

**SKOMER ISLAND:
NORTH STREAM SETTLEMENT, HUT GROUP 8.
The Excavation of an Iron Age Burnt Stone Mound**
April 2014



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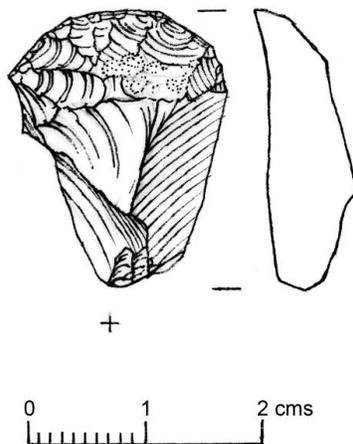
Royal Commission on the Ancient and Historical Monuments of Wales,
University of Sheffield and Cardiff University

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April 2014

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County: Pembrokeshire

Community: Marloes and St Brides

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1. Summary

A collaborative research project between the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), University of Sheffield and Cardiff University completed a third season of fieldwork and research on the renowned prehistoric landscape of Skomer Island (SM 7269 0946 NPRNs 24369 & 402711)⁵ in Pembrokeshire, west Wales, between 1st-5th April 2014 (see Barker et al. 2012; 2012b; 2013 & 2015).

Skomer is a heavily protected landscape managed largely for the benefit of its extraordinary and internationally-renowned birdlife. It is owned by Natural Resources Wales and managed by the Wildlife Trust of South and West Wales as a National Nature Reserve, with large parts of the island a Scheduled Ancient Monument (PE181) and the sea a Marine Nature Reserve. In addition to the current research project, two other archaeological studies have been undertaken on the island, both in the twentieth century: the first by Professor W. F. Grimes in the 1940s (Grimes 1950) and the second by Professor John G. Evans in the 1980s (Evans 1990).

The 2014 season of work included the first modern excavation in the island's history, exploring a mound of burnt stone associated with Hut Group 8 of the North Stream Settlement (NPRN 420196, SM 7242 0990). The principal aim of the excavation was to locate buried charcoal and other evidence suitable for radiocarbon dating and scientific analysis to establish absolute chronological markers for key phases in the development of Skomer's landscape and to reconstruct the environmental history of the island.

A small (6.06m x 1m) evaluation trench was opened across the mound, running from the external wall of a roundhouse down to the outer edge of the mound. The mound comprised 3 deposits of burnt and broken stone with evidence to suggest that it may have originally been contained by revetment walls. Aside from one find of animal bone, a sub-adult cattle tooth, it was otherwise devoid of charcoal or artefacts. A layer beneath the mound yielded charcoal, flint tools and tiny fragments of fired clay.

The excavation yielded the first scientific dates from the Island. Charcoal of probable blackthorn derived from the layer beneath the mound provided a radiocarbon date of 751-408 cal. BC (SUERC 54181 at 95%

⁵

http://www.coflein.gov.uk/en/site_search/?action=site&pnmrsname=&pnprn=24369&pclasssub=&pclassgrp=&pfr_eetext=&pperiod=&pcommunity=&pcouname=&poldcounty=

probability), Early Iron Age; whilst the cattle tooth (Find 24) within the mound provided a radiocarbon date of 161 cal. BC – 51 cal AD (SUERC 55129 at 95% probability), Late Iron Age.

The Early Iron Age date provides a terminus post quem for the mound and alongside the presence of worked flints indicates activity in the area prior to the establishment of Hut Group 8. The Late Iron Age date from high up in the lower mound deposit provides a chronological marker for the formation of the mound and occupation of the settlement.

2. Background to Project

This Skomer Island Project is a collaboration between RCAHMW, University of Sheffield and Cardiff University. It was initiated in 2011 and has four aims:

1. Develop a new landscape history of Skomer that takes account of the complex and multi-layered character of the field archaeology.
2. Establish absolute chronological markers for key phases in the development of Skomer's landscape.
3. Reconstruct the environmental history of the island and assess the changing impact of human occupation.
4. Support the organisations responsible for Skomer in applying the research outcomes of the project to the conservation management of the island's historic and natural environment.

The project was initiated following targeted aerial reconnaissance in 2008, which yielded new information about the island's field systems and hinted at greater complexity and longevity of human settlement on the island. This led to the commissioning of a new 0.5m LiDAR survey of the island (completed in 2010-11), with follow-up ground reconnaissance and survey completed during the first season of fieldwork in April 2011. This involved 3 days of walkover surveys and site visits including characterisation of the northern field system associated with the North Stream settlement (Barker *et al.* 2012; 2012b, 295) and plans and elevation drawings of new discoveries including standing stone pairs, and a sub-megalithic site in the north of the island. The results of this work revealed new information

about the island's settlements, field systems and ritual monuments demonstrating a much deeper chronology for the island than had previously been considered (Evans 1990, 255).

In April 2012, the second season of work saw geophysical survey (gradiometer and resistance) undertaken in two areas of the island, one inside and one outside the scheduled area (Barker *et al.* 2013). There were two objectives:

1. Evaluate the preservation of sub-surface archaeological features within areas cleared and improved in the eighteenth and nineteenth centuries.
2. Evaluate the preservation of sub-surface archaeological features within areas of prehistoric relict field systems and settlements.

The results highlighted the potential of geophysical survey techniques for identifying sub-surface archaeological features.

No exploratory fieldwork was carried out in 2013, but in June of that year two of the project team undertook a day's field visit and study with Professor Andrew Fleming and Polly Groom (Cadw Inspector of Ancient Monuments and Archaeology). During this year further information was also received from Richard Kipling, a wildlife researcher on the island, about a convincing solar alignment at the Harold Stone standing stone (NPRN 305372, SM 73360 09520).

The results of fieldwork so far undertaken has been published in *Archaeology Wales* (Barker *et al.* 2012; 2013 & 2015), and in a book chapter written by the project team 'Puffins amidst prehistory: reinterpreting the complex landscape of Skomer Island' (Barker *et al.* 2012b).

3. Excavation Location

The 2014 fieldwork addressed two of the project's aims: to establish absolute chronological markers for key phases in the development of Skomer's landscape, and to reconstruct the environmental history of the island. It was decided that a very limited excavation should be designed specifically to identify intact archaeological deposits that might preserve samples for scientific dating and palaeoenvironmental analysis and provide the first step in meeting these aims. This evaluative phase was necessary because burrowing sea birds and rabbits were believed to have destroyed the stratigraphic integrity of most if not all the archaeological features on the island. However, the team's ground surveys and evaluation of earlier research identified the potential of several roundhouse settlements (Evans' hut groups 6, 7, 8 and 34) associated with large, compact mounds of burnt stone (Barker et al. 2012b, 287). These stone mounds were not visibly disturbed by burrows and so they were likely to retain their stratigraphy, and it was thought that their association with domestic buildings and enclosures increased the likelihood of recovering datable material and artefacts.

Of the settlements with burnt stone mounds, hut groups 6, 7 and 8 had the advantage that they were located within the fields systems radiating out from an area of higher ground and outcrops in the north of island which were surveyed by the team in 2011 (Barker *et al.* 2012b, 293). Consequently, this area became the preferred location for excavation. The three hut groups had the added benefit of lying alongside the island's History Trail, and so were well-placed for any subsequent public interpretation. The presence of strong bracken growth on the settlements offered the further potential to support their management by investigating the impact the bracken was having on the archaeological stratigraphy.

Scheduled Monument Consent (SMC) and SSSI consent were granted for a hand-excavated trench in *one* of the mounds of burnt stone associated with hut groups 6, 7 or 8, measuring no larger than 10m x 2m in any configuration, and to a maximum depth of 1.5-2m. It was agreed that the precise location and extent of the trench would be decided in the field based on the analysis of each settlement, the visibility of burnt stone on the surface and the degree to which deposits appeared undisturbed by burrows. Consents were also obtained for geophysical (magnetometer) survey, surface collection and an auger transect survey as part of an environmental sampling programme of the field lynchets associated with the North Stream settlement to recover buried soils – a lack of time prevented the auger work proceeding. SMC did not permit excavation into the intact stratigraphy of any roundhouse.

