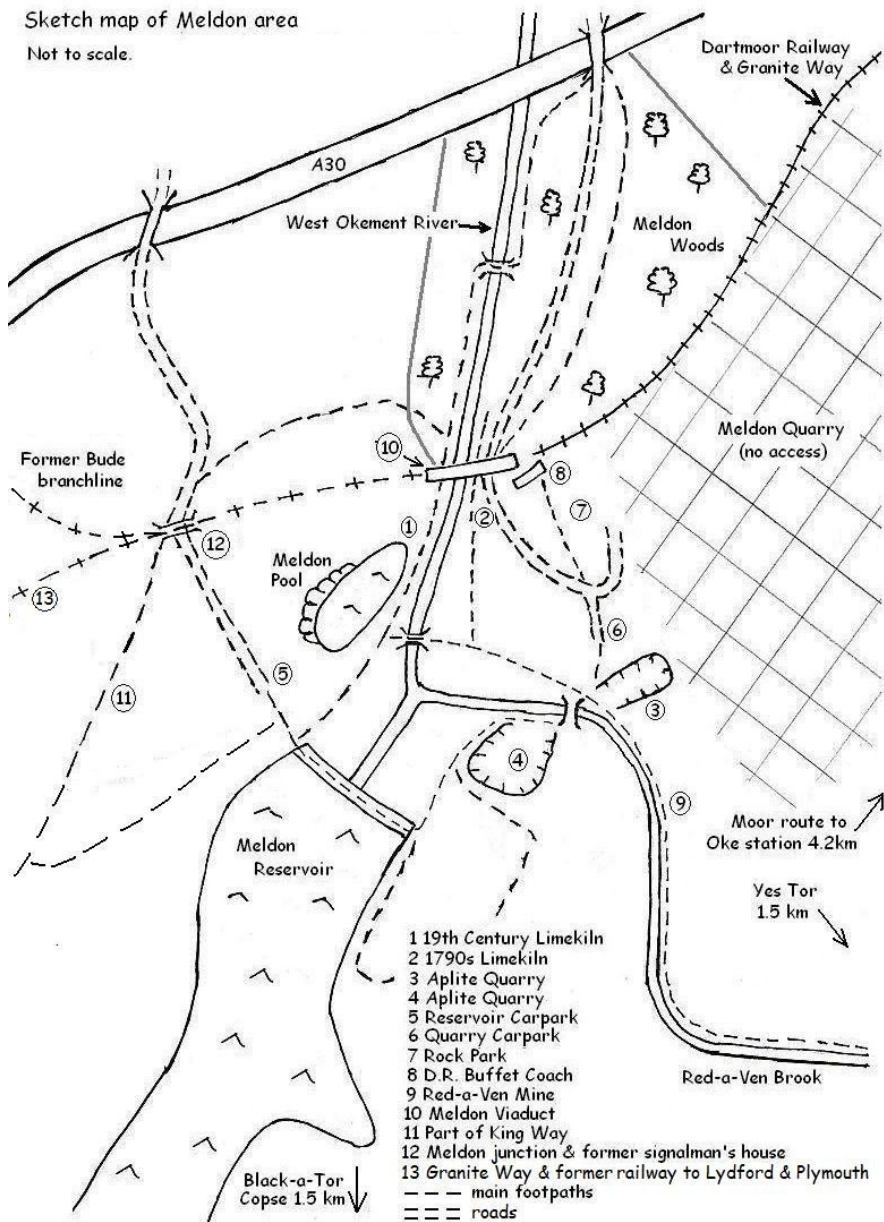


Sketch map of Meldon area

Not to scale.



Sketched from Ordnance Survey Outdoor Leisure map 28.

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## Exploring Meldon

Thanks to its location and unique geology, there is a lot to see in the Meldon area. These notes give a brief introduction to the main points of interest, approximate locations of which are shown on the sketch map. Terms in bold are explained in the glossary.

### Meldon Quarry

The hard **hornfels** rock in the Meldon area was discovered during construction of the **LSWR**. It has a crushing strength of about 75000 lbs per square inch (twice that of the Dartmoor granite, for example) making it very suitable for use as railway track ballast. By the mid 1890s the quarry was in production, soon to be producing over 100,000 tons annually, a large proportion of Britain's railway needs. The quarry was a major employer until less labour intensive production techniques were introduced. A halt for quarry workers' trains was constructed during the 1920s (not the present Dartmoor Railway one), and a terrace of 12 workers' cottages was built at the turn of the 20<sup>th</sup> century and demolished in 1994. BR sold the quarry in 1994 to ECC Quarries, subsequently part of Aggregate Industries. The quarry was mothballed in 2011, and in 2012 some of the machinery was being dismantled. The entire site is a geological **SSSI**. Access is forbidden for safety reasons.

### Rock Park

Created in 2009 to illustrate the types of rock found in the quarry, the display comprises 9 boulders and a very comprehensive interpretation board. It is a few metres east of the Dartmoor Railway buffet coach.

