
Hawkesbury Quarry, Gloucestershire

[ST 771 873]

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Introduction

The GCR site at Hawkesbury Quarry, c. 5 km south of Wotton-under-Edge, Gloucestershire, provides one of the few sections showing much of the attenuated Inferior Oolite Group of the south Cotswolds. A generalized sequence at Hawkesbury given by Richardson (1910) is probably largely based on this quarry. The location [ST 772 875] given by Mudge (1978a,b) for his graphic section of an exposure showing c. 12 m of Lower Inferior Oolite (Birdlip Limestone Formation) at 'Hawkesbury Knoll' cannot be correct and, in all probability, the section relates to the Hawkesbury Quarry described herein.

Description

The following section is based on the description by Cave (1977), with revised lithostratigraphical classification by the present author.

	Thickness (m)
Salperton Limestone Formation	
<i>Clypeus Grit Member</i>	
Oolite, yellow to cream, rubbly ('White Oolite')	1.83
Limestone, yellow-fawn, hard with scattered large yellow (limonitic?) ooids; rubbly in upper c. 0.30 m; <i>Rhactorhynchia subtetrahedra</i> (Davidson), <i>Arcomytilus?</i> , <i>Entolium corneolum</i> (Young and Bird)	2.13
Limestone, brown, hard, compact, in layers up to 0.2 m thick with rubbly marly partings; <i>Acanthothiris spinosa</i> (Linnaeus), <i>Stiphrothyris</i> sp., <i>Oxytoma inequivalve</i> (J. Sowerby)	0.76
<i>Upper Trigonina Grit Member</i>	
Limestone, grey to brown, shell-fragmental; <i>A. spinosa</i> , <i>Aulacothyris carinata?</i> (Lamarck), <i>Stiphrothyris tumida</i> (Davidson), <i>Cucullaea</i> sp., <i>Lucind</i> sp., <i>Parallelodon</i> cf. <i>hirsonensis</i> (d'Archiac), <i>Pholadomya</i> sp., <i>Pinna</i> sp., <i>Trigonina costata</i> Parkinson	1.37
Birdlip Limestone Formation	
Oolite, fawn, rather coarse-grained, shell-fragmental (including echinoid debris), in thick cross-bedded layers; top surface planed and oyster-encrusted; uppermost part hardened and brown	1.52
Limestone, brownish-yellow, hard, cross-bedded, sandy; and limestone, finely ooidal, sandy, crystalline	1.22
Oolite, yellow, massive; some shell detritus	4.27
Obscured	3.35
<i>Leckhampton Member</i>	
Limestone, yellowish-brown, finely sandy; shell detritus and large irregular brown pellets	0.91
Marl, brown, rubbly, with brown clay layers	0.15–0.20

Limestone, pale-yellow to brown, fine grained, sandy; small dark-brown ferruginous ooids	0.10
Limestone, brown, sandy with bivalve shell detritus; and limestone, soft-weathering, knobbly, containing ?limonitic ooids	0.76
Limestone, brown, hard, sandy, rather knobbly, crystalline; large, brown, ferruginous brown ooids	0.46

In 1996, all of the units described above were readily apparent, with the Leckhampton Member visible in a small section at the southern end of the quarry, and the remaining and greater part of the section visible in the main face (Figure 3.16). The Salperton Limestone Formation is well displayed at the eastern end of the quarry.

Interpretation

Hawkesbury Quarry lies towards the southern limit of the extent of the Birdlip Limestone Formation (Lower Inferior Oolite). While some 12.8 m are present at Hawkesbury Quarry, the formation is cut out entirely by the succeeding Salperton Limestone Formation (Upper Inferior Oolite) only a few kilometres to the south. As elsewhere in the south Cotswolds, the Aston Limestone Formation (Middle Inferior Oolite) is absent. This non-sequence is marked by a planar erosion surface encrusted by oysters and other epifauna.

The lowest beds seen are rather sandy, ferruginous limestones belonging to the Leckhampton Member, formerly known as the 'Scissum Beds'. This forms the basal unit of the Birdlip Limestone Formation (and Inferior Oolite Group) throughout the Cotswolds, resting on the Lias Group. Some 2.4 m of Leckhampton Member were recorded by Cave (1977; see above); this must represent virtually the total thickness of the unit (see Richardson, 1910).

