Excavation of a Bronze Age settlement at Varley Halls, Coldean Lane, Brighton, East Sussex

by Ian Greig

Excavations in 1992 at the University of Brighton Varley Halls site, Coldean Lane, Brighton revealed part of a Bronze Age settlement. Middle Bronze Age features included hut terraces, badly truncated linear features, probably lynchets, and a ditch which may have held a wooden palisade. Elsewhere on the site a single terrace was dated to the later Bronze Age. A crouched inhumation and the skeleton of a cow buried in a pit were dated by radiocarbon to the late Middle or Late Bronze Age. Other radiocarbon dates are correlated with ceramic studies. Detailed analysis of wood charcoal from a burnt layer provides information about exploitation of timber resources. Land mollusc analysis is related to the stratigraphic interpretation. The animal bone assemblage provides evidence for a model of meat production. Resistivity survey indicates that the settled area is more extensive than that excavated.

INTRODUCTION

In 1992 an archaeological evaluation was carried out by South Eastern Archaeological Services (the commercial division of The Field Archaeology Unit, University College London) at Varley Halls, Coldean Lane, Brighton, East Sussex. The site, now owned by the University of Brighton (formerly Brighton Polytechnic), was to be developed for new halls of residence. An archaeological assessment was required by Brighton Borough Council prior to the application for planning consent being determined, in accordance with the provisions of Department of the Environment Planning Policy Guidance Note No.16 (PPG 16).

Evidence to suggest the presence of a Bronze Age settlement was revealed. Preservation *in situ* was not feasible, and as the evidence was not considered to be sufficiently important to prohibit the development, a condition requiring archaeological investigation was imposed on the planning consent. Full excavation was undertaken by South Eastern Archaeological Services, funded by the University and directed by the author. The work was conducted according to a brief prepared by Ms Ros Parker, (Assistant County Archaeologist, East Sussex District Council), and monitored by her and Dr Andrew Woodcock (County Archaeologist). The site code used was VH92. The finds and archive are deposited at Brighton Museum.

THE SITE

LOCATION

The site is situated on a south-facing slope of the South Downs, on the northern outskirts of Brighton, centred around National Grid Reference TQ 3315 0892. The area investigated was approximately 80 m × 60 m, the ground surface of which sloped down from north-west to south-east, from approximately 90 m above Ordnance Datum to approximately 80 m A.O.D. The site location is shown in Figure 1.

The underlying geology is Chalk, which in the excavated area was not overlain by Clay-with-Flints. The site had been plough-damaged, and truncation of the chalk proved to be quite severe, although in places a thin layer of colluvium survived immediately above the chalk.

METHODOLOGY

The site was stripped down to the chalk by a 360-degree tracked excavator fitted with a toothless bucket. The material was removed in spits and a

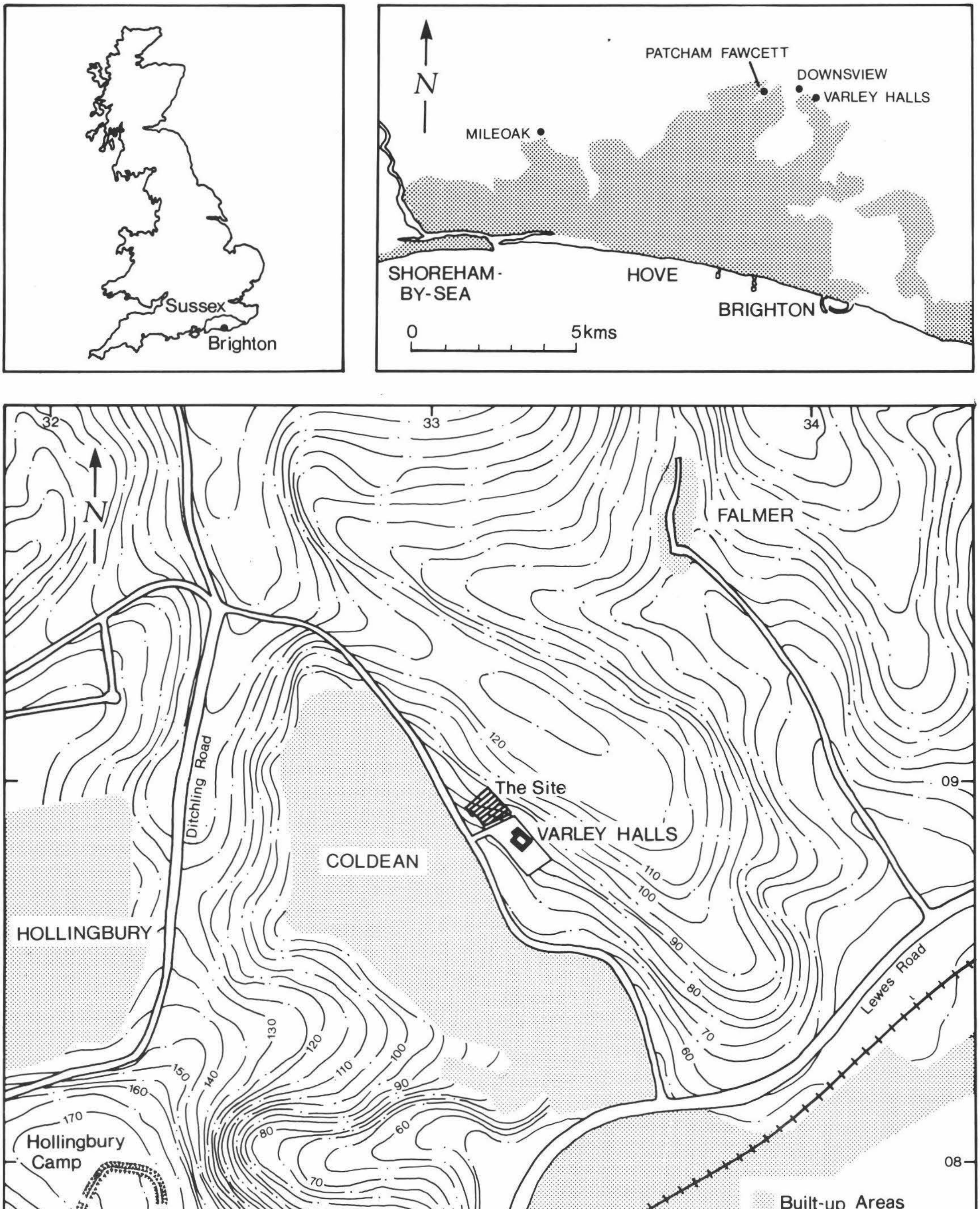

Fig. 1. Site location.

careful watch kept for archaeological features, but none were observed above the chalk. The south-western edge of the total site area was obscured by spoil derived from this operation, and remained unexcavated. Part of this area had been assessed by trial trenches during the preliminary evaluation, which had revealed no archaeological features. A further transect along the southern edge of the site was stripped by machine prior to the creation of the spoil dump, and also revealed no features. The last part of the site to be stripped was the south-west corner, at which point it became apparent that the spoil dump had encroached over at least one archaeological feature (see 'hut 5' below). It is not considered likely that any other significant feature remained undiscovered.

As a general recording policy during the excavation, material interpreted as post-packing was not given a separate context number, irrespective of whether it was thought at the time to be *in situ*. Only in the rare cases where post-pipes could be distinguished in the soil component of the fill of a post-hole were separate context numbers, representing construction and disuse phases, used.

The excavation revealed a Middle Bronze Age settlement, plus at least one structure dated to the later Bronze Age. The overall site plan is given in Figure 2. The dating of the pottery, on which the dating of the site to a large extent depends, is discussed in detail by Sue Hamilton in the relevant section of this report. The terms Middle and Late Bronze Age are used throughout; in general terms, current evidence places the Middle to Late Bronze Age transition at *c.* 1000 BC (Hamilton pers. comm.). Radiocarbon dates are quoted at one sigma.

Features recorded during the evaluation were re-examined during the excavation, and are not distinguished separately.

MIDDLE BRONZE AGE SETTLEMENT

Four hut platforms, created by terracing into the steeply sloping chalk, can be dated to the Middle Bronze Age. Features of this period are shown in Figure 3. Structures within the platforms are indicated by patterns of post-holes similar to those of other Bronze Age structures from Sussex, such as those at Itford Hill (Burstow & Holleyman 1957), New Barn Down (Curwen 1934) and, more recently, Black Patch (Drewett 1982a), Downsview (Rudling forthcoming) and Mileoak (Russell, in Rudling forthcoming). The arrangement is essentially a circle, elongated towards the entrance.

Hut 1

This hut had two structural phases, represented by two arrangements of post-holes based around an entrance position common to both. The substantial difference in size (Plate 1) indicates that these actually represent the complete replacement of one structure by another on the same site, rather than refurbishment of a single structure. The post-holes allocated to phase 1 are smaller than those of phase 2, and their fills generally contained fewer large stone fragments. The terrace was approximately 6.75 m across, and the circles of post-holes approximately 4 m and 5 m in diameter respectively.

The relationship between holes 212 (allocated to phase 1) and 209 (phase 2) suggests the relative dating. It proved impossible to excavate an informative section across both features, but excavation of post-hole 209 revealed probably *in situ* post-packing, which would have been unlikely to survive if this feature had been cut by 212. It is

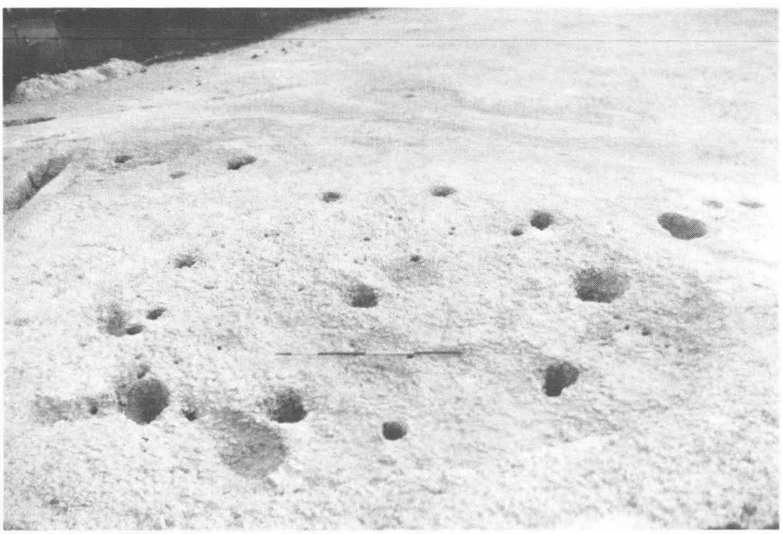

Plate 1. Hut 1 fully excavated.

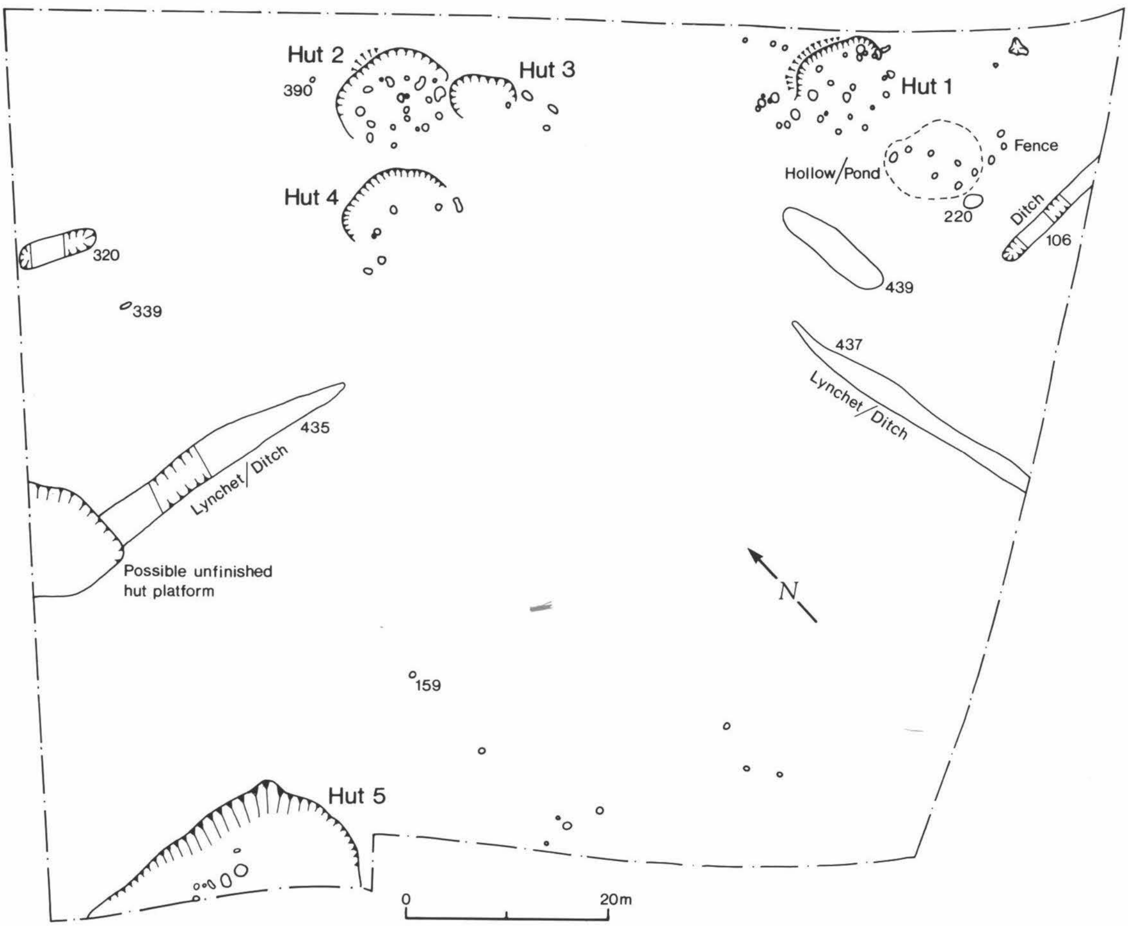

Fig. 2. Overall plan of excavated features.

therefore assumed that post-hole 212, and the rest of the holes with which it has been grouped, are earlier.

