

# Who was buried at Stonehenge?

Mike Parker Pearson<sup>1</sup>, Andrew Chamberlain<sup>1</sup>, Mandy Jay<sup>2</sup>,  
Peter Marshall<sup>3</sup>, Josh Pollard<sup>4</sup>, Colin Richards<sup>5</sup>, Julian Thomas<sup>5</sup>,  
Chris Tilley<sup>6</sup> & Kate Welham<sup>7</sup>

*Stonehenge continues to surprise us. In this new study of the twentieth-century excavations, together with the precise radiocarbon dating that is now possible, the authors propose that the site started life in the early third millennium cal BC as a cremation cemetery within a circle of upright bluestones. Britain's most famous monument may therefore have been founded as the burial place of a leading family, possibly from Wales.*

**Keywords:** Britain, Neolithic, Beaker, Stonehenge

## The human remains at Stonehenge

Stonehenge is Britain's largest cemetery of the third millennium cal BC and yet we know very little about who was buried there and when. Excavations across almost half of its area have yielded 52 cremation burials, many cremated fragments and over 40 fragments of unburnt human bone (Figures 1 and 2; McKinley 1995). The total number of individuals buried at Stonehenge has been estimated as 240, based on the assumption that many of the cremation deposits each contain the remains of two or three persons (Pitts 2001: 121). If single-individual cremation burials were the norm, a more conservative estimate might be 150 people buried at Stonehenge in the third millennium cal BC.

During his work at Stonehenge between 1919 and 1926, William Hawley excavated cremations from the western half of the monument (mostly from the ditch and the Aubrey Holes; Figure 2). It seems that no museum was prepared to curate these remains, since the scientific value of cremated bone was not appreciated in Britain at the time. In 1935, William Young and R.S. Newall reburied an estimated 58 of the cremation deposits excavated from Stonehenge; packed into four sandbags and accompanied by an inscribed plaque, they were tipped into the previously excavated Aubrey Hole 7. A few cremated remains from later excavations at Stonehenge by Richard Atkinson have remained available for study, being

<sup>1</sup> Department of Archaeology, University of Sheffield, Sheffield, UK (Email: m.parker-pearson@sheffield.ac.uk)

<sup>2</sup> Department of Archaeology, University of Durham, Durham, UK

<sup>3</sup> Chronologies, 25 Onslow Road, Sheffield S11 7AF, UK

<sup>4</sup> Department of Archaeology & Anthropology, University of Bristol, Bristol, UK

<sup>5</sup> School of Arts, Histories and Cultures, University of Manchester, Manchester, UK

<sup>6</sup> Department of Anthropology, University College London, London, UK

<sup>7</sup> School of Conservation Sciences, University of Bournemouth, Bournemouth, UK

Received: 24 April 2008; Accepted: 22 June 2008; Revised: 27 June 2008

ANTIQUITY 83 (2009): 23–39

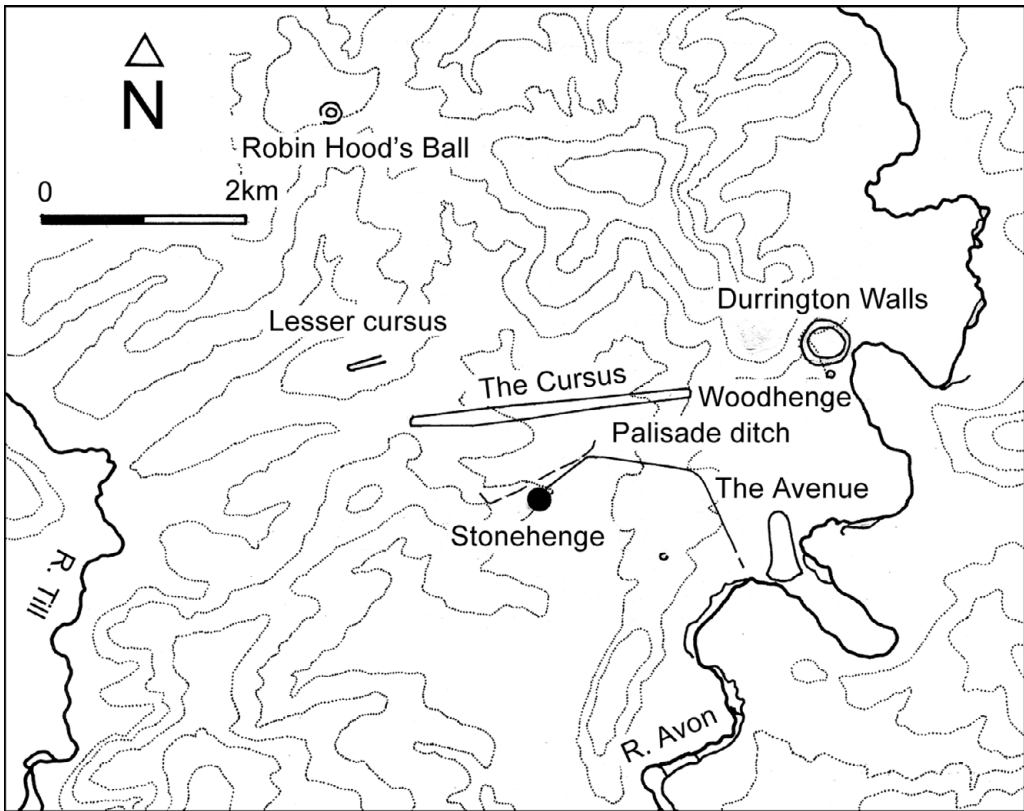


Figure 1. The location of Stonehenge (see also Figure 9).

curated in Salisbury & South Wiltshire Museum. Only three cremations have been subjected to osteological analysis (McKinley 1995: 456–8) and only one has had associated charcoal radiocarbon-dated, too imprecisely to be of use (C-602;  $3798 \pm 275$  BP; 2890–2220 cal BC [95% probability]). Previous researchers have assigned the cremation burials to the end of Stonehenge's timber phase (Phase 2; see Table 1) and the beginning of its bluestone and sarsen phase (Phase 3), estimated as around the twenty-seventh to twenty-sixth centuries cal BC (Cleal *et al.* 1995: 154, 163).

Some of the *unburnt* human bones from Hawley's excavations have been lost (Pitts 2001: 116–8), but a number of these have also been kept safely in Salisbury & South Wiltshire Museum's collections. The only prehistoric inhumation from Stonehenge, an arrow-pierced adult male known as the *Stonehenge Archer*, was buried within the ditch (Cutting 61; Evans 1984) and dates to the Beaker period (2340–2195 cal BC [95% probability]).

