The Timing and Tempo of Change: Examples from the Fourth Millennium cal. BC in Southern England

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Temporality and sociality: central questions

Generation after generation, life after life, human existence flows through time. Person to person, community to community, the relationships of social existence spread out in space. Archaeology has come up with many different approaches to the central questions of temporality and sociality, but it has not been very successful with either.

On the whole, archaeology has preferred a single scale of analysis, generally a long-term view of change and a large-scale perspective on society. Many archaeologists, certainly including most prehistorians, have been attracted to notions of *la longue durée* (cf. Braudel 1975; Febvre 1973), because archaeology allows us to study change over the entire span of hominin and human existence, and because it is regularly difficult to establish very precise chronologies within such vast reaches of time. Much processual archaeology has been so aligned, whereas many post-processual archaeologists have been more concerned with the experience of time (cf. Shanks & Tilley 1987; Ingold 2000; Lucas 2005). It is dangerous to over-generalize, since Colin Renfrew, for example (1972; Renfrew & Cooke 1979), moved in the 1970s from using a concept of the 'multiplier effect' to the mathematical modelling of very rapid structural change (so-called 'catastrophe theory'). Despite such exceptions, however, it remains broadly true that many prehistorians have neglected the interpretive importance of shorter time scales, although confronted by an archaeological record often formed by deposits, constructions, and destructions generated by specific, short-lived events.

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Likewise, many processual prehistorians, even though they would claim to have advanced from the simplicities of the notion of archaeological culture, have themselves operated largely within monolithic concepts of system and bounded society, albeit with interacting parts or sub-systems. In partial contrast, many post-processual or interpretive prehistorians have narrowed their focus down to individuals or the character of personhood, and much closer accounts of small-scale social existence and experience have resulted. Many also subscribe to a view of society and history in the now familiar terms of agency and structure, and the duality of structure or structuration; if we focus on chosen agents, the structure will take care of itself. But agency theory risks being reductionist, by-passing full consideration of the complexities of relationships, networks, institutions, identities, values and emotions which go to make up a human society. Long-lasting debates about the multiple dimensions of cultures and structures (e.g. Kuper 1999; Sahlins 1999; Sewell 2005, esp. chaps. 5–7) often seem to go unheeded.

Temporality and sociality are intimately related. With the long-term view of change goes, perhaps inevitably, a notion of the collective actions of a whole society. A perspective of individual agency or personhood should be accompanied by an interest in short time scales, though many post-processual accounts of the fine grain of social existence have had difficulty in coming to terms with time at a scale of generations, even in such closely studied situations as Çatalhöyük (Hodder 2006). It is no accident that it is archaeologists with a strong sense of historical particularities derived either from a framework of ancient literary evidence (e.g. Foxhall 2000) or from robust dendrochronologies (e.g. Van Dyke 2004) who have written most strongly in recent times about short time scales. Ruth Van Dyke's account of Chaco Canyon at the start of the twelfth century AD, for example, uses the language of decades and generations, referring Late Bonito phase architectural change back to the experience of parents and grandparents (2004, 414).

Timing and tempo

For prehistory, the consequences of fuzzy chronology, created either by acceptance of the limitations of conventional dating methodologies or by a neglect of the importance of time scales, are severe. The *longue durée* remains undefined. It is ironic that it was an anthropologist — Claude Lévi-Strauss no less, now widely criticized for the atemporal nature of structuralism — who declared towards the end of *La pensée sauvage* that 'there is no history without dates' (1966, 258). We can go further. Without dates, there are no timings and

no relationships between events and processes, which are thus in chronic danger of being lumped together or spread erroneously over great swathes of time (Baillie 1991). Without dates, there can be no sense of the tempo of change. The central issue should be more than just the sequence of generations and lives, central though that is, but must become the differences between this lifetime and that, between this historical situation and that. Prehistorians are imprisoned by generalization.

This must and can change. While dendrochronologies like those available for Pueblo societies in the American Southwest or Neolithic and Bronze Age settlements in the Alpine foreland (e.g. Van Dyke 2004; Pétrequin *et al*. 1998) are rare, radiocarbon dating is possible worldwide. Robust means of constraining the inherent imprecision of the method have been developed and have been widely available for more than a decade, through the application of Bayesian statistical modelling (Buck *et al*. 1996; Bronk Ramsey 1995). The Bayesian approach is a way of combining archaeological knowledge — of context, stratigraphy and sample character — with explicit, probabilistic modelling of date estimates, which, other things being equal, can result in much finer chronologies (Bayliss *et al*. 2007a).