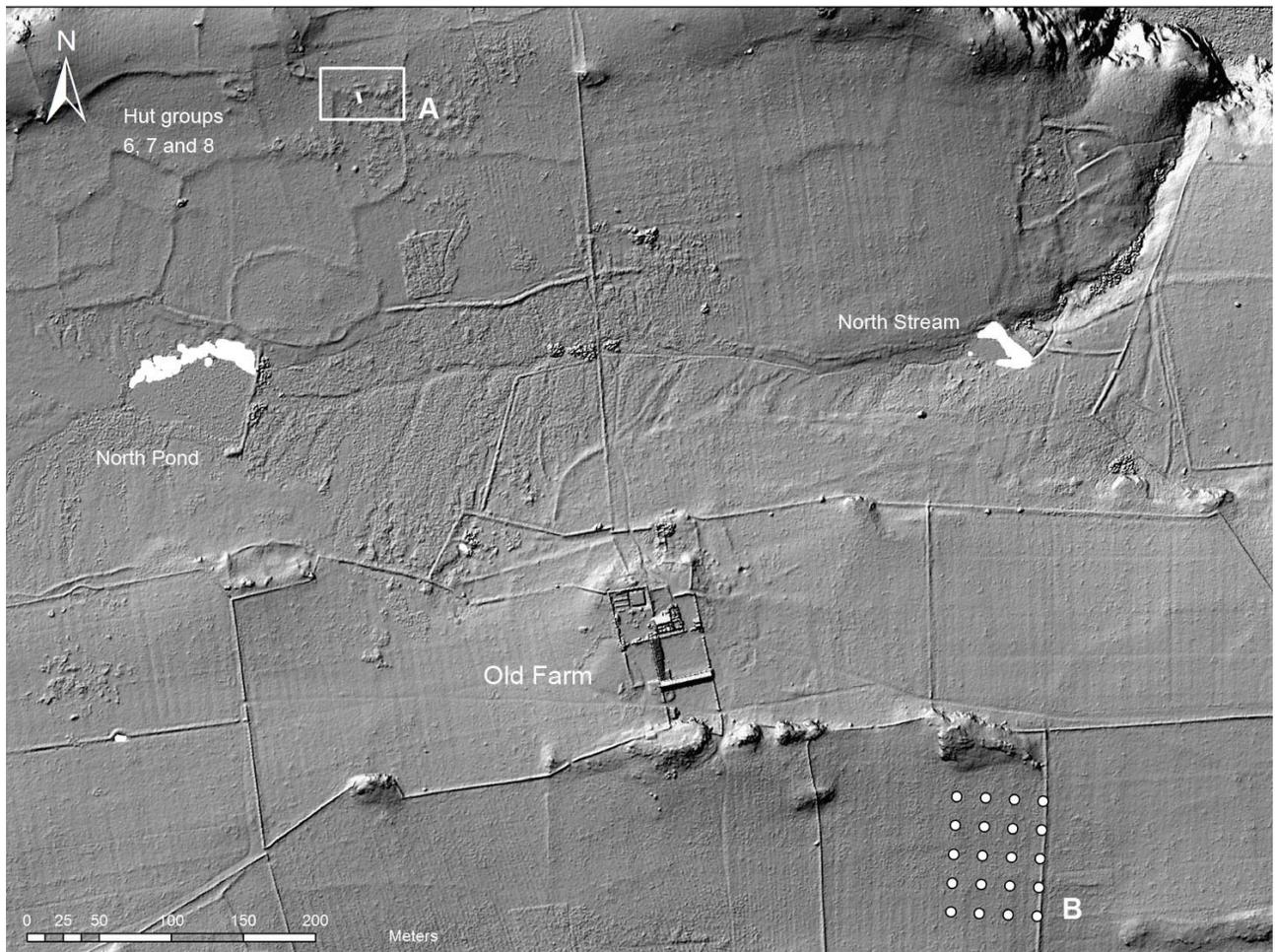


Figure 1. Skomer Island. Location map showing location of the 2014 excavation trench (A) in the north of the island and the location of the 2014 magnetometry grid (B) in the centre of the island (Crown Copyright RCAHMW; © Environment Agency copyright and/or database rights 2015. All rights reserved).

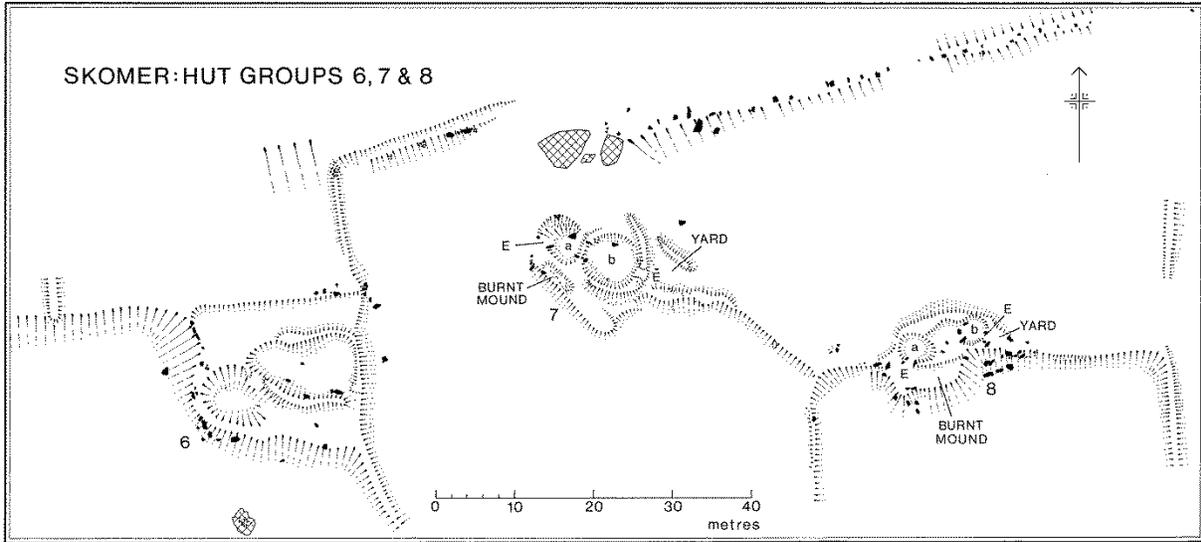


Figure 2. John Evans' (1990, 253) survey of hut groups 6, 7 and 8. The 'burnt mound' associated with Hut Group 8 (far right) was the focus of the excavation (DI2015_0235, Copyright Reserved).

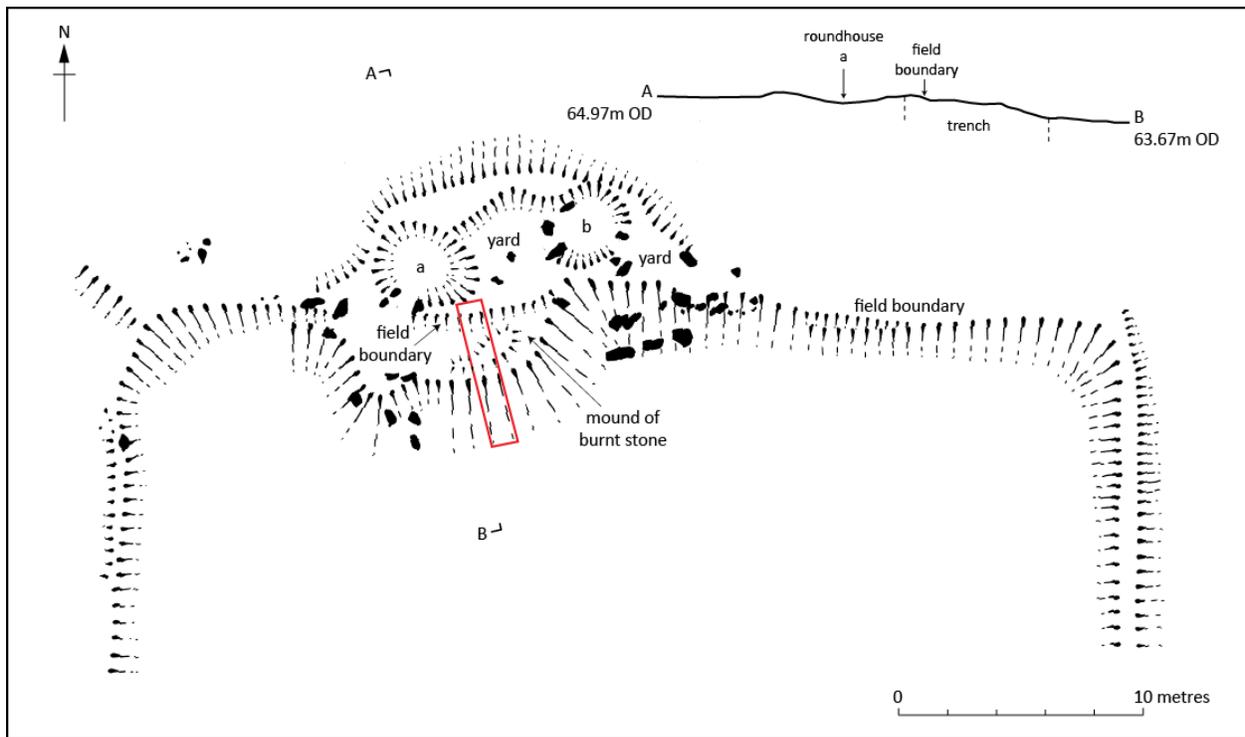


Figure 3. Hut Group 8 showing the location of the excavation in red. The earthwork plan is based on Evans' published survey (1990, 253), with the addition of a slight mound on top of the mound of burnt stone (originally surveyed by Evans' team but not included on his published plan) and the site profile (upper right) surveyed during the 2014 fieldwork.

At the initiation of the fieldwork (1st April 2014) the project team visited the mounds of burnt stone at hut groups 6, 7 and 8 to assess their suitability for excavation. **Hut group 6** is the largest of the three, comprising a single or possibly conjoined roundhouse, a yard to the north-east, and a mound of burnt stone on the south-east. There appears to be some complexity in the deposition of the burnt stone, suggesting multiple phases of build-up. The mound is also integral to the settlement, raising potential problems in distinguishing the mound from the roundhouse during excavation. It was deemed potentially too complex a site for a rapid evaluative excavation.

