

CUMNOR

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Introduction

Bradley Farm Quarry (also known as 'Rockley Quarry', and situated close to Spring Farm, Cumnor; see Figure 2.45) has been worked from the late 1870s (Blake and Hudleston, 1877) up to at least 1947 (Arkell, 1947b). Early descriptions of the site were made by Hudleston (1880), Woodward (1895) and Pringle (1926). Arkell (1927, 1931) described the site in detail, and subsequently monographed bivalves (Arkell, 1929–37) and ammonites (Arkell, 1935–1948) from this locality.

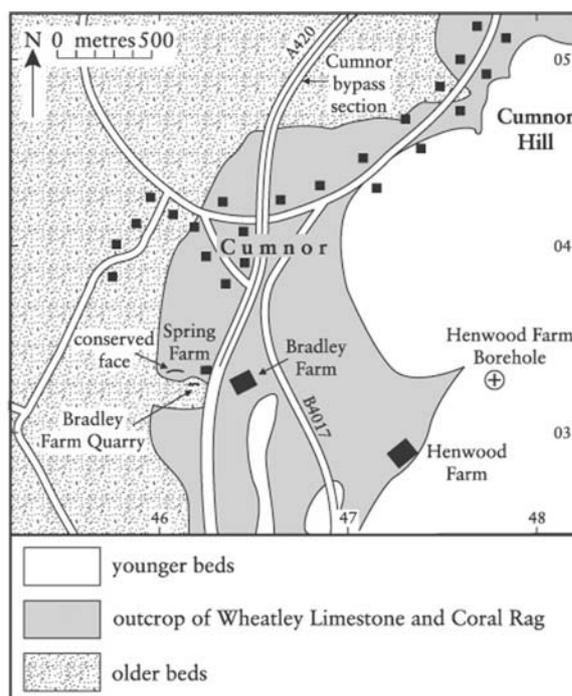


Figure 2.45: Locality map for the Cumnor GCR site. Outcrop of Wheatley Limestone and Coral Rag from BGS Sheet 236 (Witney) (1982).

A revised description was later published (Arkell, 1947b). At the time of writing, the area of the former quarry is largely made over to grassland, but a small 50 m long face in the upper part of the sequence is preserved along the northern boundary of the old quarry (Figure 2.46).