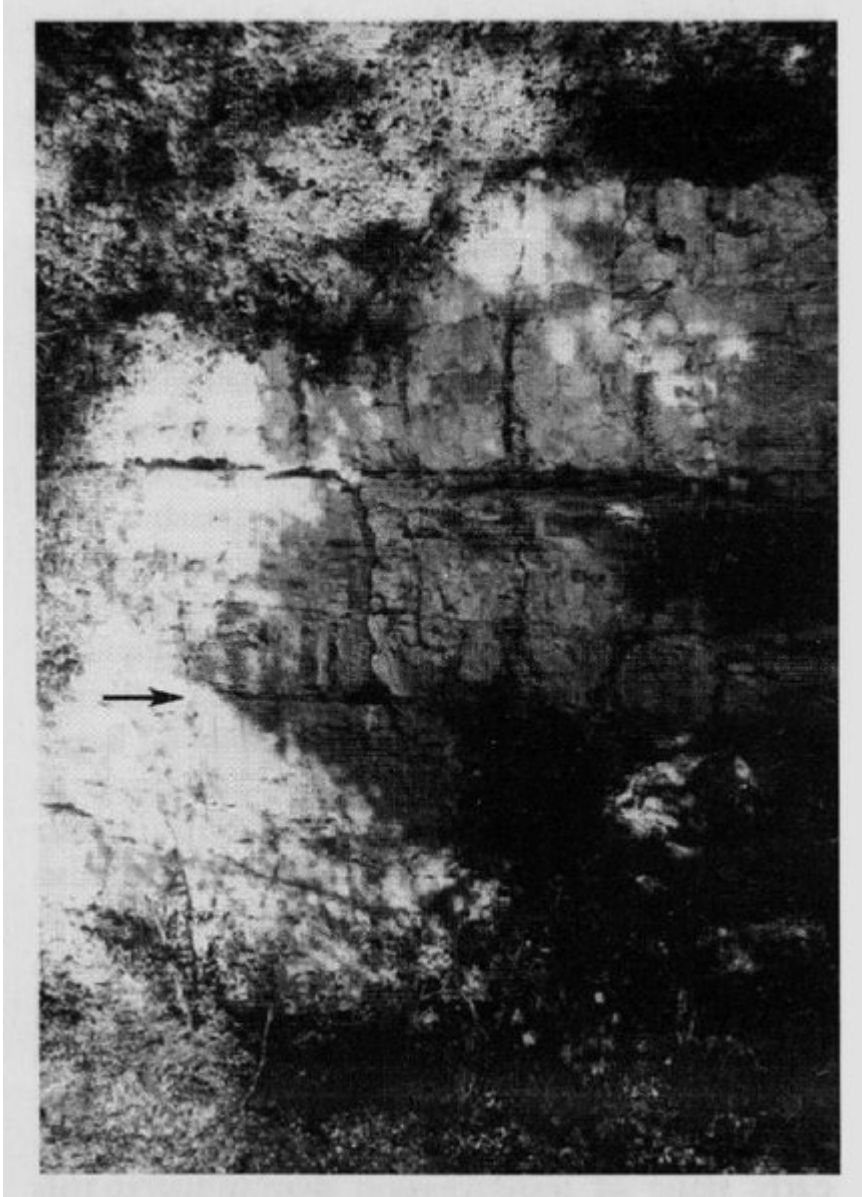
The succeeding beds of the Birdlip Limestone Formation comprise massively bedded, fine- to coarse-grained, ooidal grainstones, with signs of cross-bedding at some levels. Traditionally these beds have been assigned to the Lower Limestone that is now included in the Crickley Member (Barron *et al.*, 1997). However, the strata are of significantly different facies to the Lower Limestone of the Cheltenham type area (see Leckhampton Hill and Crickley Hill GCR site reports, this volume) and for this reason Mudge (1978a,b) introduced the term 'Frocester Hill Oolite' for the supposedly equivalent beds in the south Cotswolds, such as at Hawkesbury Quarry. Assuming that the lateral correlation of these strata is correct, the Frocester Hill Oolite may be regarded as a facies variant of the Crickley Member. Towards the top of the succession (?beneath the topmost bed of the Birdlip Limestone Formation in the section above), Mudge (1978a, fig. 3) noted another oyster-encrusted hardground. Largely on this basis, he assigned the succeeding beds to the Fiddler's Elbow Limestone, now included in the Cleeve Cloud Member (Barron *et al.*, 1997), i.e. the former Lower Freestone, although Cave (1977) was of the opinion that the latter unit was overstepped by the Salperton Limestone Formation some distance to the north of Hawkesbury Quarry.

The Upper Trigonina Grit Member, the basal part of the Salperton Limestone Formation, forms a massive post of extremely shelly limestone, and again is capped by a planed, oyster-encrusted hardground. Only the lower part of the succeeding Clypeus Grit Member is exposed; Richardson (1910) gave the full thickness (beds 2 and 3) as 6.0 m. In the south Cotswolds, Richardson (1910) recognized a tripartite sequence within the beds now included in this member, the lower two parts of which are claimed to be present at Hawkesbury Quarry. However, in the section as currently exposed, the distinction between them is rather indefinite. The lower part (the 'Clypeus Grit Beds' of Cave, 1977) includes rubbly peloidal packstones and grainstones not dissimilar to those that characterize the Clypeus Grit Member at its type locality (see First Cutting West of Notgrove GCR site report, this volume), but the basal bed is less typical, comprising a fairly massive, medium- to fine-grained slightly sandy, ooidal grainstone more akin to the 'Doulting Stone' better developed farther south in the Bath–Mendips district (see Doulting Railway Cutting GCR site report, this volume). The uppermost beds, assigned to the 'White Oolite', are slightly finer grained, and are more uniformly ooidal; this unit is again better developed farther south.

Conclusions

Hawkesbury Quarry shows one of the most southerly remaining sections of the Birdlip Limestone Formation (Lower Inferior Oolite) in the south Cotswolds. It shows a truncated succession overlain by the Salperton Limestone Formation (Upper Inferior Oolite); the Aston Limestone Formation (Middle Inferior Oolite) is absent owing to overstep. The character of the Salperton Limestone Formation, notably of the Clypeus Grit Member, is of a facies transitional between its typical development in the north Cotswolds, and the higher-energy grainstone facies developed farther south.

References



(Figure 3.16) Exposure at the western end of Hawkesbury Quarry showing the Upper Trigonía Grit Member overlying the Birdlip Limestone Formation. The boundary is marked by a black arrow. The quarry face is approximately 5 m high. (Photo: M.G. Sumbler.)