Holly Lane

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Highlights

Holly Lane, Clevedon, provides important evidence for landscape evolution in Avon during the Devensian. The site is an important locality for Devensian mammal, bird and mollusc remains and is also notable for its periglacial breccias and aeolian deposits.

Introduction

At Holly Lane, up to 21 m of breccias, sands and silts are banked against an ancient cliff. The sequence consists of a basal talus cone, overlain by sandy loams, breccias, very coarse breccias, sandy loams, breccias, sandy loams and then a final thin breccia. Several beds in this sequence have yielded important mammalian fossils and sparse mollusc assemblages indicative of cold-stage conditions.

The breccias and sands at Holly Lane were first exposed by quarrying in 1905. Initially, interest centred around a small, richly fossiliferous cave, which, with the breccias immediately outside it, yielded over 2000 bones (Greenly, 1922). Davies (1907) demonstrated that the cave was unconnected to a karstic conduit system and unrelated to the structure of the Carboniferous Limestone bedrock. Two sedimentary horizons were identified in the cave: a 'dull red stony loam' about 0.45 m thick, overlain by 1.5 m of the lower breccias (Davies, 1907; Greenly, 1922). Outside the cave, Davies (1907) described a sequence of lower 'gravel' (breccia), clay, middle 'gravel', sand, and upper 'gravel'. The mammal fauna was identified by Hinton (1907a, 1907b, 1910) and Reynolds (1907) and included horse, bear, wolf, fox, ?Arctic fox, ?rabbit, voles and ?lemming. Bird fossils were also present. The fauna included 24 species, notably eagle, buzzard, heron, gull and cormorant. Four fish vertebrae and a mollusc fauna comprising *T. hispida* and *Succinea putris* (Linn) were found in the cave. *T. hispida, Hellicella* (*Cernuella*) *virgata* (Da Costa), *Helix aspersa Müller*, *P. muscorum* and *S. putris* were found in the breccias outside the cave (Greenly, 1922), though Kerney (1966), Gilbertson (1974) and Gilbertson and Hawkins (1974) have suggested that *Helix* and *Helicella* were contaminants. Gilbertson (1974) quotes a personal communication from W.A.E. Ussher in 1970, who recalled that a local doctor had unsuccessfully tried to save human remains in the cave when excavation started.

Interest later turned to the breccias and sands at Holly Lane. Greenly (1922) provided a description of these deposits. A basal sandy breccia was overlain by a very coarse breccia. This was sharply overlain by a sandy loam, then a slightly stony loamy sand with abundant *T. hispida* and *P. muscorum* and then an upper sandy breccia. The beds dipped as much as 32° and were banked up against a steep, or even undercut, cliff in the Carboniferous Limestone. The maximum recorded thickness of the sequence was about 21 m. The clasts in the breccias were all derived from the local outcrop of Carboniferous Limestone, but mineralogical analyses of the sandy loam and loamy sand showed the presence of far-travelled minerals. The mineralogy of the sands was comparable with that of sands in South Wales. These were suggested, therefore, to be the parent deposits from which the sands at Holly Lane were derived by the action of wind.

The deposits were discussed again by Hinton (1926), Palmer and Hinton (1929), Palmer (1931, 1934), Kennard and Woodward (1934) and Vink (1949). Hinton (1926) dealt with the vole remains from the site, identifying five taxa. Palmer and Hinton (1929) described mineralogical analyses of the sandy matrix of the breccias and of the sandy loam and loamy sand which showed a common composition and thus probably origin. They described a fauna of voles, horse, wolf, bear and ?Arctic fox, most probably from the lower breccias, and a polished bone point of indeterminate type. Palmer (1931, 1934) integrated the site within a local stratigraphical scheme and suggested that the deposits overlay the '50 foot' shore platform. Palmer (1934) compared mineralogical analyses from Holly Lane with analyses from other sites in the Bristol district. The far-travelled minerals in these deposits were thought to have been derived from the south or south-west. Kennard and Woodward (1934) described mollusc faunas from the cave, lower breccia, 'aeolian sands', 'upper coarse gravel' and 'subsoil'. The faunas from the subsoil and the upper breccia and some components of the fauna from the

lower breccia were regarded by Kerney (1966), Gilbertson (1974) and Gilbertson and Hawkins (1974) as intrusive. The probably in *situ* components of the fauna are, in the middle sands, *T. hispida* and *P. muscorum* and in the lower breccias *T. hispida, P. muscorum, V. costata* and *Lymnaea stagnalis* (Linné). Vink (1949) carried out sedimentological analyses of the sands at Holly Lane. They were comparable with the periglacial coversands of the Low Countries.

