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# Hapsford Bridge, Vallis Vale, near Frome, Somerset

[ST 760 493]

## Introduction

The Upper Triassic succession exposed at Hapsford Bridge, Vallis Vale, is one of the best seen in the east Mendip region. It is most famous as the site of De la Beche's (1846) unconformity between the Carboniferous and the Jurassic rocks, with evidence for the progressive overstep of the Carboniferous Limestone Mendip islands through Rhaetian and Jurassic time. The site shows a sequence of sediments developed against one of the limestone islands of the Mendip archipelago, and has yielded important fossil finds. Of particular importance are the occurrence of the Cotham and Langport members of the Lilstock Formation, which form the upper part of the Penarth Group of Rhaetian age.

Vallis Vale and Hapsford Bridge have been described by De la Beche (1846), Moore (1867), Richardson (1907, 1911), Duffin (1982), and Duff *et al.* (1985).

## Description

Hapsford Bridge is situated approximately 1 km north-west of Frome, at the confluence of Egford Brook and Mells Stream. It was known in the older literature as 'Hapsford Mills' (Moore, 1867). Quarrying ceased some time ago. Together with other geologically significant sites, the various disused and overgrown quarries along the sides of the Egford Brook, it forms part of the Vallis Vale Site of Special Scientific Interest (SSSI).

## Sedimentology

The Rhaetian sediments at Hapsford Bridge are best seen in the walls of a disused quarry in the south side of Vallis Vale (Figure 4.16). The Mesozoic strata in this area dip slightly to the north-east (Savage, 1977). The Upper Triassic formations are sandwiched between the Lower Carboniferous Limestones (Dinantian in age) and the Upper Inferior Oolite (Figure 4.17). The following section is taken from Duffin (1982, p. 157), with stratigraphical divisions taken from Richardson (1911, p. 65):

	Thickness (m)
Middle Jurassic, Upper Inferior Oolite	1.0
Penarth Group	
<i>Lilstock Formation</i> ; Langport Member:	
Fine-grained micrites	0.60
Conglomeratic limestone	0.30–0.60
<i>Lilstock Formation</i> ; Cotham Member:	
Interbedded clays, micrites and sparry limestones	0.15
Micrite	0.12
Pale clay	0.15
Micrite/calcsiltite	0.05
Pale clay	0.02
Micrite/calcsiltite	0.10
<i>Westbury Formation</i> :	
Finely laminated calcsiltites with pebbly base	0.40
Thin conglomerate	0.01
Micrite/calcsiltite with pebble lenses and ripple lamination	0.27
Ripple cross-laminated micrite with pebbly base	0.07
Organic clay, dark in colour	0.05
Conglomeratic limestone	0.12

Dark clay with lensoidal limestones	0.05
Conglomeratic limestone	0.30–0.45
Dark organic clay yielding <i>Vallisia</i>	0.05
Carboniferous Limestone	

Older sections, for example by Moore (1867) and Richardson (1911), record the presence of a basal Triassic conglomeratic bed lying on the Carboniferous Limestone, and other conglomerates throughout the sequence. The Rhaetian succession at Hapsford Bridge oversteps the Carboniferous Limestone, with the boundary marked by an unconformity.

## Palaeontology

The Rhaetian sediments at Hapsford Bridge have yielded a wide variety of fossils, including palynomorphs (Orbell, 1973; Warrington, 1984), plants, invertebrates, and vertebrates (Savage, 1977, Dineley and Metcalfe, 1999). Invertebrates include typical Rhaetian forms, such as the bivalves *Rhaetavicula contorta*, *Ostrea*, and *Cardinia* (Moore, 1867; Savage, 1977) and the crustacean *Euestheria minuta*.

Vertebrate remains include the teeth of the shark *Vallisia coppi*, recovered from the dark clays that immediately overlie the Carboniferous Limestone. *Vallisia* was described by Duffin (1982) as a neoselachian, in other words, a modern shark, but the fine structure of its tooth enamel makes this assignment questionable (Cuny and Benton, 1999). Richardson (1911) noted remains of sharks and other fishes through much of the section. *Thecodontosaurus*, the prosauropod dinosaur described from here by Moore (1867), was initially thought to have come from Hapsford Bridge, but analysis of the material by Duffin (1978) suggests that this assumption may be incorrect. Benton and Spencer (1995, p. 72) mistakenly recorded prosauropod material from this site, based on this old record of *Thecodontosaurus*.

Plant fossils are found throughout the section, and are especially common within the dark clays of the Cotham Member. Noteworthy are well-preserved remains of the bryophyte *Naiadita lanceolata*, although other taxa such as *Lycopodites* are common (Harris, 1938; Savage, 1977).

## Interpretation

The section at Hapsford Bridge records a range of marine environments. The Upper Triassic sediments were deposited directly upon the Carboniferous Limestone, which formed part of the Upper Triassic Mendip archipelago (Duffin, 1982).

The Westbury Formation is a marine facies dominated by dark clays (Hamilton and Whittaker, 1977). Interbedded with these lithologies are coarse-grained conglomeratic clastic rocks and limestones that may show evidence of ripple cross-laminations (Duffin, 1982). It is probable that the conglomeratic beds were deposited on the shoreline of the Carboniferous Limestone landmass.

