

Causewayed enclosures and the Early Neolithic: the chronology and character of monument building and settlement in Kent, Surrey and Sussex in the early to mid-4th millennium cal BC

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Causewayed enclosures

This paper is concerned with the early and middle 4th millennium cal BC, the period occupied by the early Neolithic. Its starting point lies in the project *Dating Causewayed Enclosures: towards a History of the Early Neolithic in Southern Britain*, initiated at Cardiff University in 2003 by Professor Alasdair Whittle, and funded by The Arts and Humanities Research Council and English Heritage, whose Scientific Dating Co-Ordinator, Dr Alex Bayliss, has been responsible for obtaining more than 400 new radiocarbon dates and modelling them with an equal number of others from 42 causewayed and related enclosures in England, Wales and Ireland (Whittle *et al.* 2008; Bayliss *et al.* forthcoming; Whittle *et al.* in prep.). These enclosures, characteristically defined by ditches interrupted by gaps (or causeways) have long been seen as defining features of the early Neolithic in southern Britain. This is largely due to their large size compared with other earthworks of the period, to their often rich cultural assemblages and to the stratified sequences which they provide. They consist of single or multiple circuits and other lengths of interrupted ditch, sometimes with surviving banks, and range in area from over 8 ha to less than 1 ha. They saw varied and sometimes rich deposits of human bone, food remains, digging implements, artefacts and the debris of their manufacture. The complexity of the sites, their contents, and the interpretations that they have prompted is summarised by, among others, Edmonds (1999, 80–108), J. Thomas (1999, 38–45) and Oswald *et al.* (2001). Their place in the 4th millennium cal BC remained, however, unclear.

The questions formulated at the start of the project were thus the following, and sampling was designed to answer them:

- When did causewayed enclosures begin to be built in Britain?
- Did all of them begin to be built at the same time?
- How quickly was each built?
- Was it possible to see in detail, even at a generational timescale, how their use developed and changed through time?
- To what extent was their use continuous and to what extent episodic?
- Were they all used for the same length of time?
- What would better dating of causewayed enclosures contribute to a firmer understanding of the initial development of the British Neolithic?

The method employed has been the application of Bayesian statistical modeling to radiocarbon dates (Bronk Ramsey 1995; Buck *et al.* 1996; Bayliss and Bronk Ramsey 2004; Bayliss *et al.* 2007a). It is based on the principle that, although the calibrated age ranges of radiocarbon measurements accurately estimate the calendar ages of the samples themselves, it is the dates of archaeological events associated with those samples that are important. Bayesian techniques can provide realistic estimates of the dates of such events by combining absolute dating evidence, such as radiocarbon dates, with any and all other information about the samples and their contexts (prior information). This constrains the probability

distributions of individual measurements and provides a means of estimating the dates of events not themselves directly dated but nonetheless located in a sequence of dated events. An obvious example is the construction date of a particular monument. The resulting 'posterior density estimates' are not absolute. They are interpretative, and will change as additional data become available or as the existing data are modeled from different perspectives. In practice, especially in prehistory, the most commonly employed prior information consists of stratigraphic relationships: if sample B was stratified above sample A, and both were contemporary with their contexts, then B must be later than A and a part of each probability distribution can be eliminated. The second most commonly employed prior information is the assumption that the events concerned occurred uniformly, although not necessarily continuously, within a bounded phase. This is applied to counteract the scatter derived from the errors attached to radiocarbon dates, an effect of which is that, within any group of dates relating to a period of activity, a proportion of the probability distributions will fall earlier or later than its actual span, making it appear to start earlier and finish later than it actually did (Steier and Rom 2000; Bronk Ramsey 2000). Simple calibrated date ranges (95% confidence intervals) were calculated by the maximum intercept method (Stuiver and Reimer 1986). Calibrations and modeling were undertaken using the program OxCal v3.10 (Bronk Ramsey 1995; 1998; 2001) and the INTCAL04 dataset (Reimer *et al.* 2004).

The worth of the method depends on the contemporaneity of sample and context, and hence on rigorous sample selection. Optimal samples are bones found in articulation, in other words still connected by soft tissue when buried and hence not long dead, followed by articulating bones found in proximity to each other, and hence probably not long out of articulation when buried or simply not recognised as articulated at the time of excavation. Also preferred are antler implements from the bases of ditches which they had probably been used to dig. If these sample types are not available, recourse can be made to single charred grains or nuts or single fragments of charcoal from short-lived sources from coherent deposits like hearths or dumps of charred material. The use of single fragments eliminates the risk of combining material of different ages in the same sample, and the dating of more than one sample from the same context makes it possible to check against the inclusion of stray fragments of older material (Ashmore 1999). Superficial carbonised residues from the interior surfaces of well preserved pottery sherds, ideally from well-represented pots, can also be used. Internal residues would have derived from food, and hence from recently dead animals or plants; but external residues are excluded because they might have derived from sooting which could have included carbon from already old timber or from peat used as fuel. The emphasis on fresh condition and substantial representation aims to ensure that only a short interval elapsed between breakage (i.e. final use including the formation of the residue) and burial. Where possible, two or three rounds of samples should be submitted from the same site, so that the results of one round can inform the selection of samples for the next.

Pre-existing dates from the enclosures and other contexts have been retrospectively assessed by the same criteria as potential samples and modeled accordingly. In many cases they can serve only as *termini post quos* for their contexts because they were measured on bulk samples of charcoal or animal bone, which may have included material of various ages and/or because they were measured on samples, such as mature oak charcoal, which was clearly already old when buried.

The 15 known or probable causewayed enclosures in the south-east are listed in Table 1. They are scattered through the north of the region in the Thames valley, Sheppey, the North Downs and Thanet. On the South Downs there are distinct eastern and western clusters. Most are on the Chalk, the exceptions being Staines on the Thames gravels and the two Kingsborough enclosures on Drift deposits. Excavation on various scales has taken place at twelve sites

(Table 1). Most have more than one circuit, and there are two cases of enclosures very close to each other. The two Kingsborough sites were within 200 m of each other, and it is possible that Chalk Hill may have had counterparts to the east and north. A length of interrupted ditch containing early Neolithic pottery has recently been excavated by the Trust for Thanet Archaeology to the east of the known enclosure (Lis Dyson pers. comm.). In addition, a ‘pit’ found during drain-digging in 1949 some 500 m to the north, on what was then a new housing estate, may have been an enclosure segment (on the basis of its size, shape and contents). It was roughly 3.0 m long, 1.20 m wide and 1.70 m deep; an articulated, contracted skeleton, probably male, lay near the base overlain by sherds of a decorated Bowl. At a higher level the disarticulated bones of another individual, possibly a young adult, were separated from the first by a fill which contained charcoal, an oyster shell and flint flakes (Dunning 1966, 8–11; Perkins 2004, 80).

In the course of the project, a total of 81 radiocarbon dates was obtained from Staines, Kingsborough 1, Kingsborough 2, Chalk Hill, Offham Hill, Whitehawk, Bury Hill, Court Hill and The Trundle and modelled with 15 pre-existing dates from Kingsborough 1, Kingsborough 2, Offham Hill, Whitehawk, Bury Hill, Court Hill, The Trundle and Combe Hill. No suitable new samples could be found from Combe Hill or Halnaker Hill (the finds from the latter could not be located) and no suitable samples at all from Barkhale.

