Low Ham

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Highlights

Low Ham is of national importance as the only locality where high sea levels during a Devensian interstadial can be demonstrated. The site contains the best Stage 5a interstadial pollen, mollusc and ostracod assemblages in South-West England and is the type-site of the Low Ham Member of the Parrett Formation.

Introduction

A thick drift sequence — the Low Ham Member and the Combe Member — can be found in the Leaze Moor Valley, which cuts through the Langport–Somerton escarpment in southern Somerset (Figure 9.7). The Low Ham Member consists of sands, silts, clays and peats, dated by aminostratigraphy to Oxygen Isotope Stage 5a. These deposits contain abundant molluscs, ostracods, plant macrofossils, pollen and other microfossils, which together indicate interstadial conditions. Ostracods and rare dinocysts and diatoms show that the Low Ham Member accumulated in a back-estuarine situation in response to rising sea levels. The overlying Combe Member accumulated during a phase of climatic deterioration and falling sea level, through the recycling of marine sands by aeolian, wash and ephemeral fluvial processes.

The deposits of the Leaze Moor Valley were discovered only recently, though the type-site of the Combe Member, at Combe, near Langport, was first described by Ussher (1908). Drift-based soils were mapped at Low Ham by Avery (1955), and sands with a sparse mollusc fauna were first recorded near Low Ham by Hughes (1980). The Leaze Moor Valley was investigated in detail by Hunt (1987) and Hunt *et al.* (in prep.). Twenty-nine boreholes were drilled and twelve mollusc, seven plant macrofossil, two pollen and two organic-walled microfossil diagrams were constructed. Mizzen (1984) analysed the ostracod content of one of these boreholes. Amino-acid ratios derived from mollusc shells taken from the Low Ham Member were described by Hunt *et al.* (in prep.), who attributed the unit to Stage 5a. The Low Ham and Combe members are major constituents of the Parrett Formation defined by Campbell *et al.* (in prep.).

Description

The Low Ham beds underlie 'terraces' standing up to 4 m above Holocene alluvium in the valleys between Langport and Somerton (Hunt, 1987). At Low Ham GCR site [ST 4390 2900], the terrace surface lies at 19 m OD. Underlying the terrace surfaces are thick stony diamictons, then sandy gravels and laminated silts of the Combe Member with a sparse mollusc fauna characterized by *P. muscorum, Succinea* cf. *oblonga* and occasional *Columella edentula* (Draparnaud) (Figure 9.8).

These deposits pass down conformably into the Low Ham Member, the first unit being dark brown laminated sedge peats and thin grey silts with *Succinea* cf. *oblonga* and *P. muscorum.* These overlie dark brown highly organic detritus muds, with abundant seeds of *Zannichellia palustris, Potamogeton* stones and *Hippuris* nodes and stones. The mollusc fauna of this unit includes *Succinea cf. oblonga, A. leucostoma, Pisidium* spp. and *L. peregra.* The detritus muds overlie compacted mid-grey silts with *G. laevis, B. tentaculata, V. cristata, A. leucostoma, Pisidium* spp., *L. peregra* and *Succinea* cf. *oblonga.* These silts pass down into sparsely fossiliferous, pale blue-grey silty sands with *G. laevis, B. tentaculata, V. cristata, Pisidium* spp., and *L. peregra* and then unfossiliferous coarse red sands (Figure 9.8). Farther to the north along the Low Ham Valley, more diverse aquatic mollusc assemblages, including *Belgrandia marginata* (Michaud), were recorded (Hunt, 1987). Pollen assemblages from the detritus muds and grey silts are dominated by sedge, grass and herbs, with rare pine, birch, spruce, alder, willow and hazel. Assemblages from the laminated sedge peats and silts are of lower diversity and lack the tree and shrub species. Ostracod assemblages from the detritus muds are rich, often containing around 80 species. Occasional specimens of the salinity tolerant *Cyprideis torosa* (Jones) and a

number of obligate halophilous taxa are present (Whatley *in* Hunt, 1987; Hunt *et al., in* prep.). Also present are rare specimens of the marine dinoflagellate cysts *Operculodinium centrocarpum* and *Spiniferites* cf. *ramosus* and very rare marine diatoms. These marine taxa are present in the borehole to 13.8 m OD.

Radiocarbon assays of the Low Ham Member yielded ages of >40 300 (SRR-2450) and > 41 ka BP (SRR-2451). Amino-acid racemization assays on molluscs from the Low Ham Member are technically very difficult because of the small size of most mollusc specimens, but ratios indicate that the most probable correlation is with Oxygen Isotope Stage 5a (Bowen, pers. comm., 1996; Campbell *et al.,* in prep.; Hunt *et al.,* in prep.). However, Keen (pers. comm., 1997) notes that *B. marginata* has not been recorded in deposits younger than Stage 5e.

