
Long Hole Cave

Highlights

A site with rich Pleistocene mammal remains and human artefacts dating from the Ipswichian and Devensian Stages. 'Cold' and 'warm' mammal faunas and pollen indicate several phases of marked climatic and vegetational change, varying from temperate interglacial and interstadial conditions to arctic desert.

Introduction

Long Hole Cave [SS 452 851] is important for deposits which have yielded faunal remains, artefacts and pollen. Excavations at the site during the last century produced what could be identified as 'warm' and 'cold' mammal faunas. More recent excavations have revealed a series of well stratified sediments together with fossils and artefacts from mainly pre-late-glacial times in the Devensian Stage. The site was first excavated by Wood in 1861 (see Falconer 1868). Evidence from the site was subsequently discussed by Lyell (1873), Roberts (1887–8), Garrod (1926), Allen and Rutter (1948) and Bowen (1980a). Campbell (1977) provided a detailed account of the sequence and its interpretation, and Evans (1977b) (*in* Campbell 1977) analysed the land snail fauna.

Description

Long Hole Cave is situated in cliffs of Carboniferous Limestone in south-west Gower. The cave lies at c. 55m OD and from a SSE-facing entrance, opens directly into a single passage some 15m long. A sequence of terrestrial sediments comprising cave earths, scree, weathered scree and fine-grained wind-blown sediment up to 3m thick rests on a limestone floor. Substantial deposits are thought to remain *in situ*. Full details of the stratigraphy are provided by Campbell (1977).

The first known excavations at Long Hole by Wood were largely within the cave, and they were later documented by Falconer (1868). Initially, the cave was blocked by a talus cone, but after this had been removed, Falconer recorded a single layer of ferruginous cave earth mixed with angular limestone fragments overlying the limestone floor. The 'cave earth' was noted as being about 7 ft (2.1m) thick, but there was no trace of marine sand or shingle, like that found at nearby Minchin Hole and Bacon Hole. Falconer recorded a mixture of 'warm' and 'cold' Pleistocene faunas, with — cave bear *Ursus spelaeus*, badger *Meles meles*, polecat *Mustela putorius*, marten *Martes* sp., otter *Lutra lutra* L., red fox *Vulpes vulpes*, wolf *Canis lupus*, spotted hyaena *Crocuta crocuta*, wild cat *Felis sylvestris* Schreber, lion *Panthera leo*, Irish elk *Megaceros giganteus*, reindeer *Rangifer tarandus*, red deer *Cervus elaphus*, bison *Bison priscus*, wild boar *Sus scrofa* L., horse *Equus ferus* Bodaert, and European wild ass *Equus asinus*, narrow-nosed rhinoceros *Dicerorhinus hemitoechus*, woolly rhinoceros *Coelodonta antiquitatis*, straight-tusked elephant *Palaeoloxodon antiquus*, mammoth *Mammuthus primigenius*, mountain hare *Lepus timidus*, rabbit *Oryctolagus cuniculus* (L.) and water vole *Arvicola terrestris* (Hinton). Flint and chert artefacts associated with the fauna were also unearthed (Falconer 1868). These finds were regarded with considerable interest because, according to Sir Charles Lyell (1873), they provided "the first well authenticated example of the occurrence of *D. hemitoechus* in connection with human implements". The finds were therefore used as evidence for the 'antiquity of Man', clearly showing the relationship between the handiwork of Man and the remains of animals, many of which were extinct (Roberts 1887–8).

Interpretation

The stone implements found by Wood were fully described by Garrod (1926), who suggested that the artefact assemblage was probably of Middle or Upper Aurignacian age. She noted, however, that the fauna associated with it was mixed, some of the mammals being of known interglacial ('warm') and others of glacial ('cold') character. This indicated that there had been either some disturbance of the cave earth or that two levels were present but that they had not been detected. For the same reasons, Allen and Rutter (1948) thought that the contemporaneity of Palaeolithic Man with

Dicerorhinus hemitoechus was questionable.

Campbell in 1969 (Campbell 1977) cut a trench adjacent to Wood's at the cave entrance. He presented detailed stratigraphic, granulometric, faunal, artefact and pollen evidence in his analysis of the sequence. Land snails found in the older deposits were present, but as at Cat Hole, only as an intrusive Holocene element (Evans 1977b).

