Blind Lane

[SY 576 856]

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Introduction

The village of Abbotsbury, Dorset, is located on the south-westernmost outcrop of Kimmeridgian strata on the English mainland (Figure 2.12). Sited *c.* 13 km west of the coastal sections near Weymouth (see site report for East Fleet–Small Mouth, this volume), the locality is famous for the Abbotsbury Iron Ore (now generally known as the Abbotsbury Ironstone') which crops out on three sides of the village, dipping beneath it from the north, west and south in an E–W-trending synclinal structure (Arkell, 1947a). In the past, it has been well exposed in the lanes both north and, to a lesser extent, south of the village. It attracted the attention of Sedgwick (1826) and, later, Damon (1860), Blake and Hudleston (1877), Woodward (1895) and Strahan (1898). Subsequent accounts by Arkell (1933, 1936, 1947a) and Brookfield (1973b, 1978) have concentrated on the stratigraphical position, palaeontology, palaeoecology and depositional environment of the ironstone, which is unique in the British Kimmeridgian. Wilson *et al.* (1958) reported the various exposures that were available at the time of their geological survey. Although the ironstone has a substantial iron content of at least 30%, it has not been worked extensively because of its high silica content (Pringle in Lamplugh *et al.,* 1920); Arkell (1936) comment ed that this had fortuitously prevented 'one of the loveliest of English village settings' from being spoilt.

Description

A section in Blind Lane, at the western end of Jubilee Coppice, comprises the GCR site (Figure 2.29). According to Callomon and Cope (1995), this is the most readily accessible exposure and shows the ironstone dipping to the south into the small syncline that runs through Abbotsbury. From the site, there is a view of St Catherine's Chapel, which stands on the dip slope on the southern limb of the syncline. There is some confusion in the geological literature, even amongst individual authors, concerning the names of the lanes on the north side of the village. Although now known as 'Blind Lane', some authors have referred to it as 'Red Lane', whilst others have used the latter name for the lane further west, opposite the Ilchester Hotel, which is indeed the modern Red Lane. There is also confusion amongst authors about which of these two lanes is that referred to by Blake and Hudleston (1877;'the road leading over the hill to Gorwell'), and Pringle (in Lamplugh *et al.,* 1920; 'the lane leading from Abbotsbury to Gorwell Gate'). In either case, the sections produced by Blake and Hudleston (1877) and Pringle (in Lamplugh *et al.,* 1920) are closely similar, as noted by Arkell (1936). The latter's published section (including bed numbers) forms the basis of that given below, which includes some added detail from House (1989). The lithostratigraphical classification is based on Brookfield (1978).

	Thickness (m)
Abbotsbury Ironstone	
6. Sand, yellowish brown, ferruginous, veined by thin 5. Ironstone, reddish brown; ferruginous ooids as shining 'millet-seed' grains in matrix of fine-grained quartz sandstone; interbeds of concretionary ironstone and ferruginous mudstone; abundant fossils including brachiopods, bivalves, gastropods, ammonites, serpulids and fossil wood; harder band of sandstone near base	6.0
Abbotsbury Sandstone	
4. Sandstone, dark brown, coarse-grained; ferruginous peloids; ammonites	0.8
3. Sand, soft, weathering yellow	0.6
2. Sandstone, dark brownish green, ferruginous	0.3

1. Sandstone, brown, ferruginous; variably cemented; fossils preserved as casts	*c.* 3.0

All outcrops are oxidized and the iron ore is red or reddish brown in colour except where seen in deep trenches when it appears green owing to the presence of the iron silicate mineral berthierine, commonly (though incorrectly) referred to as 'chamosite'; much of the berthierine is now weathered to limonite (House, 1989). Bed 6 of the above section may be merely the weathered upper portion of the ironstone Bed 5 (Arkell, 1936).