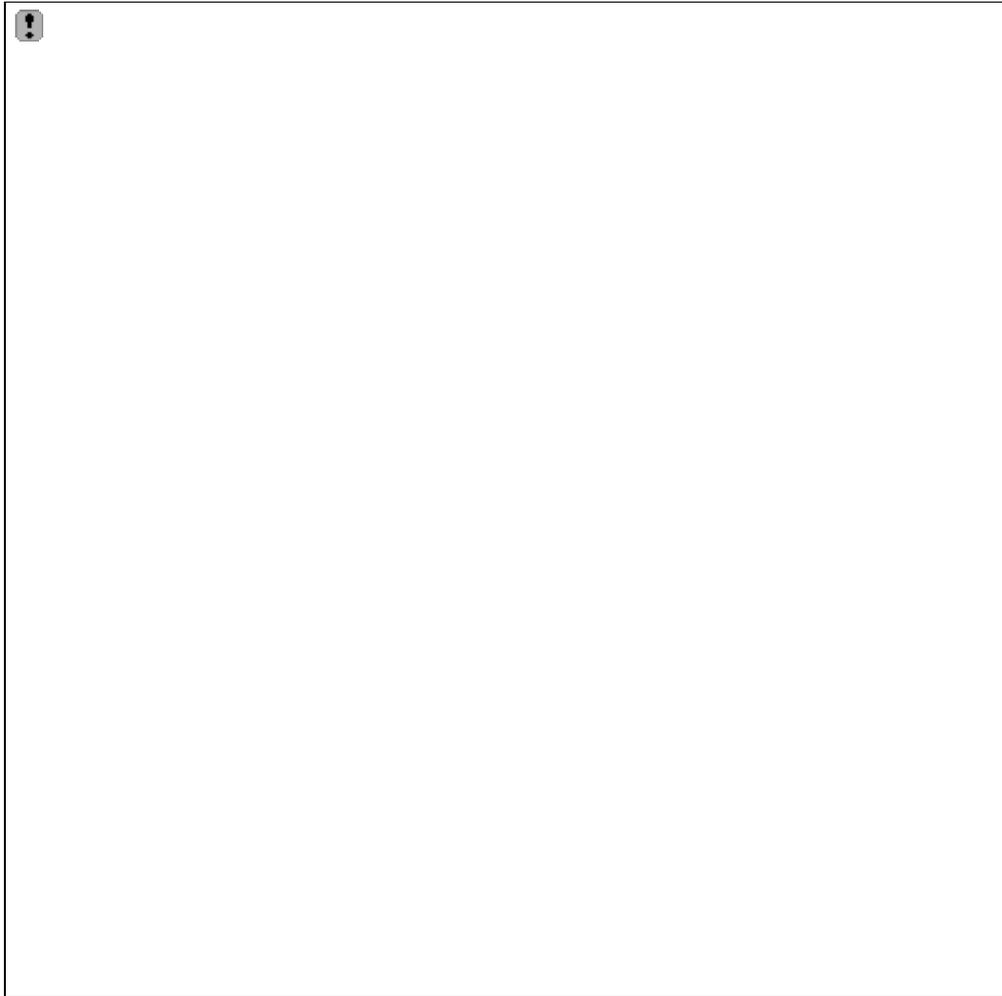


Figure 2.46: View of the Cumnor site in 1998, showing the 1.2 m high face in flaggy-weathering Wheatley Limestone. (Photo: J.K. Wright.)

Description

When fully exposed, an 8.5 m succession of sandstones and limestones was visible at the quarry. Only Bed 6 was available for inspection by the author in 1998, and for description of beds 1 to 5 it is necessary to rely on the account of Arkell (1947b). Arkell's descriptions are in brackets.

		Thickness (m)
<i>Stanford Formation</i>		
<i>Wheatley Limestone Member</i>		
6	Tough, medium-bedded, flaggy weathering, bioclastic limestone consisting of a mass of coral and bivalve fragments in a sparry matrix. Less well cemented at the base	seen to 1.2
<i>Kingston Formation</i>		
<i>Beckley Sand Member</i>		
(5	<i>Shell–Pebble Bed</i> : shelly limestone with a pebbly base. Contains many bivalves, including <i>Myophorella hudlestoni</i> (Lycett), <i>Astarte ovata</i> Smith and <i>Gervillella aviculoides</i> (J. Sowerby), with <i>Cardioceras</i> spp.	0.15–0.56)
(4	Interlaminated sand and clay or even-bedded loam	0.69–1.20)
(3	Interlaminated loam, sand and clay containing mudstone concretions with <i>Nanogyra nana</i> (J. Sowerby) and <i>Natica</i> sp.	0.20)
(2	<i>Natica Band</i> : hard gritstone with a mass of <i>Natica</i> casts at the base	0.9–1.8)
(1	Yellow, cross-bedded sand with seams of clay, and with pebbles of quartz and chert	seen to 2.7)

Most of the interest of the quarry to earlier workers lay in the fossiliferous beds 2 and 5, not exposed at the time of writing. Arkell (1927) recorded 11 species of gastropod from Bed 2. The following ammonites have been recorded from this quarry (Arkell, 1935–1948). All are indicative of the Vertebrale Subzone:

Bed 5: *Cardioceras* (*Cardioceras*) *cuneiforme* Arkell (holotype)

Goliathiceras (*Goliathites*) *titan* Arkell (holotype)

Cardioceras (*Scotcardioceras*) *excavatum* (J. Sowerby)

Cardioceras (*Cardioceras*) *cordatiforme* (Buckman) C. (*Subvertebriceras*) *sowerbyi* Arkell C. (*S.*) *densiplicatum* Boden

Bed 2: C. (*S.*) *costulosum* (Buckman) *Goliathiceras* (*G.*) *capax* (Young and Bird) *Aspidoceras* (*Euaspidoceras*) *catena* (J. Sowerby) *Perisphinctes* (*Arisphinctes*) *cotovui* Simionescu P. (*Liosphinctes*) *cumnorensis* Arkell (holotype)

Only a limited thickness of Wheatley Limestone is preserved at present (Figure 2.46), and the lateral transition into Coral Rag, seen by Arkell (1947b) at the north-east corner of the quarry, is no longer visible.