The generally paler-coloured limestones and clays of the Cotham Member were probably deposited in shallow, probably freshwater pools (Mayall, 1983). The overlying Langport Member represents deposition in warm lagoons (Whittaker and Green, 1983).

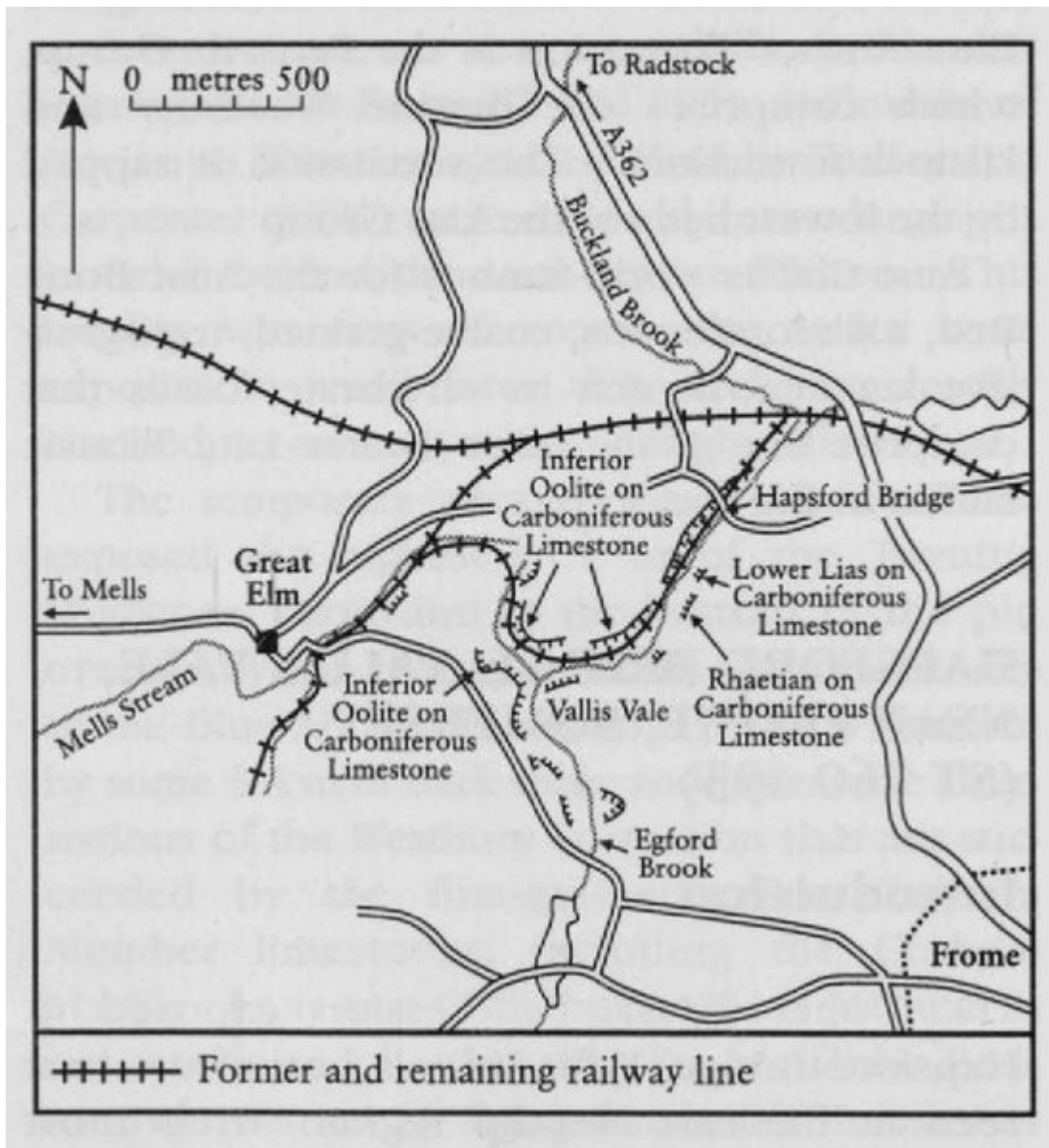
## Conclusions

Hapsford Bridge represents one of the most easterly exposures of the Penarth Group in the East Mendips, and therefore in southern England. These sediments were deposited against one of the islands in the Late Triassic Mendip archipelago, and seen now as the unconformity between the Carboniferous Limestone and the Upper Triassic strata. The site has produced many fossils, including the bryophyte *Naiadita lanceolata*, invertebrates, sharks, and possibly dinosaurs. This is an important site for studies of Rhaetian palaeogeography and palaeoenvironments.

## [References](#)



*(Figure 4.16) Hapsford Bridge, view of the Penarth Group sediments, which rest unconformably on Carboniferous Limestone. (Photo: R. Cottle.)*



(Figure 4.17) Map of the Vallis Vale and Hapsford Bridge localities. Various exposures along the stream sides show progressive onlap of first the Penarth Group, then the Lower Lias, and finally the Inferior Oolite (Middle Jurassic) onto the Carboniferous Limestone Mendip island. (After Savage, 1977).