Combe Hill was built before 3640–3010 cal BC, the date of a bulk charcoal sample from a ‘hearth’ containing Ebbsfleet Ware, animal bone, struck flint, and 2 sandstone rubbers (4590±100 BP; I-11613; Drewett 1994, 18). This feature looks like the fill of a recut into the primary silts (Musson 1950, fig. 2). Since all the charcoal from it was identified as of short-lived or relatively short-lived taxa (hazel, hawthorn and ash; Maby 1950), the deposit probably lies somewhere within the broad span of the date. The only date from Halnaker Hill remains that of 1310–810 cal BC, measured on a bulk sample of animal bone (2850±90 BP; I-12322; Bedwin 1992, 7). The form of the earthwork and the character of the finds from it support Bedwin’s conclusion (1992, 11) that the enclosure is indeed an early Neolithic one. The same conclusion holds for Barkhale.

The two enclosures with substantial series of dates are Chalk Hill (Bayliss *et al.* forthcoming) and Whitehawk, and it is here that the exercise has been most successful, with heightened precision reflecting the number of reliable measurements available. It should be borne in mind, however, that almost all the Whitehawk samples were recorded by spit rather than layer, so that some stratigraphic guesswork was entailed. A dearth of suitable samples from other sites can to some extent be attributed to small-scale excavation or selective retention of animal bone (e.g. at The Trundle), unfavourable burial environments (e.g. the low to zero bone preservation at Kingsborough on Drift deposits), or poor bone collagen preservation (e.g. at Staines on the Thames gravels). The strongest contributing factor, however, is the behaviour of the populations who built and used the monuments. The diversity of depositional practice between circuits and between parts of the same circuit teased out by Philippa Bradley at Staines (2004) is, for example, replicated at Chalk Hill, where the combination of repeated recuts and the recurrent deposition of articulated animal bone in the outer ditch made it possible to obtain a sequence of measurements, while the other ditches yielded only one further sample between them.

Comparable differences exist between enclosures. Offham Hill stands out for the ‘industrial’ character of its lithics, the only abundant finds category (James 1977). This was one of several enclosures where the ditches seem to have been left to silt up naturally after construction and initial use, often with very little deposition of cultural material. A case in point is Combe Hill, where Veronica Seton Williams excavated some 15 m of the inner ditch

and some 2 m of the outer, showing that Musson's Ebbsfleet Ware recut in the west of the circuit was localized. She found no Neolithic pottery at all, and only a few hundred pieces of struck flint, which were concentrated in the entrance area rather than in the ditch (Drewett 1994, 17). The only remarkable find was a group of three partly ground flint axeheads placed side-by-side in the middle fill of an inner ditch segment to the south of the entrance (Drewett 1994, 15, figs. 11, 12). There was virtually no bone, although the fills consisted overwhelmingly of chalk rubble in which bone would have been excellently preserved. There is little mention of bone in Seton Williams' notebooks, and only eight animal bone small finds in her finds book (held in Eastbourne Museum). The scarcity looks like an original one. There are other enclosures where stratigraphy and finds suggest a brief and simple initial history, although several saw sporadic reuse in subsequent millennia. They include Kingsborough 2 (Allen and Leivers forthcoming), Barkhale (Leach 1983), Bury Hill (Bedwin 1981), Court Hill (Bedwin 1984) and Halnaker Hill (Bedwin 1992). It is difficult to date the duration of their early Neolithic use, because, few as suitable samples from primary contexts may be, those from subsequent ones are fewer or non-existent.

The remaining enclosures had more complex histories and sequences. Staines counts among these, since it saw some recutting and the fills yielded large assemblages of early Neolithic material from bottom to top (Robertson-Mackay 1987, 30, 34–38). When it comes to construction dates, Chalk Hill was the earliest in the north of the region, with its first circuit built in the late 38th to early 37th century cal BC. The enclosures at Kingsborough followed soon afterwards, built successively and used concurrently. On the South Downs, causewayed enclosures, along with the continuous-ditched enclosure on Bury Hill, similarly began to be built in the late 38th or early 37th century cal BC. Recently obtained measurements make it clear that the dates from Court Hill, extending back into the late fifth and early 4th millennia cal BC (Bedwin 1984, 18: I-12893), and from the Trundle (Drewett 1994, table 4: I-11612, -11614, -11615), are older than their contexts, perhaps because the samples included already old material, since all were measured on disarticulated animal bone which was sometimes bulked.

The South Downs enclosures (and one in Thanet, if the 'pit' published by Dunning was indeed an enclosure segment) are distinguished by articulated human burials in addition to the disarticulated human more usual at such sites. Skeletons I, II and III from Whitehawk (Curwen 1934a; 1936) and the burial from Offham Hill (Drewett 1977) are now dated to the mid-4th millennium cal BC. A further burial near the top of the outer ditch at The Trundle, beneath the counterscarp bank of the Iron Age hillfort (Curwen 1929, pls. VI, VII), has, however, proved to date to the first millennium cal BC.

Most of the south-eastern enclosures have total areas between 1 and 3 hectares, within the range of the majority of British enclosure circuits. The exceptions are Whitehawk, which is at least 6 ha, and The Trundle, which is at least 7 ha. These fall among relatively few large circuits (Oswald *et al.* 2001, 72–3, figs 4.23–4), which include Wessex sites such as Windmill Hill and the main enclosure at Hambledon. Whitehawk and Trundle may be even larger than these minimum areas, since the extent of both is uncertain. At Whitehawk, Curwen's survey of 1928 recorded a possible fifth circuit outside ditch 4 to the north (Ross Williamson 1930, pl. I). To the south-east, the slope is masked by recently eroded material, and Curwen's observation of two ditches when the face of the hill was cut back during road building (Curwen 1936, 69) shows that archaeology survives there, whether or not these features related to the enclosure. While the continuous south-west tangential ditch has been dated to the second millennium cal BC in the course of this project, the segmented north-east tangential ditch remains a possible Neolithic outwork, as does a row of eight circular depressions, some also visible as parchmarks, with a shallow scarp to the east of them,

running north-south outside the south side of the known circuits (RCHME 1995a). At the Trundle, cropmarks and very slight earthworks of at least two ditches to the west of the known circuits have been interpreted as parts of the Neolithic complex, whether as outworks or as parts of outer circuits (R. Bradley 1969; RCHME 1995b, 12). Two cross-ridge dykes to the north remain undated, although perhaps most likely to be of later prehistoric date (RCHME 1995b, 14–15).

Within their known areas, Whitehawk and the Trundle share a rare feature in the form of incomplete circuits intersecting and overlapping with the clearly defined complete ones. These are most marked at The Trundle, where the clearest is Curwen's Spiral Ditch (1929, pl. II), the only example so far excavated, although to a small extent (Curwen 1929, 41; Bedwin and Aldsworth 1981). The identification of further examples prompted the conclusion that the plan might have resulted from the superimposition of a series of several eccentric enclosures, not all of which were used or even clearly visible at the same time (RCHME 1995b, 19–20, fig. 5). It is significant that the team who identified these features recorded nothing comparable elsewhere, although they surveyed numerous other causewayed enclosures by the same methods in the course of the *Enclosure and Industry in the Neolithic* project. They seem genuinely scarce, the only other obvious example being the spiral ditch at Briar Hill, Northampton (Bamford 1985). Whether originally complete or not, these additional circuits suggest repeated visiting and reworking. It may be that, on the South Downs, these were the equivalents of the repeated recuts in the outer ditch at Chalk Hill, which are themselves matched in other regions, for example at Hambledon Hill, Dorset (Mercer 1990, 48–54; Healy 2004, fig. 4). Recutting at Whitehawk and The Trundle seems to have been confined to single events. Most notably, ditches 3 and 4 at Whitehawk were both radically recut; and 'black mould', bands of deposit with abundant charcoal and cultural material, possibly in slot-like recuts, post-dated the chalk rubble fills of ditches 1 and 2 at Whitehawk and the second ditch at The Trundle. These rich deposits of early Neolithic material in the upper fills, together with an equally rich 'occupation layer' in an equivalent stratigraphic position in ditch 3 at Whitehawk, testify to continued use some time after construction. Modeling of the Whitehawk dates correspondingly estimates a duration of one or two centuries for the early Neolithic use of Whitehawk. Each of these enclosures stands out from the smaller, simpler, less finds-rich and probably shorter-lived ones around it. This corresponds to Drewett's distinction between ritual or ceremonial enclosures and fortified settlement enclosures (Drewett *et al.* 1988, 60–2) and to Russell's distinction between progressively expanded sites and the rest (2004, 173–4). An alternative to a hierarchy of sites is the possibility that a single site in each area became dominant and was frequented by an increasing population, including those communities who had originally built and used the other, eclipsed, enclosures.

