

Cross Hands Quarry, Warwickshire

[SP 269 291]

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Introduction

The GCR site at Cross Hands Quarry lies 5 km north-west of Chipping Norton in the northern quadrant of the junction of the A44 Chipping Norton to Moreton-in-Marsh road, and A436 to Stow-on-the-Wold, just within the county of Warwickshire. It is one of several quarries clustered around the crossroads that were originally opened during the Second World War to provide material for local RAF airfields. All of the quarries exposed essentially the same succession, showing the upper part of the Clypeus Grit Member (uppermost Inferior Oolite Group) and basal part of the overlying Chipping Norton Limestone Formation (Great Oolite Group). Only the GCR site now shows any significant section (Figure 3.58). Much of the quarry, which covers an area of about 10 ha, has been used for tipping and is largely backfilled, but faces up to 6 m high have been preserved in the southwestern part. Despite the excellence of the exposure, the quarry does not appear to have been described in the literature, receiving only passing mention by Richardson (1911a), McKerrow and Kennedy (1973) and Horton *et al.* (1987).

Description

Overall, the sections show up to 3.35 m of Clypeus Grit Member overlain by up to 4 m of Chipping Norton Limestone Formation. A composite section (measured by the present author in April 1997) is recorded below.

	Thickness (m)
Great Oolite Group	
Chipping Norton Limestone Formation	
7: Limestone, yellowish-brown, slightly sandy and ferruginous, fine- to medium-grained, fairly well-sorted ooidal and moderately shell-fragmental grainstone in several massive beds, each becoming somewhat more flaggy upwards and showing signs of cross-bedding; common specks of carbonaceous plant-material and fairly common bone fragments up to several centimetres in length; burrows common, often infilled with brown, limonitic clay; some well-preserved <i>Diplocraterion</i> in lowest 0.5 m; grey to brown clay parting at highly uneven base, perhaps channelling into Bed 6 below	up to 4 m
6: Limestone, pale-fawn to brown, hard, rubbly, coarse-grained, peloidal and shell-fragmental packstone; common small gastropods together with oysters and large serpulids; fairly common bone fragments; variable thickness	0.25–0.30
5: Clay, marly, brown, shelly	0.02
Inferior Oolite Group	
Salperton Limestone Formation	
Clypeus Grit Member	
4: Limestone, pale-buff, soft, rubbly, coarse-grained ooidal and peloidal packstone to wackestone; fossils abundant and often perfectly preserved	0.25

3: Limestone, white to pale-brown, soft, massive, rubbly weathering, coarse-grained, ooidal, peloidal and shell-fragmental packstone to wackestone	0.60
2: Marl, white and fawn banded, made up largely of coarse (up to 1.5 mm) peloids in slightly argillaceous micrite matrix; patchily cemented into soft limestone in places; forming persistent, distinctive bed in face	0.50
1: Limestone, white to pale-fawn, soft, massive, rubbly weathering, coarse-grained, ooidal and peloidal packstone to wackestone; poorly sorted, structureless, with large, often brownish-skinned and irregularly shaped composite ooids (aggregate grains) in matrix with finer-grained ooids and peloids	up to 2.0
Obscured (to quarry floor)	1.9

The quarry spoil heaps provide an opportunity to examine the fauna. The Clypeus Grit Member yields abundant brachiopods including rhynchonellids and terebratulids (particularly *Stiphrothyris*), and many bivalves including myaceans, pectinids and oysters. Several genera of irregular echinoids occur, most notably the eponymous *Clypeus*, as well as gastropods, serpulids and solitary corals (Q.D. Radley, pers. com., 2001).

Macrofauna is very sparse in the Chipping Norton Limestone Formation, although bivalves such as *Camptochlamys* and *Camptonectes* occur sporadically, and a more extensive fauna occurs in Bed 5. A new species of the bryozoan *Mesenteripora* (Warwickshire Museum, specimen No. G15409; J. Crossley, pers. comm., 1997) has also been collected. Bones of dinosaur have been recovered (Birmingham and Oxford University museums) and small bone fragments occur quite commonly; plant material is also present and wood (*?Ginkgo*) has allegedly been found.

A number of substantial, sub-vertical gullies can be seen in the section; these are widened joints, up to c. 1 m in width, which are more-or-less infilled with rock debris and travertine.

Interpretation

The section of the Clypeus Grit Member represents the upper part of the member, the total thickness of which is probably less than 5 m at this locality (Horton *et al.*, 1987, fig. 26). Despite this, the member hereabouts makes up the greater part of the Inferior Oolite Group, which is much reduced compared with farther west in the Cheltenham area where it is up to 100 m or more in thickness. To the north-east (see Hook Norton GCR site report, this volume), the Clypeus Grit Member dies out altogether and is overstepped by the Chipping Norton Limestone Formation. The micrite matrix of the rock suggests a low-energy environment, although episodes of higher energy are implied by the presence of coarse-grained peloids and shell debris. This material is now dispersed through the rock probably as a result of intense burrowing activity by creatures such as *Clypeus*. Shallow infauna is generally disturbed by burrowing but deeper infauna, such as the bivalves *Pholadomya* and *Pleuromya*, typically remain in life position.

