Table 4 A selection of British Iron Age round houses categorised by internal diameter

category	1	2	3	4
diameter (nearest metre)	3–5	6–8	9–11	12–17
numbers	13	33	21	13
%	16.25	41.25	26.25	16.25

represented by H3 of Category 1 were constructed against the inside of the western rampart, and are perhaps to be understood as occupying a more humble position.

Conderton people were not inhibited by the presence of old storage pits when selecting positions for their houses. Such structures have been recorded beneath the walls and floors of every house found so far. Care was taken on occasion to fill up the mouth of an already existing pit, such as Pits L and S beneath H1, before an area of abandoned pits became the location for a house.

Fixed domestic equipment such as ovens and hearths appear to have been rare commodities at Conderton. The hearth for H1 was outside. H4 lacked a hearth within the area of excavation, but it contained an oven located over a redundant pit. Traces of burning and burnt clay inside H3, near its centre, may have come from the only internal hearth found so far in this hillfort, although these could as easily be the remains of ovens. Some of the small postholes located within H1 could have held timber uprights for fixed looms or other wooden furnishings.

3.2.4 *The Conderton construct*

by Peter J Reynolds

3.2.4.1 Introduction

The opportunity to build a construct of a prehistoric house given to me by Nicholas Thomas in 1969 has proved to be one of the most significant moments in the development of this type of empiricism in archaeology (Reynolds 1999). Prior to this time, scaled down 'reconstructions' had been attempted, notably the building of the Little Woodbury house (Bersu 1940) and generalised 'reconstructions' of Iron Age huts (Reynolds 1965). The fundamental difference of this occasion was that the archaeological data of a specific house were made available along with the thoughts of the excavator himself. There was to hand all the information, unfiltered by the constraints of publication, the ability to see the excavation and the house data in context, as recorded and as rebuilt. Such was the quality of the data that the excavator had actually carried out preliminary trials on site with the material evidence.

Coincidentally Michael Thomas, the Director of Avoncroft Museum of Buildings, near Bromsgrove, Worcestershire, had offered the writer an area within the museum grounds to create a simple open-air research facility for Iron Age studies together with some limited funding. This gesture was made and most gratefully accepted after the original site on top of Bredon Hill (Worcs), made available by the landowner, Thurstan Holland-Martin, had been totally vandalised (Reynolds 1967 and 1969).

3.2.4.2 Philosophy and methodology

These two opportunities focused attention upon the basic philosophy and methodology of empiricism. The philosophy is relatively straightforward in that the concept of exploring the third dimension, the potential reality of a building evidenced by archaeological excavation, should be ultimately to feed back into the archaeological database not only the obvious deduced structure, but also the potential physical side effects of the construction which may have been overlooked or misconstrued during the process of excavation. The methodology demands that the structure should be at a 1:1 scale, primarily because the materials employed are natural and scaling will inevitably distort the final conclusion. In addition, the argument for the structure must be deduced from the specific archaeological evidence. Ideally such an experiment that will create a new building should also contain the components of time in order to study the life and ultimate demise of the structure since. It is the last stage which instigates the whole cycle.

3.2.4.3 The concept of the 'construct'

The term 'reconstruction' should be avoided in such cases as this, simply because there is insufficient evidence to make an actual reconstruction. It is museums of buildings, like Avoncroft Museum in Worcestershire and Weald and Downland Open Air Museum, Singleton in West Sussex, that allow early buildings to be rescued, reconstructed, and preserved in a protected state and thus afford an actual understanding of building construction through time. The earliest buildings that can be reconstructed, in fact, date from the early medieval period. Prehistoric structures, *pace* waterlogged sites that are in themselves atypical, are evidenced by foundations alone, the lowest courses of stone walling as in this case, or patterns of postholes, stakeholes, and timber slots. These can only allow disciplined, deductive reasoning to reach any kind of physical third dimension. The term currently adopted by the writer to describe such buildings is a 'construct'.

3.2.4.4 The nature of the evidence

The excavated evidence for House 1 was fascinating and revealing on a number of different counts. So clear were the wall foundations that the excavator was not only inspired, but also able to take a segment of the tumble material from the wall, both from the interior and exterior of the house, and rebuild the element of the wall whence it came. The object of this exercise was to attempt to establish the original height of the wall. The sensible argument for no loss of stone subsequent to the original destruction of the house was the lack of evidence for robbing, especially of the foundation courses which remained clearly *in situ*. Although there are drystone walls on Bredon Hill, these are of a considerably later date and their stone was deliberately quarried.

