Brean Down

C.O. Hunt

Highlights

Brean Down provides a spectacular and most unusual example of cold-stage aeolian and slope sedimentation. It has important interstadial fossil mollusc and mammal faunas and preserves a very detailed record of conditions during a considerable part of the Devensian. It is the type-section of the Brean Member.

Introduction

At Brean Down, a thick late Quaternary sequence of sands, silts and breccias rests on a shore platform and against an ancient cliff. The sequence contains abundant mammal bones and fossil molluscs. During Pleistocene cold stages, aeolian and rockfall depositional processes were dominant. Interstadials within the sequence are marked by evidence of pedogenic activity, rich mollusc and mammal faunas, and appear to be characterized by slower rates of deposition.

The Quaternary deposits at Brean Down have been of interest for over a century. Ravis (1869) provided the first short account. Reindeer bones from Brean were described by Knight (1902). Ussher (1914) dealt with the site in a general account of the deposits of the Somerset Levels. Palmer (1930, 1931, 1934) gave brief accounts of a breccia containing reindeer antlers and bones, overlain by a thick sand and an upper breccia. A mineralogical analysis of the sand unit was compared with analyses from Clevedon, Bleadon and the Barnwood terrace of the Severn and from a number of possible sources; an aeolian origin, mostly from the Tertiary deposits of Devon and Cornwall, was suggested. The breccias were ascribed to 'alternations of abnormal cold and excessive moisture' and compared and correlated with the 'combe rock' of the chalklands of southern England. Balch (1937) listed a Pleistocene and Holocene fauna including Neolithic humans, horse, red deer, reindeer and ?northern vole from Brean, but supplied no stratigraphical details. The Pleistocene deposits were then described in passing in a description of archaeological remains from the Holocene sequence (Taylor and Taylor, 1949).

The first detailed account of the site was given by ApSimon *et al.* (1961). They described a complex Pleistocene stratigraphy, with a lower breccia, stony silt, middle breccia and bone bed, silty sand, main sand and upper breccia, overlain by an extensive Holocene sequence with Beaker, Bronze Age, Iron Age and post-Mediaeval artefacts. The lower breccia contained bones of vole, arctic fox, reindeer and bison and the stony silt contained reindeer bone and antler, and vole and bison bones. These assemblages were thought to indicate a tundra landscape. The middle breccia showed signs of soil development and contained a mammal fauna with remains of lemming, hare, Arctic fox, elephant, horse and reindeer together with indeterminate bird bones. Some bones showed signs of human workmanship. This horizon also contained both land and marine molluscs. The presence of horse was taken as evidence for a grassland environment but the land mollusc fauna was regarded as indicating a very exposed, poorly vegetated landscape. The marine molluscs were fragmentary and probably blown from nearby marine sediments. The Pleistocene sequence was attributed to the Devensian late-glacial, but ApSimon (1977) later suggested that the lower and middle breccias might be of Early or Middle Devensian age.

The finding of two gold bracelets in 1983 and the necessity for sea defence works (McKirdy, 1990) led to a rescue excavation of the Holocene sequence, which unearthed a Bronze Age village (Bell, 1990, 1992a, 1992b) and a re-study and intensive sampling of the Pleistocene sequence (Hunt, in prep.). The Pleistocene stratigraphy and depositional environments described by ApSimon *et al.* (1961) were substantially confirmed by this recent work, but a more detailed picture of the mollusc fauna of the site has now emerged. The site was proposed as the type-section of the Brean Member by Campbell *et al.* (in prep.).

Description

The Pleistocene deposits of Sand Cliff, Brean Down [ST 295 588], lie against the precipitous south face of the Carboniferous Limestone massif of Brean Down and extend *c.* 70 m southwards to where they pass below Holocene deposits and the modern beach. They lie on a platform cut in the Carboniferous Limestone which lies between OD and *c.* – 6 m OD (ApSimon *et al.,* 1961). The deposits dip south at 20–25°. The westerly portion of the deposits has been removed by marine erosion and the remaining deposits are well-exposed in a coastal cliff (Figure 9.16) and (Figure 9.17).