Hut 1, phase 1

This is shown by the features shown shaded on Figure 4. It is assumed that a further hole (suggested position stippled on Fig. 4) must have been in the position of cut 171, in which case it must have either been completely removed by 171, or its remains were not noticed during excavation.

The surviving post-holes of this structure had an average diameter of approximately 200 mm, and a light or mid-greyish brown silty fill, usually with 10–15% inclusions of chalk fragments (30% in the case of 216, fill 217). No post-pipes were observed, nor were there the quantities of flint nodules and iron-rich fissure-fill stone fragments (*see* Barber report below, p. 51, for fuller details of this material) which, it is suggested, represent post-packing in the phase 2 holes (*see* below). Examples of sections are shown as Figure 5:S2 & S3. That of hole 262 is not typical, because the remainder were flat-bottomed. Most were recorded only as profiles.

Hole 127 (section Fig. 5:S1) was approximately in the centre of the circle of post-holes, though not perfectly so. It may have been a central support for the roof. Its size suggests a rather more substantial post than those used for the remainder of the structure. There was no evidence of burning, so this is unlikely to have been a hearth, nor does the depth of its profile suggest such a use.

The entrance construction is not certain. As shown in Figure 4, the pattern and dimensions

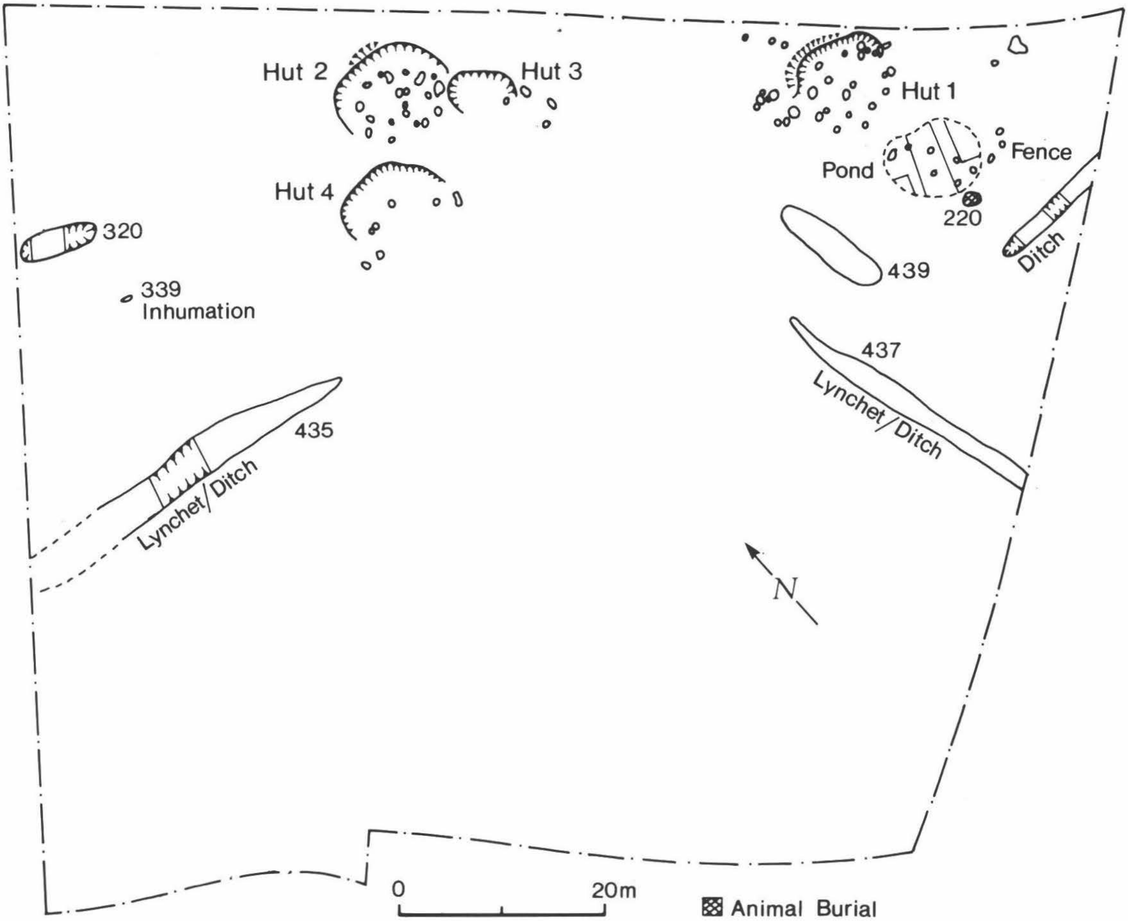

Fig. 3. Middle Bronze Age features.

suggest that holes 151 and 205 formed the entrance. This is the simplest interpretation, and would create a symmetrical structure. It implies that the more complex elements at the entrance belong to phase 2, as 151 is isolated from them, and that both phases would have had a structural post in the position of hole 205. Alternative permutations of these plus holes 226 and 228 (hatched on Fig. 4) can also be suggested, although the latter was much smaller in diameter than the others. The fills of the holes do not resolve the question, none of them having the post-packing which is elsewhere a distinguishing characteristic between the two structural phases.

Stake-holes were distinguishable around the northern perimeter of the platform. The chalk into which they were cut was relatively hard, and it would not have been possible to drive a thin wooden stake directly in, without first making a hole with an implement such as a pick. This probably explains their small size and irregularity, particularly when compared to those at Downsview (Rudling forthcoming) where the chalk was softer (Drewett, pers. comm.) and would have been easier to work. These stake-holes would have contained the wattle-and-daub structure of the outer wall, though it is not possible to state whether they belong to phase 1 or phase 2; perhaps the same holes were re-used for the latter. Stake-holes around the southern edge would have been removed by erosion. There are further stake-holes and possible stake-holes within the area of the hut floor(s), which suggest the presence of internal divisions or small structures. Their arrangement is not clear, and there is no evidence as to which phase they belong.

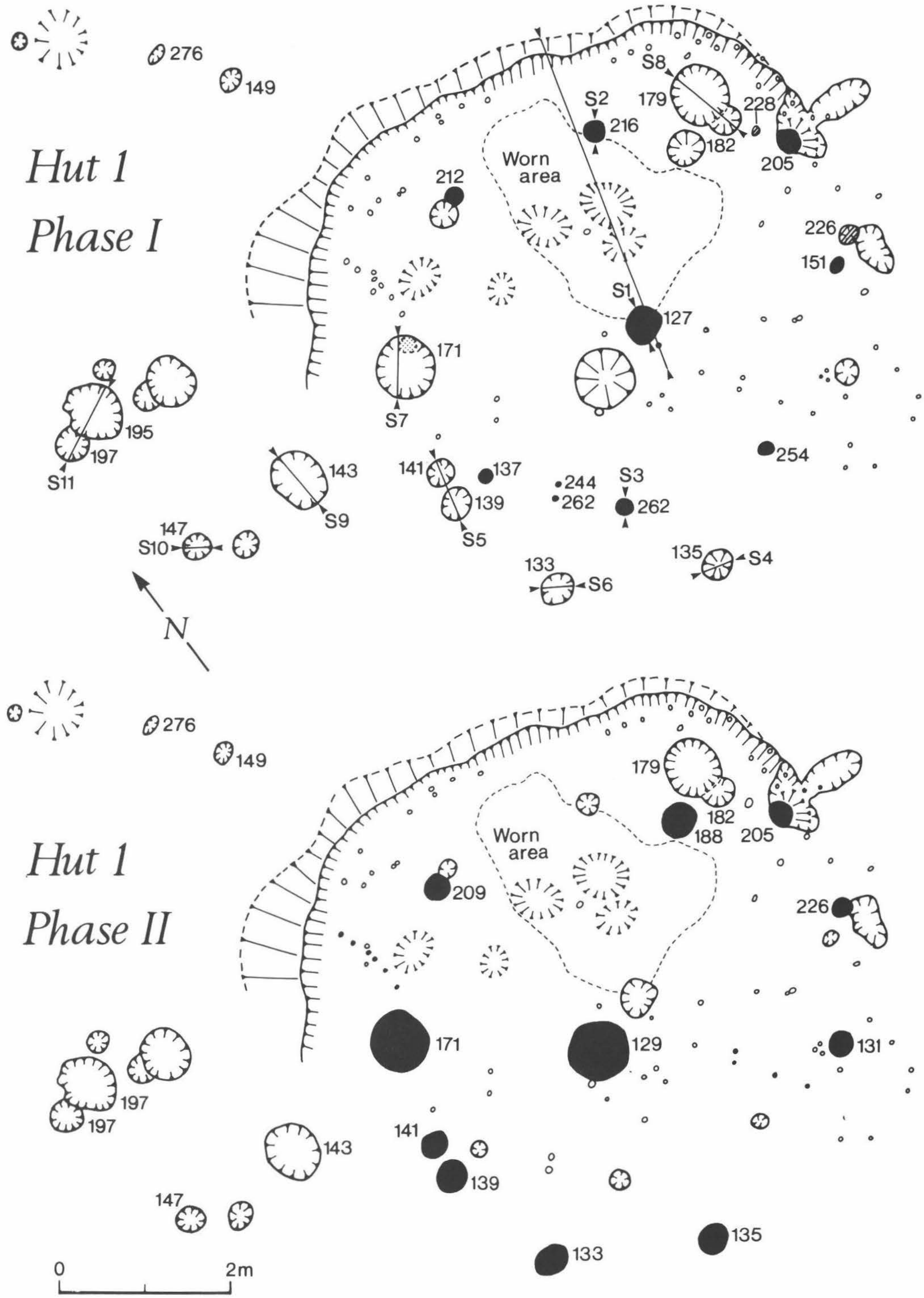

Fig. 4. Hut 1, phase 1 and phase 2.