Interpretation

The lithostratigraphical classification of the Abbotsbury Ironstone has not been straightforward, not least because authors have been influenced by its chronostratigraphy rather than following strict lithostratigraphical principles. Arkell (1936) described the Abbotsbury Ironstone as forming an upward lithological continuation of the 'already ferruginous Sandsfoot Grits' of the Corallian Group but the fact that it contains the ammonite *Rasenia* (Arkell, 1933, 1936, 1947a), indicative of the Lower Kimmeridgian Cymodoce Zone, has led many authors to consider it as part of the Kimmeridge Clay Formation. In their paper on the Corallian of England, Blake and Hudleston (1877) correctly surmised that it occurred 'at least on the horizon of the passage-beds to the Kimmeridge Clay'. Although Wilson *et al.* (1958) used the term 'Passage Beds' when they mapped the Abbotsbury area, because they were unable to recognize what they considered to be an orthodox Corallian Beds–Kimmeridge Clay boundary Brookfield's (1978) attempt to revive Blake's (1875) idea of a Passage Beds Formation for this interval (with the Abbotsbury Ironstone as its youngest unit) has not found acceptance (see site report for East FCap–Hounstl Mouth, this volume). Brookfield (1978) replaced the term 'Sandsfoot Grits', as used by Arkell (1936) for the beds beneath the Abbotsbury Ironstone, by the term Abbotsbury Sandstone' because he considered that they were not part of the same depositional episode responsible for the Sandsfoot Grit of the Dorset coast. According to Brookfield (1978), the Abbotsbury Sandstone dies out about 3 km east of Abbotsbury and is not in lateral continuity with the Sandsfoot Grit of the coastal exposures. He believed it was younger than the Sandsfoot Grit, which it overlaid, and that it was the correlative of the Ringstead Clay and basal Kimmeridge Clay of the coastal sections. According to Brookfield (1978), the top of the Abbotsbury Sandstone could then be seen at the GCR site (called by him 'Red Lane') where it belonged to the lower part of the Cymodoce Zone. All published accounts agree that the boundary between the Abbotsbury Ironstone and underlying Abbotsbury Sandstone is gradational. If the latter is in lateral and/or vertical continuity with the Sandsfoot Grit, as recent geological surveying suggests (C.R. Bristow, pers. comm.) then there appears to be no lithostratigraphical justification for excluding the beds up to and including the Abbotsbury Ironstone from the Corallian Group. There is neither a lithological change nor an event horizon (Inconstans Bed) comparable with those that define the base of the Kimmeridge Clay in its type area (see site reports for Black Head and Ringstead, this volume), and the base of that formation in the Abbotsbury area is most appropriately drawn at the top of the Abbotsbury Ironstone. Blake and Hudleston's (1877) record of the brachiopod *Rhynchonella* (*Torquirhynthia*) *inconstans* J. Sowerby (and, by inference, the Inconstans Bed) refers to *?Septaliphora hudlestoni* (Rollier) (Childs, 1969), asymmetrical variants of which have often been mistakenly recorded as *T inconstans* (Brookfield, 1973b).

A full faunal list for the Abbotsbury Ironstone was given by Brookfield (1978), updated from Brookfield (1973b). This included 17 bivalve taxa (the taxonomically most diverse group) together with gastropods, brachiopods, ammonites, a nautiloid, a serpulid, an echinoid and a crustacean. According to Cope (1980), the species of *Rasenia* that characterize the Abbotsbury Ironstone constitute a distinctive fauna that is different from that of the four *Rasenia* faunal horizons recognized by Birkelund *et al.* (1978) (see site report for East Fleet–Small Mouth, this volume). Callomon (in Cope, 1980) believed it was closest to, and possibly identical with, that of the 'Marnes à Pterocères' at Villerville in Normandy, which yielded the type specimens of *Rasenia erinus* (d'Orbigny) and *R. berryeri* (Dollfus). Specimens from the Abbotsbury Ironstone comparable with the former species were illustrated by Morris (1968) in his unpublished thesis. There is no definitive evidence for the age of the underlying Abbotbury Sandstone. Blake and Hudleston (1877) reported 'numerous *Ammonites decipiens*'but no one has been able to substantiate this record. Arkell (1947a) suggested they might be *Pictonia* or *Ringsteadia* but was not able to verify this. Morris (1968) reported that these beds had 'yielded only one ammonite which may be referred to the Pictoniinae but is not sufficiently well preserved to be of any stratigraphical value'. The few bivalve records are not age diagnostic. On the basis of this evidence, one can only conclude that Brookfield's (1978) Abbotsbury Sandstone is Late Oxfordian and/or Early Kimmeridgian in age. Future detailed palaeontological work

on cores from two recent British Geological Survey boreholes at Abbotsbury (Newell, 2000) may provide additional useful data.