The stratigraphical terminology of ApSimon *et al.* (1961) is used in this account, but the bed descriptions, mollusc data and measurements are those from the 1986 re-study (Hunt, in prep.). These differ slightly from the descriptions given by ApSimon *et al.* (1961) because of lateral variability and cliff retreat over the intervening period. The Holocene deposits described by ApSimon *et al.* (1961) are not the central part of the GCR site interest and are not therefore repeated here. The sequence is as follows (maximum bed thicknesses in parentheses):

8. Holocene deposits.

7b. 'Earthy Breccia'. Reddish-brown breccia with gravel- to boulder-sized limestone clasts in a silty sand matrix. This horizon thickens downslope. (6.0 m)

7a. 'Sandy Breccia'. Reddish-brown to strong brown sandy breccias and sands. The layer becomes thicker and sandier downslope. (2.5 m)

6. 'Main Sand'. Orange-brown, fine to medium, sometimes silty sand with large-scale (0.5–1.5 m) cross-bedding. Occasional stone lines and silt lenses are present. *P. muscorum* and fragments of marine molluscs are occasionally present. Sheets and tubular structures of calcite occur in the uppermost 2 m. The horizon from which these structures originated has since been removed by erosion. (27.4 m)

5b. Angular limestone fragments. Clast-supported breccia of gravel-sized, very angular limestone fragments in an orange-brown sandy matrix. (0.2 m)

5a. 'Silty Sand'. Yellow-brown silts and sands becoming redder and sandier upward. The bed comprises centimetre-thick silt/sand couplets, with very occasional stones. Charcoal flecks occur at the base of the unit. *P. muscorum* is locally abundant and *Trichia cf. hispida, Cepaea* sp. and marine mollusc fragments are present. (2.7 m)

4. Openwork breccia comprising very angular clasts with occasional *Rangifer* bone and antler and rare *Trichia* cf. *hispida, Catinella arenaria* (Bouchard-Chantereaux) type and marine mollusc fragments. This bed was not reported by ApSimon *et al.* (1961). (0.8 m)

3b. 'Bone Bed'. Red-brown stony silts in four thin units passing upwards into yellow-brown, stoneless sandy clay loam with occasional *Rangifer tarandus* Linné bone and antler. This is probably the lateral equivalent of the 'bone bed' which was rich in *R. tarandus* bone and antler, some showing signs of possible human working. This layer also yielded *Dicrostonyx* spp., *Lepus timidus, Canis lupus, Alopex lagopus* (Linné), '*Elephas*' sp., *Megaloceros giganteus* (Blumenbach), *Equus* sp. and indeterminate bird bones (ApSimon *et al.,* 1961; ApSimon, 1977). The mollusc fauna contains abundant *P. muscorum* (up to 92.5%), some *Trichia* cf. *hispida* (up to 22.9%), rare Limacidae, *Cochlicopa* sp., *Cepaea* sp., *D. rotundatus, Oxychilus* sp., *Succinea* cf. *oblonga, L. truncatula* and marine and freshwater mollusc fragments. (0.7 m)

3a. 'Middle Breccia'. Yellow-brown, passing up into red-brown mottled, yellow-brown, silty sandy breccias and sandy silts with occasional limestone fragments. Bones and antler of *R. tarandus* are fairly common. The terrestrial mollusc assemblage is dominated by *P. muscorum* (85.8%), with some *Trichia* cf. *hispida* (7.5%), Limacidae (3.8%) and rare *Cepaea* sp., *Vallonia costata* (Müller), and *C. arenaria* type. Fragmentary marine and freshwater molluscs are present. (3.35 m)

2c. 'Stony Silt'. Brown to orange-brown sandy clay loam, becoming sandier upwards, and containing occasional angular limestone clasts and thin chocolate-brown silty clay layers. Occasional bones and antler of *R. tarandus,* bird bones, land molluscs, mostly *P. muscorum,* and marine mollusc fragments. (3.1 m)

2b. 'Clay Band' in Stony Silt. 'Gravel' composed of pellets of green-grey and red-brown silty clay. (0.15 m)