In 2007 the *Stonehenge Riverside Project* and *Beaker People Project* jointly embarked upon a dating programme of these surviving remains to establish when Stonehenge was used as a burial space. With new techniques available for dating cremated human bone (Lanting *et al.* 2001) and improved methods of analysis for cremated bones

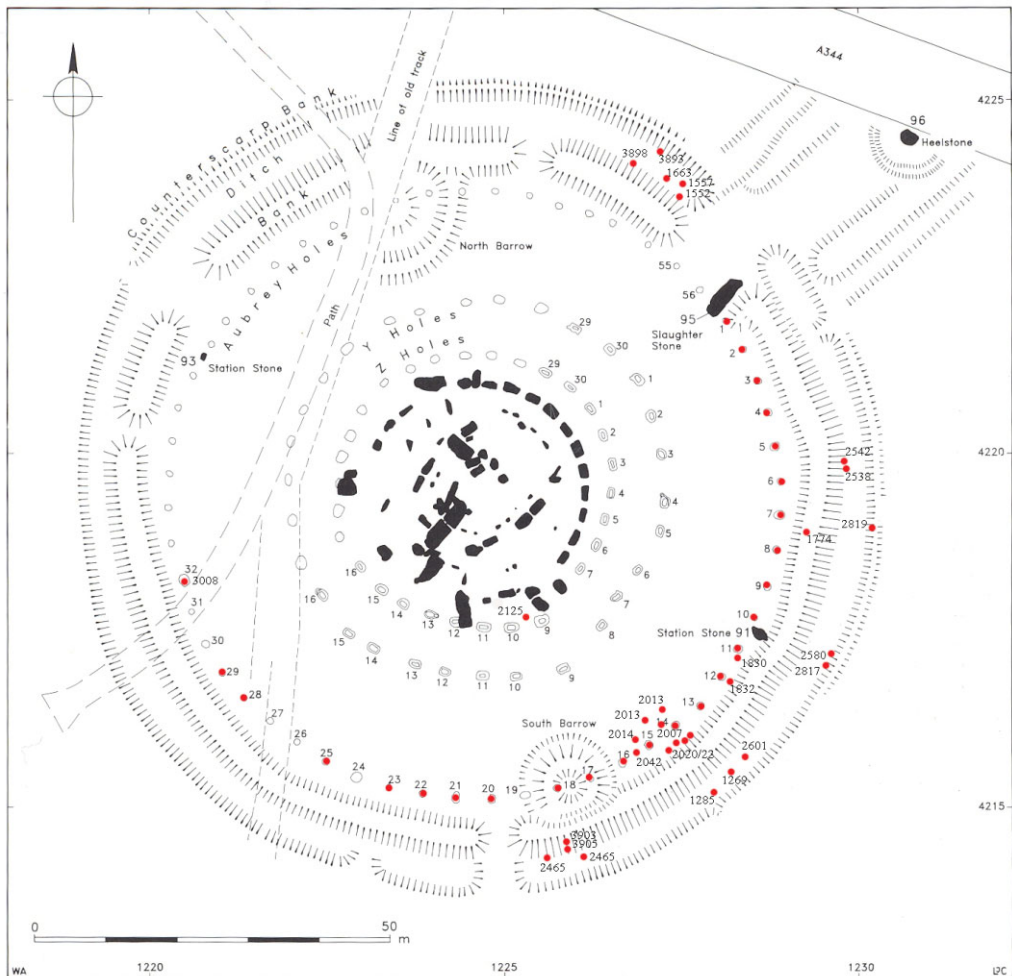


Figure 2. Plan of Stonehenge, showing the Aubrey Holes (outer perimeter), the bluestones (both in black; the bluestones are the smaller stones) and the sarsens, with finds of human bone marked as black spots (from Cleal *et al.* 1995: Figure 250; copyright of English Heritage).

(McKinley & Roberts 1993; Mays *et al.* 2002; Brickley & McKinley 2004) this is an opportune moment to study these neglected people. Furthermore, the contexts and dates of the cremations have led to an amendment of Stonehenge's overall sequence of use.

## Cremations

Of the 34 Aubrey Holes so far excavated, all but eight have contained cremated bones (Figure 2). The cremation burial within Aubrey Hole 32 is the one instance in which human remains are likely to be primary depositions within these pits. Hawley's records of

Table 1. The structural sequence at Stonehenge, comparing the conventional and proposed schemes.

Existing scheme (Cleal <i>et al.</i> 1995)		
3015–2935 cal BC	Phase 1	Ditch, bank & poss. Aubrey Holes
c. 2900–2400 cal BC	Phase 2	Timber posts, cremation burials
c. 2550–2400 cal BC	Phase 3i	Bluestone arc
2440–2100 cal BC	Phase 3ii	Sarsen trilithons & circle
c. 2300–2000 cal BC	Phase 3iii	Features on west side of stone circle
2270–2020 cal BC	Phase 3iv	Bluestones re-arranged in central oval
2210–1930 cal BC	Phase 3v	Bluestones re-arranged in central horseshoe
2020–1740 cal BC	Phase 3vi	Z Holes
1630–1520 cal BC	”	Y Holes
Revised scheme (this paper & Parker Pearson <i>et al.</i> 2007)		
3015–2935 cal BC	Stage 1	Bluestones in Aubrey Holes, henge ditch & bank, timber posts, cremation burials
c. 2900–2600 cal BC	Stage 2	Bluestones re-arranged in an arc, with timber passageway, timber post arc and large house/hall on south side, cremation burials
2580–2470 cal BC	Stage 3	Sarsen circle & trilithons, banked & ditched avenue, timber posts, Station Stones, Heel Stone, Slaughter Stones (bluestones presumably re-arranged among sarsens), cremation burials
2450–2210 cal BC	Stage 4	Large pit in centre of Stonehenge, features on west side of stone circle, ‘Stonehenge Archer’ burial
2270–2020 cal BC	Stage 5	Bluestones re-arranged in central oval
2210–1930 cal BC	Stage 6	Bluestones re-arranged in central horseshoe
2020–1740 cal BC	Stage 7	Z Holes
1630–1520 cal BC	Stage 8	Y Holes

these pits are sketchy at best (Hawley 1921 and unpublished archive). Nonetheless, it is possible to gain some understanding of the stratigraphic positions of cremation deposits within at least some of the Aubrey Holes. Reviewing his descriptions and section drawings, it is possible to establish the positions of some of these deposits within the fills of the pits (see below).

Samples from three cremation burials produced radiocarbon dates within the third millennium cal BC but at different periods within it (Table 2 and Figure 3). The earliest date comes from the cremated remains of an adult from Atkinson’s 1950 excavation of Aubrey Hole 32 (Figure 4, layer 4 [context 3008]; Cleal *et al.* 1995: 101), and dating to 3030–2880 cal BC (94% probability; OxA-18036;  $4332 \pm 35$  BP). The two other dated cremation deposits were excavated in 1954 by Atkinson from the fills of the ditch to the west of Stonehenge’s north-east entrance (within Cutting 41 [context 3893] and 42 [context 3898]). The earlier of these (from Cutting 41), of a young/mature adult, dates to 2920–2870 cal BC (OxA-17957;  $4271 \pm 29$  BP). The later cremation deposit (from Cutting 42), that of an adult woman aged about 25 years, dates to 2570–2400 cal BC (OxA-17958;  $3961 \pm 29$  BP), estimated as 2470–2300 cal BC (95% probability). This is likely

