

Silbury: research to date

1 Previous interventions at Silbury Hill

- 1.1 The following account is based largely on work undertaken on material recovered by Atkinson during 1968 and 197 and reported on in Whittle (1997) *Sacred mound, holy rings, Silbury Hill and the West Kennet Palisade enclosures: a later Neolithic complex in North Wiltshire*. The work presented in this volume was undertaken by specialists many years after the tunnel excavations, and in some cases the material had been worked on previously, by not fully reported, years before. Documentation for the locations of the samples taken for different types of material is generally lacking, as is documentation for the work undertaken by some specialists prior to the work done for the 1997 volume. For example, Dr. Spreight undertook work on insects, but no records for how the samples were processed exist. Mark Robinson had to deduce from the nature of the insect assemblages the likely method of processing (Robinson, 1997). Similarly, we know that plant macrofossils were recovered from the turf stack and the old ground surface under the turf stack, but the results from the deposits were combined. Thus, it is not possible to be certain whether a particular species was recovered from the turf stack, or the old ground surface, or both. In some cases the author (Williams, 1997) does mention where particular types of remains were found, but not in every case, so interpretation remains difficult.
- 1.2 As a result of these problems it must be stressed that the evidence derived from the different environmental studies is analogous but not directly comparable.
- 1.3 Silbury Hill is the largest man made mound in Europe. Construction took place on a 'little disturbed surface' with no vegetation cover or 'turf' removed prior to work commencing. At first, a circular gravel and turf stack was built, which was then covered by alternating layers of soil and chalk. This was then enlarged by tips of chalk, interspersed with 'toblerone', and chalk walling or dumps of chalk blocks. The fact that the top of the mound contained concentric and radial chalk walling suggests that it could have been built as a stepped cone with the steps then being infilled (Whittle, 1997, 24-26). The possibility that mound was constructed as a spiral rather than as steps, has recently been put forward by Field (2002).
- 1.4 It is considered that the whole mound was built from 2800/2500-2400/2000 BC with the possibility that this took several generations. If there were hiatuses in its construction they were not long enough to result in soil formation (Whittle, 1997, 26).
- 1.5 The old land surface is described as a brown –earth type devoid of snails. It is derived from loess overlying clay with flints. The presence of vegetation on the old land surface was taken as evidence that no truncation had taken place prior to construction (Cornwall *et al*, 1997).

1.6 The pollen evidence from the old ground surface beneath the mound indicated grazed grassland rich in perennial herbs. Some woodland was suggested, especially by the high values of hazel. Dimbleby postulated that these could be derived from hazel thickets or a mosaic of grassy clearings interspersed with woodland. No pollen work was undertaken on samples from the turf stack. One sample from the base of the mound taken from tipped chalk rubble at the tail of the primary mound, produced a spectrum dominated by hazel pollen with some grass and grassland plants also represented (Dimbleby, 1997).

1.7 The turves forming the turf stack were found to be derived from chalky parent material, probably a gravel of periglacial origin, and contained land-snails. They were interpreted as deriving from a plough soil that had reverted to grassland several years before the turves were cut (Cornwall, *et al*, 1997). Plant macroscopic remains, insect remains and snails were all preserved within the turf stack. It is likely that pollen was also preserved but no pollen analysis was undertaken on this material by Dimbleby for the 1997 volume.

1.8 A quote from the site diary (July 22, 1968) (Whittle, 1997, 16) indicates that at least in areas within the turf stack preservation was excellent (context 190)

'a layer of dark stacked turves began to appear. On breaking apart lumps of this appeared green, though much flattened. Beetles and snails are visible the former apparently in an excellent state of preservation' (Whittle, 1997, 16)

As stated above Williams work (1997) on macroscopic plant remains from the tunnels is not directly comparable with the pollen evidence as no detailed records survive as to whether the material came from turf stack or the old ground surface. However, Williams (1997) does state that all the mosses were recovered from the turf stack. The majority of species identified are consistent with mature chalk grassland although some prefer shady, moister conditions.

