

## Secrets in the Landscape

### 5 The Ironstone Landscape

Go over a wooden stile into a meadow. Continue across the meadow and through an iron kissing-gate. Cross the access road, and up the footpath ahead, gently ascending towards Berry Hill Road. Before you reach the road, there is a gap in the hedge on the left where you can see into a field.



The Ironstone Hills

The soil in the field is a red-brown colour, and it is formed from naturally weathered ironstone. These ironstone soils are extremely fertile. The soil is excellent for wheat growing, and in early times it helped to establish the Redlands as a wealthy area.

The underlying geology of this area also defines the scenic landscape of the ironstone hills. The ironstone is a relatively hard rock, so it doesn't get eroded or weathered down as easily as the soft clays that surround it. It therefore forms gentle, rolling hills.

In the 1950s the landscape of the area was under threat. A steel company put forward an application to open cast mine the ironstone in the area between Adderbury and Milcombe, as well as the areas surrounding Deddington and Hook Norton. A fight was put up by the local parishes and the application was rejected. Had it gone ahead, the landscape we see now would be a series of flat, low-lying fields.

## Adderbury Trail

### Quarrying

Iron mining began in Adderbury in 1859. The first site was Sydenham Farm in East Adderbury, which was extracting thousands of tons of iron ore per year.

When the railway opened, more mining companies started mining in Adderbury, and many more pits were opened. The field here used to be the Berry Hill Pit, which was opened in the early 1900s and worked by various companies until the 1940s.

There was a tramway system in Adderbury to link the pits to the main railway. The tramline into Berry Hill Pit tunnelled under the Oxford Road into this field. Other than the field being slightly lower than the path, there is no evidence of the quarrying today.

### Iron Ore – What is it used for?

About 98% of iron ore is used to make steel. Iron ore is a mixture of iron, rock and waste minerals (gangue). To make steel, firstly the iron metal has to be separated from the rock and the gangue minerals. To do this, the ore is burnt in a coke fuelled furnace, limestone is added, and the gases that are given off react with the ore, separating the iron. The iron is then alloyed with carbon to make steel.



The Duffield Ironworks at Adderbury © Oxfordshire County Council Photographic Archives

## Secrets in the Landscape

### 6 Village Building Materials

Retrace your steps back to the footbridge by the Old Mill (point A). Take the footpath to the left into the recreation ground. Cross the field and exit onto Dog Close, with the playground on the left. Turn left into Dog Close, then right onto New Road. Continue along Water Lane and the High Street, and back to the Green.

As you make your way back to the Green, look out for the other building materials used in Adderbury.

Some brick buildings can be seen along the way. In the early 1900s bricks were made locally at Twyford Wharf from the Lias clay. The clay was put into moulds and fired at high temperatures, causing it to harden into a brick.

There are a variety of roofing materials used in Adderbury. Some of the buildings, such as the Old School, are roofed with Stonesfield Slate. This is a type of limestone



Stonesfield Slates

quarried in Stonesfield because its platy nature makes it split easily into good roofing slate. You can find out more about the Stonesfield Slates in the Stonesfield Trail Guide.

True Welsh slates are also used in the village. They are formed by mudstones being compressed under such high pressures that they harden to form slate. You can compare the Stonesfield Slates with true slate to see just how different they are.



Welsh Slates

## Geology and Landscape

This area of Oxfordshire is underlain by clays and limestones that make up the oldest rock group in the county; the Lias. The Lias rocks formed in Early Jurassic times, and range from around 200 to 180 million years old. During this time, northern Oxfordshire was submerged under the sea. The sea level varied, and during times when the sea level was high, the calm and quiet conditions allowed tiny clay minerals to accumulate on the seafloor. They eventually formed the dark coloured Lias Clays. The clays contain some excellently preserved fossils, particularly ammonites, and it is these same clays that are famous for fossil collecting at Lyme Regis in Dorset.



The Lias Sea, with ammonites and plesiosaurs

When the sea level was low, the shallow water conditions led to the formation of limestones. One of these limestone bands, called the Marlstone Rock Bed, or Ironstone, is very rich in iron, and is particularly important in northern Oxfordshire. It occurs between the Edge Hill area in the very north of the county, where it is at its thickest, and gradually tapers out southwards to Charlbury. The Ironstone is harder than the soft Lias clays that surround it, and therefore does not get eroded down as easily, forming the ironstone hills.

The ironstone landscape

## 06 Secrets in the Landscape Adderbury Trail



### Adderbury

This is a circular walk starting in Adderbury. The trail is 1.6km (1 mile) allow 1 hour. If travelling by car please park considerably. There is a Stagecoach bus from Banbury and Oxford. Refreshments are available in the village. This trail can be used in conjunction with the Adderbury Parish Council Historic Village Trail.

### Remember

- Keep to the footpaths and respect other people's property
- Don't pull fossils out of a rock face or building
- Be alert when crossing roads
- Wear adequate clothing and footwear
- Take care and be careful

There are other trails available in the series. You can also find virtual tours of the trails on our website.



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Oxfordshire Geology Trust is a non-profit making organisation dedicated to the conservation and promotion of our Earth heritage for the benefit of everyone. We work with local communities, the general public, schools, specialist groups and others with an interest in their local environment.

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## Secrets in the Landscape

# Adderbury Trail

## Secrets in the Landscape

### Introduction

Adderbury is situated in the ironstone country of northern Oxfordshire. This area of Oxfordshire is also known as the Redlands, so called because of the colour of the local stone and soil. This important local stone is called the Marlstone Rock Bed, or ironstone, and can be easily recognised by its rich red colour.