Hut group 7 is the most clearly visible of the three and is closest to the History Trail. Earthworks suggest a conjoined roundhouse cells (a) and (b) with a yard to the south-east and a mound of burnt stone to the south-west. The mound is puzzling as it features a neat rectangular mound of stone on top of a wider spread mound. It was decided that the clarity of the roundhouse walls may indicate that the settlement had been excavated or 'wall-chased' by antiquarians, with the neater rectangular mound representing a former spoil tip. This made Hut group 7 less attractive for excavation.

At **Hut group 8**, the mound of burnt stone is distinct, lying to the south of a pair of roundhouses (a) and (b), which share a central sunken yard, with a second yard situated to the east of roundhouse (b). Overall the mound measures 11.5m east-west by 5m north-south and stands 1m high. The settlement appears to have been founded on top of a pre-existing field boundary, with the burnt stone thrown downslope and covering the boundary. The clarity of the mound meant that it could be safely evaluated without disturbing the roundhouse stratigraphy, and it was therefore decided to open a trench here. Evans' original description of the site is as follows:

'Double hut, a and b, with no linking gap between the units, although there are two stones in 8b where a gap is likely; there is a small yard to the east, set into the north side of a field lynchet. To the south is a probably burnt mound. Like hut group 7, the western hut, a, opens into one field, the eastern hut, b, into another, and again the burnt mound is adjacent to the western hut which was the cooking hut. It is presumed that the hut group is later than the lynchet otherwise the latter could not have formed.' (Evans, 1990, 257 and figure 6).



Figure 4. Mound of burnt stone associated with Hut Group 8. General pre-excavation view from the south-west following clearance of dead bracken down to the turf-covered stony surface of the mound. The two figures stand on top of the field boundary by roundhouse (a). The lower ranging rod lies at the southern extent of the mound (Crown Copyright: RCAHMW DS2014_354_003).



Figure 5. Excavation work proceeding on the lower part of the mound of burnt stone (Crown Copyright: RCAHMW DS2014_354_005).

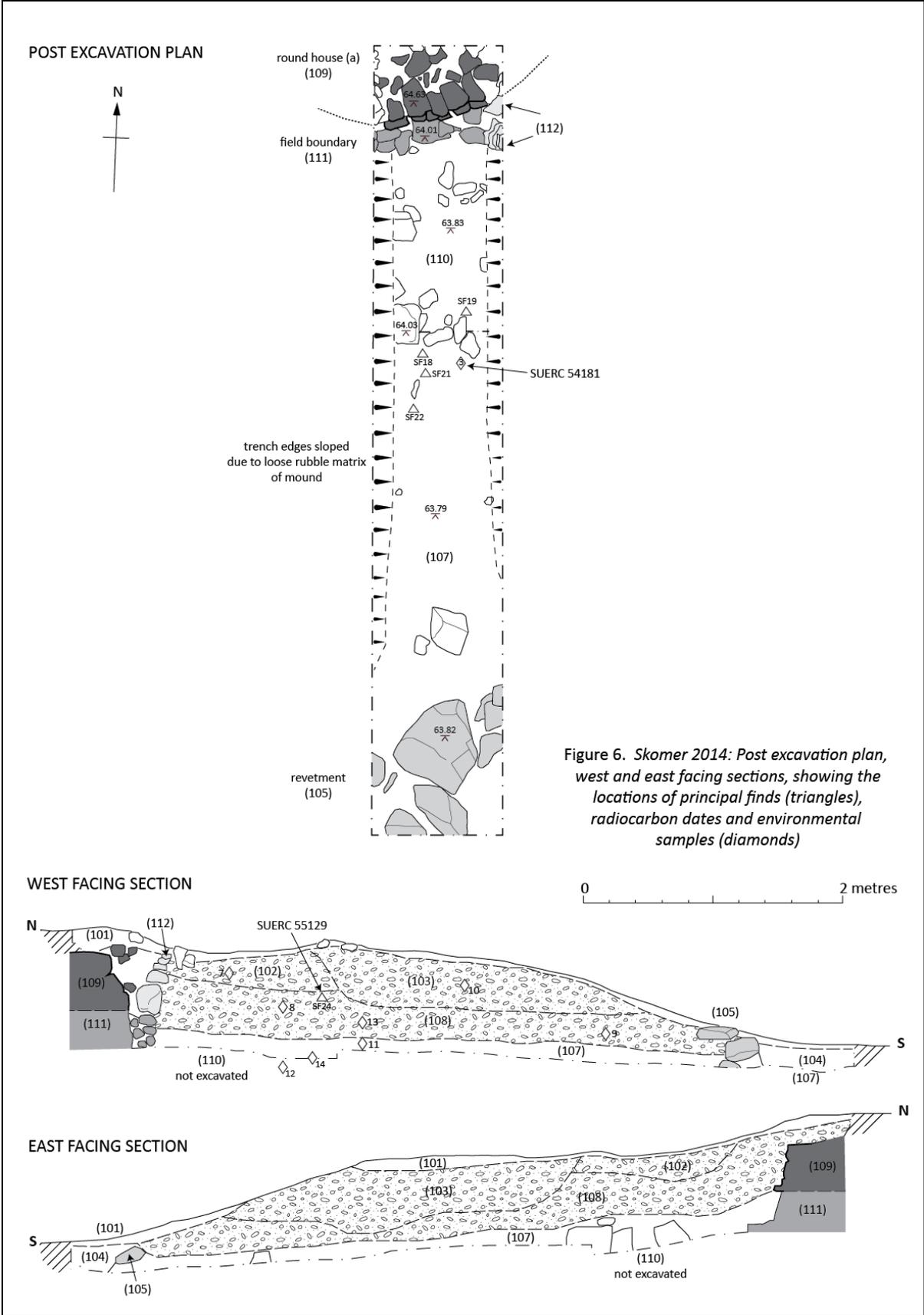
4. Excavation Methodology and Sampling Strategy

The mound of burnt stone associated with Hut Group 8 was selected for excavation. The total excavation area permitted under SMC was 10m x 2m in any configuration. It was decided to cross-section the mound from where it abutted the external wall of roundhouse (a), to its southern edge where it fell level with the ground surface of the adjacent field and where there was no further surface evidence for burnt stone. The final trench measured 6.06m north-south by 1 metre wide. The maximum depth of the excavation was 0.9m. Lists of contexts, finds and samples are provided in the appendices.

Excavation was carried out in accordance with current best practice (ClfA 2014). The trench was deturfed by hand, and all archaeological features and deposits excavated stratigraphically and to a degree whereby their extent, character and relationship to other features and deposits could be established. A full written, drawn and photographic record (archived with the NMRW) of all material revealed in the trench was made during the course of the investigation with all archaeological features encountered recorded using a standard single-context recording system. Plans and sections were drawn at a scale of 1:20. Trench location, survey tie-in and spot heights were fixed in relation to the National Grid using a Leica Viva GNSS survey-grade GPS.

An environmental sampling programme was undertaken for the identification and recovery of sediment profiles, carbonised remains and small artefactual material. Bulk sediment samples of approximately 250ml were removed from stratified contexts, profiles through sediments were sampled using Kubiena tins and small deposits of carbonised material collected and stored in aluminium foil. All environmental samples were assigned a unique number, described on a pro forma sample record sheet, and the sampling location recorded on appropriate plan and section drawings.

Detailed overlapping photographs were taken of the excavation at pertinent points suitable for processing using Structure from Motion (SfM) software, a method of 3D documentation/photogrammetry and reconstruction that enables reanalysis of the virtual excavated trench in three dimensions, and even theoretically allows for 3D printing of the resulting model (Figure 9).



5. Results of the Excavation

5.1 Pre-mound contexts

The lowest context (110) encountered, though not fully excavated, was a firm brownish-yellow silt loam. Only 1.6m of this context was excavated in the northern part of the trench, up to field boundary (111) – a stone-faced lynchet over which the roundhouse was constructed. This context contained frequent charcoal flecks together with angular blocks, 15-30 cm across, which are interpreted as possible tumble from the adjacent field boundary (111).

Above (110) was the uppermost context (107) below the mound. It was a soft dark yellowish-brown coarse sandy loam, distinct to the overlying mound of burnt stone. This was a productive layer, compared to the mound above, it was flecked with cultural debris, both specks and lumps of charcoal along with frequent flakes, pebbles and artefacts of flint. Two possible fragments of fired clay were recovered and among the finds were the island's first recorded flint scraper (Figure 12) and a quartzite hammer stone (Figure 14).

Various stones embedded in (107) might indicate cut features or postholes, but the width of the trench precluded the exploration of these. Radiocarbon dating of blackthorn charcoal from the context yielded a date of 751-408 cal. BC, Early Iron Age providing us a *terminus post quem* for the construction of the mound and along with the finds indicates human exploitation of the area prior to the establishment of Hut Group 8. Based on magnetic susceptibility and particle size analysis, (107) may be a lower part of a former A-horizon, possibly disturbed by activities relating to the construction of the settlement (Appendix 2).