1.9 Some wood fragments were present (not necessarily from the turf stack) including twigs up to twenty centimetres long. Several fragments of hazel, both wood and charcoal were identified as well as 3 fragments of hazel nutshell and one kernel. This may explain the high values of hazel pollen in the tail of the primary mound. Hawthorn was also represented by several wood fragments, A single fragment of pine was identified and one of *Prunus* sp., possible *P. spinosa* (sloe). A single yew seed was also recovered (Williams, 1997).

1.10 Some seeds were recorded as concentrations within either the turf stack or the old ground surface suggesting considerable variation, (e.g. *Urtica dioica* (stinging nettle and *Montia fontana* ssp, *chondrosperma* (blinks)). Although due to the poor recording it is not possible to be very clear about

the nature of this heterogeneity. A mature chalkland flora is clearly present, but some species clearly represent material from woodland and disturbed habitats. Some remains may be derived from flooding or from flood deposits, or have been deliberately incorporated along with the turves. The seeds of weeds such as nettle probably represent seeds that were present in the soil seed bank or seed flora. As such, they give a history of the types of vegetation that grew on the soils represented by the turves but not necessarily the vegetation cover when the turves were cut (Williams, 1997). The differences between the total seed flora of the a soil (i.e. viable seeds and those dead or decaying) and the vegetation it supports has been demonstrated by Carruthers and Straker with reference to the experimental earthwork at Overton Down (Carruthers and Straker, 1996)

- 1.11** Mark Robinson (1997) worked on insects from samples recovered from the old ground surface and turf stack during the tunnelling. This material was originally studied by Dr. M C D Spreight. No records survive concerning the details of processing but the types of insects recovered suggest sieving down to 0.5mm. Today we would normally sieve to 0.18 or 0.2 mm. It was also not possible to relate samples to tunnel rings (a specific location in the tunnel through the mound).
- 1.12** Preservation of insects did vary. This might suggest either variation in preservation conditions within the turf stack or the decay of dead insects in the top of the old ground surface or within the turves prior to burial by the mound. What is clear is that insect remains from the turf stack were generally much better preserved than those from the old ground surface.
- 1.13** An interesting aspect of the insect evidence is the lack of wood dependent taxa. The evidence suggested very open conditions with the only beetle occurring in any numbers, *Phyllobius roboretanus* or *viridiaeris*, that might at one stage have been included in the wood dependent species now known to typical of grassy and open habitats (Robinson, 1997, Morris, 1997, 32: Mark Robinson, *pers. comn.*).
- 1.14** The majority of the insect assemblage is consistent with herb-rich grassland similar to the *Festuca ovina/rubra* grassland that is found on the chalk of Wiltshire in the present day, with some less heavily grazed grassland also present. There were also dung beetles present in proportions that suggest stocking levels not unlike those found today on chalk pasture. Although remains of ants were recovered from the samples, the evidence for flying ants remains in doubt, and as dead ants may have been incorporated into the turves it cannot be said that the turves were cut in summer. Very few aquatic beetles, or those associated with wetland habitats, were found (Robinson, 1997)
- 1.15** Some animal bone was recovered from the mound, during tunnelling and from the ditch (Gardner, 1997). However the location of the material within the mound was not recorded and, the material from the ditch is from its infilling and must therefore relate to later use of the area. Gardner

concludes that 'a variety of animals were used, presumably for meat during construction of the mound and ditch' (Gardner, 1997, 49). The whole question of what was eaten by the builders of the mound and what they did on-site during its construction needs more attention.

1.16 The results from the various analyses from the turf stack show that chalk grassland was already established in the vicinity of Silbury prior to construction of the mound. Chalk grassland is a unique habitat, the result of a managed grazing and is highly valued for its bio-diversity today. The fact that this habitat was established at Silbury in the Neolithic shows the antiquity of this type of managed landscape. Results from sites elsewhere in Britain give a completely different picture suggesting limited clearance of woodland with corridors of open space being created within a largely wooded landscape or the presence of an open woodland with temporary clearings and secondary woodland growth (Robinson, 1997). Nothing comparable has been found in other burial mounds. It is simply unique.