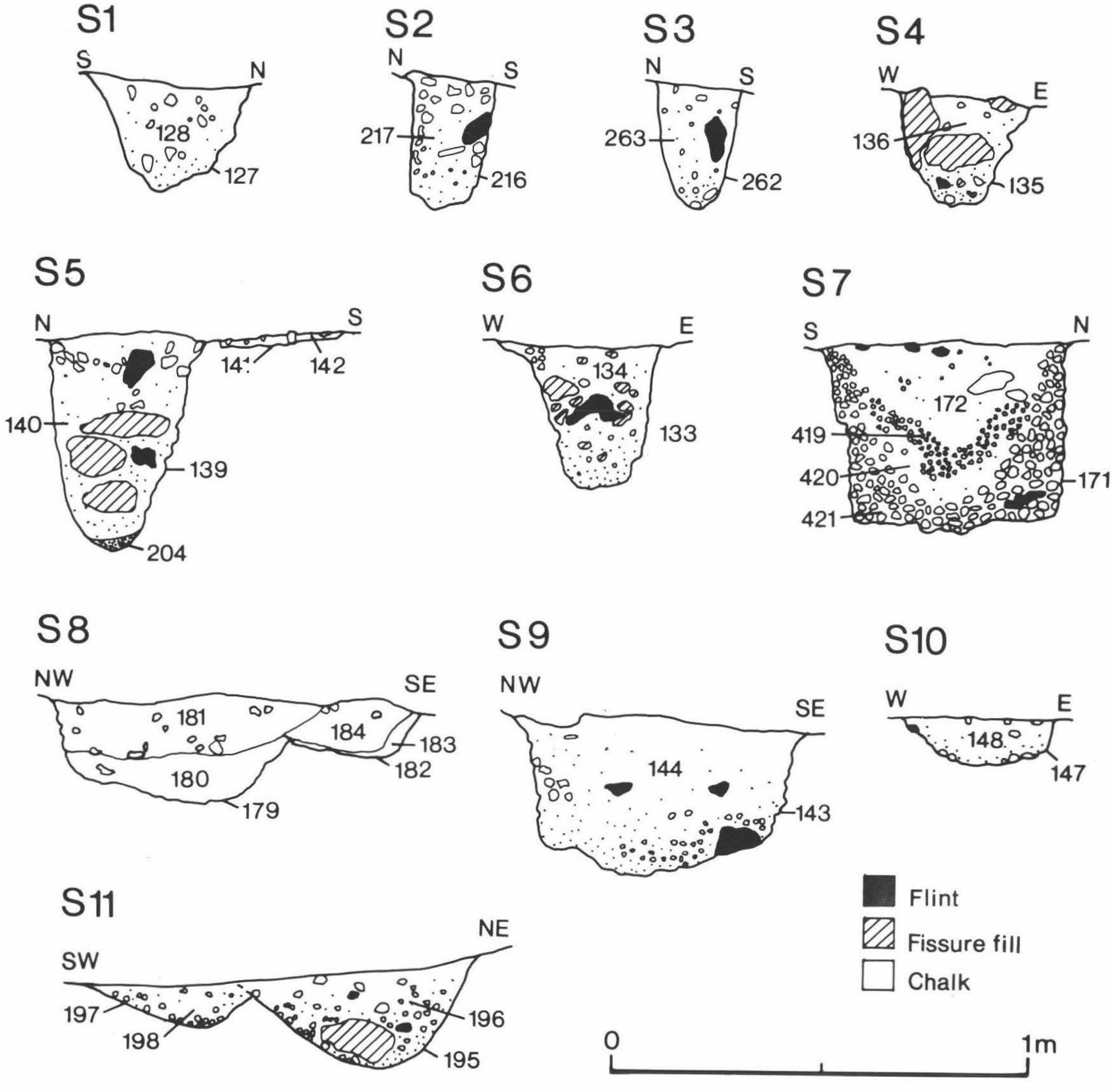

Fig. 5. Hut 1 sections.

Hut 1, phase 2

This is shown by solid shading on Figure 4. Hole 141 is included because its position, diameter and shallow depth suggest it may represent a strengthening post added to give additional support beneath a ring-beam connecting the tops of the vertical posts. A shallow depression, 426, is approximately on a line between 171 and 209, and may also represent such a strengthening post.

The post-holes of phase 2 have an average diameter of approximately 340 mm (excluding 171, which is much larger, and those at the entrance), in keeping with its being larger and more substantial than phase 1. Their fills were characterized by a high proportion (up to 40%) of large flint nodules (up to 300 mm), and of fissure-fill fragments (30%; 200 mm). This is assumed to have been used as post-packing, some of which appeared to be *in situ*, e.g. on the western side of cut 135 (Fig. 5:S4). The soil component of these fills was generally similar to those of structure 1. Most of the holes are flat-bottomed; examples of sections are shown in Figure 5:S4–7.

The reason for the large size of post-hole 171 (Fig. 5:S7) is not clear. There is the possibility of an undetected fill representing a post from the earlier structure. It may have been enlarged to take an additional or replacement post. Any post-packing appears to consist more of chalk than flint or fissure-fill. The section is more complex than that of the other post-holes, and appears to show an initial collapse of chalk packing material, followed by an accumulation of finer material, followed by further deposition of chalky fill prior to final backfilling. This could, of course, have happened very rapidly during the removal of the post, or more slowly. Its position does not suggest any interpretation other than as a post-hole of phase 2.

Hole 129 is approximately, but not perfectly, in the centre of the structure, though unlike hole 127 in phase 1, it is somewhat shallower than the holes in the structural circle. Again there was no sign of burning, so it is unlikely to be a hearth. It is probably a central roof support, the shallowness perhaps indicating that it was added later, rather than being part of the initial design.

The entrance structure is complicated. If the earlier argument that structures 1 and 2 both had a post in the position of hole 205 is accepted, the entrance consists of holes 205 and 226. The adjacent elongated holes also belong to this structure. The fills of 205 and 226, and their respective associated cuts all appeared to be the same, suggesting that they are contemporary. Material interpreted as post-packing was recorded within the fill of hole 177, lying against the eastern face of the cut. This implies that some structural element was positioned in 177, and held in place against the post in 205; the same probably applies to 153, though the fill was more disturbed.

Taken in conjunction with the stake-holes around the perimeter of the platform, a possible reconstruction would involve a doorway of substantial timber posts or planks set in the outer wall of wattle and daub. Given the orientation of the structure relative to the slope (which is down from roughly north to south), it is obvious that water could enter the doorway in wet weather. The remaining element, 156, may therefore represent an additional post or plank screen to prevent water gaining access to the interior.

Internal features

Various features were found within the floor of the platform. It is not possible to assign them to a particular structure, so they are discussed separately.

Cut 111 was a shallow depression filled with material very similar to the overlying layer, 110. It has no obvious function. It is approximately midway on a line between 129, the central post of structure 2, and 209, one of the outer holes of this structure. It is possible that it may therefore represent a post added to strengthen a rafter.

Three shallow depressions, 427, 428 and 429 were situated in the northern side of the floor. Their fills were indistinguishable from the overlying layer 110, with which they were removed; it is assumed that they were the same material. Their function and origin is unknown. They are within an area where the chalk had a smoother, more worn appearance than elsewhere. Whether this wear occurred in the life of the structures, or during or after their dismantling, is not clear. Areas described as 'trodden chalk' were found in comparable positions at Itford Hill (Burstow & Holleyman 1957). They appear to represent wear on the floor surface inside the structure, implying that the bare chalk formed the floor. Chalk does wear quite rapidly, particularly when wet. It is possible that dismantling the structure in rainy conditions could produce such an effect. In either case, the wear might be expected to be more extensive; as indeed it was in some, but not all, of the Itford Hill examples.

In addition to the stake-holes of the outer wall discussed earlier, there were a few larger holes which have the appearance of stake-holes, though they are unlikely to represent wooden stakes simply driven into the hard chalk. The function of these features, 242, 244, 234, 236, 246 and 207 is not certain. The first two are approximately on a line between post-holes 137 and 262 of phase 1, and could represent support for some sort of internal screen.

Holes 179 and 182 (Fig. 5:S8 & Plate 2) are the most noteworthy. Both of these holes were clay-lined (fills 180 and 183 respectively), though 180 appeared to be more disturbed and less complete. Fill 181 was similar to the overlying material, 110, suggesting that it accumulated after the abandonment of the structure. The fill immediately below this, 184, was unlike any in features that belong to structure 1 (which must have been filled and levelled during the period of structure 2), suggesting that it probably belonged to structure 2.

Other than the clay lining indicating storage of a liquid, the interpretation of these features is not

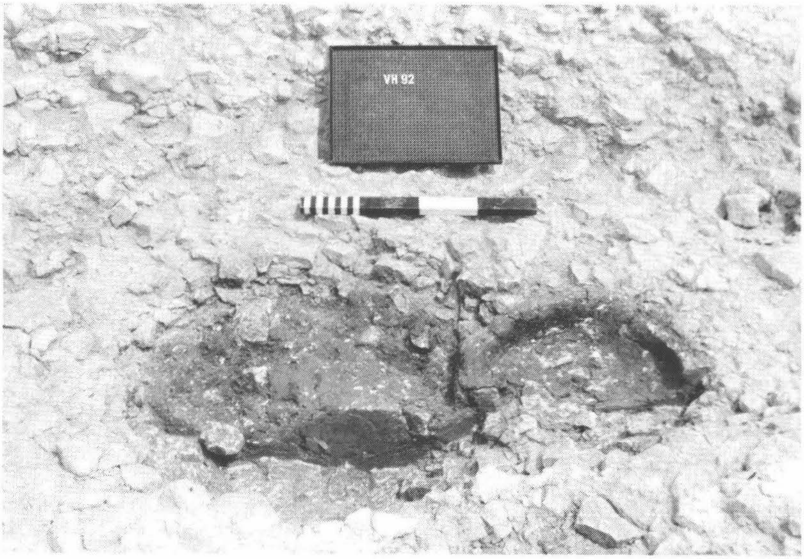

Plate 2. Hut 1: clay-lined holes 179 and 182.

certain. The recorder suggested that the completeness of the clay lining of hole 182 implied that this was later, as was also hole 179. It seems more likely that any later cut would either have avoided the earlier one altogether, or simply have been a reworking of it. The physical relationship could also suggest that they were contemporary, with some connection between them that has been lost. If, for example, there was a lip (perhaps sealed with clay as necessary) in the lining of 182 adjacent to 179, the former could have functioned as a sediment trap, allowing impurities to settle before the clear liquid was released into the lower storage hole. The most obvious such use would be the collection of clear drinking water.

Layers overlying hut platform 1 floor

Figure 6:S12 shows a section of the layers overlying the chalk floor, and the features of structures 1 and 2. No layer that could definitely have been an occupation floor surface was found, and from the evidence of the worn chalk described above, the floor of the structure(s) appears to have been the bare chalk of the levelled terrace.

It is possible that 174, a layer of friable, light greyish brown clay loam averaging 10–20 mm thick, may have been such a surface. It occurred at the northern edge of the terrace, in a restricted area protected by the overlying stony layer 173. It appeared to respect the line of peripheral stake-holes. However, its shallowness and friable nature do not suggest either the depth or compactness that would be needed in a floor surface. Even if this layer does represent the remains of a floor, it appears to have been very badly disturbed; it would belong to phase 2.

Layer 173 contained a high proportion of chalk fragments. It could represent erosion during the life of the huts, or a deliberate construction backfill, depending on their constructional details. Layers 110 and 105 represent colluvial deposition in the hollow of the empty platform, after removal of the phase 2 structure. These are considered in more detail below (Discussion of huts 1 and 2).

Features adjacent to hut 1

Three small holes (149, 276 & 280) plus a shallow depression (278) were just to the north of the platform itself (Fig. 4). The shape of 276 could suggest that it is the result of a rafter resting at an angle in the ground, after the manner suggested at Black Patch (Drewett 1982a, 328), though this is considered to be unlikely (*see* Discussion of Hut Structures below). None of these features is datable, and their function is not known.

To the west of the platform was a group of three large holes (143, 195 & 224) and several smaller ones (sections: Figs 5:S9–11). The soil component of their fills was generally a light brown clay loam. The three larger ones contained flint nodules and fissure-fill fragments which may have been post-packing, though they appear to be too large to be post-holes. They probably represent small storage pits, though their fills contained no evidence to confirm this. Dating evidence rests on Middle Bronze Age pottery from context 196 (fill of 195). The features are assumed to be roughly contemporary because of the similarity of their fills and their apparent association with hut 1.

