Shellingford Crossroads

[SU 326 942]

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Introduction

Shellingford Crossroads Quarry lies 22 km WSW of Oxford (Figure 2.37). It first came into prominence when Treacher (1907) led a Geologists' Association excursion in the Faringdon area during which the site was visited. The first detailed descriptions of the Shellingford sequence were those published by Arkell (1927, 1939a, 1947b). Arkell also monographed bivalves from this quarry (Arkell, 1929–1937). Callomon (1960) largely confirmed Arkell's stratigraphy of the area, with only slight amendments. The exposure figures prominently in the accounts of Wilson (1968a) and Talbot (1973a) on Corallian carbonate sedimentology and event stratigraphy.

A further description of the section is given by McKerrow and Kennedy (1973), while the locality also figures prominently in the works of Fürsich (1974, 1975), Ali (1977), Wright (1980), Johnson (1983) and Goldring *et al.* (1998b).

The area of interest in Shellingford Crossroads Quarry comprises a conserved portion of the quarry face where an ESE–WNW-trending section, some 100 m in length, exposes Middle Oxfordian rocks belonging to the Maltonense–Tenuiserratum Subzone interval. The site is particularly significant for its illustration of the complexities of Corallian stratigraphy in south-west Oxfordshire. Although part of the face was recently obscured during an operation to make it more safe, it showed the best section currently available through the highly variable lithologies of the Highworth Grit–Coral Rag interval.

Shellingford Crossroads Quarry is not to be confused with Shellingford Quarry (Goldring *et al.,* 1998b), situated south-west of the A417 (Figure 2.37). In an attempt to avoid confusing the two names, Goldring *et al.* (1998b) refer to Shellingford Crossroads Quarry as 'Stanford Quarry'. Unfortunately this introduces further potential confusion as an important section in the Corallian beds, described by Arkell (1947b), was formerly visible in a pit near Stanford, the latter naturally being referred to by Arkell as 'Stanford Pit'.

Description

The following section, compiled from measurements by the author and by Goldring *et al.* (1998b), has been visible at Shellingford Crossroads Quarry. The Highworth Grit and Faringdon Members are now largely obscured within the area of the conserved face, though the Highworth Grit is accessible elsewhere in the quarry.

	Thickness (m)
Stanford Formation	
Coral Rag Member	
9. Micritic limestone containing massive colonies of *Thamnasteria concinna* (Goldfuss) and *Isastraea explanata* (Goldfuss)	seen to 0.45
8. Bioclastic limestone with moulds of *Thecosmilia annularis* (Fleming), both rolled and in growth position	0.6
7. *Stanford Oncolite Bed:* muddy oncolite infilling ?scour channels	0–0.25
— erosion surface —	
Faringdon Member	
6. Tough, bioclastic oolite containing small bivalves and gastropods, and with occasional quartz pebbles	0.45

5. *Urchin Marl Bed:* Rubbly oolite, medium to coarse grained, containing *Nucleolites scutatus* Lamarck. An irregular junction is present on to harder oolite below. No erosion surface is visible, however	0.72
4. *Third Trigonia Bed:* thick-bedded oolite, weathering fiaggy, with frequent dissociated bivalves, especially *Gervillella aviculoides* (J. Sowerby) and comminuted shells towards the base	0.89
3. *Pebble Bed:* limestone with pebbles of many kinds of limestone and shale and sandstone, the clasts frequently reaching several centimetres in size, and with small quartz pebbles	0.53
— extensively bored erosion surface —	
Kingston Formation	
Highworth Grit Member	
2. Perry facies: oncolitic and oolitic sands, muds and sandy oosparite with an erosional base marked by *Diplocraterium parallelum* Torell	0–1.80
1. Shellingford facies: fine-grained, cross-bedded sand, ripple drift bedding brought out by clay laminae, and with clay drapes towards the top seen	to 5.0

A general log of the section after Goldring *et al.* (1998b) is given in (Figure 2.38). These authors provide a detailed description of the Highworth Grit, which they subdivide into two members. However, as the Highworth Grit is regarded herein as a member of the Highworth Formation, it cannot be subdivided into members, and the new subdivisions are treated here as informal facies subdivisions of the Highworth Grit Member.

