Hurcott Farm

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Highlights

Hurcott Farm is a critical locality for the Pleistocene stratigraphy of the Cary and Yeo drainage basins in southern Somerset. Here, the Chadbrick Gravels provide a relatively unambiguous aminostratigraphic marker among a largely undateable set of terrace deposits. They also provide a *terminus post quem* for the capture of the upper Yeo catchment from the Cary by a tributary of the River Parrett. The site is proposed as the type-locality for the Whatley Member.

Introduction

Hurcott Farm demonstrates heavily cemented very shelly gravels of the fifth terrace of the River Cary. The fossil mollusc fauna and pollen are indicative of interglacial conditions and the mollusc assemblage includes the locally extinct species *C. fluminalis* and the extinct species *Pisidium clessini* Neumayr. An amino-acid ratio on *Corbicula* and the presence of *P. clessini* are consistent with an Oxygen Isotope Stage 9 age or older.

The site was 'lost' for some years and only recently rediscovered. In 1954, the Reverend J. Fowler presented a fragment of cemented shelly gravel to the British Museum (Natural History). The gravel was found 2.8 km north-east of Somerton in the Chadbrick Valley, but the exact position of the find was not reported. Gilbertson (1974) and Gilbertson and Beck (1975) suggested that the fragment had come from an area of terrace gravels of the River Cary mapped by the Geological Survey near Hurcott Farm. They identified a number of molluscs, including *Valvata piscinalis* (Müller), *L. peregra, Planorbis* sp., *Hygromia* (*Trichia*)cf. *hispida, C. fluminalis, Pisidium henslowanum* (Sheppard), *Pisidium nitidum* (Jenyns) and *Pisidium* sp. They interpreted the assemblage as indicating fluvial interglacial conditions.

The shelly gravels were relocated in 1982 (Hunt *et al.,* 1984; Hunt, 1987), lying on the valley side some 6 m lower than the terrace gravels mapped by the Geological Survey. The latter were referred (Hunt, 1987) to the sixth terrace of the Cary. Hunt *et al.* (1984) and Hunt (1987) named the fifth terrace deposits the Chadbrick Gravels and described their molluscan fauna, sedimentology and clast lithology. They also described the results of an amino-acid assay from a valve of *C. fluminalis* from the Chadbrick Gravels and two assays on *Corbicula* from the Burtle Formation at Greylake and, on the basis of comparisons with other published ratios, attributed the gravels to the Ipswichian. Hunt (1990a) described a pollen and algal microfossil assemblage from the Chadbrick Gravels and re-attributed the site to the 'Stanton Harcourt Interglacial' (Stage 7).

The presence of *P. clessini,* which became extinct after Oxygen Isotope Stage 9 (Keen, 1992), and a re-run of the amino-acid ratio to 0.225 (Bowen, pers. comm., 1996), make earlier interpretations untenable. Campbell *et al.* (in prep.) have therefore proposed correlation of the deposits with Oxygen Isotope Stage 9. They also designated the site as the type-locality of the Whatley Member.

Description

Six Pleistocene gravel units are present in the Cary Valley (Hunt *et al.,* 1984; Hunt, 1987). Near Hurcott Farm [ST 512 296], coarse poorly sorted gravels with *P. muscorum* and *Trichia* cf. *hispida* underlie a well-developed terrace surface at 43 m OD (sixth terrace). The Chadbrick Gravels are cemented to an outcrop of Rhaetic limestone at 37 m OD (fifth terrace) and overlain by 0.5 m of silty sands with fragments of *P. muscorum,* succineids and hygromids and 0.5 m of stony colluvium. Farther downslope at 29 m OD are fragments of the fourth terrace, underlain by plane-bedded reddish sands and fine gravels. The third terrace is not found in this part of the Cary Valley, but is known both upstream and downstream. Near the present valley floor, the second terrace surface at 14 m OD is underlain by coarse, poorly sorted unfossiliferous gravels. Woodward (1905) described further coarse gravels underlying the Cary floodplain alluvium in

foundation trenches for the Somerton railway viaduct. These can be traced upstream into the first terrace of the Cary.

The Chadbrick Gravels lie on a gently undulating surface cut into Rhaetic limestones. One unit of clast-supported, imbricated, epsilon cross-bedded shelly cemented gravel is present, truncated by erosion and overlain by uncemented silty sands and stony silts. The gravels are well sorted, with an average clast size around 5.0 mm, and are well rounded. The cement is very uneven in development, consisting of irregular areas of grey-green micrite, which weathers rusty brown, interspersed with areas of sparry calcite. Voids are present under some large clasts (Hunt *et al.,* 1984).

