Sharps Hill, Oxfordshire

[SP 338 358]

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Introduction

The GCR site known as 'Sharps Hill' comprises Sharps (or Sharp's) Hill Quarry, *c.* 1.5 km southwest of Sibford Ferris, Oxfordshire. It is the type locality — and one of the best remaining exposures — of the Sharp's Hill Formation of the Great Oolite Group. The quarry also exposes the underlying Chipping Norton Limestone and Northampton Sand formations. The succession in the Sharp's Hill Formation is richly fossiliferous; the gastropod fauna of the so-called Niviparus Marl' and discoveries of dinosaur remains are of particular interest.

Description

The strata at Sharps Hill were first noted by Walford (1883) and Woodward (1894). A section giving more detail was subsequently described by Walford (1906) and Richardson (1911a). Summaries of the section were given by Arkell (1933, 1947b), McKerrow and Kennedy (1973) and Torrens (1968b). Additional details, including the first record of strata below the Clypeus Grit Formation, were given by Horton *et al.* (1987). However, there is no modern published description of the important section through the Sharp's Hill Formation. The following record is based on Richardson (1911a); bed numbering is that of Walford (1906) as applied by Richardson who was unable to recognize Walford's beds 7–10.

	Thickness (m)
Sharp's Hill Formation	
1: Reddish soil; up to	0.30
2: Marl, yellowish, clayey, crowded with oysters; '*Rhynchonella*', *Camptonectes annulatus* (J. de C. Sowerby)	0.30
3: Clay, brown and dirty greenish-grey at top, darker towards base	*c.* 0.30
4: Clay, marly; crowded with whitened oysters	0.15
5: Clay, tough, dark-brown, bluish and greenish, with discontinuous bed of brown sandstone, up to 0.05 m thick, near top	0.76
6: Clay, black (in places almost a coal-seam), overlying seam of rich-brown clay	0.05–0.20
11: *Viviparus Marl:* Marl, pale-purplish, with numerous pebbles and concretions, some ochreous, others phosphatic; *Bathonella scoticus* (Tate), *Ataphrus labadyei* (d'Archiac), nerineids	0–0.40
12: Limestone, generally hard but rubbly in places, passing locally into whitish-grey marl; large *Eunerinaea* ex gr. *eudesii* (Morris and Lycett) common; *Melanioptyxis* sp., *Neridomus cooksonii* (Deslongchamps) at base; *Corbula buckmani* Lycett, *Anisocardia loweana* (Morris and Lycett) (dwarfed form), *Bakevellia waltoni* (Lycett), ostreiids, *Modiolus imbricatus* J. Sowerby	0.35–0.61

13: Marl, greenish-grey, with numerous white concretions and irregular limestone layers; *Melanioptyxis altararis* (Cossmann), *Bakevellia waltoni, Isognomon isognomonoides* (Stahl), *Placunopsis socialis* Morris and Lycett, *Palaeonucula waltoni* (Morris and Lycett), ostreiids, *Modiolus imbricatus; Cyathopora bourgueti* (Defrance), principally at base	0–0.64
14: Limestone, pale-green when fresh, with abundant nerineids; at western end of section represented by occasional nodule only; *Cyathopora bourgueti near* top; *Anisocardia loweana* (dwarfed form), *Burmirhynchia concinna* (Davidson), '*Astarte*', nerineids; 0.05 m-thick clayey marl at base	0–0.30
15: Limestone mixed with marl, pale-green when fresh, harder portions blue and shelly; *Isognomon* cf. *isognomonoides, Palaeonucula waltoni, Modiolus imbricatus,* procerithiids; 0.020.08 m-thick greenish clayey marl at base 0–0.20	
16: Limestone, pale-yellow or whitish, blue-hearted; procerithiids, *Amberleya* aff. *bathonica* Cox and Arkell, *Protocardia buckmani* (Morris and Lycett), *Palaeonucula waltoni, ?Pseudomelania subglobosa* (Morris and Lycett)	0–0.25
17: Limestone	0–0.13
18: Marl and stone, pale-yellow, greenish and bluish; *Isognomon oxoniensis* (Paris), *I. isognomonoides, Bakevellia waltoni, Protocardia lingulata* (Lycett), *Pachymya* cf. *unioniformis* (Morris and Lycett), *Modiolus imbricatus, Ataphrus labadyei,* procerithiids	0.3–0.46
19: Sand; reddish-brown with nodules and masses of blue shelly limestone with numerous ostracods; *Isognomon, Placunopsis socialis, Bakevellia, Modiolus,* procerithiids	0–0.20
20: Clay, black and reddish-brown	0.58
Chipping Norton Limestone Formation	
21: Limestone, perforated with tubular holes infilled with black clay	0.46–0.81
21a: Clay, tough	0–0.05
22: Limestone, fine grained, siliceous, fawn but blue-hearted with numerous fragments of black lignite	1.42
23: *Signata Bed:* Limestone, fawn, blue-hearted, sandy, hard; abundant trigoniid bivalves	0.41
24a: Limestone, fine grained, siliceous, blue, weathering brown, with numerous fragments of lignite	0.71
24b: Conspicuous layer of ironstone	0–0.10
24c: Limestone, similar to Bed 24a; 0.61 m seen but according to Walford (1906)	2.74
Clypeus Grit Formation below.	