A stone-faced lynchet (111) was exposed at the northern end of the trench, upon which roundhouse (a) was constructed. The full extent of the lynchet is visible as an earthwork standing 1.3m high as surveyed by Evans (Figures 2 and 3). During excavation the lynchet beneath the roundhouse comprised of small-medium angular stones (the fill?) in its upper section with larger flatter footing or original facing stones at its base (Figure 7).



Figure 7. Post excavation view of the external face of roundhouse (a) (109), on top of stonework of the pre-existing lynchet (111) (Crown Copyright: RCAHMW DS2014_354_011).

5.2 Mound of burnt stone

Following removal of a thin 'topsoil' (101) the mound comprised three distinct layers of burnt and broken stone in a loose coarse sandy loam matrix (108, 103 and 102), deposited onto (107). Bracken roots penetrated deep into the loose soil matrix of the burnt mound, to a depth of at least 0.6m.

At present it cannot be ascertained whether the deposits of burnt stone (108) and (102) abut roundhouse (a) or were cut *into* during construction of it. The maximum depth of (108) was 0.44m, and it spread 4.6m as far as a line of sub-angular boulders, smaller stones and large earthfast boulder (105) aligned in a roughly north-east to south-west arrangement. This line of stones lay at the southern edge of the mound, and is interpreted as a revetment, although the possibility of field clearance against the edge of the mound cannot be discounted. The lower deposit of burnt stone (108) had a dark brown friable coarse sandy loam matrix between the stones, and it was distinguished from the upper layers (102 and 103) by having a higher proportion of angular burnt stone. The stones were very angular, some were reddened and they ranged in size from small (up to 0.04m) to large (up to 0.14m). This

context also produced the only certain find: a sub-adult cattle tooth (find 24), recovered from the west facing section high up in the deposit (Figure 6). This provided a Late Iron Age radiocarbon date of 161 cal. BC – 51 cal AD (SUERC 55129 at 95% probability).

Two further layers of burnt stone (102) and (103) were recognised on top of (108). Context (102) was only identified close to the roundhouse wall in the northern part of the mound and extended 1.7m southwards, to a maximum depth of 0.3m. It comprised angular, heat-shattered stones (0.08-0.12m) set within a dark reddish brown friable silt. A fragmentary line of larger stones (106) was identified, 1.7m south of the hut wall, against which (102) abutted. These stones could represent the remains of a revetment demarcating the southern extents of the burnt stone deposit. It is possible that the line of stones (112) visible in the west facing section, though not immediately clear within the excavated area, are the remains of a roughly built revetment supporting the mound at its north end.

The final burnt stone layer (103) comprised the bulk of stone in the middle of the mound. It extended roughly from the line of the possible revetment (106) southwards for 1.2m, to a maximum depth of 0.5m. This deposit may also have originally been contained by outer revetment (105). The deposit was predominantly (95%) burnt stone of similar sizes to (102) and (108). The material was very loose, with many voids and a dark grey coarse sandy loam matrix.

Aside from the single certain find, the cattle tooth mentioned above, a number of river or beach pebbles, potential rubbing stones or utilised stones, were also identified within the mound (see Appendix 1). No charcoal was recovered.



Figure 8. Comparative views showing excavation in progress (left) and post-excitation (right) from the south. The remains of the outer revetment (105) can be seen at the bottom of the trench. This may represent a formal revetment to delimit the extent of the mound or the results of field clearance against the edge of the mound (Crown Copyright: RCAHMW DS2014_354_007 and 015).

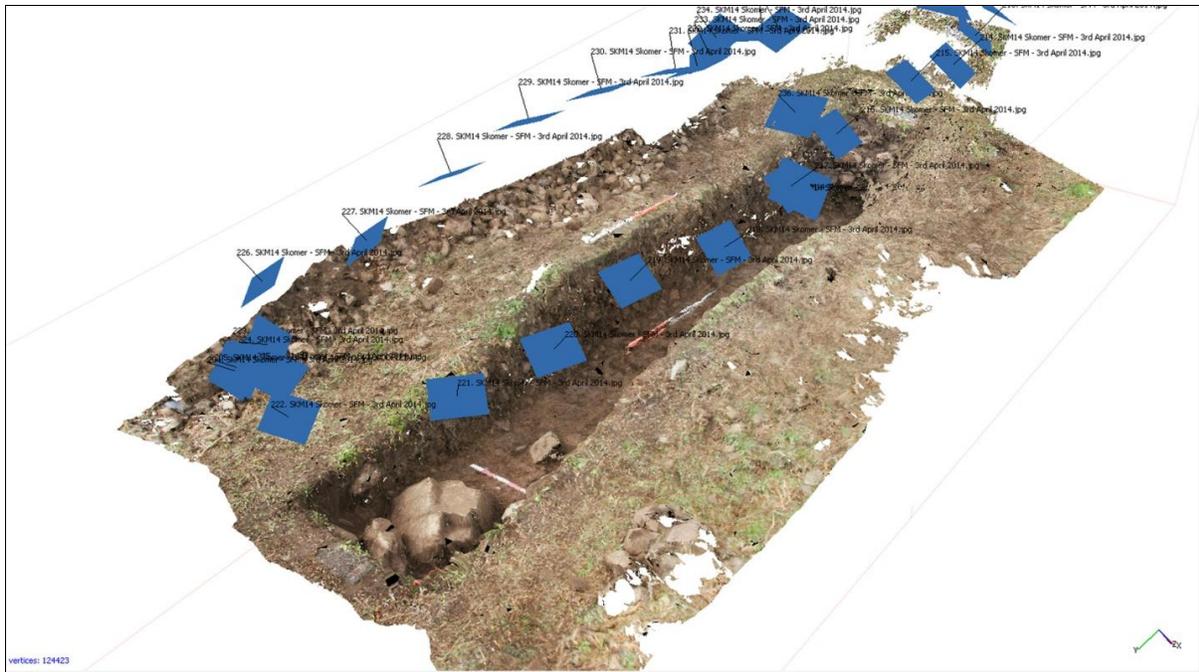


Figure 9. Structure from Motion (SfM) views generated in Agisoft PhotoScan showing the trench following excavation: (top) with camera positions; (bottom) 3D model which allows panning, zooming and close examination of the excavated trench, which is now inaccessible and backfilled (Crown Copyright: RCAHMW)



Figure 10. Completion of backfilling, 4th April 2014. View from the north-west showing the backfilled excavation trench. The original profile of the mound will eventually restore following settling of the backfilled material (Crown Copyright: RCAHMW DS2014_354_022).

6. Discussion

The results of this excavation raise a number of points for discussion relating to the role and function of the mound of burnt stone in the domestic life of later prehistoric and Romano-British Skomer.

6.1 Relationship of the mound with the settlement

The south wall of the roundhouse (109) was sited on top of a pre-existing field boundary, a stone-faced lynchet (111). At present it cannot be ascertained whether deposits of stone (108) and (102) were *cut into* during construction of the roundhouse rather than abutting it. Only a larger excavation trench would establish the structural and depositional sequence here and provide more definite chronologies.

The soil and pollen studies (Appendix 2) indicate that the mound accumulated on a disturbed A-horizon (or 'topsoil'). Although the pollen preservation within this soil was poor, the landscape seems to have been largely clear of trees, and dominated by grassland and heathland with some shrub species (notably *Salix*). This vegetation profile remains broadly unaltered during the accumulation of the mound, except in the upper layer (102) where tree species are present in very small proportions.

6.2 Phasing in the mound

At least three distinct deposits are represented in the mound with a single certain find in the lower deposit (108) providing a Late Iron Age date. The fact that deposit (108) extends all the way from the roundhouse wall to the outer revetment, some 4.6m, suggests that it could have been deliberately levelled or spread out before the later deposits were added. There was no evidence of soil formation between deposits suggesting the mound was created during a relatively continuous period of use.

6.3 Structured/ordered deposition

The mound appears to have been revetted at its south end, indicated by a line of boulders (105). Whether this revetment was specifically constructed as a feature of the mound or was the result of early clearance from the adjacent field that then defined the southern extent of the mound is not known. The stone-faced lynchet (111) would also have defined and contained the northern limit of the mound, alongside possible revetment (112) visible in the west facing section. Within the mound itself context (106) may represent the partial revetment of deposit (102) and the back edge of deposit (103). In this sense the mound is potentially *ordered* or *organised*; it is a tidy deposit, if only for the practical purpose of keeping the growing mound of burnt stone from extending too far into the adjacent field.

Further evidence of an organised deposit is that the mound was virtually clean of any other artefacts, finds or additional deposits/horizons; it solely comprised of stone and not all discarded stones showed obvious signs of burning. Why was unburnt or only partially burnt stone discarded? How often were stones re-heated and used again before discarding?



Figure 11. *Hut Group 8 and excavation trench. General view from the northwest of the roundhouses (grey circles, left) with the extent of the mound marked by the figures, and dashed line. The mound would have dominated the architecture of Hut Group 8 when viewed from the south (Crown Copyright: RCAHMW DS2014_354_008).*

6.4 The monumental role of the mound

The excavation team were impressed by the large quantity of stone from the mound, c.51 cubic metres of stone (the sloping edge and undulating surface were not taken into account in the calculation of the volume). It represents an enormous amount of burnt and unburnt stone and a monumental addition to the settlement, in many respects dominating the domestic architecture of both roundhouses. The possible revetment around the southern edge of the mound is interesting. It will have served a useful purpose by preventing stone spilling onto the adjoining field. However, it also created a vertical edge to

the mound, making its height more obvious and, potentially, impressive. It is also notable that the device used to retain soil in the fields (the stone-faced lynchet) was also employed to contain the stone in the mound. The stone was enclosed as part of the settlement, distinct from the fields, and may even have acquired a monumental value as a structure alongside the roundhouses.

