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# Rolling Bank Quarry, Gloucestershire

[SO 987 267]

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## Introduction

The Rolling Bank Quarry GCR site is a small disused quarry lying within the extensive Cleeve Common SSSI. It is the type locality and, indeed, the only available exposure of the Rolling Bank Member, the youngest part of the Aston Limestone Formation (Middle Inferior Oolite). The quarry features extensively in the literature of over 130 years (Wright, 1860; Woodward, 1894; Buckman, 1897; Richardson, 1904, 1929b; Hancock, 1966; Ager and Mudge, 1973; Baker, 1977).

## Description

A detailed description of the section is given by Buckman (1897), who combined the details of the quarry with other data to form a generalized, composite section for Cleeve Hill. The following section, recording the strata formerly exposed in Rolling Bank Quarry itself, is based on Buckman's (1897) record with minor additions and bed-numbering from Richardson (1904, 1929b).

	Thickness (m)
<b>Salperton Limestone Formation</b>	
<b><i>Clypeus Grit Member</i></b>	
1: Limestone, yellow, rubbly, pisoidal, with an admixture of marly material; ' <i>Terebratula globata</i> J. de C. Sowerby; pebbles of white limestone at base	3.66
<b><i>Upper Trigonina Grit Member</i></b>	
1b: Ragstone; planed surface locally with oysters attached; numerous <i>Trigonina</i> and <i>Rhynchonella angulina</i> Davidson' (= 2.74 <i>Rhynchonelloidella acutiplicata</i> (Brown))	
<b>Aston Limestone Formation</b>	
<b><i>Rolling Bank Member</i></b>	
<b>'Phillipsiana Beds'</b>	
2: Limestone, bluish-grey, hard, sharp fracture; planed top surface bored by annelids and <i>Lithophagus</i> , with numerous oysters attached	0.10
3: Limestone, similar to Bed 2 but not bored; but somewhat nodular in places with pockets of sand	0.15
4: Limestone, similar to above, in three layers with sandy partings; sparse ' <i>Terebratula phillipsiana</i> Walker	1.52
5: Limestone, grey, similar to above, in two beds, with sandy partings, sandy at base; ' <i>Terebratula buckmaniana</i> Walker and ' <i>T. phillipsiana</i> abundant; <i>Acanthothiris</i> cf. <i>paucispina</i> Buckman and Walker, <i>Rhynchonella quadriplicata</i> Davidson non Zieten, <i>Zeilleria anisoclines</i> S.S. Buckman; oysters at base	0.69
6: Limestone, massive, similar to above; <i>Rhynchonella quadriplicata</i> , ' <i>Terebratula phillipsiana</i> , <i>Bourguetia saemanni</i> (Oppel)	0.61
<b>'Bourguetia Beds'</b>	

7: Limestone, greyish, shelly, with brownish patches and infillings; <i>Bourguetia saemanni</i> , <i>Ctenostreon pectiniforme</i> (Schlotheim)	0.68
8: Limestone, grey, in several beds; numerous large bivalves; <i>Lopha</i> cf. <i>flabelloides</i> (Lamarck), <i>Modiolus explanatus</i> Morris etc., <i>Nautilus</i> cf. <i>ornatus</i> Foord and Crick	2.13
9: Limestone, grey, similar to above, somewhat bored	0.46
10: Limestone, similar to above	0.23

For many years, only the upper part of the section remained visible because of gradual back-filling of the lower part of the quarry with debris. However, in 1997, part of the quarry was re-excavated to show some 5 m of strata below the

Upper Trigonina Grit Member (Figure 3.46); the whole of the 'Phillipsiana Beds' are now exposed together with the upper part of the 'Bourguetia Beds' as recorded by Barron (1999a). The strata dip to the WNW at about 12° (Hancock, 1966).