Lower strata of the Inferior Oolite Group below the Clypeus Grit Formation can be seen immediately upon entering the quarry from the north (Figure 3.59). Horton *et al.* (1987) gave a detailed section of these beds; the strata comprise 4.06 m of brown to purplish-brown calcareous sandstone, with scattered ooids and shell fragments at some levels. The beds dip steeply because of valley-bulging and cambering; the mudstones of the Lias Group probably occur within 1.5 m of the base of the section. The basal bed seen is a hard, grey-hearted, sandy, ooidal limestone with many fossils including

Montlivaltia lens Edwards and Haime, *Millericrinus?,* indeterminate echinoid, *Sarcinella, Kallirhynchia,* terebratulid fragments, bivalves including *Propeamussium,* the gastropods *Aptyxiella subconica* (Hudleston), *Eunerinea* sp., as well as the ammonite *Bredyia* cf. *subinsignis* (Oppel) and belemnite fragments. The Clypeus Grit Formation is not now well exposed, but good sections of the succeeding Chipping Norton Limestone Formation can be seen. The Sharp's Hill Formation occurs in the higher, southern part of the quarry. Owing to the nature of the strata, it is currently rather poorly exposed, but trenching in 1990 revealed most of the succession (Boneham and Forsey, 1992). The Taynton Limestone Formation, which succeeds the Sharp's Hill Formation, has never been exposed in the quarry faces, but is probably present in the southern and western, unworked portion of the GCR site.

Recent investigations involving trenching in the quarry (Figure 3.60) yielded disarticulated remains of a stegosaurian dinosaur from several horizons beneath the Viviparus Marl (i.e. within Arkell's (1947b) Lower Sharp's Hill Beds); this is thought to be the earliest stegosaur yet recorded (Boneham and Forsey, 1992).

Interpretation

Horton *et al.* (1987) assigned the lowest sandy beds at Sharps Hill to the Northampton Sand Formation, although the strata are rather less ferruginous than farther to the north-east, where the Northampton Sand Ironstone is developed. The facies is transitional to the Leckhampton Member (formerly Scissum Beds) of the Birdlip Limestone Formation (Lower Inferior Oolite) (Barron *et al.,* 1997; Sumbler *et al.,* 2000), which comprise sandy, ooidal limestones, typically developed in the North Cotswolds to the west of the Vale of Moreton Axis. The overlying Clypeus Grit Formation (equivalent to the Clypeus Grit Member of the Salperton Limestone Formation (Upper Inferior Oolite) of areas farther south) is recorded as 0.36 m thick, and is very close to its eastern limit, beyond which it is overstepped by the Chipping Norton Limestone Formation (Horton *et al.,* 1987); indeed, it appears to be absent in extant exposures (1996). Walford (1906) recorded various fossils from this unit, though the eponymous echinoid *Clypeus* and the brachiopod *Stiphrothyris,* which characterize the formation farther west in According to Richardson (1911a), partly the Cotswolds, have not been recorded in this based on Walford (1906), some 5.8 m of neighbourhood. Chipping Norton Limestone Formation are present, as quoted in the section above, but, according to Horton *et al.* (1987), the thickness is only 4.5 m based on their composite record of the quarry section. Bed 23, the so-called 'Signata Bed' (or 'Knotty Bed'), named after the bivalve *Myophorella signata* (Agassiz), has been considered to be a critical marker, and forms the basis of subdivision of the Chipping Norton Limestone Formation. The strata below the top of the Signata Bed have been termed the 'Hook Norton Beds' (or Member) (Walford, 1906; Richardson, 1911a; Arkell, 1933, 1947b; Sellwood and McKerrow, 1974; see Hook Norton GCR site report, this volume). The term 'Chipping Norton Limestone Formation' was restricted by Watford (1906) to the beds above the Signata Bed, and this usage was formalized by Sellwood and McKerrow (1974) with their use of the term 'Chipping Norton Member'. Richardson (1911a) introduced the term 'Swerford Beds' for sands that take the place of the Chipping Norton Limestone Formation in north-east Oxfordshire. He defined these beds as lying above the Signata Bed, although as the latter is absent where the Swerford Beds are best developed, this relationship has never been properly established (Sellwood and McKerrow, 1974). Richardson's (1911a) use of the term at Sharps Hill is doubly inappropriate, as the beds are not of typical Swerford Beds facies; indeed, there is no significant lithological difference between the beds below the Signata Bed and those above. Horton *et al.* (1987) doubted the correlative value of the Signata Bed, calling into question the whole basis for subdivision of the Chipping Norton Limestone Formation throughout the region.

