Snowshill Hill (Hornsleasow Quarry), Gloucestershire

[SP 131 323]

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Introduction

Hornsleasow Quarry, formerly generally known as 'Snowshill Hill', shows a fine section through the lower part of the Great Oolite Group, from the Chipping Norton Limestone Formation up to the Taynton Limestone Formation (Figure 3.56). The underlying Clypeus Grit Formation (Inferior Oolite Group) is also poorly exposed. The middle part of the succession is regarded herein as an attenuated representative of the Fuller's Earth Formation, and is of a facies transitional between that formation, as typically developed farther south in the Cotswolds, and the Sharp's Hill Formation of Oxfordshire. Much of the succession is fossiliferous. Of particular interest are the Coral Bed (in the Fuller's Earth Formation) and the Hornsleasow Clay (within the Chipping Norton Limestone Formation); the latter has yielded an extensive vertebrate fauna. Both the Clypeus Grit and Taynton Limestone formations have yielded age-diagnostic ammonites.

Description

Hornsleasow Quarry was briefly mentioned by Richardson (1929b), but, the first published section was that of Channon (1950). A somewhat extended section was recorded by Torrens (1968b) and, in more detail, by Barker and Torrens (in Torrens, 1969d), and later by Kennedy, Sellwood and McKerrow (in Ager *et al.,* 1973). A certain amount of additional information was given by Sellwood and McKerrow (1974), Bradshaw (1978) and Mudge (1995), and an account relating chiefly to the important vertebrate-bearing Hornsleasow Clay was produced by Metcalf *et al.* (1992). These various accounts differ somewhat in their detailed classification of the succession, illustrating the difficulty in dealing with this section, which is isolated from the main outcrop of the formations represented. The best and most detailed description is by M.J. Barker and H.S. Torrens (in Torrens, 1969d); it forms the basis of the following abbreviated record, classified by the present author (see also (Figure 3.57); Barron, 2001).

	Thickness (m)
Taynton Limestone Formation	
5: Limestone, buff, flaggy, cross-bedded, ooidal and shell-fragmental grainstone, with scattered plant-material; upper surfaces ripple marked; sharp, basal erosion surface	2.5
Fuller's Earth Formation	
4j: *Upper Nerinea Bed:* Clay, greenish-grey and brown, ooidal, poorly fossiliferous	0.45+
4i: Limestone, pink, soft, ooidal, rubbly, becoming flaggy near top; numerous vertical burrows 0.50	
4h: *Middle Nerinea Bed:* Marl, greenish-grey, ooidal, passing down into orange-brown ooidal clay with gastropods and oysters	0.45
4g: Limestone, brownish-buff, fine-grained, ooidal, shell-fragmental grainstone, cross-bedded; lenses of sandy tilestone	2.50
4f: Clay, blue, shaly, grading up into brown, friable marl	0.50
4e: *Coral Bed:* Clay, bluish-grey, highly fossiliferous	0.10–0.30
4d: Clay, blue to brown, shaly with oysters	0.40
4c: Clay, shaly; ripple-marked upper surface with burrows and serpulids	0.05

4b: Limestone, shelly, overlain by blue and brown clays with oysters and other fossils	0.20
4a: Lower Nerinea Bed: Limestone, orange-brown, sandy, soft, ooidal, passing up into greenish-grey clay	0.35
Chipping Norton Limestone Formation	
3: Limestone, ooidal and shell-fragmental grainstone, cross-bedded, with intercalated softer, orange-coloured, ooidal marls	1.50–2.0
2: Limestone, as above with softer intercalations, cross-bedded in places	*c.* 10
Obscured	
Clypeus Grit Formation	
1: Limestone, yellow, rubbly, coarse ooidal (almost pisoidal) with marl patches; *Parkinsonia* sp.	5

Most of this section is still well exposed except for the Clypeus Grit Formation, although *c.* 2 m of coarsely ooidal and peloidal, shelly packstone typical of that formation can be seen close to the quarry entrance.