The enclosures of the South Downs are distinct from those of the rest of the region not only in clustering around two major sites, but in the settings in which they were built. Ken Thomas' molluscan analyses indicate that most were built in short-lived clearings in woodland. This holds for Offham Hill, Bury Hill and Barkhale (K. Thomas 1982), for the probably Neolithic enclosure on Halnaker Hill (K. Thomas 1992) and possibly for Court Hill (K. Thomas 1984). Only at The Trundle is there a hint of clearance prior to construction, and this was followed by regeneration (K. Thomas 1981; 1982). The later 4th millennium deposit excavated by Musson at Combe Hill also formed in a wooded environment (K. Thomas 1994). At Whitehawk, consignment to the second millennium cal BC of the south-west tangential ditch takes with it the grassland molluscan fauna recovered from all its fills (K. Thomas 1996), which, as Thomas noted, contrasts with the composition of the few, predominantly shade-loving, molluscs hand-collected from the Neolithic circuits at Whitehawk during the excavations of the 1920s and 1930s. Whitehawk too may have stood in a woodland clearing. In the Thames valley, Staines may have occupied a similarly wooded location to the South

Downs sites, since at Moor Farm, less than 1 km east of the enclosure, there was no major clearance until after local pollen zone SM-3, undated but starting with an elm decline taken to be early Neolithic (Keith-Lucas 2000). The area of the Runnymede Bridge settlement, 1 km to the south-west, similarly saw only slight clearance in the earlier 4th millennium cal BC (Scaife 2000, 184–85; Robinson 2000, 150–52; Needham 2000, 195–6;).

To the east, things look different. Rob Scaife's analysis of pollen from the Kingsborough 2 ditch sequence indicates that the enclosures there were built and used in an environment dominated by open grassland, with some cereals and weeds of cultivation (Scaife forthcoming). The immediate environment of Chalk Hill remains uncertain at the time of writing (2008). The Sheppey enclosures were built and used in a part of the landscape frequented by people and their animals, while most of the others in the region were on sites otherwise little visited. The Julliberrie's Grave long barrow, also in the east of the region, was similarly built in grassland (Kennard 1939; Evans 1972, 362–3).

These locational preferences fit into a wider pattern. The wooded sites of the South Downs enclosures (and probably Staines) correspond to those of enclosures on the Wessex Chalk (Windmill Hill, Maiden Castle, Whitesheet Hill and Hambledon Hill; Bell *et al.* forthcoming), which have been seen as peripheral to occupied and farmed areas (e.g. Evans *et al.* 1988). The more heavily used location of the Kingsborough sites is echoed farther north in eastern England, at Haddenham in the Great Ouse valley (Peglar and Waller 1994; Peglar 2006), and Etton and Northborough in the Welland valley (Pryor 1998, 351; M. J. Allen pers. comm.). It is as if different populations chose to build differently in different kinds of area, and as if the inhabitants of the South Downs shared, at least in this respect, the perspective of the Wessex Chalk, while the inhabitants of Sheppey shared the perspective of the river valleys of eastern England.

Beyond the enclosures

Hunter-gatherers and the transition to farming

The question of how long hunter-gather lifeways persisted and of the nature of the transition from one set of practices and beliefs to another is an open one. Two suggested 'transitional' sites within the region may be no such thing. Radiocarbon dates on bulk unidentified charcoal samples from a pit on the Wealden clay at Charlwood which contained burnt bone and a large late Mesolithic assemblage (Ellaby 2004) are problematic. The samples came from the three lowest arbitrary 5 cm spits in the apparently undifferentiated fill of a truncated pit which survived to 32 cm deep. The measurements were, from the bottom up, mid fifth millennium cal BC (4695–4335 cal BC; HAR-4533; 5640±90 BP), late fifth to early 4th millennium (4335–3945 cal BC; HAR-4532; 5270±90 BP) and late 4th or early third millennium (3350–2675 cal BC; HAR-4531; 4340±100 BP). Even the first two are statistically inconsistent. The charcoal was clearly of various ages, and the intrusion invoked as a possible explanation for the latest measurement (Ellaby 2004, 17) may also have affected the composition of the lower samples, since the shallow pit had at different times been subject to both ploughing and the growth of trees and was cut in and filled with clay which can crack in dry weather.

Disturbance also accounts for the 'transitional' character of longer-known deposits in a rock shelter eroded at the base of a sandstone escarpment at High Rocks, overlooking a tributary of Medway near Tunbridge Wells, once seen as reflecting the presence of pottery-using hunter-gatherers in the Weald (Money 1960; 1962). Roger Jacobi long ago pointed out that the Ebbsfleet Ware pottery was stylistically too late for the scenario to be plausible (1982, 21). The deposit in question combined a predominantly Mesolithic flint industry, a leaf arrowhead fragment, a chisel arrowhead, sherds of Ebbsfleet Ware and a sherd of Grooved Ware (Money 1960, 188–94), and the excavator noted that the largely natural sandy accumulations under the

overhangs ‘must have been churned up by successive occupations’ (Money 1960, 176). Fifth millennium cal BC dates for bulk charcoal samples provide only *termini post quos* for a hearth (4860–4160 cal BC; BM-40; 5660±150 BP; Barker and Makey 1959) and the layer overlying it (4950–4280 cal BC; BM-91; 5730±150 BP; Burleigh *et al.* 1976). Three thermoluminescence dates on pottery, one published by Green (1980, 196), the other two obtained by Tunbridge Wells Museum in the 1990s (Ian Beavis and Jean-Luc Schwenninger pers. comm.) cover a period extending from the mid 4th millennium BC to the early second at 68% probability, its length reflecting their large standard deviations. This span includes, however, the expected late 4th/early third millennium date of the Ebbsfleet Ware and reinforces the impression that the artefacts of various ages were mixed in a single deposit. It is pertinent that Harding and Ostojka-Zagórski identified high levels of disturbance in three shelters at Rocks Wood, Withyham, in a similar location some 5 km to the south-west (1987).

Another site where thermoluminescence dates were measured on samples found with Mesolithic artefacts is Finglesham, near Deal, where there are eight dates (Parfitt and Halliwell 1988: OX TL 257 F1–5, F8–10) for burnt flint from a concentration of burnt and struck lithics on a zone of clay overlying Brickearth and underlying a further, partly disturbed, clay layer. The most distinctive components of the concentration were tranchet axe fragments and resharpening flakes (Parfitt and Halliwell 1983). The dates cover a period from the mid seventh millennium BC to the late 4th at 68% probability. This reflects their large standard deviations, which are even greater than those for High Rocks; it also leaves open the possibility that the site may have been visited repeatedly, like those of many lithic scatters, before it became covered with clay. The only measurement made on a diagnostically Mesolithic artefact, as distinct from a piece of burnt flint (OX TL 257 F10), is one of the oldest, at 6295–4885 BC at 68% probability (5590±705 BC; OX TL 257 F10). Hunter-gatherer activity may have continued here up to the advent of the Neolithic, but this is yet to be confirmed.