The doorway with its paved entrance (Fig 20; Plate 27) was remarkably narrow in comparison with posthole- and stakehole-evidenced houses. This in itself suggests a recognition of the problem of expressing any kind of thrust, except for the vertical, upon the top of a drystone wall which would be inevitable during the roofing process. The paving was clearly designed to avoid the usual splash pool/depression which forms in a narrow entrance frequently used as must have been the doorway to a home. It does have a more significant, if less obvious, function, however. Because it stops the formation of a depression, so it inhibits any kind of subsidence of the butts of the stone wall at the doorway. If the base stones of a dry wall slip away, especially bearing in mind that each metre length of wall has a vertical thrust of approximately one tonne, the weakest element of the wall (the break forming the doorway) must not be undermined for fear of major collapse. It is not unreasonable, therefore, to suppose that the paving was 'structural' as well as traditional and was set in place when the house was built. A similar though more internal paving of the entrance to House 4 was also recorded (Fig 28), but not in House 3 (Fig 25).

An assumed hearth area in the centre of the house would clearly deny any central upright to support the apex of the roof. Although it is not impossible to suppose some form of tripod of posts set upon stone pads to support the roof apex, there was no evidence to suggest this, nor is such a support needed, in fact.

Of particular interest was evidence of a length of wall collapse along the southern perimeter of the foundation opposite the doorway, some 2m in extent (Plate 30). The nature of the evidence implied that the wall had fallen outwards from its top, virtually shearing the wall in half along its length. There seemed to be no significant damage to the inside face of the wall and the rubble scatter in the interior segment here was similar to the rest of the interior area.

It was clear that the house postdated the pits, although an argument could be put forward that the two free-standing pits (Pits S and L) were contemporary with the structure. Storage of grain in an underground silo within a structure virtually ensures successful storage conditions (Reynolds 1978). When a pit is not in use, however, it presents a considerable hazard to the occupants even if it is covered with a stone or wooden lid. On balance, it would seem that this zone of the site was first used as an underground silo storage area and subsequently that the pits were filled with rubble and the area then utilised for the house. It is interesting to observe that no wall subsidence was recorded where it crossed abandoned pits.

The postholes within House 1 (Fig 20) are too few and without significant plan to be regarded as structural in any way. The posthole immediately within the doorway (Posthole 1) is unlikely to be contemporary with the structure. Given its position, it is extremely difficult to postulate how it could be part of a door fitment. In effect it is an encumbrance to movement in and out of the house.

Three postholes (7–9) form an arc asymmetric to the arc of the building to the left of the doorway. Their function, whether as a pair and a singleton or as a unit, could represent a weaving activity zone within the house using the available light from the doorway. Alternatively a pair of these postholes could represent a 'dresser' or storage/display unit for pottery and/or prized possessions. Again they could possibly form a bedding area, although this would more likely be placed diametrically opposite the doorway. Unfortunately in this area there is but a solitary posthole (6) for which no adequate hypothesis springs to mind.

Finally the nature of the stones in the wall itself deserves attention. It appears that the wall has an inner and an outer face with a rubble-filled interior. Close inspection, however, shows that the wall stones were laid throughout following the traditional methods of drystone wall construction. The inference of rubble filling suggests that random material is simply tipped into the cavity between the facing walls. Such a process would deny any kind of permanent stability to the wall through the disparate pressures exerted.

Although the objective was to examine the specific detail of House 1 in order to explore its structural nature, House 3 and House 4 were also examined. The wall foundations of both these houses similarly demonstrate the skills of masons and, in the case of House 4, the argument that the core stones were carefully laid between the facing walls is quite clearly supported.

House 3 offers an interesting solution to a structural problem. While smaller than the other houses, only in the wall opposite the doorway, which backs into the enclosure bank, are the inner face stones of the wall clearly *in situ* (Fig 25). The outer wall face seems to blend into the rubble of the bank. Although this house was not completely excavated, the evidence obtained would suggest that its builders took full advantage of merging the arc contiguous to the bank actually into the bank. The interior of the house would appear to have a continuous faced wall and this would be perfectly acceptable. The exterior faced wall where it merged into the bank would be incomplete but no less strong, since the mass of the bank would provide an even more powerful support. In addition it would have saved the stone mason a considerable amount of work. The only need for care would have been to ensure that the eaves of the roof were clear of the sloping ground so that the thatch would be protected from creeping damp. Oddly the threshold of this house was not paved. The smaller the structure, however, the more powerful it is, in that the roof weight is less and exerts less thrust upon the drystone walls.

3.2.4.5 On the nature of drystone walls

There is romanticism associated with drystone walls wherever they appear in the landscape. This feeling is not particularly shared by those who build them and less so by those who maintain them. Normally they appear as field boundaries and rarely as structural walls. Where they do survive as drystone structures, they are frequently corbelled beehive-shaped buildings like those at Breuil in southern France, Gallerus Oratory (Co Kerry) or the Cleits of the Northern Isles. In the prehistoric period, however, evidence of drystone-walled houses occurs frequently throughout the south-west, west, and north. In simple fact, the houses are built out of local materials and, given that their potential durability is far in excess of timber buildings, it would have been a preferred material. Nonetheless, while a small percentage of surviving stone buildings demonstrates the traditions of corbelling, none of the structures from the Bronze and Iron Ages in Britain has so far yielded any clear evidence of this type of construction.

