

THE LIFE AND DEATH OF A POST-HOLE

Dr. Peter J. Reynolds

Paper given to Interpreting Stratigraphy 5th May 1995

Summary of Paper

The construction of the Pimperne Round House and its subsequent dismantlement have already been reported (Harding, Blake & Reynolds 1993). This paper seeks to focus upon one specific aspect/discovery made during the dismantlement process which has considerable significance for future analysis of prehistoric round houses on two specific events: first, the projected longevity of such a structure, and second, the nature of material finds from principal post-holes. For these latter, the probability that their deposition is co-eval with the early phases of the occupation of the structure is far greater than their representing a post-depositional phase of the site.

The Pimperne House

Construction Objectives

The original purpose for building a construct for the Pimperne House was to explore the three dimensional nature of such a structure both in terms of the minimum resources necessary for the building itself and the minimum architectural engineering required for its construction. The single philosophy adopted was that the structure had to be driven by the archaeological data in that it was entirely site specific. No borrowing of other data from other sites was to be countenanced nor was ethnography to be employed as a direct evidential aid. Similarly no device was to be used unless without it the building would fail (i.e. *sine qua non*...). In no sense should the resultant structure be regarded as a reconstruction. It was, in fact, a three dimensional projection of the data built at a 1:1 scale.

The secondary objective once the building was completed was to study it through time in order to assess degradation through natural causes, primarily the climate, and subsequent ease of repair and maintenance. Similarly, changes which might occur within the structure especially with regard to the dirt floor were to be isolated and measured. As with the primary objective the collection of these learned experimental data was to be fed back into the archaeological record to enhance future excavation strategies and techniques.

The testing objective initially unintended but forced upon the writer by the stupidity and fickleness of local government officials who determined that a research zone of 15 years standing had to be converted into a barbecue area *pro bono publico*, was to extract the maximum information possible from the careful dismantlement of the building.

Details

In brief, the evidence for the Pimperne House was that of the classic double ring house (Guilbert G (P.P.S.) 1981). It was chosen not least because the data was in a remarkably good state, the product of an excellent excavation technique and a first class archive (Harding, Blake & Reynolds). At the time of its building, it was the largest construct of a prehistoric round house ever to be undertaken (Reynolds 1979). Its overall diameter of 12.8m (42ft) with a free span of 9.75m (32ft) presented huge challenges not only in procuring the necessary timber, over 200 trees were used, and cladding material, 0.5ha of hazel coppice and c. 12 tonnes of thatching straw, but also in devising a method of roofing such a large span.

Findings

The primary objectives were achieved with remarkable insight being gained from the archaeological data themselves. In the event only one engineering requirement, that of the ring beam in the roof itself, had to be created under the rule of *sine qua non*. All the other 'discoveries' could have been ultimately deduced logically but the act of building simply focused upon precise detail. It proved possible for example to establish outer wall height and, therefore, apex height beyond all reasonable doubt. For these discoveries alone the construct was invaluable.

The pursuit of the secondary objective was necessarily more subjective in that wear and tear implied an actual living condition. Such a projection of modern human recreation of past living processes has been repeatedly decried by the writer (Reynolds 1994) as being unscientific if not impossible. Thus focus was invariably upon degradation brought about by non-human agencies.

The Porch

Thus after eight years the external porch posts virtually rotted away at the ground interface, a condition brought about by microbial activity in the infinitely variable humidity at this point. The architectural effect, a drunken lean, underlined the essential difference between a simple unbraced square or rectangular structure where lateral forces are continuously at work and a round structure which is inherently stable. The porch is essentially an add-on rectangular building to the main mass of the round house. However, of more interest was the action of rotting. Each upright had sheared off leaving the stump, at this time largely unaffected, firmly lodged in its post hole. The normal nature of these porch post holes as recovered by excavation is one of considerable disturbance. Certainly this was the case with the Pimperne excavation. The findings from the construct that the porch posts need replacing after a mere 8 years offer a ready explanation for this specific disturbance simply because the stump had to be removed from its post hole. Examination of the archaeological evidence even suggested the method of removal with a slot-like disturbance on the outer side of the post hole, perhaps made by the use of a pointed lever. This method was, in fact, employed, although this in itself is a kind of wish fulfilment. The second post-hole of the porch was approached in a different way initially, the objective being to extract the post packing stones, flints which had been rammed into place, to allow removal of the post stump. In practice this proved to be extremely difficult once the uppermost level of packing stones had been removed. It was virtually impossible to prise out any of the rammed flint below a level of about 100mm. The only way to remove the stump was by using a pointed metal bar as a lever. Even this had to have a raised fulcrum in order to finally break the suction exerted by the humidity of the post-pipe itself. The end result of all this activity was to have created virtually the same levels of

disturbance in the post-hole as observed in the original archaeological data. The replacement of the original pair of posts by new ones being carefully placed in the post pipes was relatively easy although the fit was not as precise. This, therefore, required initially small slivers of flint to be slipped into place and thereafter the whole post packing to be rammed again. This process necessarily caused disruption of the original packing material creating a pronounced downward angle from post-hole edge to post. The finer material introduced as supplementary packing formed a disrupted secondary post pipe. It was impossible to check this phenomenon against the original data since this level of observation, unless forewarned, is unlikely to be achieved. However it is the essence of such an experimental structure not to criticise the data to hand but to focus attention upon the possibilities of recognising such data in the future.