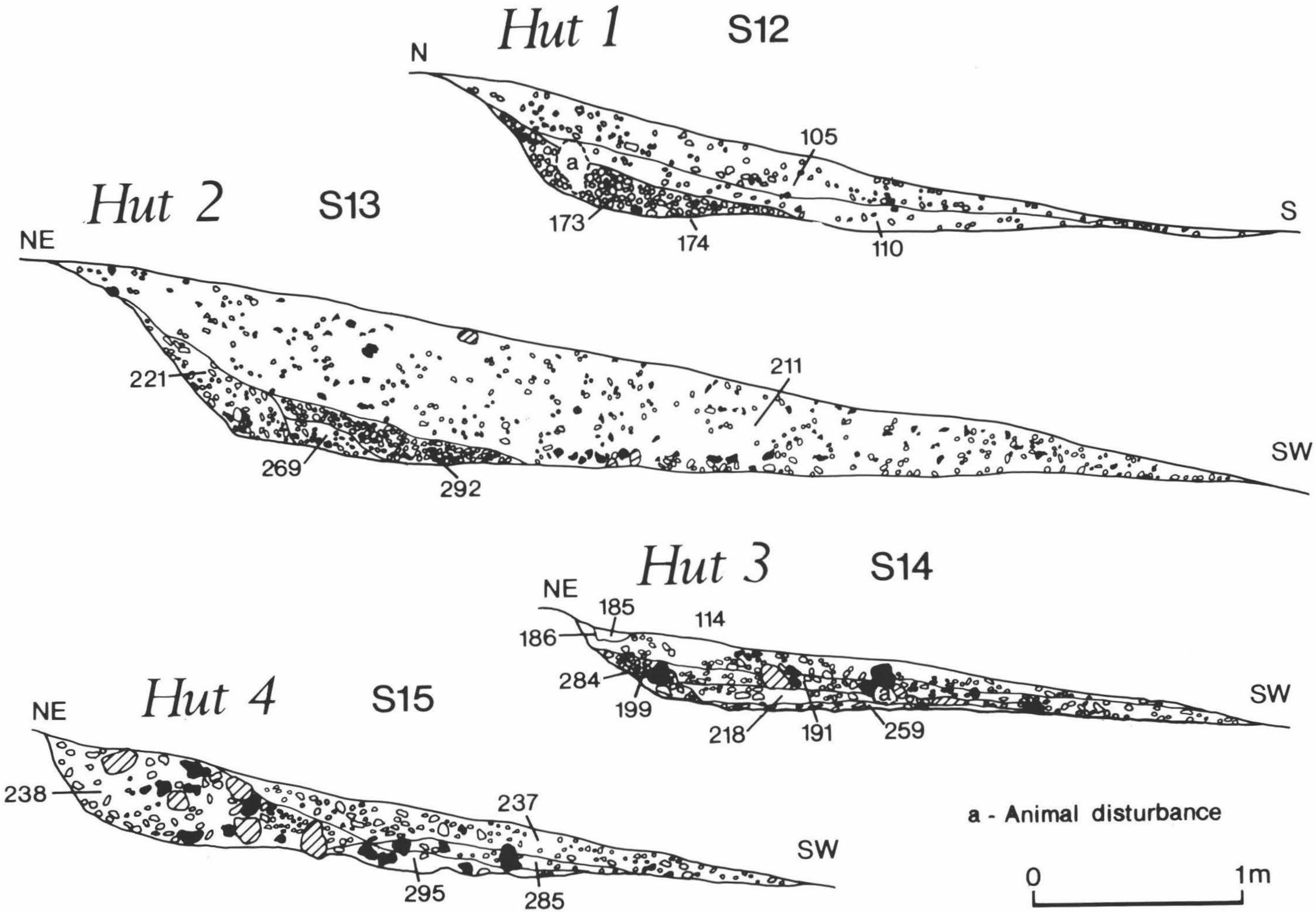

Fig. 6. Sections of layers overlying hut terrace floors.

Hut 2

This also had two phases, representing the replacement of one structure by another, larger, one. The terrace was approximately 8 m across, and the circles of post-holes were approximately 3.5 m and 4.5 m in diameter respectively. It was immediately adjacent to a smaller terrace on which stood hut 3. The relationship between the two was not apparent. The edges of the two platforms appear to respect each other, although a structure in the latter would virtually block the entrance to the former, and they are therefore unlikely to be contemporary.

Evidence for the relative dating of the two structures is not conclusive. The section through post-holes 302 and 325 is capable of different interpretations; the favoured one is shown in Figure 8:S20. Unfortunately, the section line missed the relationship between the two component features of 298/388, but some stones which may have been post-packing appeared to respect post-hole 298 rather than 388. It is therefore assumed that 298 is later, otherwise these would have been disturbed, and the structure to which it belongs is considered to be phase 2. At the entrance, 335 (phase 1) definitely appeared to be cut by 322 of phase 2 (Fig. 8:S22).

Additional evidence for the relative dating is by analogy to hut platform 1, where the smaller structure, having the smaller post-holes, was earlier.

Hut 2, phase 1

This is shown in Figure 7, with examples of post-hole sections in Figure 8:S16–20. The average diameter of the post-holes was 270 mm, with greyish brown fills containing up to 40% inclusions of flint and around 10% chalk. Fissure-fill was generally rare. Post-hole 306 contained material that in plan (Fig. 8:Plan 1) appeared to be *in situ* post-packing, and suggested that the diameter of the post was approximately 100 mm; unfortunately it was not possible to excavate and draw a section with this packing still in position (Fig. 8:S16). Packing material in cut 361 had been disturbed, but the post in this hole was probably around 150 mm in diameter (Fig. 8:S17 - N.B. bottom part recorded in profile only, after removal of packing). Cut 433 was recorded merely as a depression in the hut floor, after the overlying layers had been removed. However, its base level was comparable to that of other holes, and as the floor itself had suffered erosion at this point, it can be assumed that 433 is also the remains of a post-hole.

Cut 304 probably contained a post forming a central roof support, though there is no evidence other than its position to confirm this. Its size suggests a larger post, though some of the extra space will have been taken up by packing; note that it is shown oversize in Figure 7 owing to collapse of the sides prior to planning. The entrance is less complicated than that of hut 1, and appears to have had no major elements other than the posts of the main structural frame in either phase.

As with hut 1, the outer wall is indicated by traces of stake-holes around the edge of the terraced area, where this had been protected from erosion.

Hut 2, phase 2

This is shown in Figure 7, with examples of post-hole sections in Figure 8:S20–24. Excluding the two large multiple holes 298 and 322, the average diameter is 394 mm. The silty fills were generally light brown or greyish brown, with 10–50% flint and 10–30% fissure-fill inclusions, as well as up to 30% chalk fragments.

Interpretation of the two multiple holes 270/422 and 327/336 is not certain. The position of 270 fits neatly in the suggested layout. It possessed *in situ* post-packing (Plate 3), and undoubtedly belongs to the main hut structure. Cut 327 contained disturbed packing material, whereas 336 was unique in containing exclusively chalk inclusions. The relationship was uncertain, but appeared to be as in Figure 8:S22.

If post-hole 327 is part of the structure, the dimensions between post-holes 270 - 327 - 322 are the same as between the corresponding holes 333 - 96 - 300, but the layout is not symmetrical, with the latter being in a straight line and the former not so. If cut 336 formed part of the structure, the layout is symmetrical, but the dimensions are not. It is possible that a setting-out error was made in the construction, with holes 422 and/or 336 being filled in when the error was noticed, or alternatively either or both being additional members added to remedy a resultant structural problem. The latter is perhaps less likely in the case of 336, which appeared to be cut by 327.

The reason for the large size of post-hole 322 at the entrance is not apparent, unless it is associated with the possible problems discussed in the previous paragraph. The position of the post shown in Figure 7 is derived from that of the post-pipe visible in the section Figure 8:S21 (context 314). Otherwise the entrance is similar to that of phase 1.

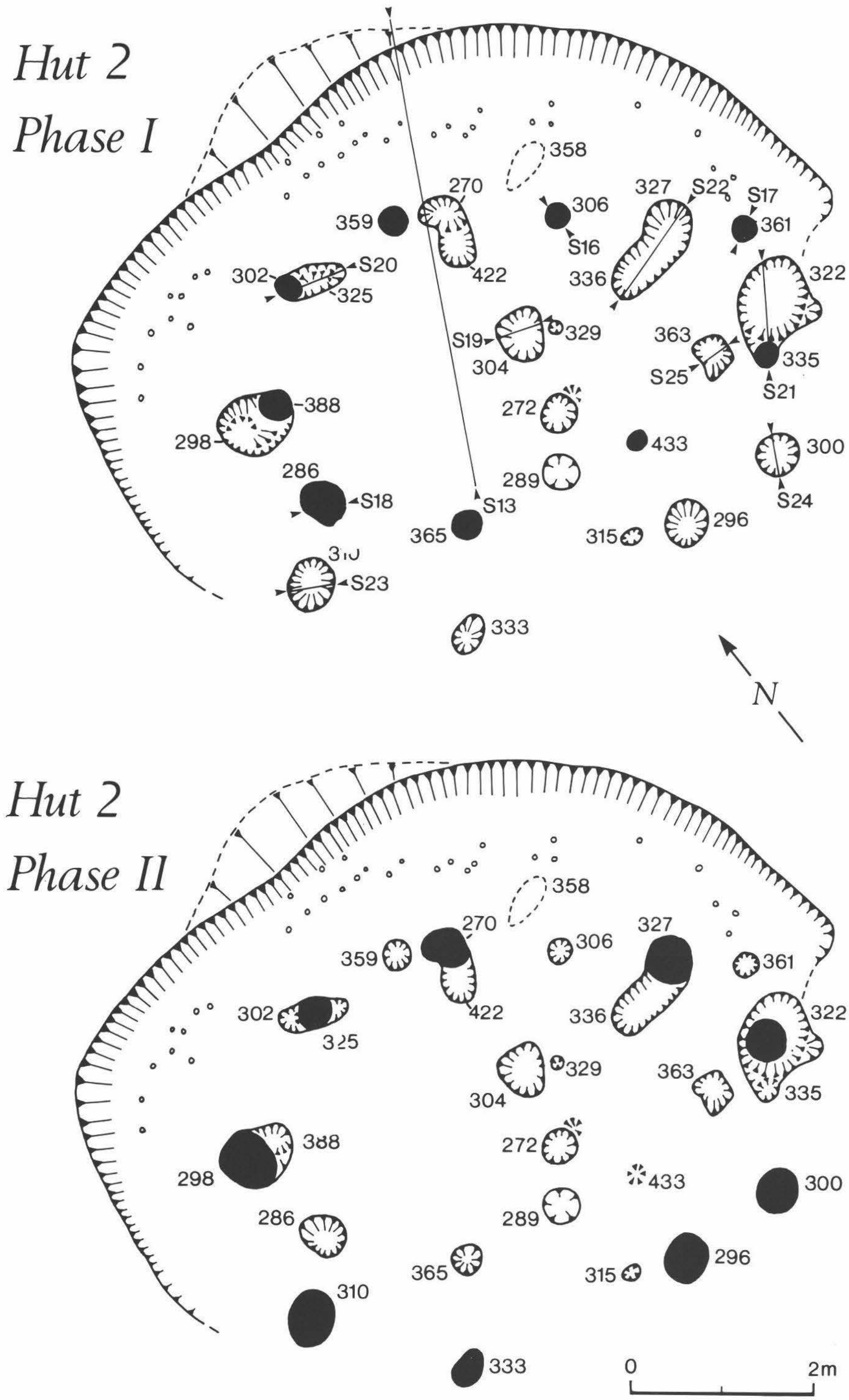

Fig. 7. Hut 2, phase 1 and phase 2.

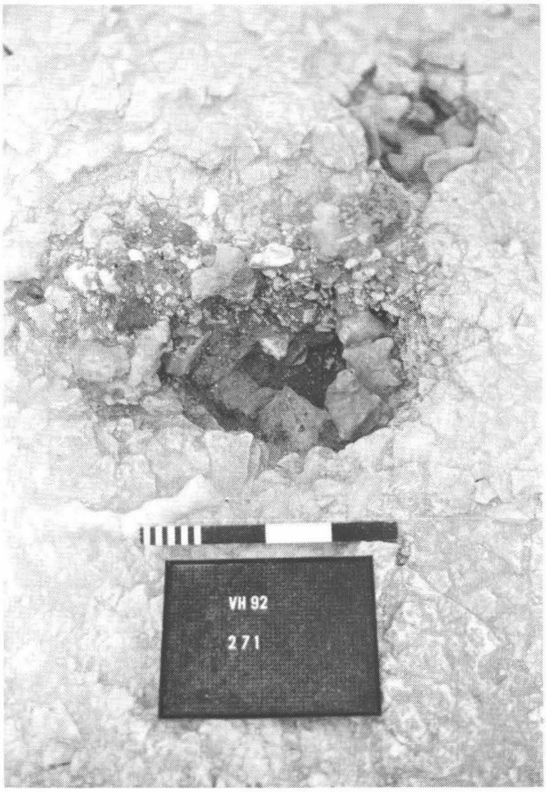

Plate 3. Hut 2: post-hole 270 showing post-packing.

Hole 272 is central to this structure, and probably contained a roof support. The outer wall probably made use of some or all of the stake-holes discussed above.

Internal features
Two small holes, 315 and 329, and two larger holes, 289 and 363, have no obvious function, nor is it possible to say which structure they belong to. Cut 363 (Fig. 8:S25) was notably deep, and could have held a structural post.

Layers overlying the hut floor
No evidence of floor surfaces was found. Referring to Figure 6:S13, the section of the overlying layers, layer 221 appears to consist of material derived from the edge of the levelled terrace. Its extent respects a line of stake-holes representing the outer wall of the hut, and it is likely that this material formed during the life of structure 4, accumulating between the edge of the terrace and the hut wall by the same process already discussed for hut platform 1. This material was quite compact, and is likely to have remained largely intact for some time after the removal of the structure, allowing a certain amount of silting and erosion debris to build up (269), followed by a more substantial accumulation (292) which was probably derived from slippage of 221. The disused terrace then gradually filled up with colluvial deposits (211).