2a. 'Stony Silt'. Yellow-brown becoming strong brown sandy loam with angular limestone clasts becoming more frequent upwards. Reindeer antler was found at the base of this unit and occasional bone and antler fragments are distributed throughout, while *Microtus* aff. *nivalis* is present towards the top. *P. muscorum* and marine shell fragments are present. (1.5 m)

1. 'Lower Breccia'. Red-brown breccia of boulder-size limestone clasts, fining upward and becoming clay-rich in the upper 0.3 m where it contains *A. lagopus, R. tarandus, Microtus* sp. and *Bos* sp. (> 2.2 m)

Interpretation

The platform and cliff on which the Pleistocene deposits rest are most probably of marine origin, though marine deposits have not been found upon them. Such platforms are most probably the result of repeated marine transgressions to approximately the same altitude over long periods (Kidson, 1977). The limestone clasts in the overlying sequence were derived by cliff fall from the limestone cliff to the north, but the overwhelming proportion of the silts and sands in the sequence must have been derived from other sources by the wind, as has been noted at many sites in Avon and Somerset (Gilbertson and Hawkins, 1978a, 1983).

The boulder pile of bed 1 reflects cliff collapse, possibly, but by no means certainly, under frost weathering. The fauna in the top of this bed is certainly characteristic of cold-stage conditions. ApSimon *et al.* (1961) interpreted the transition to bed 2 as a minor climatic amelioration, but the mollusc and mammal faunas of bed 2 reflect cold, exposed landscapes and the sediments probably reflect a considerable period of coversand-style aeolian sedimentation, being derived at least in part from local marine sands, so such an amelioration is by no means certain. The clay-rich layer (bed 2b) was interpreted by ApSimon *et al.* (*1961*)as derived from local Triassic deposits during a stillstand in aeolian sedimentation. In the 1986 re-study it was interpreted as pellets of an eroded soil (Hunt, in prep.).

Bed 3 was recorded as substantially thicker in the 1986 study than in the work of ApSimon *et al.* (1961), most probably as the result of local facies variation. Bed 3a was interpreted by ApSimon *et al.* (1961) as reflecting colder conditions than bed 2 because of an increase in the number of limestone clasts. The mammal and mollusc faunas of this bed are, however, richer than those of bed 2 and there are signs of soil development which together might indicate a minor climatic amelioration. Bed 3b, with its comparatively diverse faunas including higher incidences of the vegetation-loving *Trichia* and thermophiles such as *D. rotundatus, Cepaea* and *Oxychilus,* probably reflects further climatic amelioration and a herbaceous ground cover (Hunt, in prep.). The mammal assemblage may also be taken as compatible with steppe conditions. The breccias of bed 4 and the silts and breccia of bed 5 probably reflect a slow return to cold-stage conditions since there are relatively few mammal remains and mollusc diversity is low.