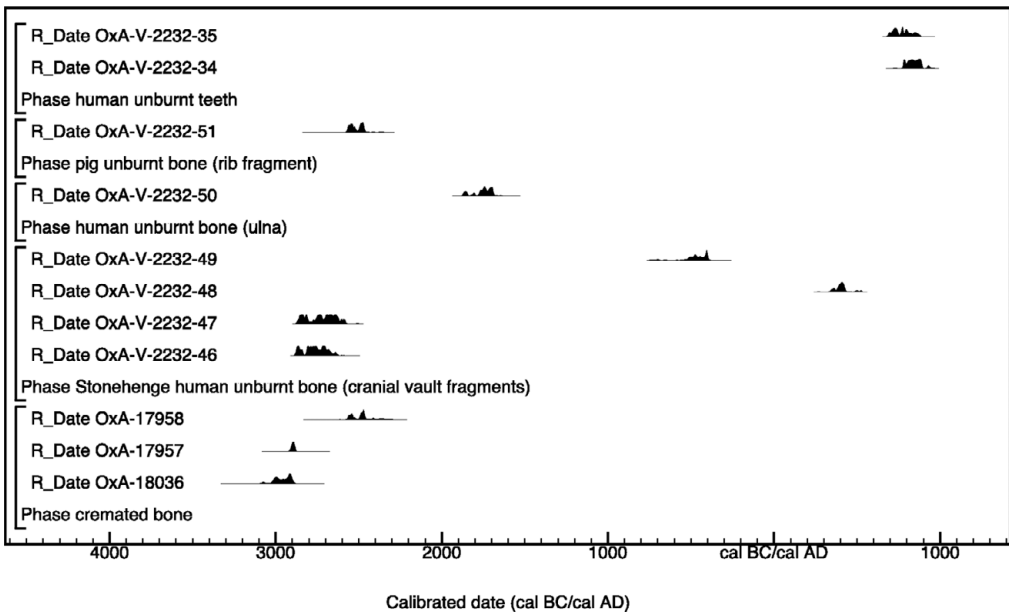


Figure 3. New radiocarbon dates from Stonehenge.

to be later than the construction of the sarsen circle (2580–2470 *cal BC*; 95% probability; Figure 5) and trilithons (2600–2400 *cal BC*; 95% probability; Figure 5; Parker Pearson *et al.* 2007).

## Inhumations and unburnt bones

Most of Stonehenge's surviving unburnt and disarticulated human bones are from unstratified or disturbed contexts. The aim of dating a selection of these was to establish whether any of them were contemporary with Stonehenge's three principal stages of use within the third millennium *cal BC*. The recently dated skeleton of a decapitated man buried within the sarsen circle indicates that he met his fate in the post-Roman period (Pitts 2001: 300–22; Pitts *et al.* 2002), and five out of the seven stray human bones and teeth selected date to between the early second millennium *cal BC* and the second half of the first millennium *cal AD* (Table 2 and Figure 3).

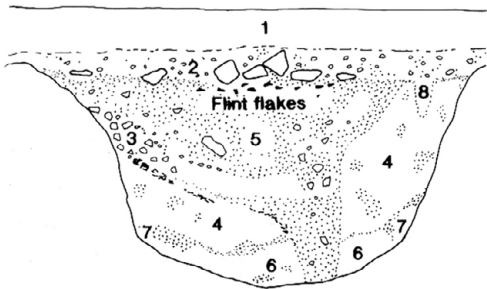


Figure 4. Atkinson's section through Aubrey Hole 32, showing the layer (4) in which the radiocarbon-dated cremated remains were found (from Cleal *et al.* 1995: Figure 55; copyright of English Heritage).

Table 2. New radiocarbon dates from Stonehenge.

Lab No	Material	Context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) $^{14}\text{C}$	$\delta^{13}\text{C}$ (‰) diet	$\delta^{15}\text{N}$ (‰)	C:N (atomic)	Calibrated date range (95% confidence)
OxA-18036	Human bone cremated	Aubrey Hole 32 (3008)	$4332 \pm 35$	-17.0				3080–2890 cal BC
OxA-17957	Human bone cremated	Ditch fill C41 (3898)	$4271 \pm 29$	-20.3				2920–2870 cal BC
OxA-17958	Human bone cremated	Ditch fill C42 (3893)	$3961 \pm 29$	-19.2				2570–2400 cal BC
OxA-V-2232-46	Human skull fragment. 1 of 4 fragments from the same context, apparently from one parietal	Ditch fill C25 (1560)	$4169 \pm 31$	-21.8	-21.8	9.9	3.4	2890–2620 cal BC
OxA-V-2232-47	Human skull	Ditch fill C28 (2589)	$4127 \pm 31$	-21.9	-21.9	10.4	3.4	2880–2570 cal BC
OxA-V-2232-48	Human skull fragment. 1 of 2 conjoining fragments (only one sampled)	Ditch fill C19 (1282)	$1646 \pm 27$	-20.3	-20.2	10.9	3.3	cal AD 340–510
OxA-V-2232-49	Human skull	Ditch fill C42 (3896)	$2379 \pm 28$	-20.3	-20.5	8.9	3.3	520–390 cal BC
OxA-V-2232-50	Human adult ulna	Ditch fill C21 (1384)	$3436 \pm 30$	-20.5	-20.8	10.5	3.3	1880–1680 cal BC
OxA-V-2232-51	Pig rib fragment	Posthole C8 1884 (1885)	$3977 \pm 31$	-20.5	-20.5	6.4	3.3	2580–2460 cal BC
OxA-V-2232-34	Human dentine from root of lower left 2 <sup>nd</sup> premolar	Stonehole 27 upper fill C58 (3543)	$1181 \pm 25$	-18.6	-19.1	9.3	3.2	cal AD 770–950
OxA-V-2232-35	Human dentine from root of upper left 1 <sup>st</sup> premolar	Eastern area C7 (1815)	$1236 \pm 25$	-19.23	-19.5	11.0	3.2	cal AD 680–880

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Two fragments of human skull, however, are from individuals who died in the early third millennium cal BC during Stonehenge's Stage 2, a period when inhumation burials were very rare in Britain. The two skull fragments date to 2890–2620 cal BC (OxA-V-2232-46;  $4169 \pm 31$  BP; sub-adult or adult from context 1560 in Cutting 25) and to 2880–2570 cal BC (OxA-V-2232-47;  $4127 \pm 31$  BP; older mature adult or older adult from context 2589 in Cutting 28). The fragments came from different segments of the ditch, at least 60m apart and separated by Stonehenge's north-east entrance, but their statistically consistent radiocarbon determinations ( $T' = 0.9$ ;  $v = 1$ ;  $T'(5\%) = 3.8$ ; Ward & Wilson 1978) and near-identical  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  isotope values raise the possibility that they derive from one and the same individual.

A human rib was found with animal bones in the fill (context 1885) of a posthole (1884 in Cutting 8) on the south-east side of the sarsen circle, excavated by Hawley in 1923 (McKinley 1995: Table 59), but it could not be located in the collections and so a pig rib from this context was selected for dating (Table 2).

