for opening up two of the largest cave systems on Mendip, Eastwater Cavern and Swildon's Hole. In his honour, the museum hosts the Balch Room, which displays some of the many bones found by him in the caves and also artifacts from early human inhabitation of the Mendips. The museum also includes a history of cave diving and has many other local displays.

To the north of Wells, a small outcrop of Carboniferous Limestone at Stoberry Park is entirely surrounded by Triassic strata. The unconformity between these two rock units can be seen in a field just west of the A39 [111] [ST 55316 46888]. Close by, hidden behind undergrowth is the entrance to Stoberry Tunnel, where the Clifton Down Limestone can be seen. The same rock outcrops in a series of small quarries 300 m to the south-east. The largest quarry is now a private garden [112] [ST 55575 46755] — an unusual use for an old quarry.

A short distance east of Wells is Tor Hill. This elongate promontory of Carboniferous Clifton Down Limestone is flanked on each side by Triassic Dolomitic Conglomerate. Many small pits on the northern side [113] [ST 55528 45816] expose these rocks. A small quarry on top of the hill [114] [ST 56002 45692] provides a small but significant outcrop of the fossiliferous Clifton Down Limestone. Examination of the loose blocks here will yield large Productus brachiopods and Lithostrotion corals. Algal stromatolites can also be found in the area. The rocks dip to the north here, but just a short distance away to the south, outcrops of limestone in the track [115] [ST 56044 45541] dip to the south. This marks the axis of the Tor Hill Anticline, which can be seen in the adjacent quarry (now a privately owned concrete works). The contact between the Carboniferous and Triassic strata can be seen in the cutting at the entrance to the concrete works [116] [ST 55823 45500].

South-east of Wells at Dulcote [117] [ST 56859 44146], a working quarry exposes the lower part of the Carboniferous Clifton Down Limestone Formation in a steeply dipping sequence overlain by the Burrington Oolite Subgroup. The limestones are locally fossiliferous and include Lithostrotion corals and crinoid debris. Here, the rocks are vertical or even overturned; spectacular testament to the enormous geological forces operating at the end of the Carboniferous. The same formation outcrops in the cutting on the A371, 150 m to the north-west.

The quarry has been operational for about 100 years and supplies aggregate for the local construction market. Around the quarry and unconformably overlying the Carboniferous Limestone are beds of the Triassic Mercia Mudstone and Dolomitic Conglomerate. Now mostly worked out, concretionary nodules and geodes known locally as 'potato stones' or 'Bristol Diamonds' occurred within the mudstones. These are composed mainly of quartz with secondary calcite and dolomite filling; other iron and manganese oxide minerals also occur.

## Figures

(Figure 103) Aerial photograph Wells.

(Figure 104) View of the cathedral and Glastonbury Tor.

(Figure 105) Wells Cathedral from the east side. The large ponds in the foreground are the St Andrews Risings, a large karst spring draining the hills to the east of Wells.

(Figure 106) The Wells and Mendip Museum, which houses many exhibits showing the geology, archaeology and natural history of the Mendip Hills.

(Figure 107) The Clifton Down Limestone on Tor Hill contains fossil stromatolites, a type of algal structure today only found in hypersaline lagoons.

(Figure 108) Dulcote Quarry used to be the source of Dulcote geodes, formed by the replacement of anhydrite nodules by quartz. © David Roche Geoconsulting. Scalee: 0 22 millimetres

(Figure 109) Dulcote Quarry, [117] near Wells. Here the Carboniferous Limestone strata have been so severely folded the rocks are vertical or even overturned.


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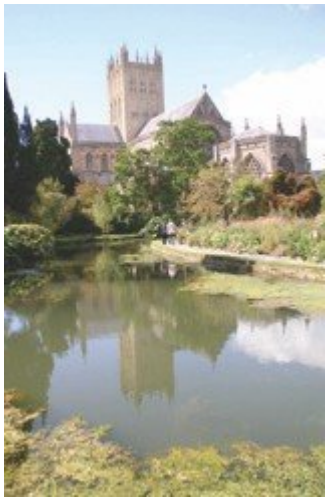
*(Figure 104) View of the cathedral and Glastonbury Tor.*



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