Campbell reconstructed the following sequence of events. The earliest stage recorded is the Ipswichian when a temperate woodland environment prevailed, with a thermophilous flora and a fauna including *Bison* or *Bos*. Several of Falconer's species such as *Palaeoloxodon antiquus* and *Dicerorhinus hemitoechus* may also have originated from this temperate phase or even earlier (Campbell 1977). A prolonged period of arctic tundra development is then indicated by the pollen record. This phase is interrupted early in the sedimentary sequence by deposits with pollen that indicate the development of boreal coniferous forest with *Picea*, *Pinus* and *Betula*, and which allow a correlation tentatively with the Early Devensian Chelford Interstadial at c. 65,000 BP. The lithology of the bed containing the Chelford pollen is dominantly weathered scree, and Campbell observed that Palaeolithic artefacts (of presumably Mousterian culture (Bowen 1980a)) were associated with it. A Chelford Interstadial age was supported by a fauna including elk and marten. This phase was followed by a protracted period of steppe and tundra conditions during which screes accumulated. These were believed to have been deposited during the Middle Devensian; they were characterised by a comparative abundance of *Juniperus* and *Salix* pollen, and by a fauna including hyaena, mammoth, woolly rhinoceros, horse, giant deer, reindeer and mountain hare (Campbell 1977). Artefacts indicating the presence of Upper Palaeolithic Man are associated with these deposits. Bowen (1980a) agreed that the pollen record from these sediments was consistent with the Middle Devensian, perhaps reflecting conditions during the Upton Warren Interstadial.

According to Campbell, the Late Devensian ice maximum was indicated in the Long Hole sequence by the apparent minimum of tree and shrub pollen, accompanied by deposition of fine-grained windblown sediment. This severely cold phase was associated with a fauna of arctic fox, horse and reindeer. Devensian late-glacial Pollen Zones I, II and III and Holocene Pollen Zones IV-VIII were also distinguished in the sequence at Long Hole (Campbell 1977).

Thus, Campbell's work showed that at least four separate faunal assemblages ranging from the late Ipswichian Stage through the Devensian Stage, and clearly associated with climatically related changes in lithology and pollen, occurred within Long Hole Cave. Falconer's original species list is considered to be a mixture of Ipswichian ('warm') and Devensian ('cold') mammal faunas.

The evidence from Long Hole, particularly the pollen record, was discussed by Bowen (1980a). He noted that except for the event referred to the Chelford Interstadial, and the rise in *Juniperus* and *Salix* pollen, no other indications of Early and Middle Devensian interstadial conditions were then known from Wales. Bowen stressed, however, that Campbell's pollen analysis had been carried out on sediments that were technically head and colluvium and there was therefore a distinct possibility that some of the pollen was derived. This was probably true, especially for the basal layers. The Chelford pollen might easily be reworked pollen of Ipswichian age. Equally, both events recorded could be equivalent to Oxygen Isotope Sub-stages 5e and 5c (Bowen 1980a).

The record of elk *Alces alces* (L.) from Long Hole was of particular interest, as this species was extremely rare in Britain prior to the Late Devensian Allereid. The antler base, found in 1969, is now preserved at the Baden-Powell Museum, Oxford. Re-examination of the specimen, however, indicates that it should almost certainly not be referred to *Alces alces* but to reindeer *Rangifer tarandus* (Lister 1984).

With the reservations noted earlier, the pollen record is perhaps the best so far available in Wales for the whole of the Devensian Stage, showing possible evidence for a brief temperate interlude correlated tentatively with the Chelford Interstadial. The site thus covers an important part of the Pleistocene record that is not well represented at other sites; for instance, it contrasts with Minchin Hole where the sequence shows strong evidence for changing marine and terrestrial conditions during the Ipswichian Stage and earlier. The Long Hole sequence also contrasts with those at Bacon Hole and Cat Hole Caves where particularly detailed palaeoenvironmental evidence for the Ipswichian and Early Devensian stages and the Devensian late-glacial are represented, respectively.

Long Hole Cave contains an important record of changing conditions from the Ipswichian Stage through the Devensian Stage into the Devensian late-glacial. The site is particularly important for its pollen record which covers the Devensian Stage. This record shows that a period of arctic conditions was interrupted by the development of boreal coniferous forest. This warmer phase has been correlated with the Early Devensian Chelford Interstadial; as such, the site provides the only evidence in Wales for this event. Long Hole Cave is therefore the only known Welsh site with fossil, implement, rock, pollen and spore evidence for changing climatic conditions in Wales during the Early and Middle Devensian.

Conclusions

Long Hole Cave contains deposits representing all of the last ice age: from about 80,000 years ago to 10,000 years ago. It contains archaeological evidence for the earlier part of the last ice age. In addition, some of the deposits contain pollen which show the former existence of boreal (northern) forest. It is an important site because of the range of evidence it contains.

[References](#)