## Implications for the Stonehenge sequence – the perimeter ditch

The late date of the uppermost cremation within Stonehenge's ditch of 2570–2400 cal BC (OxA-17958;  $3961 \pm 29$  BP) highlights a stratigraphic problem which has hitherto been overlooked. The ditch's upper fill had been assigned to the first half of the third millennium cal BC (Phase 2a in Cleal *et al.* 1995: 118–22) and yet one of the six dated disarticulated

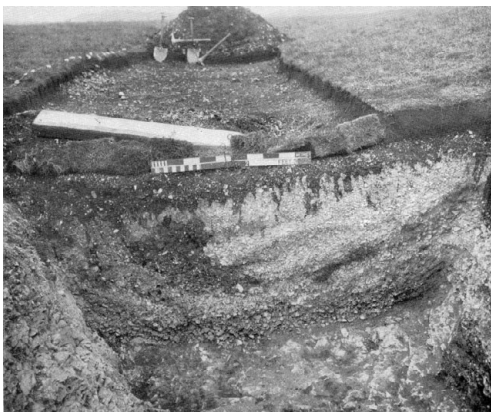


Figure 5. Hawley's photograph (looking west) of the Stonehenge ditch section (NW-SE) in segment 13 or 14, showing the U-shaped re-cut (with its dark fill on the SE side [left] and clean chalk introduced from the NW [right]) within the upper ditch fill (from Hawley 1922; Plate 8, Figure 2; copyright of the Society of Antiquaries of London).

animal bones, from over a metre below the ground surface, provides a *terminus post quem* of 2560–2140 cal BC (OxA-4880;  $3875 \pm 55$  BP), estimated as 2490–2190 cal BC (94% probability), for the in-filling of the upper layers of the ditch. The lowest secondary fills of the ditch accumulated early in the sequence, as confirmed by a date on articulated piglet bones of 2910–2670 cal BC (OxA-5981; Cleal *et al.* 1995: 84, 133; Bayliss *et al.* 1997: Table 1; Hedges *et al.* 1997: 252) but the similarly early dates on disarticulated bones, other than OxA-4880, from the top metre of the ditch's fill indicate that these other single bones are residual.

A closer look at the photographs and drawings of the ditch sections (Cuttings 41 and 42) excavated by Atkinson and re-excavated by John Evans (Evans 1984; Cleal

*et al.* 1995: 73, 75, Figures 58 and 60) reveals that the upper fill was re-cut by a shallow U-shaped ditch (Figure 6). This is most clearly visible in the drawing of Section A within

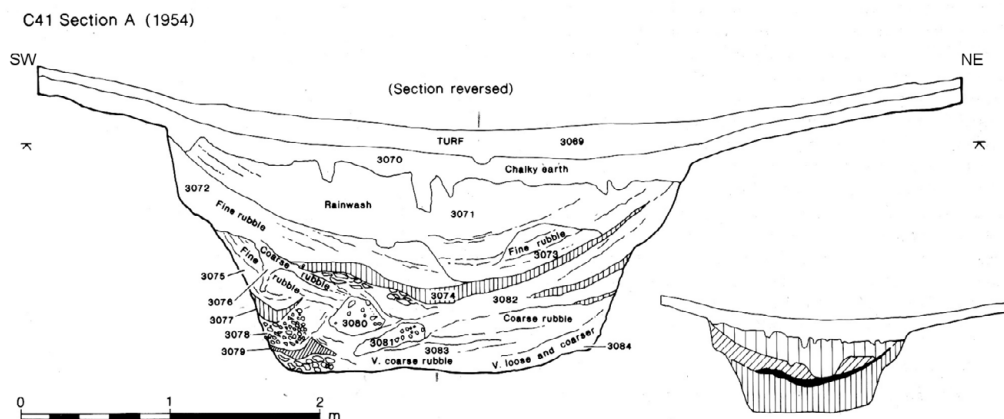


Figure 6. Atkinson's section drawing of the Stonehenge ditch (Section A within Cutting 41), showing the U-shaped re-cut within the upper ditch fill from layer 3082 upwards (from Cleal *et al.* 1995: Figure 38; copyright of English Heritage).

Cutting 41 (Cleal *et al.* 1995: 75, Figure 60) which shows that the later ditch was slightly wider than the original 1.6m-deep, flat-bottomed ditch. The re-cut ditch's primary fill of coarse rubble can be seen at 0.6m above this flat bottom (on the south-west side of the ditch), cutting through the secondary fill of fine rubble within the original ditch fill (Figure 6; we argue that contexts 3072–4 above this coarse rubble are fills of the re-cut ditch). Similar evidence of a U-profile re-cut (Figure 5) can be found in all of Hawley's photographs of ditch sections that he excavated around the eastern circuit (Hawley 1922: Plate 8, Figures 1 and 2; 1923: Plate 4, Figure 2, Plate 5, Figure 2; Cleal *et al.* 1995: Figures 40, 42–43, 61–64). There is no dating evidence from these to indicate when this re-cutting occurred but, on the assumption that the ditch was re-cut symmetrically either side of the north-east entrance, it would be logical to interpret these other re-cuts as part of the same operation. Perhaps this re-digging of the ditch was done to enhance the monument's appearance once the sarsens were erected and/or to demarcate its interior space more clearly. Since the animal bone (dated by OxA-4880) was in the lower fill of the re-cut ditch, this re-cutting has to date to within or after 2560–2340 *cal BC* [95% probability] and prior to the Stonehenge Archer's burial (2340–2195 *cal BC* [95% probability]). It was thus carried out in the period of the sarsen circle and trilithons.

The recognition of this episode of re-cutting clarifies some key problems concerning the ditch stratigraphy. Hawley recorded layers of coarse rubble and clean, compacted chalk in the upper fill of the ditch around most of its eastern circuit, forming an 'earthy chalk rubble layer over the silt' (Hawley 1922: 51; Cleal *et al.* 1995: 118–22, Table 12). He interpreted these as deriving from 'the movement of the numerous big stones and of many people, and the generally disturbed state of the ground' (Hawley 1922: 50–1). This interpretation of large-scale backfilling of the ditch was followed both by Atkinson (1979: 72–4) and by Cleal *et al.* who considered that this was a distinct event of backfilling (1995: 118). The chalk in the upper fills of the re-cuts is much cleaner



than would be expected in a re-cut ditch's secondary fills and does indeed hint at active incorporation of clean chalk, perhaps from an attempt to level the bank and fill in the re-cut ditch.

This provides a chronological framework for the cremations found within the enclosure ditch. Only one cremation deposit appears to have been placed directly onto the floor of the ditch shortly after its digging-out (Cleal *et al.* 1995: 82, Figure 42, context 1269; Pollard & Ruggles 2001: 85; this was not available for radiocarbon dating, having been buried by Young & Newall in 1935). More were deposited in the next few centuries as the ditch filled up and some of these, not yet radiocarbon-dated, may have been disturbed by the re-cutting and redeposited as fragments of cremated bone scattered within the chalk fill of the re-cut (Cleal *et al.* 1995: 124). The majority of cremations within the ditch were noted by Hawley as having been cut from the top of the silt through the upper ditch fills (Hawley 1928: 157; Cleal *et al.* 1995: 154). *'That they were interred later than the date of the ditch is evident from their partial burial in the silt and from their being found also on the interior slope of the rampart which was formed by soil cast out of the ditch'* (Hawley 1928: 157). As a result, these can now be considered to have been deposited after the re-cutting, in the decades and centuries after 2560 cal BC. This is the earlier end of the date of 2560–2140 cal BC (OxA-4880) for animal bone within the re-cut ditch fill. The dating of this event and of the burial of the cremated 25-year old woman can be refined as estimates when considered within the existing statistical model of the ditch infilling (Bayliss *et al.* 1997: 52) but the recognition of a recutting event invalidates prior beliefs about the length of time that the ditch took to fill in.

