

Let's go for a walk ...

If like me, you find rocks and fossils fascinating – why not join me, metaphorically, on a circular walk around Salford to find out more. I grew up in Salford and finding fossils in the garden of the family home started a life-long interest in geology and natural history. Salford has a number of accessible rock exposures linked by footpaths or alternatively, the rock exposures can be visited separately. However you tackle it. I hope you have a great walk and come away understanding a bit more about Salford's ancient past.

This guide is dedicated to Professor Desmond Donovan who has contributed so much to our understanding of the local geology



A geological introduction

Salford sits on Lower Jurassic rocks that formed about 200 million years ago when a large part of southern England was covered by a warm, shallow sea, perhaps similar to the Bahamas today. When they were laid down, these rocks were soft muds and limy oozes that settled on the sea floor. They contained numerous shells and a few teeth and bones of some of the animals that lived there including marine reptiles, fish, ammonites and belemnites.

These sediments have since become hard limestones and softer mudrocks, mainly composed of calcium carbonate (CaCO₃). Houses in the village are largely built from it and it is often referred to as the 'lias', probably an old quarryman's term for 'layers'.



An ammonite in Lower Jurassic rock

Start your walk here ...

The walk has been designed as a circular route; however, if you prefer to visit the sites individually use the grid references to find the stop locations.

START & FINISH ST 6831 6733 War Memorial at the junction of Norman Road and Beech Road.

Stop 1 ST 6856 6746 St Mary's Church Cemetery: Local and exotic rock types.

Stop 2 ST 6866 6777 Bristol & Bath Railway Path: Lower Jurassic rocks.

Stop 3 ST 6890 6767 Mead Lane: Lower Jurassic rocks.

Stop 4 ST 6890 6713 Bristol & Bath Railway Path: Late Triassic rocks.

Stop 5 ST 6862 6698 Footbridge over Great Western Railway: Lower Jurassic rocks.

The trail starts (and finishes) at the War Memorial at the junction of Norman Road and Beech Road. The memorial is constructed of three different rock types, all older than Salford's Jurassic rocks.

The base is of **dolomitic conglomerate**, a coarse mixture of limestone fragments of assorted sizes, held together in a red-brown rock. This type of stone is a fossil 'scree' created when piles of rock fragments accumulated at the foot of steep valleys and mountains. It formed before our Jurassic rocks, at the end of the Triassic Period c. 220 million years ago. It is very durable and was used in the construction of Bristol Temple Meads Railway Station.

The cross is cut from a coarse grey-green stone called **Pennant sandstone**, also found in Salford cemetery – I will explain more about it there.

The memorial plaque uses **granite**. This is an **igneous** rock formed when molten rock cooled slowly, deep underground, instead of being erupted from a volcano. This allowed large crystals of the minerals quartz, alkali feldspar and mica to form. The stone's origin and age is uncertain but it may well have come from Devon or Cornwall.

Before we leave the memorial, look across the road at the Georgian building, 'Tunnel House'. The GWR line passes under it and was the temporary home of Isambard Kingdom Brunel (1806–1859) when surveying and constructing the railway.

Stop 1 ST 6856 6746

St Mary's Church and the Cemetery

From the War Memorial, head down the hill along Salford High Street. You may notice that most of the older buildings and garden walls use the local Lower Jurassic limestone in their construction. Continue walking for about 100 metres until you reach the church hall (formerly the village school) on your left. Walk through the church hall car park and take the tarmac path towards St Mary's church (but not the driveway to Salford Manor on the left).

The local Lower Jurassic limestone can be seen in the walls around the cemetery and in the fabric of St Mary's Church. The church has elements in its architecture ranging from Saxon to Victorian times. In the older part of the cemetery the favoured stone for gravestones is the Pennant sandstone already seen in the war memorial. Not all the graves have stood the test of time however. You will see



LEFT One of several Anglo Saxon windows in the wall of the tower. photo Lyn Davies



Above right Pennant sandstone showing signs of weathering. Far right a cross carved from granite. Right an example of a memorial in marble.

where freezing and thawing in the winter months has flaked away the surface, in many cases damaging the inscriptions.

The pennant was formed about 300 million years ago during the Late Carboniferous Period, probably deposited by large, meandering rivers. But rapid deposition and the coarse structure of the rock mean that few fossils survive, other than poorly preserved plant remains. Pennant does not outcrop in Salford so may have been quarried in places close to Bristol including along the river cliffs of the Avon at Hanham and the Frome at Frenchay.