Features adjacent to hut 2
A small hole, 390 (shown on Fig. 2) adjacent to the terraced platform is of unknown date and function.

Discussion of huts 1 and 2
The presence of stake-holes along the edge of levelled area of huts 1 and 2 implies an outer wall of wattle-and-daub. This construction is different from that suggested for hut 4 at Black Patch (Drewett 1982a, 328 & 338), where the natural rock face was taken to be open to the interior of the structure, although it appears to be similar to that at Downsview (Rudling forthcoming) and Mileoak (Russell, in Rudling forthcoming). There would be no need for the roof to be carried on rafters reaching to ground level with such a wall.

Between the outer wall and the rear face of the terrace there would undoubtedly have been a gap when initially constructed. It is not certain whether this was deliberately backfilled at the time of construction, or left open to accumulate a mixture of silting and erosion deposits. The former may have put strain on the wattle framework; the latter could have led to damage to the daub from water collecting in wet weather. Referring to Figure 6:S13 (the layers overlying the floor of hut 2), layers 221 and 269 were similar in make-up with a high proportion of chalk fragments, and appeared to respect a wall-line of stake-holes; layer 292 was comparable in appearance. It is suggested that they were originally contemporary with the hut structure and built up, or were placed, against its back wall. Removal of the wattle wall could have left the compacted accumulation *in situ* for a time, although the exposed vertical face would soon collapse; a layer such as 269 would then result. Further, slower, erosion in the disused terrace would result in layer 292, over which the terrace would slowly fill with colluvium (211). In hut 1, stony layer 173 equates to layers 221, 269 and 292; it could simply represent initial erosion of the terrace edge after removal of

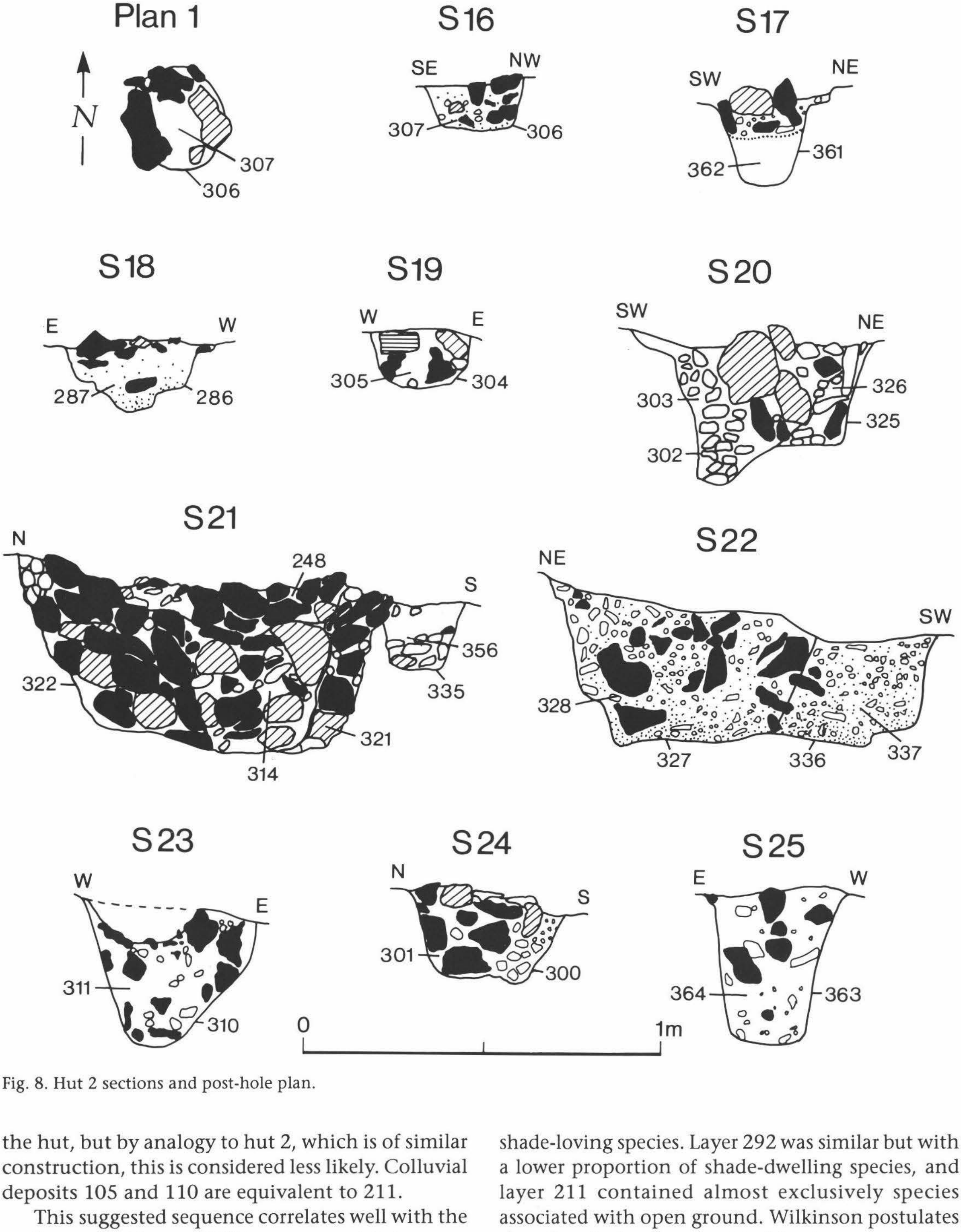

Fig. 8. Hut 2 sections and post-hole plan.

the hut, but by analogy to hut 2, which is of similar construction, this is considered less likely. Colluvial deposits 105 and 110 are equivalent to 211.

This suggested sequence correlates well with the molluscan evidence (Wilkinson, report below, pp. 51–5). Layers 221 and 269 were dominated by shade-loving species. Layer 292 was similar but with a lower proportion of shade-dwelling species, and layer 211 contained almost exclusively species associated with open ground. Wilkinson postulates that the shade was provided by long vegetation growing in the newly abandoned, freshly eroding and deep terrace, which gave way to a more open environment as the terrace filled with colluvium. It may also be possible that the shade could have been provided by the hut structure itself, with layers 221, 269 and 292 filling the gap between the hut wall and the terrace edge, the slower erosion rate of layer 292 accounting for the higher proportion of open-country dwelling species.

In both cases, the original huts were replaced by slightly larger ones, but apparently without enlarging the terraces, and maintaining approximately the original entrance position. This resulted in the pattern of the posts in both phase 2 huts being noticeably asymmetrical when compared to the originals, as the extension had to be exclusively towards the downslope side to avoid the need for increased terracing into the hillside. This could have resulted in a less sound structure; both phase 2 huts display features which can be interpreted as additional post-holes for strengthening or repair, although this could simply be an indicator of a longer life. Hut 4 may also have been extended, but in this case the terrace itself shows signs of increased excavation which would have avoided the problem.

The post-holes of the earlier structures, particularly hut 1, contained relatively few large stones, such as would be used for post-packing. Obviously the floor would need to be levelled for the new structure, and the redundant post-holes would have been backfilled, doubtless with the packing material re-used.

Hut 3 and adjacent structure

Immediately adjacent to hut 2 was a smaller terraced area of similar shape, approximately 4 m across, but significantly different in that it contained no arrangement of post-holes. Although not therefore the same type of structure as huts 1, 2 and 4, it is referred to here in the hut sequence for convenience, and shown in Figure 9.

There were post-holes immediately to the east, representing a four-post structure, one of which was within the southern periphery of the terrace (also Fig. 9). The topmost colluvial fill of the terrace overlay this hole, but no other feature or fill. It is not possible to be certain of its relationship with the terrace because the overlying material, although obviously later, is itself of uncertain date. It is convenient to consider the terrace and the post-built structure together, although the latter does not strictly belong to the hut platform.

Hut 3

It is possible that the lack of post-holes in the terraced platform indicates that no structure was actually built in it. However, burnt structural debris was found within it, and this is unlikely to have come from the adjacent structures 3 or 4, the most obvious alternative sources, because no signs of burning were associated with them. This debris consisted of a large quantity of daub with impressions of wattle and split timbers, associated with considerable amounts of charcoal (which gave a radiocarbon date of cal BC 1505–1380 or 1340–1320: BM-2936). It is therefore probable that the terrace contained a structure of some form that did not use earth-fast posts, either in holes or foundation trenches, or these were outside the terrace and have been lost through truncation. (The charcoal is discussed as necessary here; *see* Berzins, report below, pp. 48–51, for full information and discussion. Daub with split timber impressions is illustrated in Figure 9.)

Below a colluvial deposit (114) similar to those found in other terraces, hut platform 3 contained three major layers, plus one (199) probably derived from collapse of the rear face. These are shown in section in Figure 6:S14. Of the others, 259 was immediately over the level floor, with 218 overlying it. The latter contained very large amounts of daub, with impressions of both wattle and split timbers, the latter probably oak. The origin of this layer was considered above, and is taken to indicate the presence of a structure. 259 was similar, though with fewer inclusions. It is possible that it may have been originally an occupation layer, but appears to have become so mixed with material similar to 218 that it cannot be considered as such. The layer immediately below the colluvium (191) showed signs of considerable animal disturbance, and is likely to represent a disturbed upper level of material similar to 218. It has been suggested above (huts 1 and 2) that material equivalent to layer 199 was deposited in hut platforms 1 and 2 during the life of the structures within them, building up behind the rear walls. This cannot have been the case with layer 199, where the rear wall of the terrace apparently formed the rear wall of the structure.

The nature and purpose of such a structure is not easy to define. It is possible that it was a sheltered cooking area, perhaps with some of the burnt timber actually derived from cooking fires rather than from a structure, though it is doubtful whether such an activity would necessitate the construction of a fairly

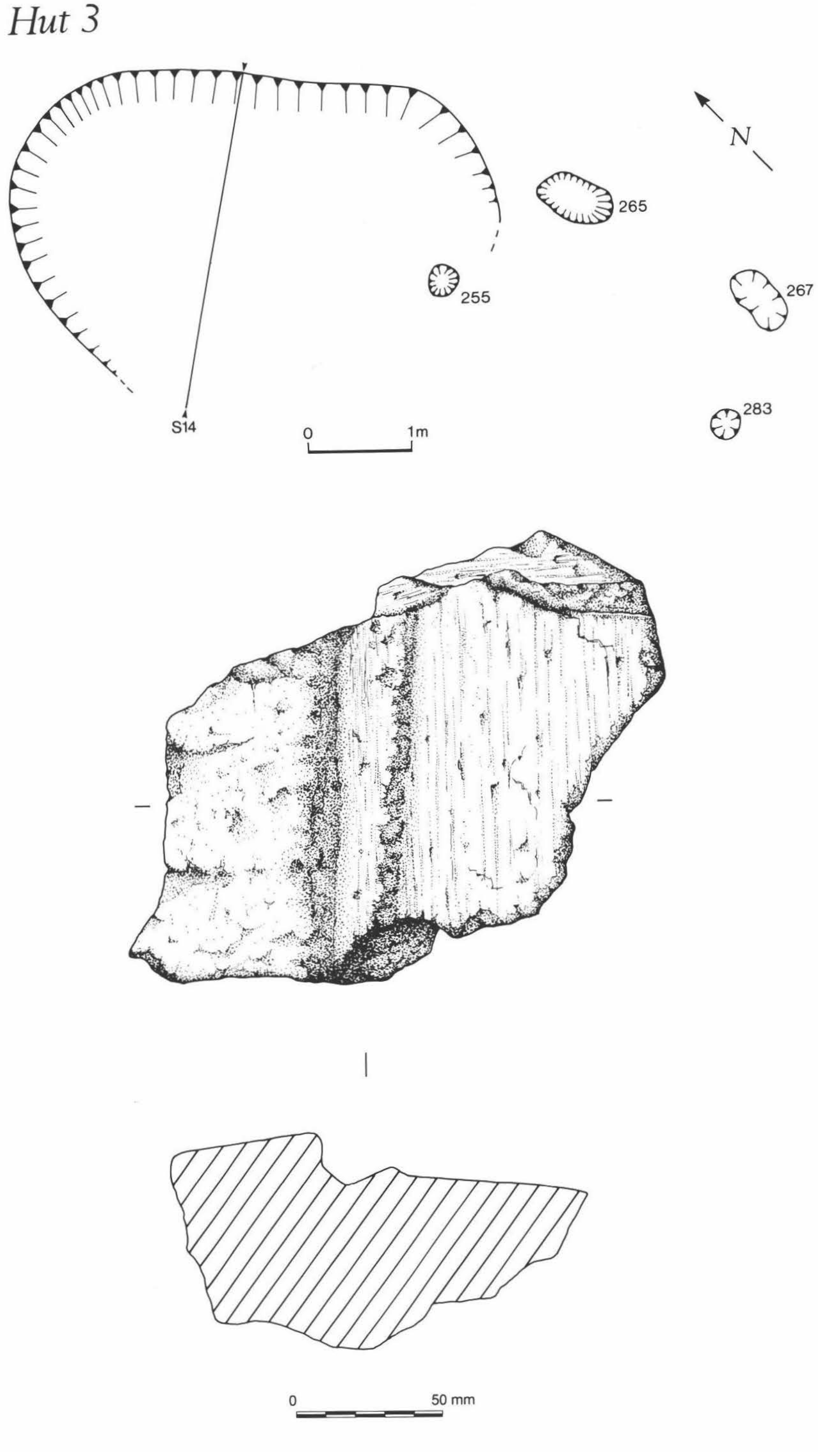

Fig. 9. Hut 3 and adjacent structure + DAUB.

substantial terrace. It did, however, contain charcoal fragments from tree types (such as dogwood and maple) that are more likely to be used for firewood rather than structural elements.