## The Aubrey Holes

Until now, the assignment of the Aubrey Holes within the Stonehenge sequence has been uncertain. The new date from Aubrey Hole 32 places the period of digging the circle of Aubrey Holes within the period of Stonehenge's first phase of use when its encircling ditch was dug; this fits the evidence of the shared concentricity and regular spacing of pit circle, bank, ditch and counterscarp (Chamberlain & Parker Pearson 2007).

There is no stratigraphic dating within the Aubrey Holes. It may be useful, however, to re-examine their in-filling using the same threefold distinction between primary, secondary and tertiary (re-cut) contexts as has been found in the Stonehenge ditch (see above). This three-part sequence can be applied as a provisional model (Figure 7) to suggest when cremation burials from these particular Aubrey Hole fills might date within the overall Stonehenge sequence.

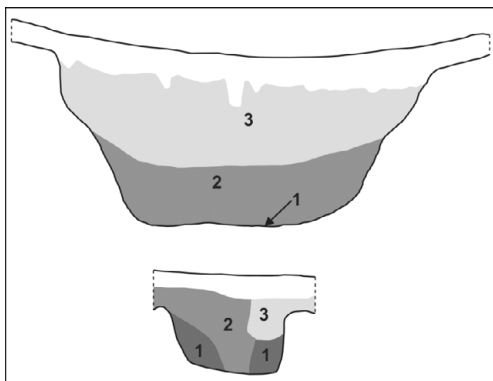


Figure 7. Schematic re-phasing of layers within the Stonehenge ditch (1 = base of ditch; 2 = lower ditch fill; 3 = fill of re-cut) and the Aubrey Holes (1 = primary fill; 2 = secondary fill; 3 = insertion into filled pit) (SRP 2008 M. Dover).

Having just excavated the Aubrey Holes, Hawley stated that *'there can be little doubt that they once held small upright stones'*, noting the compaction and crushing of basal chalk rubble in two of them and crushing of the sides in many of them (Hawley 1921: 30–1). However, he changed his mind some years later when he visited Maud Cunnington's excavations at Woodhenge. He wrote that the postholes there *'correspond exactly to the original conditions of the Aubrey holes'* (1928: 156). Hawley's unfortunate revision has led to lengthy and unresolved discussion on whether the Aubrey Holes, severally or universally, held posts or even stakes inserted into their fills (Atkinson 1956: 13; Pitts 1982: 127, 2001: 108–9; Cleal *et al.* 1995: 102–7; Pollard & Ruggles 2001: 75; Burl 2006: 119–20). Atkinson excavated two Aubrey Holes in 1950 and considered that these and therefore the others were simply pits (1979: 172). He in turn discounted their interpretation as stone-holes even though the hard, compact primary fills (layers 6, 7 and 4; see Figure 4) that he encountered within Hole 32 are consistent with its use as a stone-hole. Whilst layer 5 (in Figure 4) might appear initially as the fill of a postpipe, it is better interpreted as the fill of a hole from which the standing stone has been removed from the left side (Atkinson's section drawing has no co-ordinates of any kind), causing crushing of the pit's edge on the left side and displacement of the primary packing fills (layers 4, 6 and 7) on the left side so that they were pushed downwards to the base of the pit.

Our own recent experience of excavating postholes at Durrington Walls and Woodhenge highlights how unlikely it is that the Aubrey Holes ever held posts (Pollard & Robinson 2007; Thomas 2007). A comparison of the Aubrey Holes' dimensions with equivalent-diameter postholes at Woodhenge and the Southern Circle at Durrington Walls (Cunnington 1929: 33–5; Wainwright with Longworth 1971: 380–1) illustrates this difference (Figure 8). It is important to note that the profiles, depths and diameters of the Aubrey Holes (averaging 1.10m in maximum diameter and 0.88m deep; Cleal *et al.* 1995: Table 10, Figures 51–5) are *indistinguishable* from those of known bluestone sockets of later phases (averaging 1.12m in maximum diameter and 0.96m deep; *ibid.*: Figures 118, 120, 122, 131, 140). These known bluestone sockets include the single sockets of the bluestone arc's paired Q and R holes. Within this interpretive perspective, the cremation burial excavated by Atkinson in Aubrey Hole 32 is located within the chalk packing for a standing stone, thus being part of the primary fill of the pit.

There is thus a strong case to be made for the Aubrey Holes having held stones. They must have been bluestones because all the Stonehenge sarsens are larger, and they must have been erected in their undressed state since no chippings can be identified from this earliest phase in the ditch. This re-interpretation of the Aubrey Holes puts the arrival of at least 56 bluestones at Stonehenge at the beginning of the third millennium cal BC, rather than in the mid-third millennium cal BC. Where did the bluestones go after their removal from the Aubrey Holes? The only known bluestone sockets elsewhere at Stonehenge where they may have been re-erected are those of the bluestone arc (known as the Q and R holes). This re-location from the Aubrey Holes to the bluestone arc may have occurred at any point between the twenty-ninth and twenty-sixth centuries cal BC. The date of the cremation burial in Aubrey Hole 32 makes it likely that

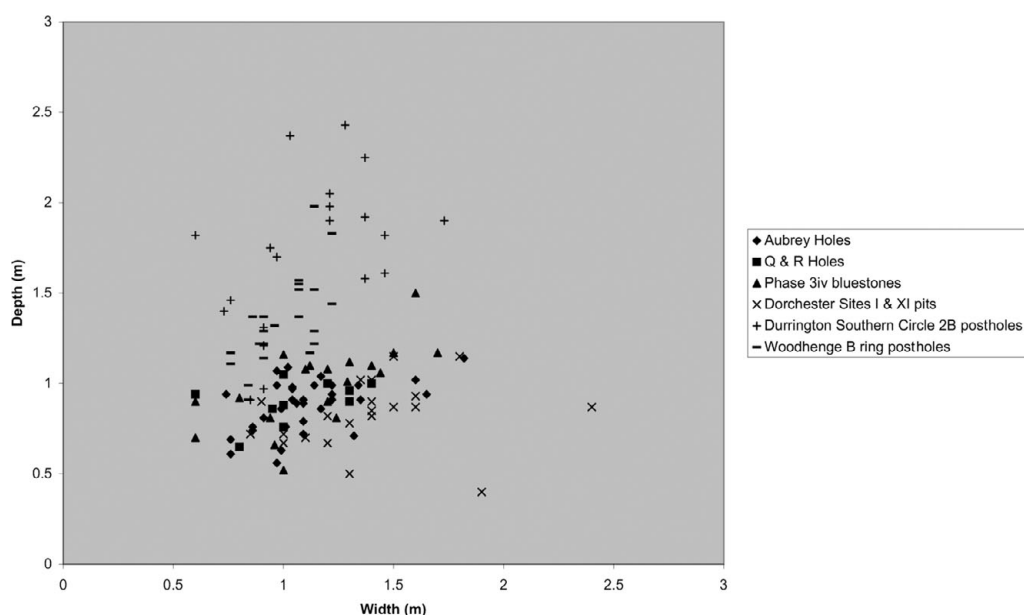


Figure 8. Pit sizes of excavated Aubrey Holes and other bluestone sockets from Stonehenge (Q and R Holes, Phase 3iv bluestone holes), Dorchester-on-Thames Site I pits, and postholes of similar diameter from Woodhenge Ring B and Durrington Walls Southern Circle Ring 2B. All depths are measured from recorded ground level except for Durrington Walls (measured as depth below natural chalk). Widths are maximum diameters.

its stone was in place probably by 2890 cal BC. The holes of the bluestone arc were cut by the sarsen circle, erected in 2580–2470 cal BC.

