Wookey Station

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Highlights

Wookey Station provides an excellent example of alluvial fan sedimentation on the Mendip margin, dating from a stadial in the Devensian. It is of special importance because uniquely it contains fossil molluscs and pollen, critical to an understanding of the depositional environment of the Mendip alluvial fans. It is the type-section of the Wookey Formation and of the Wookey Station Member.

Introduction

Deposits of the Wookey alluvial fan are exposed in old railway cuttings at Wookey Station. Coarse, sometimes cryoturbated, gravels with occasional small palaeochannel features containing fossil molluscs, pollen and recycled palynomorphs are overlain by a broad silty palaeochannel-fill (Figure 9.17).

The deposits at Wookey Station were first mentioned by Woodward (1876), who noted that up to 10 feet of gravel was visible and that the long-axes of many stones were vertical. Green and Welch (1965) noted additionally that the gravels vary from round to angular and include clasts of Carboniferous Limestone and Old Red Sandstone. The site was described in detail by Macklin (1985, 1986) and Macklin and Hunt (1988), from whose work the following description is largely taken. Campbell *et al.* (in prep.) proposed the site as the type-section of the Wookey Formation and of the Wookey Station Member.

Description

At Wookey, two gravel aggradations have been distinguished. The younger is a valley-fill of early Holocene age (Macklin and Hunt, 1988). This lies in a trench incised through the earlier aggradation, which has the morphological and sedimentological characteristics of an alluvial fan, with a convex upper surface and containing radiating palaeochannelss (Macklin and Hunt, 1988). Cuttings at the old Wookey Station ([ST 5315 4630]; (Figure 9.19)), expose the following sequence (maximum bed thicknesses in parentheses):

3. Strong brown to dark red-brown slightly clayey silt with occasional stones, thickening towards the line of the modern River Axe and apparently filling a palaeochannel. (> 1.0 m)

2. Red-brown, massive- or crudely bedded, sandy cobbly gravel, involuted, with numerous vertical pebbles and cobbles and many split clasts. Disturbed gravel of this sort is present only in those parts of the section not overlain by bed 3. (1.0 m)

1. Red-brown, massive- or crudely bedded, clast-supported sandy cobbly gravel. Two graded units, separated by silty sand partings are present. In some places, the massive sandy gravel passes down-valley into planar cross-stratified openwork and clast-supported sandy gravel with occasional sand and silty sand beds. The gravels contain occasional scour channel-fills of normally graded plane-bedded sand or coarse silt. Some of these channel-fills contained shells of *P. muscorum* and *C. arenaria,* pollen of *Callitriche* and recycled palynomorphs derived from rocks of Carboniferous, Triassic, Jurassic and Pleistocene age. (> 2.0 m)

Interpretation

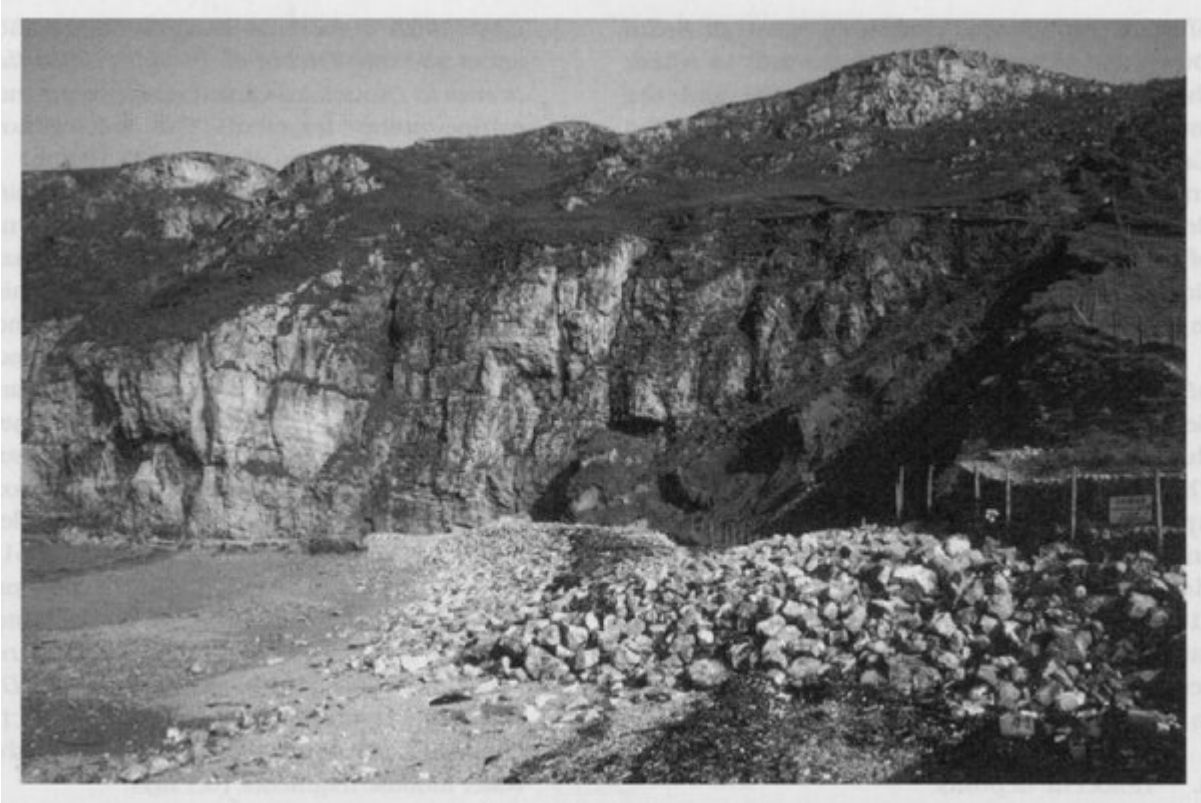
Beds 1 and 2 were interpreted by Macklin and Hunt (1988) as gravels of an alluvial fan laid down by a low-sinuosity single-channel stream. The fossil molluscs are taxa typical of British cold-stage deposits: *P. muscorum* is a xerophile tolerant of open exposed ground and *C. arenaria* today lives among sand dunes. Together, they indicate an exposed arid