2 Current work

A number of investigations are currently in progress

2.1 Radiocarbon dates on moss recovered from turves from within the turf stack (samples from the Atkinson excavations supplied by J Evans), are currently awaited. Dates on antler from the top of the mound retrieved during the 2001 excavations are presented in table 1.

2.2 Alex Bayliss is also working with Alasdair Whittle on dating bone from the mound to try and improve our knowledge concerning the duration of the construction of the mound.

2.3 Description of the six cores recovered as part of the seismic survey is complete. The assessment of one of these cores (core 5) is currently in progress. David Robinson is also assessing the turf stack samples, supplied by John Evans (see above) for pollen, while thin sections from these samples have been prepared by Matt Canti

2.4 Core 5 does not penetrate the turf stack but does include part of the old ground surface and a deposit of dumped and trampled soil which appears to overlie the turf stack. The preservation of biological remains within this 'layer' is good with fragments of insects, molluscs, moss and other plant macroscopic remains being recovered (M Robinson, 2003). Some of this material could be used to date this deposit which appears to be associated with the enlargement of the primary mound. Pollen preservation was generally poor except at the junction of the old ground surface with the trampled dumped soil where preservation was better with sufficient pollen surviving to produce meaningful results (D Robinson, 2003).

2.5 The results from the pollen assessment resemble those obtained by Dimbleby (1997) from outside the turf stack and show similar high values

for hazel (D Robinson, 2003). The macroscopic remains are also similar to those obtained from the earlier work, with wet grassland and disturbed ground indicated (M Robinson, 2003). The disturbed ground element appears to be slightly better represented than in the earlier work, probably reflecting material brought in on workers feet.

- 2.6** The preservation of biological remains within the dumped and trampled soil layer was not expected and shows that biological material survives not only in the turf stack but also in the layers immediately sealing it. While not allowing us to be certain whether conditions leading to the survival of organic material within the turf stack have deteriorated it does show that biological remains are still well preserved within this part of the mound.
- 2.7** The remaining part of core 5, consisting of around 29m of chalk rubble layers making up the rest of the mound is also being assessed. Tiny fragments of charcoal are present at intervals throughout. This material could have blown in from nearby fires or being transported on the builder's feet. Although very tiny, and therefore difficult to identify, analysis of this charcoal would throw further light on the activities associated with the construction of the mound. Occasional molluscs were also found within this part of core 5, but too few to merit further analysis.

3 *Questions arising with regard to the mound and its immediate vicinity?*

- 3.1** The case there being no truncation of the old ground surface prior to construction of the mound seems rather weak as it is only really reported as an observation made during the excavation rather than as a result of subsequent analysis (see Whittle, 1997, 24, Cornwall *et al*, 1997, 26). Can we be sure that the vegetation observed on this surface was in situ or was it laid on a truncated surface?
- 3.2** Were some of the insects and seeds remains introduced into the turves/ old ground surface as a result of local flooding, or deliberate wetting of the turf stack (see Breuning-Madsen *et al*, 2002)? Could we test this by setting up traps in the present day grassland to examine the present day flora and fauna? This would have to be accompanied by vegetation monitoring as the seed bank flora and extant flora can vary – as shown by the Overton work (Carruthers and Straker, 1996). Diatom analysis could also be useful here.
- 3.3** Are there significant differences between what was growing on the old ground surface prior to construction of the mound and the vegetation represented by the turf stack?
- 3.4** Were the turves all cut from the same type of vegetation or was there a mixture of different vegetation types? This may help us establish whether they were all cut from the same area or from different areas within the landscape.

