Archaeologia Cambrensis 166 (2017), 33–88

Neolithic palisaded enclosures of Radnorshire's Walton Basin

By NIGEL W. JONES[1] and ALEX GIBSON[2]

with contributions by Astrid E. Caseldine,[3] Seren Griffiths,[4] Philippa Bradley,[5] Catherine J. Griffiths,[3] Roderick J. Bale,[3] and Louisa Gidney[5]

INTRODUCTION

This article focuses on a group of three Neolithic palisaded enclosures in the Walton Basin in eastern Radnorshire which form part of a wider complex of prehistoric and later monuments, the extent and significance of which was initially highlighted in the 1990s through a programme of work undertaken by the Clwyd-Powys Archaeological Trust (CPAT) (Gibson 1999a; 1999b). More recent work by CPAT as part of a wider project focusing on the long-term management and conservation of monuments in an area of intensive modern agriculture has added further to our understanding of the major monuments in the complex, largely through programmes of geophysical survey and targeted trial excavation, the initial findings of which were published by Britnell and Jones (2012).

The chronological depth and complexity of the archaeology of the Walton Basin is virtually unparalleled in an area of a comparable size elsewhere in the British Isles and is increasingly coming to resemble an archaeological theme park designed to exhibit the archaeology of the Welsh Marches. The Neolithic enclosures in the eastern part of the basin include a causewayed enclosure, two cursus monuments (one of which is perhaps the second longest cursus known in Britain), three palisaded enclosures (one of which is the largest such enclosure known in Britain and another of which may be associated with a double pit alignment), and a large ring-ditch (Fig.1).

Close parallels can be drawn with similar complexes of Neolithic monuments elsewhere in Britain, but undoubtedly the key to understanding this particular complex is its distinct topographical setting and its location on the well-trodden path between the extensive uplands of central Wales and the lowlands of midland England; between Radnor Forest to the west and Herefordshire to the east. For centuries people within this borderland region have been able to exploit two quite different worlds—the lower-lying river valleys throughout the year and the neighbouring uplands during the spring and summer. The hills surrounding the basin rise dramatically, creating a natural amphitheatre. The floor of the basin is generally fairly flat but is punctuated by fluvioglacial landforms such as drumlins, gravel ridges and meltwater channels (cf. Dwerryhouse and Miller 1930, 96), which have had a pronounced impact upon the pattern of early settlement and land use.

The Walton Basin is an area of undulating lowland, measuring around 6 by 4 kilometres, which lies *c.* 200m above sea level and is surrounded by hills, the highest of which is the upland area to the north, known as the Radnor Forest (including Bache Hill), which rises to over 600m (Fig. 2). There is a low, but distinct central ridge which has produced a significant quantity of worked flint from fieldwalking, while the modern courses of the principal streams are flanked in places by distinctive terraces likely to have been formed by glacial meltwater. The soils in this area are generally deep, well-drained, fine loams with slowly permeable subsoils, largely comprising fluvioglacial gravels, overlying

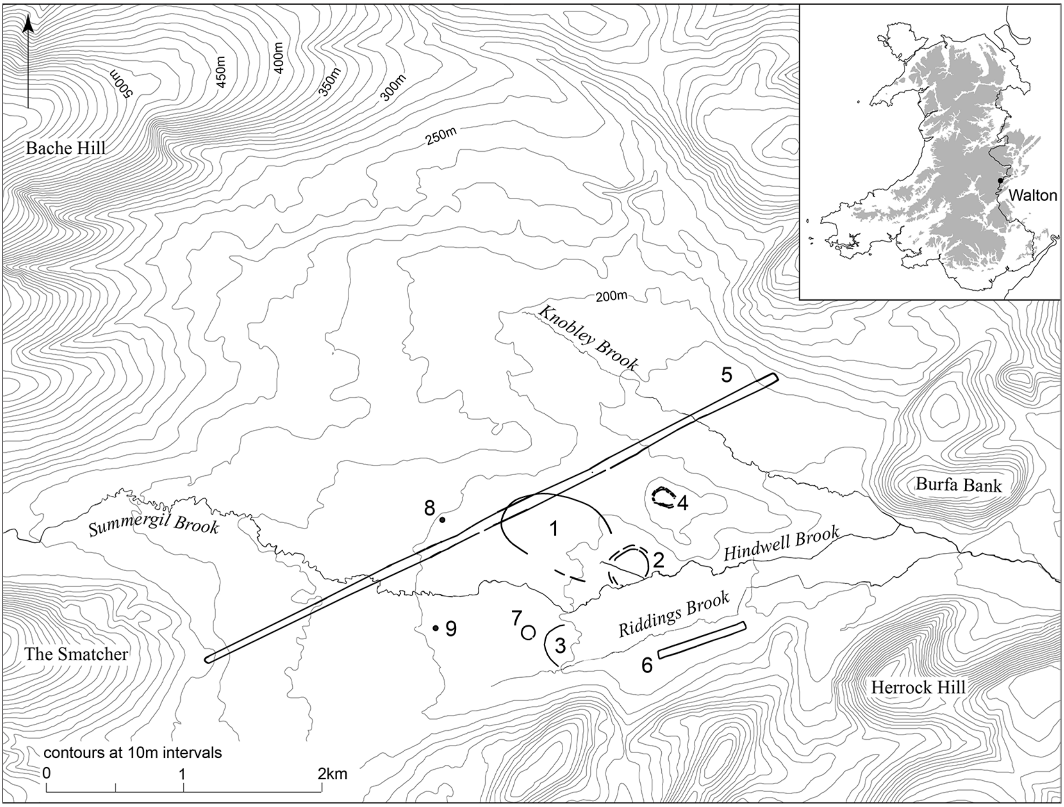

Fig. 1. The Walton Basin showing the location of the main prehistoric monuments: 1 – Hindwell Palisaded Enclosure, 2 – Hindwell Double Palisaded Enclosure, 3 – Walton Palisaded Enclosure, 4 – Womaston Causewayed Enclosure, 5 – Hindwell Cursus, 6 – Walton Green Cursus, 7 – Walton Court Farm Ring-ditch, 8 – Four Stones stone circle, 9 – Knapp Mount.

drift from Palaeozoic sandstone and shale (Rudeforth *et al.* 1984), but include a band of impermeable clay on the eastern side of the basin which has a pronounced effect on the water table, resulting in a spring line along which streams such as the Summergil Brook, which is often dry in summer, re-emerge from the gravels further west.

PALISADED ENCLOSURES: RECENT SURVEY AND EXCAVATION
By Nigel W. Jones

The following text summarizes the collective evidence for the palisaded enclosures at Walton and Hindwell derived from trial excavations, geophysical survey, topographical survey, aerial photographic reconnaissance and the transcription of cropmarks. The summary draws on the previously published excavations by Alex Gibson (1999a; 1999b), as well as presenting new evidence which is largely unpublished.

Fig. 2. The Walton Basin viewed from the east. *Photograph: CPAT 04-c-0195.*

Walton Palisaded Enclosure

The enclosure was discovered by J. K. St Joseph in 1975 (St Joseph 1980, 48–50) and consists of a curvilinear alignment of pits visible as cropmarks on aerial photographs (Fig. 3). The site lies to the west and north of Walton village, between the Summergil Brook and Riddings Brook (SO 2535 5986) at an altitude of approximately 190m above Ordnance Datum.

To date, cropmarks have only identified the western side of the palisaded enclosure, with an arc of individual pits extending for 410m from the west side of the B4357 (SO 2549 6001), south across the A44, and to within 25m of the present course of the Summergil Brook (SO 2545 5970) (Fig. 4). Cropmark evidence also reveals that the enclosure is overlain by two Roman marching camps (Davies and Jones 2006, 139).

A total of 54 pits are currently known with an average spacing of around 6m: there is no evidence to confirm whether or not the intervening spaces were infilled. Trial excavations, conducted in 1998 and 2010, investigated two of the post-pits immediately to the west of the B4357 (Figs 5–6). The earlier investigation identified an oval pit *c*. 4.3m long and 2m wide, for a post 0.4m or more in diameter, with a post ramp on the south-west side (Dempsey 1998). Unlike the Hindwell palisaded enclosure there was no evidence to suggest that the posts had been charred prior to construction. However, a sample of oak charcoal was recovered from the post-pipe which provides a radiocarbon date best interpreted as a *terminus post quem* for the felling of the post of 2840–2480 cal. BC (SUERC-32384).

In March 2010 a small area investigated immediately to the west of the earlier trench uncovered a substantial post-pit about 1.1m in diameter and up to 2.05m deep, with near vertical sides (Fig. 4). There was clear evidence for a post-pipe between 0.65m and 0.7m in diameter, and voids were noted against the

Fig. 3. Walton Palisaded Enclosure: cropmarks of the northern arc of the enclosure viewed from the south-west, visible in 1979, overlain by Roman marching camps. *Photograph: CPAT 79-ck-0006.*

outer edge of the post-pit, presumably formed by the impact of the post as it was erected. The upper fill of the post-pipe, an orange-brown clay silt (6), indicated the presence of a weathering cone, suggesting that the post had rotted *in situ*. The only artefactual evidence came from a single piece of good quality, but unworked flint from the fill of the post-pipe.

A large post ramp extended south-west from the post-pit for around 3.6m, reaching 1.5m deep and sloping at an angle of 23 degrees. The ramp contained obvious tip lines which suggested that material had been deposited initially against the post to provide support before the remainder of the ramp was infilled. A fragment of hazel charcoal from near the base of the ramp, against the post-pit, produced a radiocarbon date of 2570–2290 cal. BC (SUERC-32383). The two excavated post-pits both had ramps positioned to the west of the posts, angled slightly towards the inside of the arc of the enclosure (see Fig. 6), unlike at the Hindwell Palisaded Enclosure (see below) where the ramps were contiguous and at right-angles to the arc. This may suggest that the eastern post ramp was dug before the western one and that the posts may have been erected in an anticlockwise sequence. One reason for this may be so that the erected posts did not form an obstacle as work progressed, although it may also be related to the direction from which the timber was being brought, construction starting at the furthest point (Jones 2010a).

A deposit of clay silt in the south-western corner of the 2010 excavation and extending beyond its limits, may be part of another pit, although this was not investigated and its position does not conform to that of the next post pit as plotted from aerial photography. Alternatively, it is possible that this held

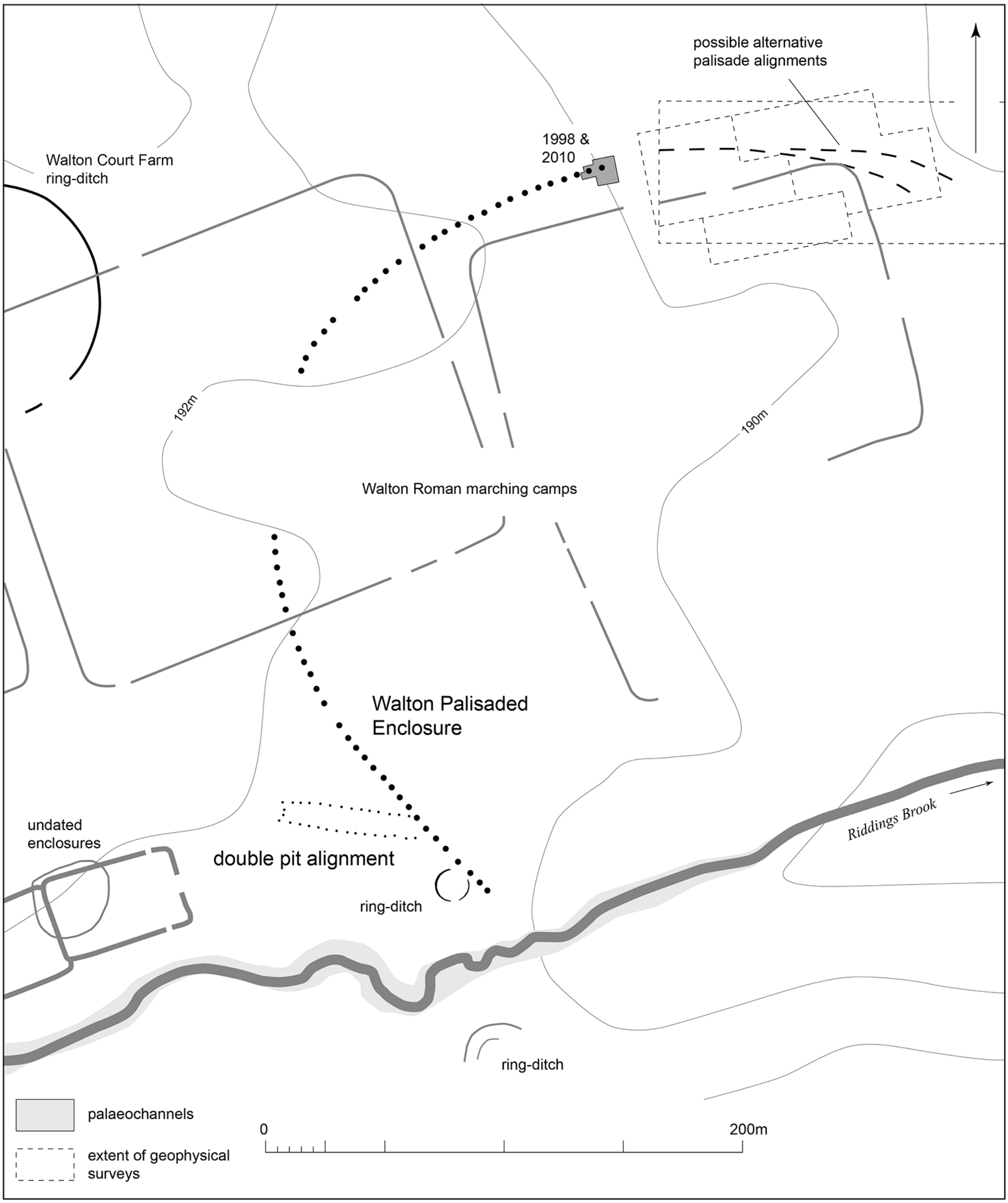

Fig. 4. Walton Palisaded Enclosure showing cropmarks, excavations and geophysics.

a medial post, between the main uprights, similar to those found at Meldon Bridge (Speak and Burgess 1999, 15–16), although there was no indication of a similarly placed feature between the two excavated postholes.

Fig. 5. Walton Palisaded Enclosure: post-pit excavated in 2010. *Photograph: CPAT 3045-0028.*

The eastern side of the enclosure remains elusive being generally under pasture which has been largely unresponsive to the formation of cropmarks. Even when conditions have been favourable for the formation of cropmarks the presence of palaeochannels in this area effectively masked the identification of potential pits. The geological conditions have also thwarted three programmes of geophysical survey. In 1995 magnetometry and resistivity surveys were conducted by Stratascan, successfully identifying part of the Roman marching camp, although with neither technique providing any evidence for the palisaded enclosure (Stratascan 1995; Gibson 1998b, part 4.5). This was followed in 2009 by a second magnetometer survey, undertaken by CPAT, which in part resurveyed the area investigated in 1995 and although the methodology adopted increased the density of readings four times it was equally unsuccessful (Jones 2010a). In a final attempt to identify this side of the enclosure caesium vapour magnetometry was used by ArchaeoPhysica, a technique which had previously been employed with spectacular results on the site of the Hindwell Palisaded Enclosure in 1999 (Gibson 1999b). The results were somewhat inconclusive, not least because of the large number of pit-type features which were present, most of which are likely to be natural variations in the gravels. Careful analysis of the data has, however, led to the tentative suggestion of two potential arcs of pits extending for up to 120m which might indicate the perimeter of the palisaded enclosure. This is far from conclusive, however, and without the known alignment to the west of the road these anomalies would not have been recognised as potentially significant (Lewis and Roseveare 2010). Nevertheless this is the only indication of the eastern side of the palisaded enclosure and we can only hope

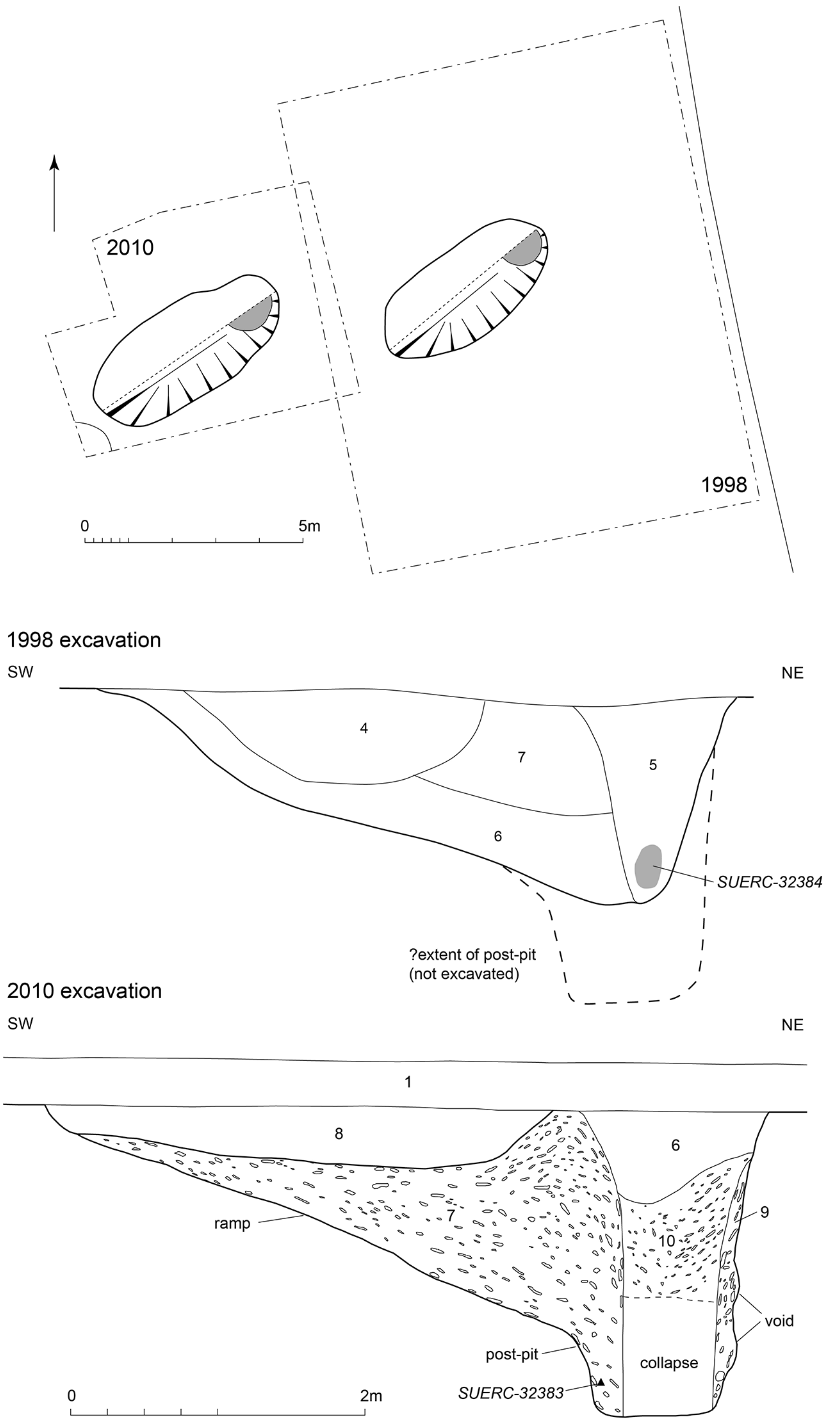

Fig. 6. Walton Palisaded Enclosure: 1998 and 2010 excavations. A possible third post-pit was visible in the south-western corner of the 2010 excavation.

that further aerial reconnaissance will eventually either confirm these results, or produce more compelling evidence for a different alignment. While there is currently no evidence to indicate the southern extent of the enclosure the position of the palisade with respect to the Riddings Brook is likely to be significant and this could have been incorporated into the monument. This being so, the enclosure could have had an overall diameter of around 300m, perhaps enclosing an area of around 8 hectares, assuming that the eastern side followed a similar curve to that already known to the west.

It has been suggested that the palisaded enclosure is associated with a double pit alignment to the south-west which has been seen as an avenue (Gibson 1999a, 8), inviting comparisons with Meldon Bridge in the Scottish Borders (Burgess 1976; Speak and Burgess 1999), Leadketty and Forteviot, Perth and Kinross, and Dunragit, Dumfries and Galloway (Gibson 1998a; Noble and Brophy 2011). The clearest evidence is provided by aerial photography taken by Toby Driver of the Royal Commission in 1999 (Fig. 7, left) which revealed cropmarks indicating two slightly curving rows of pits between 8m and 10m apart, which extend for up to 58m. Each row may have originally been composed of 15 pits around 1m in diameter, with an average spacing of 3.9m, centre to centre, although the eastern end of the northern row coincides with one of the large post-pits of the palisaded enclosure. Rather than forming an open-ended avenue there is the suggestion that the western end is closed by two pits which are set back, inside the double row. It has been noted that there is no obvious change in the spacing of the pits of the palisade at the point where the alignment and the palisade meet (Britnell and Jones 2012, 62), unlike at Meldon Bridge, where the posts of the avenue are at right-angles and match the posts of the palisade. In addition, recent re-examination of the cropmark evidence has also highlighted the fact that the pits are considerably smaller than those of the palisade and it is also worth noting that they can show as cropmarks in years when the larger palisade pits do not (Musson 2013, 29).

The relationship between the double pit alignment and the palisade at Walton can only be resolved through excavation, although given that the association of the external and angled avenues with the main enclosures at Meldon Bridge, Forteviot and Dunragit has already been proved the avenue interpretation is perhaps most likely. At present no potentially contemporary features have been identified inside the enclosure, and there is an absence of any significant finds scatters.

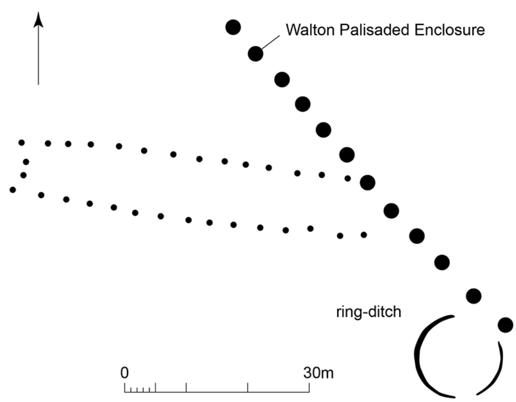

Fig. 7. ***Left*** The double pit alignment or avenue adjacent to the Walton Palisaded Enclosure, together with a small ring-ditch, 1999. *Photograph: Toby Driver, 1999, © Crown copyright, RCAHMW, 99.cs.1856.* ***Right*** plot of the cropmark evidence.

Hindwell Palisaded Enclosure

The Hindwell palisaded enclosure is a truly remarkable discovery, enclosing an area of around 34 hectares, which makes it by far the largest such site in Britain (Gibson 1997, 23–7). It lies on the valley floor at 190m OD, centred at SO 2543 6070, encompassing Hindwell Farm, from which it takes its name, as well as Hindwell Pool.

