Langport Railway Cutting

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Highlights

Langport Railway Cutting provides a good example of 'cold-stage' fluvial sedimentation, correlated with Oxygen Isotope Stage 8, and interglacial soil development seen in a rare permanent exposure. The site is located at the Langport Gap, a key locality in southern Somerset where the presence within a small area of several important fluvial and marine formations enables morphostratigraphical relationships to be elucidated. This is the type-site of the Chadbrick Member.

Introduction

Langport Railway Cutting contains well-exposed 'cold-stage' river gravels overlain by a well-developed palaeosol. The site is representative of the oldest gravel aggradation in southern Somerset, which can be traced upstream into the headwaters of the rivers Isle and Parrett. The gravels are probably best correlated with Oxygen Isotope Stage 8.

The site was first recorded by Woodward (1905) in his survey of railway cuttings between Langport and Castle Cary, but was not described. Subsequently, Hughes (1980) gave a very brief description of the site and attributed it to a 'fluvio-estuarine' facies of the interglacial marine Burtle Beds. More recently, Hunt (1987; in press) re-described the site, carrying out geomorphological, clast lithological, sedimentological and palaeontological studies. He established that deposition was from a multi-channel river flowing through a sparsely vegetated landscape. The site evidence was attributed to an unspecified cold stage prior to the last interglacial. Subseqently, Campbell *et al.* (in prep.) used Langport Railway Cutting as the type-section for the Chadbrick Member which is correlated with Oxygen Isotope Stage 8.

Description

Langport Railway Cutting [ST 426 272] is excavated in a broad terrace-like feature to the north-east of Langport. The feature is separated from the present course of the River Parrett by a low hill known as Whatley and lies some 14 m above the level of the present floodplain. The terrace surface is underlain by gravels which lie on a gently undulating erosion surface cut in Rhaetic shales. The gravels can be divided into three units (maximum bed thicknesses in parentheses):

3. Gravels, once probably sandy but now significantly clay-enriched and lacking in limestone clasts. The original trough cross-bedding is disrupted and many large clasts are orientated vertically. The upper part of the unit is generally bleached while the lower part is slightly reddened, but this pattern has been somewhat disturbed by involutions. A few very decalcified specimens of *Cepaea* sp. were present in the lower part of this unit. (1.4 m)

2. Gravels and sands infilling a channel, 0.9 m deep and over 10 m wide, incised into bed 1. The infill comprises a basal, imbricated clast-supported gravel passing into trough cross-bedded yellow-buff sands and sandy gravels. Clast orientation in the imbricated unit suggests a palaeocurrent direction of 332°. Most gravel clasts are lightly point-contact cemented with calcite, but some sand beds, particularly towards the top of the unit, are heavily cemented ('plugged'). A restricted molluscan fauna, including *Pisidium* sp., *Succinea* cf. *oblonga, Trichia* cf. *hispida, Pupilla muscorum* Linné, Limacidae and helicid fragments, was found in this unit, together with fragments of the case of the aquatic larvae of *Caddis* sp. and fragments of insect exoskeleton attributable to the Trichoptera. (0.9 m)

1. Pale brown, trough cross-bedded coarse sands and matrix-supported sandy gravels. The trough cross-beds are of the order of 0.1–0.3 m deep and 1.0–3.0 m across. A rather restricted molluscan fauna, including *Succinea* cf. *oblonga, P. muscorum, Vertigo* sp., Limacidae and helicid fragments, was found in this unit. Clast lithological analysis showed that these gravels comprise lithologies derived from the Mesozoic and Tertiary rocks upstream. The dominant lithotypes are grey micrites derived from the limestone beds in the Rhaetic and Lias, oolitic and bioclastic limestones from the Middle

Jurassic formations, and flint and chert from the Chalk and Greensand. (1.2 m)