Four-post structure

Four holes, one clearly showing evidence of a post-pipe, represent a four-post structure. Two were circular (255 & 282), and two were elongated (265 & 267), the post-pipe in 255 suggesting a timber approximately 130 mm in diameter. The arrangement of the holes is trapezoidal, and it is not clear what the construction or function of such a structure could be. The fills are similar, though not near enough identical to confirm that the four belong together, but the symmetrical arrangement suggests this is the case. It is, of course, possible that other associated holes have been lost through truncation.

Hut 4

This was in a terrace of the same basic shape as those to huts 1 and 2, approximately 7.75 m across, but displayed several peculiarities. It contained an arrangement of holes, containing material that could have been post-packing, which form part of the pattern of a structure similar to huts 1 and 2, the remainder having been removed by truncation of the sloping ground, which was severe at this point; the full diameter of the post-hole circle would have been approximately 5.5 m. The two holes furthest down the slope, 323 and 331 (the latter not forming part of the main structure), only survived to a depth of approximately 40 mm, and any further down would have been lost altogether. Figure 10 shows these features, with the reconstructed 'lost' holes shown stippled.

The surviving holes of the main framework were 400–450 mm in diameter and, except for the severely truncated hole 323, are shown in section in Figure 10:S26–28. Unusually, the holes 341 and 343 showed an initial fill with a high proportion of chalk fragments, probably from erosion of the sides of the cuts.

There was no evidence of stake-holes around the periphery of the terraced floor. There was no fill of limited extent derived from collapse of the rear wall of the terrace, comparable to those suggested to have this origin in hut platforms 1 and 2 (173 & 221). Instead, there was a much more extensive fill, 238 (Fig. 6:S15), in a comparable position, which contained a very high proportion of large fissure-fill fragments up to 200 mm in maximum dimension. Such a concentration of this material was not found anywhere else on the site; its distribution was otherwise quite widespread, but in the form of the occasional fragment, or in holes as post-packing.

It is therefore possible that this hut was constructed in the manner suggested for hut 4 at Black Patch (Drewett 1982a, 328 & 338), with rafters coming down to ground level on the top edge of the terrace, the inner face of the terrace being exposed inside the structure. The large stones could have represented some sort of outer wall or revetment of the structure. Drewett's reconstruction includes a low masonry wall to support the roof at an equivalent height on the downslope side. These stones, however, were situated at the back of the terrace; indeed, given the degree of truncation of the terrace at this point, no trace of a wall on the downslope side could have survived. The material was excavated very carefully to see if any traces of *in situ* walling were present, but none were found. Alternatively, of course, large stones simply being displaced down the hillside would tend to accumulate at the back of a disused terrace.

Also notable was a 'ledge' in the terrace floor, approximately 1 m wide for most of its length and about 10 cm deep. In hut platforms 1 and 2, the distance from the post-holes to the rear wall of the terrace was roughly 1 metre. In this case, the distance from the post-holes to the ledge was roughly 1 metre, but the distance to the rear of the terrace was a further metre. A similar ledge at Black Patch (hut platform 4, hut 1) was interpreted as a recut to extend the terrace (Drewett 1982a, 326–7), and this example would seem to be similar, though the single circle of post-holes suggests only one structure.

It may simply have been irregularly excavated, but it is possible that it may have been extended to take a new, larger structure that for some reason was never built. Alternatively an enlarged hut could have been built using the original post-holes. The latter could explain the presence of the large amount of stone; a larger hut with a relatively small circle of roof support posts may have needed intermediate support for long rafters reaching to ground level. Low masonry at the rear of the terrace may have provided such support without the need to excavate new post-holes in the chalk.

Darker layers 285 and 295 (Fig. 6:S15) appeared to be associated with the lower level of the terrace floor. They may have been occupation deposits. The

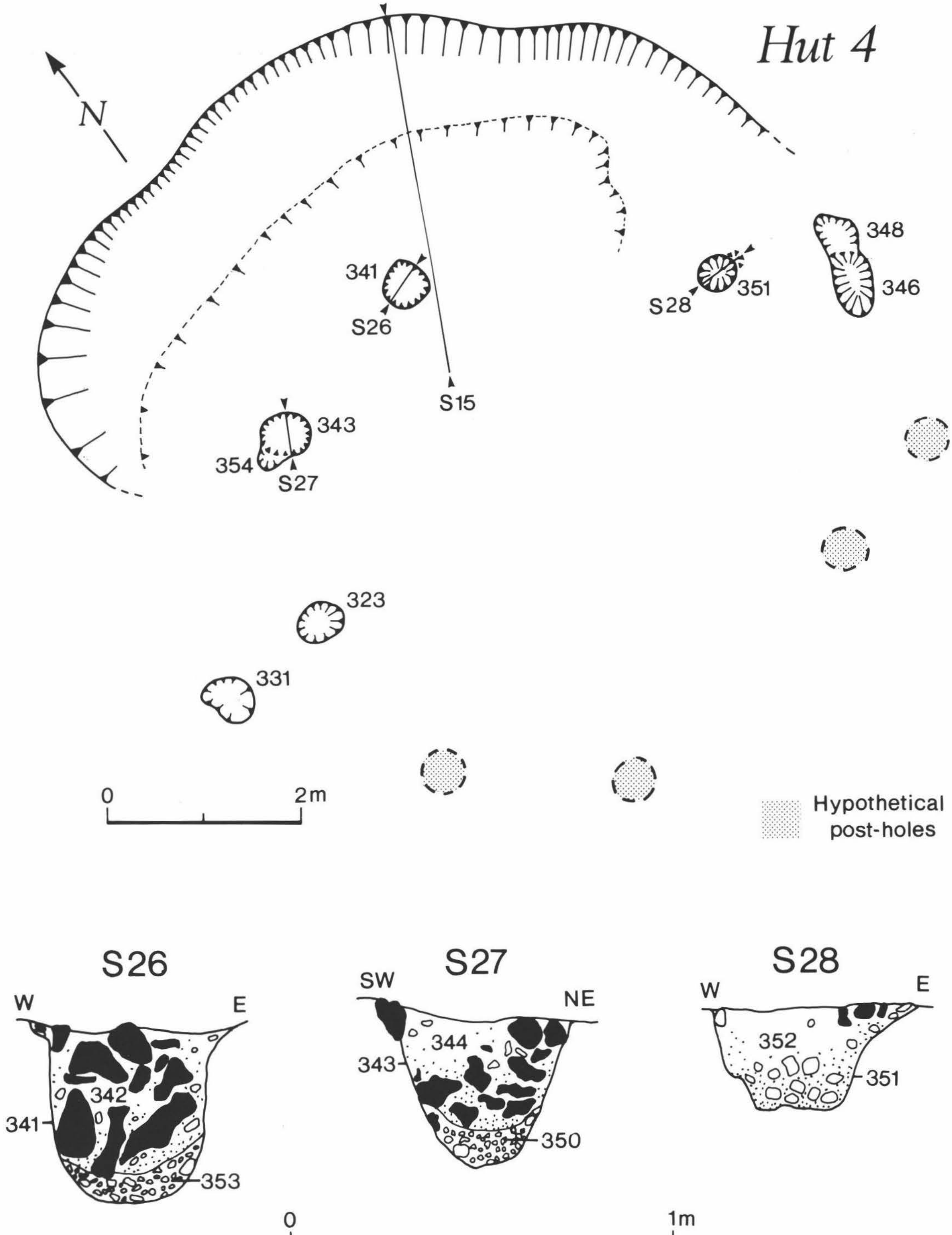

Fig. 10. Hut 4 plan and sections.

uppermost, 285, contained small amounts of pot, bone, charcoal, daub, heat-cracked flint, flint flakes and also a fragment of the shell of an edible mussel. The finds distribution plot did not show any significant concentrations, and in any case it would probably be dangerous to suggest discrete activity areas when the layer itself is of limited extent, probably due to plough damage; it survived only at the back of the terrace, which itself was badly damaged. Nevertheless, it would appear to be the most convincing floor layer. It probably also formed a good proportion of the upper fills of the post-holes, eroding in after the removal of the posts.

Other Middle Bronze Age features

Hollow/pond

A roughly elliptical hollow (319) was situated to the south-east of hut platform 1, and was stratigraphically earlier than post-holes interpreted as a fence line (*see* below). Pottery from its fills is consistent with a Middle Bronze Age date. It was approximately 7 m × 5 m; its depth cannot be precisely determined because of the steep slope, but was approximately 1 metre.

Such features have elsewhere been interpreted as ponds for the storage of water (e.g. Curwen 1937; Drewett 1982a), though the former notes in discussing the excavations at Plumpton Plain that 'chalk will not hold water for long unless puddled, and excavation of two of these hollows showed neither puddling, nor clay lining, nor any accumulation of chalk sludge such as is usually found in catchment ponds' (Curwen 1937, 190). The feature at Varley Halls was similar, and in this respect contrasts with the small clay-lined feature (179/182) in hut 1, where the lining was well preserved.

Its fills suggested a deliberate backfill, consisting of distinct bands of material, some of which were similar to the colluvium overlying the disused hut platforms, derived from contemporary top- and sub-soils, and others being predominantly chalk debris. Samples were taken for mollusc analysis. The shells proved to be poorly preserved, and appeared to have been damaged by mechanical action (Wilkinson, report below, p. 52). This would agree with their having been deposited rapidly and vigorously. Given its position so close to hut 1, it is tempting to see it as having been deliberately backfilled by material from excavation of the hut platform. If it was a pond, this may suggest that it proved to unsatisfactory, and was replaced by some alternative water source.

Possible fence-line

A group of post-holes to the south-east of hut 1 have a regular pattern suggesting a structure, although its nature is not certain. One of the holes (167) contained post-packing and a recognizable post-pipe, indicating the presence of a post approximately 100 mm in diameter, whilst others contained what appears to be disturbed packing material. No evidence to confirm their dating was recovered from any of the holes; they are stratigraphically later than the backfilling of hollow 319. Hole 169 contained a relatively large amount of charred cereal remains, including chaff; the reason for this is not known.

They appear to represent a fence-line associated with hut platform 1, such as were recorded also at Itford Hill (Burstow & Holleyman 1957) and Black Patch (Drewett 1982a). The two parallel NW–SE running lines probably represent replacement. Isolated hole 408 may represent its continuation, with further holes here and within the main group lost through later truncation. (Nearby irregular feature 249 is thought to be an area of weathered chalk or root disturbance.)

The holes form two alignments, roughly north-west and north-east, with a slightly obtuse angle between the two arms. The north-east running arm is parallel to the palisade/ditch (*see* below), the gap between them being approximately 4.8 m. This relationship suggests they may be related; this is discussed further below.

Ditch

A ditch projected into the north-eastern edge of the site (Fig. 3), running down the slope in a south-westerly direction to a distinct terminal. Two sections were recorded (Fig. 11). It is suggested that the ditch once held a timber palisade, but it is not certain whether, if this was the case, it was an original feature or represents a second phase.

Absolute dating is provided only by a bone (ulna of *Bos*) from a backfill context (117), which gave a radiocarbon date of cal. BC 1400–1265 (BM-2917). The bone was considered to be securely stratified but can, of course, only provide a *terminus post quem*, in this case of the Middle Bronze Age. The alignments of the ditch, fence (above) and lynchet (below) suggest that they are related and therefore contemporary.