Despite its size, the enclosure was only discovered by chance in 1994 when aerial photographs identified a curving length of ditch in ripening cereals (and later proving to be the western arc of the enclosure) (Fig. 8) lying between Walton and the intended target of the flight, the excavation of a round barrow at Upper Ninepence (Gibson 1994a; 1999b, 33–4). A review of existing photography showed that it had in fact been first recorded but unrecognised by J. K. St Joseph in 1969[7] in the field immediately to the east, although the main subject of that view was the Hindwell Roman marching camp (Davies and Jones 2006, 138) and the significance of the slightly curving ditch was not appreciated until the western end of the enclosure was identified by Alex Gibson in 1994 (Gibson 1994a).[8] Again the ditch showed as a

Fig. 8. Cropmarks photographed from the west showing the western end of the Hindwell Palisaded Enclosure in relation to the curving lane which follows its northern side. The paler ditches of the Hindwell Cursus (arrowed) are visible while Hindwell Farm Barrow II lies inside both the palisade and the line of the cursus. An undated rectangular enclosures lies just outside the palisade with a trapezoidal Iron Age enclosure to the right. Also visible inside the palisaded enclosure is the Hindwell Roman marching camp and the side ditches of the Roman road leading westwards from the Hindwell Roman fort. *Photograph: Toby Driver, 2006, © Crown copyright, RCAHMW.*

faint cropmark, in a grass field to the north of the fort. Further cropmarks were identified in 1996, and collectively aerial reconnaissance has accounted for around 1165m (51%) of the circuit. Interestingly, the missing northern arc of the circuit appears to be followed by a lane between Hindwell and Four Stones, the curvature of which exactly matches that of the cropmarks at either end. This accounts for a further 550m of

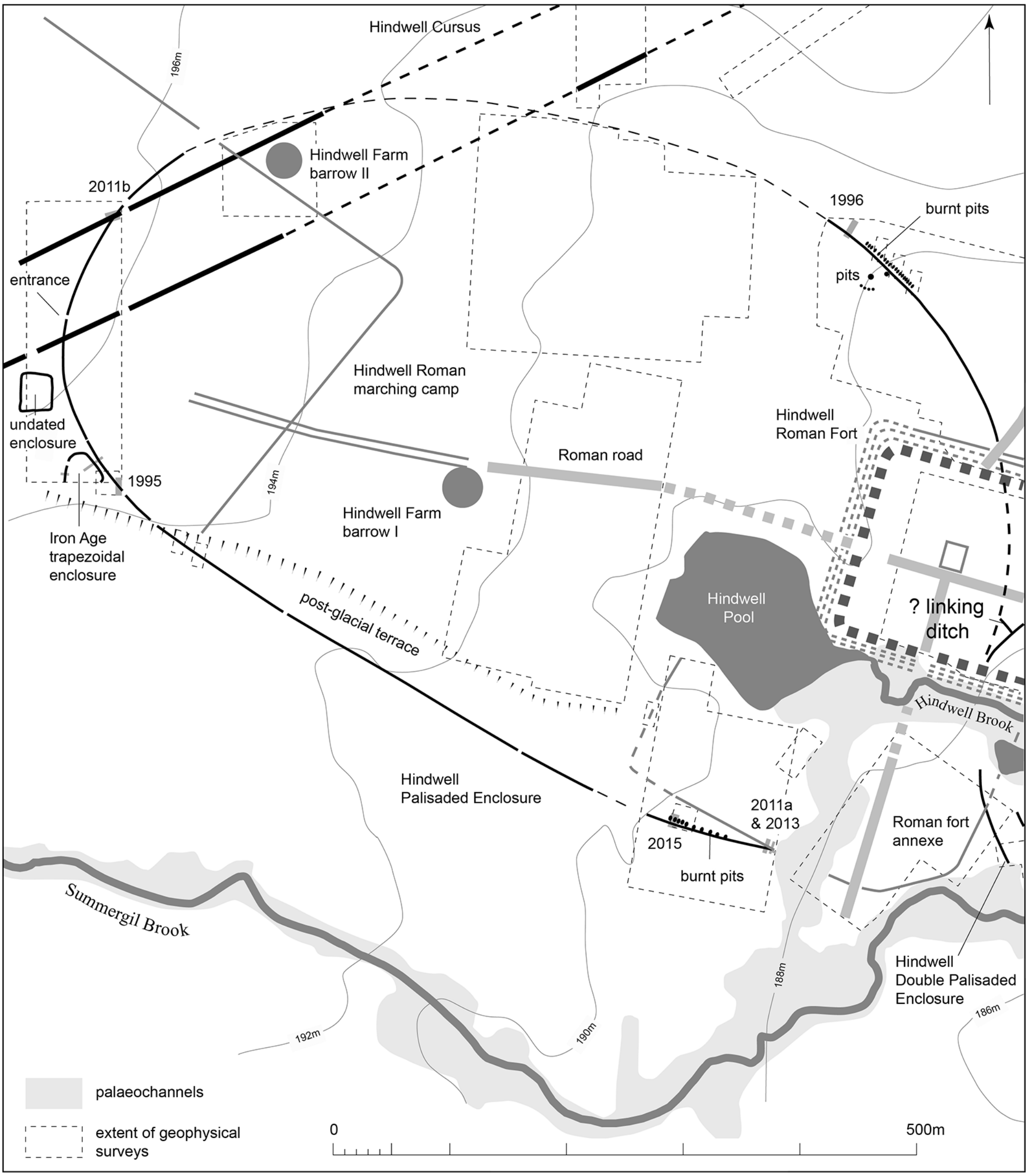

Fig. 9. The Hindwell Palisaded Enclosure shown in relation to the Hindwell Cursus, Hindwell Double Palisaded Enclosure, and Hindwell Roman fort and roads (excluding modern boundaries and roads).

the circuit (21%), so that to date around 75% of the monument has been identified with some certainty. The eastern end remains problematic, however, since it lies beneath the Roman fort and although geophysics has provided a very detailed picture of the fort interior the arc of the enclosure is not clearly visible. A single, narrow entrance has been identified at the western end, where two larger posts flank a gap around 4m wide.

In plan the enclosure forms an oval at least 750m long and around 525m wide with the long axis aligned at 287 degrees west of grid north. The northern side, together with the western end, match the curvature of such an oval almost exactly, while the southern side has a much flatter curve (Fig. 9).

The monument has been the subject of several programmes of geophysical survey, commencing with a number of small areas in 1995 (Gibson 1998b, 4.12–13) which were generally inconclusive. Of rather more significance, however, was an extensive survey conducted by Dr Helmut Becker, then of the Bayerisches Landesdenkmalamt für Denkmalpflege, in 1998 as part of a European collaborative project funded by the European Commission (Gibson 1999b) as an adjunct to the Walton Basin Project. This investigated much of the circuit then known from cropmarks, together with significant areas of the interior, as well as the Hindwell Roman fort, which overlies the eastern end (Burnham and Davies 2010, 248–9).

Six small excavations have now been conducted to investigate the enclosure, of which the primary evidence for form and dating was obtained from excavations in 1995 on the south-west side of the enclosure. This completely excavated four post-pits (Figs 10–11), while excavations the following year on the north-east side of enclosure also investigated four pits, although these were only partly excavated. The 1990s excavations revealed that the enclosure is formed by a perimeter of intersecting post-pits, each with an attendant outwardly-facing post ramp extending 2–3m from the post itself. The postholes averaged 2m in depth and would have contained posts 0.8m in diameter, which may have stood at least 6m above ground (assuming a below:above ground ratio of 3:1). The remains of carbonised oak posts were found within the post-pits, from which radiocarbon dates were obtained from the outer edge of the posts (SWAN-116, SWAN-117, SWAN-230 and SWAN-231); these radiocarbon dates are internally consistent, and regarded as probably estimating the felling of the posts. The first dated event associated with these results is estimated in the model discussed below (Table 6) as having occurred in *2870–2480 cal. BC* (*95% probability*; *first_Hindwell_enclosure*), the last dated event associated with the use of these posts is estimated to have occurred in *2670–2350 cal. BC* (*last_Hindwell_enclosure*). Discussion of the model used to calculate these estimates is given below.

There is some uncertainty regarding the eastern end of the enclosure, although based on existing cropmark evidence and the negative results from geophysics it is possible that the southern side terminated at a large palaeochannel, while the eastern end may have extended as far south as the Hindwell Brook, both features perhaps being incorporated into the monument, giving a circuit for the palisade of around 2 kilometres. The spacing of the posts indicates that there were three posts every 5m, so that over 1170 posts would have been required to complete the perimeter, and in excess of 1400 if the circuit were complete at 2.35 kilometres (Gibson 1999a, 14–18; 1999b, 35). The 1996 excavations also identified six small pits or postholes, between 0.4–0.6m in diameter and 0.12–0.4m deep, two of which were cut into the fill of the post ramps, while the remaining four had no stratigraphic relationship with the palisade (Gibson 1999a, fig. 15). While these were considered at the time to post-date the palisade since no dating or relationship could be established this remains uncertain, although similar features were not noted during any of the other excavations.

Excavations on the north-west side in 2011 (Fig. 9, 2011b; Fig. 12) demonstrated that the west end of the enclosure had been cut into the fill of the northern ditch of the Hindwell Cursus, which is thought to have been constructed after *3940–3700 cal. BC* (*95% probability*; *First_southern_ditch*, see discussion below; cf. Britnell and Jones 2012, 54), the date range suggested by other such monuments being

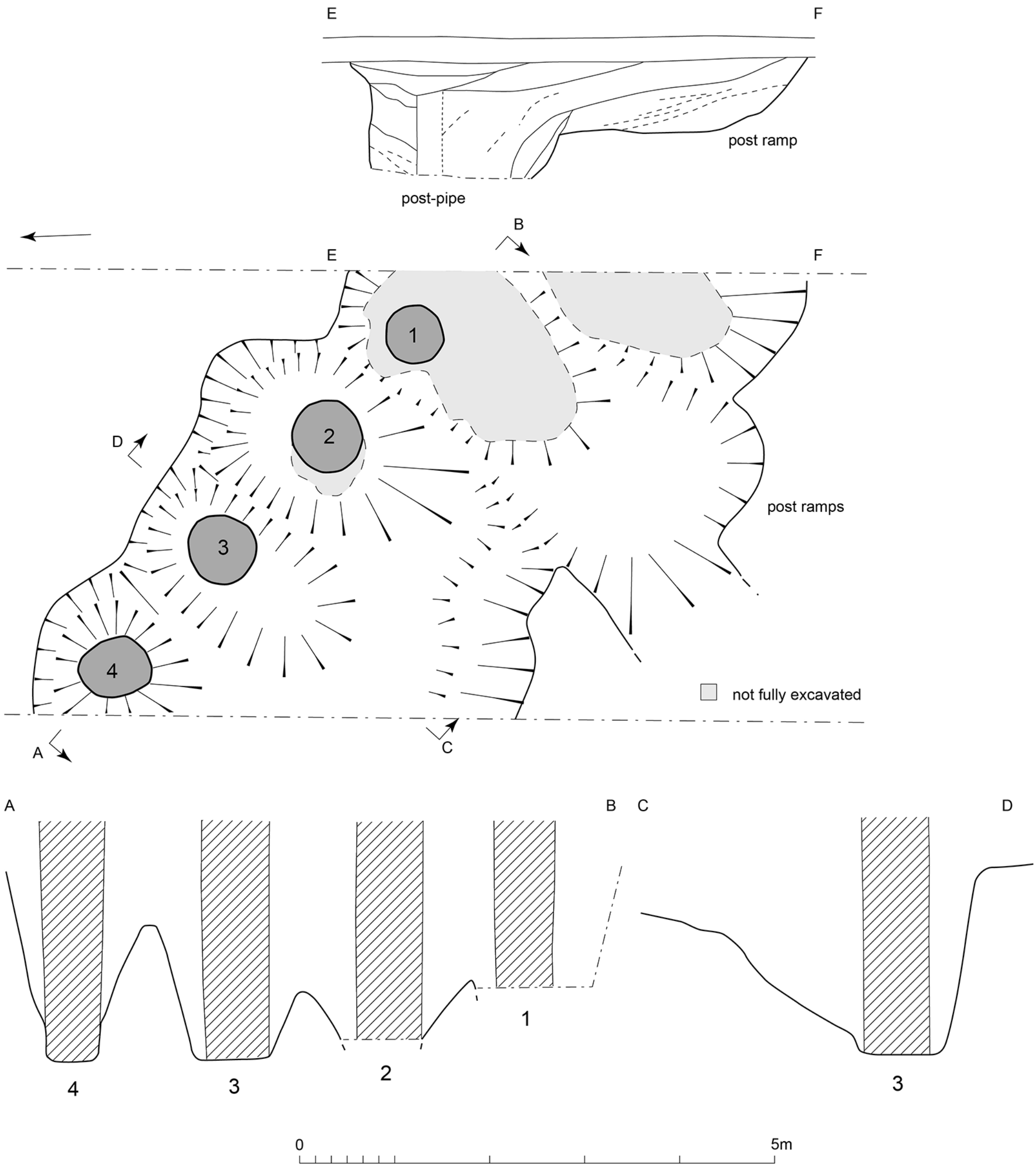

Fig. 10. Hindwell Palisaded Enclosure: 1995 excavations.

c. 3400–3000 cal. BC (see Barclay and Bayliss 1999). The limited investigations determined that the cursus ditch, which was around 3.8m wide, had been cut by a series of contiguous post-pits, the appearance of which was similar to those excavated elsewhere around the circuit of the enclosure (Gibson 1999a, 14–17) and collectively formed a broad, irregular trench. From the level at which the post pits had been cut it was apparent that the cursus ditch had become completely infilled with relatively clean gravel, perhaps

Fig. 11. Hindwell Palisaded Enclosure: 1995 excavations showing the charred outline of the posts, with post ramps to the left and interior of enclosure to the right. *Photograph: CPAT cs95-53-0036.*

representing deliberate levelling, by the time the palisaded enclosure was constructed. It is also worth noting that in the area of the palisade aerial photographic evidence reveals both of the cursus ditches as parchmarks, rather than cropmarks, which may be due to the gravel infill (Britnell and Jones 2012, 54).

Although no significant excavation was undertaken in 2011, the pattern of fills within the post pits suggested the manner in which they might have been excavated (Fig. 12). Of particular significance was a band of redeposited silty clay (21) oriented along the axis of one of the pits, which was distinctly different from the silty gravel (14) which formed the fill within most of the post pits and ramps. At this point the pits had been cut through the fill of the cursus ditch, rather than into the natural gravel subsoil and it seems likely that this material was therefore derived from an adjacent pit, outside the line of the cursus. The implication is therefore that as each post pit was excavated the spoil was used to backfill the adjacent pit, which already contained an upright post.

An unusual feature noted during the excavation was the presence of a slight 'gully' (10), around 0.7m wide and up to 0.2m deep, running along the rear edge of the post ramps, which appeared to have been cut into the fill of the ramps (14) and was infilled with fine, silty clay (11). A similar, but smaller feature (15) was also noted along the outer edge of the post ramps, which was only 0.15m wide and 50mm deep. The excavations produced no evidence to suggest the function of either feature and previous excavations do not appear to have identified anything similar. However, evidence from cropmarks and geophysical survey does indicate the presence of a gully on the outside of the perimeter at the western end but interestingly

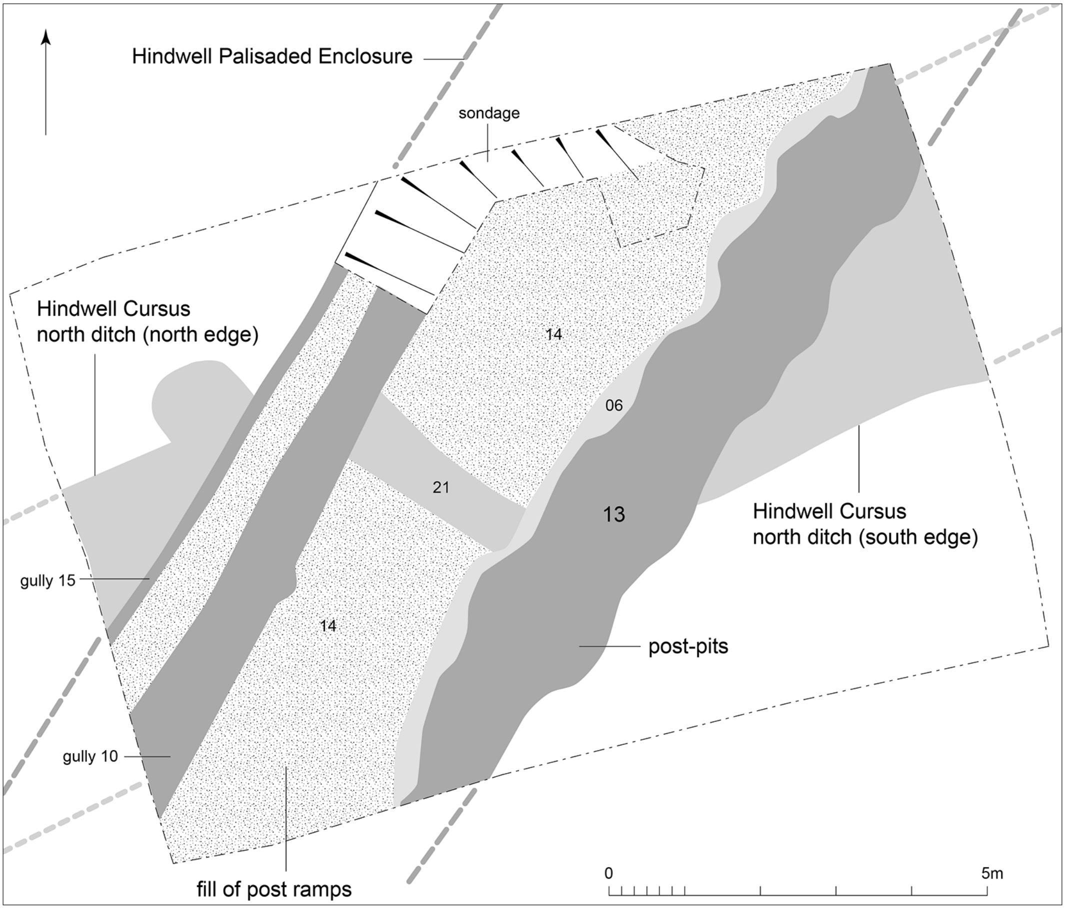

Fig. 12. The 2011 excavations at the intersection of the Hindwell Palisade and the Hindwell Cursus.

on the interior on the north-west corner. This suggests some relationship with the post ramps, since excavations have demonstrated that they are also external at the western end and internal on the north-west corner. It is possible that the larger gully has resulted from slumping of the fill, creating a linear depression towards the rear of the ramp.

On the southern side of the enclosure small-scale excavations in February 2011 and December 2013 (Fig. 9, 2011a and 2013) confirmed that a large Roman ditch (Fig. 13), defining an annexe to the fort, cuts the enclosure at its south-eastern end. It had been hoped that evidence would be forthcoming for the relationship between the palisade and the large palaeochannel shown in Figure 9, which is 30–40m across and up to 1.5m deep, although the results demonstrated that any relationship had been completely removed by the Roman fort annexe ditch (Jones 2011, 8–13; Jones and Hankinson 2014).

The nature of up to nine burnt features on the south-eastern side of the Hindwell Palisaded Enclosure has been a matter of some debate since their discovery through geophysical survey in 1998, along with perhaps 19 similar survey anomalies on the north-eastern side of the enclosure. Initially interpreted as evidence for the *in situ* burning of the posts which define the enclosure the excavations in 2015 (Fig. 9, 2015) were sadly too restricted to provide a definitive answer since only one pit (Fig. 13, pit 10) was

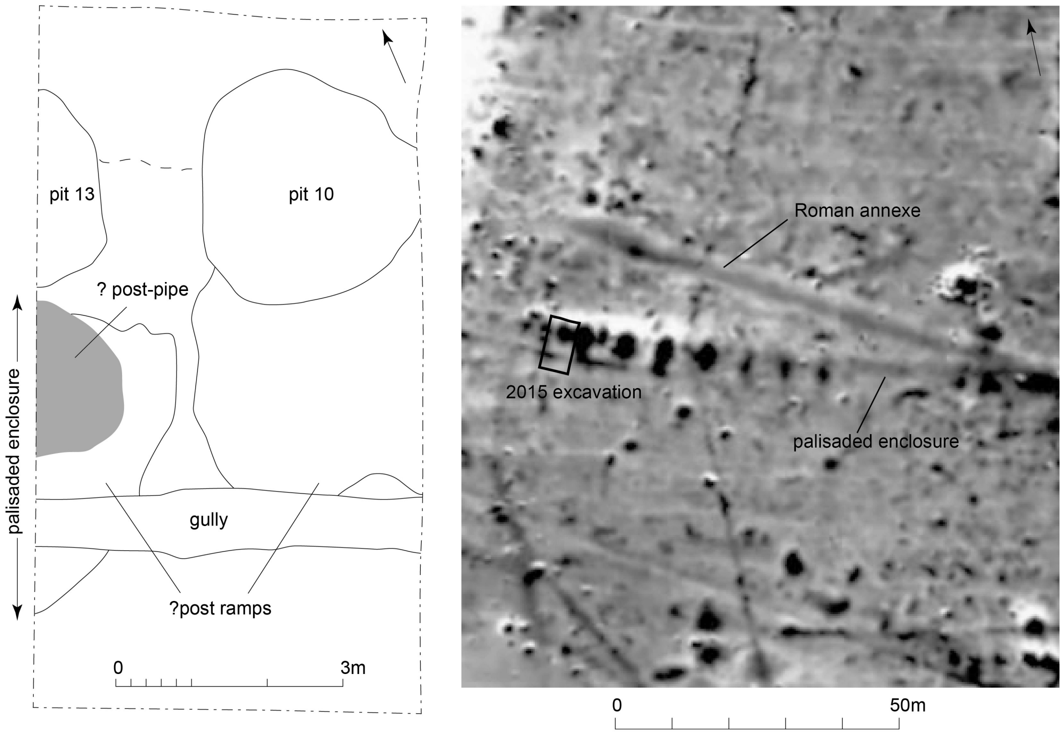

Fig. 13. Hindwell Palisaded Enclosure: 2015 excavations and the 1998 geophysical survey, showing the relationship between the palisade, the row of pits and the Roman annexe ditch.

partially excavated to a depth of 0.58m, the fill containing abundant charcoal. What is clear, however, is that the pits are positioned immediately inside the palisade and contain significant quantities of burnt material in their fills, accounting for the geophysical responses, but without any sign of *in situ* burning, having the appearance of rubbish pits. The presence of Grooved Ware and worked flints from the upper fills of these two pits (see reports by Alex Gibson and Philippa Bradley below) suggest a broad contemporaneity with the palisade itself and mirrors the presence of Grooved Ware recovered from the post-pipe of one of the posts in the inner circuit of the Hindwell Double Palisaded Enclosure. Further to the east, however, the geophysical survey suggests that the features may overlie the palisade, implying that they post-date the enclosure (Hankinson and Grant 2015).

There is little artefactual evidence that is certainly contemporary with the palisaded enclosure, with finds from the excavations being in residual contexts, although six flakes and a possible scraper fragment were recovered from the fieldwalking immediately beyond the western end of the enclosure in 2011. There is also no clear indication of any internal structures or evidence for activity, although the 1998 geophysical survey did identify numerous large pits, at least some of which are almost certainly archaeological. At the time the survey was undertaken attention was drawn to two large pits in particular, on the north-eastern side of the enclosure, one of which appeared to be associated with an arc of small pits/posts (Fig. 9; Gibson 1999b, 44).

It is perhaps significant that the geophysics has failed to identify any evidence for areas of burning within the enclosure which might be related to the charring of the timbers before their erection. Although the loss of the Neolithic ground surface to ploughing provides perhaps the most likely explanation for the absence of such evidence there is also the possibility that the posts were either burnt outside the enclosure, or perhaps at or near the felling site. There are two round barrows within the interior, of which Hindwell Farm Barrow II had been thought to overlie a circle of pits revealed through geophysical survey, some showing signs of intense burning, suggesting the possibility of an earlier timber circle (Gibson 1999b, 51). Recent excavations have demonstrated that the burnt features are in fact Roman field ovens, presumably associated with the immediately adjacent Hindwell Roman marching camp which partly overlies the palisaded enclosure (Jones 2014a; Musson 2013, 32).

Cropmark and geophysical survey evidence had identified a trapezoidal enclosure immediately to the south-west of the palisade, measuring 35m across (Fig. 9). The positioning and alignment of the north-east side of the trapezoidal enclosure suggested a possible association between the two and this was investigated in September 2014 with the excavation of two trenches (Jones 2014b). The palisaded enclosure again displayed the characteristic scalloped edges of the intercutting pits and although this was not investigated further there was no indication for the narrow gullies identified in the 2011 excavations. The ditch of the trapezoidal enclosure lay 1.8m beyond the outer edge of the palisade and was roughly V-shaped, measuring 1.2–1.5m wide and up to 0.48–0.65m deep. Birch charcoal from the base of the ditch produced a radiocarbon dates range of 190–50 cal. BC (SUERC 52863), which has not been included in the model presented below of earlier prehistoric activity in the Walton Basin. Fragments of probable late Iron Age pottery were also recovered from the section of the ditch in the second trench. The apparent Iron Age dating for this enclosure suggests that the site of the palisade may have remained an important feature in the landscape for 2,500 years after its construction, influencing the positioning of later monuments, not least the Roman camps and fort.

