Pontnewydd Cave

Highlights

This is a site with a long Pleistocene rock and fossil record which has yielded the oldest human remains in Wales, artefacts and an associated 'warm' mammal fauna. This dated evidence indicates a pre-Ipswichian temperate interglacial.

Introduction

Pontnewydd Cave [SJ 015 710] contains a sequence of deposits with faunal, artefact and human remains important for reconstructing late Middle and Late Pleistocene events in North Wales. Pontnewydd has yielded the oldest known human remains from Wales, at about 200,000 years old. The site was first mentioned by Stanley in 1832 and was studied by Dawkins (1871, 1874, 1880), Hughes and Thomas (1874), Mackintosh (1876) and Hughes (1885, 1887). More recently the site was studied by Kelly (1967), Valdemar (1970) and Molleson (1976). Excavations by the National Museum of Wales since 1978 have led to a number of detailed reports (Green 1981a, 1984; Green *et al.* 1981; Green and Currant 1982).

Description

Pontnewydd Cave is formed in the Carboniferous Limestone of the Elwy Valley, and it lies at c. 90m OD. The difference in level between the cave and the present day River Elwy is 50m, and the valley contains both glacial sediments and recent alluvium (Embleton 1984; Livingston 1986).

The cave comprises one major east-west trending chamber, with a west-facing entrance. This chamber terminates at the East Passage and is made up of a number of smaller, generally north-south trending subsidiary chambers — the North Passage, the North-East Fissure, the South Fissure, the Back Passage, South Passage and South-East Fissure (Green 1984).

Outside the main entrance lies a large spoil heap from Dawkins' excavations in the nineteenth century, overlain by waste from World War Two activities at the cave. Recent excavations by Green and his colleagues have been at a number of different locations within the cave, and details of the sediments and stratigraphy for these sites are given by Collcutt (1984). Although no reference section representing the whole of this sequence is available at any one point, the following generalised sequence has been interpreted (Collcutt 1984), and is shown in (Figure 35):

11 Earthy unit*

10 Laminated Travertine*

9 Upper Clay and Sands*

8 Red Cave Earth*

7. Upper Breccia*

6 Silt*

5 Stalagmite*

4 Lower Breccia*

3 Intermediate Complex*

2 Upper Sands and Gravels**

1 Lower Sands and Gravels**

*Calcareous Member

**Siliceous Member (basal sands and gravels)

Interpretation

Pontnewydd Cave was first recorded by Stanley in 1832, who was then also working in nearby Cefn Caves. He noted that Pontnewydd Cave appeared choked with deposits and virtually unexplored. It seems that the cave remained in this condition until an excavation by Williams and Dawkins (Dawkins 1871, 1874, 1880) when only faunal remains were recovered. By the time the cave was next explored by Hughes and Thomas (1874) it was apparent that the earlier excavations had removed substantial deposits. Hughes and Thomas recorded a sequence of gravel, limestone breccia and cave earth beds in the main cave passage. Their investigation yielded both fauna and artefacts including a large human tooth (now lost). They noted that the implements were crude and made from 'felstone', the raw materials for which they suggested were the glacial deposits of the local area. The artefacts were compared with finds from Le Moustier and St Acheul, and, before excavations at Pontnewydd in 1978, it was generally held that these finds represented a Mousterian or Acheulian industry (Green 1984).

The fauna described by Hughes and Thomas comprised the following — *Homo sapiens* L., *Crocuta crocuta, Canis lupus, Vulpes vulpes, Ursus spelaeus, 'Ursus ferox', Meles meles, Dicerorhinus hernitoechus, Equus ferns, Cervus elaphus, Capreolus capreolus* (L.), and the same species list was also recorded by Hughes (1885, 1887). Hughes (1880), however, mentioned that *Palaeoloxodon antiquus, Hippopotamus* sp. and *Rangifer tarandus* were also present, although some doubt has been expressed as to the reliability of these latter records (Currant 1984). Mackintosh (1876) suggested that the sequence in Pontnewydd Cave comprised beds of marine, fluvial and glacial origin, and he attempted, admittedly unsuccessfully, to correlate the beds with the Pleistocene deposits of the local area. A summary of the earlier findings from Pontnewydd was given by Neaverson (1942). More recently, the cave was mentioned by Kelly (1967) who recovered only a few bones, supposedly of wolf and hare (Green 1984), and brief reviews of the earlier work have been given by Valdemar (1970) and Molleson (1976).

