Leigh's Quarry, Gloucestershire

[SO 826 026]

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Introduction

Leigh's Quarry, sited about 3 km south-west of Stroud in Gloucestershire, lies at the southern end of the extensive Selsley Common SSSI. There were several quarries on Selsley Common (or Selsley Hill) as mentioned by Lycett (1857) (see Richardson, 1910, fig. 4) but, of these, Leigh's Quarry features most frequently in the literature, and still provides an excellent section through the upper part of the Inferior Oolite Group (Figure 3.27). A brief description of the quarry section was given by Witchell (1882a, 1890), but the first detailed account was that of Richardson (1910). This formed the basis for various subsequent guides and accounts of field excursions (e.g. Ager, 1956, 1969; Ager and Donovan, 1973; Murray and Hancock, 1977).

Description

The following section is based mainly on Richardson (1910) with revised lithostratigraphical classification by the present author.

	Thickness (m)
Salperton Limestone Formation	
Clypeus Grit Member	
1: Debris of white ooidal limestone	0.30
2: Limestone, somewhat flaggy, broken up and mixed with some marl; fossils including '*Terebratula globata*'of authors (*non* J. de C. Sowerby), 'T.' *globata* var. *birdlipensis* Walker, *permaxillata* S.S. Buckman, *Rhactorhynchia hampenensis* S.S. Buckman, *Amberleya hudlestoni* Richardson, *Ceratomya striata* (J. Sowerby), *Limatula gibbosa* (J. Sowerby), *Holectypus depressus* (Leske)	1.52
3: Limestone; bryozoa (*Berenicea*)*, Bourguetia saemanni* (Oppel)	0.38
4: Limestone, massive, bored top in places; '*T.*' *globata* very common; *Entolium demissum* (Phillips)	0.61–0.76
5: Limestone, with irregular base resting upon lumps of limestone; *Pleuromya subelongata* (d'Orbigny), *Trigonia costata* (Parkinson) (common), *Holectypus depressus* (Leske)	0.20
6: Limestone, grey-brown, with very irregular top; few fossils	0.15–0.30
7: Limestone	0.18
8: Limestone, rubbly; few fossils	0.76
Upper Trigonia Grit Member	
9: Limestone, very shelly, with oysters on top surface	0.25
10: Lumps of pale-brown limestone and shaly marl	0.15
11: Ragstone; 'usual' fossils	0.61
12: Parting	0.03
13: Limestone, rubbly; few fossils	0.15
14: Ragstone; 'usual' fossils	0.63
Birdlip Limestone Formation	

Scottsquar Member	
15: Limestone, white, ooidal packstones and grainstones; cross-bedding in parts; top bored by annelids and bivalves; *Trigonia costatula* Lycett, *Nerinea oppelensis* Lycett	1.27
16: Marl (?) parting	0.03
17: Limestone, rubbly, whitish; *Spiropora,* pentacrinoids, *Granulirhynchia granulata* (Upton), *Acrosalenia lycetti* Wright, *Trochotiara depressa* (Agassiz), *Hemipedina tetragramma* Wright	0.38
18: Marl (?) parting; small sponges	0.01
19: Limestone; *Plectothyris fimbria* J. Sowerby, *Globirhynchia subobsoleta* (Davidson), *G. witchelli* (Richardson and Upton)	0.61
20: Marl; same fossils as in Bed 19, and *Epithyris submaxillata* Morris, *Granulirhynchia granulata* (Upton)	0.02–0.10
Cleeve Cloud Member	
21: Limestone, white, massive-bedded, ooidal grainstones showing large-scale cross-bedding	seen to 3.96

The section exposed at the time of writing was much as described above, although the lower part of the Cleeve Cloud Member was covered by talus. Lower parts of the succession are exposed in quarries at the northern end of the common (see Richardson, 1910; Mudge, 1978a,b).

The Upper Trigonia Grit Member, at the base of the Salperton Limestone Formation, is typically developed as an irregularly bedded, shell-fragmental, fossiliferous calcarenite. The 'usual' fossils referred to by Richardson (1910) are large bivalves, and brachiopods such as the distinctive rhynchonellid *Acanthothiris spinosa* (Linnaeus). The Clypeus Grit Member is dominated by poorly bedded, peloidal packstones and grainstones that are very fossiliferous at some levels, particularly with the large, so-called '*Terebratula globata*'(= *Stiphrothyris* spp.). Pieces of Richardson's (1910) Bed 1 may be found in the subsoil at the top of the quarry.

Interpretation

The Cleeve Cloud Member, at the base of the section, corresponds with the Lower Freestone of previous authors, or the Devil's Chimney Oolite of Mudge (1978a). It is capped by a planed hardground on which Mudge (1978b) reported encrusting oysters.

The succeeding Scottsquar Member is only 2.3 m thick. The marls and soft, burrowed micri-tic limestones of the lower part (beds 16 to 20) represent the 'Oolite Marl' of Richardson (1910) and others. The upper part (Bed 15) rests sharply and probably erosively on the underlying beds. These higher-energy packstones and grainstones have generally been assigned to the Upper Freestone (Richardson, 1910); Baker (1981) assigned them to his 'micritic marginal facies' rather than the 'oolite-dominated shoal facies', although most of the 'Upper Freestone' elsewhere belongs to the latter.