The physical construction of a drystone wall depends upon a strict set of rules and, unless they are rigidly followed, the wall will soon founder. A wall comprises two faces which are locked together both in the manner of their individual construction and in the way in which the internal stones are positioned. In practice, stones with a straight edge are used for the wall faces. Along the length of the wall, every third or fourth stone projects back into the middle of the wall. This can clearly be seen in Plate 41. The further the projection into the wall the better. These stones are technically referred to as through stones.

Each individual stone is carefully balanced so that it is completely stable. In practice, even the tiniest chip of stone can be used to stabilise a much larger stone. It should be possible at all times to walk along a stone wall without any stone moving or wobbling underfoot. This applies equally to the facing stones and to the stones laid within the wall.

The wall is held together by a combination of inward projecting stones being locked into position by the stones around them and above them within the wall. These internal stones are irregular in shape and size and give rise to the description 'rubble filled' but, in fact, each of these stones is as carefully laid as the facing stones. Once built, a wall is stable because all its weight thrust is vertical. The above rules can be simply summarised as guideline statements:

- one stone is never placed on one stone, always on two or more;
- every third or fourth stone in the face must be a through stone;
- the builder never picks up the same stone twice – there is always the perfect place for it in the wall in front of the builder.

3.2.4.6 The building of the construct

The greatest problem in building the construct lies in the very nature of the stone wall itself. Its strength comes from the vertical weight thrust. Mounting a roof upon it necessarily introduces an angled thrust through the wall, especially during the construction phase. An Iron Age roundhouse is geometrically a cylinder surmounted by a cone. Depending upon the nature of the roof cladding, so the angle or pitch of the cone is fixed. A turf or sod roof requires a shallow pitch of approximately 15–20° and is extremely heavy, needing considerable vertical support usually expressed by multiple rings of vertical posts relatively closely set (Bersu 1977). The other principal materials, heather or ling (*Calluna vulgaris*), reed (*Phragmites australis*), and wheat straw (*Triticum* spp) all need to be applied at a minimum angle of 45° and a maximum of 55° in order to be waterproof. It is extremely unlikely that any Iron Age roundhouse in Britain or the near continent had a beehive-shaped or domed roof such as are known in Africa, particularly Swaziland: these are relatively small, however, and in the infrequent periods of rain leak horribly. In the humid climate of Britain, such a choice would be decidedly perverse.

Given the presence of hypothesised grain-storage pits at Conderton Camp and the nature of the landscape surrounding the site, which was well able to sustain an extremely successful arable and pastoral economy, the most probable roof-cladding material would have been wheat straw. Thus the angle of thrust exerted onto the drystone wall would have been within the range of 45–55°.

The first stage of construction was the building of the wall (Plate 43). The ground plan of the original was replicated exactly by excavating the turf layer to create a foundation trench. No attempt was made to excavate further and the stones were laid directly upon the truncated topsoil. Limestone similar to the original was used in the wall construction, the building obeying all the above precepts. The butt walls forming the doorway were raised to a height of *c* 1.5m simply to provide an adequate doorway. There was no recorded evidence, like an increased quantity of stones from the doorway segment, to support this decision. Nonetheless it seemed a necessary provision, the alternative option being a need to crawl

Plate 43 Avoncroft Museum of Buildings, Bromsgrove (Worcs). Conderton construct, lowest course of drystone wall facings in position on subsoil; combination of facing stones and through stones. Entrance gap marked out towards top of plate. Easter 1970. Photograph: Peter Reynolds

through a gap just a metre high. It did, however, present a further problem in that the roof angles were subtly altered to accommodate the slight undulation. In order that the roof pitch near the doorway should be 45°, the remainder of the roof was pitched some 3° steeper. In addition, the roof thrust in this section of wall was altered, but not significantly. The doorway was spanned by a single unworked baulk of timber to provide a lintel. Either end was locked into the wall by angled stones.

Once the wall was completed, which required some 60 tonnes of limestone, the problem of springing the roof was considered. The major component of a cone is a basic tripod. One such of ash trees was constructed simply by lashing the narrow ends together, raising the three elements to the vertical and then 'walking' each leg of the tripod equidistantly from the others. Each tree weighed approximately 50kg, giving the tripod a total weight of well over 100kg. Once set in place on top of the house wall, the stones immediately became unstable and in one position collapsed outwards under the thrust. The thrust from the tripod was travelling diagonally through the wall and literally pushing the stones out of position. The nearer the rafter butt was placed to the outer face of the wall, the more immediate and greater the collapse. Even when positioned just 300mm in from the inner face, the stones were displaced and would have collapsed sooner rather than later, even under their own weight. Any additional weight put on to the rafter simply accelerated the wall collapse.

Re-examination of the archaeological evidence from House 1, South Quad (Fig 20), provided the answer. The area of collapse of the outer face of the wall (referred to above) extended over 2m in length. Why was only the outer face collapsed? And why over such a large span? In order to spring the roof from the wall, the weight thrust had to be extended from the surface of the rafter butt and spread along the wall in some manner. The obvious conclusion was a wall plate into which the rafter butt could be seated.