Interpretation

The Combe Member (beds 1 and 2) contains *P. muscorum, Succinea* cf. *oblonga* and *C. edentula,* an assemblage typical of 'cold-stage' terrestrial sedimentation in open exposed landscapes. The diamictons, sandy gravels and silts of these deposits are consistent with deposition by a variety of mass movement and wash processes and thus with generally poorly vegetated stadial conditions.

The Low Ham Member at this site has the characteristics of a channel-fill succession, with basal moving-water sands passing up into quiet-water detritus muds and then marsh peats. The succession of mollusc species also indicates a transition from a basal assemblage consisting largely of taxa typical of moving water with some weeds, such as *B. tentaculata* and V. *cristata,* to assemblages typical of rather poor quality stagnant water, typified by *A. leucostoma* and *L. peregra* in the detritus muds, and then into marshy conditions with occasional standing water characterized by *Succinea* cf. *oblonga,* occasional *Pisidium* spp. and terrestrial molluscs.

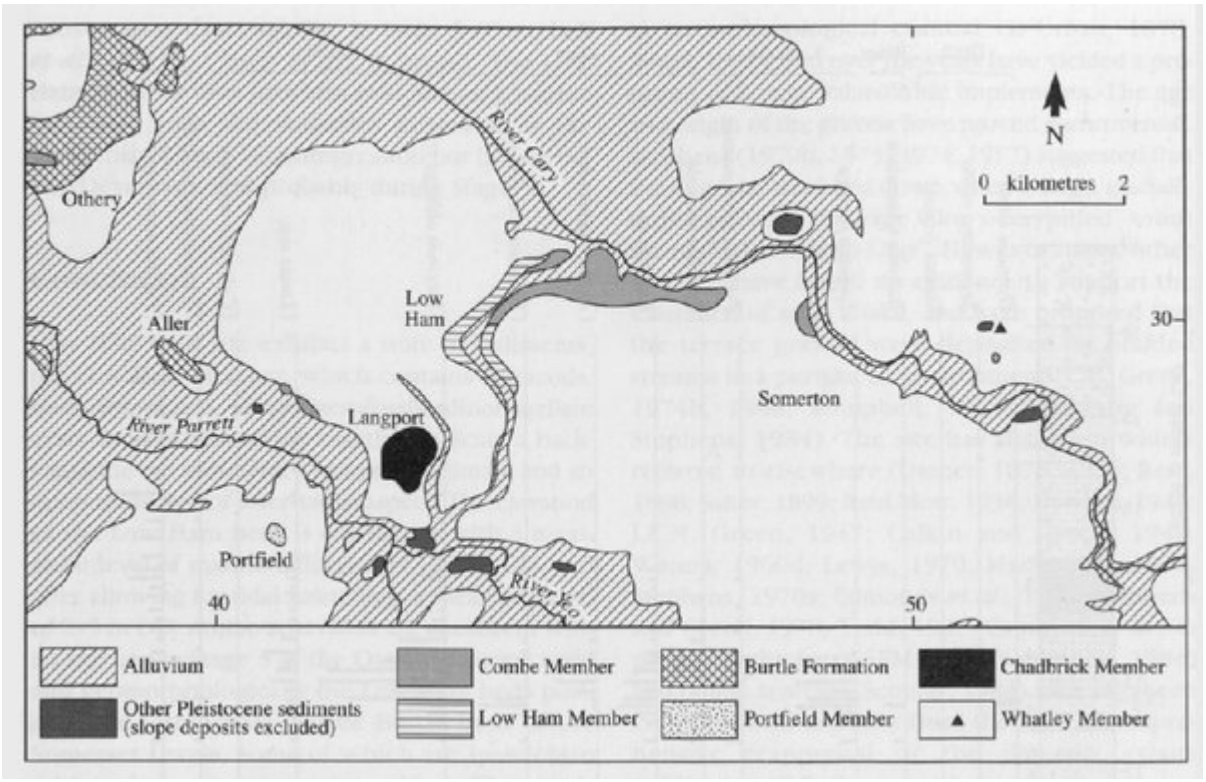
Although no brackish-water molluscs are present, the ostracods, dinoflagellate cysts and diatoms point to marine influence up to 13.8 m OD. The tidal range in the Bristol Channel is very large as the result of tidal funnelling and, assuming similar tidal ranges in the past, a mean sea level of 2–5 m OD is probable.

The age of the Low Ham Member is still open to question. The facies of the pollen and terrestrial mollusc assemblages are consistent with interstadial rather than interglacial conditions, though the presence of *B. marginata* at some localities is incompatible with later Devensian interstadials. The most compelling biostratigraphic comparisons are with the Wretton Interstadial of Norfolk (Hunt, 1987). The radiocarbon assays indicate only an age greater than 41 ka BP, while the amino-acid ratios are broadly consistent with an age late in Stage 5 (Campbell *et al.,* in prep.; Hunt *et al.,* in prep.). The Low Ham Member thus provides evidence of a marine incursion into the Somerset Levels after the Ipswichian (Stage 5e) transgression but before the Mid-Devensian, and probably during Stage 5a.