The top of the Scottsquar Member is marked by a hardground that represents a substantial break in the succession, for it is succeeded by the Salperton Limestone Formation (Upper Inferior Oolite). As in the Cotswolds farther south, there is no Aston Limestone Formation (Middle Inferior Oolite) present at this locality. Witchell (1882a) erroneously recorded 0.61 m of 'Gryphite Grit', but the beds he identified are actually a part of the Upper Trigonia Grit Member, and the Aston Limestone Formation is overstepped by the Salperton Limestone Formation within Rodborough Hill, a short distance to the north-east (see Fort Quarry GCR site report, this volume; also Buckman, 1901, pl. 46; and Barron *et al.,* 1997, fig. 4). Indeed, it was the absence of the distinctive Middle Inferior Oolite strata on Selsley Common and to the south, and the regional pattern of its overstep, that led Buckman (1901), building on an idea suggested by T.T. Groom, to the theory that, after deposition of the Middle Inferior Oolite, an episode of gentle flexure was followed by erosion, which he termed the 'Bajocian denudation'. Farther south, the erosion surface beneath the Salperton Limestone Formation, representing the 'Bajocian denudation', cuts down to lower levels in the Inferior Oolite Group; the Scottsquar Member is cut out just

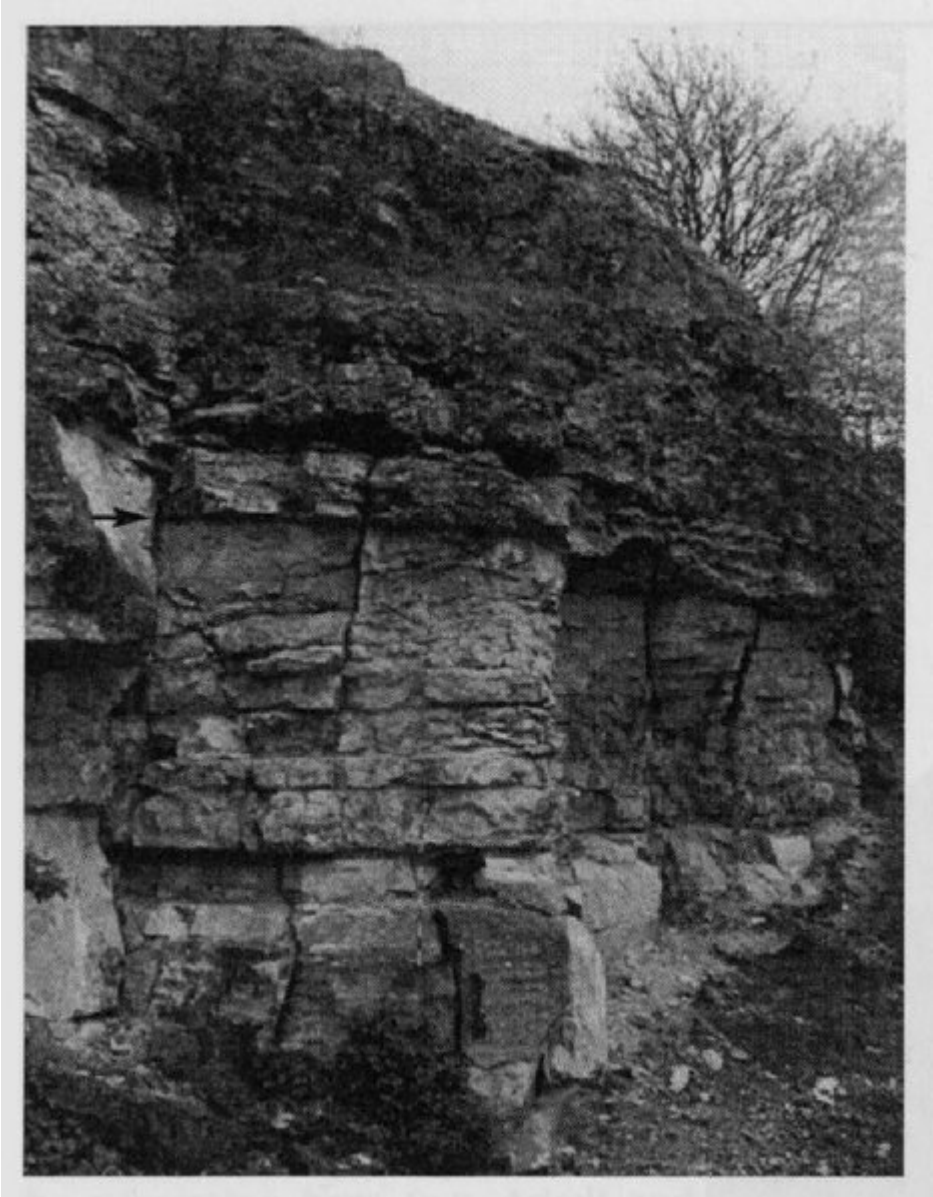
south of Leigh's Quarry (see Cave, 1977) and the Cleeve Cloud Member is apparently absent at Nibley Knoll and Hawkesbury Quarry (see GCR site reports, this volume).

The Upper Trigonia Grit Member is also capped by a hardground encrusted by oysters, though this marks a relatively minor break in deposition compared to the 'Bajocian denudation'; other depositional breaks occur within the succeeding Clypeus Grit Member (at the top of Bed 4, for example). Richardson (1910) assigned his Bed 1 to the 'White Oolite', which forms the middle part of the Clypeus Grit Member in the south Cotswolds.

Conclusions

Leigh's Quarry shows the unconformable relationship between the Salperton Limestone Formation (Upper Inferior Oolite) and the Birdlip Limestone Formation (Lower Inferior Oolite); the Aston Limestone Formation (Middle Inferior Oolite) is missing. In combination with other sites described in this volume, it helps clarify the stratigraphical relationships within, and the tectonic history of, the Aalenian–Bajocian rock succession in the Cotswold region.

References



(Figure 3.27) Salperton Limestone Formation overlying the Birdlip Limestone Formation at Leigh's Quarry. The boundary is marked by a black arrow. (Photo: M.G. Sumbler.))