The limestone sequence is allocated to a new Stanford Formation, this being the type section, divided into Faringdon and Coral Rag members. Goldring *et al.* (1998b) referred the predominantly oolite succession at the site (beds 3 to 6, (Figure 2.38)) to the Osmington Oolite Formation, but as this oolite succession is treated herein as a member of the Stanford Formation, 'Osmington Oolite' is not appropriate, and the term Taringdon Member' is re-introduced, having been rejected initially by Wright (1980). 'Faringdon Oolite' was a term first used by Arkell (1939a), sometimes as a facies term, and Shellingford Crossroads Quarry was included in the definition of the facies. Though Shellingford Crossroads Quarry is the type section, excellent cores through the member were recovered from the base of Wicklesham Quarry, Faringdon (Goldring *et al.,* 1998b). Various subdivisions of this oolite succession were made by Arkell (1939a) and Callomon (1960). These are included as bed subdivisions within the Faringdon Member.

The 'Coral Rag' (beds 7 to 9) is regarded herein as the uppermost member of the Stanford Formation, and not as a formation itself, as used by Goldring *et al.* (1998b). Goldring *et al*'s 'Stanford Member', which is only 0.25 m thick at maximum, becomes the 'Stanford Oncolite Bed'. *Thecosmilia* was the initial colonizer upon the oncolite surface. The phaceloid branches of this coral have now been dissolved out, leaving moulds of the corals preserved in a biomicrite that is rich in *Rhaxella* spicules. There were several erosive events truncating coral growth (Ali, 1977), enabling scattered colonies of *Thamnasteria* and *Isastraea* to grow upon the hardground surfaces.

Ammonites collected from the locality are usually poorly preserved, Arkell (1935–1948) recording *Perisphinctes* (*Dichotomosphinctes*) *antecedens* Salfeld and *P.* (*Arisphinctes*) *pickeringius* (Young and Bird) from Bed 3 (?uppermost Maltonense Subzone) as well as *Cardioceras* (*Scoticardioceras*) *excavatum* (J. Sowerby).

Interpretation

The Shellingford facies of the Highworth Grit is seen at present on the west side of Shellingford Crossroads Quarry and in Shellingford Quarry at [SU 327 938]. With its small channels, cross- and ripple-drift bedding, clay drapes and clay-pebble conglomerates, it exhibits the varied energy regimes characteristic of tidal deposition (Johnson, 1983), or of estuarine or delta distributary (Goldring *et al.* 1998b). Bipolar dips in the cross-stratification indicate a channel flowing towards the south-east. The point-bar facies is truncated by two major erosion surfaces introducing the wedge of fine sands, oncoidal and ooidal sands and muds of the Perry facies. This was formerly exposed in the conserved face, but is, at the time of writing, obscured. The basal surface of this ooidal facies bears the features (planation and colonization by the *Diplocraterion*-producing animal) of a transgressive surface, with a rapid transgression in an estuarine environment (Goldring *et al.,* 1998b).

The almost planar base of the Faringdon Member Pebble Bed (Bed 3) cuts evenly across both underlying facies of the Highworth Grit. Chert pebbles and fish teeth are present in the Pebble Bed. The Third Trigonia Bed (Bed 4) is a high-energy, predominantly *Gervillella* shell bed, and is typical of the *Gervillella aviculoides* association of Fürsich (1977), an association typical of high-energy conditions. The oriented, dissociated valves suggest combined wave and current activity. Scattered *Myophorella* valves occur in addition, swept in from the more offshore environment preferred by this burrowing bivalve.

Bed 4, the Third Trigonia Bed, was correlated with the Upper Trigonia Bed of the area southwest of Oxford by Arkell (1947b). Callomon (1960) noted that, coming above the Highworth Grit, Bed 4 could not correlate with the Upper Trigonia Bed, which comes beneath the Highworth Grit at Lamb and Flag Inn Quarry (Figure 2.41). Therefore Bed 4 should be termed the 'Third Trigonia Bed'. Its facies is really a variant of the standard Corallian ooidal facies. The ooidal limestone and marl subdivisions of the Faringdon Member are best interpreted as 'lagoonar, back-barrier sediments with the barrier inferred to lie to the south (Goldring *et al.,* 1998b). The presence of fine quartz sand as cores in the ooids indicates that sand was entering the depositional area, probably from reworking of the Highworth Grit. As was pointed out by Goldring *et al.* (1998b), Bed 5, the Urchin Marl, is of local significance, and these authors also believe that the *Trigonia* shell beds considered by Arkell (1947b) to represent correlatable horizons across Oxfordshire must be regarded as localized.