## Interpretation

The Rolling Bank Quarry was first mentioned by Wright (1860) who mistook the Upper Trigonina Grit Member (Upper Inferior Oolite) for Lower Trigonina Grit Member (Middle Inferior Oolite), consequently gaining a mistaken notion of the stratigraphical position of the underlying Phillipsiana ('Terebratula Phillipsi Bed') and Bourguetia ('Roadstone') beds. Buckman (1897) realized their true position beneath the Upper Trigonina Grit Member and, by combining the section at Rolling Bank Quarry with that seen in nearby quarries, established that the beds lay above the Notgrove (Freestone) Member, i.e. at the top of the Middle Inferior Oolite. The full succession between the Upper Trigonina Grit and Notgrove members at Cleeve Hill is as follows:

Phillipsiana Beds	3.1m
Bourguetia Beds	4.1 m
Witchellia Grit	1.2 m

The thicknesses given are those of Buckman (1897), although he acknowledged difficulties in making direct measurements. The recent re-excavation of the Rolling Bank Quarry and the nearby Pot Quarry (which shows the Witchellia Grit) suggests that they are approximately correct, although the presence of faulting between the sections precludes absolute certainty (Barron, 1999b). The Witchellia Grit, named after the ammonite genus *Witchellia*, comprises 'iron-shot' limestones. The Bourguetia Beds are notably rubbly, shelly limestones named after the large gastropod *Bourguetia saemanni* (Oppel), though more common and distinctive are large *Lopha* and the clam-like *Ctenostreon*. The Phillipsiana Beds are grey to yellowish, more-or-less well-cemented calcareous sandstones or sandy limestones with sporadic shelly beds; in Rolling Bank Quarry the topmost part (Bed 2) is hard and strongly cemented, with a markedly bored top surface with encrusting oysters. They take their name from the brachiopod *Terebratula phillipsiana* Walker, which is quite common in the lower part. These three units have recently been combined into the Rolling Bank Member of which Rolling Bank Quarry is the designated type locality (Barron *et al.*, 1997). The member is confined to a very small area of the Cotswolds, essentially to Cleeve Hill alone (Buckman, 1897, p. 46; Barron *et al.*, 1997, fig. 4); elsewhere, the succeeding Upper Trigonina Grit Member rests on older strata. From the pattern of overlap beneath the Upper Trigonina Grit Member, Buckman (1901) deduced that an episode of minor folding and erosion (the Bajocian denudation) preceded the deposition of the Upper Trigonina Grit Member, such that generally the Rolling Bank Member was eroded away, being preserved only in the core of the so-called Cleeve Hill Syncline; on the axis of the flanking Birdlip Anticline to the south-west, the Upper Trigonina Grit Member rests directly on the Birdlip Limestone Formation (Lower Inferior Oolite) (see Knap House Quarry GCR site report, this volume).