The original appearance of the enclosure also remains uncertain as it is impossible to determine whether the posts were freestanding, with gaps in between, or whether they may have been infilled with timbers or wattle to form a solid barrier.

Topographically, the location of the enclosure is interesting in as much as the majority lies on a level terrace, with the exception being the southern part of the perimeter which drops off the terrace onto what is presumed to be the northern edge of a former late-glacial lake. At the eastern end of the southern side there is currently no evidence to extend the palisade beyond a large and prominent palaeochannel between the Summergil Brook and the Hindwell Brook. Indeed, geophysical survey has now been conducted on either side of the channel and shows clearly the arc of the palisade extending to the western edge of the channel, but there is no indication of its continuation beyond the channel to the east. This suggests that the channel was adopted as the south-eastern boundary of the enclosure, whether it was a contemporary watercourse or not. Unfortunately, there is currently no evidence with which to date the channel, although it is possible that this represents an earlier course of the Summergil Brook, which later became diverted further to the east.

The Hindwell Brook now issues from Hindwell Pool, which was enlarged, perhaps during the late eighteenth century to supply a water meadow to the east and perhaps also as a picturesque feature, but is likely to have incorporated the site of a natural pond or spring, one of several springs which emanate from the point at which the predominantly gravel subsoils in the west of the basin meet a bed of impermeable clay. The Summergil Brook is so named because it dries completely in the summer months along much of its length, reappearing at Hindwell, which is itself derived from the Old English *hind* ('female deer') and *wella* ('well, spring, or stream'), perhaps reflecting the importance of these water sources for wildlife (Britnell and Jones 2012, 50–1). The inclusion of this important water source within the palisaded enclosure is hardly likely to be a coincidence.

There is no indication as to whether the enclosure was constructed in a single season, although it is clear that significant manpower would have been required to fell, shape and transport the timber, as well

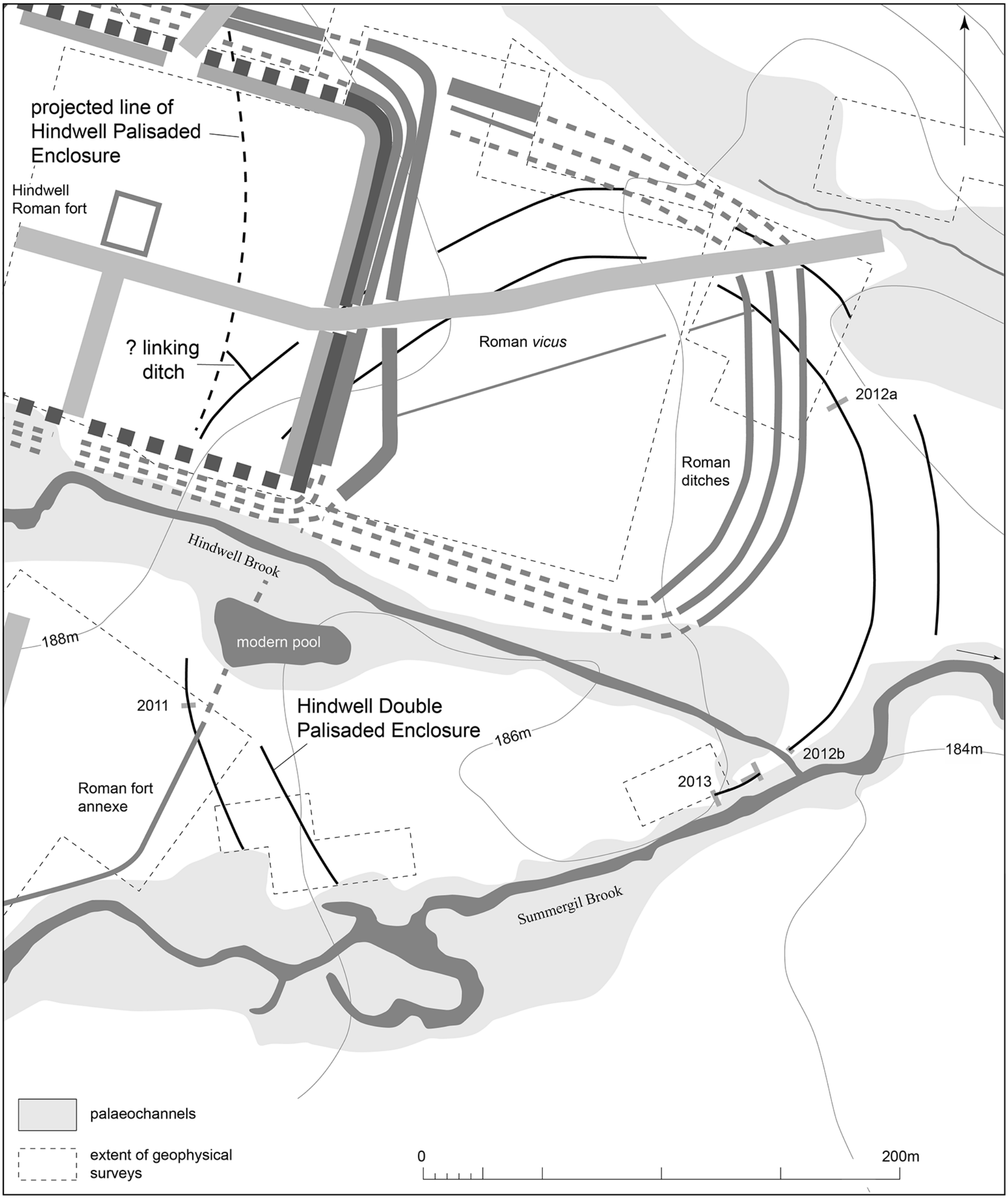

Fig. 14. Hindwell Double Palisaded Enclosure showing cropmarks, excavations and geophysics, palaeochannels.

as to excavate the post-pits and erect the posts (see Gibson 1998a, 78–9 for an estimate). Consequently, it may be presumed that some form of contemporary settlement should be present within the immediate area. It is interesting that the geophysical survey has not identified potentially significant areas of burning which might be associated with domestic hearths or fires, or indeed for larger fires which might have been used to char the base of the posts. This could suggest that even during its construction the internal space was regarded as 'special', or at least separate from day to day life. This absence of internal features may also, of course, be due to the loss of any old ground surface associated with the enclosure as a result of agricultural activity but it is nevertheless worthy of comment that during fieldwalking as part of the 1993–97 project, very few finds were found in the interior of the enclosure though significantly a polished flint axe fragment was recovered (Gibson 1999, fig. 41.5). Several other flints had previously been found within the interior by Chris Dunn during the 1960s (Bradley 1999), though at this time the enclosure had yet to be recognised. This paucity of flint contrasts with the ridge to the north of the Hindwell Cursus (Gibson 1999, fig. 4; Britnell 2013, 10) where a high density of flint scatters has been identified. It is also in this area that the pit complex at Upper Ninepence was found, protected by an overlying barrow (Gibson 1999). Associated with the Grooved Ware activity at this site were three roughly circular structures, two of which had internal hearths and were almost certainly domestic in nature suggesting settlement contemporary with the construction of the Hindwell palisade.

Hindwell Double Palisaded Enclosure

The enclosure lies to the south-east of Hindwell Farm at around 185m above Ordnance Datum, centred at SO 2597 6044. Its presence was first noted in 1998 during the geophysical survey conducted by Dr Helmut Becker mentioned above. This was primarily focused on the Hindwell palisaded enclosure but also included the Hindwell Roman fort and revealed the partial circuit of a double-palisaded enclosure, apparently lying in part beneath the fort and its eastern *vicus* (Gibson 1999a, fig. 24; Gibson 2001, figs 8.1, 8.3). At the time it was thought to be associated with a set of triple ditches further to the east (Fig. 14; Jones 2009a, 40, note 11), first recorded from the air by Chris Musson in 1992, which have now been shown to be associated with pre-Flavian activity within the Roman fort (Jones forthcoming) The eastern side of the palisaded enclosure and a short section between the Summergil Brook and Hindwell Brook was identified by aerial reconnaissance by Toby Driver of the Royal Commission in 2006.[9] Further geophysical survey by CPAT in 2010 to the east and south of the fort provided additional evidence for the enclosure palisades to the south-east and the south-west (Hankinson 2011).

The combination of aerial photography and geophysical survey has so far identified at least 55% of the enclosure, which measures 250m across internally, with the two circuits 25m to 30m apart. The inner circuit encloses an area of around 5.3 hectares, while the total area enclosed by the outer circuit could have been *c*. 7.7 hectares (Fig. 12). The position of the monument with respect to both the Hindwell Brook and the Summergil Brook also raises an interesting question regarding its relationship with the larger Hindwell palisaded enclosure to the west. As noted previously, the latter site appears to respect a large palaeochannel lying between the two brooks and does not continue to the east, into the area occupied by the double circuit enclosure. Whether either of these channels was active during the Neolithic is perhaps questionable but as landscape features they appear to have exerted some influence over the siting of both monuments.

Excavations in February 2011 investigated the outer palisade at a point between the two brooks, although flooding led to work being halted before the excavation was completed (Fig. 15; Jones 2011, 13–17). Crucially, however, the results demonstrated that the outer circuit was constructed as a continuous palisade trench around 2.7m wide and at least 0.8m deep, with a steeply sloping inner edge and an outer edge which was significantly undercut.

The inner, eastern edge sloped steeply, while the outer edge was significantly undercut to such a degree that some voiding was evident beneath the overhanging lip. A linear 'slot' ran along the centre of the trench at the lowest excavated level. The slot contained concentrations of charcoal along either side (116 and 117) which suggested the position of a number of closely spaced, charred oak timbers around 0.25m

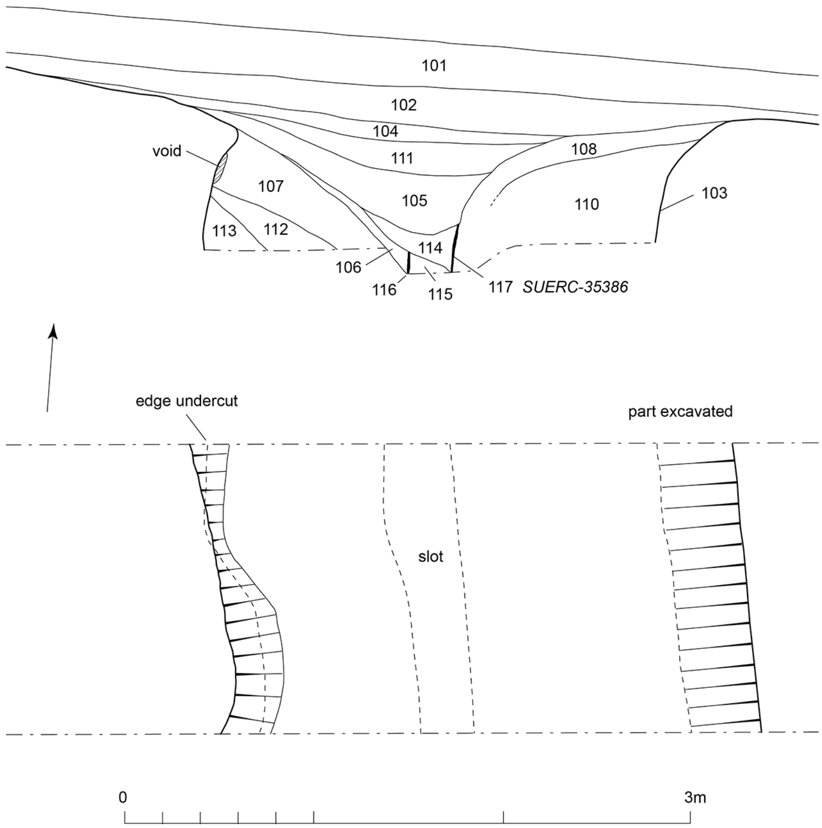

Fig. 15. Hindwell Double Palisaded Enclosure: plan and section of the outer circuit.

across, although the conditions under which the excavation was conducted meant that it was not possible to identify individual timbers with any confidence. What is certain, however, is that the timbers were set vertically and the trench was then deliberately backfilled. The infill was asymmetric with the inner, eastern side consisting of compacted stony material (108 and 110), while the opposite side contained deposits of relatively stone-free clay silt (112) and clay (107), sealing a more gravely layer (113). A sample of unidentified charcoal from one of the charred timbers produced a radiocarbon date which may represent a *terminus post quem* for the associated activity of *2880–2560 cal. BC* (*SUERC-35386*; *95% probability*).

The different materials used in backfilling probably reflect variations in the fluvioglacial subsoils through which the palisade trench had been cut, rather than a deliberate choice of material. The presence of clays and clay silts in an area which is predominantly gravel suggests that part of the palisade trench may have been cut through palaeochannels that must pre-date the construction of the enclosure. Topographically, the area between the Hindwell Brook and the Summergil Brook lies up to 1.5m below the level on which the majority of the enclosure was constructed and includes not only the large palaeochannel which may have been incorporated into the Hindwell palisaded enclosure, but also other, smaller channels, such that the whole area is likely to be include reworked alluvial material.

It was evident that the palisade trench remained as a slight earthwork until at least the Roman period since the uppermost fill (104) contained sherds of Roman pottery and a worn copper alloy coin.

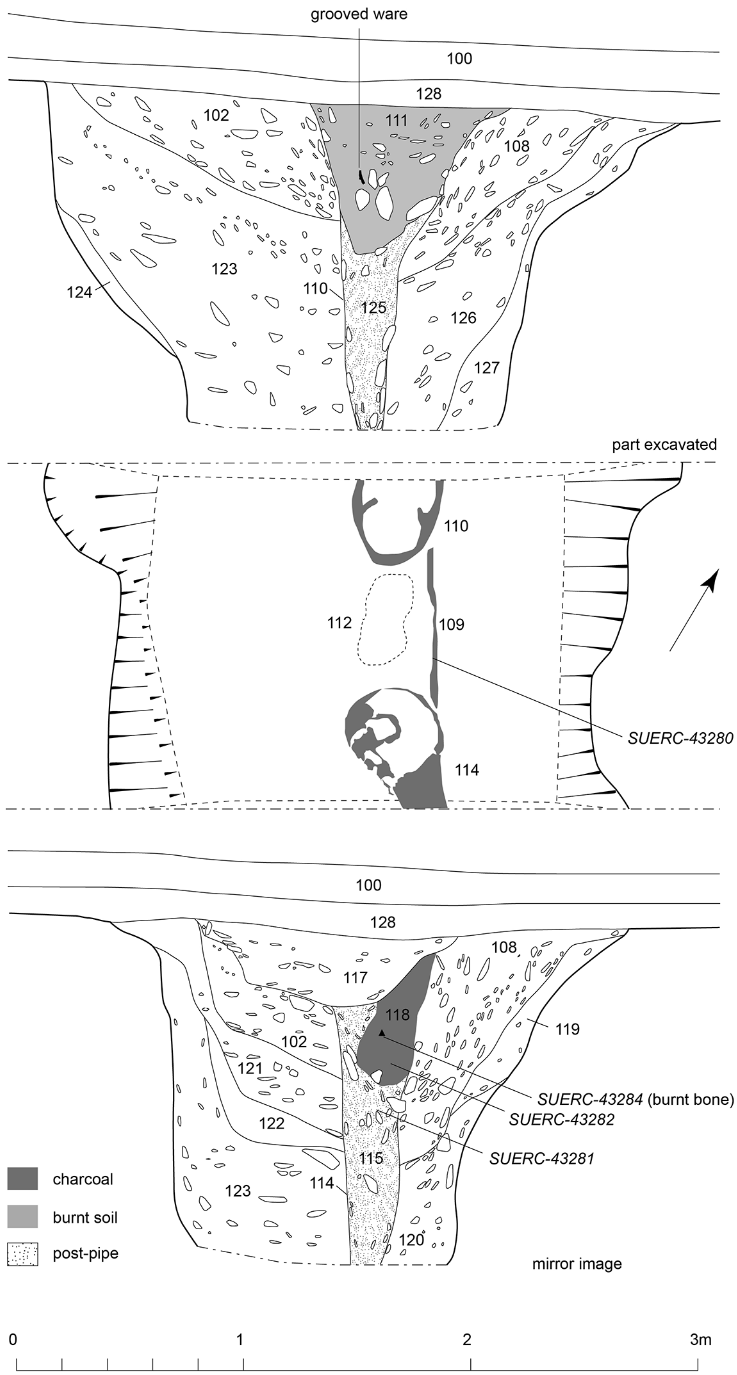

Fig. 16. Hindwell Double Palisaded Enclosure: plan and sections of the inner circuit.

In 2012 the inner circuit of the enclosure was investigated by two trenches (Fig. 14, 2012a and b; Jones 2012b). The main excavation (2012a) revealed the palisade trench (101), which was excavated to a depth of 1.45m before reaching the water table, at which point work had to be abandoned (Figs 16–17).

The palisade trench was steep-sided, between 2.1m and 2.8m in width, and both the inner and outer edges were scalloped, suggesting that it may have been dug as a series of interconnecting pits without post-ramps, rather than as a continuous trench. The removal of the uppermost fill exposed several areas of *in situ* burning, together with concentrations of charcoal which indicated the positions of a number of large oak posts. It was notable that the burning was concentrated on the outer edge of the posts, against which the gravelly fill showed areas of significant fire-reddening, while the fill against the inner side of the posts was unaffected.

The individual posts were between 0.35 and 0.4m in diameter with charring affecting only the uppermost 0.6m, beneath which the post-pipes were preserved as areas of gravely silt surrounded by the more compacted gravels that formed the general backfill of the palisade trench. Two of the posts (110 and 114) were defined clearly by the charring of their outer surfaces, both extending into the sections on either side of the excavation. A sample of the charcoal from one of the posts provided a *terminus post quem* range of *2580–2460 cal. BC* (*SUERC 43281*; *95% probability*). Both had well-defined weathering cones, indicating that they had decayed *in situ*. The intervening posts were less clear and, although charring was evident in places, the apparently more or less contiguous nature of the posts made it difficult to distinguish them individually. The evidence, however, suggests that perhaps a further two were present within the

Fig. 17. Recording the south-facing section of the inner circuit of the Hindwell Double Palisaded Enclosure. *Photograph: CPAT 3433-0233.*

excavated area, one of which was contiguous with post 114 and, in plan at least, could not be separated from it.

A single, large sherd of Grooved Ware (Fig. 18, no. 1) was recovered from the fill of the weathering cone for post 110. The sherd was positioned on edge, suggesting that it may have been placed deliberately against the post. Fragments of calcined bone—the identifiable element of which was a sheep/goat tibia (see report by Louisa Gidney below)—were recovered from a similar position in the weathering cone for post 114, and dates this activity to *2620–2470 cal. BC* (*SUERC 43284*; *95% probability*).

As in the outer circuit there was a significant difference between the fills of the palisade trench on the inner and outer sides of the posts, suggesting that they may have formed a more or less continuous barrier. The fills on the outer side displayed prominent tip lines, with many of the flatter stones lying at a steep angle and some being near vertical against the outside of the posts. On the inner side, however, the fills were more mixed with little indication of tip lines.

The evidence suggests, therefore, that a succession of intercutting pits were dug to receive the posts which must have been held in place while the trench was rapidly infilled from the outside, followed by the dumping of the remaining material on the inside. The clear separation of the fills may indicate that the spoil from the trench was placed entirely on the outer side, possibly leaving the inner side clear for erecting the posts. There is also the possibility that the spoil was recycled from one pit to infill its neighbour.

The second trench focused on the point where the palisade had been truncated by the canalised section of the Hindwell brook, adjacent to its confluence with the Summergil Brook (2012b). Cleaning of the upper part of the river bank, which at this point was around 2.4m in height, revealed a partial section of the palisade trench. Unfortunately, only the inner edge of the trench was accessible owing to the presence of a large hawthorn tree. Limited excavation indicated that the trench appeared to be relatively straight-sided in its upper part, narrowing to a slot lower down, in the base of which a hollow suggested the position of a possible post. A post-pipe (106) containing some charcoal was tentatively identified in section and a single burnt flint was recovered from the base of the post-setting. Overall, the trench is likely to have been around 1.8m in depth.

The inner circuit was further investigated in 2013 by two hand-excavated trenches located adjacent to the confluence of the Hindwell Brook and the Summergil Brook (Fig. 14, 2013a and 2013b). The excavation initially focused on a single trench (2013a) positioned on a prominent rise between 1.5m and 2m above the level of the river which had been interpreted as a remnant land surface surviving between earlier river channels that had been cut by a canalized section of the Hindwell Brook to the east, and sloped down by around 1m to a possible palaeochannel to the west. At this point the palisade trench was around 2.3m wide, with the irregular edges giving the impression of a series of intercutting post-pits, similar to those observed during previous excavations. A second trench (2013b) was excavated further to the west to investigate the potential line of the inner palisade beyond a track leading from a ford across the Summergil Brook. Here, the palisade trench was some 2.5m in width, within which two potential post-pipes were visible, although these were not investigated further and remain unconfirmed. The palisade trench narrowed at the western end of the excavation, although this is likely to reflect truncation of the upper levels by a trackway which fords the Summergil Brook at this point.

Although the excavations have demonstrated that the inner circuit of the palisade extends to the south-west of the canalized Hindwell Brook the southern side of the enclosure as a whole is still a matter for conjecture. The inner circuit runs parallel to the Summergil Brook and the angle at which the western side approaches the watercourse suggests that either there was an abrupt change in direction, or the brook was incorporated into the layout, although a further possibility may be that the modern line of the brook follows a line of soft ground formed by the palisade trench. The relationship of the outer circuit with the brook is less certain and given the likely movement of the brook over the last three millennia it is possible the southern side of the circuit has been lost.

The excavations have demonstrated that the construction technique for the double palisade was markedly different from that employed at the Walton and Hindwell palisaded enclosures, both of which utilised substantial post ramps to position individual timbers. Instead, the steep-sided palisade trenches would have held close-set posts, similar to those at West Kennet where it has been suggested that rollers were used to extend the end of the posts over the trench before they were upended and held in place with packing material before the trench was backfilled (Whittle 1997, fig. 82).

PREHISTORIC POTTERY
By Alex Gibson

The 2015 excavations on the south side of the Hindwell Palisaded Enclosure produced 25 sherds of pottery, while a single sherd of Grooved Ware was recovered from the inner circuit of the Hindwell Double Palisaded Enclosure in 2012 (Jones 2012b). The sherds were unpacked and laid out in good natural light and examined macroscopically with the aid of a ×10 hand lens. No microscopic analysis of fabrics has been undertaken and consequently fabric groups are liable to refinement should this be undertaken subsequently. Similarly, no chemical analyses have been undertaken though some carbonaceous residues were noted. The sherds were arranged into sherd groups by fabric, finish and thickness thus estimating a minimum number of individual vessels.

The allocation to various ceramic traditions based on fabric alone can be unreliable and subjective, therefore the identifications made here must be so regarded. For example, the use of grog inclusions to open fabrics is found throughout later prehistory and in Neolithic and Bronze Age contexts is found in the Fengate style of Impressed Ware, Grooved Ware, Beaker and Collared Urn. This provides a potential range of some two millennia (*c.* 3500–1500 BC). Similarly, the flat base thought largely to originate in Late Neolithic ceramics (Grooved Ware) can now be seen to be increasingly present in the Impressed Ware assemblages of the Middle Neolithic as well as in ceramics from the Bronze Age onwards. The lack of decorated sherds and/or sherds with distinctive formal characteristics within the present assemblage makes certain identification difficult.

Only two fabrics could be identified, both containing finely crushed grog (pre-fired pottery): A – Soft, 'soapy' textured fabric with abundant grog inclusions; B – Grog and quartz sand giving the fabric a slightly grittier feel than fabric A. Some fired clay, without apparent opening agents, was also present.

Sherd Groups (hereafter SG) 1–3 can be positively identified as Grooved Ware. The vertical cordon on SG1, from the double-palisaded enclosure, draws immediate parallel with the Grooved Ware assemblage from nearby Upper Ninepence (Gibson 1999a, fig. 53). As at Upper Ninepence, the cordon on SG1 appears to have been applied. The inturned rim forms of SG2 and 3 can also be paralleled in Grooved Ware assemblages amongst closed vessels and cups, not least in the large assemblage from Durrington Walls (Wainwright and Longworth 1971). The incised diagonal line on SG2 may reinforce the Grooved Ware identification and such light incision is also found at Upper Ninepence. However, incision is a commonly used technique and not restricted to Grooved Ware.

