
Elmstead Rock Pit, Chislehurst, Kent

[TQ 423 706]

Highlights

This small site comprises a good section in cemented and fossiliferous Blackheath Beds, examples of which are now rare. The succession, with its diverse marine and brackish water fauna, is considered to be a good representative of tidal channel bar facies.

Introduction

The site referred to here as Elmstead Rock Pit is located in the back garden of 41 Elmstead Lane, Chislehurst [TQ 423 706] and is a former quarry face comprising fossiliferous pebbly sands attributed to the 'Blackheath Beds'.

Prestwich (1854a) made an early reference to this area of Kent in his comprehensive study of the Woolwich and Reading Beds. He noted that in the vicinity of Sundridge Hill, the pebbly sands ('Blackheath Beds') overlying the Woolwich Beds were unusual in having a strong calcite cement and contained abundant shelly fossils. At Sundridge (Elmstead), these beds showed a 'strong stratification dipping up to 22° north'.

The area of Elmstead Woods and Sundridge Park has in earlier years been visited many times by the Geologists' Association, interest being in the 'Rock Pit' in Sundridge Park and in the railway tunnel and cutting at Elmstead Hill [TQ 422 707]. There are numerous references to the area dating back to the 19th century (Ilott and Coles-Child, 1872; Lobley, 1876; Whitaker and Holmes, 1897; Holmes, 1900, 1901; Holmes and Osman, 1902a,b; Stamp, 1920; Wrigley, 1945). As was pointed out, however, by James and George (1970) in a report on the current site, the past literature contains many vague location details, and clearly more than one site was involved. However, the present site is probably that described by Wrigley (1945) as being 'in an enclosed copse hard by the station', i.e. Elmstead Station.

On the 1910 6-inch geological map (Kent VIII SW), the area is inscribed 'Fossiliferous sands with pebbles' and the site of the Rock Pit is marked 'Sand and pebbles with conglomerate bands. 20ft. Many fossils'. This map also shows the area containing the Rock Pit as Rockpit Wood, a name the later 6-inch maps use for the area south of the railway. The most recent description of the site is the brief account given by James and George (1970) who referred to earlier descriptions by Stamp (1920) and Wrigley (1945) who produced faunal lists, as did Prestwich (1854).

Description

The rock pit at 41 Elmstead Lane is a fine section, comprising some 6 m exposure of Blackheath Beds. These consist of fine quartz sands containing abundant, very well-rounded flint pebbles up to 8 cm in diameter, concentrated into bands some centimetres to decimetres in thickness. The beds have an apparent dip of up to 25° NE, but this is a syndepositional inclination rather than one of tectonic origin.

The sands, for the most part, are strongly cemented by calcite which has facilitated their remaining particularly fossiliferous. Amongst the most common fossils recorded by Wrigley (1945) are *Corbicula cuneiformis*, *C. cordata*, *Ostrea bellovacina*, *Lentidium antiquum* and *Aloidis arnouldi*. James and George (1970) recorded *Nerita semilugubris* and a teredinid tube, both of which were new records for the locality, together with *Barbatia modioliformis*, rare in Britain, and a variety of fish teeth and bones.

Interpretation and evaluation

As King (1981) pointed out, good exposures of the Blackheath Beds nowadays are rare. Although formerly well-exposed at Blackheath (grid reference [TQ 395 765]), there are no longer good exposures there.

Opinions have differed regarding the stratigraphical relationships and status of the Blackheath Beds (see discussion in King, 1981). Although at one time thought to be the lateral equivalent of the Oldhaven Beds, a later consensus suggested that they are a facies of the Woolwich and Reading Beds (King, 1981; Ellison, 1983). King (1992, pers. comm.) subsequently postulated that they may be younger than this, a view recently supported by Ellison *et al.* (1994) who placed the Blackheath Beds in their Harwich Formation.

A particularly unusual and significant aspect of Elmstead Rock Pit is the preservation of a diverse fauna including brackish as well as fully marine species. Wrigley (1945) considered that the former were derived from the underlying Woolwich Beds, although Curry (1965a, p. 159) felt that derivation from the latter could only account for a proportion of what he called the 'estuarine element' of the fauna of the Blackheath Beds. Ellison's (1983) conclusions are compatible with this view. Elmstead represents a western brackish facies of his 'Pebble Beds' (synonymous with Blackheath Beds) which contrasts with their marine development further east.

Although the bottom of the Blackheath Beds is not visible in the Elmstead Rock Pit, it is apparent from Elmstead Hill that they have a markedly erosional base and, in Elmstead railway Tunnel, truncate various divisions in the underlying Woolwich Beds (Whitaker, 1889). In outliers, near Caterham, the Blackheath Beds are reported to actually cut down into the Chalk but this may be due to late Tertiary reworking, followed by the formation of solution hollows (King, 1981 and pers. comm.).

Curry (1965a) suggested a tidal channel origin for the Blackheath Beds, whilst Ellison (1983) concluded that those parts of the sequence with steep syndepositional dips are best interpreted as bars within such channels (see also Ellison *et al.*, 1994). Elmstead Rock Pit therefore appears to provide a rare exposure of the latter and one representing brackish influences some way westward from the seaward end of the tidal channels.

The presence of well-rounded flint pebbles is indicative of high energy, although rounding may reflect a polycyclic history. The presence of flints in large numbers may shed light on the palaeogeography of the area, although open to various interpretations. Was the Chalk locally exposed; were the flints derived from earlier gravels; or were they, as Curry (1965a) suggested (following Leach, 1910), derived from the erosion of the Chalk subaqueously in deep channels?

Conclusions

Elmstead Rock Pit comprises a good exposure of the Blackheath Beds of which exposures are nowadays rare. It consists of a fine example of what is considered to be tidal channel bar facies within this unit and unusually contains a diverse fauna, comprising abundant shelly fossils of brackish as well as marine affinities.

The presence of large numbers of well-rounded flints indicates that a considerable amount of Chalk had been eroded by the time the Blackheath Beds accumulated. However, whether they were derived from subaerial exposures of Chalk, subaqueously, in deeply incised channels, or polycyclically via earlier flint gravels remains unclear.

References