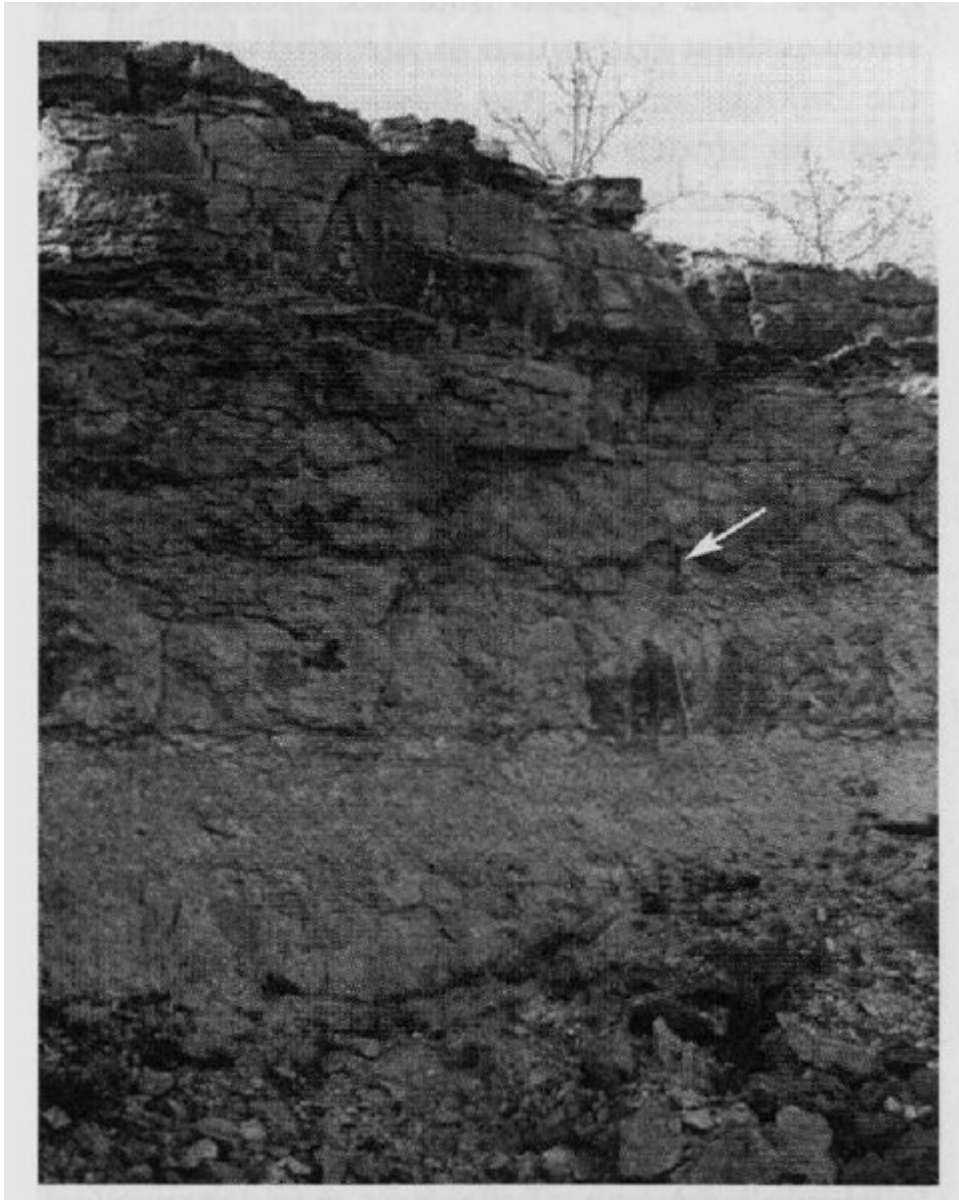
The overlying Chipping Norton Limestone Formation, which comprises high-energy oolite facies limestones, is the basal unit of the Great Oolite Group. It rests sharply on the underlying Inferior Oolite Group and, given the likelihood of progressive overstep of the latter, there is presumably an erosive non-sequence at the base. There is, however, no indication of a bored surface such as has been described at this level elsewhere (Sumbler *et al.*, 2000). Apart from the basal limestone (Bed 6), which incorporates material (coarse peloids) reworked from the underlying Clypeus Grit Member, the Chipping Norton Limestone Formation is of markedly different facies to that of the latter, having a distinctive brownish colour and being somewhat sandy with scattered specks of black plant-material. This facies, which characterizes the lower part of the Chipping Norton Limestone Formation throughout the region, has been ascribed to the Hook Norton Member, although the validity of this formational subdivision is debateable (Horton *et al.*, 1987; Sumbler *et al.*, 2000; see also Snowhill Hill and Hook Norton GCR site reports, this volume). Bone and plant material, together with the substantial component of quartz sand, reflect the influence of the London Landmass.

The sub-vertical gulls reported above are associated with an early stage of landslipping known as 'cambering'. This phenomenon is common throughout the Cotswolds in situations, such as that at Cross Hands Quarry, where limestone beds crop out on a hilltop or scarp edge, above slopes of incompetent Lias Group mudstone.

Conclusions

The Cross Hands Quarry GCR site displays the boundary between the Inferior and Great Oolite groups. The exposed beds are probably exclusively earliest Bathonian in age, and very close to the Bajocian–Bathonian stage boundary. Apart from its stratigraphical interest, it is a highly fossiliferous site yielding an abundance of brachiopods and bivalves, as well as echinoids and corals, to the many educational groups (particularly school parties) that have visited during the past 20 years. Dinosaur remains have also been found. The strata show indications of the influence of the London Landmass during the Mid Jurassic Epoch, and the site is thus of interest for regional palaeogeographical studies.

[References](#)



(Figure 3.58) Chipping Norton Limestone Formation overlying Clypeus Grit Member (Salperton Limestone Formation) at Cross Hands Quarry. The hammerhead (arrowed) marks the formational boundary (Photo: M.G. Sumbler.)