
Vale Farm, Sutton, Suffolk

[TM 317 456]

Potential GCR site

Highlights

This pit exposes an excellent section of Red Crag showing sedimentary facies that indicate a shal-lowing-upward sequence and is one of the rare localities where Red Crag pollen has been recorded.

Introduction

This pit is located approximately 1 km NNW of the village of Shottisham. The pit appears to be a relatively modern excavation and was unrecorded in the geological literature before the 1970s. Dixon (1979, fig. 7) and Balson *et al.* (1991) have described the facies relationships in this pit.

Description

This exposure consists of a single linear face approximately 40 m long in a shallow pit up to approximately 4 m deep (Figure 11.12). A nearby borehole [TM 3175 4589] proved more than 15.5 m of Red Crag in this area. Three units are recognizable in the face (Figure 11.13). Unit 1 consists of planar cross-bedded red-brown shelly sands (just visible below talus) passing up into horizontally bedded sands. The top of unit 1 is taken at the point where mud drapes first occur in the vertical sequence. The sediment is coarse-grained and contains rounded flint and phosphatic pebbles up to 1 cm in diameter.

The base of unit 2 is marked by a discontinuous lag of shell fragments, often convex up, with flint pebbles and mud horizons, either as laterally continuous lenses or as ripple drapes. This unit is dominated by trough cross-bedding and low-angle laminae, with characteristic trough-shaped mud drapes. Two types of burrow are present: vertical *Skolithos*-type tubes and clay-filled U-shaped tubes of *Lanicoidichna*-type or *Arenicola*-type. The top of unit 2 is eroded into by an undulatory sheet of coarse-grained, bioturbated shelly and pebbly sands of unit 3. The bedding of unit 3 is concordant with the basal scoured surface in the centre of the face, but low-angle stratification resembling lateral accretion bedding is also seen. One type of burrow occurs in large numbers within unit 3, which has a vertical shaft which tends to taper downwards. Many shafts show a bulbous swelling somewhere along their length. Burrow dimensions are typically in the region of 5–10 mm in diameter and several decimetres in length. These traces may be related to the ichnogenera *Lanicoidichna*, *Cylindrichnus* (although this is usually unbranched) or possibly *Psilonichnus*.

A number of vertical fissures filled with shelly sand derived from above or a friable micritic calcite are conspicuous at this locality. These fissures are part of an orthogonal joint system affecting both the Red and Coralline Crag in east Suffolk and north Essex. There is clear evidence of vertical displacement of c. 30 cm on one fissure in the pit. Balson and Humphreys (1986) suggested fissuring may have been caused by flexuring of the East Anglian landmass in response to subsidence in the adjacent North Sea and the tilting of East Anglia. Close inspection of the micritic calcite reveals root moulds and tubules and possibly even extant root material. These rhizoliths are believed to have formed during the Holocene due to root penetration down the fissure planes.

Excavation of unit 1 suggests a greater thickness of tabular-planar cross-bedding occurs at depth. Unit 1 is therefore probably the product of migration of a straight crested sandwave, and the horizontal beds at the top of the unit probably represent truncation and reworking of the bedform.

Unit 2 shows evidence for repeated truncation of bedforms. Packets of interlaminated mud and fine sand are laid down on the truncation surfaces and these pass into foreset laminae of coarser sand which are in turn truncated and overlain

by muddy packets. This may reflect a modification of spring–neap tidal bedding. In general, deposits showing systematic variations in foreset thicknesses attributed to monthly tidal cyclicity have been recorded from estuaries, tidal channels or tidal inlets but are also recorded from shallow shelf deposits (e.g. Allen, 1981). The shallow scour structure at the base of unit 3 was filled more or less vertically and therefore contrasts with the lateral accretion infill expected from the migration of tidal channels. The scour also lacks a marked basal lag/intra-formational shell or mudstone pebble lag although the fill is generally very coarse. This feature represents a high-energy fill event, but the abundance of vertical burrowing suggests that multiple phases of infill took place, while the lack of any fining-upwards motif argues against deposition generated by major storm events. Although the interpretation of this structure remains problematic, it can be provisionally interpreted as the basal lag fill of a large tidal channel.

Harrison (1983) has described pollen from mud drapes at Vale Farm. The flora is dominated by tree pollen which include *Pinus* (pine), *Quercus* (oak), *Alnus* (alder) and *Tilia* (lime).

Interpretation and evaluation

Pollen in Red Crag sediments has only been recorded from two surface exposures: Vale Farm (Harrison, 1983) and Walton-on-the-Naze (Hunt, 1989). At Walton-on-the-Naze, tree pollen also dominate but pollen of grasses, heathers and other herbs are also found. The strongly oxidized nature of sediments in surface exposures usually precludes the preservation of pollen but these two studies, together with Gibbard and Peglar's (1988) record of pollen in the Coralline Crag at Rockhall Wood, indicate that, with careful selection of sample material, further study may be fruitful.