Gilbertson (1974) and Gilbertson and Hawkins (1974) re-described the sections at Holly Lane and reviewed previous work on the site. They described two sections and recognized a complex stratigraphy, with a basal talus cone, overlain by sandy loams, breccias, very coarse breccias, sandy loams, breccias, sandy loams and then a final thin breccia. The middle sandy loam was equivalent to the middle aeolian sand bed of Greenly (1922), Palmer and Hinton (1929) and Palmer (1931, 1934). They suggested that the breccias had accumulated during phases of frost-shattering and that the sandy loans were niveo-aeolian coversands, and they compared the sequence with stratified slope-waste deposits elsewhere. These authors reassessed early accounts of the terrestrial molluscs from the site. They obtained occasional specimens of *P. muscorum* from the middle and lower sandy loams and one specimen of *Succinea* sp. from the lower sandy loam.

Description

At Holly Lane [ST 419 727], a thick breccia and sandy loam sequence has been exposed by quarrying (Figure 10.9). The description by Gilbertson (1974) and Gilbertson and Hawkins (1974) is followed here (maximum bed thicknesses in parentheses).

12. Black topsoil developed on breccia, with angular blocks in a sandy matrix. The bed has a sharp boundary with bed 11. (0.5 m)

11. Reddish-brown sandy loam with a few small angular clasts. The bed has a sharp boundary with bed 10. (1.0 m)

10. Breccia containing many angular blocks in a reddish-brown loam matrix, with clasts up to 0.25 m. The deposit is poorly bedded and has an indistinct boundary with bed 9. (4.30 m)

9. Reddish-brown silty sand with occasional angular clasts. It occurs in discontinuous lenses and has an indistinct boundary with bed 8. (0.30 m)

8. Breccia containing angular boulders in a reddish-brown blocky sandy matrix. This occurs in discontinuous pockets and has an indistinct boundary with bed 7. (0.50 m)

7. Breccia containing angular blocks in a reddish-brown sandy loam matrix, and clasts up to 0.3 m. The bed thickens downslope and has a distinct boundary with bed 6. (0.20 m)

6. Breccia containing angular blocks and boulders in a reddish-brown sandy matrix, and clasts up to 0.4 m. Occasional lines of finer clasts are present and the deposit is poorly bedded and coarsens upward. It has a sharp boundary with bed 5. (1.50 m)

5. Reddish-brown loamy sand with occasional tabular clasts up to 0.04 m, lying parallel to the dip of the bed. It contains occasional *P. muscorum* and some foraminifera. It has a sharp boundary with bed 4. (0.40 m)

4. Breccia containing angular boulders and smaller clasts in a reddish-brown sandy matrix. It has an indistinct boundary with bed 3. (0.45 m)

3. Breccia containing angular blocks in a reddish-brown sandy matrix. Clasts average 0.02–0.04 m, and the deposit coarsens upwards. It contains occasional boulders and has a sharp boundary with bed 2. (1.10 m)

2. Reddish-brown, very silty loamy sand with occasional angular clasts up to 0.01 m, becoming more frequent upwards. Occasional *P. muscorum,* very rare *Succinea* sp. and other molluscs, and some foraminifera are present. This deposit buries the dome of bed 1 and is banked against the limestone cliff at an angle of 30°. It has a sharp junction with bed 1.

(> 2.0 m)

1. Breccia containing angular blocks in a red sandy matrix. Clasts average 0.25 m, and occasional boulders are present. It is poorly bedded and forms a low cone-shaped structure. It lies on a fissured rock surface, possibly bedrock. (1.1 m)