The size of the mounds found alongside a number of the roundhouses on Skomer are difficult to parallel at Iron Age settlements on the mainland, even those where preservation is relatively good. They are also not a feature of standard roundhouses excavated within Welsh Iron Age hillforts or defended enclosures.

6.5 Function of the mound

In his description of Hut Group 8, Evans (1990, 257) identified roundhouse (a) as the 'cooking hut' for which the mound was directly associated. Further investigation is needed to verify this association and function, although general opinion is that the mound was created as a result of heating water with hot stones and the most likely reason for doing this was cooking, especially if the single find of a cattle tooth is taken into consideration. Until other key features are identified e.g. troughs or cooking pits other activities cannot be discounted, for example, Evans (1990) suggested a number of possible sauna sites on the island and 'industrial processes' such as dyeing or fulling, brine evaporation or brewing have also been linked with burnt mounds (Kenney 2012, 268).

Pioneering, yet still relevant, work on cooking mounds was carried out by Michael J. O'Kelly in the early 1950s in County Cork, Ireland (O'Kelly 1954). Excavations were carried out on several cooking mounds (termed *fulacht fiadh*) which were found to date to the early-middle Bronze Age (1783-1323 BC; *ibid.*, 136-7). The most pertinent results were obtained from the site at Ballyvourney I where the excavated site was subsequently reconstructed *in-situ*, and then a cooking episode was re-enacted, to attempt to further understand the nature and process of cooking at these sites.

In common with the other sites examined, the Irish cooking mounds had an exceptionally well preserved array of structures associated with them including preserved woodwork. Ballyvourney I was a complex site with a roasting pit (associated with a charcoal spread), a timber-lined trough which still held water at the time of excavation, paving stones and stepping stones to facilitate access to the trough, and two post settings, one interpreted as meat-rack supports and a four-post structure postulated as supporting a butcher's block or oak table (*ibid.*, 114-5). A dump of broken and burnt stone extended away from the site comprising around 27 cubic metres of material, between 50-60cms deep.

Preservation on-site was exceptional. In the base of the trough were pieces of partly charred branches and the excavators interpreted the leaf and twig debris as suggesting abandonment before the beginning of autumn, suggesting occupation and use during the summer only (*ibid.* 110). O’Kelly also experimented with the cooking process (*ibid.*, 120-3). The most efficient method of heating the stones was found to involve laying down a layer of stones on the base of the hearth, building up with fuel, and then adding a second layer of stones. The fire was then started and after about an hour, red hot stones could be carefully retrieved from the fire with a long-handled spade.

The contents of the 1.8m x 1m trough (40cm deep) which held 454 litres (100 gallons) of water could be brought to the boil in 30-35 minutes. Thereafter just a few stones could keep the water at boiling point and were still too hot to handle after 30 minutes in the trough. In relation to the Skomer mound, O’Kelly found that red hot stones dropped into the trough did not immediately shatter, and some could be used a second or third time (*ibid.* 121).

O’Kelly found that a 4.5kg leg of mutton tightly wrapped in clean straw (to keep it clean and free of stone chips) cooked in 3 hours and 40 minutes, and that a 0.5 cubic metre of broken burnt stone was left in the trough. O’Kelly took this figure to calculate that the entire mound of burnt stone on site may have represented 54 cooking episodes, or 54 days use if cooking was done once a day. There are caveats such as the likely re-use of some stone, but this gave an acceptable estimate of function and duration for the Ballyvourney I site. On the basis of O’Kelly’s calculation the mound of burnt stone at Hut Group 8, Skomer, could be estimated to represent around 102 cooking episodes.

Whatever its function, the growing mound at hut group 8 would have become a highly conspicuous addition to the settlement, and if related to cooking a very visible measure of how many meals had been prepared at the family hearth and a demonstration of physical effort in all the journeys required to gather or quarry suitable stone for heating. Could the mound therefore signify how long a family had been resident in a particular location? A monumental, physical reminder of the number of meals prepared would have spoken of the age and status of residency, of memory and land tenure. Could the scale of the mound also suggest larger aggregations of people and feasting? Small scale cookery such as that which might take place on a daily basis for a domestic settlement sites is more effectively done using a hide to hold water or in dry ovens. The time and labour expended in creating large troughs would perhaps only be justified where large quantities of meat were to be cooked (Kenney 2012, 269).

7. Conclusion

The excavation had the specific objective of identifying intact archaeological deposits that might preserve samples suitable for scientific dating and palaeoenvironmental analysis. This is a particular challenge on Skomer because burrowing rabbits and seabirds have disturbed very large areas of the island's surface, including and indeed especially the earthen banks of the field systems and settlements. We chose to excavate a mound of burnt stone associated with one of the North Stream settlements because burrows did not penetrate the compacted stone and the proximity to the settlement raised the likelihood of recovering cultural material.

The stone mound did retain its stratigraphic integrity and, critically, there were intact sediments preserved beneath the stone. Artefacts, charcoal and pollen (though poorly preserved) were recovered from the sediments (110), and we can be reasonably confident these were deposited before the mound accumulated. Intact columns were collected from the sediments (110 and 111), and we are awaiting the results of a micromorphological study. This may help to corroborate the conclusion of the sediment analysis that 110 and 111 were a former A horizon, albeit disturbed.

Two samples were sent for radiocarbon dating: a cattle tooth from within the stone mound and a fragment of *Prunus* charcoal (probably blackthorn). Neither of the samples is from an 'event context' (e.g. hearths or burials) and the charcoal is not roundwood, so the unknown age of the tree needs to be considered a factor in the reliability of the date. That said, the dates fit with their stratigraphic relationship – the earlier date is from the lower sample, beneath the mound – and they span the Iron Age (750 BC – AD50), which fits with when we believe the settlement was occupied.

It is reasonable to speculate on how the dates might relate to the occupation of the settlement. The cattle tooth is the most helpful as it was recovered from the top of the lower layer within the mound and its incorporation into the mound can be explained by the use of the stone in domestic cooking. This would place the formation of the mound and occupation of the settlement in the Late Iron Age (161BC-AD51 calibrated). The tooth was recovered from the lowest layer of burnt stone, although from high in the context, and so it cannot be confidently attributed to the early formation of the mound.

The *Prunus* charcoal is more problematic. While it is highly probable that the charcoal is anthropogenic in origin, we have no knowledge of why the wood was burnt, where it was burnt or how it became

incorporated into the sediment beneath the mound (110). We are also unsure what chronological relationship 110 has with the field boundary and the roundhouse. That said, it seems unlikely that the charcoal filtered through the overlying stone mound, at least once the mound was well-established, so the date (751-408 cal. BC – an unhelpfully wide range as it falls on a plateau on the calibration curve) provides a *terminus post quem* for the mound. Given that blackthorn is a hedgerow species and shrub, we might speculate that it grew on the field boundary and was burnt when the boundary was cleared to make way for the settlement. This interpretation is supported by the physical relationship between (110) and the field boundary: (110) appears to abut against the lynchet.

Overall, we have shown that undisturbed archaeological deposits survive on Skomer and it is possible to get scientific dates and environmental samples. The restricted size of the excavation brought significant limitations in terms of the interpretations we can make. It is also just one of many settlements (of varying types), and does not represent the many field boundaries, which are the most prominent archaeological feature of the island. It is worth targeting more settlements using some of the same principles that guided the fieldwork in 2014. With the field systems, many boundaries are severely affected by burrows, but some of the largest lynchets have the potential to retain intact sediments towards their base.

8. Acknowledgements

The Skomer Island Project team would like to thank the Acting Secretary and Commissioners of the Royal Commission, Inspectorate staff at Cadw, particularly Polly Groom and Adele Davies, the Skomer Island Wardens, Birgitta Büche and Ed Stubbings for help before and during our 2014 season, Dr Lizzie Wilberforce at the Wildlife Trust of South and West Wales and Chris Lawrence at Natural Resources Wales for accommodating the archaeological work and granting SSSI consent to work on Skomer's highly protected landscape. The team is grateful to Andrew David, Jody Deacon, Adam Gwilt, Havananda Ombashi, Ellen Simmons, Peter Webster and Elizabeth Wright for assisting with aspects of post excavation.



Figure 12. *The Skomer Island Project team at the trench edge, April 2014. L-R, O. Davis, L. Barker, B. Johnston and T. Driver (Crown Copyright: RCAHMW DS2014_354_006).*

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Appendix 1: The Finds

Flint (Andrew David and Toby Driver)

Most of the pieces are 'natural', part of the local soil population or perhaps brought in as incidental inclusions with other materials (e.g. fuel). The only two certain artefacts from the excavation are the scraper [19] and the retouched flake [18]. The scraper [19] is a very neat convex-ended 'thumbnail' type with inclined retouch, worked on a flake of good quality translucent and unpatinated grey flint. There are no obvious signs of macroscopic wear and the piece is quite 'fresh' in appearance. Such scrapers are usually ascribed broadly to the Early Bronze Age, but an earlier or indeed later dating (even Iron Age?) is not inconceivable. The other worked piece [18] is a secondary flake (i.e. retaining some cortex) and seems to have signs of both limited retouch and some utilisation on the opposing lateral edge; the piece is undiagnostic. Flint [4] is 'shatter' and is not necessarily an artefact - the shatter perhaps being related to the later (Iron Age?) burning of a natural flint pebble (as for, e.g. [11]).

