Pincent's Kiln, Theale, Berkshire

[SU 651 721]

Highlights

This small section shows the Palaeocene resting unconformably on the Chalk and is one of the few surviving exposures of the Tertiary–Cretaceous junction in the western part of the London Basin. The marine Upnor Formation (formerly the Reading Basement Bed) is well developed here and is succeeded by fluvial sediments (Reading Formation) containing a variety of plant macrofossils.

Introduction

The site (Figure 4.3) comprises the Palaeocene Lambeth Group (including both the Upnor and Reading Formations), resting unconformably on the Upper Cretaceous Chalk (*Micraster coranguinum* Zone). The section is important since it is one of the very few extant exposures of the Cretaceous–Tertiary junction in the Reading area towards the western end of the London Basin.

A measured section at Pincent's Kiln may be found in Blake (1903, p. 23), although the site was not referred to by name. Whitaker (1872) had earlier described the site and identified the molluscan fossils present. The section has twice been included in excursions run by the Geologists' Association (Hawkins, 1934, 1946). In the former account, Hawkins recorded the section, referring to 'about 12 feet of dune-bedded, yellowish sharp sand' at the top. Recently, Crane and Goldring (1991) have described and re-interpreted the section and listed both plant and animal fossils found. All writers have been interested in the biogenic structures associated with the unconformity. Whilst Whitaker tentatively ascribed these to boring molluscs, they are now known to be burrows (Bromley and Goldring, 1992).

This site was also independently selected for its fossil plant content, a more detailed account of which can be found in the GCR series volume *Mesozoic to Tertiary Palaeobotany of Great Britain* (Cleal and Thomas, in prep.).

Description

The site comprises some 4.5 m of sands and muds assigned to the Lambeth Group.

Upnor Formation

The burrowed planar surface of the unconformity above the Chalk is followed by bioturbated glauconitic and pebbly sands and grey silty muds. This is the Reading Basement Bed of Edwards and Freshney (1987b) whose nomenclature replaces the term 'Bottom Bed' probably first used in Hull and Whitaker (1861) and later used by Curry *et al.* (1978) and other workers. More recently, this has been renamed the Upnor Formation (Ellison *et al.,* 1994). The Chalk has been subjected to solution so that locally there is a zone about 10 cm in thickness of concentrated burrow infills. Large flints that originally rested on the surface of the unconformity, now 'float' about 10 cm above the Chalk.

Crane and Goldring (1991) have described both the burrows and the body fossils. The former are shallow, U-shaped burrows, possibly attributable to arthropods. Of the latter, *Ostrea, Discinisca* and foraminifera occur in the sands, whilst the silty muds contain *Glycymeris* and *Crassatella.* Coccoliths collected by Hamilton and Hojjatzadeh (1982) suggest a correlation with nannoplankton Zone NP9 (top of the Palaeocene).

Reading Formation

The marine sediments are truncated (in places cryptically) by a channel-form structure. From the northern part of the section, Crane and Goldring (1991) described medium to coarse sands and muds, exhibiting a series of scours and fills,

and containing a variety of fossil plants including leaves, fruits, seeds and megaspores. To the south, the erosion surface rises gently and the overlying sediment is mud in which leaf remains are common. These younger sediments are assignable to the Reading Formation of Ellison *et al.* (1994).

Interpretation and evaluation

The importance of the section is that it provides one of the very few exposures of the Cretaceous–Tertiary unconformity in the Reading area towards the western end of the London Basin.

The Upnor Formation (Reading Basement Bed) clearly represents a major transgressive event. It is thin here compared with the maximum thickness of around 10.7 m found in Surrey, west Middlesex and south Berkshire (see Hester, 1965, p. 121). Hester referred to the considerable variation in the thickness of the Reading Basement Bed and postulated that this might be the result of erosion and fluvial reworking, with thicker occurrences representing less-eroded 'remnants'. Crane and Goldring (1991) concluded that the Chalk was uncemented though firm at the time of the Upnor Formation transgression and that its surface was probably a submarine-planed hardground.

The sediments above the Reading Basement Bed are fluvial in origin, the sands not being aeolian as Hawkins (1946) had suggested. Perhaps, at least in part, they comprise material reworked from a formerly thicker Basement Bed. Crane and Goldring (1991) suggested that these fluvial sediments were probably laid down relatively quickly and that their truncating relationship with the underlying strata presumably reflected a sea-level fall.

Pincent's Kiln has not been designated as a stratotype but Ellison *et al.* (1994) believe that Warner's Brickworks, Knowl Hill, near Reading (although largely infilled) may be suitable for their Reading Formation. Indeed, the best exposures of this stratigraphical unit are in the Hampshire Basin. Perhaps the best of all is that in Alum Bay, Isle of Wight, which Edwards and Freshney (1987b) have designated as the Hampshire Basin hypostratotype. It should, however, be noted that their usage of the term Reading Formation includes the 'Reading Formation Basement Bed', rather than raising the latter to separate formation status (cf. Ellison *et al.,* 1994).

It may be that this albeit small section at Pincent's Kiln includes the Palaeocene–Eocene boundary. Whilst the Reading Basement Bed appears to be uppermost Palaeocene in age (NP Zone 9), Knox (1984, p. 995) has suggested that the junction of this unit and the overlying non-marine strata in the western part of the London Basin be considered to represent (somewhat arbitrarily) the NP9/10 or Palaeocene–Eocene boundary.

Conclusions

Pincent's Kiln is an important locality in that it represents one of the very few exposures of the Cretaceous–Tertiary unconformity in the western part of the London Basin. The Upnor Formation represents a major westerly transgression of the sea which reached this area towards the end of the Palaeocene (nannoplankton Zone NP9). The subsequent regression is represented by fluvial sediments with plant remains.

References

(Figure 4.3) Pincent's Kiln, Theale, Berkshire, showing the Palaeogene (Lambeth Group) resting unconformably on the Upper Cretaceous Chalk. (Photograph courtesy R. Goldring, who obtained this picture in 1979 after the site had been re-excavated by NCC.)