- 3.5** Are the remains of woodland plants, pollen and macroscopic remains, the result of brushwood etc. being brought to the site as part of the construction process of the mound and /or ditch?
- 3.6** The whole question of what was eaten by the builders of the mound and what they did on –site during construction needs more attention. This could be partly achieved through further bone studies and charcoal, plant macrofossil studies related to recent interventions (extant samples) and could be a topic of research for construction of prehistoric ritual sites in general.
- 3.7** Can we further refine the date for the inception and subsequent enlargement of Silbury Hill?(Cleal, R M J, 2001, 63)
- 3.8** Is Silbury Hill unique? What is the date of the Marlborough mound? Can we date the antlers? (Cleal & Montague, 2001, 17)

4 The current state of knowledge concerning the surroundings of the Hill and its wider context

- 4.1** The following account is largely based on the small excavations and coring work undertaken by John Evans at Avebury and West Overton (Evans *et al*, 1993), the work by Whittle on the West Kennet palisade enclosures (Whittle, 1997), and work undertaken by Wessex Archaeology on the Kennet valley foul sewer pipeline (Powell, 1996)
- 4.2** While Silbury Hill appears to have been set in a very open landscape that some woodland was available for exploitation in its hinterland is suggested both by the presence of a small woodland element at Silbury and by the environmental evidence from the West Kennet palisade enclosures (Whittle, 1997). The pre-dominance of pig, although this may be due to its significance in feasting ritual, at the enclosures may indirectly imply exploitation of woodland as an important source of pannage (Whittle, 1993, Robinson & Dimbleby, 1997). Also there would be a need for timber for construction of the enclosures and as fuel. The charred plant remains from the enclosure contain woodland plants such as hazelnut again suggesting exploitation of woodland. The plant remains from the enclosures also suggest some arable cultivation, although it is possible that crops were brought from some distance. The small numbers of crop remains recovered could indicate that little or no crop processing activity or consumption was occurring within the palisade enclosures. This provides a sharp contrast with Windmill Hill where a large assemblage of cereal remains was recovered (Whittle *et al*, 2000).
- 4.3** The building of Silbury Hill and other monuments is seen to be associated with a renewed phase of clearance triggering alluviation (West Overton Formation, Evans *et al*, 1993). I would argue that the dating of this sequence is in doubt. The charcoal from a cremation, cut from below or within the Avebury, and burnt sarsons found at the same level were dated to 3020 +/- 70BP (OxA-1348) and 3030 +/- 250 BP (TL date) respectively

(Evans *et al*, 1997, 146, Huxtable & Evans, 1990). A cattle skull from the surface of the soil (i.e. the onset of alluviation at this point) gave a date of 2980+/- 100 (OxA-1045) (Evans *et al*, 1993, 146, 163). Other dates from within the West Overton formation (silt) give earlier dates but these could be on residual/ re-deposited material (e.g. the human femur from the Avebury cutting found low in the West Overton formation (OxA – 1221, 3800 +/- 60BP) (See Appendix 1, Table 2 by Peter Marshall). The argument that the sequence represents a succession of silt layers with the earliest close to the river and the latest furthest from the river is reasonable but needs further testing.

- 4.4** There are no palaeoenvironmental investigations of the ditches or the reservoir (extension of the ditch to the west of the mound) of Silbury Hill itself or of palaeochannels associated with the River Kennet. However the shafts dug by Pass (1887) into the ditch and reservoir showed that there are considerable depths of deposit. The account of shaft 5 which describes a 'distinct black layer, about 1ft thick containing fractured flints, bones, burnt sarson stone and charcoal' (Pass, 1887, 253), hints at the possibility of permanently waterlogged deposits, or at the very least deposits containing cultural waste within the ditch.
- 4.5** 'There has been no specific investigation of the Swallowhead Springs, just below Silbury Hill [and] the hydrological history of the Hill remains uncertain' (Whittle, A, 1997, 6).
- 4.6** According to Evans *et al*, (1993, 142) the Kennet was a perennial stream, from Swallowhead Springs (Kennet is called the Winterbourne above this point) before the extraction of water by boreholes. The extraction of water in this area will have had an affect on the overall water table in the area. It would be interesting to know when this dates from.