SG4 is undecorated and has a distinctive and clearly defined cross-section colouration. The fabric is also hard and well-fired and whilst superficially resembling undecorated Beaker, it must nevertheless be admitted that hard, well-fired fabrics are also found within Grooved Ware assemblages both in Britain (Upper Ninepence) and amongst the small tub-shaped vessels from Ireland such as those from Newgrange and Knowth (Brindley 1999) which are also largely undecorated below the rim. Beaker has, so far, not been found in the Walton Basin though the round barrows within the area and barbed and tanged arrowheads and thumb nail scrapers from some of the flint scatters suggest that the absence of Beaker may be more apparent than real.

SG5 comprises what appears to be a single carinated sherd in a similarly grog-filled fabric. The concave profile of the vessel walls above and below this carination and the thickness of the fabric are suggestive of the shoulder from a small tripartite Collared Urn which might suggest an early Bronze Age element but again this is based on very little evidence and it may represent a low raised cordon. It does not appear to come from an uneven base angle.

SG6 represents a fragment from a small flat-based cup. Cups, of course, are found in many assemblages from Carinated Bowl at the start of the Neolithic to later Iron Age assemblages and indeed rims from apparently small diameter vessels were also encountered in the Grooved Ware assemblage from Upper Ninepence (Gibson 1999a). Small cups, albeit highly decorated, are integral to the Woodlands Style of Grooved Ware in southern England (Stone 1949). The undecorated nature of the present vessel therefore makes dating difficult and speculative.

Also known as Pigmy Cups and Accessory Vessels, cups are commonly found in Bronze Age contexts and Welsh cups have recently been discussed by the present writer (in Schlee 2013). These small cups, usually funerary in context, are frequently found with cremations though current research in England is suggesting that this is not necessarily the norm. These cups are normally decorated, sometimes highly, though undecorated or sparsely decorated examples are also encountered (Savory 1980; Gibson 1993). A sparsely decorated cup from Carneddau, Powys, seems to share the same simple and open form as the present example (Gibson 1993). The few radiocarbon dates for these funerary cups in Wales suggests a range from 2000–1500 cal. BC which appears slightly earlier than the range for Northern Britain.

SG7–12 seem to belong to similar vessels and the soft fabric can be matched to some of the Grooved Ware from nearby Upper Ninepence. Flat bases noted amongst these sherds might belong to either the Grooved Ware or Earlier Bronze Age Collared Urn traditions and therefore cannot be regarded as chronologically diagnostic. A low raised cordon on SG8 may again indicate Grooved Ware affinity.

Discussion of the prehistoric pottery

This assemblage highlights the problems encountered in Neolithic and Bronze Age assemblages when dealing with small sherd material lacking in diagnostic formal or decorative traits. The majority of the assemblage could easily be assigned to vessels in various Neolithic or Bronze Age traditions, particularly Collared Urn and Funerary Cup. The presence of diagnostic Grooved Ware sherds (SG1–3), however, provides the clue with which to interpret the rest of the material and there is nothing within the assemblage from a fabric point of view that is out of place within a Grooved Ware environment, though the lack of decorated sherds is perhaps worthy of comment: Grooved Ware is generally (though not universally) highly and diagnostically decorated.

The carinated sherd (SG5) is not immediately indicative of a Grooved Ware formal trait and may represent intrusive Early Bronze Age material as may the cup (SG6); however, it is possible that the ‘carination’ in fact represents a pinched or raised cordon similar to that noted on SG8. Also, as stated above, cups are not unknown in Grooved Ware assemblages.

In short, the assemblage is best compared to the larger and more decorated assemblage associated with pre-barrow activity at Upper Ninepence (Gibson 1999a) and, when considered with the Upper Ninepence radiocarbon dates and those from the outer carbonised rings of the posts from the Hindwell enclosure (Gibson 1999a), it suggests that both the pit from which the pottery was recovered and the palisaded enclosure itself fall within the currency of Grooved Ware in the Later Neolithic.

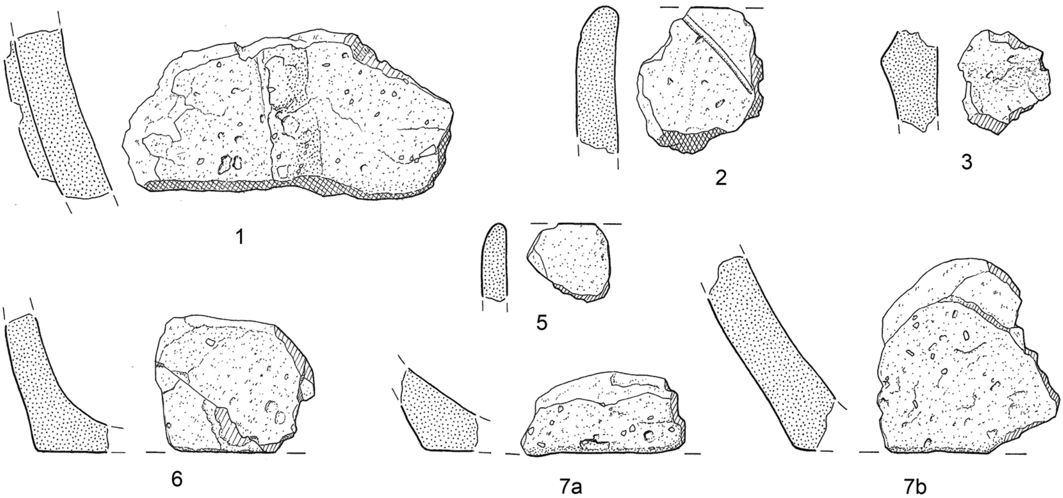

Fig. 18. Neolithic pottery from the palisaded enclosures: 1 – Hindwell Double Palisaded Enclosure; 2–7 – Hindwell Palisaded Enclosure 2015. Scale 1:2.

Hindwell Double Palisaded Enclosure

1. Fabric B, single sherd, 58g. Grey, slightly voided fabric with dark grey/black core. Fabric averages 8–12mm thick and contains abundant finely crushed grog and quartz sand inclusions. There appear to be some charcoal flecks in the temper mix. The vessel has a single near-vertical external cordon that appears to have been applied and may have been dot or fingertip impressed. There is a band of carbonaceous residue on the inner surface. Find 1022, context 111, weathering cone.

Hindwell Palisaded Enclosure

The sherds were derived from four contexts: 12, the upper fill of pit 13; 17, the upper fill of the palisaded enclosure; 21, the fill of pit 10; and 22, a lower fill of pit 10.

2. A rim sherd and body sherd (17g) in a grey 'soapy' textured fabric (Fabric A), with pink, finely crushed grog inclusions and some voids. The fabric averages 10mm thick and has brown patches on the inner surface. The rim is simple and rounded and slightly inturned suggesting a closed vessel. There is a single diagonal, lightly incised line emanating from the rim on the outer surface. A deep sub-circular void on the inner surface may possibly be a seed impression. The body sherd has a brown internal surface and what may be the remains of a moulded cordon on the outer. These sherds are probably (though not certainly) from the same vessel. Finds 25 and 28, context 22.
3. A rim sherd (2g) in a grey 'soapy' textured fabric (Fabric A), with pink, finely crushed grog inclusions and some voids. The fabric averages 6mm thick. The rim is simple and rounded and slightly inturned, suggesting a small closed vessel. Despite the fabric and formal similarity to SG2, it is clear that this has come from a much smaller cup-sized vessel. Find 12, context 21.
4. Four sherds (13g) in a hard, well-fired fabric (Fabric B) with brown surfaces and a black core. The grog and quartz sand inclusions are much more sparse than in SG1. The fabric averages 5mm thick. There are finishing marks on the outer surface of 011. Although there is no diagnostic decoration, these sherds may represent the undecorated zone from a Beaker. Not illustrated. Find 9, 11 and 20, context 21.

5. A sherd (6g) in a slightly crumbly black fabric with a brown exterior (Fabric B). The quartz sand is sparse but sufficient to give the sherd a slightly gritty feel. The outer surface of the sherd is marked by a ridge above and below which the surface is concave. This suggests the shoulder of a vessel such as a tripartite Collared Urn. However, the identification must be regarded as tentative. Find 27, context 22.
6. A single sherd and several crumbs from a small cup in a soft light brown fabric with grey-black core (Fabric A). The rim is simple and slightly flattened. The cup measures 30mm high with a rim diameter of *c.* 80mm and a base diameter of *c.* 60mm. The fabric averages 8–10mm thick. The cup wall has separated from the base sherd along a coil break (this has been rejoined). The grog inclusions gibe the fabric a slightly speckled appearance but otherwise the cup is undecorated. Find 23, context 22.
7. Two sherds (50g) with orange-brown surfaces and a black/grey core (Fabric A). The fabric averages 12mm thick and both surfaces are abraded. Grog up to 7mm across breaks both surfaces and some small possible quartz inclusions may be naturally occurring in the clay. Both sherds exhibit evidence for a base angle. Both are undecorated. Find 21 (7a) and 22 (7b), context 22.
8. A single sherd (26g) in a soft light brown fabric with grey-black core. The sherd at first sight resembles a base angle but on closer inspection this appears to be a low raised cordon or pinch as the surfaces are concave on either side of the ridge. Find 26, context 22.
9. Four sherds (66g) in a soft ‘soapy’ fabric with well-crushed grog inclusions (Fabric A). The sherds average 14mm thick and are light buff/brown throughout. Wipe marks occur on the outer surface of the largest (and thickest) sherd (014) but otherwise the sherds are undecorated. Finds 7, 13 and 14, contexts 17 and 21. Not illustrated.
10. A hard, well-fired sherd (7g) with a brown outer surface, light brown inner surface and a black core (Fabric B). The grog and quartz sand inclusions are much sparser than in SG1. The fabric averages 5mm thick. The surfaces are abraded but the sherd may be related to SG4 above though the fabric has a softer feel (perhaps due to the erosion). Find 8, context 21. Not illustrated.
11. An abraded, undecorated wall sherd (12g) with a light brown outer surface, grey inner surface and core (Fabric A). Fabric averages 8mm thick. Find 10, context 21. Not illustrated.
12. Six body sherds (29g) with light brown outer surfaces, light brown to grey internal surfaces and a grey core (Fabric A). The sherds are abraded and average 10–15mm thick. All sherds contain abundant finely crushed grog inclusions. These sherds may well belong to the same or at least similar vessels. Finds 4, 5, 24, 29, 30 and 31, contexts 12, 17 and 22. Not illustrated.

WORKED FLINT

By Philippa Bradley

The following small quantities of flint were recovered from the three palisaded enclosures, none of which is illustrated.

Walton Palisaded Enclosure

A single piece of flint was recovered from the Walton Palisaded Enclosure in 2010 (the only lithic to be associated with the enclosure so far).

1. A single piece of good quality, unworked flint. Find 109, context 10, upper fill of post-pipe.

Hindwell Palisaded Enclosure

Seven pieces of flint were recovered from two features in 2015. The flint is good quality and dark brown in colour with a few cherty inclusions. All of the pieces are in a very fresh condition with limited post-depositional damage. No cortex remains on the unburnt pieces so that assessing the source is difficult. The five burnt flakes have been very heavily calcined. The two retouched pieces have both been carefully made; the serrated flake has very fine serrations along the left-hand side, which may result from use rather than formal retouch. Gloss is present along the dorsal and ventral sides indicating use on silica-rich plant materials (Moss 1983). The side scraper has been made on a flake with a hinge fracture. It has fairly shallow retouch. There is a large break in the upper portion, so the extent of the retouch along this edge is uncertain. No diagnostic pieces were recovered but technologically a Neolithic date would not be out of place. However, given the size of the assemblage this should be treated with caution. The assemblage is fairly typical of domestic flintwork comprising both burnt and used pieces, and can be paralleled locally (see for example Bradley 1999; 2011; 2012; 2014).

2. A small, burnt and broken flake, heavily calcined. Find 001, context 6, fill of gully 7.
3. A heavily burnt and broken flake. Find 002, context 8, upper fill of pit 10.
4. A finely retouched serrated flake. The left-hand side has been retouched, with traces of gloss on both the dorsal and ventral sides. Find 003, context 8, upper fill of pit 10.
5. A broken side scraper with quite shallow retouch, on a hard-hammer struck flake. Find 006, context 12, upper fill of pit 13.
6. Three heavily burnt and broken flakes. Finds 016, 017 and 018, context 21, fill of pit 10.

Hindwell Double Palisaded Enclosure

Three pieces of flint were recovered from the Hindwell Double Palisaded Enclosure, one from the outer palisade in 2011 (no. 7) and two from the inner palisade in 2012 (nos 8–9). None of this material is diagnostic but is probably prehistoric in date.

7. An irregular broken flake of grey flint with cherty inclusions. Find 1103, context 106, fill of post-pipe.
8. Burnt unworked flint, heavily calcined. Find 1069, context 106, fill of post-pipe 105.
9. Small burnt flake. Find 1070, context 113, fill of post-pipe 112.

BURNT BONE

By Louisa Gidney

Several small fragments of calcined bone were recovered from the fills of three post-pipes and one of the weathering cone during the investigation of the inner circuit of the Hindwell Double Palisaded enclosure in 2012. The only identifiable fragments were two small pieces from a sheep or goat tibia shaft, which came from the fill of the post-pipe for post 114. One fragment of bone from context 118, post 114, produced a radiocarbon date of 2620–2470 cal. BC (SUERC-43284; 95% probability; see modelling below). It has been noted during other excavations that the soil acidity in this area is such that uncalcined material rarely survives.

CHARRED PLANT REMAINS AND CHARCOAL

By Astrid E. Caseldine, Catherine J. Griffiths and Roderick J. Bale[10]

This report presents the results from the analysis of charred plant remains from the Hindwell Double Palisaded Enclosure, together with the analysis of charcoal from the same excavation and also the 2010 investigation of the Walton Palisaded Enclosure, which produced no charred plant remains.

The samples were processed using flotation, the finest mesh used to collect the flot was 250 µm while a 500µm sieve was used for the residue. A Wild M5 stereomicroscope was used to examine the plant

Table 1. Charred plant remains from the inner palisade of the Hindwell Double Palisaded Enclosure

Sample	1101	1102	1104	1105	1109	Ecological
Context	104	105	109	106	115/116/117	preferences
Sample size (litres)	10	17	3	10	12	
Corylus avellana L.(hazel) – shell frags	1	–	–	–	–	W
Rhizome frag.	1	1	–	–	–	
Charcoal	+	+	+	+	+	

Ecological preferences: W = woods, hedgerows, scrub.

+ = present

Table 2. Charcoal identifications from Walton Palisaded Enclosure (2010)

	weathering cone	post-pit							post-pipe	
Sample	100	101	102	103	104	105	106	111	108	110
Context	6	8	8	7	7	7	7	7	10*	10*
Quercus spp. (oak)	–	–	–	–	–	1	–	–	–	–
Alnus glutinosa (L.) Gaertner (alder)	1	–	–	–	–	–	–	–	–	–
Corylus avellana L. (hazel)	–	2	1	2	1	4	1	1**	1	3

* = collapse; ** sample used for AMS dating

remains, while the charcoal examined using a Leica DMR microscope with incident light source after having been fractured to produce clean sections in three dimensions to enable the wood anatomy to be examined. Charcoal was either randomly selected or all the identifiable charcoal was identified. The charcoal was identified principally to determine the wood used in the construction of the palisades, and hence to gain some information about the nature of the woodland exploited in the area, and to provide identified samples for AMS radiocarbon dating.

For the plant remains standard identification atlases and manuals (e.g. Schoch *et al.* 1988; Cappers *et al*. 2006) were consulted for identification purposes as well as a reference collection. Nomenclature and ecological information is based on Stace (1995). The sample details and results are given in Table 1. Identification of the charcoal was by reference to wood identification manuals (Schoch *et al.* 2004; Schweingruber 1978) and modern type material, while nomenclature follows Stace (1995). The identifications are given in Tables 2–4.

Table 3. Charcoal identifications from the outer palisade of Hindwell Double Palisaded Enclosure

Context Sample	104 1101	105 1102	109 1104	106 1105	107 1106	112 1107	110 1108	115/116/117 1109	117 1110	Total
Quercus spp. (oak)	–	–	–	1	–	–	–	30	30*	61
Corylus avellana L. (hazel)	10	10	10	1	4	1	3	–	–	39
Prunus spinosa L. (blackthorn)	–	–	–	–	–	1	–	–	–	1
Maloideae type (crab apple, hawthorn, rowan, whitebeam, wild service-tree)	–	–	–	1	–	–	–	–	–	1
Fraxinus excelsior L. (ash)	–	–	–	7	–	–	–	–	–	7
Total	10	10	10	10	4	2	3	30	30	109

* includes charcoal used for AMS dates

Table 4. Charcoal identifications from the inner palisade of Hindwell Double Palisaded enclosure

	Trench 2012a								Trench 2012b			
Feature	Palisade trench fill	Post-pipe 110	Post-pipe 112	Post-pipe 114					Palisade trench fill			Post-pipe
Context Sample	109 1005	111 1013	113 1007	115 1008	115 1014	115 1016	115 1017	116/115 1019	104 1001	104 1002	104 1003	106 1004
Quercus spp. (oak)	–	–	2	2	2	2	3*	–	1	2	2	3
Corylus avellana L. (hazel)	2*	1	–	–	–	–	–	2	–	–	–	–
Total	2	1	2	2	2	2	3	2	1	2	2	3

* includes charcoal used for AMS dates

Walton Palisaded Enclosure

Of the samples taken specifically for charcoal identification two failed to produce any charcoal that was identifiable. Most of the charcoal from the other samples was hazel (*Corylus avellana*) but oak (*Quercus* sp.) and alder were (*Alnus glutinosa*) recorded from two samples (Table 2).

Hindwell Double Palisaded Enclosure

Outer palisade. Very few plant remains were recovered from the samples apart from wood charcoal. Samples 1105 and 1109 from the narrow slot representing the position of closely-spaced posts, and sample 1104 from a charcoal concentration (109) between two stony layers (110 and 108) infilling the trench on the eastern side of the slot produced only wood charcoal (see Fig. 15). Sample 1101 from the upper fill (104) of the palisade trench, which produced Roman pottery and a copper alloy coin, and sample 1102 from fill 105 within the weathering cone, both produced a rhizome fragment while a hazelnut (*Corylus avellana*) shell fragment was also found in sample 1101. This sample also produced hazel charcoal (see below) and it therefore seems likely that the hazelnut shell occurred as the result of a natural fire or was collected along with wood as fuel, although it could indicate the collection of wild foodstuffs. Its presence might indicate autumn fire activity.

All the charcoal identified from a sample (1110) of a concentration (117) of charcoal on one side of the closely-spaced posts was oak (*Quercus* spp.). This supported the view that the charcoal concentrations were the remains of charred timbers forming a palisade. Further support for this was provided by another sample (1109), from a similar location but derived from a combination of material from three contexts which included charcoal concentrations (116 and 117) on either side of the posts as well as the position of the posts themselves (115). Again the charcoal identified was entirely oak. A fragment of oak from sample 1110 gave an AMS radiocarbon date of 2870–2570 cal. BC (SUERC-35386), which is in keeping with dates for the Grooved Ware phase at Upper Ninepence (Gibson 1999a). However, unlike at Hindwell, plant remains from Upper Ninepence, particularly hazelnut fragments, especially from pits, were frequent, although other remains were generally scarce (Caseldine and Barrow 1999).

In contrast to the dominance of oak in the palisade trench, charcoal from a sample (1105) from a thin layer of charcoal-rich clay silt (106), which also produced a flint flake, on the western edge of the slot produced a range of species, including ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and Maloideae type which includes *Malus sylvestris* (crab apple), *Crataegus* spp. (hawthorns) and *Sorbus* spp. (rowan, whitebeam and wild service-tree) as well as oak. Equally, charcoal from sample 1102 from the fill (105) where the slot became wider in the upper part of the trench and from sample 1101 from the upper fill (104) of the ditch, which also produced Roman pottery and a coin, was solely hazel.

A concentration of charcoal (109) between stony deposits 110 and 108 infilling the trench on the eastern side of the slot and a few fragments of identifiable charcoal recovered from one of the stony layers (110) were also hazel. Identifiable fragments of charcoal were equally scarce from clay-silt (112) and clay (107) deposits on the western side of the trench and again were of hazel, although blackthorn (*Prunus spinosa*) was identified from the clay-silt (112) layer as well.

Inner palisade. The charcoal was from samples from two excavation trenches. The charcoal from Trench 2012a was from post-pipe fills associated with posts 110, 112 and 114 and from *in situ* burning of the trench fill (109), while that from Trench 2012b was from the post-pipe of post 106 and palisade trench fill 104. The whole assemblage was dominated by oak (*Quercus* spp.) with occasional hazel (*Corylus avellana*), notably in the trench fill (109) interpreted as *in situ* burning.

Discussion of the charred plant remains and charcoal

The evidence suggests that both palisaded enclosures were constructed of oak and therefore that oak woodland was being exploited in the area, while the presence of hazel charcoal in the fill of the post ramp for the Walton Palisaded Enclosure and both palisade trenches of the double-palisade demonstrates that hazel was also a significant element of the woodland. From the outer circuit of the double-palisade there is also evidence that ash, hawthorn type and blackthorn were present in the woodland, while alder was also present in samples from the Walton palisade. In the case of the double-palisaded enclosure it is possible that the charcoal from the palisade trench deposits, other than that from the remains of posts, may reflect clearance of woodland prior to construction of the monument, or perhaps the collection of wood to make a fire to char the oak timbers to help prevent decay. There is clear evidence of the latter from the inner palisade where hazel was identified from a deposit interpreted as *in situ* burning and a date from the charcoal is almost identical to that from an inner palisade post.

The charcoal evidence from the double palisade is similar to that from Upper Ninepence during the Grooved Ware phase where the charcoal assemblage included oak, hazel, hawthorn type and blackthorn, contrasting with that from the Peterborough Phase where oak was largely absent (Johnson 1999).

RADIOCARBON DATING AND BAYESIAN MODELLING

By Seren Griffiths

The results have been calibrated using IntCal13 (Reimer *et al*. 2013), and OxCal v4.2 (Bronk Ramsey 2009). The date ranges in Table 5 have been calculated using the maximum intercept method (Stuiver and Reimer 1986), and have the endpoints rounded outward to 10 years. The probability distributions shown in the figures were obtained by the probability method (Stuiver and Reimer 1993). Bayesian modelling has been applied using OxCal v4.2, with the models defined by the OxCal command query language 2 keywords and the brackets shown in the figures (Bronk Ramsey 2009). (The outputs of the Bayesian models are quoted in italics here and elsewhere in this article.)

Samples which included oak charcoal or which were not identified, and therefore potentially an in-build 'old wood' effect were included in the model as *termini post quos*. Samples of oak charcoal that had been identified as from the outer rings of a post were included as if they did not have an offset.

Where more than three measurements are related to each other in a phase of a monument, these measurements have been related using the Boundary parameters as part of the OxCal program. The results have been modelled to reflect stratigraphic relationships between the parent contexts of the radiocarbon samples. So for example, from Hindwell Cursus southern ditch, two measurements (SUERC-24619 and -24834) are stratigraphically later than another measurement (SUERC-24618).