### Meldon Viaduct

The viaduct was built in 1874 when the **LSWR** pushed south from Okehampton to Lydford. It was built with riveted wrought iron piers for a single track railway. In 1878 double track was required, so in effect a second bridge using welded steel piers was built on the east side of the original, and the 2 bridges were braced together. At various times in its life it was reinforced to cope with the demands of the traffic of the day. It spans over 160m and is up to about 40m above the valley floor. The trusses are Warren girders, in which sloping members are set between horizontal top and bottom members, with no vertical elements. One theory why the LSWR engineer (Galbraith) didn't build a masonry bridge like many of the others on the line is that the girder bridge has less resistance to the high winds in such an exposed position.

Traffic beyond Meldon ceased in 1968, although the viaduct remained in use as a **headshunt** for the quarry. The down (east) line was replaced in 1970 by a concrete track for lorries carrying reservoir construction material, and the up line rails were lifted in 1990. The Meldon Viaduct Company, a non-profit making company representing Aggregate Industries, Devon County Council, West Devon Borough Council, Dartmoor National Park, Sustrans and Dartmoor Railway, now owns it. It is one of the few wrought iron girder truss viaducts remaining in UK, and is protected by English Heritage Scheduled status.

### Limestone Quarrying

In the agricultural boom of the 18<sup>th</sup> and 19<sup>th</sup> centuries, lime was in great demand as a soil improver, and the area's limited **limestone** resources were heavily exploited to meet the need. Much evidence of this industry exists at Meldon, but because the site frequently changed, and nature has had over a century to reassess itself, the evidence is difficult to interpret. Quarrying ceased at the end of the 19<sup>th</sup> century, when it became too expensive to follow the steeply dipping limestone deposit downwards. When the drainage pumps stopped, the quarry filled with water to create what is now Meldon Pool. Two limekilns remain; one near the pool dating from the late 19<sup>th</sup> century, and one further east from about 1790. Originally the limestone was probably roasted with charcoal from **coppiced** oak woodland in Meldon Woods, but the railway enabled coal to be imported after 1874. There is evidence of inclined tramways used to charge the kilns. Other relics include a weighhouse with the iron platform of the weighbridge, numerous finger dumps which would have carried tramways for removing spoil, a wheelpit and an assortment of earthworks and stoneworks.

## Meldon Reservoir

Meldon Dam was completed in 1972. Made of concrete, it is approximately 200m long and 50m high, and dams the West Okement river. The reservoir can hold about 300 million litres of water, and is used to supply north and west Devon. High rainfall, low population and a steep sided valley underlain with largely impermeable rocks are factors which make the site suitable, though there was much local opposition to the reservoir's construction because of the loss of amenity.

## Aplite Quarries and Glass Making

The chemical composition of the Meldon **aplite** (also sometimes known as **granulite**) is unique in Britain, and ideal for glass making, although it was also used for other purposes including roadstone. It was worked in 2 bays, separated by the Red-a-Ven Brook. There is evidence of aplite quarrying and glass production in the late 19<sup>th</sup> century. In 1920 an attempt was made to establish a major glass works at Meldon, but it was unsuccessful and ceased by 1921. Quarrying had certainly finished by the 1970s. Examples of Meldon glass products can be seen in the Museum of Dartmoor Life in Okehampton, and occasionally pieces of glass turn up on the site. Many of the quarry buildings still exist in the vicinity, as well as various waste dumps and earthworks. This area is a geological **SSSI**, prohibiting mineral collection.

## Red-a-Ven mine

Attempts to exploit the copper mineral **chalcopyrite** (and possibly the arsenic mineral **arsenopyrite**) which occurs in the **skarn** deposits took place here on several occasions during the 19<sup>th</sup> century; sometimes under the alternative names Meldon Mine, Devon Copper Mine or Okehampton Wheal Maria. There is no evidence of commercial success; nor is there any for Homerton Mine and Forest Mine, mines using the same mineralisation a little further south west and now submerged under the reservoir. At Red-a-Ven there is a wheelpit, adit, shaft and numerous dumps, though they are well hidden by now. The mine area is also in the aplite quarry **SSSI** and mineral collection is forbidden.

## Meldon Woods

Meldon Woods is recorded on the national inventory of Ancient Woodland, a designation applied to land which has been wooded for at least 400 years. It is mostly oak, with some ash, beech, hazel and holly. **Coppicing** was practiced here, charcoal from oak coppice likely to have been used to supply the lime kilns. A coppiced tree is recognisable by having several thin trunks around the position of the original central trunk. The area is renowned for its carpet of bluebells in spring. There are ongoing studies of dormouse and pied flycatcher populations. Unfortunately it has been bisected by the A30 in recent times.

## High Willhays (621m) and Yes Tor (619m)

Yes Tor is the prominent peak visible south east of Meldon. High Willhays is under 1km further south. They are the highest points on Dartmoor, and the only land in England south of Derbyshire's Kinder Scout which is over 2000 ft high. There are Bronze Age cairns on Yes Tor. The peaks are straightforward to climb by various routes, but they are further and higher than they look, and bad weather can arrive very quickly. Take a proper map and compass (and know how to use them), strong footwear and suitable bad weather clothing.