## Sequence at the South Barrow

Within the south part of Stonehenge, the southern Station Stone (set within the South Barrow) appears to have been set into ‘a level floor . . . made of a yellow substance resembling chalk beaten fine and mixed with clay’ which was covered by the barrow mound (Hawley 1923: 14–15). Excavations at nearby Durrington Walls have revealed house floors of this composition and appearance (Parker Pearson 2007; Parker Pearson *et al.* 2007). Given this comparison, it becomes very likely that Hawley’s ‘floor’ was indeed the floor of a roofed structure, presumably without a hearth. In plan it appears to have been far larger (11m × 10m) than the domestic houses at Durrington Walls but compares closely in size and shape with the large post-walled and terraced building at Durrington Walls located north of the Southern Circle, initially interpreted as a midden (Wainwright with Longworth 1971: 38–41) but now seen as a hall-sized building. In contrast, the only human remains from early third-millennium BC Durrington Walls are three disarticulated bones from its avenue and from a pit dug into a ruined house (Parker Pearson; 2007: 133; Parker Pearson *et al.* 2007: 633), although there are two skulls from the early second millennium, and a tibia from the Iron Age (Figure 10; Table 3).

The house floor under the South Barrow lies inside the south entrance through Stonehenge's encircling ditch, on the west side of the access route from this entrance to the post-lined avenue known as the southern 'passageway' leading to a post façade (Cleal *et al.* 1995: 150–2). It may thus have been a significant staging point or gathering place for people entering or exiting the monument by its southern entrance. The floor seals Aubrey Holes 17–19 (Phase 1) and must post-date them. Any stones within the Aubrey Holes would have been removed by the time that this floor was laid. The South Barrow house and southern 'passageway' may well have been contemporary with the arc of bluestones in the Q and R holes. The house floor was buried by the fill of the South Barrow and was apparently cut by the southern Station Stone. This Station Stone (and presumably the three others) are thus likely to date to the period when the bluestone arc or the later sarsen circle and trilithons were erected. Since this Station Stone is later than the Aubrey Holes, Newham's claim for significant sightlines between these Station Stones and the Early Mesolithic postholes (Allen in Cleal *et al.* 1995) as contemporaneous structures (Newham n.d.) can be refuted.



Figure 9. Distribution of late fourth/early third-millennia BC pit-circle cremation monuments and related sites (Duggleby Howe, Priddy Circles, West Stow, Monketon Up Wimborne and Flagstones, Dorchester) in Britain.

## Discussion: the origins of Stonehenge

We can now offer a new model for the initial stages of Stonehenge. It was a cremation cemetery demarcated by a bluestone circle, later dismantled to leave the Aubrey Holes. The cemetery was in use from the early third millennium BC. Fourteen similar burial-associated monuments are known from elsewhere in Britain, likely or known to date to the end of the fourth or the beginning of the third millennium cal BC (Figure 9). The closest parallel to Stonehenge Stage 1 is, interestingly, in North Wales, about 75 miles (120km) north of the Preseli source of the bluestones. This is Llandegai henge A, Gwynedd, in which a circular ditch with internal bank enclosed the cremation burial of an adult woman dating to 3370–2930 cal BC

(GrA-22954;  $4480 \pm 50$  BP; Lynch & Musson 2004: 44–6, 118). Further cremations were buried within a sub-circular arrangement of elongated pits outside the enclosure's entrance, at least eight of which contained cremated bones (*ibid.*: 48–54). *Terminus post quem* dates from charred planks within the pits date to 3640–2870 cal BC (NPL-224;

Table 3. New radiocarbon dates on human remains from Durrington Walls.

Lab No	Material	Context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) <sup>14</sup> C	$\delta^{13}\text{C}$ (‰) diet	$\delta^{15}\text{N}$ (‰)	C:N (atomic)	Calibrated date range (95% confidence)
OxA-V-2232-43	Human bone; skull	Posthole 79 (S Circle)	3515 ± 29	-21.4	-21.7	10.0	3.3	1930–1740 cal BC
OxA-V-2232-44	Human bone; skull	Posthole 79 (S Circle)	3474 ± 29	-21.3	-21.5	10.1	3.3	1890–1690 cal BC
OxA-V-2232-45	Human bone; tibia	Layer 8 of henge ditch	2246 ± 28	-20.4	-20.6	8.6	3.3	400–200 cal BC
OxA-V-2232-41	Human bone; mandible? male	(1034)	4023 ± 30	-21.2	-21.4	11.3	3.3	2830–2470 cal BC
OxA-V-2232-42	Human bone; occipital? female	(641)	4032 ± 30	-21.9	-22.1	9.8	3.2	2620–2470 cal BC

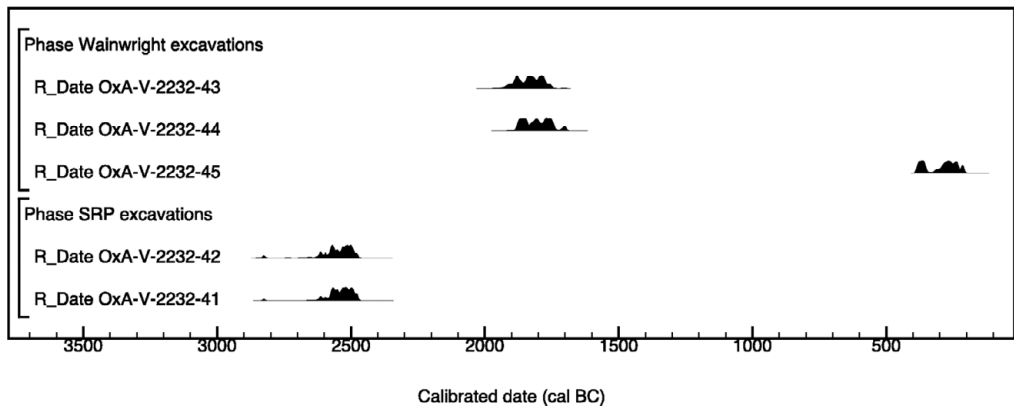


Figure 10. New radiocarbon dates on human remains from Durrington Walls.