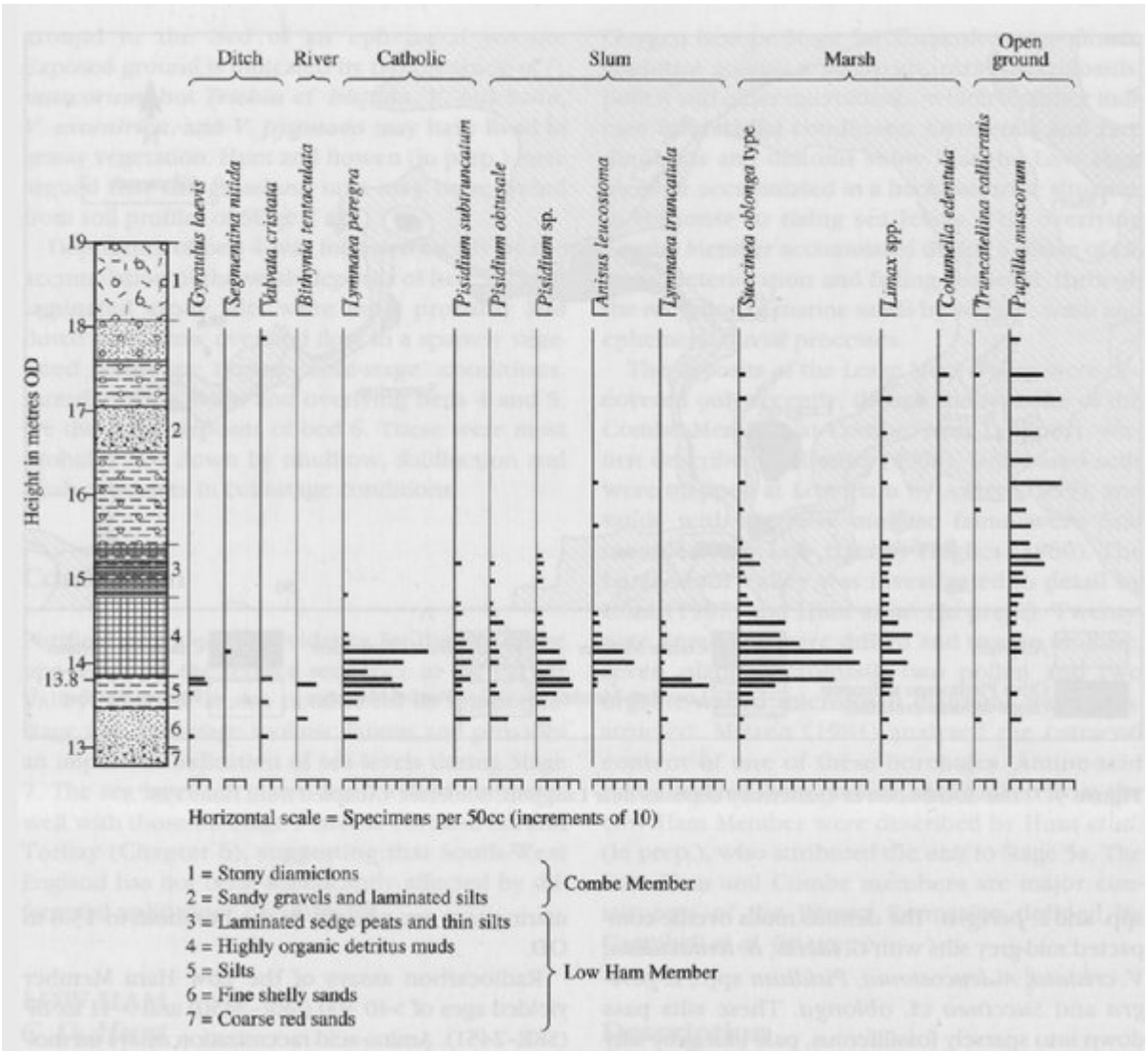
Conclusion

Low Ham GCR site exhibits a suite of sediments, the Low Ham Member, which contains ostracods, molluscs, pollen, plant macrofossils, dinoflagellate cysts and diatoms which together indicate a back-estuarine environment, a temperate climate and an open landscape of interstadial aspect. The elevation of the Low Ham beds is consistent with a maximum level of marine influence at 13.8 m OD, and after allowing for tidal funnelling, a mean sea level of 2–5 m OD. Amino-acid ratios are consistent with an age late in Stage 5 of the Oxygen Isotope scale and geomorphologically the Low Ham beds postdate the interglacial marine Burtle Beds of the Somerset Levels, some of which are Ipswichian (although some are certainly older). The site is therefore of national importance as the only location where high sea levels subsequent to the Ipswichian Interglacial (Oxygen Isotope Stage 5e) and prior to the Holocene marine transgression can be demonstrated clearly.

References



(Figure 9.7) The distribution of Quaternary deposits near Langport, Somerset. (Adapted from Hunt 1987.)



(Figure 9.8) The molluscan biostratigraphy of Pleistocene deposits at Low Ham. (Adapted from Hunt 1987.)