As Salford became more affluent and water, road and rail links improved, more exotic stones began to be used in the cemetery, such as granites and marbles. Marble is a limestone that has been altered by heat and pressure.

Next to the church, Salford Manor House dates from around 1160 and may be the oldest continuously inhabited domestic house in the country.

When you are ready to move on, go through the stile in the back wall of the church yard that looks out over the large field and follow the footpath signs opposite. Walk along the hedge line on the right with the field on your left. At the field corner follow the footpath signs that direct you down a set of steep wooden steps (these can be slippery in wet weather). At the bottom of the steps, pass through the metal gate and immediately take a right turn through the gap in the stone wall. You are on the Bristol and Bath Railway Path. Turn left towards Bitton and Bristol but do be aware of cyclists. Walk for about 200 metres passing the Avon Lane gated access on your right. A short distance beyond this is a large rock exposure. This is **Stop 2**.



Follow the footpath signs that direct you down a set of steep wooden steps. photo Lyn Davies

Before setting off ...

Code of conduct

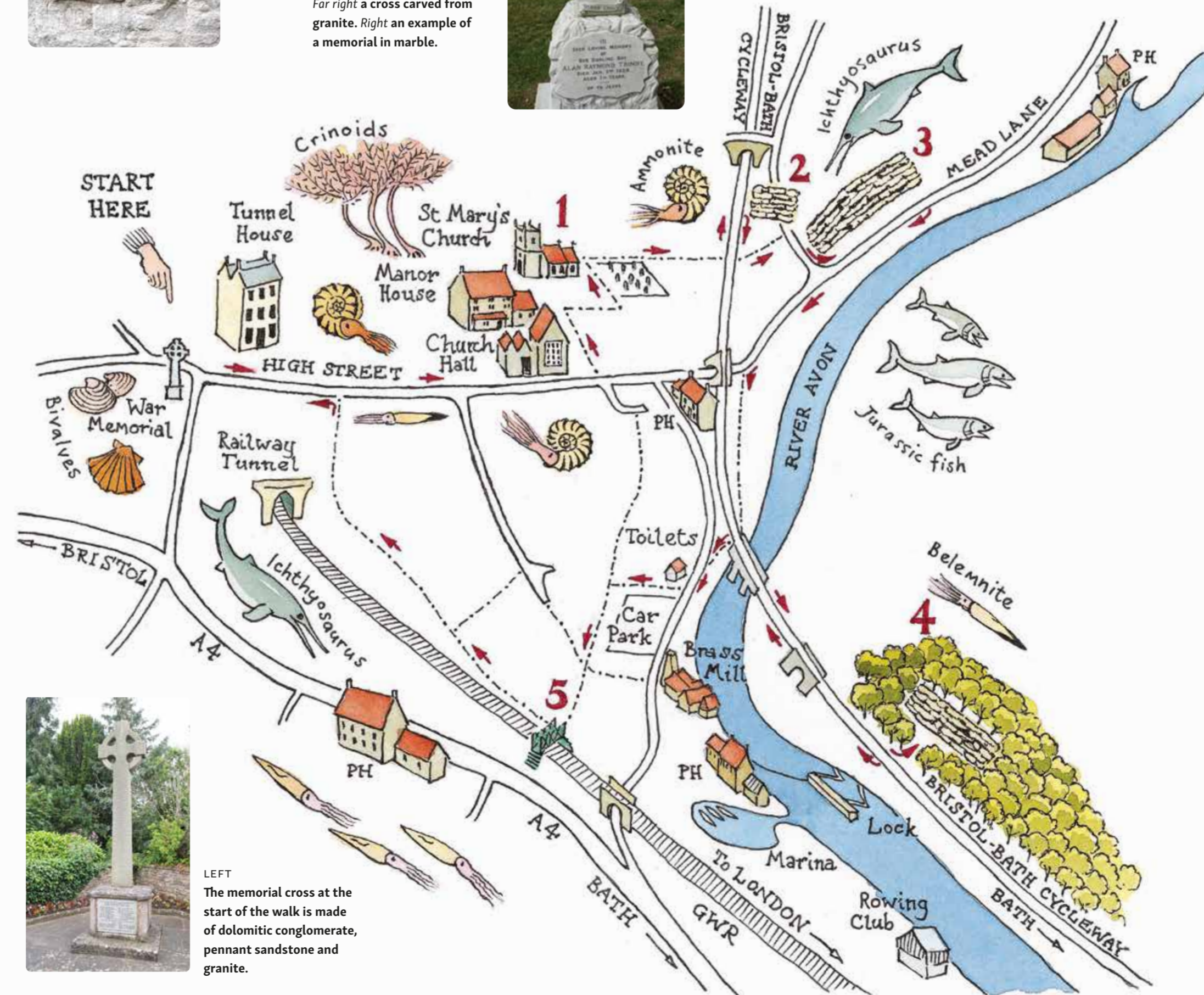
There are no longer any working quarries in the Salford area, so the few remaining exposures are precious. Our aim is to preserve them for the future. So, please don't climb on, hammer or remove fossils from them.