5 Questions arising with regard to the broader environs of Silbury Hill?

- 5.1** What was the nature of the landscape surrounding Silbury prior to the construction of the mound and in subsequent periods?
- 5.2** What is the nature and date of the deposits within the ditches and reservoir? Do the fills post –date the use of the monument or are the lower fills contemporary with it? A series of cores taken through these features could greatly increase our knowledge with minimal impact to the site and allow also examination of the crop mark noted during David Field's survey (Field, 2002, 29).
- 5.3** Is there any evidence for ritual use of the reservoir and or ditches as depositories of weapons or other 'offerings' and if so when?
- 5.4** Are there deposits surviving in the palaeochannels associated with the River Kennet to the east of Silbury Hill? If so what date are these deposits, and can they be used to help reconstruct the history of the Silbury landscape? Again

this question could be answered through coring in conjunction with geophysical survey.

- 5.5 Can we be certain that arable agriculture was practised in the area? None of the cereal remains from the West Kennet palisade enclosures were dated. The grain dated from Avebury (Evans *et al*, 1993) turned out to be Saxon. This is also a distinct possibility for the West Kennet material, given the presence of Saxon remains at the site. Is arable agriculture confined to the area around or to the north of Windmill Hill (Whittle *et al*, 2000)? Is the ritual landscape a place apart?
- 5.6 What is the date of the onset of alluviation? The West Overton Formation needs to be more closely dated. There is potential for OSL here both on the alluvium, and the associated colluvial deposits.
- 5.7 The occurrence of bracken on chalkland sites including Silbury has led to the suggestion that further research is needed to understand why bracken has disappeared from the chalkland landscape (Allen, 2001, 57). Can we establish whether bracken spores are entering deposits today? What is the present occurrence of this plant within the World Heritage Site? The collection of data from the present day ground surface could be combined with collection of present day insects and seeds in the immediate surroundings of the Hill.
- 5.8 Is there any environmental material from the Winterbourne/ Silbury Roman settlement other than those reported on in (Powell *et al*, 1996), or the ?Roman wells?
- 5.9 When did water extraction from boreholes begin? Any monitoring of water in the Mound itself would need to take account of the amount of water being extracted from the boreholes (overall water levels)

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Table1: Silbury Hill Scientific dating (Fachtna McAvoyn)

Sample Ref	Site Ref	Material	BP	Cal BC 95% confidence	Provenance
I - 4136		Twigs, plant stems/roots	4095 ± 95	2871 - 2486	Surfaces of turves
OxA - 10818	661-851	Antler, red deer	3953 ± 34	2490 – 2340	From next to chalk 'wall' on summit (CfA excavation)
OxA -10819	661-851	Antler, red deer	3918 ± 36		
OxA -11187	661-200100864	Antler, red deer	3946 ± 37	2490 - 2310	From chalk layer on summit (CfA watching brief)
OxA -11188	661-200100864	Antler, red deer	3910 ± 37		
BM - 842		Antler	3849 ± 43	2398 – 2202	Nr base of south ditch
BM - 841		Antler	3752 ± 50	2270 – 2042	

Appendix 1 (Peter Marshall)

Laboratory Number	Luminescence Age	Radiocarbon Age	Calibrated age (68% confidence)	Calibrated age (95% confidence)
OxA-1348		3020 ±70 BP	1390 – 1120 cal BC	1440-1010 cal BC
	3030 ± 250 BP		1330 – 820 cal BC	1580 – 570 cal BC
OxA-1045		2980 ± 100 BP	1390 – 1020 cal BC	1440-910 cal BC
OxA-1221		3800 ± 60 BP	2310 – 2140 cal BC	2470 – 2030 cal BC