In the first section to be excavated (Fig.11:S29) (initially during the evaluation and then extended), contexts 104, 108, and 109 were relatively compact when compared to contexts 116 and 117. The

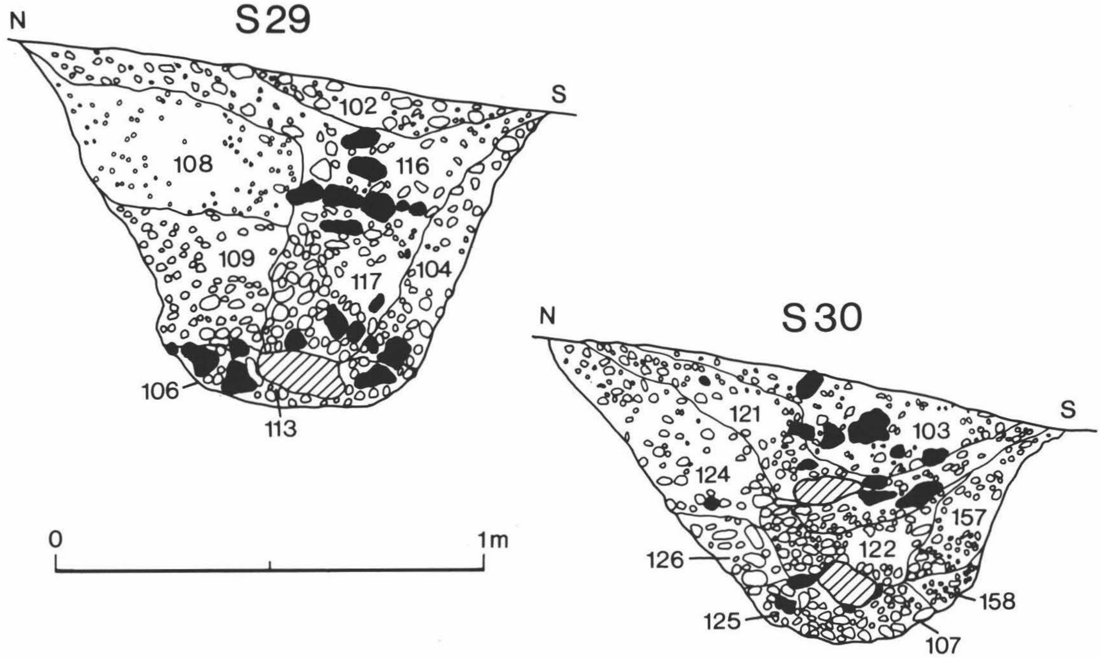

Fig. 11. Ditch sections.

horizon between 108 and 109 was horizontal, suggesting deliberate and rapid backfilling rather than natural silting. The materials were predominantly varying proportions of chalk and silty clay. contexts 116 and 117 were much looser, with voids, and included larger stones. The section shows an indistinct horizon between the two. A concave upper surface suggests natural settlement, filled by later silting (102). In section, 116 and 117 have the appearance of a post-pipe, but in plan (confirmed during excavation) they were linear. Context 113 again has a relatively horizontal upper surface suggestive of deliberate deposition rather than natural erosion of the sides; the position of the large stone directly below contexts 116 and 117 was repeated elsewhere in the excavated sections of the ditch, but did not form a regular pattern.

One interpretation of this section would be that the ditch originally contained a continuous palisade, substantial vertical timbers being set within it, supported by the well-consolidated backfills 104, 108 and 109. Subsequent removal of these timbers would leave a straight-sided slot to be backfilled and/or become silted up; the lack of distinct silt layers at the bottom or evidence of erosion of the vertical sides suggests backfilling. The slot is not absolutely vertical, but the slight angle is compatible with slumping down the slope, probably whilst the timbers were in position. There is also likely to have been some disturbance during their removal.

The second section (Fig. 11:S30) displays a comparable sequence of fills. The division between fills 124 and 125 also appears roughly horizontal, but the upper surface of other fills, 124 in particular, is much more suggestive of silting. Fills 121 and 122 were similar in composition to fills 116 and 177, but with less of the appearance of an upright slot. Overall, and in contrast to Figure 11:S29, an alternative interpretation of a silted-up ditch with a smaller recut — perhaps for the insertion of a palisade — appears possible. It is also argued that the mollusc analysis, samples for which were taken from the second section, indicates silting and recutting rather than rapid backfill (Wilkinson, report below, p. 54).

The function of such a feature, whether or not it contained a palisade, is obscure. Unfortunately, its full length is not known, but there was no comparable terminal forming the other side of an entrance, or indeed any other feature to suggest a complete enclosure. However, truncation has been severe and it is possible that at a higher level it abutted the bank of a positive lynchet (see Other Linear Features below), thus forming a more complete barrier at this point. A similarly isolated ditch terminal was found at Downsview (Rudling forthcoming).

Other linear features

Four linear features were heavily truncated (*see* Fig. 3). Two, numbered 320 and 439, were relatively short (approx. 6 m × 1.5 m and 9 m × 1.5 m respectively) with rounded ends, whereas the two others 435 and 437 were of unknown, but considerably greater, length. Sections were excavated across 320 and 435 and showed a surviving depth of *c.* 0.25 m and *c.* 0.2 m respectively. Both had gently concave bases, no. 435 the latter being slightly asymmetrical. The remaining two were unexcavated because of pressure of time, and the lack of any indication to suggest they were likely to be different. They each contained a single fill, similar to the colluvial fills recorded elsewhere.

When first revealed by machining, these features were thought to be natural variations in the surface of the chalk. The contours are shown in Figure 1, and it can be seen that the westernmost pair roughly follow the natural slope. The easternmost pair, however, are almost at a right angle to the slope, which does not suggest a natural origin. In plan the longer two (435 & 437) have the appearance of being the very truncated remnants of negative lynchets demarcating an archaic field system, and are considered henceforth to be such, though the single recorded profile does suggest the alternative possibility of truncated ditches and as such they would still appear to be field boundaries. The origin and purpose of the two shorter ones are unknown, but their alignments are similar to the probable lynchets and they may in some way be related.

The features interpreted as lynchets, the ditch and the fence all seem to form a series of alignments approximately parallel or at right angles to each other, and are therefore tentatively suggested to be of similar date. The radiocarbon date of the ditch fill, and the suggested relationship to hut 1, would put them in the Middle Bronze Age. They are illustrated as being of this date on Figure 3, but it should be borne in mind that the evidence for this assumption is not conclusive. The projected line of lynchet/ditch 435 would pass very close to hut 4, but it is possible for them to be contemporary; had this not been the case, its interpretation as a Middle Bronze Age field boundary would be less likely.

The relationship between lynchet 435 and the undated terrace could not be determined. The fill of the former contained a mixture of Middle and Late Bronze Age, and post-medieval sherds, suggestive of accumulation over a lengthy period and/or a degree of disturbance. It is possible that the single post-medieval sherd is intrusive, perhaps from the animal action which was recorded elswhere on the site. If the Middle Bronze Age date of the putative lynchet is accepted, then the terrace is likely to be later, perhaps considerably so, as it is unlikely that a Middle Bronze Age terrace would cut a lynchet of similar date, and vice versa.

Inhumation

A crouched inhumation was recovered from an elliptical grave cut towards the north-west of the excavated area (detail Fig. 12). It had been damaged by ploughing, and is likely to be that of a female aged 15–25 (Wood, report below, pp. 47–8). No grave goods were present. It was dated by radiocarbon to cal. BC 1210–1000 (BM-2919).

LATER BRONZE AGE

A single large feature, referred to as hut 5, was situated in the south-west of the site. Various smaller features were in the same area, and are probably of the same date. Those features shown on the overall site plan (Fig. 2), but not on the Middle Bronze Age plan (Fig. 3) can be assumed to be of this date. It is not certain whether the field boundaries represented by the lynchets continued in use in this period.

Hut 5

This was only partially within the excavated area (*see* Introduction and Fig. 13) and insufficient

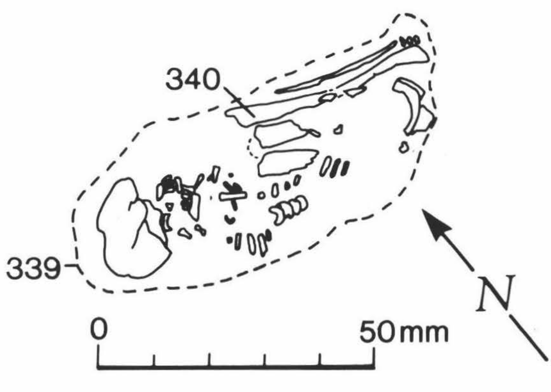

Fig. 12. Inhumation.

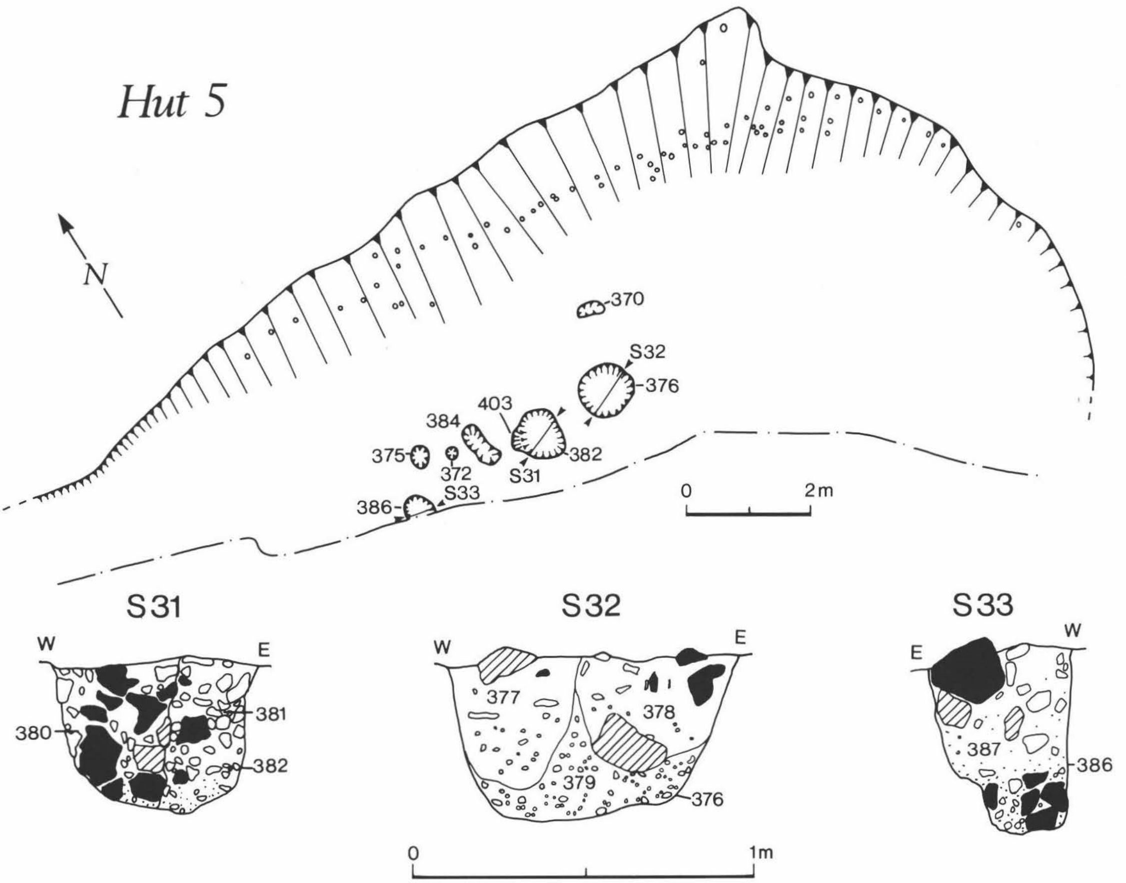

Fig. 13. Hut 5 plan and sections.

evidence is available to interpret it satisfactorily. It is referred to here as a hut for convenience, because it shares some of the characteristics of the Middle Bronze Age huts described above. Its excavation was, unfortunately, of necessity rushed. Only a small part was originally within the site. The opportunity to borrow a machine and driver (from Llewellyn Homes Ltd., the University's contractors for the development) towards the end of the fieldwork programme was taken, and the site extended as far as possible by cutting back the spoil heap, revealing a much larger feature than anticipated. The western edge was slightly damaged during machining. It appears to be a terraced platform similar to those of huts 1–4, though larger and less regular. The edge was marked by large stake-holes, in places in a somewhat erratic pattern, and there were probable structural elements within it. The pottery indicates a Late Bronze Age date.

The section of post-hole 382 (Fig. 13:S31) indicates a substantial post-pipe. Although no similar feature could be clearly identified in hole 386, its profile, and the presence of large potential post-packing material in the fill, suggests that it may also have held a large post (Fig. 13:S33).