For people interested in fossil collecting try visiting the Dorset Coast. The modern way to collect fossils is to take photographs and leave the originals for others to see. For more information about fossil localities on the Dorset Coast, visit: jurassiccoast.org

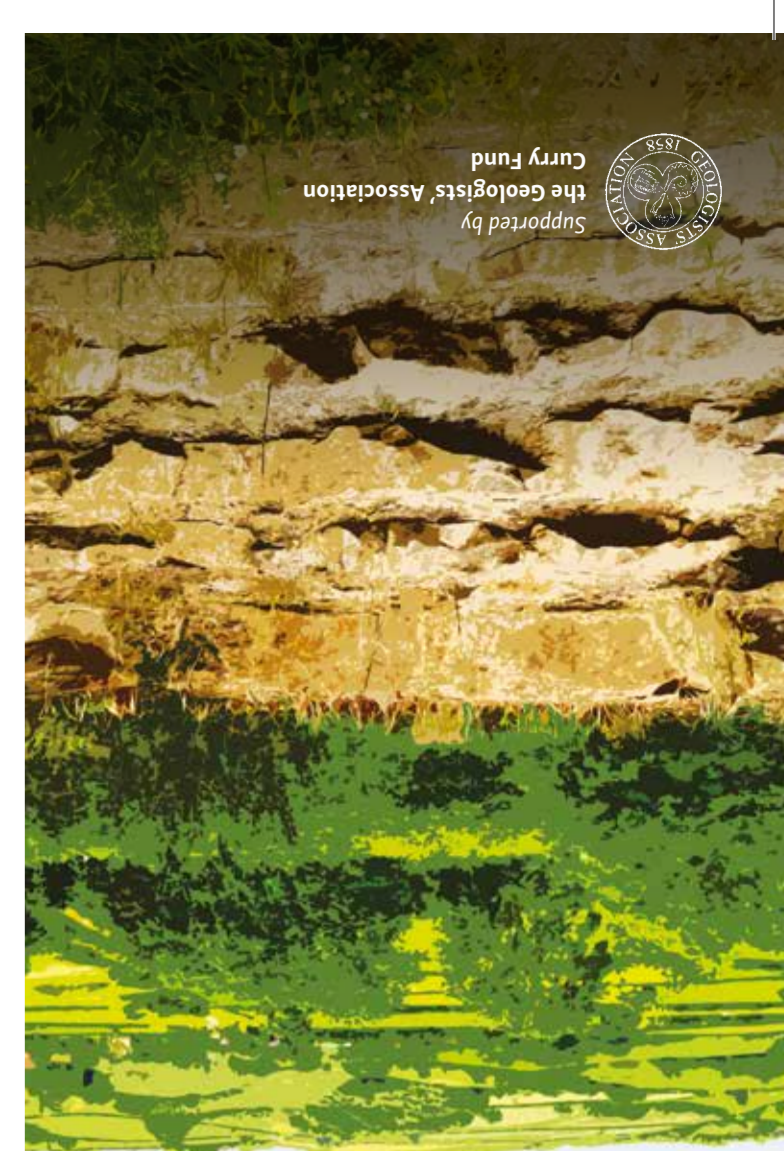
Be prepared

- Wear stout footwear as some of the trail locations may be wet, muddy or uneven.
- Take a magnifying glass to see the detail of the rocks and fossils.
- Take a camera and notepad to record anything of interest.
- Take some money as you are never far from a pub or cafe in Salford!