Funerary monuments, burials and their landscape contexts

Given that causewayed enclosures began to be built in the late 38th to early 37th century cal BC, they were *not* a part of the earliest Neolithic presence in the region (Bayliss *et al.* forthcoming). The construction of the White Horse Stone rectangular structure in the first quarter, probably the first century, of the 4th millennium cal BC (Hayden, this web site) makes this abundantly clear. It is reinforced in this same area, where the Medway cuts through the North Downs, by the dating of the remains of at least 16 individuals from the sarsen chamber of the Coldrum megalith, 10 km west of White Horse Stone on the opposite side of the Medway valley (Wysocki *et al.* in prep). Like the White Horse Stone building, these go back to the first centuries of the 4th millennium cal BC (Bayliss *et al.* forthcoming, fig. 11). The original account (Bennett 1913; Keith 1913) makes it impossible to be sure that these individuals were freshly dead when placed in the chamber, but the simplest conclusion is that the tomb was built by this time. In other words, the Burham causewayed enclosure, on the slope of the Medway valley some 5 km north-west of White Horse Stone, would have been built in an area already known, recognised and marked. It may, indeed, have been significant before any of the innovations of the early Neolithic were taken up, since it is a focus of late Mesolithic finds (Scott 2004, 9).

It does not follow that all the megaliths which cluster here are as early as Coldrum. Their diverse forms (Holgate 1981) suggest diverse origins. Indeed, the difficulty of matching Coldrum, especially, among other stone-built tombs in Britain has meant that continental sources for the group have repeatedly been sought and ascribed (e.g. Piggott 1935; Daniel 1950; Ashbee 1999). Some are so badly damaged that their original forms are a matter of guesswork. Others have traits in common with monuments to the north and west. If Kit’s

Coty House, The Chestnuts, or Addington were located in the Cotswolds (and, of course, built of local stone) they would not seem exceptional. It may be that, once Coldrum was built, following continental practice in the use of stone and, specifically or generically, in its form, it provided a model of stone construction for other tombs subsequently built there, although they conformed to styles current elsewhere in England. Such a stimulus would go some way to account for a cluster of stone-built tombs almost 150 km away from their nearest counterparts in Britain (Kinnes 1991, fig. 1A.1). The repeated use of stone in this limited area was a matter of choice as well as of availability. Jessup, for example, notes (1939, 261) of the earthen long barrow of Julliberrie's Grave, farther to the east, that 'There was no sign of megalithic structure, though suitable sarsen stone could have been obtained locally without very much trouble'. Boulders of suitable size for monument building also occur on the monument-free Bagshot Beds of the Weald (Field and Cotton 1987, 81).

The Severn-Cotswold tombs which some of the Medway megaliths resemble may point to a re-interpretation of one of them. Hazleton, in Gloucestershire, built in the 37th century cal BC, and Ascott-under-Wychwood in Oxfordshire, built in the 38th, were both located within Mesolithic settlements which had, after an interval, also seen Neolithic occupations which included the building of structures in the 39th or 40th century cal BC (Saville 1990; Meadows *et al.* 2007; Benson and Whittle 2007; Bayliss *et al.* 2007b). The Chestnuts, in the Medway valley, was less well preserved than either, having suffered from medieval destruction and recent horticulture, which meant that the pre-monument land surface survived very incompletely (Alexander 1962, plan II). Some points, however, are clear: it was built within an extensive late Mesolithic scatter, from which it was separated stratigraphically; a pre-monument structure may be represented by a single posthole sealed by the pre-monument land surface; and, where it was best-preserved, under the forecourt blocking, sherds from eight plain Bowl were found on the old land surface, which, with further less securely stratified material, were interpreted as having accompanied the original burials in the chamber and having been thrown out from it when later burials were inserted (Alexander 1961, 10). This is possible, but the pre-monument posthole and the examples of Hazleton and Ascott suggest an alternative: that here too construction was preceded by occupation. The possibility is enhanced by the pottery itself. The illustrated sherds from the forecourt (Alexander 1961, fig.11: 2, 5, 7-11) are light-rimmed, thin-walled and from open vessels. They are very fragmentary, but their surviving characteristics, like those of the fewer, equally fragmentary, sherds from White Horse Stone (Hayden, this web site), accord with those of certain or potential early 4th millennium assemblages which include thin walls, fine hard fabrics, light rims, open forms, carinated profiles and internal fluting (Cleal 2004). The larger, better-preserved pre-monument Hazleton and Ascott assemblages exemplify these characteristics (Smith and Darvill 1990; Barclay and Case 2007), as do assemblages far closer to the region, such as the earlier fraction of the pottery deposited in the Area 6 midden at Eton Rowing Course between the 38th and the earlier 36th century cal BC (Allen *et al.* 2004; Alistair Barclay pers. comm.) and Bowls from in and near a burial at Yabsley Street, Blackwall, for which a date on a mature oak plank provides a *terminus post quem* of 4230–3970 cal BC (95% confidence; 5252±28 BP; KIA-20157; Coles *et al.* forthcoming). The Chestnuts assemblage may reflect activity within the use-life span of the White Horse Stone structure.

Not only may occupation horizons beneath some long barrows pre-date enclosures in other regions, some of the long barrows themselves may do the same (Whittle *et al.* 2007). There is a hint of a direct relationship between the two at Whitehawk, where a kink in the northern part of Ditch II seems to respect a particularly substantial 16 m length of external bank, suggesting that the ditch may have changed direction because of a pre-existing earthwork, conceivably a long barrow (Ross Williamson 1930, pl. II; RCHME 1995a, 17). A pre-existing earthwork here could indeed explain why, exceptionally, an *external* ditch was dug. Otherwise, it is

impossible to assess the relationship between long and oval barrows and enclosures in the region, because none of the more than 40 long barrows is satisfactorily dated (apart from Coldrum which may or may not usefully be considered a long barrow). Indeed, amazingly little is known about them. The available measurements are summarized in Table 2. Replicate dates for probably articulating cattle vertebrae from primary (though not certainly basal) levels in the ditch of the Badshot long barrow (Table 2: BM-2273N1, -2273N2, -2273N3) suggest that this relatively small monument was built during rather than before the currency of enclosures.

Nor were long and oval barrows the only burial monuments built at this time. In the Thames valley, the first phase of a segmented ring ditch at Staines Road Farm, Shepperton, some 6 km south-east of Staines, in which there were plain Bowl pottery and a complete and an incomplete inhumation (Bird *et al.* 1990, 211–3; Lewis 2000, 69) seems to fall in the middle centuries of the 4th millennium cal BC. The undated first phase of a similar monument at Horton, Berkshire, less than 5 km north-west of Staines (Ford and Pine 2003) also yielded Bowl pottery and is probably of similar date. Such an early start for the construction of ditched ‘hengiform’ monuments is echoed the other side of the Thames estuary, in Mildenhall Ware associations at Rainham (J. Hedges 1980, 34) and Brightlingsea (Lavender 1995; 1996; Lavender & Clarke forthcoming) or, farther north, in the almost completely undecorated Bowl assemblage from Eynesbury (Ellis 2004, 7–13, 28–30). Most hengiforms in the region and beyond, however, are of later date and often yield Peterborough Ware, as at Ashford Prison, some 3 km east of the Staines enclosure (Carew *et al.* 2006, 17–30) or at Lavant, 2 km south-west of The Trundle (Magilton 1998; Field 2004b, 90–1) (Garwood, this web site).