4480 ± 145 BP), 3330–2910 cal BC (GrN-26818; 4420 ± 40 BP) and 3020–2890 cal BC (GrN-26817; 4320 ± 30 BP; *ibid.*: 119).

Cremation deposits were generally placed in secondary relationships within these pit-circle monuments, suggesting at first glance that funerary rites might not have been the principal purpose behind their construction. Yet it is likely that they were constructed as the first stage of a lengthy funerary process in association with a first, founding burial, and that those cremations which were clearly secondary were added later within the funerary sequence. Many pit circles are not associated with funerary remains (Harding with Lee 1987) but whether any of these date to this period at the turn of the fourth to third millennium cal BC, rather than later, remains to be demonstrated.

Interestingly, all of the examples except Cairnpapple, Duggleby Howe and Priddy circles are located in close proximity to cursuses or linear monuments, and Stonehenge is no exception. Most of the burial sites appear to date to some centuries after the period in which cursuses were mostly constructed (Thomas *et al.* this volume) and many are associated with

Table 4. Estimated numbers of cremation deposits at Stonehenge through time, converted to a modelled mortality profile.

Date (centuries cal BC)	30 <sup>th</sup>	29 <sup>th</sup> -27 <sup>th</sup>	26 <sup>th</sup> -24 <sup>th</sup>	30 <sup>th</sup> -24 <sup>th</sup>
New scheme stages	1	2	3	1-3
Cleal <i>et al.</i> scheme phases	1	2 & 3i	3ii	1-3ii
Aubrey Hole cremations	2	10	12	24
Ditch cremations	1	2	15	18
<b>TOTAL BURIALS</b>	<b>3</b>	<b>12</b>	<b>27</b>	<b>42</b>
Estimated burials per phase (150 total)	10	42	92	144
Estimated burials per phase (240 total)	17	66	150	233
Estimated burials per century (150 total)	10	14	31	55
Estimated burials per century (240 total)	17	22	50	89

the introduction of geometrically precise architecture, which Harding has interpreted as marking a period of religious change (2003).

The small sample available has shown that there was a minimum number of two cremated individuals buried in Stonehenge's first century of use (Table 4), rather more during the next three centuries (about 12), with most cremation interments (about 27) taking place in the three centuries of the sarsen-building phase up to *c.* 2400 cal BC, culminating with a single inhumation in the twenty-third/twenty-second century cal BC. All of the burials estimated for the monument's first century could have been generated by the natural deaths occurring within a single nuclear family but, by the latest phases, the deaths would have to derive from an extended family or from a sub-section of a large lineage. The population buried at Stonehenge might well derive from a single dynasty over seven centuries.

This raises the question of whether they were, indeed, a ruling elite (Renfrew 1973; Hayden 2003: 246–7; Fleming 2004). The few grave goods are definitely unusual, notably a gneiss macehead (Montague & Gardiner 1995: 394) and a disc-shaped 'ceramic object' (Cleal 1995: 360–1), and their specialised nature has been commented upon before (Bradley 1991: 215). In the case of the skewer pins from some of the Stonehenge cremation burials (Montague 1995: 409–10), it is interesting that, among the many pins from Durrington Walls (Wainwright with Longworth 1971: 181–3; and many more found in 2004–2007), none is of this type even though the skewer pin from a cremation burial in the upper fill of the Stonehenge ditch (Cleal *et al.* 1995: Table 43, object 9) is likely to be contemporary with the Durrington Walls settlement. A preliminary estimate of the demography of the Stonehenge cemetery thus provides figures that are consistent with it having been the burial ground of a single family. This raises the possibility that it was the burial ground of a ruling elite family, perhaps even of Cambrian origin, whose hereditary hold on power is revealed to us by their increasingly dramatic manipulations of workforces moving large stones. Recovery of the cremated bones from Aubrey Hole 7 in August 2008 can now allow this demographic and social model to be more fully evaluated.

## Conclusion

The quality of most excavations at Stonehenge during the twentieth century was very poor, particularly those carried out by Richard Atkinson who kept few records of the trenches

he dug between the 1950s and 1970s. The work has been salvaged as far as possible in an exemplary publication by Rosamund Cleal and her team (Cleal *et al.* 1995). Atkinson proposed a three-stage model of Stonehenge from Aubrey Holes, to bluestones to sarsens (Atkinson 1956), which was amended by Cleal *et al.*: their model presented two phases (the ditch, bank and possibly Aubrey Holes being Phase 1, and timber structures and cremation burials as Phase 2) prior to the bluestones and sarsens (Phase 3i and Phase 3ii respectively; see Figure 2 and Table 1).

The new dates for Stonehenge presented here, together with a re-appraisal of the twentieth-century excavations, support a further revision of the Stonehenge sequence. Rather than starting as a simple earth and timber monument, as is conjectured in the existing models, we argue that Stonehenge was a stone monument and a cremation cemetery from its beginning and continued as such throughout the third millennium cal BC. Within this new scheme the 56 Aubrey Holes belong to the first stage of construction and we propose that they contained Welsh bluestones (Table 1). This outer circle of bluestones was replaced by the inner arc of bluestones (our Stage 2, Cleal *et al.*'s Phase 3i), after which the sarsen circle and trilithons were erected (our Stage 3, Cleal *et al.*'s Phase 3ii).

Stonehenge was thus founded as a high status burial ground and continued as such for at least half a millennium.

## Acknowledgements

We thank Mike Allen, Alex Bayliss and Dale Serjeantson for their comments on dated material and dates, Mike Pitts, Alison Sheridan and Ann Woodward for their comments on this paper, and Martin Carver for his editing from a much longer version. Especial thanks are due to Jane Ellis-Schön of Salisbury & South Wiltshire Museum for permitting radiocarbon and isotopic sampling, and for providing copies of Hawley's excavation notes. Figure 1 was drawn by Irene de Luis. Figures 2 and 9 and Tables 1 and 2 were produced by Peter Marshall. Figure 7 was drawn by Mark Dover. Figures 8 and 9 were produced by Mike Parker Pearson. Figures 2, 4 and 5 were produced with permission of English Heritage, and Figure 6 by permission of the Society of Antiquaries of London.

## References

- ATKINSON, R.J.C. 1956. *Stonehenge*. London: Hamish Hamilton.
- 1979. *Stonehenge* (third edition). Harmondsworth: Penguin.
- BAYLISS, A., C. BRONK RAMSEY & F.G. MCCORMAC. 1997. Dating Stonehenge, in C. Renfrew & B. Cunliffe (ed.) *Science and Stonehenge* (Proceedings of the British Academy 92): 39–59. Oxford: Oxford University Press.
- BRADLEY, R. 1991. Ritual, time and history. *World Archaeology* 23: 209–19.
- BRICKLEY, M. & J.I. MCKINLEY. 2004. *Guidelines to the Standards for Recording Human Remains* (IFA Technical Paper 7). Southampton: BABAO, Department of Archaeology, University of Southampton.
- BURL, A. 2006. *Stonehenge: a new history of the world's greatest stone circle*. London: Constable.
- CHAMBERLAIN, A. & M. PARKER PEARSON. 2007. Units of measurement in Late Neolithic southern Britain, in M. Larsson & M. Parker Pearson (ed.) *From Stonehenge to the Baltic: living with cultural diversity in the third millennium BC* (British Archaeological Reports International Series 1692): 169–74. Oxford: Archaeopress.
- CLEAL, R.M.J. 1995. Earlier prehistoric pottery, in R.M.J. Cleal, K.E. Walker & R. Montague (ed.) *Stonehenge in its landscape: twentieth-century excavations*: 349–67. London: English Heritage.

