Corsham Railway Cutting, Wiltshire

[ST 863 694]

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Introduction

The exposures in Corsham Railway Cutting, on the main railway line from London to Bath, lie between the former Corsham Station and the eastern portal of Box Tunnel, *c.* 6 km south-west of Chippenham, Wiltshire. They reveal an Upper Bathonian succession that includes the upper part of the Bath Oolite Member of the Great Oolite Formation, in a locally commercial freestone facies (Corsham Down Stone), and the lower part of the Forest Marble Formation, characterized by its basal coralline facies (Figure 3.9). Woodward (1894) referred to the exposures, but the only published measured section is that of Green and Donovan (1969), whose account includes a diagram illustrating the most informative part of the section (Figure 3.10).

This account assigned the Upper Rags Member, including the coralline limestones, to the Great Oolite Formation, but Penn and Wyatt (1979) regarded these beds as the basal part of the Forest Marble Formation, which oversteps the Great Oolite Formation to the north.

Description

The following description, including bed numbers, is based on Green and Donovan (1969).

	Thickness (m)
Forest Marble Formation	
8: Limestone, brown, grey-hearted, shelly and ooidal, thinly bedded, cross-bedded	up to *c.* 2.2
7: Clay, grey and brown, shelly with 'Bradford Clay' fauna (see below); base sharp and pocketing into beds below	up to 0.4
Upper Rags Member	
6: Oolite, cream, shell-fragmental, massive, planar-bedded; abundant shell-debris; upper surface commonly oyster-encrusted; thin marl parting at base	2.4
5: Oolite, cream, shell-fragmental, strongly cross-bedded	1.4
4: Marl, persistent, more-or-less planar; locally lapping on to coral reef-knolls of Bed 3	0.3
3: Limestone, massive and shell-fragmental, marly and shelly, and cross-bedded oolite; gently undulating clear-cut base; intermittent sections through mounds of rubbly, porcellaneous, white-weathering limestone (*Corsham Coral Bed*), up to 18.3 m long and 2.4 m high, with masses of commonly recrystallized compound corals (including *Cladophyllia, Cyathopora* and *Isastrea*), as well as bivalves, gastropods including *Bactroptyxis bacillus* (d'Orbigny) and brachiopods (including *Avonothyris, Dictyothyris coarctata* (*Parkinson*), *Epithyris oxonica* Arkell and *Eudesia cardium* (Lamarck)); tops of mounds truncated by sharp base of overlying beds	up to 2.6
Great Oolite Formation	
Bath Oolite Member	

1–2: Oolite freestone, cream, well sorted with little or no shell-debris; shelly lens locally developed at top with corals, gastropods, brachiopods including *Dictyothyris, Epithyris, Kallirhynchia* and *Rhactorhynchia,* and abundant bivalves; otherwise poorly fossiliferous with rare *Mytilus* (*Falcimytilus*) *sublaevis* J. de C. Sowerby; upper surface slightly bored	up to 1.2

Interpretation

The uniform, even grain-size of the Bath Oolite Member freestone reflects deposition in a high-energy, shallow-water, carbonate shelf-sea, in which strong currents constantly mobilized the substrate to produce good sorting of the constituent ooids. The unstable nature of this sediment probably made it unsuitable for most ben-thic organisms, which would account for the sparse macrofauna in the member. The bored upper surface of the member indicates lithification of the substrate during a depositional break, before renewed sedimentation occurred.

The shell-fragmental limestones and oolites of the succeeding Corsham Coral Bed also suggest a high-energy, shallow-water environment with a mobile substrate. Although the associated coral reef-knolls demanded active currents to convey micro-organisms to the coral polyps, they also required a stable sea-floor on which to flourish. Probably, the lithified top of the Bath Oolite Member allowed their establishment and growth before deposition of the accompanying sediment restricted further colonization. The overlying shell-fragmental oolites of the Upper Rags Member reflect continued high-energy conditions, the cross-bedded lower beds suggesting strong currents. The oyster-encrusted upper surface, together with the sharp, pocketing base of the overlying part of the Forest Marble Formation, may represents a break in sedimentation.

The lowest beds above the Upper Rags Member at Corsham Railway Cutting indicate an influx of muddy sediment before renewed deposition of shelly and ooidal limestones. Notably, at the base, there is a fossiliferous clay (Bed 7) with the so-called 'Bradford Clay fauna'. Where fully developed, this fauna contains a characteristic association of brachiopods including common *Avonothyris, Digonella digona* (J. Sowerby), *D. digonoides* S.S. Buckman, *Epithyris bathonica* S.S. Buckman and *Rhactorhynchia obsoleta* (Davidson), and much less common *Dictyothyris coarctata* (Parkinson) and *Eudesia cardium* (Lamarck), as well as the bivalves *Oxytoma* and *Radulopecten.* Of the brachiopods, only *D. digona, D. coarctata* and *E. cardium* do not occur below the Forest Marble Formation (Penn and Wyatt, 1979). However, the Bradford Clay faunal assemblage is not confined to the stratigraphical level of its type locality at Bradford-on-Avon, but occurs in at least three well-defined clay beds, including the equivalent of the one (Bed 4) that rests on the Corsham Coral Bed in Corsham Railway Cutting. Elements of the fauna also occur disseminated throughout the Upper Rags Member.