The section at Vale Farm shows a sequence that indicates a shallowing of the environment comparable with that seen at Orford Lodge, Waldringfield and Broom Covert.

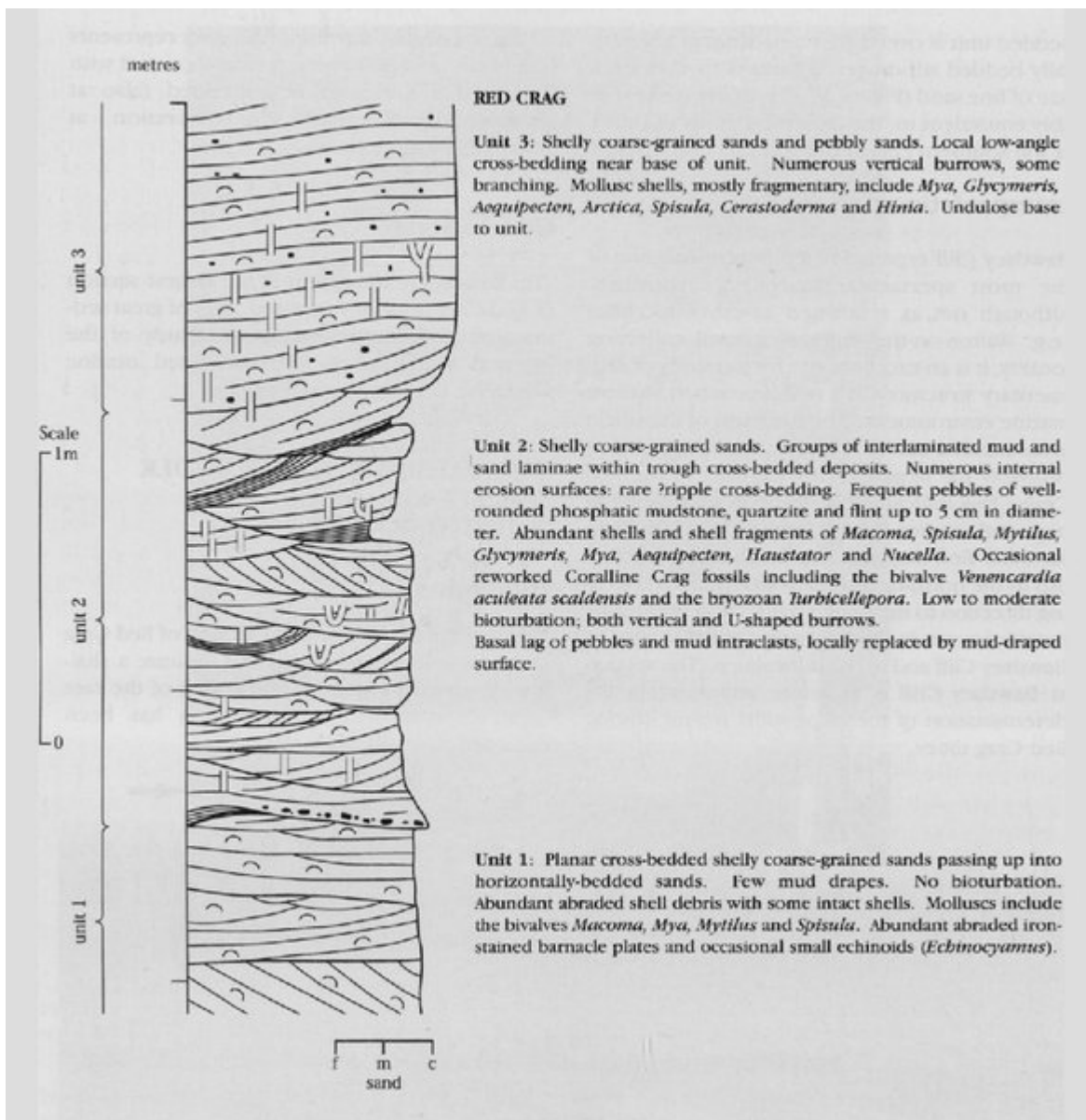
Conclusions

The pit at Vale Farm exposes an important section for the interpretation of palaeoenvironments and facies change in the Red Crag and is one of only two from which pollen has been recovered.

[References](#)



(Figure 11.12) Red Crag exposure at Vale Farm showing possible spring-neap tidal rhythms in unit 2 and truncation by the overlying unit 3. Scale is 1 m long. (Photograph: P. Balson.)



(Figure 11.13) Composite summary log for the Vale Farm GCR site. Metre scale approximate; f = fine, m = medium, c = coarse. (After Balson et al., 1991.)