Remnants of the lenticular 'Hornsleasow Clay', which has been intermittently exposed at the base of Bed 3 within the Chipping Norton Limestone Formation (Channon, 1950; Metcalf *et al.* (1992), can still be examined in the easternmost part of the quarry, where they occur in a steep-sided channel incised up to 0.8 m into the underlying limestones. The sides and base of the channel are ferruginized and somewhat cavernous; this distinctive surface can be traced along the quarry face where the clay is absent. The clay contains abundant plant-material including rootlets, as well as non-marine molluscs such as the gastropod *Viviparus.* Importantly, it has yielded an extensive fauna of fossil vertebrates, including salamanders, lizards, crocodiles, dinosaurs, turtles, mammal-like reptiles and 'eupanothere' mammals (Metcalf *et al.,* 1992).

The basal part of the Fuller's Earth Formation (beds 4a-4t) is highly variable, comprising shelly clays that pass laterally into limestones with gastropods such as *Aphanoptyxis eulimoides* (Lycett), *Neridomus* and *Pseudomelania,* and bivalves such as *Modiolus imbricatus* J. Sowerby. The lowest beds as now seen (within beds 4a-4b) include a shell bank, packed with the small oyster *Praeexogyra* (mainly *P. hebridica* (Forbes)). The Coral Bed (Bed 4e) is perhaps the most fossiliferous in the section, having yielded abundant, well-preserved corals, particularly *Cyathopora pratti* Edwards and Haime, *Isastrea limitata* (Lamouroux), *Dendrarea* (*Microsolena*)*excelsa* Edwards and Haime, and *Thamnasteria lyelli* (Edwards and Haime) (Negus and Beauvais, 1975). The upper part of the formation (beds 4i-4j) and the contact with the succeeding Taynton Limestone Formation (Bed 5) is not now exposed, although brown to white, poorly sorted, coarse-grained, shelly, ooidal grainstone typical of the latter is poorly exposed in the highest, northern parts of the quarry. It contains a fairly rich fauna including *Praeexogyra hebridica* (Forbes), trigoniid bivalves and brachiopods such as *Burmirhynchia.*

Interpretation

The cross-bedded oolites of the Chipping Norton Limestone Formation appear to be about 12.5 m thick in total. Although, in gross lithological terms, it is fairly uniform throughout, the formation has previously been subdivided into a Hook Norton Member below (Bed 2), and Chipping Norton Member above (Bed 3) (see Sellwood and McKerrow, 1974, for an explanation of these terms). This subdivision was based on the presence of a discontinuity noted by Channon (1950), who recorded a lenticular black clay, up to 0.3 m thick, at the base of the upper unit. The clay was not seen by later workers, but a similar lens was uncovered by quarrying in 1987. This 'Hornsleasow Clay' forms the basis of an account by Metcalf *et al.* (1992). The clay has a high kaolinite content, generally regarded as indicative of weathering in a warm, humid climate, and thus supporting the idea that the underlying surface represents a 'palaeokarst' formed subaerially. The karstified surface evidently marks an important break in sedimentation during the deposition of the Chipping Norton Formation, and is likely to be of more than local significance. However, the correlation of this event horizon with sections elsewhere remains unproven, and formal division into Hook Norton and Chipping Norton members at Snowshill Hill

(Hornsleasow Quarry) is unjustified. Above the Hornsleasow Clay, the upper part of the Chipping Norton Limestone is capped locally by a bored and oyster-encrusted hardground (Kennedy, Sellwood and McKerrow in Ager *et al.,* 1973) although this is not well developed in current exposures, and the contact with the overlying strata appears to be conformable, albeit a rapid transition.

The overlying strata (beds 4a-4j) have generally been included in the Sharp's Hill Formation, although this term is best restricted to Oxfordshire, where the strata have some non-marine characteristics transitional to the Rutland Formation of the East Midlands (Arkell, 1947b; Bradshaw, 1978; see Sharps Hill GCR site report, this volume). A more appropriate term is Fuller's Earth Formation; this name is applicable to the marine strata developed between the Chipping Norton Limestone and Taynton Limestone formations in the Cotswolds to the west of the Vale of Moreton Axis (Arkell, 1933; Sumbler, 1999; Sumbler *et al.,* 2000). However, the formation is thinner (5.4 m) than is general in areas farther south, and it appears likely that the lower, mudstone-dominated part of the formation present to the south of Snowshill Hill (Hornsleasow Quarry) (e.g. Huntsmans Quarry and Hampen Railway Cutting, see GCR site reports, this volume) is absent. Bed 4g has been included in the Sharp's Hill Formation by most workers, but in the Taynton Limestone Formation by Kennedy, Sellwood and McKerrow (in Ager *et al.,* 1973). As currently exposed, it is much like parts of the Eyford Member of the Fuller's Earth Formation as developed at its type section of Huntsmans Quarry (see GCR site report, this volume). This equivalence was evidently recognized by Channon (1950), who included Bed 4 in the 'Stonesfield Slate'. Overall, its facies is transitional between the Eyford Member and the Taynton Limestone Formation, and has much in common with the Charlbury Formation of Oxfordshire (Boneham and Wyatt, 1993) which occupies the same stratigraphical position, immediately beneath the Taynton Limestone Formation.