It is necessary to comment on the dates from the Alfriston oval barrow on the South Downs, since this has been cited as an example of Neolithic single burial. Both legs of the articulated central burial were dated, one yielding a measurement in the first millennium cal BC, the other a measurement in the second (Table 2: HAR-942, -1811; Jordan *et al.* 1994). Both cannot be accurate and neither is Neolithic. It may be relevant that the pretreatment methods employed for bone and antler in the 1980s, when these measurements were made, sometimes resulted in only incomplete removal of humic acid contaminants, resulting in dates that were too young (e.g. Longin 1971; Gillespie *et al.* 1986; Gillespie 1989; Hedges and Law 1989; Hedges and van Klinken 1992; Bronk Ramsey *et al.* 2004). The possibility that the three dates of the initial series (HAR-940, -941 and -942), all measured on bone and antler, are too young is reinforced by the late 4th/early third millennium date of HAR-940, which is distinctly late for the early Neolithic artefacts with which the sample was associated in the bottom layer of the ditch. In these circumstances, HAR-1811, measured rather later, may be a more accurate date for the burial, although it too could be too young. The burial cannot, however, be taken to be Neolithic. It could be a later, perhaps second millennium, insertion into a 4th millennium monument, following Drewett’s conclusion that the burial and the pick on the surface beside it must result from later reuse of the mound (2003, 41). The stratigraphic relation between burial and mound was unclear because the mound was badly ploughed, with ploughmarks sometimes cutting into the old land surface (Drewett 1975a, 124, figs.4–5).

The distribution of long and oval barrows is dominated by two clusters on the South Downs, one coinciding with the easterly group of causewayed enclosures, the other lying west of the westerly group and extending into Hampshire (Drewett *et al.* 1988, fig.2.1; Russell 2004, fig. 19.5). Like other Neolithic monuments they are far rarer on the North Downs, where they have long been recognised to focus on gaps in the escarpment: Julliberrie’s Grave and two unexcavated examples (Parfitt 1998) mark the Great Stour gap (as the Medway megaliths mark the Medway gap). West of the Medway, a long barrow or long ‘mortuary’ enclosure built in an open environment at Tollgate, Gravesham, lies beside a dry valley running from

the North Downs to the Thames (Oxford Archaeological Unit 1995; Museum of London Archaeology Service 1999). To the west again, there is air photographic evidence for a long barrow or long ‘mortuary’ enclosure (near a possible hengiform) in the Darent gap at Sutton-at-Hone (NMR NATINV-410018). Finally, the Badshot long barrow, at the western edge of the region, lies at a gap in the Hog’s Back (Cotton and Field 1987, 80–81, Field 2004a, 160). Between the Darent and Badshot, however, there have still been no comparable identifications in the Wandle, Mole or Wey gaps. Other recent long barrow identifications reinforce existing concentrations, as in the case of an example outside Brighton, in the easterly South Downs concentration (Bewley *et al.* 2004, fig.7.1). The excavation by Wessex Archaeology of a previously unknown example, succeeded by a round barrow, at Northdown, Margate (Alistair Barclay pers. comm.) further expands the distribution and recalls Perkins’ suggestion that fragmentary records may relate to other long barrows in Thanet (2004, 80).

Field’s and Cotton’s distinction in Surrey of two provinces, a Thames valley-oriented one north of the North Downs and a southern-oriented one to the south (1987, 95) has much weight. The Staines causewayed enclosure could be matched anywhere in southern England, but the monuments surrounding and probably succeeding it are typical of the Thames terraces: the linear monuments and hengiforms of Perry Oaks (Framework Archaeology, 2006) echo the composition of monument complexes in the middle and, especially in the case of linear monuments, the upper Thames (Gates 1975, 38; Barclay *et al.* 2003, 216–32), as well as the river valleys of eastern England (such as the Great Ouse: Malim 1999; 2000). The river itself, especially between its confluences with the Mole and Wandle, has long been known for its concentrations of flint and stone axeheads (Adkins and Jackson 1978, fig. 3; Field and Cotton 1987, fig. 4.7). Some, at least, of these are of 4th millennium date, and they may be only the most durable and recognisable of the artefacts which entered the river, deliberately or otherwise, given the measurement of 3630–3350 cal BC (4660±50 BP; Beta-117088) made on an alderwood club or beater recovered from the Thames foreshore at Chelsea (Webber 2004). The extent to which human remains were placed in the river in this period remains uncertain, since only a few of the hundreds of crania recovered from dredging have been dated, and most of those are second millennium cal BC. One example from Battersea, however, yielded a measurement of 3910–3510 cal BC (4880±80 BP; OxA-1199; Bradley and Gordon 1988), leaving open the possibility of others. Current research by Rick Schulting may go some way to clarify this.

Flint mines

There are only 20 radiocarbon dates from the South Downs flint mines, all but two of them listed by Barber *et al.* (1999, 81–82). Most were on antler implements used to work the mines, and, despite the period of decades over which they were measured, it inspires confidence that results for antler samples measured in the 1960s (Barker *et al.* 1969), the 1980s (Bowman *et al.* 1990), and the 1990s (Ambers and Bowman 2003) are consistent with each other (Whittle *et al.* in prep.). The dates from Cissbury and Harrow Hill can be modelled to indicate that each was worked in the first half of the 4th millennium cal BC, possibly starting as early as the 39th century. Single measurements from Church Hill and Blackpatch and 2 on samples possibly redeposited in the top of a mine shaft at Long Down (only an interim report is so far available: Holgate 1995b) are consistent with this. More dates would provide better precision.

An early 4th millennium start for flint mining on the South Downs would be compatible with the attribution to a South Downs source of a flaked axehead (Craddock *et al.* 1983, sample no.362) from the Sweet Track in the Somerset Levels, the construction of which is dated by dendrochronology to the end of the 39th century BC (Coles and Coles 1986; Hillam *et al.* 1990). The axehead itself (Coles and Coles 1986, pl. 28) is compatible with the ‘Cissbury’ form. It is also noteworthy that several tranchet axeheads of Mesolithic type, most of them in

the same condition as the struck flint from mining contexts, were found at the Cissbury mines, although none was securely stratified (Gardiner 2001, and pers. comm.). Flint mining on the South Downs cannot be seen in purely functional terms for several reasons: it is restricted to a far smaller area than that of *in situ* flint deposits in the Chalk (Barber *et al.* 1999, fig. 1.1); the flint extracted was not always the best available locally (Field 2004a, 160–1); and its extraction was unnecessary, since the bulk of any local industry and many local axeheads were made of flint from superficial deposits (Gardiner 1990, 131). The extra-utilitarian aspects of flint mining - conceptual, symbolic, cosmological - have been emphasised persuasively (e.g. Topping 2004; Edmonds 1995, 59–66), and are exemplified in the South Down mineshafts, alongside their engagement with the earth and its properties, by articulated burials, disarticulated human bone, placed deposits and engravings. The South Downs mines may have expressed the attitudes and beliefs of one particular population, while for those to the west or east there was far less motivation to delve into the chalk to extract flint at considerable effort and risk. If South Down flint mining indeed goes back to the start of the local Neolithic, it may have been, for this group, a means of marking the establishment of new lifeways by mining in a manner already developed in adjacent parts of the continent.