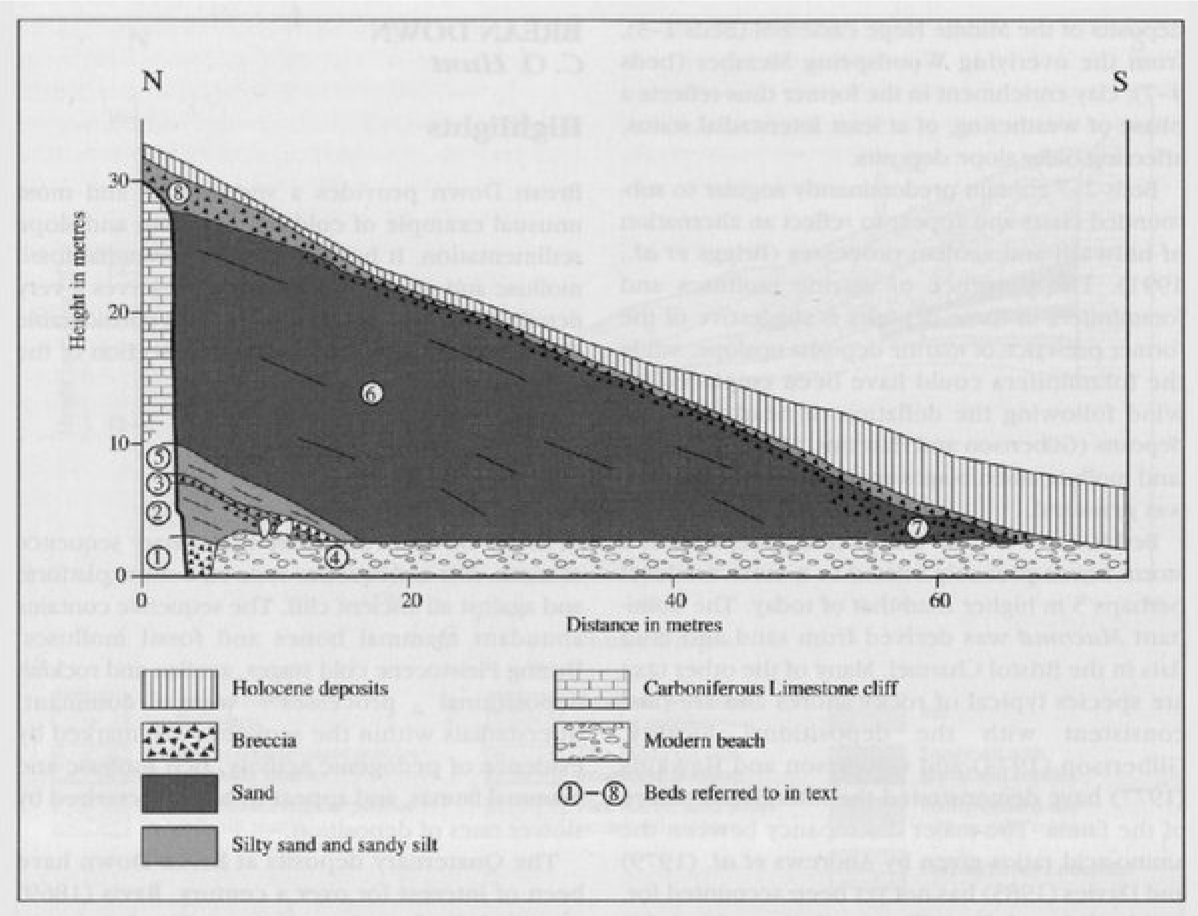
The aeolian sands of bed 6 are most probably the product of a very exposed and at least episodically arid landscape, and sand sedimentation continued during the deposition of the sandy breccia (bed 7a). A soil profile must then have formed with tree-sized vegetation and considerable carbonate mobilization by soil acids to give rise to the calcite structures. This had been completely eroded away before the deposition of the final Pleistocene unit (bed 7b).

The development of a soil profile and arboreal vegetation before the development of bed 7a most probably reflects a major climatic amelioration, perhaps the Windermere Interstadial. If this is the case, then the original attribution of the 'bone bed' by ApSimon *et al.* (1961) to the Devensian late-glacial cannot be correct and ApSimon's later (1977) suggestion that this reflects an Early or Middle Devensian event is much more convincing. Sea level in Stage 5e and probably Stage 5a would have been high enough to have emplaced raised beach deposits at Brean, rather as happened at Swallow Cliff, Middle Hope (this chapter). The absence of raised beach deposits might therefore be used as evidence that the whole Brean Down sequence post-dates Stage 5. It is perhaps reasonable to suggest, therefore, that the interstadial reflected by bed 3 is equivalent to Oxygen Isotope Stage 3. Broadly comparable mollusc faunas of Stage 3 age are known from Pin Hole Cave, Creswell Crags (Hunt, 1989). On this basis, beds 4–7a at Brean Down may have formed during Oxygen Isotope Stage 2, and bed 7b during the Younger Dryas (= Loch Lomond Stadial).

Conclusion

The Brean Down sequence is nationally important because it provides a very detailed, though inevitably incomplete, history of changing terrestrial depositional environments, and especially aeolian sedimentation, through much of the last cold stage. It has important mammal and mollusc faunas. A dating programme is urgently needed to place the environmental history of the site in context and enable its full potential to be realized.

[References](#)



(Figure 9.16) The Quaternary sequence at Brean Down, simplified from ApSimon et al. (1961).

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