Green (1984) divided the sequence into eleven beds — see site description. These consist of two main elements, a basal siliceous member comprising beds 1 and 2, and a calcareous member consisting of the overlying beds. The basal siliceous member was interpreted as a mixture of fluvial and debris flow deposits (Bull 1984; Collcutt 1984) and it yielded neither artefacts nor fauna. Scanning Electron Microscopy (Bull 1984) and petrological analysis (Bevins 1984) revealed that the basal layers contained elements of redeposited till with erratics from north-west Wales and the Lake District. The sediments were deposited in a harsh environment when surface vegetation was locally absent. Selective cementation of these sediments may reflect, however, a milder climatic event during this phase of deposition.

Interpretation of the succeeding sediments which make up the Intermediate Complex and Upper and Lower Breccias, however, is more straightforward. These deposits have yielded not only artefacts and fauna, but human remains including a molar. The presence of limestone fragments in all these beds probably reflects the inclusion of typical cave entrance weathering products. The beds appear largely to be the product of debris flows, as shown by the apparent reworking of faunal elements through the sequence. Debris flow may have been interrupted by stalagmite growth on a number of occasions and ages for stalagmite fragments, both derived and in situ, provide a geochronological framework for this part of the sequence. A burnt flint found close to the human molar in the Intermediate Complex has been dated by thermoluminescence to 200,000 ± 25,000 BP (Huxtable 1984). It seems likely that this flint core was burnt in a domestic fire, and it offers the best date for the human occupation of the cave (Green 1984). Uranium-series dates on speleothem have shown that the Lower Breccia (bed 4) formed at sometime between 225,000–160,000 BP, and a period of renewed stalagmite growth is indicated between 95,000–80,000 BP. A long period thus separates the Lower and Upper Breccias. In places, the Upper Breccia (bed 7) is succeeded by the Red Cave Earth (bed 8) and by current bedded clays and sands (bed 9). The sequence is capped by a stalagmitic floor (bed 10) — see (Figure 35), dated at c. 20,000 BP,

suggesting that the underlying sediments date from no later than the Late Devensian late-glacial or early Holocene.

Currant (1984) recognised three mammal faunas of different ages from beds in the calcareous member. Most of the faunal material is not *in situ;* it has been substantially reworked by debris flows. Under such conditions, an increasingly derived faunal content could be expected in successive debris flows. Bones were grouped on the basis of their preservation: three different preservational states were identified and material assigned to these. The first occurs in the Intermediate Complex, and also as a derived component in the Lower Breccia. It is a 'warm' fauna and it includes beaver *Castor fiber* L., wood mouse *Apodemus* cf. *sylvaticus,* bear *Ursus* sp., roe deer and horse *Equus* sp., indicative of an open-woodland habitat. There is some evidence that the cave may have been used as a bear den during this period. According to Currant, this assemblage is probably post-Cromerian and has certain Hoxnian affinities. An Ipswichian age is ruled out on both faunal and stratigraphic grounds.

The second preservation group occurs mainly in the Lower Breccia, is dominated by bear *Ursus* sp., horse *Equus* sp. and extinct rhinoceros *Dicerorhinus hemitoechus,* and generally indicates an open-steppe environment. This second fauna appears close in age to the first, with only minor changes in species composition (Currant 1984).

