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# Lulsgate Quarry, Avon

[ST 519 658]

## Introduction

Lulsgate Quarry exposes a composite succession of Rhaetian sediments, banked against a steep and stepped surface of Carboniferous Limestone (Figure 4.20). Preserved here are Westbury Formation clays, as well as the Cotham Marble and Langport Member limestones. These Upper Triassic sediments lie unconformably on the Carboniferous Black Rock Limestone, one of the best examples of this unconformity. Of especial importance is a coral biostrome in the Lilstock Formation.

Although Lulsgate Quarry is an important locality, it has received little attention in the geological literature. Brief mention was made by Donovan and Kellaway (1984), Green (1992), and Kellaway and Welch (1993).

## Description

Lulsgate Quarry is within the Avon Ridges and Valleys Natural Area. The following composite sedimentary section is taken from a report by K. N. Page to English Nature:

	Thickness (m)
<b>Lias Group</b>	
<i>Blue Lias Formation</i> ('Aldergrove Beds'):	
Coarse bioclastic limestone with some angular clasts and shell bands (containing <i>Modiolus billanus</i> )	4+
<b>Penarth Group</b>	
<i>Lilstock Formation</i> :	
Massive limestone with corals	~ 1.2
Massive breccia with angular and subrounded clasts in yellow limestone matrix	~1.1
Massive breccia-conglomerate in yellow brown limestone matrix with encrusting <i>Areta intusstriata</i> near the base	~ 2.0
Rounded and angular limestone clasts in a creamy coloured matrix, some showing algal structures ('Cotham Marble')	~0.7
<i>?Westbury Formation</i> :	
Bored and encrusted cobbles in a clay matrix	~ 0.4
<b>Carboniferous:</b> Black Rock Limestone	

The Upper Triassic sediments, including a coral biostrome, are banked up against the palaeo-landscape formed on Carboniferous Limestone. Fissures in the latter are common in Lulsgate Quarry, and infilling sediments include Lower Lias limestone and clay (Kellaway and Welch, 1993). The topmost unit represents the lower part of the Aldergrove Beds', an informal term proposed by Palmer (1972) for the basal Lias units in West Somerset, and now included in the Blue Lias Formation.

A range of fossil taxa has been described from Lulsgate Quarry, including the bivalve *Modiolus* from the upper unit, plus corals, crinoids, and bryozoans. The corals from the top of the Lilstock Formation include *Cyatharofenia dendroidia* and *Asteracoenia gibbosa*. Encrusting faunas, for example the bryozoan *Areta intusstriata*, are also known from a conglomeratic horizon in the Lilstock Formation.

## Interpretation

The Upper Triassic sediments at Lulsgate Quarry preserve a record of changing environmental conditions superimposed on a Mesozoic landscape. The Carboniferous Limestone is cut into a series of steps and cliffs, and the Mesozoic sediments were deposited against this feature.

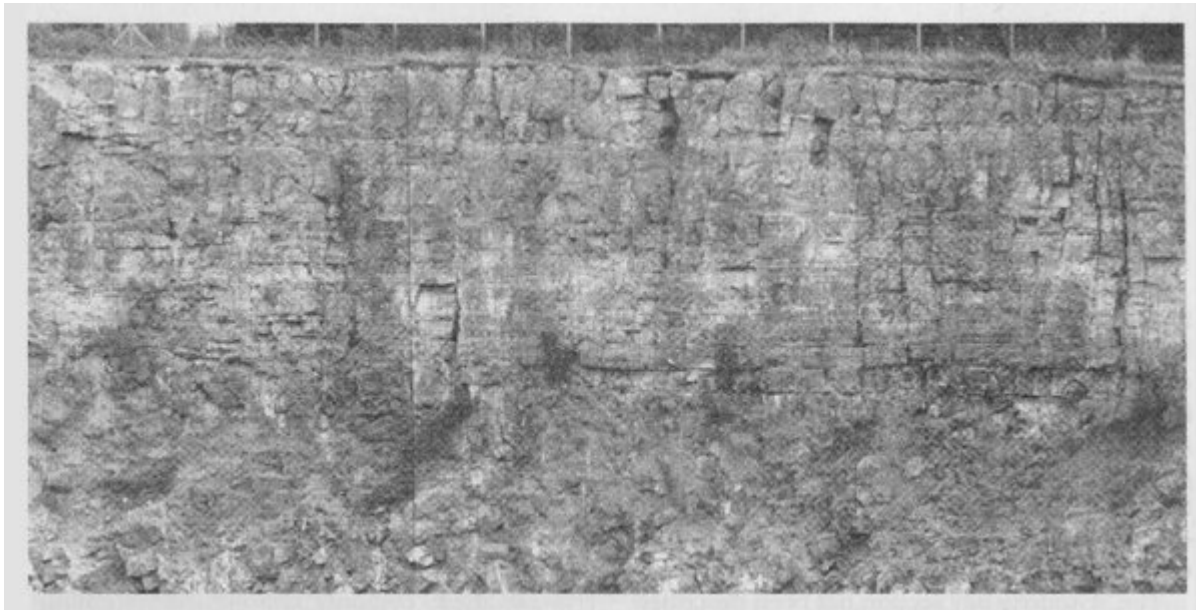
The clays immediately overlying the Carboniferous Limestone are thought to belong to the Westbury Formation. However, in certain parts of the quarry, the basal conglomerate, consisting of limestone blocks in a greenish-grey fine-grained limestone, is younger (Donovan and Kellaway, 1984). The Westbury Formation clays represent deposition in a shallow sea following a phase of marine transgression.

The overlying Lilstock Formation sediments are indicative of a lagoonal environment. The tree-like patterns in the Cotham Marble formed as algal growths (Hamilton, 1961). The algal mats probably grew in and around hypersaline lagoons. The remainder of the Lilstock Formation sediments have been interpreted as deposited in warm, shallow shelf lagoons; the presence of corals supports the interpretation of these beds as marine.

## Conclusions

Lulsgate Quarry exposes Carboniferous, Triassic and Jurassic rocks. The section is important as it shows the relationships between the palaeoshoreline and the marine sediments of the Westbury Formation and the overlying lagoonal facies of the Lilstock Formation. The coral biostromes at the top of the Lilstock Formation are an unusual and notable feature of the site.

## [References](#)



*(Figure 4.20) Lulsgate Quarry, view of the north face. This shows the steeply dipping Carboniferous Black Rock Limestone at the base, overlain unconformably by horizontal units of the Penarth Group. (Photo: D. Evans.)*