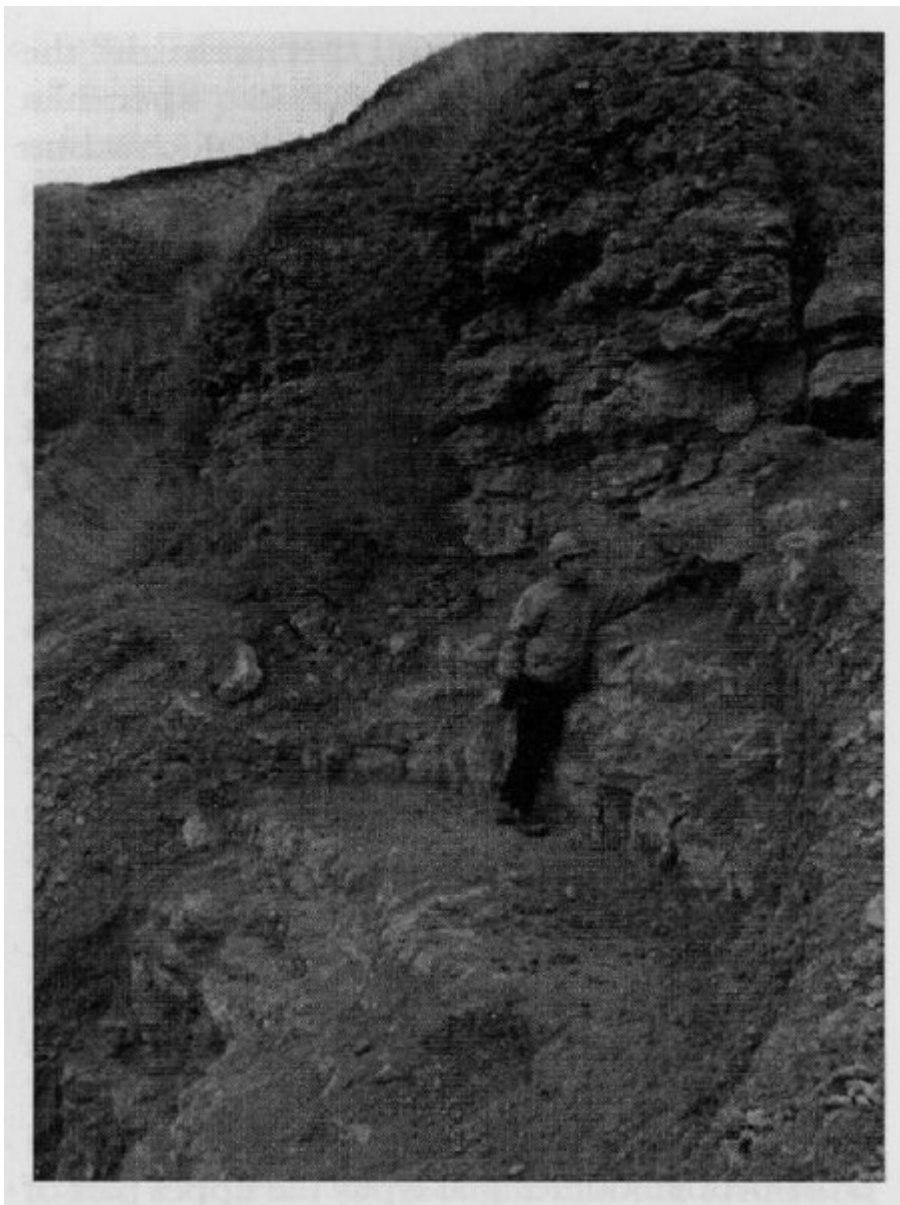
The Rolling Bank Member represents the youngest part of the Aston Limestone Formation (Middle Inferior Oolite). The Witchellia Grit, at nearby localities, has yielded ammonites indicating the younger part of the Lower Bajocian Laeviuscula Zone, but the only ammonite recorded from the Rolling Bank Quarry section itself is a stephanoceratid thought to come from Bed 7, near the top of the Bourguetia Beds (Buckman, 1897, pp. 609 (footnote), 613). Identified as *Skirroceras* aff. *leptogyrale* Buckman by Parsons (1980b), it is a form consistent with the Lower Bajocian Sauzei Zone.

The dip of the strata at Rolling Bank Quarry is contrary to the gentle south-eastward regional dip in this part of the Cotswolds and is due to local tectonic complications combined with cambering (incipient landslipping) at the margin of Cleeve Hill, a phenomenon resulting from the deformation of the mudstone-dominant Lias Group beneath the Inferior Oolite Group. Some minor faults and large, debris-filled fissures (gulls) which have at various times been noted at the quarry (e.g. Buckman, 1897, fig. 3) (Figure 3.47) are probably related to this latter process, although a more substantial tectonic fault bringing in oolites of the Cleeve Cloud Member (Birdlip Limestone Formation) has recently been exposed by excavations in the northern part of the quarry.