While some human remains in the mines clearly date from the time of their working (Barber *et al.* 1999, 62), the age of others is less certain, especially those placed in round barrows or in possibly remodeled spoil heaps over and among the shafts. Some of the burials at Blackpatch were early Bronze Age, and others were Saxon (Barber *et al.* 1999, 70; Russell 2001, 48–81). An unaccompanied primary burial in Barrow 12, however, must have been made when mining was still going on - unless its insertion into an existing mound was not observed - since the mound overlay one mineshaft, was overlain on one side by spoil from another, and was cut by a third (Russell 2001, 79–81). This and the disarticulated bones scattered through the mound may have been Neolithic, as may some of the other human remains from the site (Piggott 1954, 49; Barber *et al.* 1999, 70; Russell 2001, 48–78, 247). This is bound up with the unresolved (*pace* Russell, 2001, 247–8) question of whether later activity at these sites included mining or consisted only of the scavenging and reworking of old spoil heaps.

The scant tally of pottery from mining contexts includes a fragment of a plain, light-rimmed, open, shouldered Bowl recovered by Lane Fox (later Pitt Rivers) from *c.* 4 m deep in a shaft at Cissbury (Piggott 1931, 139; Barber *et al.* 1999, 69, fig. 5.13), in other words a further fragment of potentially early 4th millennium cal BC pottery, like those from various contexts mentioned above. In contrast to these, assemblages from causewayed enclosures, within or beyond the region, tend to heavier rims and more frequent unshouldered, closed or neutral forms, and include decorated vessels in a style well exemplified at Whitehawk. It may be that different styles of vessel were used in different contexts. It is increasingly probable, however, that the potting tradition developed over the two or three centuries between the first uptake of Neolithic practices and beliefs and the start of enclosure building. It does not follow from this that every Bowl with ‘early’ characteristics was made in the first quarter of the 4th millennium, simply that there was a trend away from these characteristics. Certainly, where Bowl pottery from early 4th millennium contexts has any distinguishing characteristics, they are ‘early’ ones and, where assemblages, whether plain or decorated, like those from the enclosures are dated they tend to fall in the second or third quarter of the 4th millennium rather than the first, as at Runnymede Bridge (Needham 1991; Needham 2000; Needham & Trott 1997), where the early 4th millennium dates are *termini post quos*, Saltwood Tunnel (Trevorthen in prep.) or the ditch of the Bevis’ Thumb long barrow (Table 2; Drewett 2003).

Hoard, pits and settlement evidence

Caches of flint axeheads have been found on the Chalk of the South Downs and the sands of the Weald. Pitts lists at least 10 from the region (1996, 355–6, 358, 365, 367). Given that all

of these, except for the group from the Combe Hill causewayed enclosure, have been found by accident, they are likely to be under-represented in the archaeological record. As far as can be judged, all seem to have been tightly grouped and, except again for the Combe Hill find, to have been apart from other traces of activity. They might be seen as dry land equivalents of river deposits. Most differ from the Combe Hill find in being flaked, with little or no grinding and are of similar narrow-butted form to these and to axeheads made at the Sussex flint mines. They could thus be of early Neolithic date. This applies to a group of eight from Clayton Hill, near Hurstpierpoint (Anon 1856, 285; Curwen 1929c) and to another of three from Peaslake (Bruce-Mitford 1938), both in the Weald. An exception is the find from Bexley Heath, bordering the Thames estuary, where two parallel-sided thick-butted almost all-over-ground axes were found with three very slender, chisel-like forms, one of them ground (Smith 1923, pl.V). In this case, the morphology suggests a later Neolithic date.

The early centuries of the 4th millennium cal BC saw sea level rise followed, on the Thames at least, by organic sedimentation (Bates and Whittaker 2004, 55). As a result, much contemporary settlement in low-lying locations will now be obscured, although covered and preserved. Runnymede Bridge exemplifies the extent to which structures and surface deposits of the period, as well as cut features, can be preserved in riverine deposits (Needham and Trott 1978; Needham 2000). Numerous early Neolithic living sites have been encountered on the Thames and its tributaries, almost always by complete accident or in the course of the excavation of later deposits. None has been investigated on the scale of Runnymede, but it is clear that some were small and short-lived and others more substantial (Field and Cotton 1987, 75–77; Lewis 2000, 68; Sidell and Wilkinson 2004, 67). Settlement in low-lying, now wet, locations recurs across the region, whether in the Little Stour valley at Wingham (Greenfield 1960) or on what is now the foreshore in Minnis Bay (MacPherson-Grant 1969).

More generally, it is clear that the whole landscape was used, and most of it occupied. Apart from possible pre-long mound occupation evidence (discussed above), equally early on typological grounds may be the assemblages from pits at St Richard's Road, Deal (Gibson forthcoming), seven Bowls from a pit at Wingham in the Little Stour valley (some of them light-rimmed and open-profiled and three of them with lightly fluted rims; Greenfield 1960, fig. 3), a vessel from a terrace of the Thames at Clapham (Densem and Seeley 1982, fig.5:1), pottery from Erith Spine Road, Thamesmead (on the evidence of a verbal description only; Bates and Whittaker 2004, 67), and at least five Bowls from a deposit of burnt material on the base of a pit on New Barn Down, Patching, on the south Downs (Curwen 1934b, 153–6; Piggott 1934, figs.29, 30–36a). New Barn Down provides a link to the South Downs flint mines, in that the pit contained a 'Cissbury type' flaked flint axehead (Clark 1934a) and in that it lay some 750 m south of the Harrow Hill mines, where such axeheads were made (McNabb *et al.* 1996, Fig. 13; (Holgate 1995a, fig. 12: 3–7; Holleyman 1937, figs IV–IX).

Pits containing settlement residues, however selective and symbolic these may sometimes have been, occur on various terrains. These include the sands and gravels bordering the Thames estuary at Grovehurst, where a truly exceptional assemblage included half a dozen ground flint axeheads, four whole or fragmentary single-piece flint sickles (Payne 1880; Clark 1932, 72, 76–7, figs.4, 7), and pottery, including a fragment from a coarse Bowl with a row of perforations beneath the rim (Piggott 1931, fig.21). Other sites are known on the Brickearths of the Deal area in Thanet, where there is a concentration of finds resulting in part from the historical working of brick pits (e.g. Dunning 1966; Barber 1997), and on the Chalk of the South Downs, not only at New Barn Down but also at sites such as Bishopstone (Bell 1977), Saltwood Tunnel, and north of The Trundle (Down and Welch 1990, 221–31). Analysis of rich surface collections from East Sussex has shown that concentrations of leaf-shaped arrowheads tend to lie 3 km or more from each of Whitehawk, Combe Hill and Offham Hill

and to coincide with patches of Clay-with-Flints, as do most of the long barrows. If these concentrations bear any relation to day-to-day living, then some of the activities involved may have focused on perhaps originally loessic soils formed on the Clay-with-Flints, away from major aggregation sites (Gardiner 1984, 20–22). A closer view of such scatters is afforded by excavation and systematic collection on Bullock Down, Eastbourne, where there is ample evidence for the extraction and working of flint from the Clay-with-Flints. Small quantities of plain Bowl pottery and larger quantities of early Neolithic lithics have been found at Belle Tout and in Drewett's area C, both of which were also used in later periods (Drewett 1982, 45–57; Bradley 1982). Such substantial early Neolithic scatters are exceptional, most being so restricted as to be swamped by the more extensive spreads of earlier and later periods.

There is so far surprisingly little evidence for occupation on the coastal plain between the South Downs and the sea, and even less is known about activity of this period on what are now the offshore peat beds and submerged forests (Woodcock 2003). An isolated pit at Oving, south of The Trundle, contained sherds from a single, plain, heavy-rimmed Bowl (Drewett 1985), and unpublished sherds eroded from the coastline at Selsey were described by Piggott as 'developed Abingdon Ware' (1954, 36). The Westhampnett Bypass (Fitzpatrick 1997, and in prep.) provided a slice across the coastal plain which yielded substantial evidence for Mesolithic and for late Neolithic/early Bronze Age activity but little for an early Neolithic presence.