Please report any damage to the rock exposures (or any difficulties you have navigating the trail) to me at simonccarpenter@gmail.com



LEFT The memorial cross at the start of the walk is made of dolomitic conglomerate, pennant sandstone and granite.



Supported by the Geologists' Association Curry Fund

Additional contributions by Richard Arthur, David Moore, Richard Ashley, and Dick Stabbins

With Simon Carpenter

Walking through the geological past

Salford



Find out more ...

I hope you enjoyed this tour of Salford geology. If you would like to find out more try:

Reading
Geology of the Bristol district: the Lower Jurassic rocks. D.T. Donovan and G.A. Kellaway, 1984.
Memoir for 1:63 360 Bristol geological special sheet. British Geological Survey, HMSO, London.

Web
Salford Environment Group
www.salfordenvironmentgroup.org.uk
Includes pages describing the geology of Salford

Geological societies and clubs
Bristol Naturalists Society, Geology Section:
www.bristolnats.org.uk/geology
Bath Geological Society:
www.bathgeolsoc.org.uk
West of England Geologists Association:
www.wega.org.uk
The Geologists Association:
www.geologistsassociation.org.uk

Local museums with geology displays
Bristol City Museum, Queens Road, Bristol:
www.bristolmuseums.org.uk
Bath Royal Literary and Scientific Institution (BRLSI)
Queens Square, Bath

Thanks and acknowledgements
Friends have supported this project in lots of different ways – some have made improvements to the guide, while others have helped clear and maintain the geological sites. They include: Richard Arthur, Richard Ashley, Dick Bateman, Alan Bentley, John Garrett, Phil Harding, Richard Keyford, David Moore, Bob Mustow, Joyce Pickard, Dick Stabbins, Richard Stevens and Rob Knap. Thanks to you all, **Simon**

Illustrated map by Jane Brayne
Design and layout by Lyn Davies Design

Stop 2 ST 6866 6777

Bristol & Bath Railway Path

Here, for the first time on the trail, we are looking at the Lower Jurassic rocks as they occur naturally, as thin beds of limestone alternating with mudrock or shale. The cutting, the former route of the London Midland Railway, now forms the popular Bristol & Bath Railway path and is part of the National Cycle Network.

Many of the spectacular ammonites we see in Saltford were found in rocks like these. The bones of marine reptiles also occur in places.

Retrace your steps back to the gated access on Avon Lane. Leave the railway path here and turn right down Avon Lane towards Mead Lane. Keep your eyes peeled for fossils (mainly ammonites) preserved in the walls. At the junction with Mead Lane, turn left and follow the road to a point just beyond the entrance to 'Spion Kop'. This is **Stop 3**



Above The rock exposure you will find at Stop 2. Look out for left the quarryman's chisel mark and below the large ammonite in the stone pavement. photos Lyn Davies



Above Ammonites in limestone from the Lower Jurassic period found in Saltford. photo Phil Harding

Stop 3 ST 6890 6767

Mead Lane

The most impressive part of the Mead Lane section occurs at the south-western end of the lane (the end nearer the village) where you are now. The rock exposures are all on private land, **so please do not trespass but observe what you can from Mead Lane.**

The section continues in a north-easterly direction as a cliff behind private houses and Bristol Avon Sailing Club and eventually peters out in the vicinity of Saltford Boat Yard. The exposure clearly demonstrates the alternating limestone / mudrock and mudrock / shale sequence already seen on the Railway Path.

Many hypotheses have been advanced to explain this phenomenon, but the method of rock deposition remains unresolved and beyond the remit of this guide. It is thought that the water depth and sea floor environment changed dramatically over time, ranging from lagoonal (very shallow water separated from a larger body of water, such as the open sea, by a natural barrier), through intertidal (the area that is above water at low tide and under water at high tide), to shallow marine (open sea) conditions.

Now look towards the rock exposure, particularly the upper part. Here the cliff is composed of distinctive limestone and mudrock layers. These are simply a continuation of the rock layers exposed on the railway path. The remaining and lower part of the rock face is composed of thin layers of uneven, rubbly limestone. These are some of the oldest Lower Jurassic rocks to be seen at Saltford.