The third mammal group occurs in the Silt (bed 6) and the Upper Breccia. It is a classic 'cold' fauna characteristic of the Arctic tundra today; it is the most readily placed of the faunal groups identified from Pontnewydd. A harsh environment with open, treeless vegetation and extensive seasonal snow cover is indicated. Much of the bone material is interpreted as the debris of a wolf den. This third fauna is readily assigned to the Late Devensian and Devensian late-glacial. It includes wolf *Canis lupus,* red fox *Vulpes vulpes,* reindeer *Rangifer tarandus,* arctic hare *Lepus cf. timidus* and brown bear *Ursus* cf. *arctos,* and entirely lacks extinct forms. Similar well dated faunas are known from numerous British cave sites.

Currant noted that elements of a classic Ipswichian type fauna, with *Palaeoloxodon antiquus* and *Hippopotamus* sp. described by early workers at the site, could not be confirmed. These records may have come from deposits now destroyed at Pontnewydd or may have been confused with faunal records from nearby Cefn Caves. Indeed, there is evidence to suggest that during the Ipswichian Stage, the cave entrance at Pontnewydd was blocked (Green 1984).

Seven human bone and tooth fragments have so far been recovered from Pontnewydd. The first, a human molar, was discovered during the last century but it was subsequently lost. Stringer (1984) has described the human remains from the recent excavations. These include the molar of an adult, found in the Intermediate Complex close to the burnt flint core with a thermoluminescence date of 200,000 ± 25,000 BP. Near this find, in the Upper Breccia, were recovered fragments of a juvenile upper jaw with two teeth. From an unknown bed within the cave have come further fragments of a child's mandible and a vertebra, and the 1983 season also yielded two pre-molars in the Lower Breccia. The two permanent upper molars are of great interest since they resemble early Neanderthal teeth and they compare closely with finds from Krapina in Yugoslavia (Stringer 1984).

Some 300 artefacts were recovered during the National Museum of Wales' excavations, mainly from the Intermediate Complex and the Lower and Upper Breccias. No evidence of settlement within the cave was found; all the artefacts appear to have been transported into the cave by mass-movement. The principal tools are handaxes of Acheulian types and Levallois tradition. The nature of these artefacts and the small size of the cave entrance suggests that Pontnewydd was probably used only as a temporary butchering site (Green 1981a, 1984).

The combination of stratigraphic, sedimentological, faunal, human and dating evidence from Pontnewydd provides the most extensive terrestrial Pleistocene record so far known in Wales. The earliest event recorded is deposition of the Lower and Upper Sands and Gravels, probably in a cold environment. These sediments contain erratics, presumably derived from an earlier glacial event. The succeeding Intermediate Complex contains mammal bones, artefacts and human remains. The recognition of a 'warm' mammal fauna (interglacial or interstadial) from these sediments (bed 3), together with a human tooth dated to c. 200,000 BP, provides evidence to suggest human activity at Pontnewydd during the temperate conditions in Oxygen Isotope Stage 7 (Green 1984). The earliest certain growth of stalagmite within the cave has been correlated with Oxygen Isotope Sub-stage 7c (*c.* 250,000–230,000 BP) and it seems reasonable that the human finds and associated artefacts could, in part, belong to this time. The evidence suggests that the succeeding

Lower Breccia was also formed in Oxygen Isoptope Stage 7, probably during Substage 7b (Andrews 1983) which is consistent with the 'cool temperate' fauna (Green 1984).

Overlying the Lower Breccia, in places, are deposits of stalagmite (bed 5) *in situ* that range in age between *c.* 215,000 and 83,000 BP, indicating no clastic sedimentation during this extended period, which covers much of Oxygen Isotope Stage 6 (cold) and Sub-stage 5e (temperate). Stable isotope data from the youngest of these *in situ* stalagmite deposits confirms that the cave was sealed, during a cool episode towards the end of the Ipswichian Stage.