The diverse sands and gravels of the Weald have long been a prolific collecting ground. The lithics leave no doubt of an early Neolithic presence (Gardiner 1984, fig. 3.2), often on sites already used in the Mesolithic (e.g. Rankine 1939, 124, maps 1 and 2; Tebutt 1974, fig. 1). Leaf arrowheads are notably frequent on the Lower Greensand south of the North Downs in the west of the region, as are flint axeheads, at least some of which are likely to be early Neolithic (Field and Cotton 1987, 77–79, 93, figs 4.7, 4.15). The results of some of the fieldwork projects mentioned by Cotton (2004) could be important here.

The absence of monuments from the Weald and their scarcity on the North Downs have given rise to repeated comment, even to hand-wringing and chest-beating (Barber 2004, 2–4). This is misplaced. It would be more productive to ask how 4th millennium populations *were* using these areas. It is possible to suggest two principal reasons for the apparent absence of monuments, both of which may be partly valid:

(1) On an insular scale, it is the presence of 4th millennium monuments that is exceptional, not their absence. Most of the population seems to have done without them. Decisions were taken to build them, often repeatedly, in particular places in particular areas. Overall plots of 'classic' early Neolithic monuments, in the form of long barrows and cairns (e.g. Kinnes 1991, fig. 1A.1) and causewayed enclosures (e.g. Oswald *et al.* 2001, fig. 1.1) show more blank areas than busy ones.

(2) More 'non-classic' monuments than have been recognised may have been built in the 4th millennium, and they may have been built in different locations from the 'classic' ones. A structure that does not conform to a recognised type, whether it survives as an upstanding monument or a cropmark, will remain mis- or undated unless it is excavated. The record of eastern England serves to demonstrate this point. Here the 'classic' causewayed enclosures and long barrows are found in both upland and river valley locations, while a range of so far unique structures, some of them at least as early, seems confined to the river valleys. These include a trapezoid ditched and banked enclosure lined by a setting of widely-spaced massive oak posts at Godmanchester in the Great Ouse valley (McAvoy 2000) and unditched turf mounds, one elongated and one subsquare, preserved under alluvium at Raunds in the Nene

valley (Harding and Healy 2007). Since long barrows in the south-east seem confined to higher ground (almost always the Chalk), even when recent identifications are taken into account, it is plausible that other kinds of monument may have been built in river valleys in the same period.

Conclusions

To sum up, the interval between the appearance of Neolithic practices and the start of causewayed enclosure building in the region was of the order of that between the Napoleonic wars and the present day. The enclosures embodied concepts already current in adjacent parts of the continent and constituted an increase in the scale of construction and, by implication, of aggregation and communal endeavour. Before the enclosures were built, the start of flint mining on the South Downs and some undated settlement traces may have been coeval with the use of the White Horse Stone structure and the Coldrum monument.

Table 1: Certain and probable causewayed and related enclosures in Surrey, Kent, and Sussex (see Oswald *et al.* 2001 for some specific site discussions and general gazetteer).

Site	Category	NGR	Topography	Fieldwork dates	Summary description	Selected references
Staines	Certain	TQ 0241 7261	At c. 16 m OD, on Thames gravels capped by alluvium, on tip of elongated gravel island, beside one of several channels joining Thames in Colne delta.	1961–63	2 circuits approximately 25 m apart, eroded by stream on flattened SW side. Outer ditch wider and deeper than inner. Multiperiod internal features, some of them Neolithic.	Robertson-Mackay 1987
Burham	Probable	TQ 7166 6238	At c. 50 m OD, on Chalk at E side of Medway valley, on W-facing slope overlooking river		Double circuit incompletely visible in air photographs	Dyson <i>et al.</i> 2000
Kingsborough 1, Sheppey	Certain	TQ 9770 7200	At 69 m OD, on Drift deposits over London Clay. On slope just below crest of low hill, facing south towards river Swale and North Downs	1998 (Archaeology South-East), 2004 (Wessex Archaeology)	Overall diameter approx 160 m. 3 circuits. Much pottery and flint in inner and middle circuits. c. 100 m south of Kingsborough 2.	Allen and Leivers forthcoming
Kingsborough 2, Sheppey	Certain	TQ 9770 7235	At 71 m OD, on Drift deposits over London Clay. Upslope from Kingsborough 1, with same aspect but also, since it surrounds the highest point on the island, with views over the Thames estuary to Essex	2004	Single arc of segments delimited to the N by a steepish slope rather than by earthworks, disappearing under newly built houses to S, not yet traced to W. Sections suggest external bank. Finds relatively few.	Allen and Leivers forthcoming
Chalk Hill, Ramsgate	Certain	TR 3635 6535	At c. 30 m OD on cliffs of Upper Chalk overlain by Brickearths, above Pegwell Bay, on S-facing slope	1997–8	3 circuits, the outermost approx. 150 m across. Inner ditches fairly insubstantial, Outer ditch wider, deeper and richer in finds, formed from series of pits, extensively recut. Two parallel, fairly straight discontinuous ditches cutting middle and outer circuits, also Neolithic, cut in turn by possible cursus.	Shand 1998; 2001; 2002
Eastry or Tilmanstone	Probable	TR 3038 5237			Two circuits, incompletely visible on air photographs	Dyson <i>et al.</i> 2000; Hammond 2007
Combe Hill, Eastbourne	Certain	TQ 5750 0222	At 190 m OD, on undifferentiated Upper/Middle Chalk. Open to steep natural scarp on N. Overlooks lower ground to SE, visible from higher ground to N	1949 (Musson), 1962 (Seton Williams)	2 circuits of well preserved earthworks, Ebbsfleet Ware from Musson's excavation was secondary. No Bowl pottery from his or Seton Williams' excavation.	Musson 1950; Drewett 1994

Site	Category	NGR	Topography	Fieldwork dates	Summary description	Selected references
Offham Hill, Hamsey	Certain	TQ 3988 1175	At 110 m OD on NE-facing slope of Upper Chalk, just below highest point of hill. Looks over lower ground to NE rather than Ouse valley to E	1976	Two circuits, E part of site quarried away, rest badly ploughed-down. Relatively shallow ditches (surviving to max 0.80 m), naturally silted. More material in outer ditch than inner. Few or no Neolithic features in interior.	Drewett 1977
Whitehawk, Brighton	Certain	TQ 3303 0477	At 120 m OD on saddle of spur of Upper Chalk extending from South Downs towards sea. 'Tilted' to and intervisible with downs to N, location visible from lower ground to SW. Steep slope to E.	1929 (Ross Williamson); 1932–33 and 1935 (Curwen); 1991 (Russell)	Composed of four clearly-defined circuits, with further intersecting and overlapping ones, only parts of which can be detected on the surface. Outer circuit joined by tangential earthworks, segmented in NE, continuous in SW. Two further possible ditches to S observed by Curwen during road building in 1935. Gate structures. Discrete Neolithic features in interior.	Ross Williamson 1930; Curwen 1934a; 1936; Russell and Rudling 1996
Barkhale, Bignor Hill	Certain	SU 9758 1261	At 200 m OD, on south-facing slope of Upper Chalk, capped by Clay-with-Flints	1958–61 (Seton Williams); 1978 (Leach)	Well preserved earthworks, 1 ovoid circuit. Much clay and silt in fill descriptions	Leach 1983
Bury Hill, Houghton	Certain	TQ 0023 1203	At 152 m OD, just below summit of Upper Chalk down, SE-facing	1979	Defined by single continuous pit-dug ditch with W entrance. Early Neolithic artefacts.	Bedwin 1981
Court Hill, Singleton	Certain	SU 8977 1375	At 180 m OD, on sloping SW-facing spur of Upper Chalk, relatively gentle approach on NE, otherwise steep	1982	Single circuit, undated crescentic earthwork to N	Bedwin 1984
The Trundle, Singleton	Certain	SU 8774 1107	At 195 m OD on well defined, isolated summit of Upper Chalk, 'tilted' N towards downs. Location spectacularly visible from coastal plain	1928 and 1930 (Curwen); 1980 (Bedwin and Aldsworth)	Composed of three clearly defined circuits and further intersecting and overlapping ones, only parts of which can be detected on the surface. Outworks to the north and west may be of Neolithic or later date, perhaps relating to the Iron Age hillfort which occupies the same hilltop.	Curwen 1929; 1931; Bradley 1969; Bedwin and Aldsworth 1981
Halnaker Hill, Boxgrove	Probable	SU 9200 0965	At 125 m OD, on S-facing spur of Upper Chalk capped by Clay-with-Flints, running off summit to E	1981–83	Subquadrangular, causewayed, with inturned entrance in S. Some survives as slight earthwork, several potential causeways.	Bedwin 1992