In consequence of the evidence, a series of trials was carried out. Varying lengths of timber were set horizontally on the wall just 300mm from the inner face. Each was jointed with 45° face and a simulated rafter, the base of which was cut into an L shape, fitted into it. A force was then applied. The only force available happened to be a cement lorry, the drum of which could be angled ideally. After several

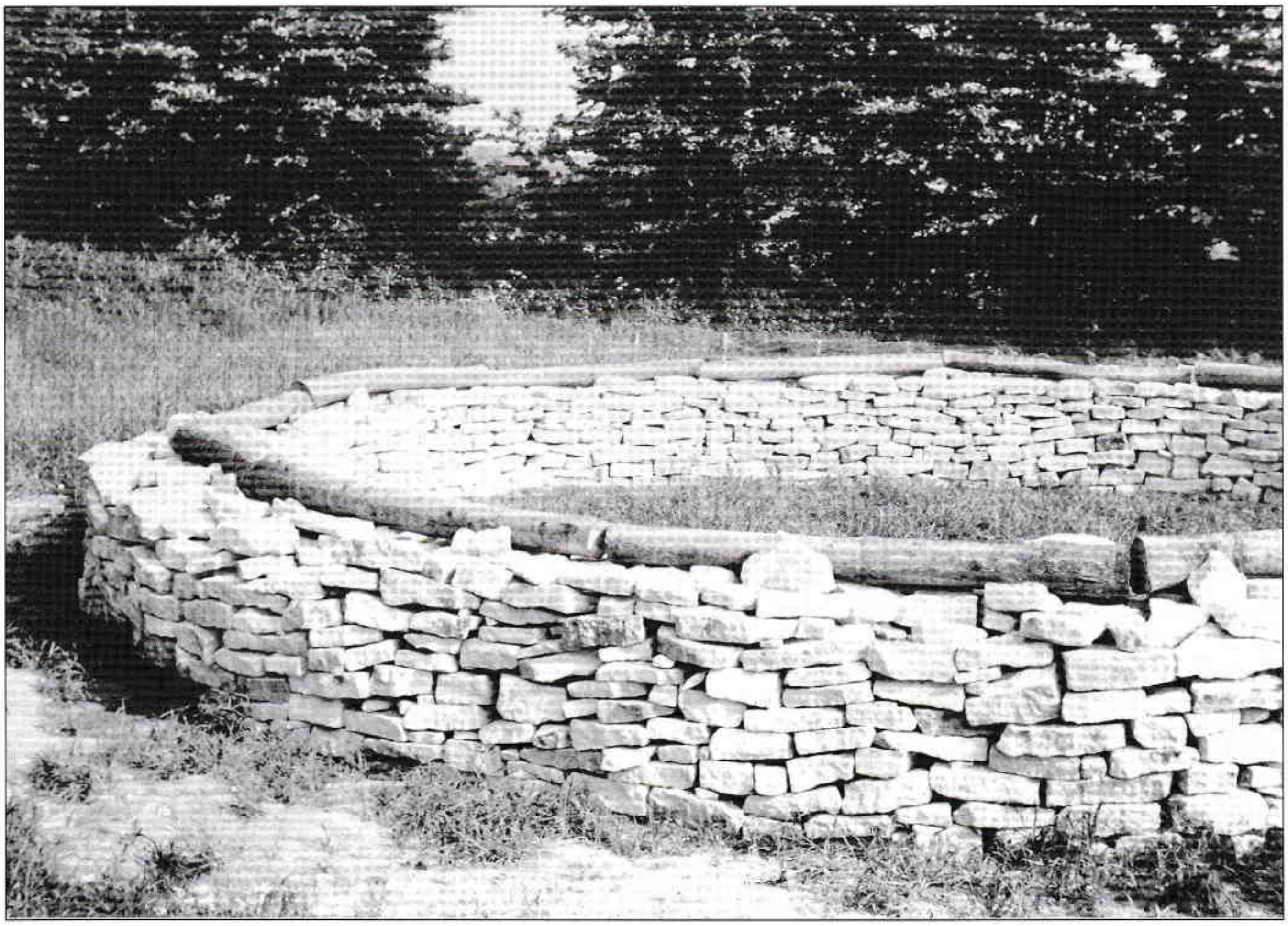

Plate 44 Avoncroft Museum of Buildings. Conderton construct, wall completed, ring beam in position secured by upright stones bedded into wall top. Easter 1970. Photograph: Peter Reynolds

attempts, it was discovered that a timber length of 1.8m caused an exactly similar collapse of the outer wall to that recorded in the excavation. Unfortunately it was not possible to quantify the thrust expressed by the cement lorry, but it was judged to be in excess of the calculated weight thrust of some 2.5 tonnes of the completed roof in a new state. If the wall-plate theory is valid, the wall collapse in House 1 was caused by the roof and plate disintegrating and consequently a relatively fine balance is indicated.