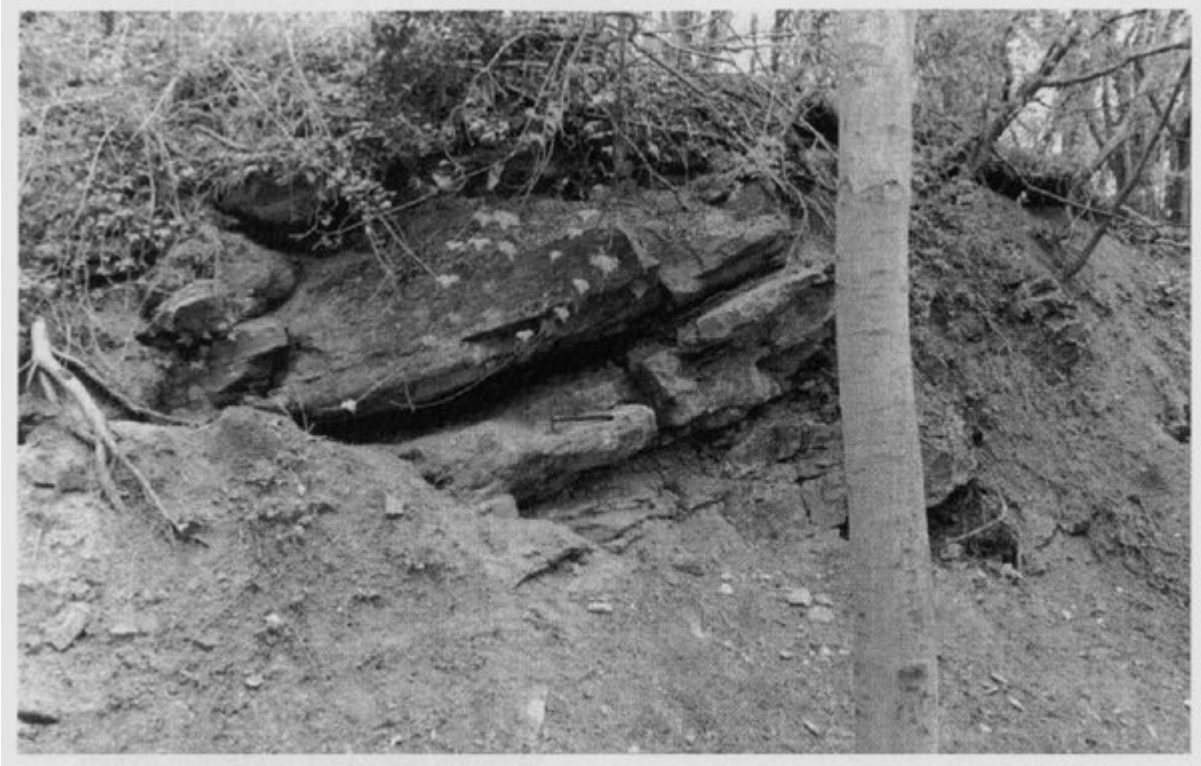
The Sharp's Hill Formation comprises the beds originally known as the 'Neaeran Beds' (Walford, 1906). Arkell (1933) introduced the name 'Sharp's Hill Beds', restricting it to those strata between the Viviparus Marl and Chipping Norton Limestone Formation (i.e. beds 12 to 20 of Richardson's section above). Later, he extended the term to cover all of the clay-dominated beds between the Chipping Norton Limestone and Taynton Limestone formations, and divided the succession into Lower and Upper parts at the base of the Viviparus Marl, which is a non-sequence as indicated by the records of pebbles (Arkell, 1947b). The name was formalized by McKerrow and Kennedy (1973). The strata exposed in Sharps Hill, probably representing almost the whole of the formation, total *c.* 5 m in thickness (Boneham and Forsey, 1992), the thickest succession known. In general terms, the formation is made up of greenish-grey mudstones and marls with subordinate sandy and argillaceous micritic limestones, which are particularly prominent in the lower part. Individual beds lens out laterally, making Richardson's (1911a) correlations between different localities highly speculative. The