The ironstone, which underlies much of Adderbury, has had a huge impact on the village in many different ways. It is an important building stone, and provides Adderbury with its characteristic golden-brown cottages and buildings. The ironstone influences the landscape of the area, forming the attractive rolling hills and creating extremely fertile soils. It has also been used as a natural mineral resource, which was an important factor in the prosperity of Adderbury and the other ironstone villages of North Oxfordshire.



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## Adderbury Trail

### 1 The Ironstone

Start at the Village Green. Walk down the High Street, and take the second fork on the left into Church Lane. Continue to the end of Church Lane and down the narrow alleyway.

As you walk through the village, you can see that the cottages and buildings are built of a rich red-brown stone. This stone is called the Marlstone Rock Bed, but is known locally as the Banbury Ironstone or the Hornton Stone.



Ironstone cottages

The ironstone is an iron-rich limestone that formed in the Jurassic on the floor of a shallow sea, around 190 million years ago. The ironstone is red in colour because the iron in the rock is rusting. However, you may be able to find examples of greenish-blue coloured ironstone. These are the stones that haven't rusted, or where the rusted layers have peeled off leaving a fresh surface underneath.

Red and green ironstone



The ironstone is vulnerable to weathering. The acid in rainwater reacts with the calcite minerals in the ironstone and dissolves them away. This causes the building stones to crumble and flake. Look out for examples of this in the village.



Brachiopod - Tetrahynchia tetraedra



Brachiopod - Lobothisyria punctata



Belemnite

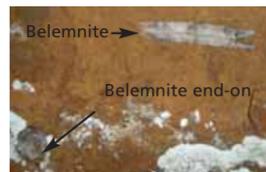
## Secrets in the Landscape

### Ironstone Fossils

The ironstone contains many fossils of the creatures that lived in the Jurassic sea. Most commonly you can find fossil shellfish called brachiopods. Often they are found in small clusters or 'nests'. These nests formed during storms, when the sea whipped up so much sediment that the brachiopods living on the sea floor were actually buried alive.



Brachiopod nest



Belemnite fossils

There are also some fossilised worm-burrows in the ironstone, although these are much more difficult to find.



Worm burrows

You may also be able to find fossil belemnites in the ironstone. The belemnites were a type of squid-like animal that became extinct with the dinosaurs, about 65 million years ago. The remains that we can see in the ironstone today are their bullet-shaped internal shells.

Please be considerate when looking at the walls of people's homes. Do not remove any fossils from the buildings!

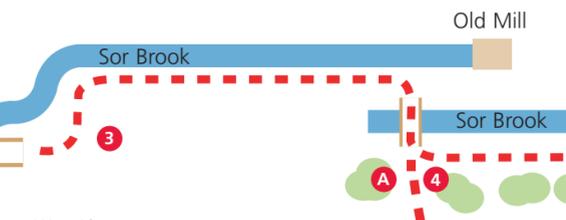
## Adderbury Trail

### 2 St Mary's Church

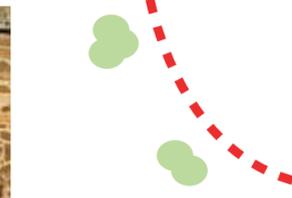
At the end of the alleyway, cross over the road (Mill Lane) and into the churchyard.

St. Mary's Church was considered by Sir John Betjeman to have "the finest exterior in the county of Oxfordshire". The church dates from about 1250, and is mostly built of ironstone. Some of the stone is rubble, with thick layers of mortar in between. There are also blocks of freestone, which are stones that can be cut in any direction and can therefore be carved. These are the square blocks of ironstone that fit neatly next to each other, so do not need much mortar.

Another type of freestone has also been used to build the church. A light-coloured Cotswold limestone is used around the doors and windows, and has also been used to replace ironstone blocks in the tower. This Cotswold limestone is



Rubble and freestone



Cross-bedding

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## Secrets in the Landscape

### 3 Sor Brook

Walk through the churchyard with the tower behind you, towards the brook. Cross over the footbridge and turn left, following the footpath along the side of the brook.

Sor Brook originates from a spring about a mile north-west of the Hornton, and joins the River Cherwell near Aynho.

Sor Brook



Sor Brook is similar to many of the rivers in Oxfordshire because it is a misfit river. The valley through which the brook flows is much wider than the brook

itself. These wide valleys formed in the Ice Age, 2 million to 10,000 years ago. The Ice Age was a time when the climate was very variable, alternating between cold phases when much of the country was covered in ice and snow, and warm phases when the climate was similar to today. During the times of thaw, the water from the melting ice and snow filled up Oxfordshire's rivers, causing them to be 20-30 times wider than they are now. The rivers powered through the county, carving out wide valleys as they went.

The Old Mill



## Adderbury Trail

### 4 The Ironstone Railway

Just before the Old Mill, take the footpath that goes off to the right, go over the footbridge, and then continue to follow the brook on the left. You will soon see the brick wall of the old railway line.

This disused railway was part of the Banbury-Cheltenham Direct Railway line. It opened in 1887, and closed in the early 1960s. One of the main reasons why the railway was built was the ironstone. This is because



The ironstone railway at Adderbury  
© Oxfordshire County Council Photographic Archive

the ironstone was not only used for building stone, it was also an important source of iron ore. From the mid 19th century, the ironstone was quarried extensively in this area of Oxfordshire, including Adderbury, and the railway was built to carry up to 10,000 tons of iron ore per year from ironstone fields in Oxfordshire to Wales and the Midlands. Adderbury station was just to the east of here, where the Fired Earth buildings are now.

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