The measurement SUERC-34213 produced a much older date range than other results from the Hindwell Cursus and was not included in the model calculations. From Upper Ninepence occupation site, the result SWAN-24 was older than the other samples associated with Grooved Ware (see discussion below) and has been included as a *terminus post quem* in the model discussed below. From Hindwell Ash round barrow, a single much later result (CAR-1481) is not presented in the figures as it is significantly later in calibrated years (and stratigraphically post-dates) the prehistoric activity discussed here. For the Upper Ninepence occupation site, all the radiocarbon measurements have been included as related to Neolithic occupation. This Neolithic occupation included the use of Impressed and Grooved Ware pottery, and estimates for the first and last dated events associated with these different pottery styles have been produced. One of the radiocarbon measurements (SWAN-24) associated with Grooved Ware from the site is older than the other measurements produced on samples associated with this pottery style; this measurement has been

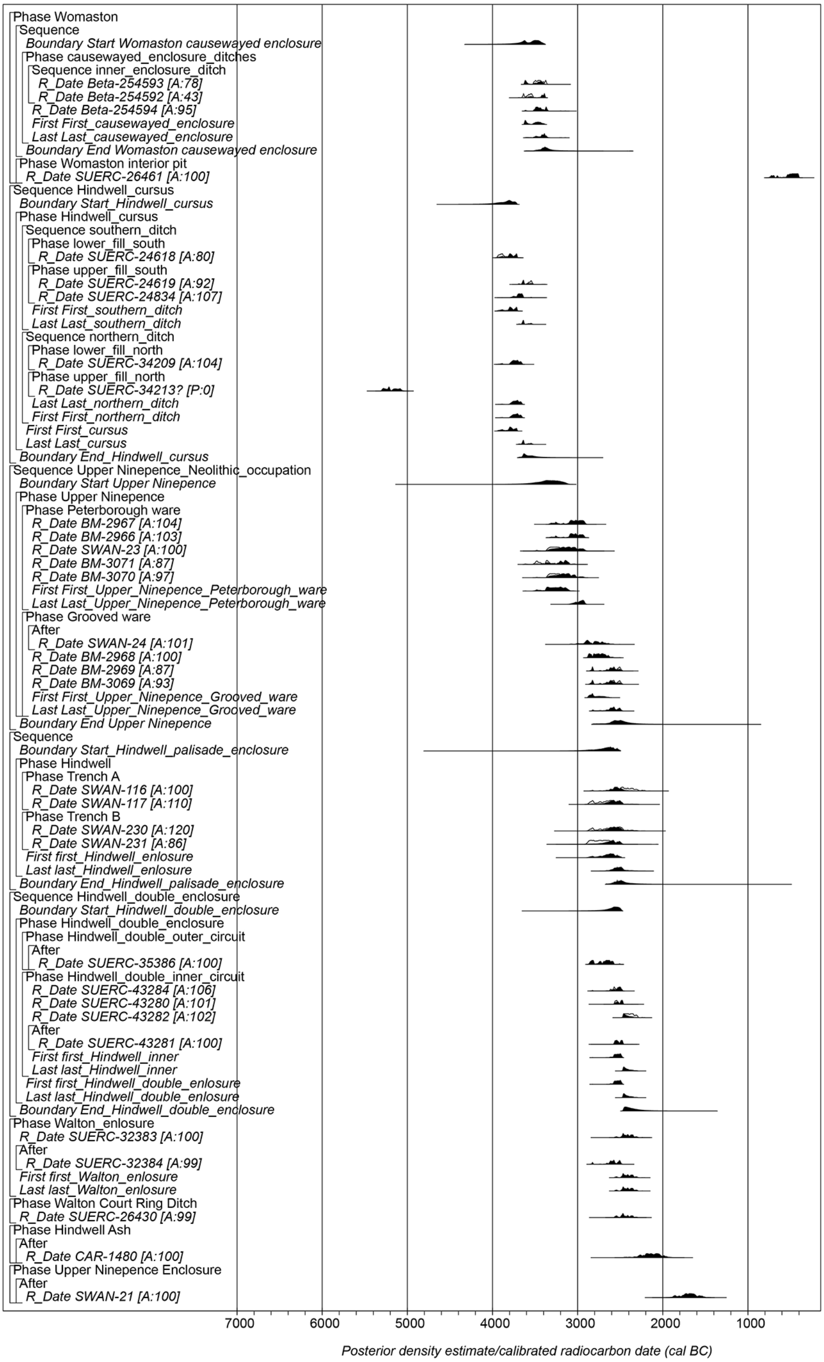

Fig. 19. Radiocarbon measurements from the Walton Basin. Sample and results details are listed in Table 5. Calibrated radiocarbon results are depicted in outline, while the dark plots are the posterior density estimates derived from the modelling presented here. The OxCal command query words and the brackets define the model employed. Modelling approaches are described in the text.

Table 5. Radiocarbon dates from the Walton Basin discussed in the text. Posterior density estimates are calculated in the model shown in Figure 19

Lab. No.	Sample No.	Material and context	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated radiocarbon date (95% confidence)	Posterior density estimate (95% probability)
Hindwell Palisaded Enclosure						
SWAN-116	–	Charred oak post, from outer rings of post 1 spit 3	3960±70	–	2860–2470 cal BC	2860–2480 cal BC
SWAN-117	–	Charred oak post, from outer rings of post 4 spit 3	4070±70	–	2840–2200 cal BC	2840–2340 cal BC
SWAN-230	–	Charred oak post, from outer rings of post 2, enclosure perimeter	4040±80	–	2880–2470 cal BC	2850–2460 cal BC
SWAN-231	–	Charred oak post, from outer rings of post 3, enclosure perimeter	4130±80	–	2880–2340 cal BC	2860–2450 cal BC
Hindwell Double Palisaded Enclosure						
SUERC-35386	1110	Charred oak post (117), outer circuit	4110±30	-29.9	2870–2570 cal BC	2870–2570 cal BC
SUERC-43284	1067	Cremated (calcined) sheep or goat bone (118), inner circuit	4035±28	-26.4	2630–2470 cal BC	2620–2470 cal BC
SUERC-43280	1005	Hazel charcoal (109), inner circuit	3983±29	-25.3	2580–2460 cal BC	2580–2460 cal BC
SUERC-43281	1017	Charred oak post (109), inner circuit	3989±29	-26.6	2580–2460 cal BC	2580–2460 cal BC
SUERC-43282	1020	Charred hazelnut shell (118), inner circuit	3895±28	-28.4	2470–2290 cal BC	2480–2300 cal BC
Walton Palisaded Enclosure						
SUERC-32383	111	Hazel charcoal, from fill of post ramp	3930±35	-24.2	2570–2290 cal BC	2560–2290 cal BC
SUERC-32384	1000	Oak charcoal, from fill of post-pit	4055±30	-26.2	2840–2480 cal BC	2840–2480 cal BC
Hindwell Cursus						
SUERC-24619	HC1007	Hazel charcoal, from upper fill of southern ditch	4815±35	-25.0	3670–3520 cal BC	3700–3520 cal BC
SUERC-24618	HC1003	Hazel charcoal, from lower fill of southern ditch	5030±30	-26.5	3950–3710 cal BC	3940–3700 cal BC
SUERC-24834	HC1004	Hazel charcoal, from upper fill of southern ditch	4900±45	–	3790–3630 cal BC	3770–3630 cal BC
SUERC-34209	HC102	Unident. charcoal, from lower fill of northern ditch	4955±40	-25.9	3910–3640 cal BC	3800–3650 cal BC
SUERC-34213	HC103	Alder charcoal, from upper fill of northern ditch. ^{14}C measurement suggests residual material, not included in models as active likelihood	6225±35	-27.9	5310–5060 cal BC	–
Upper Ninepence Enclosure						
SWAN-21	–	*Hazel, blackthorn and small diam. oak charcoal, from basal fill	3390±70	–	1890–1520 cal BC	1890–1520 cal BC
SWAN-22	–	*Ash, rowan, poplar, hawthorn and gorse charcoal from upper fill	2010±70	–	200 cal BC–cal AD 140	200 cal BC–cal AD140
Upper Ninepence Neolithic Settlement						
BM-2967	U9D 94.17	Charcoal; bulk sample of mixed short-lived wood charcoal (cf. Ambers and Bowman 1998, 427), from pit 16, containing Mortlake Ware sherds, struck flint, charred hazelnut shells, and hazel, Pomoideae and *Prunus* sp. charcoal.	4400±50	-24.8	3330–2900 cal BC	3320–2900 cal BC
BM-2966	U9D 94.21	Charcoal; bulk sample of hazel and *Populus* sp., from pit 20, containing Peterborough Ware sherds, and struck flint.	4410±35	-24.6	3330–2910 cal BC	3310–2910 cal BC
SWAN-23	U9D I	Charcoal; bulk sample of hazel, from context 66, pit 65, containing a Mortlake Ware sherd and struck flint.	4470±80	–	3360–2920 cal BC	3340–2920 cal BC
BM-3070	–	Charcoal; bulk sample of hazel, from pit 500, containing Fengate Ware sherds, charred hazelnut shells, and hazel, Pomoideae and *Prunus* sp. charcoal.	4490±60	-24.7	3370–2940 cal BC	3360–2930 cal BC
BM-3071	–	Charcoal; bulk sample of hazel, from pit 200, containing Fengate Ware sherds, charred hazelnut shells, a few charred wheat grains, oak (only one fragment), and hazel, Pomoideae and *Prunus* sp. charcoal.	4590±60	-24.2	3520–3090 cal BC	3500–3030 cal BC
SWAN-24	–	*Hazelnut shells?	4240±70	–	3030–2610 cal BC	3020–2620 cal BC
BM-2968	U9D 94.133	Charcoal; hazel and hazelnut shells, *Populus* sp., *Sorbus* sp.	4160±35	-26.0	2880–2620 cal BC	2890–2630 cal BC
BM-2969	U9D 94.155	Charcoal; oak sp., *Populus* sp., hazel charcoal.	4050±35	-23.7	2840–2470 cal BC	2860–2480 cal BC
BM-3069	–	Hazel charcoal	4060±40	-25.0	2860–2470 cal BC	2860–2480 cal BC
Womaston Causewayed Enclosure						
Beta-254592	–	Hazel charcoal, from basal fill of recut of inner ditch	4800±40	-26.2	3660–3380 cal BC	3660–3380 cal BC
Beta-254593	–	Hazel charcoal, from lower fill of inner ditch	4660±40	-25.9	3630–3360 cal BC	3530–3360 cal BC
Beta-254594	–	Hazel charcoal, from fill of feature cut into upper fill of outer ditch	4630±40	-23.9	3620–3340 cal BC	3530–3350 cal BC
SUERC-26461	WCE1018	Hazel charcoal, from fill of pit within interior	2410±35	-26.0	750–390 cal BC	750–390 cal BC
Walton Court Ring Ditch						
SUERC-26430	WC111	Hazel charcoal, from secondary ditch fill	3945±35	-26.9	2570–2300 cal BC	2570–2300 cal BC
Hindwell Ash Barrow						
CAR-1480	–	*Oak charcoal from posthole below mound	3730±70	–	2400–1930 cal BC	2400–1930 cal BC
CAR-1481	–	Hazel, ash and oak charcoal. Not included in model as too late for period of interest. Hearth over turf mound.	1970±60	–	170 cal BC–cal AD 210	–

* = Included as *terminus post quem*

Table 6. Selected parameters from the model shown in Figure 19

Parameter name	Posterior density estimate (95% probability)
Start Womaston causewayed enclosure	4180–3380 cal BC
End Womaston causewayed enclosure	3520–2740 cal BC
*Start_Hindwell_cursus*4	250–3700 cal BC
First_southern_ditch	3940–3700 cal BC
Last_southern_ditch	3700–3520 cal BC
Last_northern_ditch	3800–3650 cal BC
First_northern_ditch	3800–3650 cal BC
First_cursus	3940–3700 cal BC
Last_cursus	3700–3520 cal BC
End_Hindwell_cursus	3700–3170 cal BC
Start Upper Ninepence	3720–3100 cal BC
First_Upper_Ninepence_Peterborough_ware	3500–3090 cal BC
Last_Upper_Ninepence_Peterborough_ware	3090–2900 cal BC
First_Upper_Ninepence_Grooved_ware	2890–2640 cal BC
Last_Upper_Ninepence_Grooved_ware	2840–2470 cal BC
End Upper Ninepence	2830–2180 cal BC
Start_Hindwell_palisade_enclosure	3140–2490 cal BC
first_Hindwell_enlosure	2870–2500 cal BC
last_Hindwell_enlosure	2660–2340 cal BC
End_Hindwell_palisade_enclosure	2680–2030 cal BC
Start_Hindwell_double_enclosure	3080–2470 cal BC
first_Hindwell_inner	2620–2470 cal BC
last_Hindwell_inner	2480–2300 cal BC
first_Hindwell_double_enlosure	2620–2470 cal BC
last_Hindwell_double_enlosure	2480–2300 cal BC
End_Hindwell_double_enclosure	2480–1860 cal BC
first_Walton_enlosure	2560–2290 cal BC
last_Walton_enlosure	2560–2290 cal BC

Table 7. Selected parameters from the model shown in Figures 20–21

OxCal CQL2 keyword and parameter name	Posterior density estimate (95% probability)
Boundary Start_Hindwell_double_enclosure	3030–2470 cal BC
First first_Hindwell_inner	2620–2470 cal BC
Last last_Hindwell_inner	2490–2310 cal BC
First first_Hindwell_double_enlosure	2620–2470 cal BC
Last last_Hindwell_double_enlosure	2490–2310 cal BC
Boundary End_Hindwell_double_enclosure	2490–1920 cal BC
Boundary Start_West_Kennet	2790–2380 cal BC
Boundary End_West_Kennet	2080–1650 cal BC
Boundary Start_Hindwell_palisade_enclosure	3130–2490 cal BC
First first_Hindwell_enlosure	2870–2500 cal BC
Last last_Hindwell_enlosure	2690–2330 cal BC
Boundary End_Hindwell_palisade_enclosure	2730–2040 cal BC
First first_Walton_enlosure	2560–2290 cal BC
Last last_Walton_enlosure	2560–2290 cal BC
Boundary Start_Marne_Barracks	2680–2460 cal BC
First first_Marne_inner	2600–2450 cal BC
Last last_Marne_inner	2280–2060 cal BC
First first_Marne_outer	2490–2340 cal BC
Last last_Marne_outer	2320–2140 cal BC
Boundary End_Marne_Barracks	2210–1970 cal BC
Last Last_Meldon_Bridge	2300–1930 cal BC
First First_Mount_Pleasant	2580–2300 cal BC
Last Last_Mount_Pleasant	2210–1780 cal BC
Boundary Start_Forteviot	3050–2660 cal BC
Boundary End_Forteviot	2590–2290 cal BC
Boundary Start_Dunragit	3080–2570 cal BC
Boundary End_Dunragit	2630–2190 cal BC
First First_Greyhound_Yard	2880–2500 cal BC
Last Last_Greyhound_Yard	2830–2290 cal BC

included as a *terminus post quem* in the model to reflect its potential residual status.

Radiocarbon results for sites with multiple measurements

Womaston Causewayed Enclosure

Three results were produced from Womaston Causewayed Enclosure. Of these, two from a lower fill in the inner enclosure ditch (Beta-254593 and -254592) are stratigraphically earlier than Beta-254594. An estimate for the first dated event associated with this enclosure is *3640–3390 cal. BC* (*95% probability*; *First_causewayed_enclosure*; Fig. 19). An estimate for the last dated use of this structure is *3610–3340 cal. BC* (*95% probability Last_causewayed_enclosure*; Fig. 19).

Hindwell Cursus

Three results exist from deposits from Hindwell Cursus, the first of these (SUERC-24618) is stratigraphically earlier than the parent deposits from two other results (SUERC-24619 and 24834), from an upper fill in the south ditch. An estimate for the first dated event associated with the use of this cursus ditch is *3940–3700 cal. BC* (*95% probability*; *First_southern_ditch*; Fig. 19). An estimate for the last dated event associated with the use of this ditch is *3700–3520 cal. BC* (*95% probability*; *Last_southern_ditch*; Fig. 19).

Upper Ninepence Neolithic occupation site

From the Upper Ninepence Neolithic assemblage, an estimate for the start of Neolithic activity places this in *3720–3100 cal. BC* (*95% probability*; *Start Upper Ninepence*; Fig. 19). The end of Neolithic occupation associated with this site occurred in *2830–2190 cal. BC* (*95% probability*; *End Upper Ninepence*; Fig. 19). The first dated event associated with the use of Peterborough Ware is dated to *3500–3090 cal. BC* (*95% probability*; *First_Upper_Ninepence_Peterborough_ware*; Fig. 19), while the first dated event associated with the use of Grooved Ware is estimated to have occurred in *2890–2640 cal. BC* (*95% probability*; *First_Upper_Ninepence_Grooved_ware*; Fig. 19).

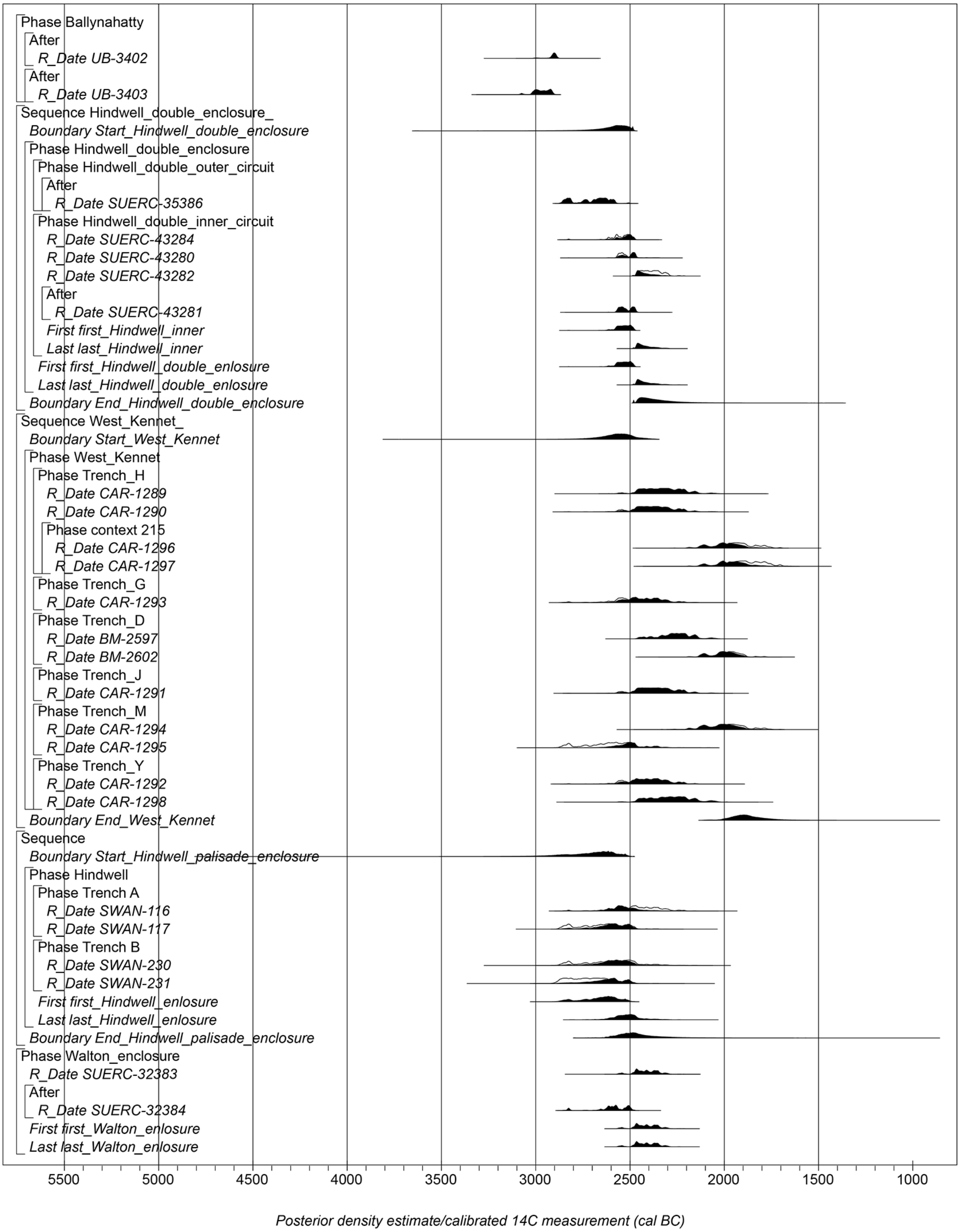

Fig. 20. Radiocarbon dates from comparable Neolithic palisaded enclosures. Calibrated radiocarbon results are depicted in outline, while the dark plots are the posterior density estimates derived from the modelling presented here. The OxCal command query words and the brackets define the model employed. Modelling approaches are described in the text. (See also Fig. 21.)

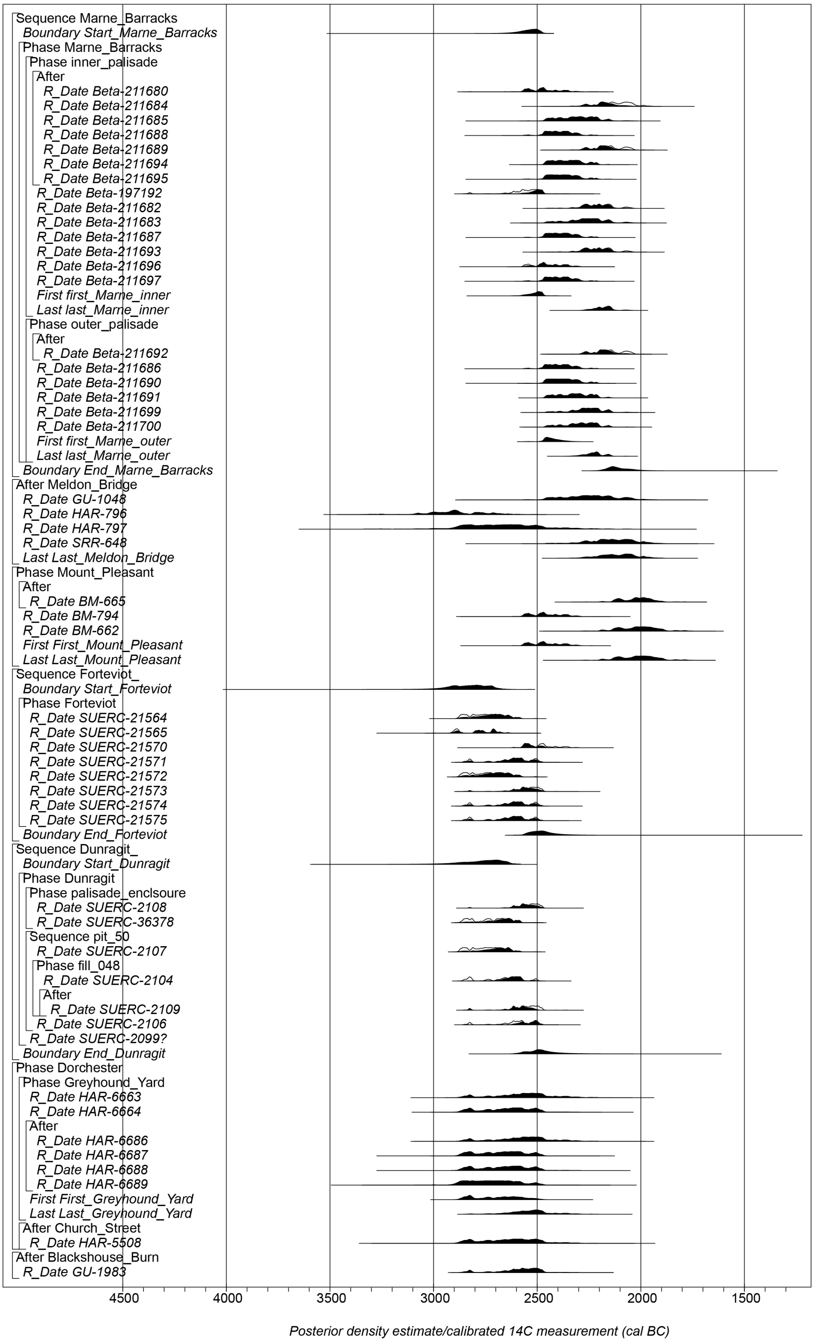

Fig. 21. Radiocarbon dates from comparable Neolithic palisaded enclosures. Calibrated radiocarbon results are depicted in outline, while the dark plots are the posterior density estimates derived from the modelling presented here. The OxCal command query words and the brackets define the model employed. Modelling approaches are described in the text. (See also Fig. 20.)

Hindwell Palisaded Enclosure

Four radiocarbon dates on the outer rings of oak posts from Hindwell Palisaded Enclosure estimate the use of this structure. The first dated event associated with these timbers is estimated to have occurred in *2870–2480 cal. BC* (*95% probability*; *first_Hindwell_enclosure*; Fig. 19), and the last dated event associated occurred in in *2670–2350 cal. BC* (*95% probability*; *last_Hindwell_enclosure*; Fig. 19).