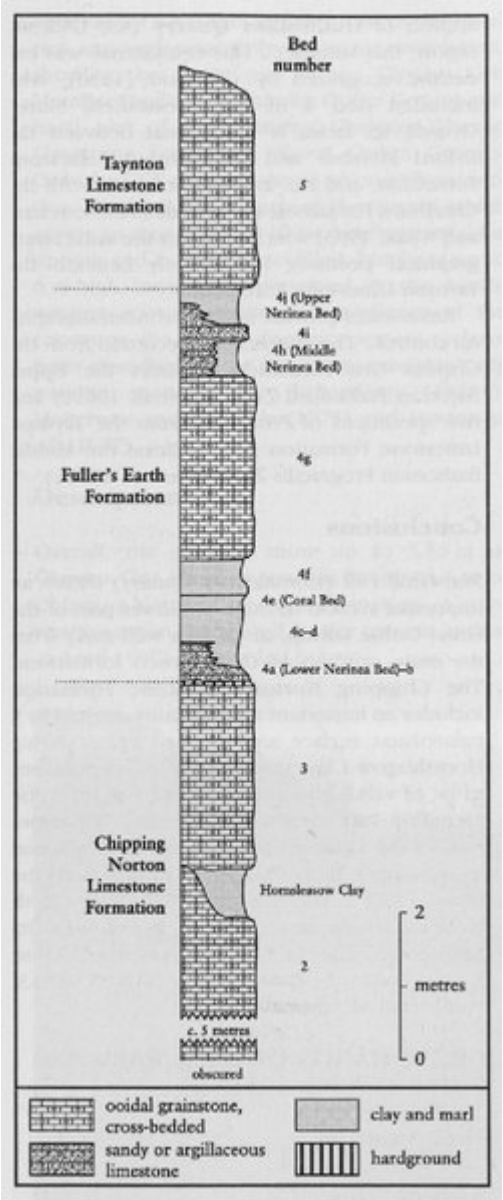
Ammonites provide some chronostratigraphical control. The *Parkinsonia* recorded from the Clypeus Grit Formation indicates the Upper Bajocian Parkinsoni Zone (Torrens, 1969e) and two specimens of *Procerites* from the Taynton Limestone Formation here indicate the Middle Bathonian Progracilis Zone (Torrens, 1969e).

Conclusions

Snowshill Hill (Hornsleasow Quarry) shows an important section through the lower part of the Great Oolite Group, in an area well away from the main outcrop of the exposed formations. The Chipping Norton Limestone Formation includes an important discontinuity marked by a palaeokarst surface and the vertebrate-bearing Hornsleasow Clay; this event horizon promises to be of value in correlation, but has yet to be identified with certainty elsewhere. The exposure of the Fuller's Earth Formation is unusual in showing a facies that is transitional with the Sharp's Hill Formation of Oxfordshire. Both these aspects of the section may be related to its position marginal to the London Platform, close to the Vale of Moreton Axis (Arkell, 1933; Sumbler *et al.,* 2000).

References

(Figure 3.56) Snowshill Hill (Hornsleasow Quarry). The floor of the quarry here is the level from which the Hornsleasow Clay has been excavated from the Chipping Norton Limestone Formation; the latter forms the bench with Fuller's Earth Formation above. (Photo: M.G. Sumbler.))



(Figure 3.57) Graphic section of the succession at Snowshill Hill (Hornsleasow Quarry). (After Torrens, 1969d.))