Applications are becoming common in the literature for a range of problems: from the dating of single monuments such as Stonehenge and Hambledon Hill (Bayliss *et al.* 1997; Healy 2004), to refining the chronology of proto-historic sequences such as the Zhou Dynasty in China (Lu *et al*. 2001) or cultural series such as those for the Aegean Late Bronze Age (Manning *et al*. 2006). Bayesian modelling has been routine for projects supported by English Heritage for over a decade (Bayliss & Bronk Ramsey 2004), and is being adopted increasingly by commercial archaeology in the UK. What the rest of this short paper offers is a taste of the potential for achieving much more precise chronologies for *groups* of sites in prehistory and the implications that this has for the kinds of histories we can write for remote pasts.

Our example is based on the study of five long barrows in southern England, already published in this journal (Bayliss & Whittle 2007), and on a much more ambitious project on the dating of causewayed enclosures (the most widely known of the first large-scale communal Neolithic monuments) in southern Britain and Ireland now nearing completion. We now have dates for 38 early Neolithic enclosures in Britain out of a population of more than 90 (Oswald *et al*. 2001), obtaining over 400 new radiocarbon results and modelling them, along with more than 400 existing dates for enclosures, in a Bayesian statistical framework. We have also been able to model available dates for other monuments and settlements of the early Neolithic period.

Southern England in the first half of the fourth millennium cal. BC: selected examples

To illustrate what is now possible in terms of new understandings of timings and tempo, we concentrate here on a restricted part of southern England, from the north Wiltshire Downs northwards into the upper Thames valley, in the Early Neolithic period. This has tended to be seen in the literature as a long-lasting and little changing set of lifeways; a recent treatment (Bradley 2007) begins to reflect more precise but still informal and unmodelled chronologies. There has been an impression that, once new beliefs and practices had been taken up, monumental and artefactual traditions remained constant through the earlier part of the fourth millennium cal. BC, a period during which the same funerary monuments, whether earthen long barrows or stone-built chambers, were used and elaborated by successive generations who also gathered repeatedly at causewayed enclosures, contributing to an ever-growing accumulation of cultural material in their ditches and sometimes expanding the enclosures themselves. Parallel to this, and often away from the monuments, small deposits of cultural material were placed in pits, rare rectangular houses were built, cereals were cultivated and domestic stock reared — the last two to a debatable extent (e.g. Thomas 1999). This impression of the Early Neolithic in southern Britain is largely the product of the visual inspection of groups of radiocarbon dates which fails to take into account the statistical scatter inherent in the method (Bayliss *et al*. 2007a). More precise date estimates, however, now begin to make it possible to establish the entrances and exits of elements that previously all crowded the stage together. In this way different perspectives of the tempo and scale of change begin to emerge.

The earliest manifestations of the Neolithic period in southern Britain included pits, flint mines, rectangular houses, wooden trackways, domesticates and pottery-making, with few monuments. These began around 4000 cal. BC (though our work in progress will discuss significant regional variation in this picture). In contrast, most long barrows can now be placed substantially later, probably from the thirty-eighth century cal. BC onwards,[1] and most enclosures later still, from the thirty-seventh century cal. BC onwards.

In our study area, the construction of the monumental West Kennet long barrow can be dated to the later thirty-seventh century cal. BC (*3670–3635 cal. BC (81% probability)*[2] or *3575–3545 cal. BC (14% probability;*

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start West Kennet primary: Fig. 1), with its primary use lasting for perhaps a single generation (*1–55 years; 95% probability; use West Kennet primary*: Fig. 2). The much more modest primary phase of the Wayland's Smithy long barrow, 25 km to the northeast, was probably constructed in the early thirty-sixth century cal. BC (*3610–3550 cal. BC; 83% probability)* or *3545–3525 cal. BC (12% probability; start_Wayland's Smithy I*: Fig. 1), and was in use for probably less than a generation (*1–65 years; 95% probability; use Wayland's Smithy I:* Fig. 2); its much larger second phase, in the same style as West Kennet, was probably built in the later thirty-fifth century cal. BC (*3490–3390 cal. BC (95% probability; start_Wayland's Smithy II*: Fig. 1).