The next rock exposure on the railway path is on the eastern side of Saltford, in Tennants Wood. Walk back along Mead Lane, passing the junction



Above The rock exposure you will find at Mead Lane. Right U-shaped animal burrows like these are common trace fossils. Below right An ammonite from Mead Lane missing its inner whorls. photos Lyn Davies

with Avon Lane and take the footpath on the left, immediately before the old railway bridge. When you join the Railway Path, turn left and continue walking south-westwards towards Bath for about 400 metres until you see a small stone cairn. This marks the position of the rock exposures to your left, located along the brow of the cutting, high in the wood. Enter the wood, taking care climbing the steep slope here, especially if it is wet. You are now at **Stop 4.**

Stop 4 ST 6890 6713

LMSR Exposure 2 on the Bristol & Bath Railway

This rock exposure was cleared by volunteers in 2015–16 and shows layers of pale limestone and mudrock, known as the White Lias. This is the only place we will see rocks of this age on our trail, although it's used in some of the houses in 'The Batch'. These rocks formed at the end of the Triassic Period approximately 210 million years ago, so are slightly older than our Lower Jurassic rocks. Ammonites are absent here,



Current bedding in a block of White Lias photo Lyn Davies



Volunteers clearing the rock face at Stop 4 photo David Moore

possibly because of adverse sea conditions or the occurrence of barriers that prevented them from migrating from the open sea into shallower bodies of water.

Near the very top of the rock exposure there is a thick limestone bed with a flat upper surface. This is called the 'Sun Bed' and on closer inspection you may be able to see the U-shaped burrows of tube worms exposed in the top portion of the limestone. These organisms lived by burrowing through the soft sediments on the sea floor before they became hardened into rock. The pale limestone is fine-grained and some layers display desiccation cracks suggesting that the water level was shallow enough to occasionally expose the sea floor to the atmosphere.

Now make your way back down to the railway path, turn right and start walking back towards Saltford. Please look out for cyclists. After approximately 400 metres, you will see a red Sustrans milestone on the left hand side. Leave the railway path on the left and take the steep steps down to the field below and then follow the footpath to 'The Shallows'. The public toilets here are built from the same pale Triassic limestone we have just seen. The fine lines that run through some of the blocks are 'current bedding'; the natural layers created by currents as the sediments accumulated on the sea floor.

Take the tarmac path that runs diagonally up the grassy slope to the more level footpath above you. Turn left where the paths meet and carry on past the steep gardens on your left before joining the footpath that runs parallel with the Great Western Railway. Take the descending path for a very short distance and stop at the metal footbridge over the railway. This is our final stop on the trail. This is **Stop 5.**



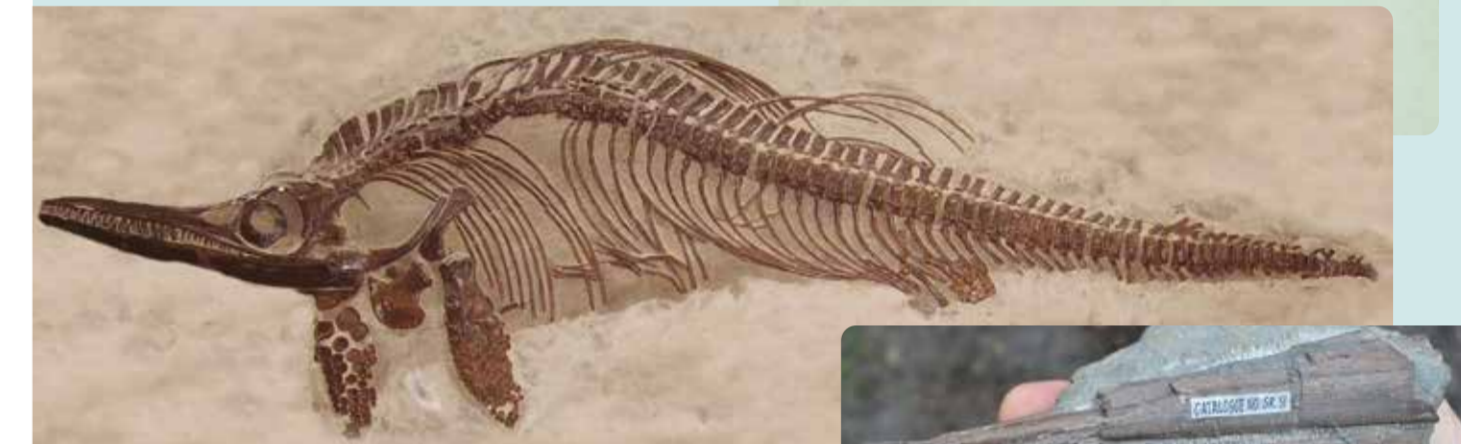
Above A small limestone slab preserving ammonites and brachiopods. photo Steve Smith

Stop 5 ST 6862 6698

Footbridge over the railway line

Before the footbridge was strengthened, it was possible to view the entire railway cutting, with Saltford Tunnel and Tunnel House in the distance.