Table 1. *Flint finds.*

Find	Context	Description
4	108	Angular shattered fragment of flint pebble, max. 2.6cm across; white patina with fire-reddening on cortex.
11	107	Heavily patinated, brown broken fragment of flint pebble with thick cortex, 2.2cm across, 1 flake removal.
13	107	Patinated, white broken flint pebble, 2.3 x 2.0cm.
14	107	Very small oval flint pebble, 2.0cm across, with a single oval flake removal on one side.
15	107	Very small split flint pebble, 1.1cm across, with no clear signs of artificial work.
16	107	Very small fragment of flint pebble, 1.3cm across, with no clear signs of artificial work.
18	107	(Figure 9) A secondary flake (i.e.: retaining some cortex) with signs of both limited retouch and some utilisation on the opposing lateral edge. Measures 3.3 x 3.1cm.
19	107	(Figure 10). A very neat convex-ended 'thumbnail' type with inclined retouch, worked on a flake of good quality translucent and unpatinated grey flint, 2.3 x 1.8cms. There are no obvious signs of macroscopic wear and the piece is quite 'fresh' in appearance. Such scrapers are usually ascribed broadly to the EBA, but an earlier or indeed later dating (even

		IA?) is not inconceivable.
20	107	Broken flint pebble, small, max 1.9cm long.
23	107	Natural split flint pebble, white patina, 3.3 x 2.7cms.
25	107	Small, abraded fragment/chunk of flint pebble 1.5cm across with evidence of flake removals, possibly natural fractures.
26	107	<i>Not located. Number allocated in error.</i>
27	107	Split flint pebble, 2.0 x 1.6cms, with brown cortex and thick patina. Single flake removal/split is heavily abraded and appears to be a natural fracture.
28	107	Small chip of flint, 1cm across, heavily patinated.
29	107	Small angular chip of fractured flint, 1.9cm across, brown patina.

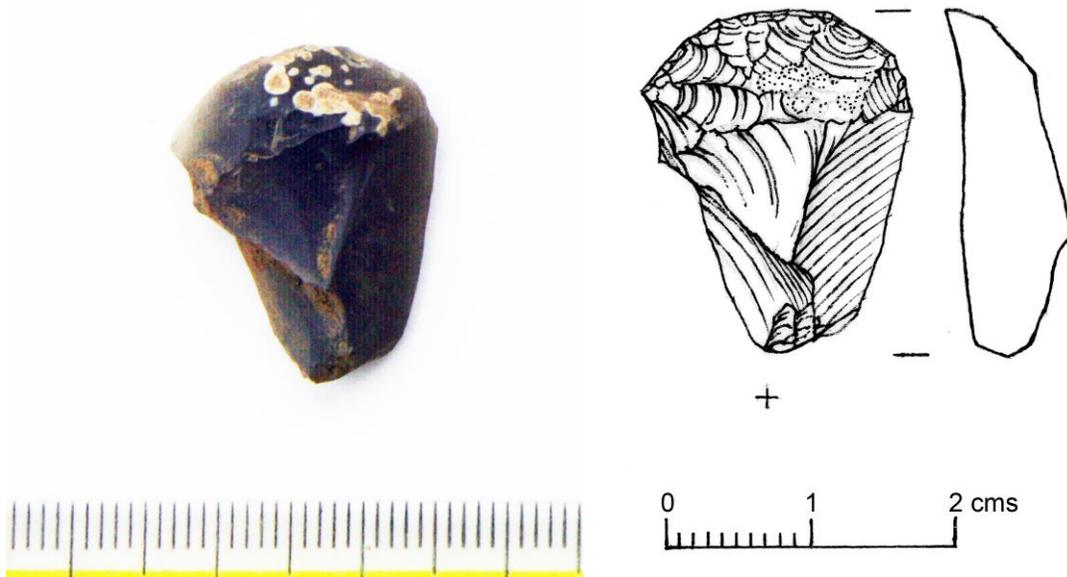


Figure 13. Convex-ended thumbnail scraper [19] from context (107) on unpatinated grey flint. The first recorded flint scraper from Skomer Island (Crown Copyright: RCAHMW DS2016_010_001, drawing by Andrew David. Original held in the NMRW archive: DI2015_0014).



Figure 14. *Secondary flake [18] from context (107), with signs of limited retouch and utilisation (Crown Copyright: RCAHMW DS2016_010_002).*

Objects of Stone (Toby Driver)

Several rounded pebbles or cobbles were found during excavation which were locally distinctive against the broken and burnt stone of from the mound, or the larger natural boulders and tumbled wall stones in other contexts. Among the few stone finds, three are worthy of mention. Find 6 (Figure 15) is a fine, flat, smooth quartzite pebble or beach cobble 11.0 x 7.6cm from context (107). The narrow end has marked pecking or abrasion suggesting its use as a hammerstone.

Two further small pebbles from contexts (107) and (108) are convincing as sling stones (Figure 16). It is assumed that each of these smooth pebbles would have had to be brought at least 1.1kms from the pebble beach at North Haven (the modern landing place) or from mainland beaches to the east.

Table 2. *Stone finds*

Find	Context	Description
1	109	Fragment of fire-shattered quartz pebble, with smooth upper surface 26mm x 15mm. <i>Non-archaeological find.</i>
2	102	Small, rounded coarse-grained pebble, 24mm x 20m. Naturally occurring in geology? Not a beach pebble. Sling stone?
3	109	Smooth, water-rounded quartzite pebble, 30mm x 29mm
5	108	(Figure 16) Smooth, ovoid rounded pebble, 46mm x 38mm, fire-reddened. Sling stone?
6	107	(Figure 15) Flattish, water-rounded quartzite pebble with pecking at narrow end, 107mm x 76mm. Likely hammerstone found in association with flints.
7	103	Water-rounded cobble, 106mm x 84mm, coarse-grained stone.
8	103	Angular broken lump of fire-cracked stone 41mm x 33mm. <i>Non-archaeological find.</i>
9	103	Fragment of broken, fire-cracked stone 60mm x 30mm. <i>Non-archaeological find.</i>
10	107	Water-rounded, long pebble, 82mm x 42mm. Found in association with worked flint. No unusual wear detectable.
12	107	(Figure 16) Smooth, flattish, ovoid water-rounded quartzite pebble 25mm x 30mm.
17	107	Grey stone chip 1.8mm x 1.5mm. <i>Non-archaeological find.</i>



Figure 15. Utilised stone [6], context (107). Smooth, flat quartzite beach pebble 11.0 x 7.6cm, with oval area of pecking/abrasion at narrow end suggesting use as hammer stone (Crown Copyright: RCAHMW DS2014_354_023).



Figure 16. Possible sling shots [12] (left) and [5] (right). Find 12, context (107) measures 3.3 x 2.9cm, oval, flat pebble. Find 5, context (108) measures 4.9 x 4.2cms, oval pebble possibly of old red sandstone. (Crown Copyright: RCAHMW DS2016_010_003).

Fired Clay (Dr Peter Webster and Jody Deacon, National Museum Wales (NMW))

Finds 21 and 22 (2 fragments) from context (107) beneath the mound were initially thought to be fragments of friable pottery or daub on excavation. Because of the lack of any prehistoric pottery from Skomer to date, and the damp nature of the finds when excavated, the fragments were not cleaned but bagged immediately and sent to NMW for identification.

They were identified as 'fired clay' of indeterminable date and although they appear to be ceramic, are not considered to be pottery.

- Find 21. Fired clay. A dark grey fabric with one orange-brown surface surviving. The gritty filler includes quartz and mica – the latter implies firing at a temperature below 1000°C. The piece is abraded but from something of some thickness.
- Find 22. Fired clay? or burnt stone. The pieces are abraded and burnt and lacks any of its original outer surfaces. A gritty fabric with some similarities to find 21 above. However the filler includes a reflective grey crystalline mineral which was not recognisable.

Bone (Elizabeth Wright, University of Sheffield)

A single cattle tooth (Find 24) was recovered from the west facing section, caught in a void in deposit (108) and bound by plant roots 0.42m below the modern ground surface. This is the only certain find from the mound and came from high up in the lowest layer of burnt stone, below the latest and final deposits (102) and (103).

The cattle tooth is an upper molar, most likely a 3rd molar and was unworn. Potentially it could have not yet erupted through the jaw, and therefore it is likely to have come from a sub-adult.

The tooth has been radiocarbon dated to 116-54 cal BC, Late Iron Age (see below).

Appendix 2: Charcoal, Soils and Pollen

Charcoal (Ellen Simmons, University of Sheffield)

Six charcoal samples (numbers 1 to 6) were collected, all from context 107 below the mound.