We have already written about the implications of the more precise dating of these sites in terms of both social scale — West Kennet holding some 40 people, but Wayland's Smithy I only 14 — and social memory — Wayland's Smithy II being some 200 years younger than West Kennet (Whittle *et al.* 2007b; Fig. 1). We can now add to this emergent picture of a more historical Early Neolithic period. From our case study area, the construction of the massive ceremonial arena of Windmill Hill, not far from the West Kennet long barrow, can now be dated to *3700–3640 cal. BC* (*95% probability; start Windmill Hill*: Fig. 1). We can even suggest the order of construction of the three causewayed ditch circuits which make up the enclosure (it is *69% probable* that the inner ditch was dug first, and *88% probable* that the middle ditch was dug last), and suggest that the circuits were built over a period of *5–75 years* (*95% probability; period construction*: Fig. 2). The construction of West Kennet long barrow falls after that of the inner and outer circuits at Windmill Hill (*90%* and *72% probable* respectively) and before that of the middle circuit (*83% probable*) (Fig. 1). The people whose remains were deposited at West Kennet may have been alive at the time that the community chose to construct the middle circuit of Windmill Hill. They had surely experienced the inner and outer circuits, and the older individuals among them may have participated in the digging of these earthworks.

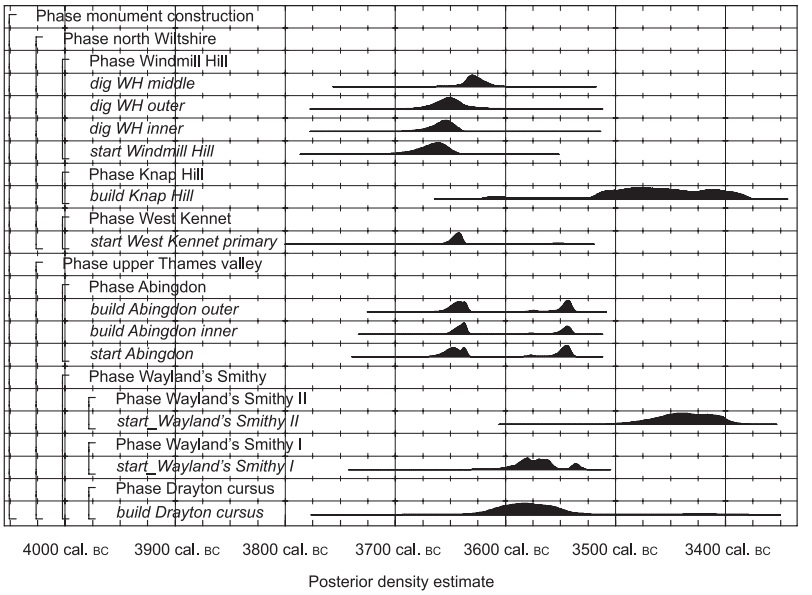

Figure 1. *Probability distributions of construction dates for selected monuments in north Wiltshire and the upper Thames valley. Each distribution represents the relative probability that an event occurs at a particular time. The distributions have been taken from the models defined in Whittle* et al. *in prep., figs. 3.8–3.11 (Windmill Hill), Whittle* et al. *in prep., fig. 3.20 (Knap Hill), Bayliss* et al. *2007b, fig. 6 (West Kennet), Whittle* et al. *2007a, fig. 4 (Wayland's Smithy), and Barclay* et al. *2003, fig. 8.3 recalculated using the updated calibration data of Reimer* et al. *2004 (Drayton).*

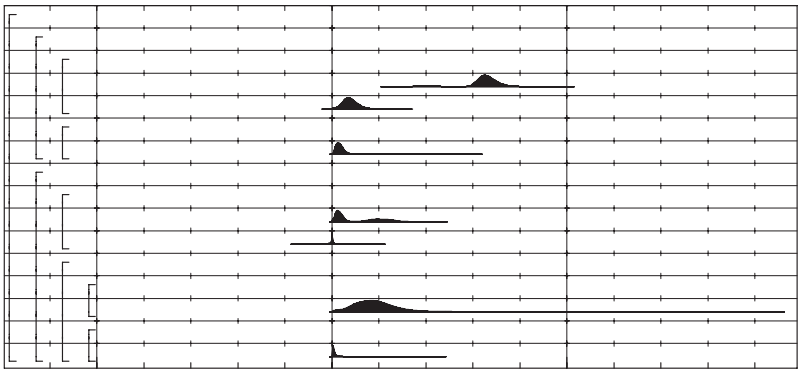

Figure 2. *Probability distributions showing the number of calendar years for construction and use for selected monuments from north Wiltshire and the upper Thames valley. The distributions have been taken from the models detailed in Figure 1.*