Hindwell Double Palisaded Enclosure

From Hindwell Double Palisaded Enclosure, radiocarbon measurements on demonstrably shortlife sample only exist from the inner circuit. An estimate for the first dated event associated with these features places this activity in *2620–2470 cal. BC* (*95% probability*; *first_Hindwell_double_enclosure*; Fig. 19), and the last dated event associated with this circuit as occurring in *2480–2310 cal. BC* (*95% probability*; *last_Hindwell_double_enclosure*; Fig. 19).

Walton Enclosure

The single short-lived sample from Walton Enclosure suggests activity associated with this monument in *2560–2290 cal. BC* (*95% probability*; *SUERC-32383*; Fig. 19).

Context of the Walton Basin monuments

Radiocarbon results from comparable monuments to the Walton Basin palisaded enclosures elsewhere in the British Isles were collected and analysed. Modelling took place applying a consistent approach as outlined above, with measurements presented as *termini post quos* where they were produced on unidentified samples or samples with potential age offsets. Stratigraphic sequences or phases were reflected in the OxCal keyword commands, and Boundary parameters were used to constrained statistical scatter in cases where there were more than three results. The output from this modelling is presented in Figures 20–21. Modelling of the three palisaded enclosure types discussed below are presented in Figures 26–27.

DISCUSSION

By Alex M. Gibson

Morphology

Four types of palisade enclosure can be attributed to the British Later Neolithic and three of the four types have been found in the Walton Basin. They comprise enclosures formed by well-spaced posts (Type 1 – Meldon Bridge Type), enclosures formed by close-spaced but still individual posts (Type 2 – Hindwell Type) and enclosures formed by contiguous palisades (Type 3 – Mount Pleasant Type) (see Fig. 22 for sites in Wales, England and Ireland, Fig. 23 for sites in Scotland and Fig. 24 for overall distribution). These three types have parallels elsewhere in Britain and Ireland and will be discussed below but the fourth, comprising radially arranged spaced post pairs is so far unique to Catterick, North Yorkshire and is clearly later, dating to the Chalcolithic or Beaker period (Hale *et al.* 2009). These monumental palisaded enclosures are so far rare in Britain and to date only 15 (including Catterick) are certainly known, with the possible addition of the curving alignment of pits at Kinloch, Fife (Gibson 2002; Noble and Brophy 2011). Their identification and discovery may be hampered by their size: they all survive as cropmarks and rarely do they occur in a single field so that they are not just subject to the usual constraints of aerial photography but also to different crop regimes over different parts of the perimeter at any one time. As has been stated above, the Hindwell enclosure was discovered over a number of years including the re-analysis of archive photographs. Of the 15 sites that have been discovered (Figs 22–23) excavations have been undertaken at

Meldon Bridge, Peeblesshire (Speak and Burgess 1999), Forteviot, Perthshire (Noble and Brophy 2011), Hindwell, Hindwell Double and Walton (Gibson 1999; Britnell and Jones 2012 and this report), Dunragit, Dumfries (Thomas 2004; 2015), Greyhound Yard and Mount Pleasant, both, Dorset (Woodward *et al.* 1993: Wainwright 1979), West Kennet, Wiltshire (Whittle 1997) and Blackshouse Burn, Lanarkshire (Lelong and Pollard 1998). Palisaded enclosures have been summarised by the present writer (Gibson 1998a; 2002; 2014) and the Scottish evidence has been described by Noble and Brophy (2011). The possible site at Nether Exe, Devon (Griffith 2001; Gibson 2002) has been shown to have been a ditched enclosure probably dating to the Bronze Age (Bayer 2011).

The Type 1 enclosures all appear to be associated with external timber avenues. A case has been made above for the Walton avenue representing a separate monument being apparently closed by a pair of posts at the western end. Furthermore, the eastern end does not seem to join the enclosure precisely. It is possible, however, that the western postholes represent some kind of gate structure and, if a posthole is missing from the eastern end of the southern line of posts then the avenue would join the palisade far more neatly. This must be regarded as a distinct possibility given the nature of cropmark evidence. The avenues at Meldon Bridge and Dunragit (Fig. 23) are more or less perpendicular to the enclosure whilst those at Ballynahatty, Forteviot and Leadketty are, like Walton, more angled. Where the avenues have been excavated (Meldon Bridge, Forteviot and Dunragit) they have proved integral to the enclosures and they do seem to be consistent features. The Dunragit entrance avenue is also slightly bowed like the Walton example. Arguing against the association of the avenue and palisade at Walton is the different dimensions of the postholes. Those of the avenue appear slighter than the main perimeter posts whereas at the other excavated sites the avenue and perimeter posts were of a comparable size. This question must remain unresolved until excavation can shed further light on the relationship, however, analogy strongly suggests the association of the avenue and perimeter. The Dunragit avenue was also focused on the large mound at Droghduil (Thomas 2015) and with this in mind it is worth mentioning Knapp Mount, the large tree-covered mound next to Knapp Farm (Fig. 1). Although the Walton avenue does not sight on this mound, nevertheless the two are intervisible and the prehistoric origins of Knapp Mount may be supported by the first element of its name (ultimately derived from Old English *cnæpp* 'hill-top' rather than the castle names given to many local mottes) and its lack of association with ridge and furrow agriculture. The mound has not been excavated and remains undated but is nevertheless worthy of consideration in a Neolithic context.

Entrances are difficult to detect at the other enclosure types since few are known in their entirety. A gap some 4m wide and marked by substantial postholes was located in the western end of the Hindwell enclosure but it is uncertain as to whether this was the only entrance given breaks in the cropmark evidence and the fact that so much of the northern arc would appear to underlie the modern road. There are two entrances at Mount Pleasant, one in the north and the other in the east, that are also flanked by considerable posts. These two sites suggest rather narrow entrances when compared to the overall size of the enclosures and it has been suggested elsewhere that, taken with the 'gunsight' avenues of the Type 1 sites, this may have been not just to control physical access, but also visual access into the interior (Gibson 2002).

Few palisaded sites can be proved with certainty to be complete enclosures. Only Mount Pleasant is known in its entirety as are the two inner rings at the palisaded enclosure at Dunragit. The double circuit at Ballynahatty appears more or less complete. Gaps in the circuits of West Kennet 1 may be due to modern land usage but it is interesting that no trace of the enclosure was found in Trench U north of the river Kennet and to the west of Gunsight Lane though this could have been due to an unexpected change in direction of the line of the palisade or as a result of modern disturbance (Whittle 1997, 70). Both West Kennet 1 and 2 are reconstructed as complete circuits in the report (ibid. fig. 87) but this is by no means certain and in this regard, the association of many of these sites with water courses is interesting.

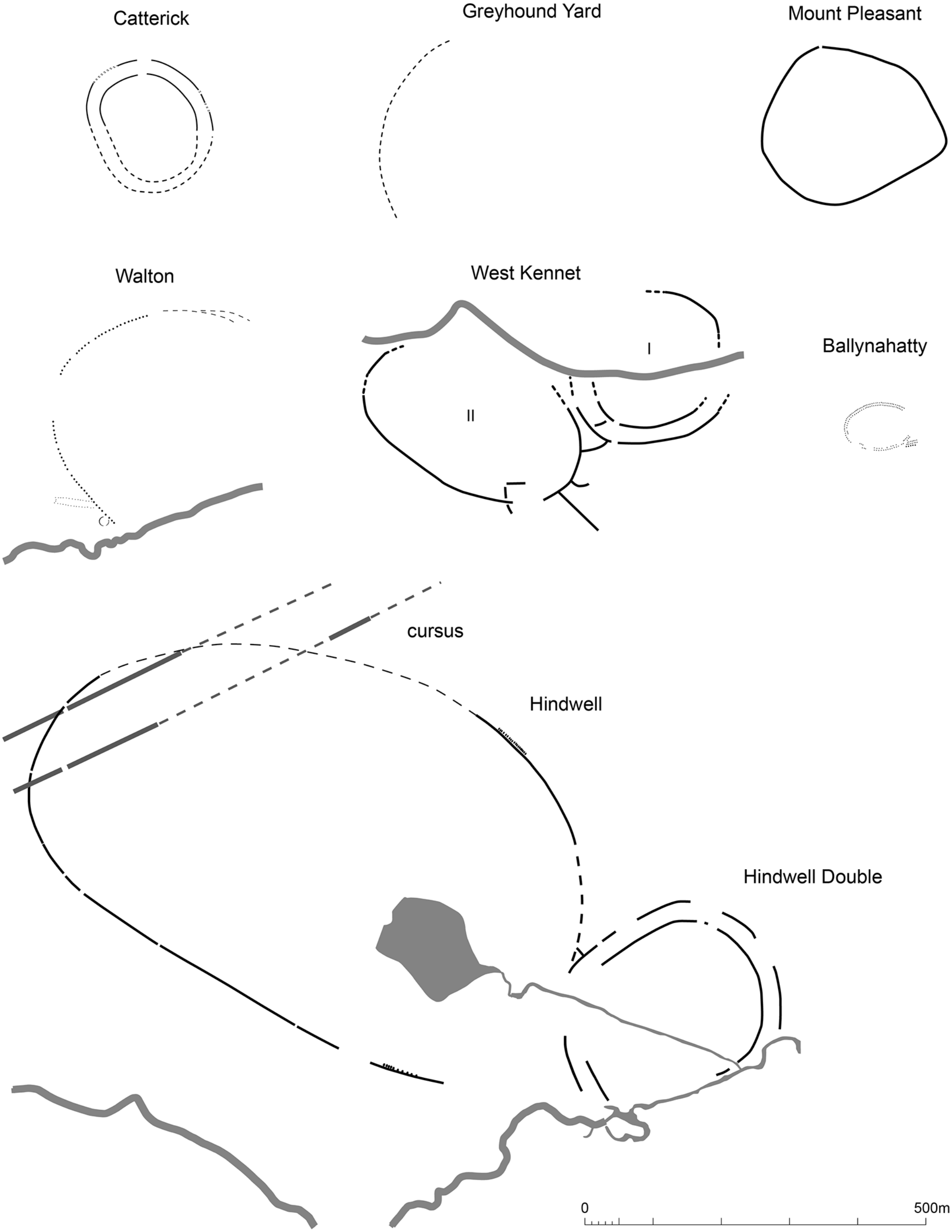

Fig. 22. The palisaded enclosures of England, Wales and Ireland.

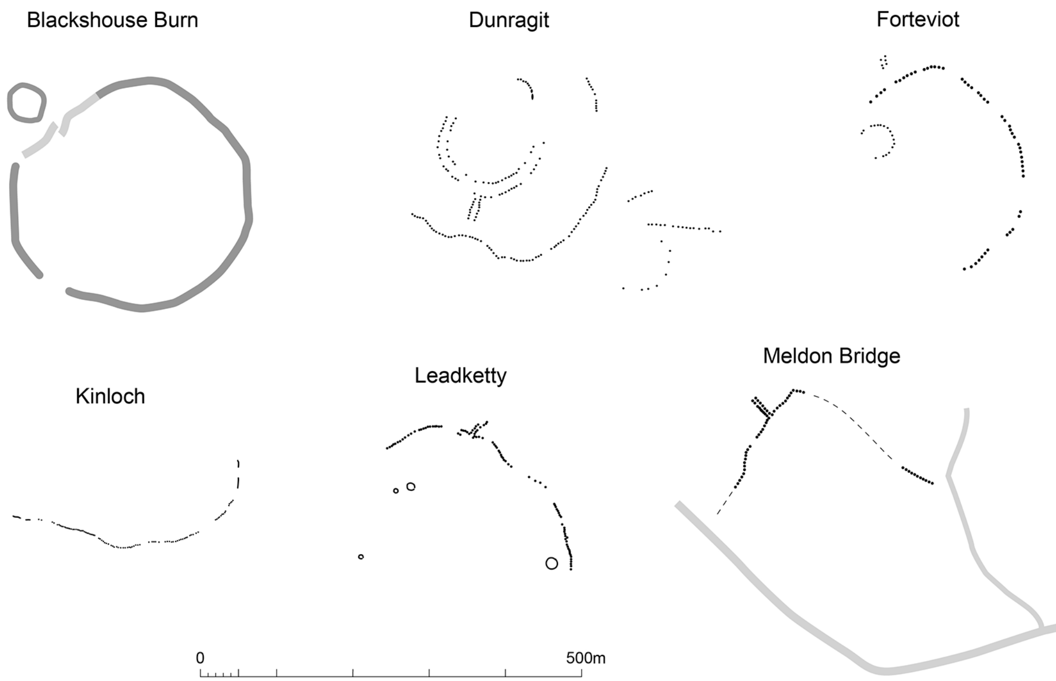

Fig. 23. The palisaded enclosures of Scotland.

It has been mentioned above that Walton lies between the Summergil and Riddings brooks (Fig. 2). The southern end of the palisade coincides with the current channel of the Riddings Brook whilst the northern arc turns eastwards before the Summergil Brook is reached. Geophysical survey (including powerful caesium magnetometry) could detect no unequivocal traces of the palisade to the east of the road and its continuation remains uncertain, although it must remain a distinct possibility that the palisade incorporated the brook as part of its circuit, as appears to be the case at Forteviot and Leadketty. The topographical location of the Walton enclosure, on the interfluve between the two brooks, is also in some ways similar to that of Meldon Bridge, where the enclosure very clearly cuts off the promontory formed by the confluence of the Lyne Water and the Meldon Burn. It was exactly this topographical situation, similar in many respects to an Iron Age promontory fort, that first influenced Burgess to regard the enclosure as defensive (Burgess 1976). As has been discussed elsewhere, however, the outward-facing entrance avenue and absence of internal domestic activity make a defensive function unlikely (Gibson 2002). Today, there is a long promontory some 3 kilometres long between the curve of the Walton Palisade and the confluence of the Riddings and Summergil brooks but, as stated above, it must be considered that the channels of these brooks may have changed considerably in the last 5000 years as may be suggested by the flatness of the contours in this area and the promontory may not have been so long in the Neolithic.

Whilst not in confluence situations, Forteviot and Leadketty also have riverine connections. The gap in the western perimeter at Forteviot coincides with the deep gorge of the Water of May which flows north to enter the Earn. The missing southern perimeter at Leadketty similarly coincides with the slope down to the Dunning Burn before it too turns northwards to meet the Earn. It may be that river erosion has removed traces of the ‘missing’ circuits at Meldon Bridge, Leadketty and Forteviot but this is not really important in this context: it is the proximity of the watercourses that is worthy of note and the confluence

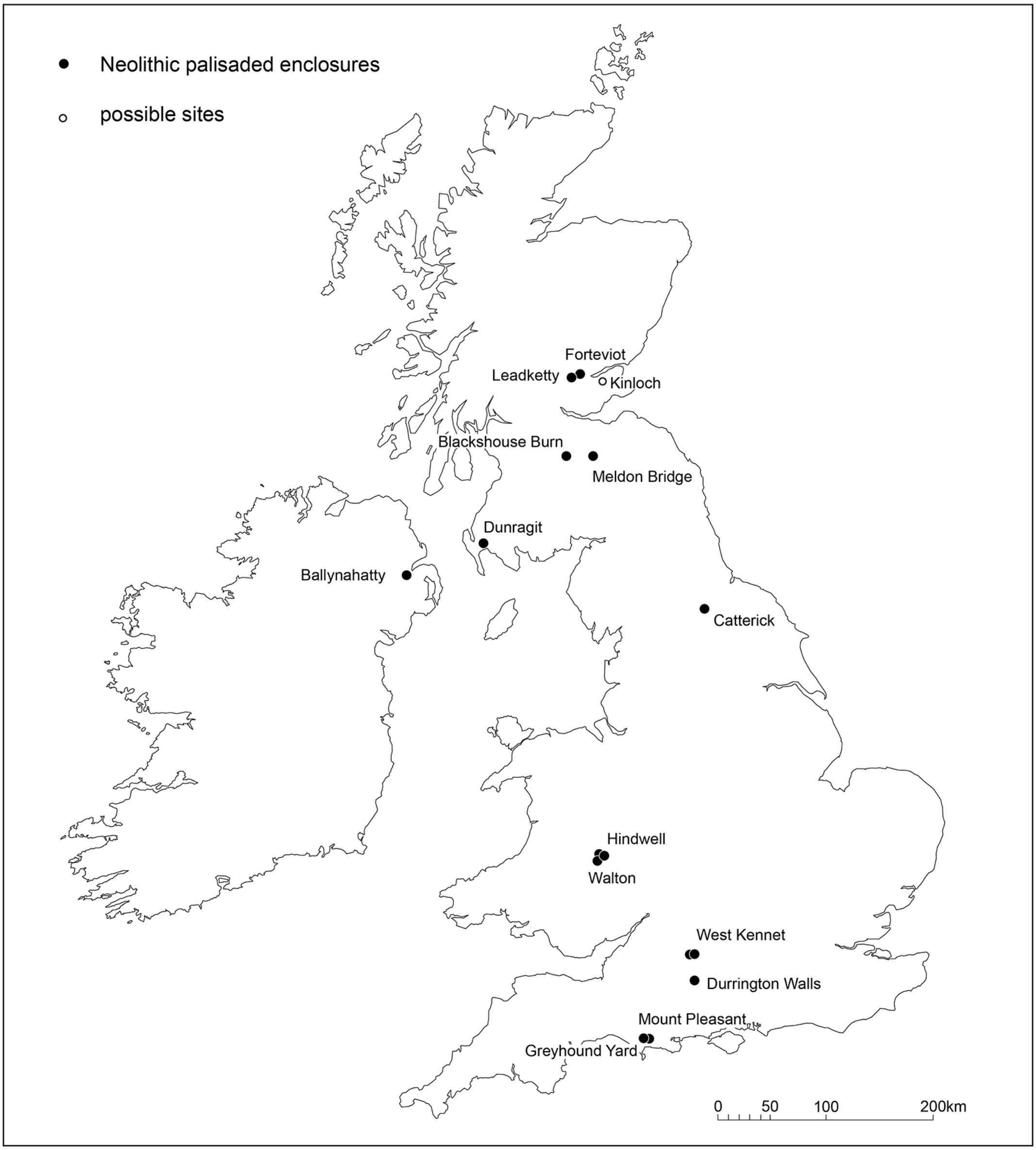

Fig. 24. Distribution of palisaded enclosures in the British Isles.

location of Meldon Bridge and Walton. Dunragit too is situated to the north of an area of marshy ground separating the enclosure from a large mound at Droughduil and this marsh way well have been integral to the siting of the enclosure. It has already been mentioned above that the Hindwell enclosures lie at the point in the basin where gravels meet impermeable clays resulting in a number of springs, not least that feeding Hindwell Pool. This may be another strand of evidence suggesting that the presence of water was another factor influencing the position of these sites.

Despite intensive survey, the Hindwell enclosure also seems to be incomplete. Parts may be masked by the Hindwell Roman fort that overlies the projected eastern circuit. On the 1998 magnetometer survey (Gibson 1999b, figs 23 and 24) the north-eastern arc can be clearly seen as a positive anomaly underlying the Roman access road leading to and from the northern gate of the fort but no indisputable traces are visible below the fort itself which is puzzling given that the ditches of Hindwell Double are clearly visible as positive anomalies running under the south-eastern quadrant. There are, however, slight hints of a positive anomaly entering the north-eastern quadrant of the fort some 50m west from the north-east corner which may be traced for some 15m into the fort interior but is then lost amongst a number of very strong positive anomalies probably relating to the Roman occupation (Fig. 25, A). The south-east arc of the enclosure appears to have stopped at a former palaeochannel, perhaps an earlier course of either the Summergil Brook or Hindwell Brook (Fig. 9). It is possible that two streams emanated from the spring below what is now the Hindwell Pool, one following the route of the Hindwell Brook, the other flowing south to join the Summergil Brook in which case these two streams (or the palaeochannels at least) may have been integral to the design and layout of the enclosure as suggested for Walton and clearly demonstrated at Meldon Bridge.

Hindwell Double is currently bisected by the modern course of the Hindwell Brook (Fig. 14) which is now, in part, canalised. The southern arcs of both circuits seem once again to have coincided with the course of the Summergil Brook. The inner circuit has been shown to run parallel with the course of the stream for at least a short distance, but no traces of the outer circuit have been found in this area. It may be, as at Forteviot and Leadketty, that the steam has eroded the original palisade trench or that the stream actually formed an integral part of the circuit.

The relationship of the two enclosures at Hindwell must remain unresolved. Hindwell Double is interesting in that the two palisade trenches had very different profiles suggesting different construction methods. The inner circuit, excavated in a series of intersecting pits, suggests a construction method similar to the larger enclosure though the post ramps as such seem absent and the posts appear to have been contiguous. The very similar radiocarbon dates for the two palisades shed no further light on the sequence.

The juxtaposition of Hindwell and Hindwell Double strongly resembles West Kennet 1 and 2, the former an irregularly double circuit to the east and the latter a single oval to the west. West Kennet 1 is also of almost identical size to Hindwell Double though, at only 6 hectares in area, West Kennet 2 is much smaller than Hindwell. Like Hindwell Double, West Kennet 1 is bisected by the modern route of a stream, in this case the river Kennet, and although the river may have moved slightly, there is no reason to doubt that this was also the case in the Neolithic otherwise either one of the northern or southern palisades would have been lost to erosion. The northern arc of West Kennet 2 is missing and once again may have been formed (or have been eroded) by the west–east flowing river.

The two West Kennet enclosures do not intersect but instead are connected by an arc of ditch termed Outer Radial Ditch 2 and interpreted as a possible palisade (Whittle 1997). With this in mind, a positive geophysical anomaly can be seen emanating from the western arc of Hindwell Double (Fig. 25, B) where it underlies the Roman fort (Gibson 1999b, fig. 24). This anomaly has exactly the same character as the Hindwell Double ditches in this area and it cannot be seen to cross the outer ditch of the enclosure but rather to run up to and join with it. From this junction with the outer ditch, it extends in a shallow curve for a distance of some 40m to the west-north-west, crossing the line of a road probably belonging to an earlier phase of the fort. If the possible line of the Hindwell palisade is extended southwards from the point where it enters the fort and as described above, then this curving ditch would join with it (Fig. 25, C). The intersection with Hindwell cannot be proven without excavation; however, the intersection with the outer ditch of Hindwell Double is clearly visible and not in doubt. It would appear that this may be yet another point of remarkable comparison between the Hindwell and West Kennet complexes.

Fig. 25. The possible link between the Hindwell Double Palisaded Enclosure and the Hindwell Palisaded Enclosure beneath the Roman fort. A – point of entry of the Hindwell Palisade. B – curving anomaly coming from the Hindwell Double outer palisade. C – Curving anomaly near to its projected intersection with the Hindwell Palisade ditch.

From the above it would appear that there are a set number of rules governing the shape and construction of palisaded enclosures. The posts may be well-spaced, closely spaced or contiguous. They may be constructed in bedding-trenches or pits. The entrances are narrow and Type 1 enclosures have 'gunsight' entrances formed by parallel or slightly bowed avenues. It would also appear that watercourses are important to the majority. Most were constructed at least close to watercourses and that some of these streams may have actually formed part of the perimeters of the enclosures remains a distinct possibility.