This in itself raised questions about the proposed wall plate. Given the potential establishment of each length of timber forming the wall plate, was each length independent of the others or were they attached to each other to form a penannular ring, the break being over the increased wall height over the doorway? For the House 1 wall collapse to have occurred, either the section of wall plate broke away or it was never attached to its neighbours. It was decided in this first construct not to join the elements of the wall plate together, but rather to overlap them with a simple vertical scarf joint. In addition the wall plate timbers were locked into place with stones set into the middle of the wall along their length. Simple joints were cut into the wall plate at metre intervals. These comprised a face cut at 45° into the wall plate to provide a seat for each rafter butt. The butts were prepared with an L-shaped joint by cutting halfway through the butt 300mm from the end and splitting off the cut. Thus each rafter could be placed in position, half of its diameter on the seat in the wall plate with a 'tail' extending over it. Each tail then had a limestone block laid upon it to hold it in position (Plate 44). This refinement was, in effect, of little extra benefit other than a psychological one for the builder, since each rafter was perfectly stable without it. Should any outward stress be exerted on the rafter, the stone was easily dislodged.

Raising the roof (internal apex 4.1m above ground) proved to be relatively simple except that great care was taken to leave the doorway until last. The initial tripod was raised and seated in place. The cross trees at the apex allowed a further three rafters to be positioned and tied into place. At this point, however, it was realised that any further rafters extending into the apex would distort the point of the cone-shaped roof. The only way forward was to attach a ring of withy rods around the six rafters some 2m down the slant height from the apex. All the supplementary rafters were then attached and tied to this ring beam.

At this point the roof still exerts an angled thrust down the rafters on to the wall plate. In order to provide not only a surface to support the thatch but also to create the physical cone of the roof, willow withies were interwoven between the rafters creating an inverted cone basket. With all the rafters now fully integrated into a cone, the weight thrust of the roof became vertical. In fact, given enough strong people, it would be possible to lift the roof up as a single unit. All the angled thrust diagonally through the drystone wall is exerted primarily during the construction phase. Once the cone is complete, stress on the wall is minimised until such time as the cone breaks down and lateral thrust occurs again.

Given the nature of drystone walls discussed above and the experimental rebuilding of a length of the wall during the excavation, the section of the wall is usually rectangular or, in this case, virtually square. The building of the construct and the final location of the ring beam seem to render the outer element of the wall redundant. In practice, since the thrust is angled diagonally through the wall, the 'redundant' upper corner acts as a kind of reverse buttress that holds the wall together by virtue of its weight, especially during the construction phase.

Nonetheless, the structure's form, a cone set on the inside edge of the stone wall, immediately presents a problem for the thatcher. There are two basic options: either the thatch is extended beyond the outer edge of the wall to provide both an eave and protection from frost action on the stone; or the roof is thatched to the base of the cone, thus allowing water to run off into the wall itself. Tradition allows for both options. The thatched houses and crofts in the Highlands of Scotland (Sinclair 1953) and stone-built houses in west Wales offer both models as analogies. The Hebridean type is thatched in such a way that the roof extends only to the inner edge of the wall, with thin flat stones angled under the thatch to the outside edge of the wall to throw off the worst of the rainwater. Inevitably water penetrates into the wall, but in practice does not reach the inner face. The alternative Skye type, of an eave projecting beyond the wall edge, is perhaps the more usual and, with any other type of walling material except for stone, provides critical protection against erosion. Aesthetically the projecting eaves are more satisfying to the eye. This was the option selected for this construct, not only for aesthetic reasons, but also because the alternative tradition has survived in the more remote regions and is probably driven by extreme climatic conditions and/or lack of thatching material. There is thus a supplementary economic reason for not having an eave insofar as it saves a considerable amount of thatching straw. In this case, some 15% of straw could have been saved.

The method of thatching selected was as simple as possible. First an underlay of a tonne of hay was spread evenly over the roof and, thereafter, the straw was pegged in place into the underlay by using spars and spring pegs. These last were made by splitting hazel or willow rods and twisting them under pressure into a staple. When pushed into the underlay, they spring apart and lock into place holding the spars firmly in position.

The finish to the thatch is always a matter for conjecture. Should the end product look rough and ready and suitably 'primitive' or 'ethnic', or should it be smooth and elegant? In practice rough and ready is really quite inefficient in that it suffers badly from wind damage and waterlogging. The traditional smooth finish of a thatched roof is functional rather than aesthetic and was the option chosen. Just over one and a half tonnes of straw were needed to thatch the house.

The completed structure (Plate 45) was remarkably satisfying from a series of aspects. Initially its appearance is visually pleasing in that its proportions are fitting and it melds comfortably with virtually any landscape. From the structural engineering point of view, a range of problems had been encountered and solved without suggesting that the solutions were in any way exclusive, or peculiar, or even right, but rather that they were solutions particularly driven by the nature of the materials and a process of empirical deduction. The house, since hut is too demeaning a term to describe such an investment of materials and skill, was a successful building that was faithfully arrived at from the archaeological evidence. Whatever debate there may be over the detailed method of building, the structure represents, at the very least, an Iron Age volume (82m^3) contained by appropriate materials.