The basal unit of the Coral Rag is now recognized to be the Stanford Oncolite Bed (Bed 7) (Goldring *et al.* 1998b). At Shellingford Crossroads Quarry, a complex unit of oncolite-filled scour structures up to 0.25 m deep and 1.0 m wide occurs beneath the coralliferous sediments. This unit marks a significant stratigraphical event. At the base there is an erosion surface and at the top a firmground with the initiation of coral colonization. The coralliferous beds have been the subject of detailed petrographical and palaeoenvironmental analysis by Wilson (1968a) and Talbot (1973b). They are formed of rubbly, bioclastic limestone containing principally autochthonous branching *Thecosmilia* with associated massive *Thamnasteria* and *Isastraea.* Branched coral colonies are most common in the lower part of the section (Bed 8), whilst in the upper part (Bed 9) massive forms prevail. It was noted by Ali (1977) that the growth of *Thecosmilia* at this locality had been interrupted at three principal horizons by deposition of lenses of biosparite and by argillaceous sediment that had smothered the corals. Determination by X-ray diffraction of the mineralogy of the clay fraction has shown that it is 60–70% smectite. This suggests strongly that the clay seams interbedded with the corals are the result of alteration of contemporary volcanic material.

Chowdhurry (1982) noted that smectite is present throughout the Corallian succession in this region, with peaks in the Lower Calcareous Grit and Coral Rag. Zeolites are also present, plus unweathered biotite and apatite. The most likely origin for these four minerals was from contemporary volcanic ash, delivered directly to the site of deposition as air-fall sediments.

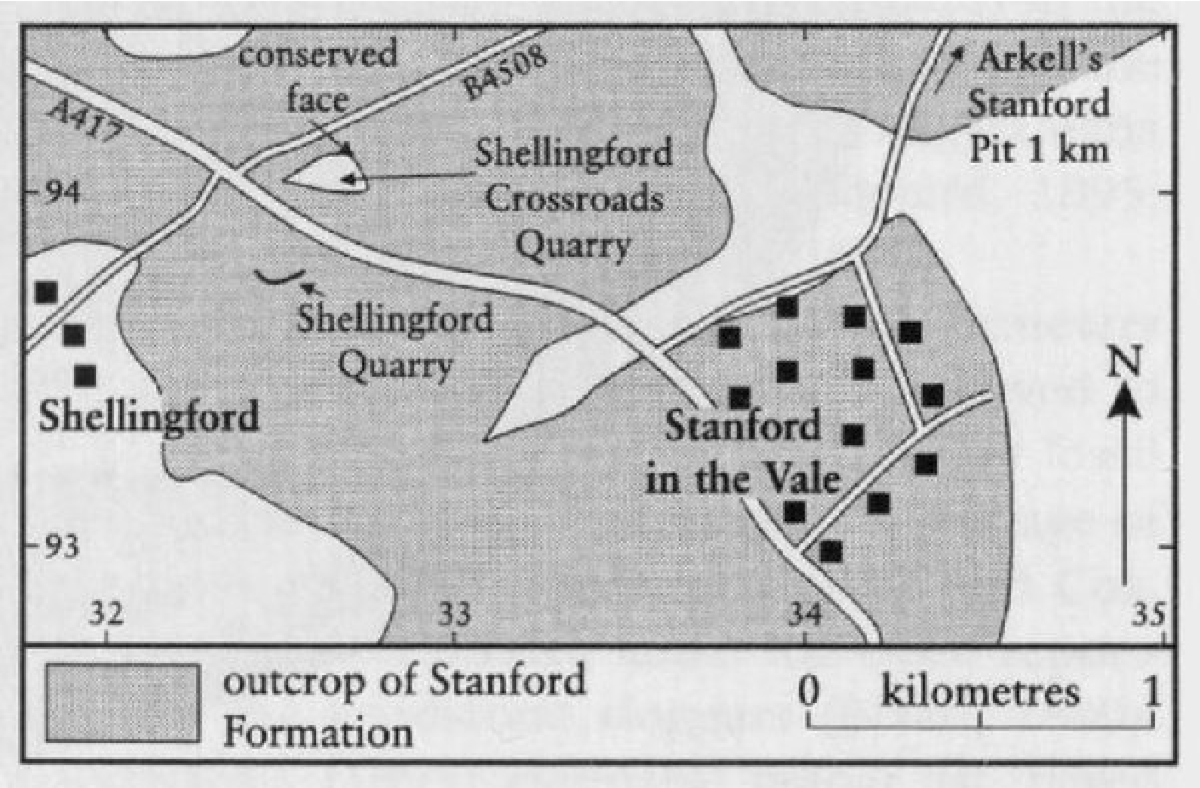
Broad peaks spread over several metres of strata suggest repeated ash falls from a volcano situated to the south-west, and redistribution of the volcanic ash by marine currents in the shallow shelf.