Samples 3 and 6 were the only two samples to contain charcoal of a sufficient size for dating that was not vitrified and so could be identified.

- Sample 3 (context 107) - *Prunus cf. spinosa* (probable blackthorn). Blackthorn is commonly used as a hedgerow species as its thorns make it a particularly effective barrier. It is also productive, its fruit are sloes.
- Sample 6 (context 107) - *Ulmus sp.* (elm). The growth rings on this sample were very close together which suggests that the tree was growing under stressful conditions, although we cannot be confident that the elm grew on the island.

No round wood was found in either sample and whilst it is possible to date non round wood charcoal the result may be affected by the potential long life of the wood before charring. It would still give an approximate idea of date. Sample 6 was radiocarbon dated to 751-408 cal. BC, Early Iron Age (see below).

Soils and Pollen (Havananda Ombashi, University of Sheffield)

Six bulk samples and one profile were taken from contexts in the west facing section of the trench (see Table 3 and Figure 6 for locations). The samples were analysed as a MSc dissertation project at the University of Sheffield (Ombashi 2015).

Loss-on ignition, magnetic susceptibility and particle size analysis were carried out on all the bulk samples (methods statements provided in Ombashi 2015). Additionally, six subsamples were taken in order to conduct pollen analysis. Two kubiena tins were sampled from 110, and were used for the subsampling and preparation of six microscopic slides for pollen analysis.

Table 3. *Soil Samples*

Sample	Context	Size	Description
7	102	1 x c.250ml bag	Soil matrix from centre of burnt mound deposit, taken from west facing section.
8	108	1 x c.250ml bag	Soil matrix from burnt mound deposit at north end of deposit, taken from west facing section.
9	108	1 x c.250ml bag	Soil matrix from burnt mound deposit at south end of deposit, taken from west facing section.
10	103	1 x c.250ml bag	Soil matrix from middle of burnt mound deposit, taken from west facing section.
11	107	1 x c.250ml bag	Soil horizon underlying mound of burnt stone. Sample from middle of deposit, taken from west facing section.
12	110	1 x c.250ml bag	Soil horizon underlying context 107. Sample from top of deposit, taken from west facing section.
14	107/110	2 x kubiena tins	Profile through contexts 107 and 110, taken from west facing section.

Particle size

Based on particle size analysis, samples 102, 103, 108 north and 107 were coarse sandy loams. Sample 108 south was a silt loam, but lies very close to the border of a coarse sandy loam. Sample 110 is a silt loam. With some exceptions, Skomer contains a uniform, friable, sandy loam of the Brown Earth type and so the samples reflect the most common soils found on Skomer Island (Jenkins and Owen 1995).

Considering that all samples display a soil texture of either sandy loam or silt loam, it seems very likely that the soil in and underneath the mound are of a local source. Furthermore, the particle size distribution shows very poorly sorted soils, which is not uncommon for these soil types. The sorting value of 107 almost reaches a state of 'extremely poorly sorted' which may indicate it being (partly) disturbed in the past or that it was an old A2 horizon.

Magnetic susceptibility

Soils are composed of different magnetic groups, which influence the overall magnetic susceptibility values for the bulk samples. The presence of different minerals and ions are defined by the composition of their parent material, which can then be affected by transport or other factors. The values of the analysed samples show little variety on a larger scale and fit within the magnetic value ranges expected

for the island's soils. The values of samples 107 and 110 are most likely to fall within the range of topsoils, paramagnetic minerals and sedimentary rocks. Sample 102 has the highest value and can also represent acid igneous rocks, although its value would be at the very minimum end of the average acid igneous rock magnetic values.

Contexts 107 and 110: a 'buried soil'?

The magnetic susceptibility and particle size values support each other in indicating mixed soils that are most probably brown earths/sands. For the largest part of Skomer, a thin layer of gravelly (periglacial) drift covers the igneous rocks and is of a mixed origin with a variable composition. This periglacial material probably represents the parent material for most soils on Skomer (Alexander 2014, 9). Since the soils can be composed of mixed origins and the samples from Skomer Island show poorly sorted conditions, it is almost impossible to trace back the parent material of the excavated mound and its underlying soils. The following possible theories are therefore based on the relative differences in the data between the samples themselves.

Based on the differences in soil values, it appears that layer 107 might well have been an old soil horizon of either a brown earth or brown sand soil. The magnetic susceptibility values of layers 107 and 110 are significantly lower than the values of the mound deposits. If layer 107 was once the lower part of a top soil and layer 110 a part of the lower A or higher B horizon, it could be that they have had more influence from the parent material. This would be very likely, since the parent material contains high values of haematite. This might have lowered the values of 110 and 107. Another possible explanation could be that layers 107 and 110 were showing the commencement of podsolization. Examples of brown earth podsolization have been found on Skokholm Island, and layers 107 and 110 could well be old examples from Skomer Island. Podsolization of layer 107 and 110 would then be suggested by their paler colour due to leaching of the iron ions, which also results in lower magnetic susceptibility values.

All explanations so far are based on the theory that layer 107 represents the lower part of a presumably old A horizon and in the case of leeching perhaps an E horizon. It seems very unlikely that it represented the top of an old A horizon, since it contains a low presence of values in organic matter. Several explanations for these low organic matter contents of both layers 107 and 110 exist. A first possibility is the removal of turf for the roundhouses at the settlement. Soil overlaying layer 107, containing most of the organic matter, could have been taken and used for the creation of roofs of the roundhouse(s). This would leave a partially disturbed layer 107 at the surface, being then (perhaps shortly after) covered

with layer 108, which sealed it off from further influences. If layer 107 would have been higher up in the soil, the other possibility for its low contents can be caused by perhaps trampling of animals or humans of the area. This would have caused plants to die off or restrict growing and thus decrease the water retention of the soil and thus reduce organic content. The lack of pollen can further support the theory of layer 107 being a lower part of an old A horizon, since pollen could not have reached this layer before disturbance or only through bioturbation. The lack of pollen can however also be a result of the more neutral (and thus less acid) conditions of the soil and thus preventing most preservation of the pollen. A last addition to this theory is based on the particle size data. Layer 107 shows less extreme values in all particle size presence compared to layer 110, except for the dominant presence of coarse sand. This sand could have been deposited by the wind once layer 107 laid at the surface. It could also have been dropped during the removal of the top soil layer and mixed afterwards.

Although it is hard to state whether layer 107 represents an old top soil, or a lower part of an old A horizon, it does seem likely that is a buried soil underneath the mound. The soil data indicates a closer relationship of layer 107 with layer 110, than with the deposited layers on top of 107.

Pollen and vegetation Pollen was identifiable in all analysed samples, although statistically significant quantities were present only in 102 and 103 (Table 4). It appears that for the period represented by the archaeological sediments (including prior to the formation of the mound of burnt stone), the landscape was a mosaic of open rough grasslands (Poaceae) and heathlands (*Calluna vulgaris*), with shrubs and herbs found locally in the landscape around the settlement. *Filipendula* (meadowsweet) species probably originate from damp valley bottoms or meadows of lower altitude. Taraxacum-type species found in sample 102, 103 and 108 (north and south) also argue for the presence of meadows and waste places, but are also found in damp and dry sands and on cultivated grounds. The ratio of heathland to a more open (grass)land, seems to be different between sample 102 and the rest. In all other samples the relative importance of Poaceae pollen and the occasional presence of *Plantago lanceolata* and Asteraceae species (aster family) indicate more open grasslands or perhaps cleared patches within the heathland. Tree pollen appear to be almost absent from the samples. Only 102 contains several tree pollen, but the percentages are very low.

Table 4: Summary of identified, unidentified and obscured pollen in absolute counts and percentages. The percentages for the identified pollen are calculated from the total amount of identified pollen. For the calculation of the percentages of the unidentified and obscured pollen, absolute counts of all pollen have been used (per sample).

Sample number →	102	102	108 – 8	108-8	108 - 9	108-9	103	103	107	107	110	110
Species	Total of 2 slides	In %	Total of 3 slides	In %	Total of 3 slides	In %	Total of 1 slide	In %	Total of 3 slides	In %	Total of 3 slides	In %
<u>Trees</u>												
<i>Pinus sylvestris</i>	1	0.11	1	1.18	-	-	-	-	-	-	-	-
<i>Tilia</i>	2	0.23	-	-	-	-	-	-	-	-	-	-
<i>Ulmus</i>	4	0.46	-	-	-	-	-	-	-	-	-	-
<i>Fraxinus excelsior</i>	1	0.11	-	-	-	-	-	-	-	-	-	-
<u>Shrubs</u>												
<i>Corylus avellana</i> -type	1	0.11	-	-	-	-	-	-	-	-	1	8.33
<i>Salix</i>	60	6.88	8	9.47	13	17.69	23	4.6	-	-	5	41.67
<i>Calluna vulgaris</i>	556	63.76	28.5	33.72	23	31.29	146.5	29.3	2	66.67	-	-
Ericaceae	64	7.34	-	-	-	-	29	5.8	-	-	-	-
Vaccinium-type	-	-	-	-	-	-	8.5	1.7	-	-	-	-
<u>Herbs</u>												
Apiaceae	-	-	-	-	-	-	4	0.8	-	-	-	-
Poaceae	176	20.18	44	52.07	37.5	51.02	268	53.6	1	33.33	6	50
Asteraceae	-	-	-	-	-	-	8	1.6	-	-	-	-
Asteraceae <i>Taraxacum</i>	3	0.34	2	2.37	-	-	1	0.2	-	-	-	-
<i>Plantago lanceolata</i>	4	0.46	1	1.18	-	-	10	2	-	-	-	-
<i>Filipendula</i>	-	-	-	-	-	-	2	0.4	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Degraded	96	9.5	26	22.1	12	13	123	19.6	-	-	5	16.7
Obscured	41	4.1	7	6	7	7.6	3	0.5	3	50	13	43.3
<i>Total amount of identified pollen</i>	872		84.5		73.5		500		3		12	

Appendix 3: Radiocarbon Dates

Two items (sample 6 and find 24) were sent to the Scottish Universities Environmental Research Centre (SUERC) in East Kilbride for Accelerator mass spectrometry (AMS) dating. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal v4.1; Bronk Ramsey *et al.* 2010) using the atmospheric calibration curve with Atmospheric data from Reimer *et al.* (2013) and are quoted at the overall range at 95.4% probability.