The roundhouse at Avoncroft was completed in 1970 and formed the nucleus of an area devoted to empirical research into archaeological problems. These included house constructions, the storage of grain in underground silos, the growing of the prehistoric cereals Emmer (*Tr dicoccum*), Spelt (*Tr spelta*), and Einkorn (*Tr monococcum*) and erosion and revegetation studies of ditches and banks. It was in fact the first open-air research laboratory devoted to Iron Age studies set up in England and was the precursor to Butser Ancient Farm which was initiated in 1972 in Hampshire. Since the writer was the instigator of the former and became the director of the latter, the Avoncroft laboratory became derelict shortly after 1972 and was destroyed in 1973. Maintenance is of course critical and, more particularly, expensive. Consequently there is only gratitude and no opprobrium whatsoever due to the authorities of this museum.

The demise of the laboratory area, however, and particularly the construct of the Conderton roundhouse was deeply regretted because the study of the building was incomplete. In building the construct, the learning curve had been remarkably steep but structures have a birth, a life, and a death. The last is clearly represented by the archaeology and the lacuna between new building and surviving foundation evidence is an episode of great fascination.

The stone walls of the roundhouse would require minimal maintenance by their very nature but the roof is an entirely different matter. Thatch, whether straw, reed, or ling, actually wears out from the

Plate 45 The Conderton House 1 construct, Avoncroft Museum of Buildings, c *1975. Photograph: Peter Reynolds*

outside. The straw butts individually rot away until such time as the retaining rods are exposed. Alternatively disparate damage can be caused by wind especially and repairs inevitably accelerate further deterioration. Given normal wear and tear, a straw roof lasts approximately 15 years, a reed roof 40 years, and a ling roof a little longer. It would have been especially interesting to monitor this building through time and perhaps to have let it deteriorate naturally as if abandoned. Would the roof have collapsed in an archaeologically significant manner? This is one of a number of fascinating questions. That the walls in the original were deliberately slighted is not in question, though it raises problems. In all probability, abandonment of the settlement occasioned the wall destruction. This in turn offers the hypothesis that the roof timbers and wall plate could have been purposely removed and that the original wall collapse was brought about during this dismantlement process. In contrast to the stone, such timbers would have been valuable materials for building new houses in a resettlement zone. Reverting to the Scottish Highlands and Islands where timber was in short supply, the roof was regarded as 'movable': the tenant would provide his own roof timbers, while the walls belonged to the laird (Sinclair 1953). Scarcity of timber in this region of the west Midlands is unlikely to have been as strong a motive but the principle of reusing perfectly good and seasoned timber is sensible enough. In Africa it is not unusual to lift a complete thatched roundhouse roof from worn-out, perhaps termite-damaged walls on to new walls built some way away. In this consequence, the hypothesis still remains viable and validated by experiment, but it could have been not the result of deterioration and dilapidation, but rather the side effect of deliberate demolition of the roof.

During the short life of the construct, its interior was explored for functionality. A central hearth, for which there was no archaeological evidence, was built and fires lit in perfect safety. It proved relatively easy to raise the ambient temperature within the house to a very comfortable 20° within an hour. Nor was there a need for the presumed smoke hole. Ideally dry wood is burned on a domestic fire and what smoke is produced percolates easily through the thatch: a hole in the roof actually introduces a fire hazard because of the enhanced draught.