The section has received considerable attention from stratigraphers, and provided one of the major pieces of evidence for the hypothesis of correlation by event stratigraphy in the Oxfordian (Talbot, 1973a). Talbot was impressed with the similarity of the junction of the Faringdon Member oolite on Highworth Grit at Shellingford Crossroads Quarry and that of the Osmington Oolite on Bencliff Grit at Osmington. Both sections show impure, pebbly oolite resting on, and infilling borings in, cross-bedded, marginally marine sandstone. In fact, the resemblance is only superficial. Ammonite evidence shows that the equivalent of the Highworth Grit in south Dorset is not the Bencliff Grit, but is probably the sandy Upton Member of the Osmington Oolite. The Faringdon Member oolite is represented only by the overlying, cross-cutting, Shortlake Member of the full Osmington succession (Wright, 1986a).

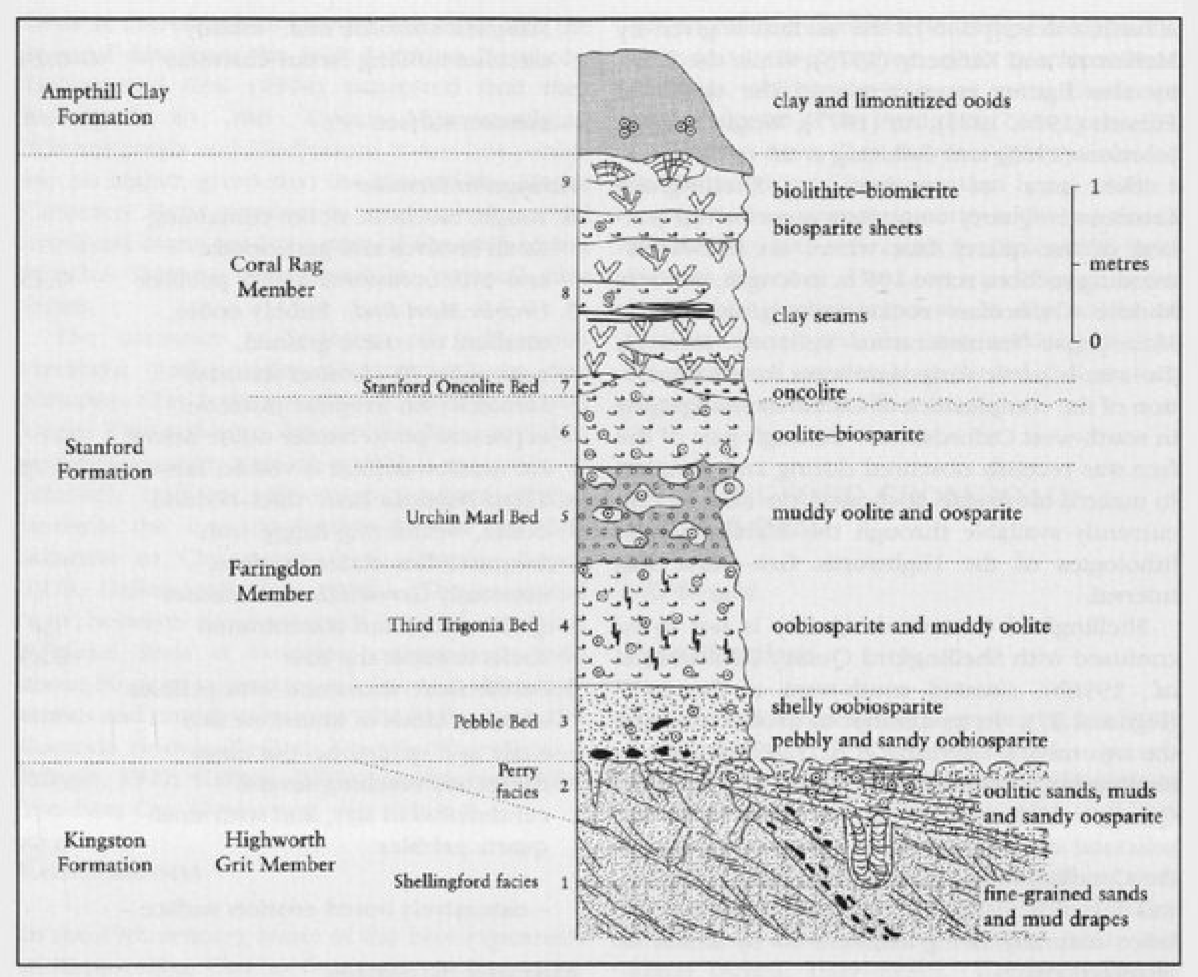
Conclusions