The primary use of Windmill Hill continued for *180–200 years (1% probability)* or *290–390 years* (*94% probability; use Windmill Hill*: Fig. 2), into the second half of the thirty-fourth century cal. BC (*3475–3460 cal. BC; 1% probability)* or *3365–3295 cal. BC* (*94% probability; end Windmill Hill*). This extended initial enclosure

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phase now emerges, from our wider study of southern Britain and Ireland, as the exception rather than the rule. Locally, the single circuit of Knap Hill causewayed enclosure is less precisely dated, but its construction can be estimated to belong probably to the thirty-fifth century cal. BC (*3620–3585 cal. BC (4% probability);* or *3530–3375 cal. BC (91% probability; build Knap Hill*: Fig. 1).

Abingdon in the upper Thames valley to the northeast provides a sharper contrast. The circuits were constructed within a decade or so of each other (*–15–10 years; 95% probability; gap circuits*: Fig. 2), either in the third quarter of the thirty-seventh century cal. BC or the third quarter of the thirty-sixth century (*3670–3630 cal. BC (55% probability)* or *3585–3570 cal. BC (3% probability)* or *3565–3535 cal. BC (37% probability; start Abingdon*: Fig. 1).[3] The primary use of the site, including the recutting of the inner ditch, may have lasted little more than a generation (*1–40 years; 57% probability*) or *65–145 years (38% probability; use Abingdon*: Fig. 2). Finally, in a very different tradition of monument building, the linear Drayton cursus a little to the south of Abingdon was, on the imperfect evidence of very few dates, probably built in *3640–3520 cal. BC (92% probability)* or *3445–3405 cal. BC (3% probability*; *build Drayton cursus*: Fig. 1). If Abingdon was built and used on the first peak of its probability distribution in the third quarter of the thirty-seventh century cal. BC, then the Drayton cursus was later, possibly by only a generation or two. If, however, Abingdon was built on its second peak in the third quarter of the thirty-sixth century cal. BC, then there is a sporting chance (*63% probable*) that Drayton is earlier, if only by a generation or two.

Implications: prehistories of the short- and middle-term

So, instantly we move from a largely undifferentiated Early Neolithic, within which different sorts of constructions and styles of activity float timelessly, to a period in which varying public architectures constitute historical sequences. For perhaps up to two centuries, a Neolithic existence was established in southern Britain which may have been largely without monuments. After *c.* 3800 cal. BC, people became more concerned to mark the dead, of perhaps small and possibly mostly local social units, in impressive barrow constructions. In our study area, the construction of enclosures then soon follows, from the thirty-seventh century cal. BC. By these means, we begin to see something of the varying tempo of change, and with it changing scales of social interaction. There is a *longue durée* to be seen here, but probably of much shorter duration than many prehistorians habitually suppose.

There are several newly sharpened features. There was often a lull rather than continuity between the Early Neolithic and subsequent uses of monuments. The extended infilling of the West Kennet long barrow with secondary deposits was separated from its primary use by an interval probably of a century or more (Bayliss *et al.* 2007b, figs. 6, 9), and Windmill Hill saw a diminution if not an hiatus in activity in the latter part of the fourth millennium cal. BC. There was disparity between the construction dates of similar monuments. When Wayland's Smithy II was constructed, West Kennet was already antique, and the later monument may have been consciously built to look archaic; practice had endured in a sense, but at a remove of two centuries it was perhaps no longer the same. There was disparity between the use-lives of similar monuments. Centuries of use at Windmill Hill contrast with possibly no more than decades at Abingdon.