Chronology

In 1998, the present writer suggested that those Type 1 palisades with well-spaced posts (Meldon Bridge type) probably represented the earliest forms of palisade with those formed by contiguous posts (Mount Pleasant type) being the latest in the sequence. This was based on a few radiocarbon dates, mainly from Hindwell and West Kennet but also on the occurrence of deposits associated with Impressed Ware at the Meldon Bridge type sites, Grooved Ware at West Kennet and Beaker at Mount Pleasant. An increased radiocarbon dataset (Fig. 26), however, is suggesting that this sequence may no longer be valid and that the deposits within the interior of the site (for example the Impressed Ware deposits at Meldon Bridge) probably pre-date the enclosure just as the Bronze Age cremations from the same site clearly post-date it. Excavations within Meldon Bridge (Speake and Burgess 1999) and Forteviot (Noble and Brophy 2011) demonstrate that these enclosures are on sites of long term significance and that the perimeters may reflect

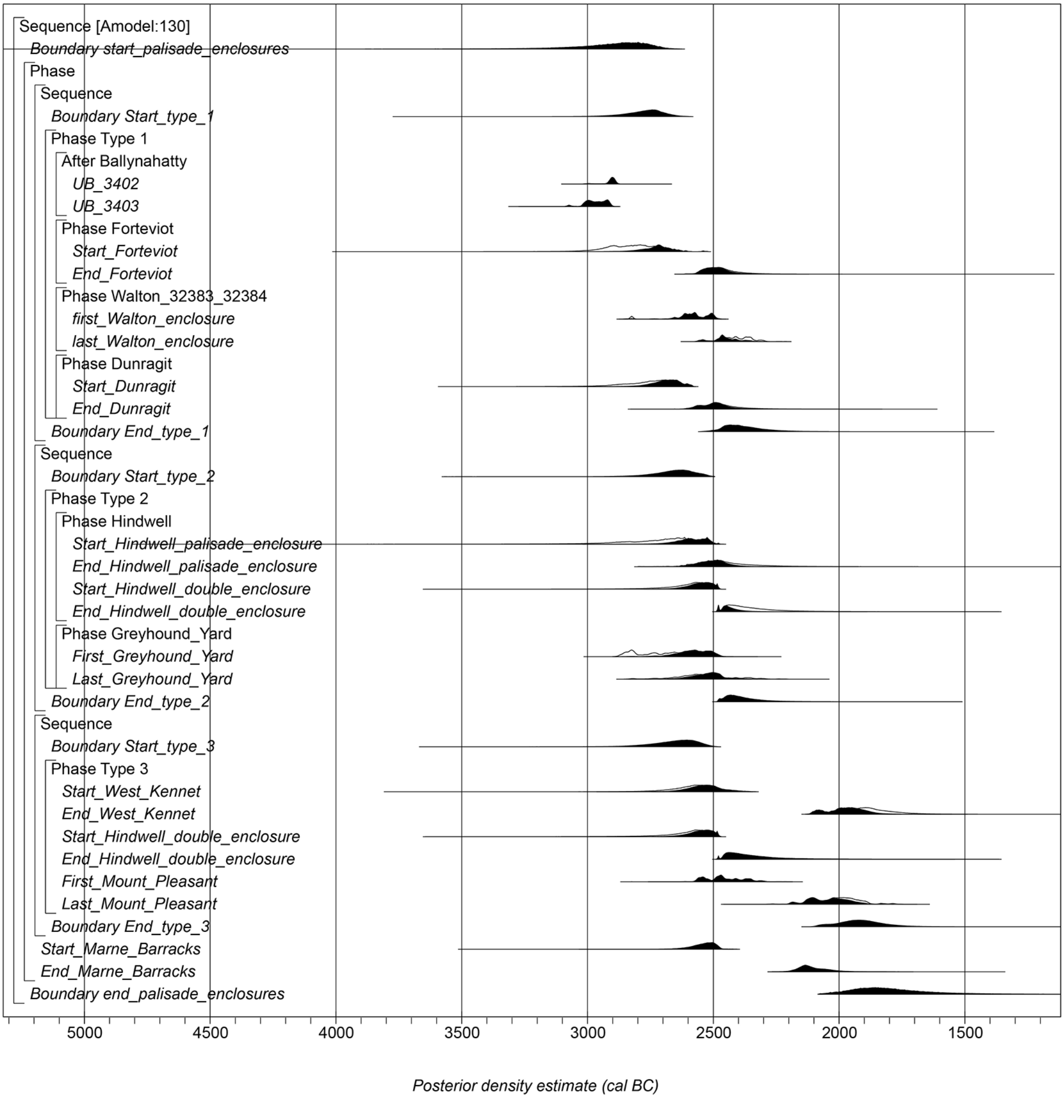

Fig. 26. Radiocarbon dates from comparable Neolithic palisaded enclosures. Calibrated radiocarbon results are depicted in outline, while the dark plots are the posterior density estimates derived from the modelling presented here. The OxCal command query words and the brackets define the model employed. Palisaded enclosure Types 1–3 (after Gibson 1998a) are described in the text.

only one episode of prolonged ritual activity. The duration of this episode must remain largely conjecture but few excavated sites show evidence of post-replacement suggesting that the perimeters are single and perhaps even temporary concepts. The radiocarbon database has increased significantly since the original sequence was proposed but dates obtained from some sites are not in statistical agreement and the plateau in the calibration curve in the later Neolithic gives considerable date ranges at others.

The previously suggested typological sequence does not seem to work in the Walton Basin on the available dates, although it must be noted that the dates from Walton are not in statistical agreement and nor are the dates from Hindwell Double. Consequently their value other than establishing a broad indication of chronology is questionable. Furthermore, the Hindwell dates suffer from a plateau in the calibration curve and therefore provide broad date ranges spanning the 29th to 25th centuries cal. BC (Gibson 1999a). The dates from these sites have already been discussed elsewhere (Gibson 2002) but few sites present coherent pictures or date ranges in statistical agreement. The dates from the excavated Type 1 sites (Walton, Meldon Bridge, Ballynahatty and Forteviot) show considerable ranges at face value. Walton would appear to span the 27th to 24th centuries BC (this volume), Meldon Bridge appears to span the entire third millennium (Speake and Burgess 1999; Gibson 2002). The dates for the palisaded enclosure at Forteviot form a more cohesive group but again span the 28th to 25th centuries BC (Noble and Brophy 2011). The dates from Dunragit have been modelled (see report by Seren Griffiths above) and suggest that the enclosure was in use from *3080–2570 cal. BC* (*95% probability*; *Start_Dunragit*; Fig. 26) until *2630–2190 cal. BC* (*95% probability*; *End_Dunragit*; Fig. 26) suggesting the possibility of a long period of use in keeping with the dates from other sites (Hamilton and Thomas 2015). The dates from Ballynahatty seem to be the earliest reliable dates for palisaded sites spanning the 30th to 29th centuries cal. BC (Hartwell 1998; Gibson 2002). Type 1 sites would probably appear to start in *2960–2630 cal. BC*

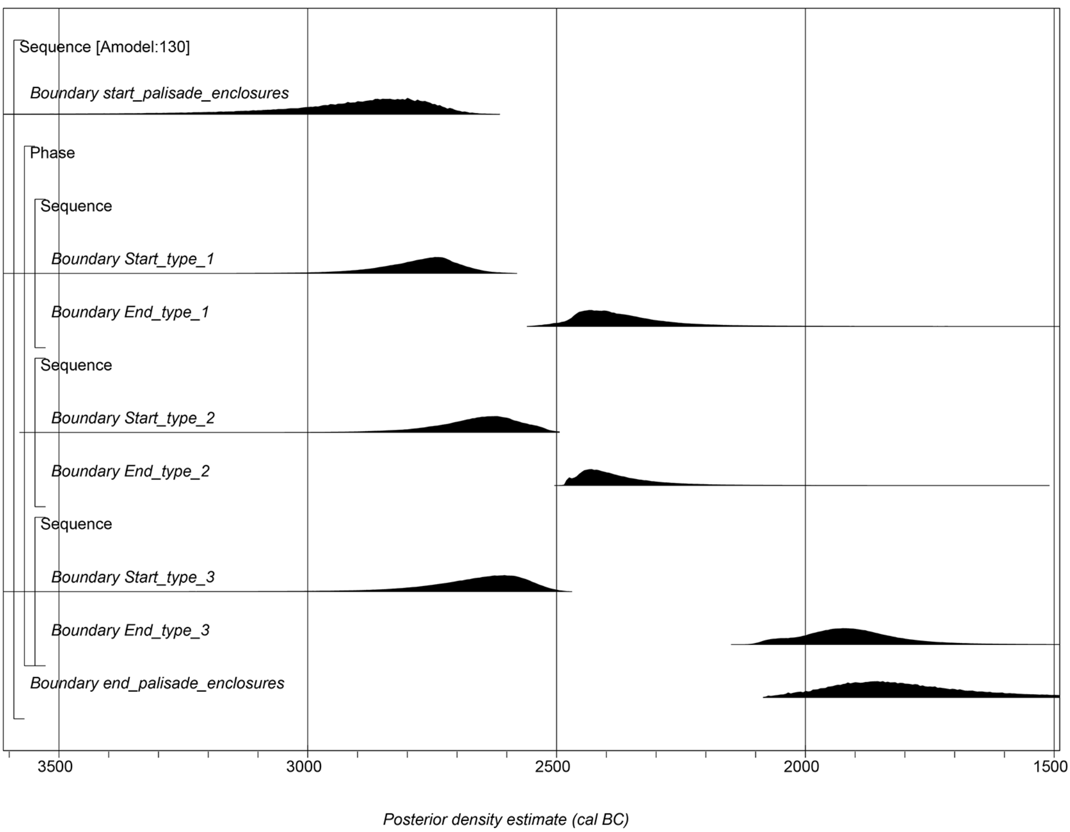

Fig. 27. Modelling of the palisaded enclosure Types 1–3 (after Gibson 1998a).

Table 8. Selected parameters from the model shown in Figure 27.

Parameter name	Posterior density estimate (95% probability)
start_palisade_enclosures	3170–2650 cal BC
Start_type_1	2940–2640 cal BC
End_type_1	2540–2160 cal BC
Start_type_2	2810–2550 cal BC
End_type_2	2490–2190 cal BC
Start_type_3	2710–2500 cal BC
End_type_3	2110–1750 cal BC
end_palisade_enclosures	2090–1530 cal BC

(*95% probability*; *Start_type_1*; Fig. 26), and end in *2540–2150 cal. BC* (*95% probability*; *End_type_1*; Fig. 27).

Of the Type 2 sites only Greyhound Yard in Dorchester (Woodward *et al.* 1993) and Hindwell (Gibson 1999a) have been excavated. As mentioned above, a plateau in the calibration curve affects these dates but an estimate for the start of these sites places this in *2850–2510 cal. BC* (*95% probability*; *Start_type_2*; Fig. 27), and end in *2410–2200 cal. BC* (*95% probability*; *End_type_2*; Fig. 27). The estimate for the start of use of Type 1 palisaded sites therefore highly probably (*86% probability*) occurred before the estimate for the start of use of Type 2 palisaded sites.

The earlier fourth millennium date from West Kennet 2 (Whittle 1997; Gibson 2002) is clearly an outlier but the other dates from both the West Kennet enclosures, Blackshouse Burn (Lelong and Pollard 1998; Gibson 2002), Mount Pleasant (Wainwright 1979; Gibson 2002), and Hindwell Double again suggest a probable start date in the 27th–26th centuries BC extending into the early second millennium, perhaps as late as the 19th century BC.

The dating of these sites is therefore still problematic but enough dates exist to be able to confirm their Late Neolithic/Chalcolithic currency. They suggest that the enclosures with contiguous timbers (Type 3) are certainly later than the sites with spaced posts (Type 1) and that the few available dates for the Type 2 sites suggests a narrow time range within the periods of currency of the other two (Fig. 27).

The presence of Grooved Ware and worked flints from the upper fills of two pits dug into the top of the inside of the palisade trench in the south-eastern arc of the main Hindwell Enclosure (see above) may possibly suggest that the site may have been decommissioned whilst Grooved Ware was still in circulation (see above). It was also noted from the geophysical data that pits seem to overlie the palisade trench to the east of the excavated area and would also appear to be later than the palisade (Hankinson and Grant 2015). This brings to mind the deposits in the tops of the postholes of the timber circles at Durrington Walls. Originally interpreted as weathering cones (Wainwright and Longworth 1971), these deposits have been reinterpreted as pits dug into the tops of the postholes once the posts had rotted or been removed (Pollard and Robinson 2007, 160; Thomas 2007, 149). If this is correct, it suggests that the lifespan of the enclosure perimeter may have been relatively short-lived.

Reconstruction

The reconstructions of, associations with and resources needed for these large enclosures has already been reviewed elsewhere (Gibson 2002) and care must be taken not to duplicate those observations here but suffice it to say that the reconstruction of these sites, based on post size and posthole depth is difficult and largely a matter of personal preference. Noble and Brophy (2011) prefer to see unmodified tree-trunks and living trees making up a permeable boundary. Burgess (1976) prefers a closed boundary of trimmed posts linked by horizontal timbers, whilst closed boundaries are indisputable at sites with perimeters comprising contiguous posts (Mount Pleasant, West Kennet and Hindwell Double). The closed boundary at Meldon Bridge was inferred by pairs of small postholes between the major uprights and smaller posts between larger uprights were also noted in the central of the three potential circuits at Dunragit (Thomas 2015, fig. 3.4) again suggesting an intention to completely close at least part of the perimeter. These smaller intermediate posts have not been noted at the other excavated Type 1 sites such as Ballynahatty, Walton, Forteviot or Leadketty and it remains a possibility that agricultural degradation may have played a part here. Alternatively, the perimeters of these Type 1 enclosures may indeed have varied from site to site. Nevertheless, and as has been stated above, external avenues, often at an angle, are consistent features at these enclosures and suggest formalised entrances. These avenues therefore demand entry by a set route probably by a procession of no more than two or three people abreast and so they control entry into the monument. This idea of formalised entry does not in itself prove a solid boundary but it certainly suggests it and for this reason the present writer prefers to envisage solid perimeters making these sites closed and private places to which some had open access, some were permitted access and others were possibly excluded.

The heights of the posts constitute another uncertainty. A case has been made for a below ground/above ground ratio of *c.* 1:3 (or 1:3.5) by several authors (Mercer 1981: Gibson 1994b; 1998a; 2002: Speake and Burgess 1999, though note that Speake and Burgess calculate the ratio wrongly) and if correct, these palisaded sites would present formidable constructions involving vast quantities of timber. They would certainly merit the epithet monumental as the posts would have towered above their onlookers. The Hindwell posts may have had an overall length of 8–9m, each weighing over 4 tonnes, and the posts at Mount Pleasant may have been even longer (some 11m total length). On this basis, it has been calculated that Hindwell, Mount Pleasant and West Kennet 1 would respectively have required 6330, 2800 and 1480 tonnes of timber for the uprights alone (Gibson 2002). It has also been pointed out elsewhere (Gibson 2002), however, that this is hypothesis and not fact and the inverted central tree-stump at Holme-next-the-Sea must serve as a salutary warning (Brennand and Taylor 2003). The hole for this tree-stump was 1.5m deep and, had it been found in a dry-land environment, would have suggested a post standing 4–5m above the ground. How wrong this would have been and instead the posthole may have been dug to such a depth in order to compensate for the top-heavy nature of the inverted tree-stump. With this in mind, Noble and Brophy's (2011) naturalistic reconstruction of Forteviot may have more relevance.

Though fairly ephemeral on the ground, now comprising ploughed-out negative features, these enclosures must have been substantial undertakings involving considerable investments in labour. With perimeters enclosing areas of between 5 and 10 hectares, the monuments would have required substantial woodland resources. The largest, at Hindwell, enclosed some 34 hectares and must have used about 1400 mature oak trees (Gibson 1999; 2002) though, as mentioned above, it may not have been totally enclosed. Whittle (1997) estimates a total of some 4400 posts for both the West Kennet enclosures and Wainwright (1979) estimates 1600 posts for Mount Pleasant. These post numbers are likely to represent the minima in terms of woodland resource requirements, especially if the solid boundary interpretation is correct. The woodland cover for the areas in which these enclosures were constructed is not known but it may be assumed from the monuments themselves that mature woodland existed nearby. The areas of woodland exploitation has been estimated for some of these sites suggesting between 2 and 14 hectares of woodland would have been felled but this is little more than guesswork (Gibson 2002, 15). The size of the local populations at this time is also an unknown quantity and, of course, it may be that these centres represented communal projects from seasonally large gatherings rather than the work of a local community. The timescale over which these monuments were constructed is also, therefore, difficult to calculate. It has been suggested that Hindwell may have taken over 33,000 workdays to fell, trim and erect the uprights alone, and if a solid, planked boundary is envisaged, this may have increased to over 70,000 involving woodworkers, excavators, ropemakers, provisioners, overseers, toolmakers and repairers and so on. The double enclosures of West Kennet 1 and Hindwell Double may have involved even more resources and labour.

Walton, Hindwell and Hindwell Double all seem to lack internal features. There are almost certainly anthropogenic pits within Hindwell, as revealed by caesium magnetometry, and there may also be similar features at the other two sites, but there are no convincing patterns visible and the contemporaneity of these potential features with the perimeters cannot be demonstrated. Internal features at Meldon Bridge were equally ephemeral and proved to pre- and post-date the enclosure with activity at the site lasting from the mid fourth to mid second millennium BC (Speake and Burgess 1999). Internal circular features at West Kennet 2, where excavated, are probably broadly contemporary with the main enclosure whilst the double palisade 1 appears empty (Whittle 1997). The two ostensibly similar Type 1 enclosures at Forteviot and Leadketty appear to have been treated very differently. Forteviot proved to be artefact rich and to be part of a large pit and ring-ditch complex. The site seems to have started as an early third millennium cremation cemetery prior to the construction of the palisade. A timber circle, replaced by a henge monument appear broadly contemporary with the palisade but use of the site into the Bronze Age is attested by a cist containing a dagger burial. Later Roman and Pictish features have also been found on the site (Noble and Brophy 2011). Leadketty by contrast is artefact poor and seems to lack the intensive (albeit protracted) activity of Forteviot, only some 5 kilometres to the west-south-west.

The timber circle and henge at Forteviot recall the similar arrangement at Mount Pleasant where site IV comprises a multiple timber circle with cardinally orientated aisles and a central stone setting within a penannular ring-ditch (Wainwright 1979) and the complex timber circle within the double enclosure at Ballynahatty (Hartwell 1998). Here, the timber circle also enclosed a rectangular setting but this time composed of wood rather than stone. The aerial photograph of Dunragit reveals pits and circular features within and close by the enclosure and excavation has demonstrated that the site was preceded by a post-defined cursus of the earlier Neolithic (Thomas 2015). In contrast to Meldon Bridge and Forteviot, little evidence was found for Early Bronze Age activity at the site though an unurned cremation burial was dated to the Bronze Age, ring-ditches show on the aerial photographs and Beaker and Food Vessels sherds were recovered.

The longevity of the Walton Basin enclosures may also be inferred by the presence of Bronze Age barrows and ring-ditches within or around the enclosures and also the position of the Iron Age enclosure to the west of Hindwell, the position of the Roman marching camps and fort. The Iron Age enclosure clearly respects the arc of the palisade as mentioned above and whilst it is less than plausible that the timbers of the palisade still stood some 2500 years after its construction, it nevertheless suggests that the line of the perimeter, perhaps surviving as a ditch, perhaps even a hedge, and the space that it enclosed were still being respected in later prehistory. The Roman marching camps may also have been positioned to deliberately slight areas of local importance and thereby to stamp Roman authority on the native population. The marching camps represent pre-Flavian offensives into Wales and are therefore early in the country's Roman history representing the works of an army of conquest rather than assimilation. As implied by the Roman finds from the upper fills of the palisade trench at Hindwell Double, the perimeter of the two Hindwell enclosures may have been still visible as slight earthworks. Any later prehistoric activity within the areas of the former palisades must remain unknown and may have been archaeologically invisible but later Romano-British iconography attests that springs and confluences may have been important within Iron Age religion and were often associated with local spirits (*genii loci*) so it may not be stretching the realms of imagination too much by suggesting that these local springs and river courses may have retained semi-religious significance well into the later Iron Age.

Function

Despite the paucity of demonstrably contemporaneous monuments, features or deposits within the enclosures, or indeed any trace of domestic activity, the enormity of the perimeters and the labour involved in their constructions clearly represent deliberate conscious and conspicuous acts of enclosure. They define and delimit an internal area that is markedly separated from the outside representing a distinct and monumentally enclosed space. It must be regarded as almost certain that activities would have taken place within these enclosures but they must have been of such a nature as to leave little or no archaeological trace. Trying to identify these activities leads to speculation but we can imagine, given the restricted access to the interiors via avenues or comparatively narrow and monumental entrances, activities involving active participants and spectators. Faunal remains from excavated sites are scarce due to prevailing soil conditions, but the abundance of pig bones at West Kennet suggests conspicuous consumption and feasting. This further implies large gatherings of people partaking in the construction of the monuments and in other archaeologically invisible activities possibly at particular times of the year dictated by solar or lunar events. As has been suggested for causewayed enclosures and the large henge monuments of Wessex, their actual construction may have been more important than what they enclosed involving congregated groups working together to create a common monument and by so doing making and renewing social bonds and participating in trade and exchange (Oswald *et al.* 2001; Whittle *et al.* 1999). In this respect, the perceived construction method noticed in the 2011 excavation of the area where the Hindwell palisade intersects with the cursus is important. It demonstrated that the postholes seemed to have been dug, posts inserted, and pits backfilled sequentially with one posthole being filled with the spoil from its neighbour. This suggests that the construction (if not the intention) may well have been episodic and organic rather than a single-phased monument where multiple pits may have been pre-excavated to receive prepared timbers. Admittedly this is based on a very narrow window and does not preclude work taking place simultaneously on different parts of the circumference.

Trade and seasonal gathering may have been one of the main roles of these enclosures. It has been mentioned above that the Walton Basin lies on an historic route between the English midlands and the Welsh uplands that were traditionally exploited for summer grazing. The palisades therefore lie on a routeway that may already have been established in the Neolithic. This is a common feature of the other palisaded sites. Leadketty and Forteviot lie in the valley of the river Earn leading from the Scottish uplands to the Tay estuary. The West Kennet enclosures are close to the Swallowhead Spring the source of the Kennet and a major tributary of the Thames (Leary *et al*. 2013) and on a major east–west route across the Wessex chalk as fossilised by the modern A4. Meldon Bridge lies on the major route between the Tweed and Clyde valleys on the A72 and Dunragit lies in the A75 corridor linking Southern Scotland with the Irish Sea. Ballynahatty lies on a lowland route between the Lough Neagh Basin and the Atlantic, and Mount Pleasant lies on the modern east-west A35 corridor along the south coast. That these modern routes have an archaeological relevance can certainly be traced, in Britain at least, to the Roman period. The Roman roads running east–west through the Walton Basin, the Roman fort at Hindwell farm and the temporary camps overlying the Walton and Hindwell enclosures have already been mentioned above. The Earn Valley was the main route connecting the fortress at Carpow to the Gask Ridge and a temporary camp lies in a bend of the Earn some 1 kilometre north-west of Forteviot at Gateside of Broomhill. Dunragit lies on the Roman coastal road from the fort at Gatehouse of Fleet to that at Stranraer. A Roman marching camp overlies the enclosure at Meldon Bridge and another three lie close by at Lyne and Easter Happrew. Possible traces of the Roman road preceding the A72 and leading from Newstead to Castledykes were also revealed during the excavation. The A35 near Mount Pleasant fossilises a Roman road heading eastwards from Exeter into Dorchester and a Roman settlement lies at the foot of Silbury Hill on the Great West Road from London to Bath and Bristol. Ballynahatty lies close to the river Lagan at what may have been, in the Neolithic, its lowest fording point again suggesting a routeway of considerable antiquity (Hartwell 1998).

These routeways doubtless existed before Roman formalisation and may have been travelled by traders in commodities and livestock. With this in mind, it is notable that the artefacts made of Bullhead flint recovered from the excavation at Upper Ninepence, on the ridge above Hindwell, and from scatters elsewhere in the basin, may have come from as far away as the Thames Valley or Kent (Bradley in Gibson 1999a). Other artefacts may have been made of flint from the Berkshire Downs or Chiltern Hills and a creamy white flint may be from Lincolnshire. Whilst direct links between the Walton Basin and Kent and Lincolnshire are perhaps unlikely it nevertheless illustrates imported material and demonstrates movement of people and resources certainly amongst adjacent communities.

Despite describing the Hindwell and Walton enclosures as being in the Walton Basin, they actually occupy a very small part of it, no more than $4km^2$. They are concentrated very much in the south-eastern part of the basin where the Riddings, Summergil, and Hindwell brooks are still separate entities but close to their confluences where they become one and flow out of the basin through the gap between Burfa Bank and Herrock Hill towards the river Lugg. They are not the first monuments in the area, however, as the Womaston Causewayed Enclosure, lies only some 750m from the centre of Hindwell and is still within the $4km^2$. None of the dates from Womaston come from primary contexts (Jones 2009c) but the dates form a consistent group and by analogy with the other causewayed enclosures that have been securely dated, is likely to date from *c.* 3700 cal. BC (Whittle *et al.* 2011), over a millennium earlier than the palisades. As has been suggested for the palisaded enclosures above causewayed enclosures are generally interpreted as seasonal meeting places for dispersed groups coming together to renew bonds, exchange goods and livestock and take part in ritual feasting (Whittle *et al.* 1999; Oswald *et al.* 2001) and as such, the Womaston Causewayed Enclosure may be the original site of communal gatherings in the basin.