In addition the hypothesised loom postholes were

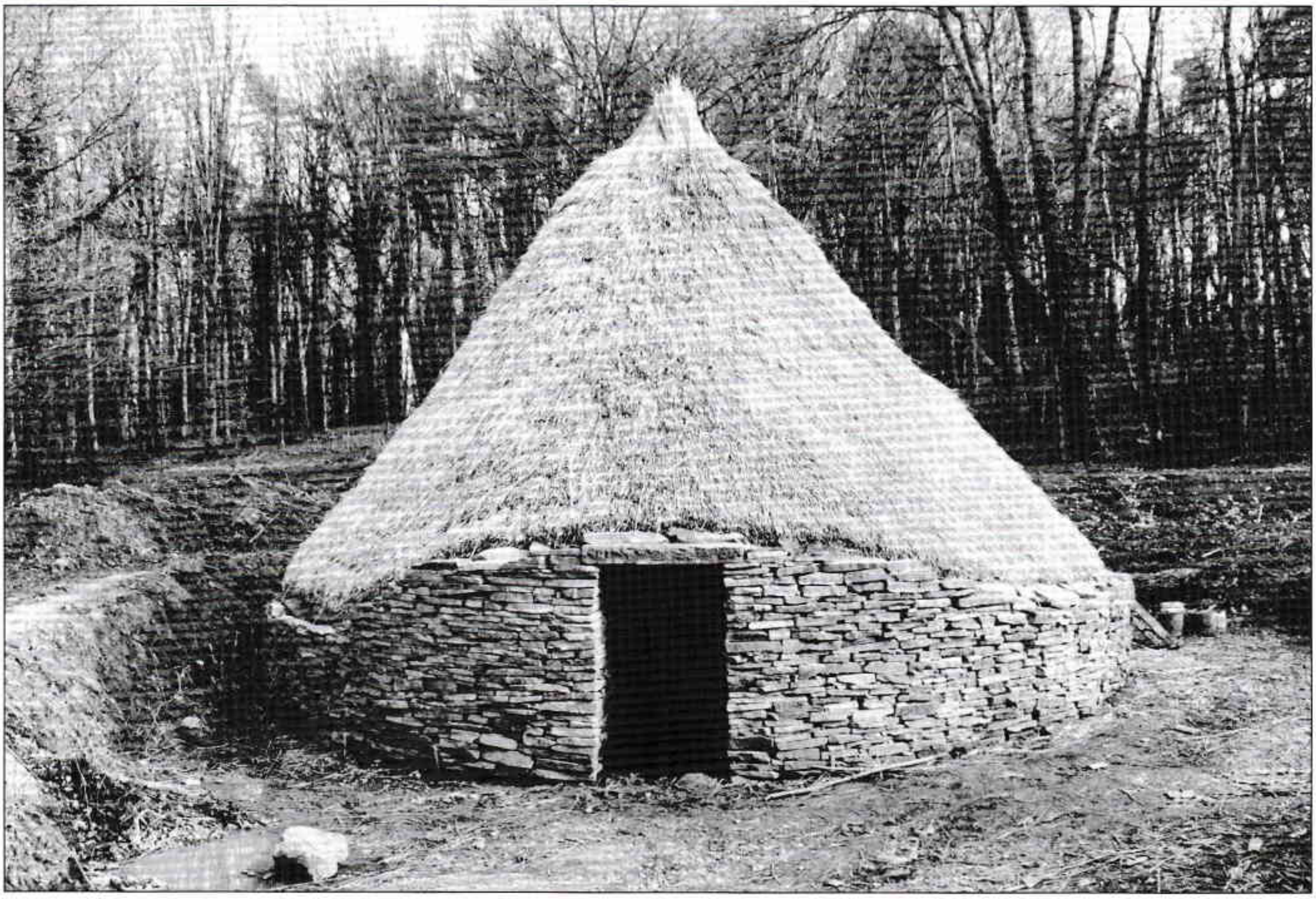

Plate 46 Museum of Welsh Life, St Fagans, Cardiff. Second Conderton construct, completed 1992. Photograph: Peter Reynolds

explored with the insertion of a simple upright warp-weighted loom. It proved perfectly possible to use the loom in the light available from the doorway. It was even possible with non-patterned weaving to operate the loom in the light from the fire.

Any final observation about the structure must conclude that it was an extremely substantial building with an indefinite life span, given adequate maintenance of the roof. The investment of time, labour, and materials in the construction of the walls alone argue for a long-term expectancy of occupation.

In 1992 an opportunity to build a second construct based on the archaeological evidence at Conderton was afforded the writer by the Museum of Welsh Life, St Fagans, near Cardiff. It was to form one unit of an 'Iron Age Settlement' of three houses within an enclosure to be used primarily as an educational resource. The national curriculum in Wales, unlike England, includes the study of prehistory. The other two constructs were based upon excavations at Moel y Gaer (Guilbert 1975) and Moel y Gerddi (Kelly 1988). On this occasion the opportunity was taken to explore many of the alternatives discussed above. The wall plate was joined together with half-lap joints pegged with wooden treenails and the butt of each rafter was similarly pegged into its seating joint. Instead of interweaving the roof like a basket, hazel rods were lashed on to the rafters in concentric rings a hand's width apart. The wheat straw thatch was sewn into place using sisal twine, a vegetable twine being the poor relation of hemp twine (*Cannabis sativa*). Alternatives, occasionally found in late medieval thatched roofs, could have been stripped bramble stems or even twisted hay strings. The doorway was bridged with a stone lintel which, by virtue of its weight, was structurally much stronger than the wooden lintel used before. The roof itself was only thatched to the middle of the stone wall, with flat stones tilted across the exposed wall shelf to disperse rain water. This decision was encouraged by the traditions in west Wales (Gerallt Nash pers comm) similar to the Hebridean style discussed above.

In general appearance, while it was based upon exactly the same archaeological data, this second construct is very unlike its predecessor (Plate 46). The local stone used in the construction of the wall, while similar to the oolitic limestone, was by nature thinner in its depositional layers. In consequence nearly 90 tonnes were needed to complete the walls. The roof and wall plate were structurally much stronger but would not necessarily last any longer in the sense that regular maintenance of the thatch would give an almost indefinite life expectancy. The concentric rings of purlins, just like the interwoven willow withies, would have to be replaced each time the roof was completely rethatched. This construct is still (1998) standing, despite the depredations/attentions of thousands of schoolchildren and in time could provide information concerning the life span of such a building. It is particularly rewarding that such a research structure is also an educational tool.