environment. The absence of pollen of terrestrial plants may also be taken as evidence for a largely unvegetated landscape or may be due to taphonomic problems. The *Callitriche* pollen probably reflects the vegetation of shallow, sun-warmed, relatively ephemeral pools. The recycled palynomorphs include taxa derived from rocks not present upstream from Wookey Station: the most probable explanation for their presence is that they were recycled by aeolian processes. The involutions of bed 2 post-date deposition of gravels in beds 1 and 2 and the colluvial deposits of bed 3. The latter is probably best interpreted as the colluvial-fill of a large channel, composed of sediments comparable with the aeolian coversands (Vink, 1949; Gilbertson and Hawkins, 1978a, 1983) of Avon and north Somerset. These sediments are thus probably at least partly of aeolian origin.

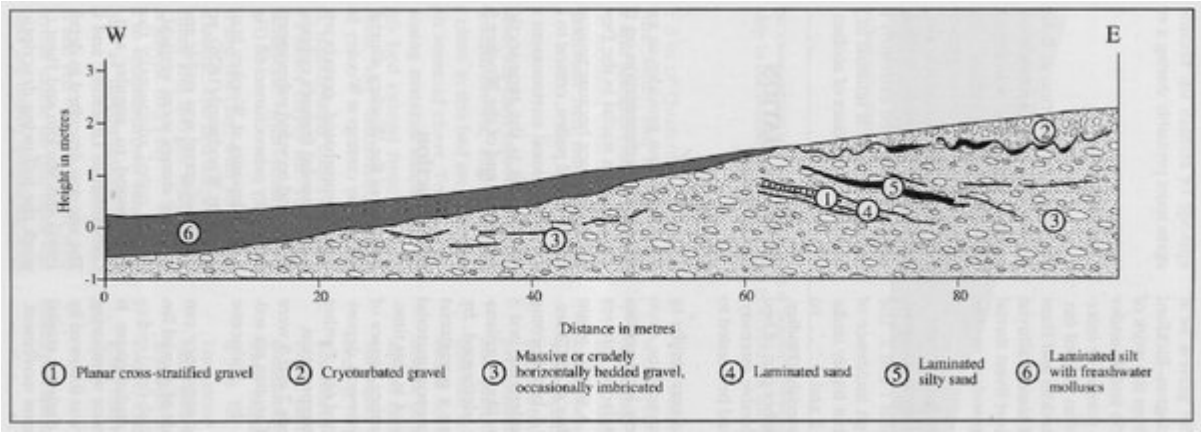
Conclusion

Wookey Station railway cutting exposes an excellent example of Devensian alluvial fan sedimentation on the margins of the Mendip Hills. The site is important because it contains fossil molluscs, pollen and recycled palynomorphs critical to an understanding of the depositional environment of the Mendip alluvial fans. The palaeobiological evidence suggests very open exposed landscapes. The recycled palynomorphs and sedimentary evidence points to considerable quantities of aeolian sediment being recycled by colluvial processes and to gravel deposition by streams on the alluvial fan.

References



(Figure 9.17) The Pleistocene sequence at Brean Down. (Photo: S. Campbell.)



(Figure 9.19) The Quaternary sequence exposed in the old railway cutting at Wookey Station. (Adapted from Macklin and Hunt, 1988.)