Cursus monuments appear to be a short-lived phenomenon, particularly in southern Britain where they date to the Middle Neolithic (Barclay and Bayliss 1999). They tend to be fairly ephemeral monuments with shallow ditches apparently out of proportion to their length but the fact that some are fossilised in later field systems suggests that some at least remained visible in the landscape for a considerable period and it may be that their banks were emphasised in archaeologically invisible ways such as by hedgerows. Formerly described as processional ways, this interpretation is now untenable and it is more likely that, given their common lateral causeways, that some at least had a boundary role (Loveday 2006; 2012). With this in mind, the Walton Green cursus effectively blocks the route into the basin marked by the current A44 whilst the Hindwell Cursus runs for over 4.5 kilometres from the uplands in the north-east, across the Knobley Brook, the central spine of the basin, the Summergil Brook and reaches the uplands in the south-west. It effectively bisects the basin forming a boundary between the north-western and south-eastern halves. It is in this south-eastern area that the enclosures lie forming a distinct cluster of monuments in contrast to the comparative emptiness of the north-western half.

The dates for the Hindwell Cursus seem a little early with the southern ditch-defined cursus monuments being generally later than the Scottish post-defined types (Barclay and Bayliss 1999) but it cannot be denied that it is earlier than the Hindwell enclosure which overlies its apparently deliberately filled-in ditches. The siting of the Hindwell enclosure, may therefore be deliberately referencing the site of the cursus and it has been noted elsewhere that the only known entrance to the Hindwell enclosure lies within the area defined by the cursus ditches (Britnell and Jones 2012, 67). This draws analogy again with Dunragit where the palisaded enclosures overlie the site of a destroyed post-defined cursus (Thomas 2015). The cursus boundary must therefore pre-date the massive monumentalisation of this area although, as has already been stated, the Womaston Causewayed Enclosure pre-dates the palisades and its period of use most probably overlapped with the construction of the cursus monuments. The boundary function of the Stonehenge Greater Cursus and the Aston-on-Trent Cursus can easily be easily seen. The former marks the northern edge of the Stonehenge landscape (Cleal *et al.* 1995) and the latter marks a crossing point of the Trent and may have been pivotal in the distribution of Charnwood axes (Loveday 2012). The boundary role of the Hindwell Cursus is less easy to appreciate save for the fact that it clearly bisects the basin at what appears to have been a carefully chosen point and therefore to have been deliberately sited. A clue to its position, however, may lie in the distribution of the many flint scatters in the area nearly all of which occur in the 'empty' (i.e. major monument free) north-western half of the basin and particularly on the well-drained ridge between the Knobley Brook and the Summergil Brook (Britnell 2013, 10). Only small flint scatters, generally comprising fewer than 50 pieces, are found to the south-east of the cursus and some of these may have resulted from artefacts picked up in tractor tyre treads. Fieldwalking over ploughed sections of the Hindwell enclosure as part of the Walton Basin Project produced very few artefacts (Gibson 1999). This distribution may be another manifestation of the 'specialness' of this section of the basin being reserved for religious, ritual and inter-communal purposes whilst the major Neolithic and Bronze Age settlements were situated elsewhere and as exemplified by the Impressed Ware and Grooved Ware associated settlement phases at Upper Ninepence (Gibson 1999). The Womaston Causewayed Enclosure attests and the cursus boundaries suggest that his south-eastern portion of the basin was significant before the construction of the palisaded enclosures that came to dominate it.

Postscript

Since this paper was written, a Type 1 enclosure has been located beneath the bank of Durrington Walls in August 2016 (Parker Pearson and Gaffney 2016). Geophysical survey, particularly Ground Penetrating Radar, by the Stonehenge Hidden Landscapes Project (SHLP) identified a series of large anomalies beneath the bank at Durrington Walls describing an irregular circle some 440m across. The strength of the signal suggested to the project team that the anomalies represented buried, prostrate stones and the British media carried stories about the new 'Superhenge' with some spectacular computer-generated imagery of the reconstructed circle (*inter alia* http://www.telegraph.co.uk/news/earth/environment/archaeology/11844357/Huge-ritual-monument-found-hidden-near-Stonehenge.html>).

Stone and timber circles being enclosed by henges are well known (Gibson 2010; 2012) but stone circles being buried beneath henge banks has not yet been encountered in British archaeology. As a result, there was a certain amount of scepticism of the interpretation of the data by some British prehistorians (the present writer included). Fuelling this scepticism was the fact that Wainwright had found the severely truncated remains of an arc of posts during his excavations in the north-eastern sector of the site (Wainwright and Longworth 1971, 15–16). As some 1.20m of chalk surface had been removed by machine, these postholes must originally have been some 1.5–1.8m deep, spaced at 1–1.5m intervals and have contained posts up to 0.75m in diameter. Due to the removal of the natural chalk surface, Wainwright was unable to establish the chronological relationship between the henge bank and the arc of posts. Two of the anomalies discovered by the SHLP under the southern sector of the bank were excavated and proved to be substantial postholes up to 1.5m deep and 1.2m in diameter. They had held posts over 0.5m wide (information from M. Parker Pearson and V. Gaffney). The depths and post diameters match the dimensions of the postholes recorded by Wainwright.

The recent excavation has also demonstrated that the palisaded enclosure is likely to have been short-lived. The posts post-date the pre-henge Grooved Ware settlement which ended in the mid third millennium (Parker Pearson 2007) and pre-date the erection of the bank in the early second half of the millennium as Beakers were starting to arrive in southern England in 2450–2385 cal. BC (68% probability) (Marshall forthcoming). That the posts seem to have been dug out rather than being allowed to rot *in situ* suggests a comparatively sudden change in plan.

The geophysical anomalies can be detected round most of the perimeter of the site with the exception of the east side and it is interesting to note the proximity of the Avon in this area. Once again, part of the perimeter, as at Hindwell, Walton, Mount Pleasant and Forteviot may have been intended to give focus to the river.

ACKNOWLEDGEMENTS

The original Walton Basin Project, undertaken in 1993–97, was funded by Cadw, who also funded the more recent investigations. The detailed magnetometer survey in 1998 was conducted as part of the SEPAH project, funded by the European Commission. The writers would like to thank Bill Britnell in particular, as well as colleagues at the Clwyd-Powys Archaeological Trust: Richard Hankinson, Ian Grant, Jenny Britnell, Viviana Culshaw, Wendy Owen and Sophie Watson. Thanks are also due to the following: Philippa Bradley; Astrid Caseldine, Catherine Griffiths and Roderick Bale, School of Archaeology, History and Anthropology University of Wales Trinity St David; Frances Lynch; Louisa Gidney, Archaeological Services, University of Durham; and Martin Roseveare and Dan Lewis, ArchaeoPhysica, for undertaking the 2010 geophysical survey at Walton. Finds illustrations are by Brian Williams. We are also grateful to the respective landowners, Mr John Goodwin for the Hindwell palisades and Mr E. Jones at Walton, for their kind permission regarding access. Alex Gibson would like to thank Kenny Brophy for useful discussions regarding the Forteviot and Leadketty sites in advance of full publication and Mike Parker Pearson and Vince Gaffney for information about recent work at Durrington Walls.

NOTES

1. Clwyd-Powys Archaeological Trust, 41 Broad Street, Welshpool, Powys, SY21 7RR.
2. School of Archaeological and Forensic Sciences, University of Bradford, Bradford, BD7 1DP.
3. School of Archaeology, History and Anthropology, University of Wales Trinity St David, Lampeter, SA48 7ED.
4. University of Central Lancashire, Preston, PR1 2HE.
5. 23 Feversham Road, Salisbury, Wiltshire, SP1 3PP.
6· Archaeological Services, University of Durham.
7. Cambridge University Collection of Aerial Photography (CUCAP), AYB27.
8. CPAT photograph 94-c-0292.
9. RCAHMW photograph 2006-3706 to 3708.
10. We would like to thank Inga Peck and Susan Davies for processing the samples.

BIBLIOGRAPHY

Ambers, J. and Bowman, S., 1998. 'Radiocarbon measurements from the British Museum: Datelist 24', *Archaeometry* 40, 413–35.

Barclay, A. and Bayliss, A., 1999. 'Cursus monuments and the radiocarbon problem', in A. Barclay and J. Harding (eds), *Pathways and Ceremonies: The Cursus Monuments of Britain and Ireland* (Oxford: Oxbow Books), 11–19.

Bayer, O., 2011. 'Lithic Scatters and Landscape: the Mesolithic, Neolithic and Early Bronze Age Inhabitation of the Lower Exe valley, Devon', unpublished PhD Thesis, University of Central Lancashire.
Bradley, P., 1999. 'The worked flint from the Dunn collection and the excavations', in Gibson 1999a, 49–81.
——2011. 'Worked flint [Hindwell cursus and fieldwalking]', unpublished report for CPAT.
——2012. 'Worked flint [Hindwell Double Palisaded Enclosure project 715]', unpublished report for CPAT.
——2014. 'Worked flint from Walton fieldwalking 2013 and 2014 (project 1788)', unpublished report for CPAT.
Brennand, M. and Taylor, M., 2003. 'The survey and excavation of a Bronze Age timber circle at Holme-next-the-Sea, Norfolk, 1998–9', *Proceedings of the Prehistoric Society*, 69, 1–84.
Brindley, A., 1999. 'Irish Grooved Ware', in R. Cleal and A. MacSweeen (eds), *Grooved Ware in Britain and Ireland*, Neolithic Studies Group Seminar Papers 3 (Oxford: Oxbow Books), 23–35.
Britnell, B. [W. J.], 2013. *Walton Basin: Archaeology and Conservation* (Welshpool: Clwyd-Powys Archaeological Trust).
Britnell, W. J. and Jones, N. W., 2012. 'Once upon a time in the west: Neolithic enclosures in the Walton Basin', in W. J. Britnell and R. J. Silvester (eds), *Reflections on the Past: Essays in honour of Frances Lynch* (Welshpool: Cambrian Archaeological Association), 48–77.
Bronk Ramsey, C., 2009. 'Bayesian analysis of radiocarbon dates', *Radiocarbon* 51, 337–60.
Burgess, C. B., 1976. 'Meldon Bridge: a neolithic defended promontory complex near Peebles', in C. B. Burgess and R. Miket (eds), *Settlement and Economy in the Third and Second Millennia BC*, British Archaeological Reports, British Series 33. (Oxford), 151–79.
Burnham, B. C. and Davies, J. L., 2010. *Roman Frontier in Wales and the Marches* (Aberystwyth: RCAHMW).
Cappers, R. T. J., Bekker, R. M. and Jans, J. E. A., 2006. *Digital Seed Atlas of the Netherlands*, Groningen Archaeological Studies 4 (Eelde: Barkhuis Publishing).
Caseldine, A. E. and Barrow, C. J., 1999. 'The charred plant remains from Walton', in Gibson 1999a, 141–50.
Cleal, R. M. J., Walker, K. E. and Montague, R., 1995. *Stonehenge in its Landscape: twentieth century Excavations*, Archaeological Report 10 (London: English Heritage).
Davies, J. L. and Jones, R. H., 2006. *Roman Camps in Wales and the Marches* (Cardiff: University of Wales Press).
Darvill, T., and Thomas, J. (eds), 2001. *Neolithic Enclosures in Atlantic Northwest Europe*, 91–100, Neolithic Studies Group Seminar Papers 6 (Oxford: Oxbow).
Dempsey, J., 1998. 'Walton Pit Circle, Radnorshire: trial excavation 1998', unpublished report, Clwyd-Powys Archaeological Trust Report No. 298.
Dwerryhouse, A. R. and Miller, A. A., 1930. 'Glaciation of the Clun Forest, Radnor Forest and some adjoining districts', *Quarterly Journal of the Geological Society of London* 86, 96–129.
Gibson, A. M., 1993. 'The excavation of two cairns and associated features at Carneddau, Carno, Powys, 1989–90', *Archaeological Journal* 150, 1–45.
——1994a. 'Aerial photography in Powys', *Archaeology in Wales* 34, 33.
——1994b. 'Excavations at the Sarn-y-bryn-caled cursus complex, Welshpool, Powys and the timber circles of Great Britain and Ireland', *Proceedings of the Prehistoric Society*, 60, 143–224.
——1997. 'Survey in the Walton Basin (Radnor Valley), Powys', *Transactions of the Radnorshire Society* 67, 20–62.

——1998a. ‘Hindwell and the Neolithic Palisaded sites of Britain and Ireland’, in Gibson and Simpson (eds) 1998, 68–79.

——1998b. ‘The Walton Basin Project 1993–1997’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 283.

——1999a. *The Walton Basin Project: Excavation and Survey in a Prehistoric Landscape 1993–7*, CBA Research Report 118 (York: Council for British Archaeology).

——1999b. *The Walton Basin, Powys, Wales. Survey at the Hindwell Neolithic Enclosure* (Welshpool: Clwyd-Powys Archaeological Trust).

——2001. ‘Survey at Hindwell enclosure, Walton, Powys, Wales’, in Darvill and Thomas (eds) 2001, 101–10.

——2002. ‘The Later Neolithic palisaded sites of Britain’, in A. M. Gibson (ed.), *Behind Wooden Walls: Neolithic Palisaded Enclosures in Europe*, British Archaeological Reports, International Series 1013 (Oxford: Hadrian Books), 5–24.

——2010. ‘Excavation and survey at Dyffryn Lane Henge complex, Powys, and a reconsideration of the dating of henges’, *Proceedings of the Prehistoric Society* 76, 213–48.

——2012. ‘An introduction to the study of henges. Time for a change’, in A. M. Gibson (ed.), *Enclosing the Neolithic. Recent Studies in Britain and Europe*, British Archaeological Reports, International Series 2440 (Oxford: Archaeopress), 1–20.

——2014. ‘Enclosures and burial in Middle and Late Neolithic Britain’ in A. C. de Valera (ed.), *Recent Prehistoric Enclosures and Funerary Practices in Europe: Proceedings of the International Meeting Held at the Gulbenkian Foundation, Lisbon, Portugal November 2012*, British Archaeological Reports, International Series S2676 (Oxford: Hadrian Books), 13–18.

Gibson, A. and Simpson, D. (eds), 1998. *Prehistoric Ritual and Religion: Essays in Honour of Aubrey Burl* (Stroud: Sutton Publishing).

Griffith, F., 2001. ‘Recent work on Neolithic enclosures in Devon’, in Darvill and Thomas (eds) 2001, 66–77.

Hale, D., Platell, A. and Millard, A., 2009. ‘A Late Neolithic palisaded enclosure at Marne Barracks, Catterick, North Yorkshire’, *Proceedings of the Prehistoric Society* 75, 265–304.

Hamilton, D. and Thomas, J., 2015. ‘Radiocarbon dating and Bayesian modelling’, in J. Thomas, *A Neolithic Ceremonial Complex in Galloway: Excavations at Dunragit and Droughduil, 1999–2002* (Oxford: Oxbow Books), 140–5.

Hankinson, R., 2011. ‘Hindwell Roman Fort and Vicus, Walton, Powys: Archaeological Investigations 2010–11’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 1092.

Hankinson, R. and Grant, I., 2015. ‘Walton Basin, Radnorshire: Geophysical Survey and Excavations 2014–15’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 1320.

Hartwell, B., 1998. ‘The Ballynahatty complex’, in Gibson and Simpson (eds) 1998, 32–44.

Johnson, S., 1999. ‘The Walton complex charcoal identifications’, in Gibson 1999a, 150–3.

Jones, N. W., 2009a. ‘Womaston Causewayed Enclosure: survey and excavation 2008’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 959.

——2009c. ‘Womaston Neolithic Causewayed Enclosure, Powys: survey and excavation 2008’, *Archaeologia Cambrensis* 158, 19–42.

——2010a. ‘Walton Palisaded Enclosure, Geophysical Survey and Excavation 2009–10’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 1026.

——2011. ‘Excavations at Hindwell, Radnorshire, 2010–11’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 1089.

——2012b. ‘Hindwell Double-palisaded Enclosure and Roman vicus: Archaeological investigations 2012’, unpublished report, Clwyd-Powys Archaeological Trust Report No. 1138.

——2014a. 'Hindwell Farm Barrow II: Excavation 2013', unpublished report, Clwyd-Powys Archaeological Trust Report No. 1247.

——2014b. 'Hindwell Trapezoidal Enclosure: Excavation 2013', unpublished report, Clwyd-Powys Archaeological Trust Report No. 1248.

——forthcoming. 'Roman military and civilian activity in the Walton Basin: excavation and survey 2009–2014', *Archaeologia Cambrensis*.

Jones, N. W. and Hankinson, R., 2014. 'Hindwell Palisaded and Double-palisaded Enclosures, Radnorshire: Excavation 2013', unpublished report, Clwyd-Powys Archaeological Trust Report No. 1244.

Larsson, M. and Parker Pearson, M. (eds), 2007. *From Stonehenge to the Baltic. Living with Cultural Diversity in the Third Millennium BC*, British Archaeological Reports, International Series 1692 (Oxford: Archaeopress).

Leary, J., Field, D. and Campbell, G. (eds), 2013. *Silbury Hill: The Largest Prehistoric Mound in Europe* (Swindon: English Heritage).

Lelong, O. and Pollard, T., 1998. 'The excavation and survey of prehistoric enclosures at Blackshouse Burn, Lanarkshire', *Proceedings of the Prehistoric Society of Scotland* 128, 13–53.

Lewis, D. and Roseveare, M., 2010. 'Walton Palisaded Enclosure and Walton Court Ring Ditch. Caesium Vapour Magnetometer Survey', unpublished report, ArchaeoPhysica Project No. WER091.

Loveday, R., 2006. *Inscribed Across the Landscape: The Cursus Enigma* (Stroud: Tempus Publishing).

——2012. 'Aston on Trent 1, Derbyshire – excavation of a round Barrow and protected cursus land surface', *Derbyshire Archaeological Journal* 132, 80–128.

Marshall, P., forthcoming. 'Bayesian modelling of the radiocarbon dates', in M. Parker Pearson (ed.), *The Beaker People Project*, Prehistoric Society Research Paper.

Mercer, R., 1981. 'The excavation of a late Neolithic henge-type enclosure at Balfarg, Markinch, Fife, 1977–78', *Proceedings of the Society of Antiquaries of Scotland* 111, 63–171.

Moss, E. H., 1983. *The Functional Analysis of Flint Implements: Pincevent and Pont d'Ambon: Two Case Studies from the French Final Palaeolithic*, British Archaeological Reports, International Series 177 (Oxford).

Musson, C., 2013. *Radnorshire from the Air. Images of landscape and archaeology* (Welshpool: Radnorshire Society and CPAT).

Noble, G. and Brophy, K., 2011. 'Big enclosures: the Later Neolithic palisaded enclosures of Scotland in their Northwestern European context', *European Journal of Archaeology* 14 (1–2), 60–87.

Oswald, A., Dyer, C. and Barber, M., 2001. *The Creation of Monuments. Neolithic causewayed Enclosures in the British Isles* (Swindon: English Heritage).

Parker Pearson, M., 2007. 'The Stonehenge Riverside Project: Excavations at the east entrance of Durrington Walls', in Larsson and Parker Pearson 2007 (eds), 125–44.

Parker Pearson, M. and Gaffney, V., 2016. 'Ground-truthing Durrington Walls', *British Archaeology*, November December 2016, 26–31.

Pollard, J. and Robinson, D., 2007. 'A return to Woodhenge: the results and implications of the 2006 excavations', in Larsson and Parker Pearson 2007 (eds), 159–68.

Reimer, P. J., Bard, E., Bayliss, A., Beck, J. W., Blackwell, P. G., Bronk Ramsey, C., Grootes, P. M., Guilderson, T. P., Haflidason, H., Hajdas, I., Hatt, C., Heaton, T. J., Hoffmann, D. L., Hogg, A. G., Hughen, K. A., Kaiser, K. F., Kromer, B., Manning, S. W., Niu, M., Reimer, R. W., Richards, D. A., Scott, E. M., Southon, J. R., Staff, R. A., Turney, C. S. M. and van der Plicht, J., 2013. 'IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP', *Radiocarbon* 55.4.

Rudeforth, C. C., Hartnup, R., Lea, J. W., Thompson, T. R. E. and Wright, P. C., 1984. *Soils and their use in Wales*, Bulletin No. 11 (Harpenden: Soil Survey of England and Wales).

Savory, H. N., 1980. *Guide Catalogue of the Bronze Age Collections* (Cardiff: National Museum of Wales).

Schlee, D., 2013. 'The excavation of Fan round barrow, near Talsarn, Ceredigion, 2010–11', *Archaeologia Cambrensis* 162, 67–104.

Schoch, W., Heller, I., Schweingruber, F. H. and Kienast, F., 2004. *Wood Anatomy of Central European Species*, online version <www.woodanatomy.ch>.

Schoch, W. H., Pawlik, B. and Schweingruber, F. H., 1988. *Botanical macro-remains* (Berne and Stuttgart: Paul Haupt).

Schweingruber, F. H., 1978. *Microscopic Wood Anatomy* (Birmensdorf: Swiss Federal Institute of Forestry Research).

Speak, S., and Burgess, C., 1999. 'Meldon Bridge: a centre of the third millennium BC in Peeblesshire', *Proceedings of the Society of Antiquaries of Scotland* 129, 1–118.

Stace, C., 1995. *New Flora of the British Isles* (Cambridge: Cambridge University Press).

St Joseph, J. K., 1980. 'Air reconnaissance: recent results, 49', *Antiquity* 54, 47–51.

Stone, J. F. S., 1949. 'Some Grooved Ware pottery from the Woodhenge area', *Proceedings of the Prehistoric Society* 15, 122–7.

Stratascan 1995. 'A Report for University of Staffordshire on a Geophysical Survey carried out at Watery Lane, Walton Green (east end of cursus)', unpublished report, Stratascan.

Stuiver, M. and P. J. Reimer, 1993. 'Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program', *Radiocarbon* 35, 215–30.

Thomas, J., 2004. 'The later Neolithic architectural repertoire: the case of the Dunragit complex', in R. Cleal and J. Pollard (eds), *Monuments and Material Culture. Papers in Honour of an Avebury Archaeologist: Isobel Smith* (Salisbury: Hobnob Press), 98–108.

——2007. 'The internal features at Durrington Walls: investigations in the Southern Circle and Western Enclosures 2005–2006', in M. Larsson and M. Parker Pearson (eds), *From Stonehenge to the Baltic: living with cultural diversity in the third millennium BC* (Oxford: British Archaeological Reports), 145–58.

——2015. *A Neolithic Ceremonial Complex in Galloway: Excavations at Dunragit and Droughduil, 1999–2002* (Oxford: Oxbow Books).

Wainwright, G. J. and Longworth, I. H., 1971. *Durrington Walls: Excavations 1966–68* (London: Society of Antiquaries).

Wainwright, G. J., 1979. *Mount Pleasant, Dorset. Excavations 1970–71*, Research Report 37 (London: Society of Antiquaries).

Whittle, A., 1997. *Sacred Mounds, Holy Rings. Silbury Hill and the West Kennet Palisade Enclosures: A Later Neolithic Complex in North Wiltshire* Oxbow Monograph 74 (Oxford: Oxbow Books).

Whittle, A., Healy, F. and Bayliss, A., 2011. *Gathering Time: Dating the Early Neolithic Enclosures of Southern Britain and Ireland* (Oxford: Oxbow Books).

Whittle, A., Pollard, J. and Grigson, C., 1999. *The Harmony of Symbols. The Windmill Hill Causewayed Enclosure* (Oxford: Oxbow Books).

Woodward, P. J, Davies, S. M. and Graham, A. H., 1993. Excavations at the Old Methodist Chapel and Greyhound Yard, Dorchester, 1981–1984, Dorset Natural History and Archaeological Society Monograph No. 12 (Dorchester).

Published with the aid of a grant from Cadw – Welsh Government