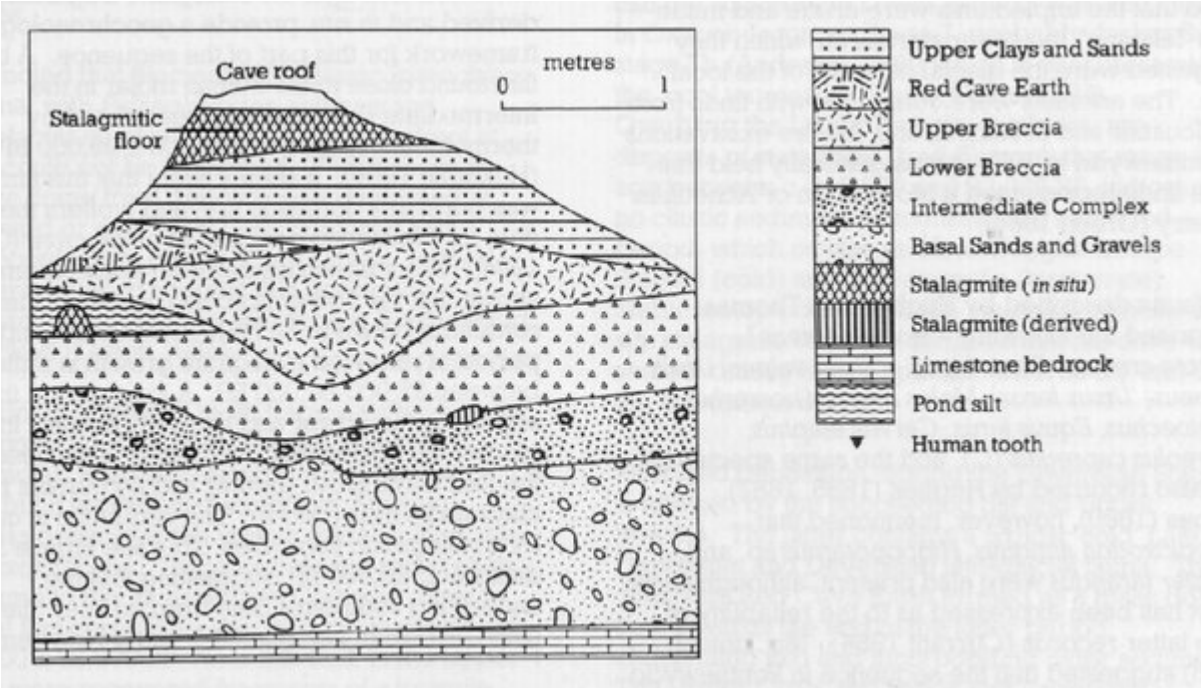
Renewed deposition, during the Devensian Stage, is marked by the succeeding Silt and Upper Breccia. The latter contains a typical 'cold' Late Devensian and Devensian late-glacial fauna. The overlying Red Cave Earth formed as a mass debris flow towards the end of the latter period, channelling into and incorporating older sediments. The Upper Clays and Sands and Laminated Travertine are complex waterlain deposits, containing the bones of modem mammals, and extending the record at Pontnewydd into the Holocene.

Pontnewydd Cave contains the most extensive Pleistocene sequence in Wales and the only record of Middle Pleistocene conditions in North Wales. The sequence has been dated and correlated with the deep-sea oxygen isotope record. The human tooth is the earliest such find in Wales, and except for the Swanscombe fossil, the earliest in the British record. This probable early Neanderthal was associated with over 300 artefacts of Acheulian type. These are the only finds of Lower Palaeolithic antiquity from a stratified sequence in Wales, and they provide strong evidence for human activity probably in Oxygen Isotope Stage 7.

Conclusions

Pontnewydd Cave contains some of the oldest ice age rocks known in Wales. The latest methods of dating such rocks have been applied and they are known to be at least 200,000 years old. The human tooth dated to this time is the earliest evidence for Man in Wales.

References



(Figure 35) Quaternary sequence at Pontnewydd (after Green et al. 1981)