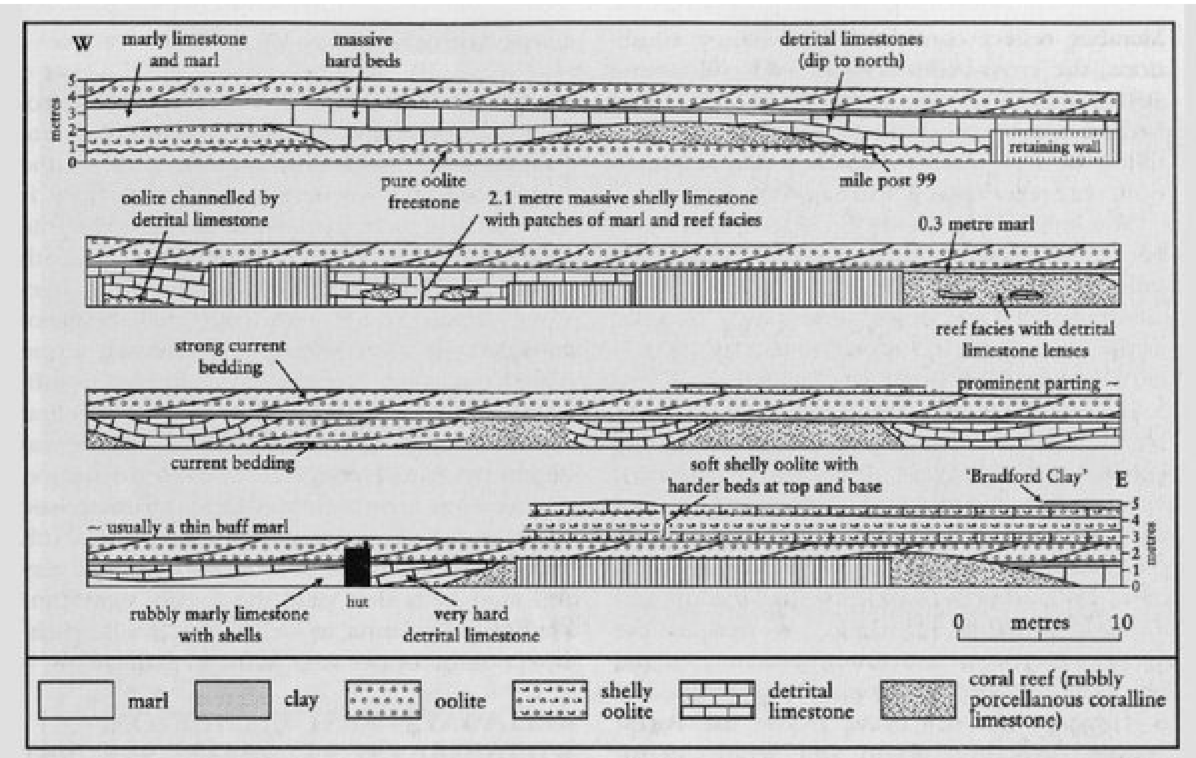
The diagnostic elements of the Bradford Clay fauna are the only fossils of biostratigraphical significance in the cutting. No ammonites, which are rare in the Bath Oolite Member and the Forest Marble Formation, have been collected from the cutting to date the succession. However, Penn and Wyatt (1979) considered the lower part of the Bath Oolite Member to be laterally equivalent to the Twinhoe Member south of Bath, which has yielded Retrocostatum Zone ammonites; they inferred that the whole of the Bath Oolite Member might belong in this zone (then called the *aspidoides* Zone). *Clydoniceras hollandi* (S.S. Buckman) occurs in the Bradford Clay of the type locality, indicating that the Forest Marble Formation above the Upper Rags Member belongs to the Hollandi Subzone of the Discus Zone. Penn and Wyatt (1979) favoured inclusion of the Upper Rags Member in the latter zone, but Torrens (1980b) included them in the *orbis* (then *aspidoides,* now Retrocostatum) Zone.

Conclusions

Corsham Railway Cutting presents a fine exposure of the upper part of the Bath Oolite Member and the overlying basal beds of the Forest Marble Formation. The section is through Late Bathonian strata, falling within the Retrocostatum and Discus zones. The Bath Oolite Member is present in a uniform, freestone facies, which historically has been of considerable local value as a building stone (Corsham Down Stone). Of particular significance are the sections through intermittent coral reef-knolls developed within the Corsham Coral Bed at the base of the Forest Marble Formation (Upper Rags Member), in a facies characteristic of this stratigraphical level in Wiltshire and south Gloucestershire. The section also exhibits clay and marl beds that yield the locally significant Bradford Clay fauna, as well as the 'Bradfordian' aspect of the Upper Rags fauna in general.

References

(Figure 3.9) North side, Corsham Railway Cutting; current-bedded shell-fragmental limestones and shelly ooidal limestone rest on a rubbly bedded patch-reef immediately west of mile post 99. The hammer-head rests on top of the underlying oolite freestone (Bath Oolite Member). (Photo: British Geological Survey, No. A10913; reproduced with the permission of the Director, British Geological Survey, NERC, 1967.))



(Figure 3.10) Diagrammatic section of the north side of Corsham Railway Cutting. (After Green and Donovan, 1969, fig. 6.))