The tertiary objective, imposed rather than sought as indicated above, was the analysis of the dismantlement of the construct in the autumn of 1990, fifteen years after its construction. Surface examination of the building showed it to be perfectly sound and functional. Even the replaced outer porch posts were in better condition after seven years than their predecessors had been. Examination of the rotting at the ground/interface argued for at least another five years of functional service before replacement. In consequence one might suggest regular replacement of these particular would an average be at ten year intervals. The rest of the structure including the cladding, thatch and daub, were in relatively good condition and required only the annual two or three days of minor refurbishment and maintenance.

The Roof

The process of dismantlement operated exactly in reverse to the construction - having rejected the attractive alternative of burning the structure. This particular fate awaited a smaller roundhouse based upon the excavations at Mel Y Gael in north Wales (Reynolds - forthcoming). The thatch was carefully stripped off from the roof allowing detailed examination of the ties and the underlying purlins. The thatch literally wears away from the outer surface of the roof from the action of wetting and drying and wind. A simple estimation argued the roof would have lasted for another ten years before another half coat would have been needed. In other words like any other straw thatched building roof life expectancy is about fifteen years. All the ties were in good order despite being a natural fibre. Similarly all the purlins were strong having seasoned in place. The lashing at the roof apex, although heavily sooted from the hearth immediately beneath were as strong as the day they were put in place. In fact all the major roof timbers were saved and earmarked for re-use on the new site of the Ancient Farm.

The Outer Wall

The destruction of the outer wall, plastered as it was with daub inside and out giving an overall width in excess of 350mm, required the use of a 7kg lump hammer to break down. There can be no doubting the brittle and enduring strength of a wattle and daub wall. However, all the stakes which formed the uprights in the wall had rotted away below a depth of 100mm from the old ground surface. Beneath this level a clear gully had been formed by the activities of rodents (mice, rats and voles), all of which had been observed during the life of the house, so that the original firm ground between each stake had been totally disturbed. A minor excavation showed that clearing this material revealed a neat gully punctuated by minor depressions where the original pointed stakes had been driven into place. In a real sense it appeared to be the so beloved 'classic' drip gully. In all the research devoted to roundhouse constructs conducted by the writer over some

25 years, the phenomenon of the drip gully has signally failed to occur. The reverse, a humic lump, is the normal result, being the product of a protected vegetative habitat. The only inferences one can make are that such a gully is deliberately manufactured under the roof eave to collect or control rainwater, or that such a gully is created by drip action only if the ground surface beneath the eave is completely devoid of vegetation, or, thirdly, that the so-called drip gully is, in fact, the outer wall of the building. Of these possibilities only the first and third make any real sense, the second requiring such exceptional circumstances as to make it virtually impossible. However such a drip gully has been observed by the writer around a construct of pre-historic roundhouse at the museum site of Cragganowen in Southern Ireland. The reason for its presence owed much not to the famous Irish rain but to the fact that the whole site had been sprayed with chemicals to kill all the vegetation!

Posts and Post Holes

The most startling discovery of the whole dismantlement process and perhaps the most significant finding to emerge from the building of any roundhouse construct was reserved for the posts and post-holes of the inner ring. This element of the building is essentially that which holds it all together and restrains the vertical thrust of the roof. Once the building is completed the outer wall is virtually redundant as a structural element and can be completely replaced. Similarly it is possible to replace individual or even pairs of uprights in the inner ring since the roof holds the building together during such relatively minor repairs. But for overall stability the inner ring of posts is quite crucial.

Thus, when the inner ring was finally taken down the state of the butts of the posts caused a major revelation. During the life of the structure superficial examinations of the posts immediately below the ground surface had been made regularly by the simple expedient of probing with a strong knife. Some deterioration had occurred but was considered to be extremely minor. The argument was that all the inner ring posts were protected by the roof and therefore dry and would not rot! Quite the reverse proved to be the case. All the upright posts had been severely affected by rotting. In all cases the pith wood had rotted away completely leaving only a butt of heart wood. All these butts were rotted at least 100mm from their bases. In five cases the butt had rotted away completely leaving the post above ground seemingly suspended in mid-air. This was not, in fact, true since the visible and unrotted post was still held in place by the upper stones of the post-hole packing forming a supporting lip. Thus each post-hole was to a greater or lesser degree empty or void. Once all the uprights had been removed each post-hole was carefully examined. The following description synthesises the findings as for a typical post-hole.