Table 2: Radiocarbon dates from long and oval barrows in Sussex and Surrey

Lab no.	Sample ref.	Material	Context	Radiocarbon age BP	$\delta^{13}\text{C}$ (‰)	Calibrated age range (2-sigma)	Comment
Bevis' Thumb long barrow, East Sussex							
I-11843		<i>Corylus</i> and <i>Pomoideae</i>	Near W butt of S ditch, layer 8. Charcoal-rich soil containing Neolithic pottery similar to that from The Trundle, entering ditch from exterior, overlying chalk rubble primary silts (Drewett 1981; 2003)	4546±95		3630–2920	All charcoal short-lived, although bulked. If sample derived from single event, provides <i>terminus ante quem</i> for construction of barrow
North Marden oval barrow, West Sussex							

Lab no.	Sample ref.	Material	Context	Radiocarbon age BP	$\delta^{13}\text{C}$ (‰)	Calibrated age range (2-sigma)	Comment
HAR-5544	Sample 3	Charcoal : 9 g <i>Quercus</i> sp., 8 g <i>Corylus</i> sp., 5 g <i>Fraxinus</i> sp. Note on charcoal from the site: 'About 80% of the charcoal fragments identified appear to have come from brushwood-sized timber; the rest of the fragments (where discernible) derive from larger branches or trunk material' (Cartwright 1986, microfiche frn.25)	Segment 6, context 65. Area of charcoal c. 1 x 1.4 m with Neolithic Bowl pottery, lithics, and adult male cranium within loose chalk rubble derived from barrow in recut of short segment at W end of mound (Drewett 1986, 35, 41, 42, 49)	4710±10		3710–3100	Bulked sample contained long-lived species and could have contained mature wood. Provides <i>terminus post quem</i> for context.
HAR-5542	Sample 1	1 g <i>Fraxinus</i> sp., 2 g <i>Ulex</i> sp., 6 g <i>Quercus</i> sp. (Cartwright 1986, microfiche frame 24). Same general note as for HAR-5544	Ditch segment 4, context 25. Patch of ashy loam in upper ditch fill, containing burnt flint and bone and Peterborough and Beaker pottery (Drewett 1986, 33, 42, fig. 5)	3550±80		2140–1680	As above
HAR-5543	Sample 2	12 g <i>Fraxinus</i> sp., 6 g <i>Corylus</i> sp., 2 g <i>Quercus</i> sp., 1 g. <i>Crataegus</i> sp., 1 g <i>Betula</i> sp. (Cartwright 1986, microfiche frame 24). Same general note as for HAR-5544	Ditch segment 5, context 55. Topmost fill of ditch (Drewett 1986, fig. 5: I–J).	3590±80		2200–1730	As above
Alfriston oval barrow, East Sussex							
HAR-940	ALF1	Red deer. Antler pick (Drewett 1975, fig. 12: 34)	Ditch 2, layer 6. Bottom layer of ditch., with struck flint of early Neolithic character and, at an equivalent level in an adjoining length of ditch, a few sherds probably from a single indeterminate Bowl (Drewett 1975, 126, 151, fig. 3, fig. 7: O–P)	4310±10	□22.5	3340–2620	Single-entity sample in apparent functional relation to context, but date surprisingly late for associated artefacts. Discrepancy between HAR-942 (measured at the same time as HAR-940) and HAR-1811 (measured later) raises possibility that HAR-940 may be too young. See text.
HAR-942	ALF4	Human. Bones of one leg from articulated crouched burial probably female adult. (Drewett 1975, 126, 144–5, 151, fig. 8. pl XII; Jordan <i>et al.</i> 1994, 4). Replicate of HAR-1811	Base of burial pit on axis of mound of oval barrow. Stratigraphic relation to mound uncertain because mound badly ploughed, and because of cut made into mound in area of grave in C19 (Drewett 1975, 121–7, figs 4, 5)	2590±90	□23.5	910–415	HAR-942 and -1811, measured on two legs of the same individual, cannot both be accurate. See text.
HAR-1811		Replicate of HAR-942, on bones of second leg of same individual	From the same burial as HAR-942	3190±80	□22.5	1665–1270	As above
HAR-941	A1	Red deer. Antler pick	On buried land surface c. 2.5 m N of burial pit (Drewett 1975, 124, fig. 3)	2540±70	□23.3	830–400	Some doubt must hang over accuracy of this measurement, since it was made at the same time as HAR-942. See text
Badshot, Surrey							
BM-2274R	B.IV.3	Red deer antler beam	Primary chalk silting of north ditch, cutting B4, where there were two leaf arrowheads (Keiller and Piggott 1939, 133–35, fig. 53: section E–F)	4860±80	□21.4	4045–3100	Large standard deviation and wide probability distribution result from the application of a correction following discovery of counting error in 1980s (Bowman <i>et al.</i> 1990)

Lab no.	Sample ref.	Material	Context	Radiocarbon age BP	$\delta^{13}\text{C}$ (‰)	Calibrated age range (2-sigma)	Comment
BM-2273 N1	B.IV.3 (F)	Cattle vertebrae, probably articulating, since they are described as 5 th and 6 th cervical vertebrae and 3 thoracic vertebrae, all with unfused epiphyses (Keiller and Piggott 1939, 147–48). Replicate of BM-2273N2, -2273N3	From the same context as BM-2274R	4780±40		3640–3380	Weighted mean 4746±27 BP (T' =1.3; T' (5%)=6; i=2) Three replicates measured in course of correction of counting error discovered in 1980s (Bowman <i>et al.</i> 1990)
BM-2273 N2	B.IV.3 (F)	Replicate of BM-2273N1, -2273N3	From the same context as BM-2274R	4710±50			
BM-2273 N3	B.IV.3 (F)	Replicate of BM-2273N1, -2273N2	From the same context as BM-2274R	4730±50			
BM-2272R	B.IV.3 (G)	Bone fragments	Red brown loam at E terminal of N ditch, stratified above other samples, associated with sherds of a Mortlake style Bowl (Keiller and Piggott 1939, 138–39, 142–43, fig. 53: section E–F)	4640±130	□22.6	3655–2940	Large standard deviation and wide probability distribution result from the application of a correction following discovery of counting errors in the early 1980s (Bowman <i>et al.</i> 1990) Bulked, unidentified sample provides <i>terminus post quem</i> for context

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