Interpretation

The sands and gravels of the Langport terrace and many of the other terrace deposits of Somerset can be exemplified by the site at Langport Railway Cutting. The trough cross-stratification of the lower unit (bed 1) is consistent with deposition from a multi-channel river with a highly peaked or even ephemeral discharge regime and an abundant sediment supply. Modern analogues are widely known from high altitudes, high latitudes and arid and semiarid areas (Doeglas, 1962; Williams and Rust, 1969; Bull, 1972; Miall, 1977). The palaeontological evidence from bed 1 is consistent with this type of depositional regime. The absence of aquatic molluscs in this unit probably reflects the ephemeral nature of the river, particularly the short duration of flows. *P. muscorum is* a species typical of exposed arid environments (Kerney and Cameron, 1979), though it is thought to have been tolerant of damp places during the Pleistocene (Kerney, 1963; Kerney *et al.,* 1964). The other taxa were most probably living in damp, partially vegetated areas on the floodplain.

The imbricated gravels at the base of the middle unit (bed 2) are probably related to the scouring of the channel. The scour-and-fill structures in the sands and gravels overlying the imbricated gravels may be the result of the movement of sand waves in one channel, or may reflect deposition from a number of smaller braided channels. The fauna from bed 2 includes remains of the aquatic larvae of *Caddis* sp. and Trichoptera and the aquatic bivalve mollusc *Pisidium* sp.. It is therefore probable that flows were less ephemeral than they were during deposition of bed 1, or that standing water occupied a pool here after the recession of seasonal floods. The other molluscs are taxa of damp herbaceous vegetation (*Trichia* cf. *hispida*), wet terrestrial environments (*Succinea* cf. *oblonga*), generalists (Helicidae, Limacidae) or xerophiles (*P. muscorum*).

The remaining traces of trough cross-bedding in the upper unit (bed 3) are again consistent with deposition from a multi-channel stream. *Cepaea* is a thermophilous, generalist terrestrial mollusc genus, but other smaller taxa were most probably destroyed by decalcification. The leached and reddened upper horizons and especially the presence of plugged calcretes are consistent with weathering under a warm arid climate, probably during the last interglacial. However, most evidence shows that the last interglacial was characterized by a 'continental warm summer' rather than 'arid' climate (Jones and Keen, 1993). The disruption of soil horizons and bedding and the reorientation of stones probably took place under periglacial conditions during the Devensian.

Langport Railway Cutting is one of the key sites in the argument about the possible glaciation of southern Somerset, as suggested by Gilbertson and Hawkins (1978a, 1978b), or a more widespread glaciation of southern England, as argued by Kellaway (1971) and Kellaway *et* al. (1975), or the development of a proglacial lake in southern Somerset as hypothesized by Stephens (1966b, 1970b, 1973). A possible glacial erratic was recorded some 7 km north at Greylake (Kidson *et al.,* 1978; Gilbertson, pers. comet., 1982), but Langport Railway Cutting contains only clasts derived from within the Parrett catchment and therefore probably lay beyond any possible glacial or glaciolacustrine limits.

Conclusion

Langport Railway Cutting was selected as a good example of 'cold-stage' fluvial sedimentation seen in a rare permanent exposure. The site has well-preserved scour-and-fill stratification typical of deposition from a braided river and well-preserved, if sparse, molluscan assemblages. It is also unusual among British 'cold-stage' sites for having yielded remains of the larvae of aquatic insects. The upper part of the sequence shows good examples of post-depositional modification by periglacial and pedogenic processes including the rather unusual process of calcrete formation during the last interglacial. The site has stratigraphical significance: it is part of the oldest (and only pre-Ipswichian) terrace of the River Parrett and is located at the Langport Gap, a key locality in southern Somerset where the presence within a small area of several important fluvial and marine formations enables their morphostratigraphical relationships to be elucidated. The site also helps to establish the limits of glaciation in southern Somerset; it contains only rock types derived from within the Parrett catchment and therefore probably lay beyond any possible glacial or glaciolacustrine limits.

References