fauna is dominated by fully marine forms (corals, rhynchonellid brachiopods and echinoids as well as a variety of bivalves, particularly *Praeexogyra,* and gastropods). However, the presence of the gastropod *Bathonella* ('*Viviparus*) in association with ostracods and charophytes in the so-called 'Viviparus Marl' (Sylvester-Bradley, 1948b; Sellwood and McKerrow, 1974) suggests an intermittent freshwater influence. The proximity of land is also suggested by the abundance of plant material, notably the richly lignitic Bed 10, and by stegosaurs. Seatearth textures and rootlets are recorded from most sections (Horton *et al.,* 1987), suggesting extremely shallow 'estuarine' conditions such as typify the Rutland Formation of the East Midlands, into which the Sharp's Hill Formation passes when traced to the north-east (Bradshaw, 1978). Such non-marine characters are herein regarded as diagnostic of the Sharp's Hill Formation, which is thus restricted to the area to the east of the Vale of Moreton Axis.

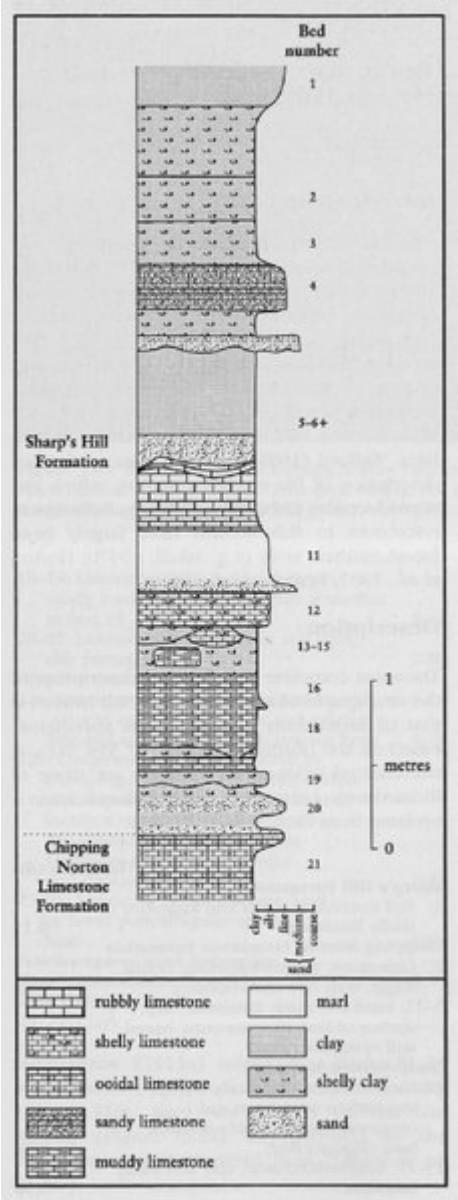
Conclusions

Sharps Hill is the type locality of the Sharp's Hill Formation, in the area of its thickest development. The succession is richly fossiliferous and is of particular interest because of the presence of a freshwater fauna at one level. The underlying Chipping Norton Limestone Formation is also exposed. An attenuated representative of the Clypeus Grit Formation is one of the most easterly occurrences of this unit, and the underlying Northampton Sand is of a facies transitional to the Leckampton Member (formally Scissum Beds), typically developed in the Cotswolds to the west.

References



(Figure 3.59) Exposure of Northampton Sand Formation near the entrance of the quarry at Sharps Hill; the steep dip is due to valley-bulging and cambering. (Photo: M.G. Sumbler.))



(Figure 3.60) Graphic log of a trench section through the Sharp's Hill Formation (beds 1–20) and uppermost Chipping Norton Limestone Formation at Sharps Hill. (Based on B. Boneham MS (English Nature files); see Boneham and Forsey, 1992.) Bed numbering follows Richardson (1911a) but this slightly expanded section may include representatives of Walford's (1906) beds 7 to 10 (see text). Stegosaur remains were found in the lower part of the Sharp's Hill Formation.)