Interpretation

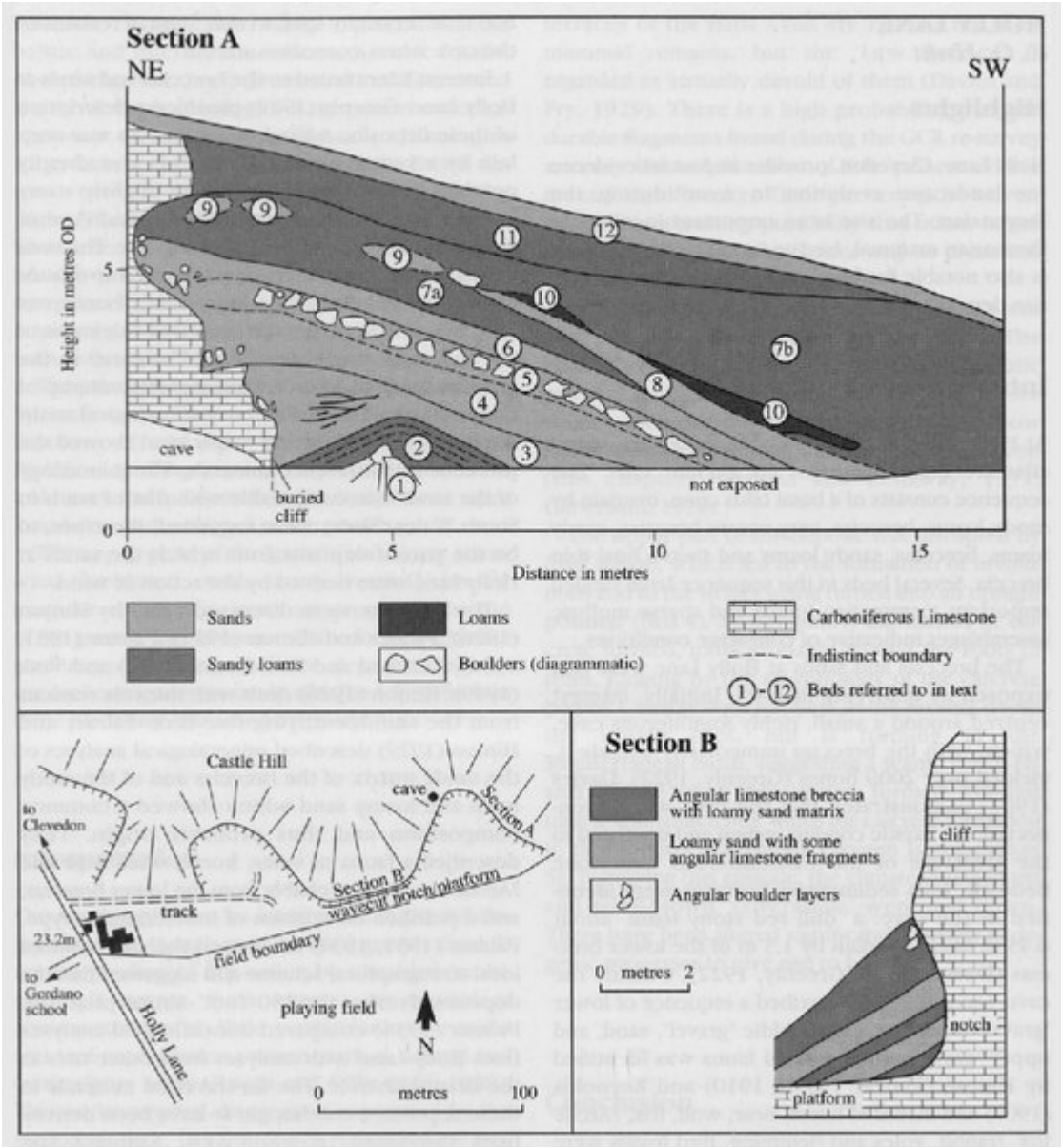
No palaeosols or weathering horizons have been found at Holly Lane, so it is probable that the whole sequence dates from the Devensian (Gilbertson and Hawkins, 1974). The alternating breccias and sandy loamy at Holly Lane provide evidence for aeolian, perhaps niveo-aeolian, activity and intermittent frost-shattering. Gilbertson and Hawkins (1974) argued that the breccias reflected cold moist phases, while the sandy loamy and loamy sands were laid down in cold arid periods.

The biological evidence in the lower beds is for open, relatively exposed landscapes, with molluscs such as *P. muscorum* and *T. hispida* typical of open, perhaps discontinuous herbaceous vegetation. The presence of moisture-loving taxa like *Succinea* in the lower loam is consistent with a locally very damp environment and conflicts with Gilbertson and Hawkins' (1974) suggestion that the sandy loamy indicate aridity, unless the shells were brought to Holly Lane from marshy environments nearby. The mammal and bird faunas, which were probably recovered mostly from beds 1–3 and their lateral equivalents are arguably indicative of a cold steppe environment. The decrease upward in the diversity and incidence of faunal remains may perhaps be taken as evidence for a gradual climatic deterioration.

Conclusion

The deposits at Holly Lane, Clevedon, provide evidence for a complex sequence of environmental change and landscape evolution during the Devensian cold stage. They have yielded important mammal, bird and mollusc faunas characteristic of this period, together with sedimentary evidence for aeolian activity and intermittent frost-shattering.

References



(Figure 10.9) The Quaternary sequence at Holly Lane, Clevedon. (Adapted from Gilbertson and Hawkins, 1974.)