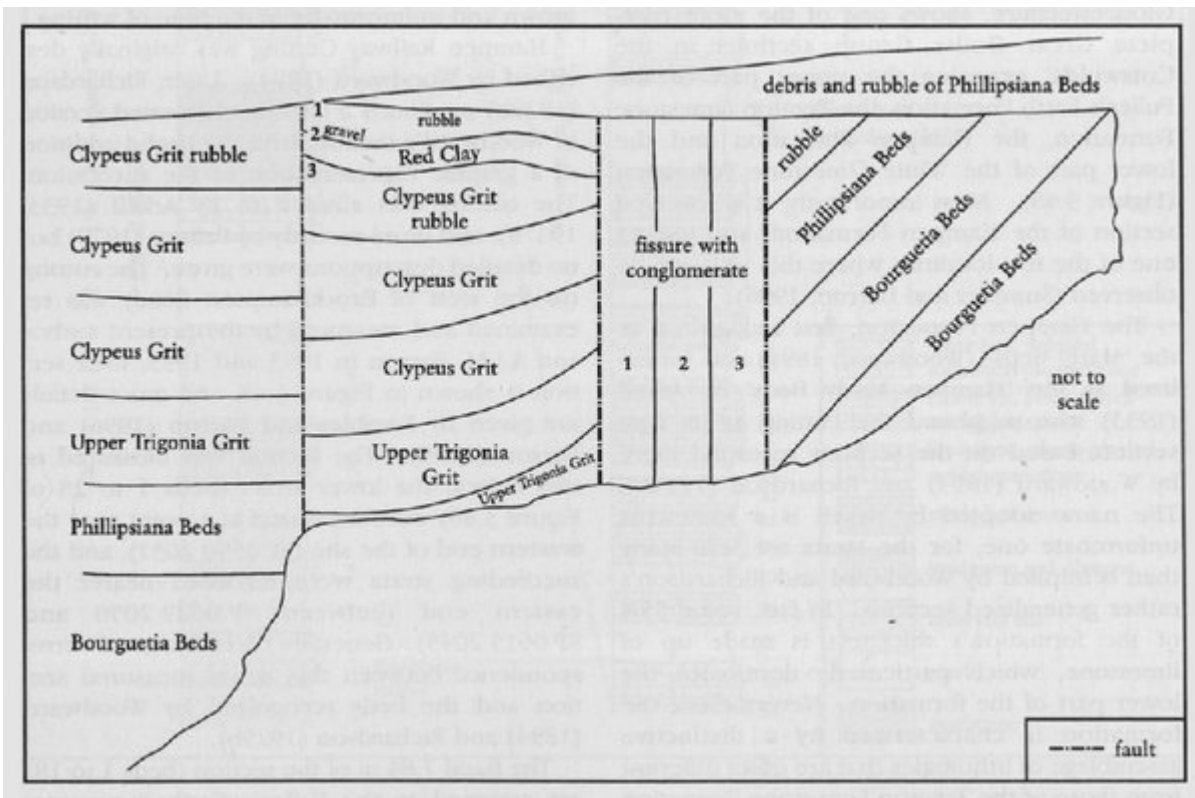
## Conclusions

Rolling Bank Quarry exposes the youngest part of the Aston Limestone Formation (Middle Inferior Oolite) in the Cotswolds, and is the only place where these strata can be seen in section. It is the type locality for the Rolling Bank Member, which comprises the strata traditionally known as the *Witchellia* Grit', '*Bourguetia* Beds' and *Thillipsiana* Beds'.

## [References](#)



*(Figure 3.46) Section at Rolling Bank Quarry showing the rubbly Clypeus Grit Member overlying the more massive Upper Trigonina Grit Member, with 'Phillipsiana Beds' (Rolling Bank Member) below. The geologist's hand rests on the boundary between the Upper Trigonina Grit Member and the Thillipsiana Beds'. (Photo: M.G. Sumbler.)*



(Figure 3.47) Minor faults and large debris-filled fissures at Rolling Bank Quarry as illustrated by Buckman (1897, fig. 3.)