The fossil mollusc fauna (Table 9.1) is dominated by *V. piscinalis* (35.5%), with lesser *L. peregra* (16.5%), *Bithynia tentaculata* (Linné) (9.6%), *C. fluminalis* (7.3%) and other species. The extinct bivalve *P. clessini* is present (Hunt *et al.,* 1984). The pollen assemblage is marked by abundant *Alnus* (24.7%) and Cyperaceae (20.5%), and a variety of broad-leaved tree and wetland species. The algal microfossils *Pediastrum* and *Spirogyra* are present (Hunt, 1990a).

An amino-acid assay on a valve of *C. fluminalis* gave a D-*alloisoleucine* to L-*isoleucine* ratio of 0.18 (Hunt *et al.,* 1984). This was re-run at 0.225 (Campbell *et al., in* prep.).

Interpretation

The Chadbrick Gravels are epsilon cross-bedded, indicating deposition in a meandering river. They contain a diverse, temperate freshwater molluscan fauna, with a group of species typical of slow moving, calcareous, eutrophic mud-bottomed rivers and a group of species typical of faster moving water with sandy substrates and little aquatic vegetation. This is consistent with molluscan assemblages from rivers characterized by pool and riffle sequences (Hunt *et al.,* 1984; Hunt, 1987). The terrestrial molluscs are species typical of woodland and damp sheltered habitats. The pollen assemblage is of interglacial type, being dominated by broad-leaved arboreal taxa and wetland species. It probably reflects alder thickets and sedge marsh close to the river and mixed-oak woodland beyond. The presence of the planktonic *Pediastrum* and the benthonic *Spirogyra is* consistent with deposition in a fluvial environment (Hunt, 1990a).

The original amino-acid ratio is broadly comparable with ratios from the Stanton Harcourt Stage 7 interglacial deposits (Bowen *et al.,* 1989; Hunt, 1990a), but the re-run ratio is more compatible with ratios indicative of an Oxygen Isotope Stage 9 age (Bowen, pers. comm., 1996), as is the presence of *P. clessini,* which became extinct after Stage 9 (Keen, 1992). The high tree pollen percentages are also similar to those from other Stage 9 sites, whereas most Stage 7 sites have relatively low tree pollen percentages. Capture of the former headwaters of the Cary by the Yeo, a tributary of the Parrett, occurred after aggradation of the second terrace of the Cary (Hunt, 1987).

(Table 9.1) Fossil molluscs from the Chadbrick Gravel

Species	***Number***	***Percentage***
Valvata cristata (Müller)	1	0.4
Valvata piscinalis (Müller)	88	35.5
Bithynia tentaculata (Linné)	24	9.6
Physa fontinalis (Linné)	1	0.4
Lymnaea stagnalis (Linné)	1	0.4
Lymnaea peregra (Müller)	41	16.5
Planorbis spp.	2	0.8
Gyraulus laevis (Alder)	7	2.8
Ancylus fluviatilis (Müller)	1	0.4
Unio sp.	3	1.2
Corbicula fluminalis (Müller)	18	7.3
?Sphaerium sp.	1	0.4
Pisidium amnicum (Müller)	9	3.6
Pisidium clessini Neumayr	5	2.0
Pisidium henslowanum (Sheppard)	5	2.0
Pisidium nitidum Jenyns	1	0.4

Pisidium subtruncatum Maim	4	1.6
Pisidium spp.	22	8.9
Oxyloma cf. *pfeifferi*	5	2.0
Cochlicopa cf. *lubrica*	1	0.4
Vallonia cf. *pukhella*	1	0.4
Discus rotundatus (Müller)	1	0.4
?Helicella sp.	1	0.4
Trichia cf. *hispida*	6	2.4
Total	248	

Conclusion

The Chadbrick Gravels at Hurcott Farm have yielded important interglacial molluscan and pollen assemblages. A re-run of an amino-acid assay on a valve of *C. fluminalis* yielded a ratio of 0.225, comparable with ratios from sites attributed to Oxygen Isotope Stage 9. There is support for this ascription from the molluscan and palynological data. Hurcott Farm is a critical locality for the Pleistocene stratigraphy of the Cary and Yeo drainage basins in southern Somerset, where the Chadbrick Gravels provide a relatively unambiguous aminostratigraphic marker among a largely undateable set of terrace deposits. They help to determine when the upper Yeo catchment was captured from the Cary by a tributary of the River Parrett. Non-marine interglacial deposits are unusual in South-West England, making Hurcott Farm's aminostratigraphically correlated interglacial molluscan and pollen assemblages of considerable importance to reconstructions of Pleistocene history.

References