Such different histories paint a picture of traditions shared over wide areas, but manipulated according to far more local circumstances, demands and pressures. They bring into focus the different choices of particular communities in particular places within the span of a single human lifetime. Why did people in a small area of north Wiltshire choose to enclose at Windmill Hill in the middle decades of the thirty-seventh century cal. BC, to construct and use the long barrow at West Kennet a few decades later, and to return to enclosure probably in the 3630s or 3620s cal. BC (Fig. 1)? Surely the swift pace of construction of the enclosure, evidenced also at Abingdon (Fig. 2), has implications for how we view the sociality of the building process: carried out by particular people in particular circumstances. Why did occupants of the upper Thames valley build and abandon the Abingdon enclosure and construct the Drayton cursus, probably in the space of a generation or two? These time scales, within a single human lifespan and certainly within the extent of directly transmissible memory reaching back another lifetime (for example from grandparent to grandchild), form the sort of *conjuncture* or medium-term realities which Fernand Braudel saw as forming social history (1975, 16, 20).

Views of the continental relations of the British Early Neolithic are also modified. It has been customary to refer the idea of long barrows back to a memory of much earlier continental Neolithic timber longhouses (e.g. Hodder 1998; Bradley 2007), but the gap in time can now be seen to be more than half a millennium. It is much more tempting to link British causewayed enclosures with the continental practice of building interrupted ditched enclosures, but the twist now is that the majority of Michelsberg and Chasséen

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enclosures of northern France and the Rhineland were probably going out of use, or had already gone out of use, by the time when their counterparts began to appear across southern Britain. What factors are involved in this apparent re-invention of tradition at this particular historical moment?

This is a question we could hardly have asked before in this form. From timing come the relationships between events and so the durations of past actions — and from these emerges tempo. Tempo to the level of the single lifetime or even generation opens up the relationship of short-term change to long-term change for renewed examination (see again Febvre 1973). Short-term changes are framed within the long-term context, and the long-term context is constituted by the flow of short-term events. No single scale suffices on its own.

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Notes

1. There may be exceptions, including Coldrum, Kent, and Burn Ground, Gloucestershire (Smith & Brickley 2006).
2. In this paper, date posterior density estimates which derive from Bayesian chronological models are cited *in italics*, and are exactly identified by the distribution name and reference to the detailed chronological model provided in the caption to Figure 1.
3. The strong bimodality apparent in the date estimates from Abingdon and, to a lesser extent, in those from West Kennet is a product of a strong 'wiggle' in the calibration curve between 3620 and 3540 cal. BC (Reimer *et al.* 2004; Bayliss *et al.* 2007a, fig. 18).

References

Baillie, M.G.L., 1991. Suck-in and smear: two related chronological problems for the 90s. *Journal of Theoretical Archaeology* 2, 12–16.

Barclay, A., G. Lambrick, J. Moore & M. Robinson, 2003. *Lines in the Landscape: Cursus Monuments in the Upper Thames Valley*. (Thames Valley Landscapes Monograph 15.) Oxford: Oxford Archaeology.

Bayliss, A. & C. Bronk Ramsey, 2004. Pragmatic Bayesians: a decade integrating radiocarbon dates into chronological models, in *Tools for Constructing Chronologies: Tools for Crossing Disciplinary Boundaries*, eds. C.E. Buck & A.R. Millard. London: Springer, 25–41.

Bayliss, A. & A. Whittle (eds.), 2007. Histories of the dead: building chronologies for five southern British long barrows. *Cambridge Archaeological Journal* 17(1), supplement.

Bayliss, A., C. Bronk Ramsey & F.G. McCormac, 1997. Dating Stonehenge, in *Science and Stonehenge*, eds. B. Cunliffe & C. Renfrew. Oxford: British Academy, 39–59.

Bayliss, A., C. Bronk Ramsey, J. van der Plicht & A. Whittle, 2007a. Bradshaw and Bayes: towards a timetable for the Neolithic. *Cambridge Archaeological Journal* 17(1), supplement, 1–28.

Bayliss, A., A. Whittle & M. Wysocki, 2007b. Talking about my generation: the date of the West Kennet long barrow. *Cambridge Archaeological Journal* 17(1), supplement, 85–101.

Bradley, R., 2007. *The Prehistory of Britain and Ireland*. Cambridge: Cambridge University Press.

Braudel, F., 1975. *The Mediterranean and the Mediterranean world in the age of Philip II*, trans. S. Reynolds. London: Fontana.

Bronk Ramsey, C., 1995. Radiocarbon calibration and analysis of stratigraphy: the OxCal program. *Radiocarbon* 37, 425–30.

Buck, C.E., W.G. Cavanagh & C.D. Litton, 1996. *Bayesian Approach to Interpreting Archaeological Data*. Chichester: Wiley.