It is of little relevance to prehistory to record that both constructs took roughly the same amount of time to build. In both instances, the stone, timber, and straw were delivered to the site so there is no quantification of time and labour in obtaining the raw materials. The construction of the walls took one man 6 man days of working 10 hours, however, wall-plate and roof construction took 5 days and thatching a further 5 days but for two men. There is a great temptation and concomitant danger in transferring 'human time taken to achieve' back in time, in this case to the Iron Age. This temptation should be resisted at all costs since it denies any understanding of motivation or reward and takes no account of other daily demands of life upon the builder. In both these cases, the builder was entirely focused and devoted all the available time to the task in hand and dependent upon a modern domestic infrastructure to be able to do so.

These two constructs, built by the same person but separated by a 20-year gap, visually unalike but in fact and detail extremely similar, emphasise the value of the empirical approach. Excavators dismiss too lightly the implications of stone house foundations, both in terms of the materials necessary for their construction and in the potential life expectancy of the buildings themselves. There is no doubt but that the houses reflect the locally available material, but the sheer tonnage the walls represent in stone quarrying, carting, and building imply a much sterner motive. By contrast, a post-and-wattle wall is a minor undertaking. These houses are tough, solid, comfortable, and perfectly capable of withstanding all the extremes of the weather. Perchance they may even reflect the personalities of their builders and occupants.

3.3 The storage pits
by Nicholas Thomas

3.3.1 Introduction

During 1958 and 1959 at least 46 pits were located, of which 38 were fully excavated (Fig 30) and a further seven were partially excavated. The 1996 resistivity survey has revealed the whereabouts within the upper camp and just outside the central rampart of at least 120 certain pits (Fig 4), including those excavated. More could lie hidden beneath the central rampart and house foundations, while the experience of excavation suggests that a number of apparently single pits may conceal remains of earlier ones (cf Pits V/Vi, BB/CC, and GG/HH). The original total for all phases may have been 140–150.

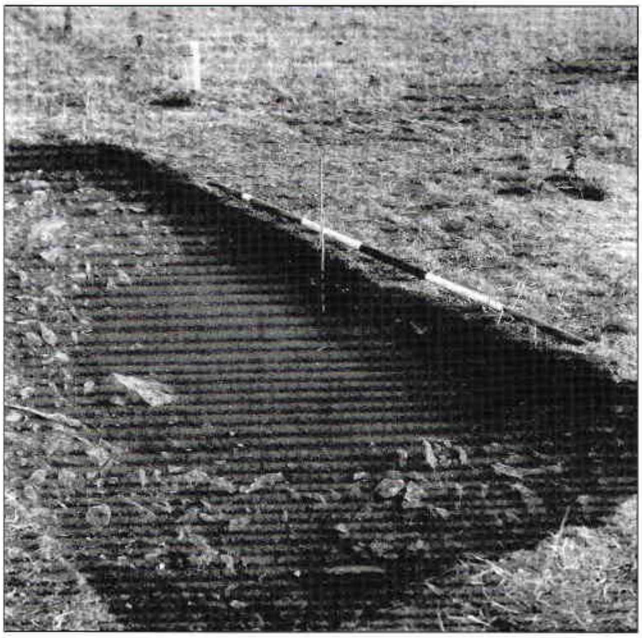
Plate 47 Pit A looking north. Centre, marked by bamboo, located by magnetometer. 1959

One of the most unusual and important results of the Conderton excavation was the uncovering of rock-cut storage pits, many of which retained evidence for linings and/or patching (Plates 47–53). The supposed wickerwork used for lining some pits was a feature without precedent at the time of the excavations and for which, 40 years on, parallels remain hard to find. Stone linings and patching continue to be found only slightly more frequently. Had the excavations not coincided with development of the proton magnetometer by M J Aitken, this hitherto unrecorded feature of Iron Age storage pits might not have been established. Dr Aitken surveyed the whole of the interior of the hillfort during the two seasons of work and almost every anomaly was tested by excavation. His survey was the leading factor in deciding where to lay out our trenches within the earthworks of the hillfort.

The pits are discussed in this section, supported by an illustrated inventory including excavated data, which is to be found in Appendix 2.

Indication of the period of the pits within the history of the hillfort has been expressed as a ceramic phase (cp) where the quantity of distinctive pottery allows it. The context of several other pits has enabled a broad estimate of chronological position – ?earlier (?E) or ?later (?L) – to be given. For a few pits neither process can be applied.

Trenches 1, 2, and 3 (Fig 6)

Trenches 1 and 2 were dug in 1958 in response to anomalies revealed by the magnetometer. Trench 3 was dug in 1959 for the same reason. At the time they