SUERC-54181 (GU34955)

Context: 107, charcoal derived from soil horizon beneath mound of burnt stone

Material: charcoal, *Prunus cf. Spinosa* (probable blackthorn)

Radiocarbon age: 2439 ± 30 BP (before 1950 AD)

Calibrated date (95.4% probability): 751-408 cal. BC. (68.2% probability) 731-429 cal. BC.

Calibration Plot

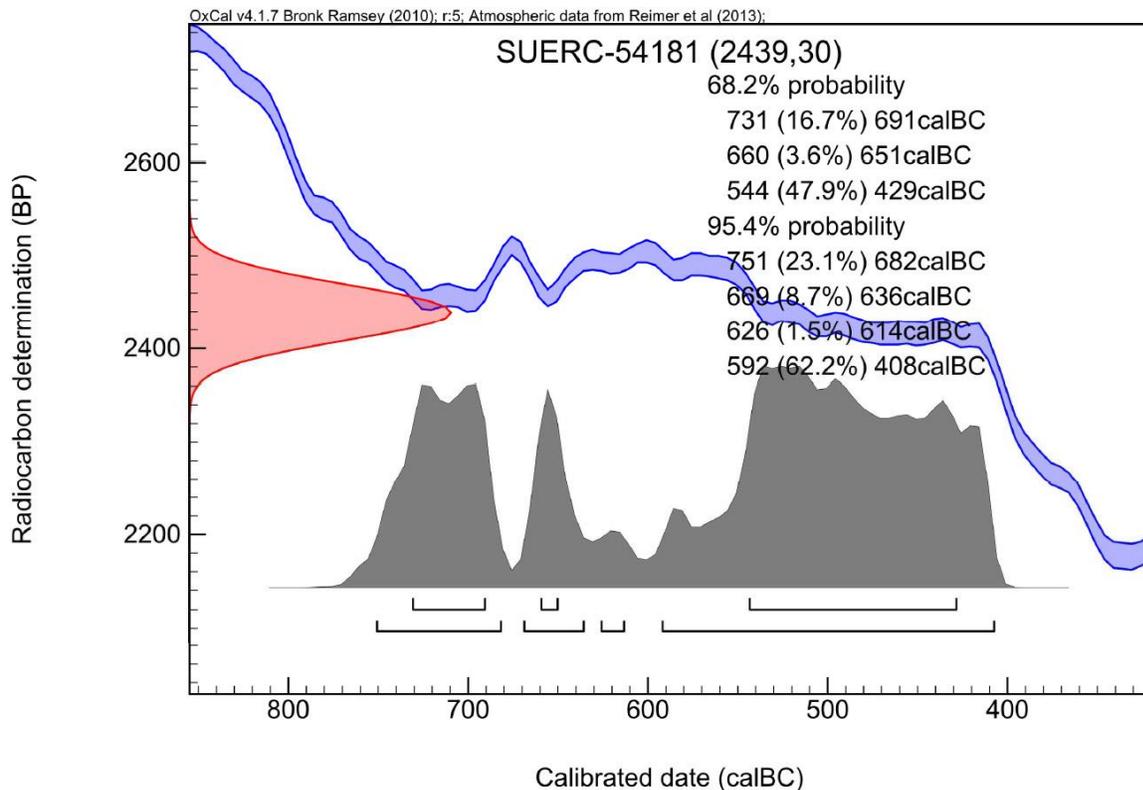


Figure 17. Calibration Plot for radiocarbon date, context (107), soil horizon beneath burnt mound.

SUERC-55129 (GU34956)

Context: 108, Find 24.

Material: Cattle tooth recovered high up in deposit

Radiocarbon age: 2035 ± 31 BP (before 1950 AD)

Calibrated date (95.4% probability): 161 cal BC-51 cal AD (68.2% probability) 91 cal. BC-16 cal. AD.

Calibration Plot

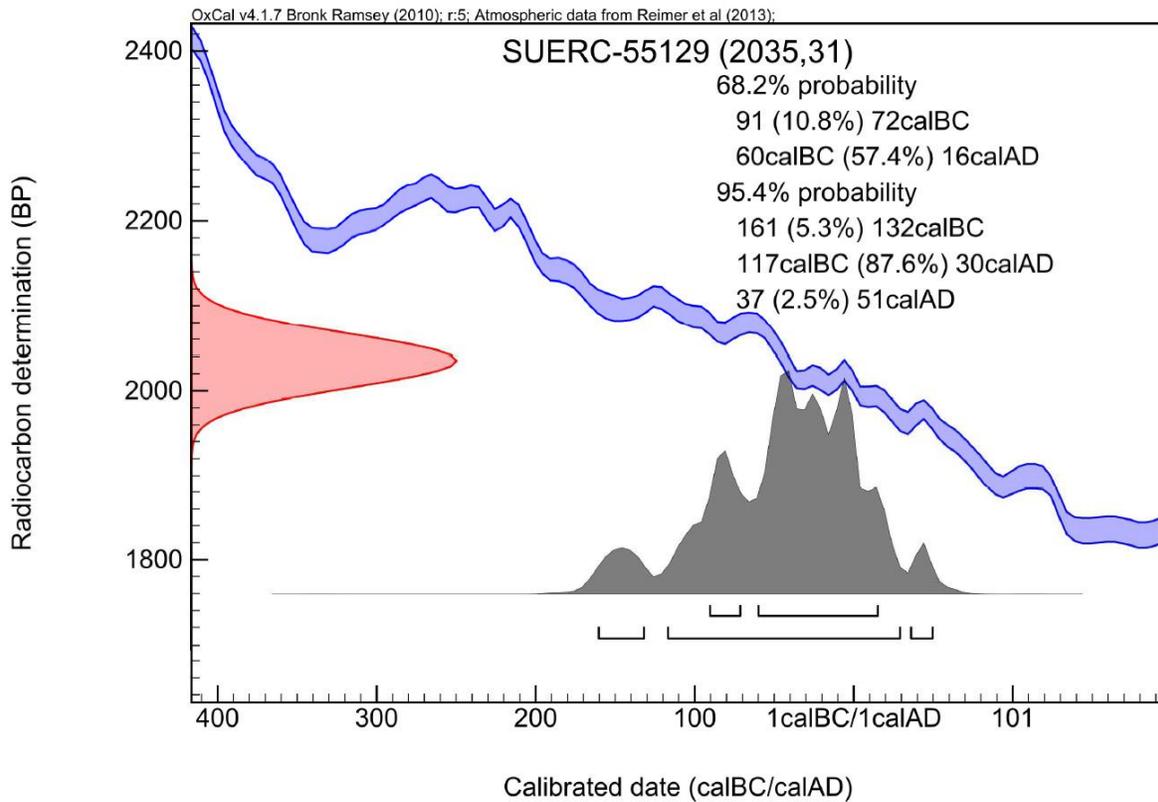


Figure 18. Calibration Plot for radiocarbon date, cattle tooth [24] recovered from the mound.

Appendix 4: Context and Drawing List

Context List

Context	Description
100	Unstratified
101	Top layer of turf and organic rich soil
102	Mound of burnt stone deposit
103	Mound of burnt stone deposit
104	Below (101) at southern end of trench south of the mound of burnt stone
105	Stone revetment at southern end of the mound of burnt stone
106	Possible stone revetment at the southern end of mound deposit (102)
107	Below mound of burnt stone deposit (108)
108	Mound of burnt stone deposit.
109	External wall face of roundhouse (a)
110	Below 107
111	Stone faced lynchet
112	Possible stone revetment

Drawing List

Drawing	Plan/Section	Description
01	Plan 1:20	North end of Trench following removal of turf layer (101), showing wall of roundhouse (109), mound context 102 and stone revetment 106.
02	Plan 1:20	South end of trench, showing mound of burnt stone contexts 102, 103 and 108, stone revetment 105 and context 104.
03	Plan 1:20	South end of trench, showing stone revetment 105.
04	Plan 1:50	Location plan showing trench and earthworks around it.
05	Plan 1:20	Post-excavation plan
06	Section 1:20	West facing
07	Section 1:20	East facing