## Black-a-Tor Copse

This is a 29 **hectare** National Nature Reserve about 1km south east of the southern end of the reservoir. It is an area of high altitude oak woodland, granite clitter and moorland, nationally renowned for its mosses and lichens. Numerous moorland bird species can be observed in spring and early summer.

## King Way

Medieval main road between Okehampton and Tavistock.

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## Geological Background

In the Early **Carboniferous**, Meldon was in a tropical sea. Sediments were accumulating, mainly mud and silt, but also volcanic ash and lava, silica from plankton which formed **chert**, and some limestone deposits. By the Late Carboniferous, the Variscan **Orogeny** was taking place. This was the **plate tectonic** collision between the African and European plates, resulting in a fold belt which can be traced from the Urals through SW England to the Appalachians (America was still joined to Europe at the time). The Variscan Orogeny was responsible for

much of Devon's folding and faulting, and was the cause of complex **nappe** structures being moved into place in the Meldon area. Many of the quarry's rock strata are steeply dipping, or even inverted, as a result.

The Variscan Orogeny also led to some rock being forced downwards, to melt at depth. This resulted in a body of molten rock which later rose and solidified as the south western granite, of which Dartmoor is the highest and easternmost outcrop. As the molten rock material cooled and solidified, it baked the surrounding rocks, forming the **metamorphic aureole** around the granite intrusion. Examples of metamorphic rocks in the Dartmoor aureole are **hornfels** and **quartzite**. During the final stages of solidification the residual rock material became increasingly exotic, forming the unique Meldon **aplite** with its suite of unusual minerals. Hot mineral-rich fluids impregnated some of the Early Carboniferous rocks to create **skarn** mineralisation.

Initially the granite would have solidified a few kilometres below substantial mountains, but these were eroded relatively quickly in warm climates to expose the Dartmoor granite, which being more resistant to weathering forms higher ground than the surrounding rock. Subsequent colder climates and human activity shaped the landscape we see today.

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### Glossary:

**Aplite** – a fine-grained igneous rock.

**Carboniferous** – a geological period from roughly 360 Ma to 299 Ma (Ma = million years ago), named for the vegetation of the time which became coal beds in many parts of the globe (though not Devon).

**Chert** – a hard, dense, crystalline variety of quartz, commonly derived from plankton.

**Coppice** – a traditional woodland management technique in which young tree stems are cut down to ground level, encouraging multiple stems to emerge from the stool in subsequent seasons.

**Granite** – medium or coarse grained intrusive igneous rock containing quartz, feldspar and mica.

**Headshunt** – a short siding which allows a locomotive to uncouple, move forward, then run round its train.

**Hectare** – 10000 square metres, or just under two and a half acres.

**Hornfels** – fine grained, hard rock, typically the result of metamorphism of mudstone or shale.

**Igneous rock** – rock that has solidified from molten rock material.

**Intrusion** – a body of igneous rock which has solidified below the surface, like the Dartmoor granite.

**Limestone** – rock formed by deposition of calcium carbonate, commonly from fragments of the skeletons and shells of marine organisms.

**LSWR** – London and South Western Railway. The original builders and operators of the line. Absorbed into the Southern Railway at the 1923 Grouping, and British Railways Southern Region at Nationalisation in 1948.

**Metamorphism** – process of physically or chemically changing an existing rock, usually by heat and/or pressure applied by contact with igneous rock being intruded.

**Metamorphic Aureole** – the region of metamorphic rock surrounding an igneous intrusion. The Meldon area is in the metamorphic aureole of the Dartmoor granite.

**Mudstone** – fine-grained rock formed by the compaction of clays and muds. Rock of the same composition which splits readily into layers is known as **shale**.

**Nappe** – a body of folded rock moved from its original position by forces resulting from plate collision.

**Orogeny** – an episode of mountain building, resulting from deformation caused by plate collision.

**Plate tectonics** – mechanism whereby the earth's crust is thought to be divided into a number of rigid plates which move relative to each other. The movement is possible because of the weaker material below. Enormous forces act on the crust when plates collide. New crust is created where plates move apart.

**Quartzite** – rock resulting from metamorphism of sandstone.

**Skarn** – area of minerals formed at the contact with an igneous intrusion by the reaction of limestones and cherts with metal-rich fluids from the intrusion

**SSSI** – Site of Special Scientific Interest, a designation applied by Natural England which provides legal protection for wildlife and geological sites.

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**Sources:** Meldon Case Study, Devon County Council ; Exploring a Dartmoor Valley by Peter Keene. Published by Devon County Council ; Geology Explained: Dartmoor and the Tamar Valley by John W Perkins. Published by David and Charles ; Interpretation boards around Meldon (Granite Way fence near quarry, Rock Park, Viaduct, Quarry car park) ; Ordnance Survey Outdoor Leisure 28 and Explorer 113