Shellingford Crossroads Quarry contains an outstanding section in Corallian rocks. The Highworth Grit shows trace fossils and sedimentary structures laid down in an estuarine environment. The Faringdon Oolite has at its base a pebble bed marking a significant and widespread regional non-sequence. This is overlain by shelly oolites containing a variety of bivalves and echinoids of great significance in palaeoecological studies. The Coral Rag is well known for its abundant in-situ corals and reef-dwelling bivalves. Shellingford Crossroads Quarry is thus of great importance for its illustration of the complexities of Oxfordian stratigraphy in the Oxford area.

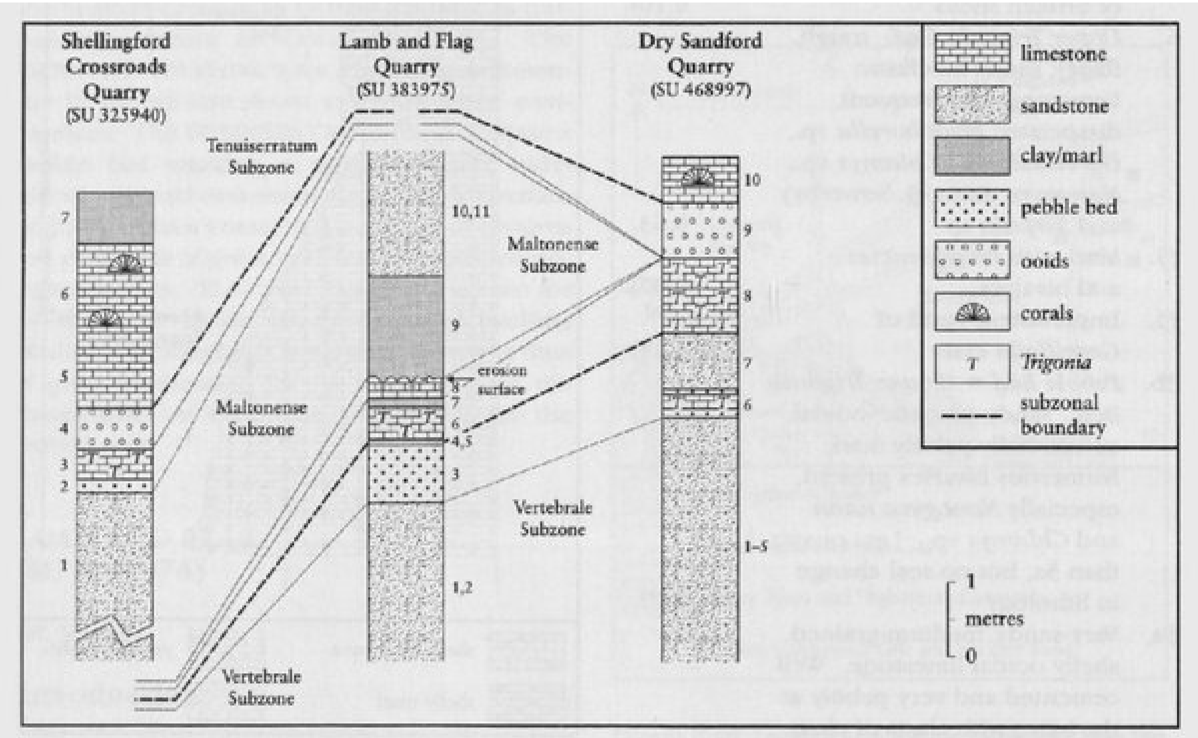
[References](#)



(Figure 2.37) Locality map for the Shellingford Crossroads GCR site. Outcrop of the Stanford Formation (mapped as 'Corallian limestone glib') from BGS Sheet 253 (Abingdon) (1971).



(Figure 2.38) Log of the Corallian succession at Shellingford Crossroads Quarry (after Goidring et al., 1998b, fig. 3).



(Figure 2.41) Correlation of sections at Shellingford Crossroads Quarry, Lamb and Flag Quarry, and Dry Sandford Quarry (after Johnson, 1983, fig. 2).