- CLEAL, R.N.J., K.E. WALKER & R. MONTAGUE. 1995. *Stonehenge in its landscape: twentieth-century excavations*. London: English Heritage.
- CUNNINGTON, M.E. 1929. *Woodhenge*. Devizes: Simpson.
- EVANS, J.G. 1984. Stonehenge – the environment in the Late Neolithic and Early Bronze Age and a Beaker-Age burial. *Wiltshire Archaeological and Natural History Magazine* 78: 7–30.
- FLEMING, A. 2004. Hail to the chieftdom? The quest for social archaeology, in J. Cherry, C. Scarre & S. Shennan (ed.) *Explaining social change: studies in honour of Colin Renfrew*: 141–7. Cambridge: McDonald Institute for Archaeological Research.
- HARDING, A.F. with G.E. LEE. 1987. *Henge monuments and related sites of Great Britain: air photographic evidence and catalogue* (British Archaeological Reports British Series 175). Oxford: British Archaeological Reports.
- HARDING, J. 2003. *Henge monuments of the British Isles*. Stroud: Tempus.
- HAWLEY, W. 1921. The excavations at Stonehenge. *The Antiquaries Journal* 1: 19–39.
- 1922. Second report on the excavations at Stonehenge. *The Antiquaries Journal* 2: 36–51.
- 1923. Third report of the excavations at Stonehenge during the season of 1923. *The Antiquaries Journal* 3: 1–20.
- 1928. Report on the excavations at Stonehenge during 1925 and 1926. *The Antiquaries Journal* 8: 149–76.
- HAYDEN, B. 2003. *Shamans, sorcerers and saints: a prehistory of religion*. Washington D.C: Smithsonian Books.
- HEDGES, R.E.M., P.B. PETTIT, C. BRONK RAMSEY & G.J. VAN KLINKEN. 1997. Radiocarbon dates from the Oxford AMS system: *Archaeometry* datelist 23. *Archaeometry* 39(1): 247–62.
- LANTING, J.N., A.T. AERTS-BIJMA & J. VAN DER PLICHT. 2001. Dating of cremated bones. *Radiocarbon* 43(2A): 249–54.
- LYNCH, F. & C. MUSSON. 2004. A prehistoric and early medieval complex at Llandegai, near Bangor, north Wales. *Archaeologia Cambrensis* 150: 17–142.
- MAYS, S., M. BRICKLEY & N. DODWELL. 2002. *Human bones from archaeological sites: guidelines for producing assessment documents and analytical reports*. London: English Heritage/BABAO.
- McKINLEY, J.I. 1995. Human bone, in R.M.J. Cleal, K.E. Walker & R. Montague (ed.) *Stonehenge in its landscape: twentieth-century excavations*: 451–61. London: English Heritage.
- McKINLEY, J.I. & C.A. ROBERTS. 1993. *Excavation and post-excavation treatment of cremated and inhumed human remains* (IFA Technical Paper 13). Birmingham: Institute of Field Archaeologists.
- MONTAGUE, R. 1995. Bone and antler small objects, in R.M.J. Cleal, K.E. Walker & R. Montague (ed.) *Stonehenge in its landscape: twentieth-century excavations*: 407–14. London: English Heritage.
- MONTAGUE, R. & J. GARDINER. 1995. Other stone, in R.M.J. Cleal, K.E. Walker & R. Montague (ed.) *Stonehenge in its landscape: twentieth-century excavations*: 390–99. London: English Heritage.
- NEWHAM, C.A. n.d. The three car park post holes. Unpublished manuscript.
- PARKER PEARSON, M. 2007. The Stonehenge Riverside Project: excavations at the east entrance of Durrington Walls, in M. Larsson & M. Parker Pearson (ed.) *From Stonehenge to the Baltic: living with cultural diversity in the third millennium BC* (British Archaeological Reports International Series 1692): 125–44. Oxford: Archaeopress.
- PARKER PEARSON, M., R. CLEAL, P. MARSHALL, S. NEEDHAM, J. POLLARD, C. RICHARDS, C. RUGGLES, A. SHERIDAN, J. THOMAS, C. TILLEY, K. WELHAM, A. CHAMBERLAIN, C. CHENERY, J. EVANS, C. KNÜSEL, N. LINFORD, L. MARTIN, J. MONTGOMERY, A. PAYNE & M. RICHARDS. 2007. The age of Stonehenge. *Antiquity* 81: 617–39.
- PITTS, M. 1982. On the road to Stonehenge: report on investigations beside the A344 in 1968, 1979 and 1980. *Proceedings of the Prehistoric Society* 48: 75–132.
- 2001. *Hengeworld* (second edition). London: Arrow Books.
- PITTS, M., A. BAYLISS, J. McKINLEY, A. BOYLSTON, P. BUDD, J. EVANS, C. CHENERY, A. REYNOLDS & S. SEMPLE. 2002. An Anglo-Saxon decapitation and burial at Stonehenge. *Wiltshire Archaeological & Natural History Magazine* 95: 131–46.
- POLLARD, J. & D. ROBINSON. 2007. A return to Woodhenge: the results and implications of the 2006 excavations, in M. Larsson & M. Parker Pearson (ed.) *From Stonehenge to the Baltic: living with cultural diversity in the third millennium BC* (British Archaeological Reports International Series 1692): 159–68. Oxford: Archaeopress.
- POLLARD, J. & C. RUGGLES. 2001. Shifting perceptions: spatial order, cosmology, and patterns of deposition at Stonehenge. *Cambridge Archaeological Journal* 11: 69–90.
- RENFREW, C. 1973. Monuments, mobilisation and social organisation in Neolithic Wessex, in C. Renfrew (ed.) *The Explanation of culture change*: 539–58. London: Duckworth.



- THOMAS, J.S. 2007. The internal features at Durrington Walls: investigations in the Southern Circle and Western Enclosures 2005-6, in M. Larsson & M. Parker Pearson (ed.) *From Stonehenge to the Baltic: living with cultural diversity in the third millennium BC* (British Archaeological Reports International Series 1692): 145-57. Oxford: Archaeopress.
- THOMAS, J.S., M. PARKER PEARSON, J. POLLARD, C. RICHARDS, C. TILLEY & K. WELHAM. 2009 [this volume]. The date of the Greater Stonehenge Cursus. *Antiquity* 83: 40-53.
- WAINWRIGHT, G.J. with I.H. LONGWORTH. 1971. *Durrington Walls: excavations 1966-1968* (Report of the Research Committee of the Society of Antiquaries of London 29). London: Society of Antiquaries of London.
- WARD, G.K. & S.R. WILSON. 1978. Procedures for comparing and combining radiocarbon age determinations: a critique. *Archaeometry* 20: 19-31.