The cutting was made during the construction of the Great Western Railway in the late 1830s. The rock layers encountered were recorded at the time

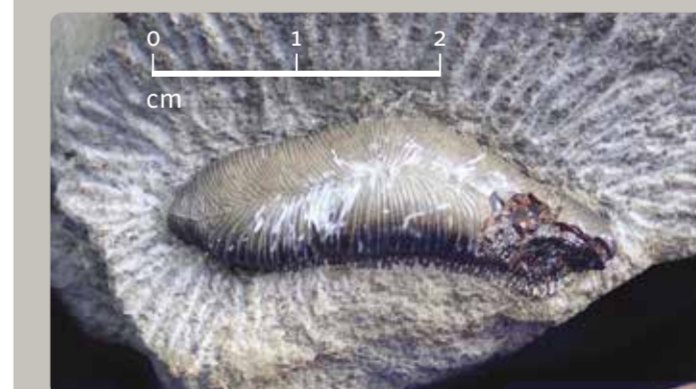


Above & above right Ichthyosaur skeleton and skull. photos Wikipedia

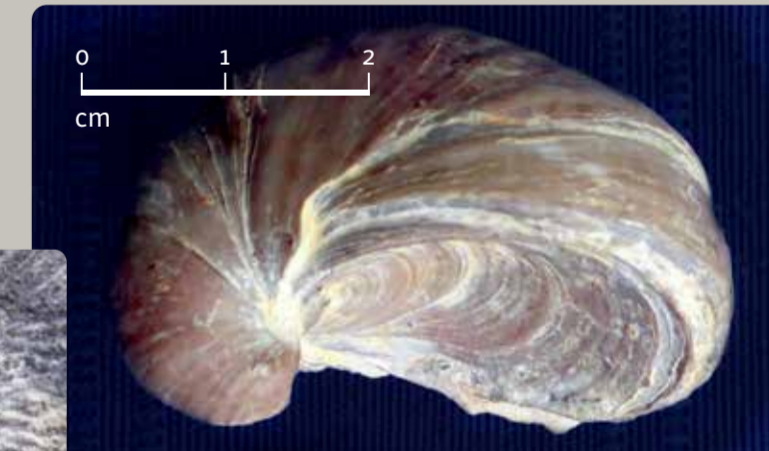
Right The lower jaw of an ichthyosaur found in the Jurassic limestone at Saltford. photo Phil Harding



Other common Lower Jurassic fossils from Saltford



A shell-crushing shark tooth



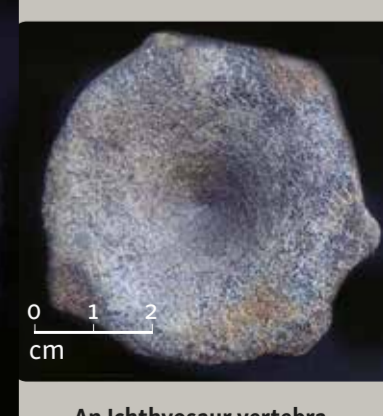
A shellfish (common name 'devil's toe nail')



A shellfish



A gastropod



An Ichthyosaur vertebra (a single back bone)

by William Sanders (1799–1875), a founding president of the Bristol Naturalists Society, who also helped in the early development of Bristol Museum.

Records show that a skeleton of a dolphin-shaped marine reptile called Ichthyosaurus (pron. *ik-theo-saw*) was excavated from the cutting and given to the Bristol Institution by Isambard Kingdom Brunel.

Several years ago, Network Rail stabilised the cutting because of the risk of land slides. The sides of the cutting were covered in netting fastened down with rock bolts which has, unfortunately, made the geology much more difficult to view.

Return to the end of the footbridge and take the ascending path keeping the railway line on your left. Stay on this footpath to Saltford High Street. Turn left at the High Street and proceed to the War Memorial where the walk finishes.

photos Steve Smith