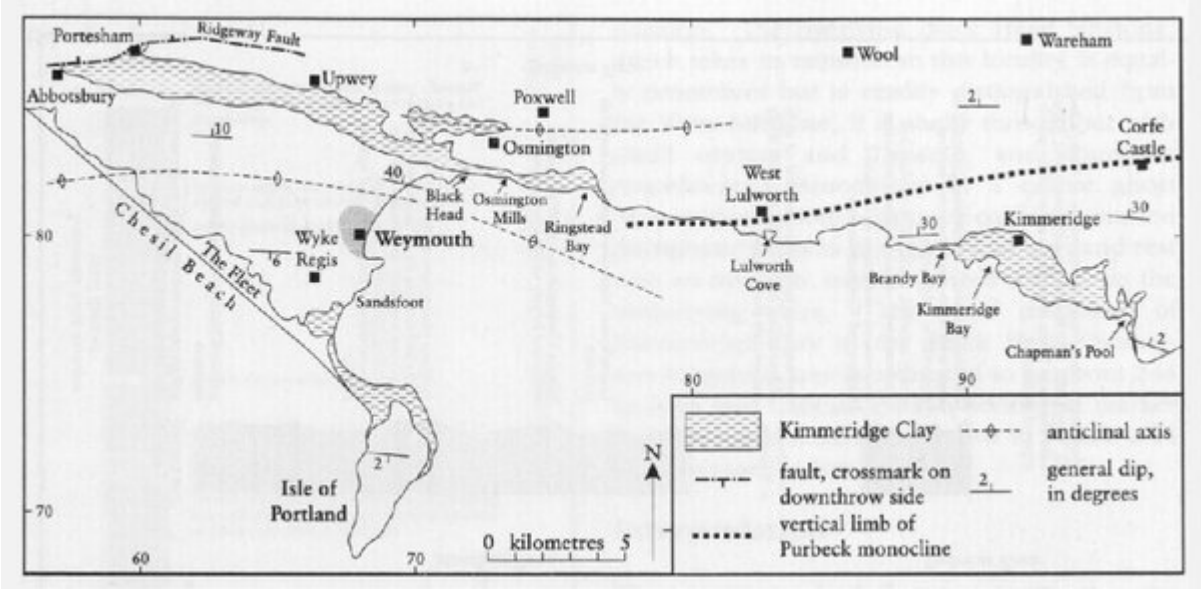
Although bivalves dominate the fauna of the Abbotsbury Ironstone taxonomically, brachiopods are locally more abundant. The brachiopod fauna is rich and varied for the British Kimmeridgian (Sandy, 1985). The rhynchonellid *?Septaliphoria hudlestoni* has already been mentioned but, in addition, Brookfield (1973, 1978) recorded '*Terebratula*'*subsella* (Leymerie), *Ornitbella lampas* (J. Sowerby), *Aulacothyris dorsetensis* (Davidson) and *Lingula* sp.. Following investigation of the internal shell structures, Sandy (1985) reassigned the specimens previously identified as *Aulacothyris dorsetensis* to the genus *Rugitela,* and indicated that the '*Terebratula*' *subsella* belonged to the genus *Kutchithyris.*

The faunal and lithological characteristics of the Abbotsbury Ironstone suggest a nearshore depositional environment or, more likely, because of the lack of any indications of shoreline or strand, or sediment derived from southwest England, an environment marginal to an offshore (barrier) bar facing south-east (Brookfield, 1973). This scenario, analogous to the present-day barrier bar environments of the Gulf of Mexico, was apparently terminated by a marine transgression that brought relatively quiet water and mud (Kimmeridge Clay) deposition to the area (Brookfield, 1973).

Conclusions

The village of Abbotsbury in Dorset is sited on the outcrop of the Abbotsbury Ironstone that represents a unique deposit in the British Kimmeridgian. The ironstone, comprising (when fresh) berthierine ooids in a fine-grained quartz sandstone matrix, was once worked on a small scale but has never been fully exploited for iron because of its high silica content. It has, however, been much used locally as a building stone. The GCR site offers a readily accessible exposure in one of the lanes leading northwards from the village. The Abbotsbury Ironstone has yielded a rich benthic fauna, including an unusually rich and varied brachiopod fauna, as well as age-diagnostic ammonites of the genus *Rasenia.* Known only at Abbotsbury, this unique and unusual deposit is interpreted as representing an Early Kimmeridgian offshore barrier bar.

References



(Figure 2.12) Kimmeridge Clay outcrops in the Dorset type area (after Cox and Gallois, 1981, fig. 1).

(Figure 2.29) Exposure of Abbotsbury Ironstone at Blind Lane, Abbotsbury. (Photo: A6478, reproduced with kind permission of the Director, British ,Geological Survey ©NERC.)