The post pipe was perfectly preserved with the original bark still surviving in good condition and tight against the flint packing material. The base of the post-hole had begun to `silt' up with a combination of soil particles and rotting wood fragments. The silting showed gradual accretion of layers in the form of an inverted cone. The uppermost stones in the packing around the post had variously shifted forming a slight overhang or lip irregularly around the circumference of the post-hole itself. Some artefacts were recovered from the post-holes. These included two aluminium beer can pulls, one marble, one plastic toy soldier (an American GI), one ladies hair grip and several sherds of locally, (i.e. experimentally fired on the Ancient Farm) pottery. Notwithstanding the voids in the post-holes, the framework of the house had remained stable, primarily because of the lipping of the uppermost packing stones in each post-hole. It is important to reflect that all the weight thrust of the structure, the roof and the posts themselves comprising at least 40 tonnes, is vertical. Given its aerodynamic shape of a cone surmounting a cylinder, it is difficult to conceive

of a natural force capable of exerting sufficient lateral force to cause a movement significant enough to disturb such a weight and hence the stability of the building. In fact, during the winter of 1989 - 1990, several severe gusts were experienced with no effect upon the structure at all.

Conclusion

The significance of these findings, however, is not inconsiderable. If it is assumed that the deterioration of the post butts experienced in this construct is the normal process, then, given that the tradition of roundhouse building spans some two millennia of pre-history, this process would have been recognised as an inevitable state gradually reached over a period of, say, two decades. Thus, instead of the shock experienced by the experimenter on finding voids, the house occupier could well have taken steps to combat the problem. By regular assessment probing and careful filling of the voids created by the rotting timber, the spaces could have been filled sequentially producing distinct layering in the fill, an activity which could well include inadvertent addition of artefactual material. Ultimately, as in the five cases in the construct where the butts had entirely disappeared, the whole post pipe is filled with a final layer comprising larger stones not unlike the ordinary packing stones. Each post itself remains entirely supported until finally it is sitting on the surface of its original post-hole. Throughout house stability is completely unthreatened.

This scenario is remarkably similar to the archaeological reality of recognising post-holes by the concentration of stones across their surface, removal of which reveals a post pipe surrounded by packing material, the pipe itself in section revealing layering in inverted conical form with occasional intrusive artefacts!

The implication of these findings, if the foregoing argument based as it is upon real data is accepted, is that a structure like a roundhouse has a potential life span far in excess of its foundation post-holes. Similarly anything found within the context of a post-hole cannot be regarded as a deposit after the destruction and removal of the building but is much more likely to date to the first twenty years of its life.

In conclusion, it is as well to remember the principles of a cruck framed building, like the tithe barn, where the base of the cruck sits upon a dry built stone pier. Quite impossible to build in this way but once the roof is finished and holding each frame in position, quite simple to cut off each individual post one at a time and build a rot-proof supporting pier. The roundhouse as evidenced in the archaeological data recovered from Pimperne Down and projected in a three dimensional construct proved to be unexpectedly powerful. Whatever arguments or debates may be raised concerning detailed joinery whether simple or sophisticated, the critical elements remain the same. A 3m length of oak, 300mm in diameter, weight in excess of 150kg, is virtually impossible to crush in its length. A roundhouse comprises a cone set upon a cylinder and the cylinder itself is massively overbuilt. The sheer investment of labour and material in constructing such a building argue that its life span should certainly exceed one generation of circa 25 years. However, the findings above indicate that within that time period, the post butts will have rotted and that probable action will have been taken to in-fill the resultant cavities - including, one suspects, the product of floor sweepings being positively used as opposed to the negative of "beneath the carpet" of later periods. The inference from this experiment is absolutely clear. The material evidence recovered from the excavation of a post-hole which forms an element of the inner ring of a double ring house cannot be used to date the terminal state of the house, rather it must indicate

the early occupation phase. By this same argument the roundhouse structure as a whole can long outlive its foundation post-holes which have their primary use only during the building phase itself. It would be perfectly possible in structural engineering terms to build such a house and when complete deliberately cut off each post at ground level and insert a stone support pad. This clearly is not evidenced in the archaeology but evidence of the alternative process described above is regularly found.

As a postscript, the Celtic story of Bricrius' Feast from the Book of the Dun Cow recorded by the chief scribe Hael Mieire in the twelfth century (1106 A.D.) describes how Cuchulain lifted the wall of Bricrius' house to allow his wife Emma and her fifty women attendants to win a race with dramatic results - the house almost collapses. It is attractive to think that the inner ring of posts was displaced from the vertical causing the house to lean at an alarming angle. Ultimately after the usual heroic reverses Cuchulain raises the lop-sided house into an upright position, i.e. he sets the inner ring posts back into the vertical.

© Peter J Reynolds 1995
Butser Ancient Farm,
Nexus House,
Gravel Hill,
Waterlooville,
Hampshire.
PO8 0QE

Bibliography

Guilbert, G. 1981. *Double Ring Roundhouses*. PPS Vol.47 p299.

Harding, D.W., Blade, I., Reynolds, P.J. 1993. *Excavations at Pimperne Down, Dorset*. Monograph, Edinburgh University Press.

Reynolds, P.J. 1979. *Iron Age Farm: The Butser Experiment*. British Museum Publications, London.

Reynolds, P.J. 1994. Reuvens Lecture 5, Stichting voor de Nederlandse Archeologie, Alphen a/d Rijn.