Interpretation

The exposure was quarried largely for the sands of Bed 1. This showed marked cross-bedding; more so than that which occurs at the same stratigraphical horizon at Dry Sandford Quarry (see site report, this volume). This characteristic indicates greater shoaling of the sands in the Cumnor district and closer proximity to the 'Oxford Axis' (see below).

The earliest evidence of settled shallow marine conditions in the area is witnessed here by the most north-easterly known outcrop of the Natica Band, representing one of the earliest occurrences of a richly shelly bed in the Oxfordian of southern England. The bed is of great palaeogeographical interest, representing the atypical development of large, localized gastropod banks with clastic sedimentation reduced to a minimum.

Bed 5 has yielded only cardioceratids, and although these are not entirely zonally diagnostic, the absence of perisphinctids makes it almost certain that this is the Lower Trigonina Bed, of Vertebrata Subzone age. The higher condensed shell beds with their predominantly perisphinctid faunas of Antecedens Subzone age (Upper Trigonina Bed of Dry Sandford, Third Trigonina Bed of Shellingford Crossroads Quarry, and the Cowley–Sandford Shell Beds of the area south-east of Oxford) are not represented here.

Arkell (1933) used the term 'Oxford Axis' for this area of retarded Middle Oxfordian sedimentation, which extends from Cumnor east to Wheatley. Later, Arkell (1947b) abandoned the term 'Oxford Axis' and current thinking now places the Oxford area at the junction of the Birmingham–Oxford Block with the London Platform. The Birmingham–Oxford Block (the concealed Midlands Microcraton of BGS, 1996) is underlain by Palaeozoic rocks quite close to the surface, and was an area of reduced sedimentation during much of the Mesozoic Period (Horton *et al.*, 1995).

When fully exposed, the site was renowned for its display of the rapid facies changes that have been observed between Coral Rag and Wheatley Limestone (Wilson, 1968a). Reef corals such as *Thamnasteria*, *Isastraea* and *Thecosmilia*, predominantly in growth position, could formerly be observed in the north-east corner of the quarry (Arkell, 1947b), and the site figures in Arkell's palaeogeographical distribution map of the reefs and channels of the Cumnor district (Arkell, 1935, pp. 83–9). Arkell (1947b, fig. 12) summarized this work, producing a map of the distribution of coral reef rock (Coral Rag) and reef debris (Wheatley Limestone) in the area between Dry Sandford Quarry and Cumnor. He showed that this was an area of patch reef, with the Wheatley Limestone occupying sinuous channels 100 to 300 m wide separating larger areas of Coral Rag 1 to 2 km across. He was struck by the extraordinary resemblance between the sections exposing Coral Rag and the low cliffs cut in Recent and Pleistocene raised reefs along the coastline of the Red Sea.

Stacks of reef coral were seen particularly well during the construction of the nearby Cumnor Bypass in 1981. Though the sections are beginning to grass over, there is still a considerable amount of exposure of the Coral Rag, and its lateral transition into Wheatley Limestone, in the bypass section.

Conclusions

A rich ammonite fauna has been collected from this quarry, especially from the Natica Band and condensed Shell–Pebble Bed. A total of seven ammonite species of the genera *Perisphinctes*, *Aspidoceras*, *Goliathiceras* and *Cardioceras* have been recorded, including the Middle Oxfordian zonal index *Cardioceras densiplicatum* and the holotypes of three species.

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