Febvre, L., 1973. *A New Kind of History, and Other Essays*, ed. P. Burke & trans. K. Folca. New York (NY): Harper and Row.
Foxhall, L., 2000. The running sands of time: archaeology and the short term. *World Archaeology* 31, 484–98.
Healy, F., 2004. Hambledon Hill and its implications, in *Monuments and Material Culture. Papers in Honour of an Avebury Archaeologist: Isobel Smith*, eds. R. Cleal & J. Pollard. East Knoyle: Hobnob Press, 15–38.
Hodder, I., 1998. The domus: some problems reconsidered, in *Understanding the Neolithic of Northwestern Europe*, eds. M. Edmonds & C. Richards. Glasgow: Cruithne Press, 84–101.
Hodder, I., 2006. *Çatalhöyük: the Leopard's Tale, Revealing the Mysteries of Turkey's Ancient 'Town'*. London: Thames and Hudson.
Ingold, T., 2000. *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*. London: Routledge.
Kuper, A., 1999. *Culture: the Anthropologists' Account*. Cambridge (MA): Harvard University Press.
Lévi-Strauss, C., 1966. *The Savage Mind*. London: Weidenfeld and Nicholson.
Lu, X., Z. Guo, H. Ma, S. Yuan & X. Wu, 2001. Data analysis and calibration of radiocarbon dating results from the cemetery of the Marquises of Jin. *Radiocarbon* 43, 55–62.
Lucas, G., 2005. *The Archaeology of Time*. London: Routledge.
Manning, S.W., C. Bronk Ramsey, W. Kutschera, T. Higham, B. Kromer, P. Steier & E.M. Wild, 2006. Chronology for the Aegean Late Bronze Age 1700–1400 BC. *Science* 312, 565–9.
Oswald, A., C. Dyer & M. Barber, 2001. *The Creation of Monuments*: *Neolithic Causewayed Enclosures in the British Isles*. London: English Heritage.
Pétrequin, P., R.-M. Arbogast, C. Bourquin-Mignot, C. Lavier & A. Viellet, 1998. Demographic growth, environmental changes and technical adaptations: responses of an agricultural community from the 32nd to the 30th centuries BC. *World Archaeology* 30, 181–92.
Reimer, P.J., M.G.L. Baillie, E. Bard, A. Bayliss, J.W. Beck, C.J.H. Bertrand, *et al.*, 2004. IntCal04 terrestrial radiocarbon age calibration, 0–26 cal kyr BP. *Radiocarbon* 46, 1029–58.
Renfrew, C., 1972. *The Emergence of Civilisation: the Cyclades and the Aegean in the Third Millennium* BC. London: Methuen.
Renfrew, C. & K. Cooke (eds.), 1979. *Transformations: Mathematical Approaches to Culture Change*. New York (NY): Academic Press.
Sahlins, M., 1999. Two or three things that I know about culture. *Journal of the Royal Anthroplogical Institute* 5, 399–421.
Sewell, W.H., Jr, 2005. *The Logics of History: Social Theory and Transformation*. Chicago (IL): University of Chicago Press.
Shanks, M. & C. Tilley, 1987. *Social Theory and Archaeology*. Cambridge: Polity Press.
Smith, M. & M. Brickley, 2006. The date and sequence of use of Neolithic funerary monuments: new AMS dating evidence from the Cotswold Severn region. *Oxford Journal of Archaeology* 25, 335–56.
Thomas, J., 1999. *Understanding the Neolithic*. London: Routledge.
Van Dyke, R., 2004. Memory, meaning and masonry: the Late Bonito Chacoan landscape. *American Antiquity* 69, 413–31.
Whittle, A., A. Bayliss & M. Wysocki, 2007a. Once in a lifetime: the date of the Wayland's Smithy long barrow. *Cambridge Archaeological Journal* 17(1), supplement, 103–21.
Whittle, A., A. Barclay, A. Bayliss, L. McFadyen, R. Schulting & M. Wysocki, 2007b. Building for the dead: events, processes and changing worldviews from the thirty-eighth to the thirty-fourth centuries cal. BC in southern Britain. *Cambridge Archaeological Journal* 17(1) supplement, 123–47.
Whittle, A., F. Healy & A. Bayliss, in prep. *Gathering Time: Dating the Early Neolithic Enclosures of Southern Britain and Ireland*.