The remaining large cut, 376, has a much more complex section (Fig. 13:S32). Two possible explanations suggest themselves. The hole could have held two posts, not necessarily simultaneously. These would presumably have rested on the base of the cut; fill 379 must therefore represent the original construction backfill, which slumped when the posts were removed and covered the base with a concave deposit; layers 377 and 378 would be the backfill/silting following disuse. Alternatively, the hole may have been a storage pit, perhaps containing two jars set in a backfill of deposit 379;

the remaining fills would then represent the filling of the feature after their removal. There was no *in situ* pottery to confirm this suggestion.

The sections as drawn are confirmed by photographs, but there remains a possibility that hole 386 may have had an arrangement of fills similar to those of hole 376 which, under the circumstances of the excavation, and despite being dug by a competent excavator, were not noticed. The proximity of the two holes to each other, and their similarity in size may suggest that they had a similar function. It seems unlikely that a single hole would have held two posts originally, and the regular shape of cut 376 argues against its having been enlarged to carry an additional post, or for the insertion of a replacement post prior to removing the original. They are both very large for post-holes.

Of the remaining features within the terrace, 370 and 384 were amorphous shallow scoops of no obvious function. 372 and 375 were small flat-bottomed holes which could have been post-holes.

The main problem in interpretation of the platform as a whole is the absence of a coherent plan of structural post-holes comparable to those found in hut platforms 1, 2 and 4, although it is possible that an insufficient area of the floor was exposed in the excavation to reveal them. However, the absence of structural, or any other, features from the eastern side of the terrace is noteworthy. It is unlikely that any were missed, as the chalk base provided a clear and distinct background. It does not, therefore, seem possible that the structure could have been of a similar type to those in the earlier platforms, although the presence of the peripheral stake-holes indicates a degree of similarity.

Miscellaneous small features

Two small holes in the vicinity of hut 5 contained Late Bronze Age pottery and are discussed below. Various other small holes in the same general area formed no obvious pattern, but are likely to of the same date because of their location close to an area of known Late Bronze Age activity and remote from that of the Middle Bronze Age.

Hole 159 had a diameter of 330 m and a depth of 120 mm, and was notable for containing the greater part of a Late Bronze Age carinated bowl, plus fragments of other pots of comparable date (*see* Hamilton, report below, p. 33, for full discussion). The hole was neatly circular, suggesting that it had been deliberately dug to contain the pot, which was probably whole, or nearly so, when deposited, although in a fragmentary condition when excavated. The sherds, which were relatively large, were lying horizontally. A fill of mid-brown silty clay filled the gaps between them, and also the remainder of the cut. It appeared that the pot had somehow become broken and flattened.

All the fill of the feature was retained and sieved off-site, but yielded no information to suggest any purpose for the deposition of the pots.

The other small hole contained a small amount of pottery; it is not discussed further here, and should be considered along with the undated holes discussed below.

FEATURES OF UNCERTAIN OR UNKNOWN PERIOD

Animal burial

The articulated, but damaged, skeleton of a cow was found in a burial pit towards the north-east of the excavated area. It gave a radiocarbon date of cal. BC 1010–865 which puts it in the Middle to Late Bronze Age transition period, and is shown hatched as possibly Middle Bronze Age in Figure 3. The backfill of the pit contained a single small sherd of later Bronze Age pottery, although it came from very close to the truncated upper surface of the fill, and it could be intrusive. It does, however, correlate with the radiocarbon date.

There were no pathological indications to suggest the reason for the cow's death and burial. The skull was largely missing, which could be the result of deliberate removal (Wood, report below, pp. 47–8), but could also have been caused by plough damage if the position of the carcase at burial had left the head at a slightly higher level than the remainder of the body. The presence of skull fragments may suggest the latter.

The two obvious interpretations of this feature are firstly the burial of a diseased animal, and secondly a ritual deposition. The burial of a dead animal is perhaps unlikely to have taken place so close to an inhabited hut (or to a hollow which may have functioned as a pond for water collection), although the available dating evidence suggests that these are likely to have been abandoned by this time. It is an atttractive idea to see it as a ritual deposition at the entrance to a trackway between the fence and ditch/palisade, but there is no evidence to confirm such an interpretation and it is probably of too late a date.

Unfinished terrace

This feature (436) was only partially within the excavated area (Fig. 2), but appears to be comparable to hut platforms 1, 2 and 4; it was terraced into the slope, but was probably slightly larger. However, it consisted only of a single large cut, without any associated features. Its fill was suggestive only of colluviation and erosion into an open cut; it did not appear to have been deliberately backfilled.

The section indicated only that it predated modern ploughing. It was not possible to establish its relationship to linear feature 435. It is likely to be later than the Middle Bronze Age (*see* Lynchets, above). Its fill contained Late Bronze Age pottery, and it may well be of this date; its size is certainly more comparable to the similarly dated hut 5.

Miscellaneous features

The remaining features are isolated small holes that cannot be dated or interpreted. They are not discussed further, and are not specifically illustrated.

Also of note is a substantial proportion of a Romano-British East-Sussex ware jar (Hamilton, report below, p. 42). This was recovered during the machining of the top- and sub-soil and was allocated context number 21 (following on from the initial evaluation). No associated features were observed.

DISCUSSION

In general terms, the Middle Bronze Age evidence suggests a fairly typical small downland settlement of the period, although the interpretation of those features considered to be lynchets, fencing, and a possible pond is less certain than that of the huts themselves. All of these are found on comparable sites such as those already quoted.

The settlement is notable for being situated on a steeper slope than that of previously recorded sites, with the exception of that recently excavated nearby at Downsview (Rudling forthcoming). The lynchets indicate ploughing. This can only have taken place parallel to the slope; ploughing up-and-down such a gradient must have been impossible without an efficient plough and may even require mechanical power. Cultivation of a relatively difficult site suggests pressure on land resources as a result of an increasing population. It is interesting that the mollusc evidence (Wilkinson, report below, pp. 51–5) suggests that the surviving colluvium immediately above the chalk, which was distinct from the soil horizons above it, may result from agricultural activity in the medieval period (although it could be later). This, until *c.* AD 1300, was also a time of increasing population, with marginal land being brought into cultivation (Rowley 1986, 17). It is not possible to assess the continuity of this cultivation. Assuming that the area downslope of the lynchets was indeed a cultivated field in the Middle Bronze Age, the presence of a Late Bronze Age structure within it would indicate that cultivation had, for some reason, ceased.

The agricultural economy of the settlement, as suggested by the carbonized plant remains, is typical of settlements of this date and time (Hinton, report below, p. 48). The three main cereal crops, wheat (some identifiable as emmer), barley (hulled) and oats were present, though in small quantities. Preservation was poor, and this may account for the absence of non-cereal crops.

Animal husbandry also included the main species to be expected: cattle, sheep/goat and pig (Wood, report below, pp. 47–8). The evidence contrasts with the relative paucity of that from Black Patch, where the three species were in similar proportions, with cattle slightly in the majority (O'Connor 1982; Drewett *et al.* 1988, 106). At Varley Halls there was a much larger assemblage, and cattle were by some way in the majority, though the picture is slightly skewed by the presence of an articulated though incomplete cow-burial which formed roughly 15% of the identifiable assemblage, although there were no obvious midden deposits.

It was suggested that the paucity of remains from Black Patch resulted either from the discard of waste away from the settlement, from an emphasis on the arable, or from stock being kept on lowland pasture, and butchered there with only the meat portion being brought up to the settlement (Drewett 1982a, 340–41). The Varley Halls results would support the latter hypothesis, although it is possible that all three factors were present to some degree. (It should, however, be remembered that few of the contexts could be directly related to the occupation of the site, and the bone assemblage is probably more indicative of activity in the general area of the settlement rather than necessarily on the site itself.) Whilst situated on a steep slope, the site is close to the bottom of the valley which would provide sheltered grazing for cattle. The majority, though not all, of the bones present were from the extremities of the animal (head, feet) which are generally considered to be waste and which, as Wood suggests below, probably indicate on-site butchery.

The remainder of the animal could have been taken to other sites higher on the downs, which were less suitable for cattle, with only a small proportion of the meat cuts retained for local consumption. Mature animals predominated. It is suggested (Wood, report below) that this indicates that they were kept mainly for milk. It is perhaps more likely that they were kept for the duration of their useful dairy life and then eaten, which would be more economical than maintaining separate dairy and beef herds, although by modern standards less desirable. Some would doubtless have been draught animals.

Such a transfer of animal produce between individual settlements exploiting different local environments could have been by simple trade, or may indicate close family or tribal ties sharing resources. Sheep may have been exchanged in the reverse direction, as they are well-suited to life on exposed upland locations. Woodland was exploited for timber (Berzins, report below, pp. 48–51), and probably also provided at least part of the grazing requirement for pigs.

Hamilton (report below) observes that Ellison Type 7 finewares are notably absent from the Varley Halls pottery assemblage, which may indicate a 'low-status' or relatively poor settlement. There were no other significant finds groups by which the wealth of the settlement could be assessed; the only other artefactual finds of the period, a faience pendant fragment and a tracer/awl came from overlying colluvial contexts not directly related to the settlement. Few surfaces that could be identified, or even suggested, as being *in situ* occupation deposits were located; those that were had been disturbed and/or truncated, and produced few finds. Two-dimensional finds-plots of the few possible floor layers were made, but did not reveal any significant groupings to enable the kind of activity area analysis undertaken at Black Patch (Drewett 1982a) to be made. There was no evidence to suggest that the settlement was anything other than purely agricultural.

SPECIALIST REPORTS

EAST SUSSEX LATER BRONZE AGE POTTERY TRADITIONS: THE ASSEMBLAGE FROM VARLEY HALLS

By Sue Hamilton

Introduction

The Varley Halls pottery 832 assemblage comprises sherds, of which 796 are Bronze Age, 32 are Romano-British, two are medieval and two post-medieval. Some 6.1 kg of pottery was recovered, of which 5.7 kg is Bronze Age. The Middle Bronze Age (MBA) pottery is of Deverel-Rimbury tradition and comprises *in situ* finds from a group of associated settlement features. The Late Bronze Age (LBA) assemblage falls within a post-Deverel-Rimbury 'plain' tradition and is topographically separate from the MBA assemblage, except where it occurs in colluvial deposits over the MBA hut platforms.

In addition to documenting the pottery assemblage recovered from Varley Halls, the discussion considers the Varley Halls MBA and LBA assemblages in the context of Sussex Middle and Late Bronze Age assemblages as a whole, and specifically East Sussex Bronze Age assemblages.

The Varley Halls assemblage is one of seven MBA/LBA assemblages from Sussex that have associated radiometric dates. The implications of these dates are considered in the final section of the pottery discussion. All quoted radiocarbon dates have been calibrated according to data published by Pearson and Stuiver 1986 and method A as published by Stuiver and Reimer 1993. Dates are quoted at one sigma.

Methodology

The pottery was analyzed using the pottery recording system recommended by the Prehistoric Ceramics Research Group (1992). All sherds were assigned a fabric type, after macroscopic examination and the use of a binocular microscope (X20 power), and then counted and weighed to the nearest whole gramme. Each diagnostic sherd was assigned a form/decorative/technological type (Prehistoric Ceramics Research Group 1992, 16–18).

Stratigraphic implications

Table 1 summarizes the Varley Halls pottery assemblage according to the stratigraphic context of the pottery and its fabric categories. The specific stratigraphic contexts of the pottery are discussed below, with particular attention to the information provided for on-site chronological sequences, the interrelationships between features and the possible function(s) of features.

Hut 1

Hut 1 produced 0.74 kg of pottery comprising exclusively Bronze Age sherds (123 sherds). These sherds come from post-hole contexts (context 112: fill of context 111; context 154: fill of context 153; context 196: fill of context 195; context 253: fill of context 254) and colluvium (contexts 105 & 110) overlying these features. The pottery from hut 1 suggests a coherent and related MBA assemblage characterized by cordoned, and finger-impressed, bucket urns (e.g. Fig. 14:1, 5, 6, 7, 9, 10 & 11). The greater part of the colluvium resting on the terrace, together with the infill of the features on the hut terrace, relates to a spread of contemporary material derived from general (probably upslope) activity in the area, which accumulated on the terrace after disuse. This is particularly demonstrated by contexts 105 and 110 which share sherds from the same vessels (e.g. Fig. 14:1, 14 & Fig. 14:9, 10 & 11). Additionally, sherds from one Ellison Type 10 urn decorated with a line of finger-tip impressions below the rim (Fig. 14:10) belong to the same or a similar vessel to that represent by sherds found in hut 4 (context 328: Fig. 14:16), suggesting downslope movement of material subsequent to hut abandonment. Sherds

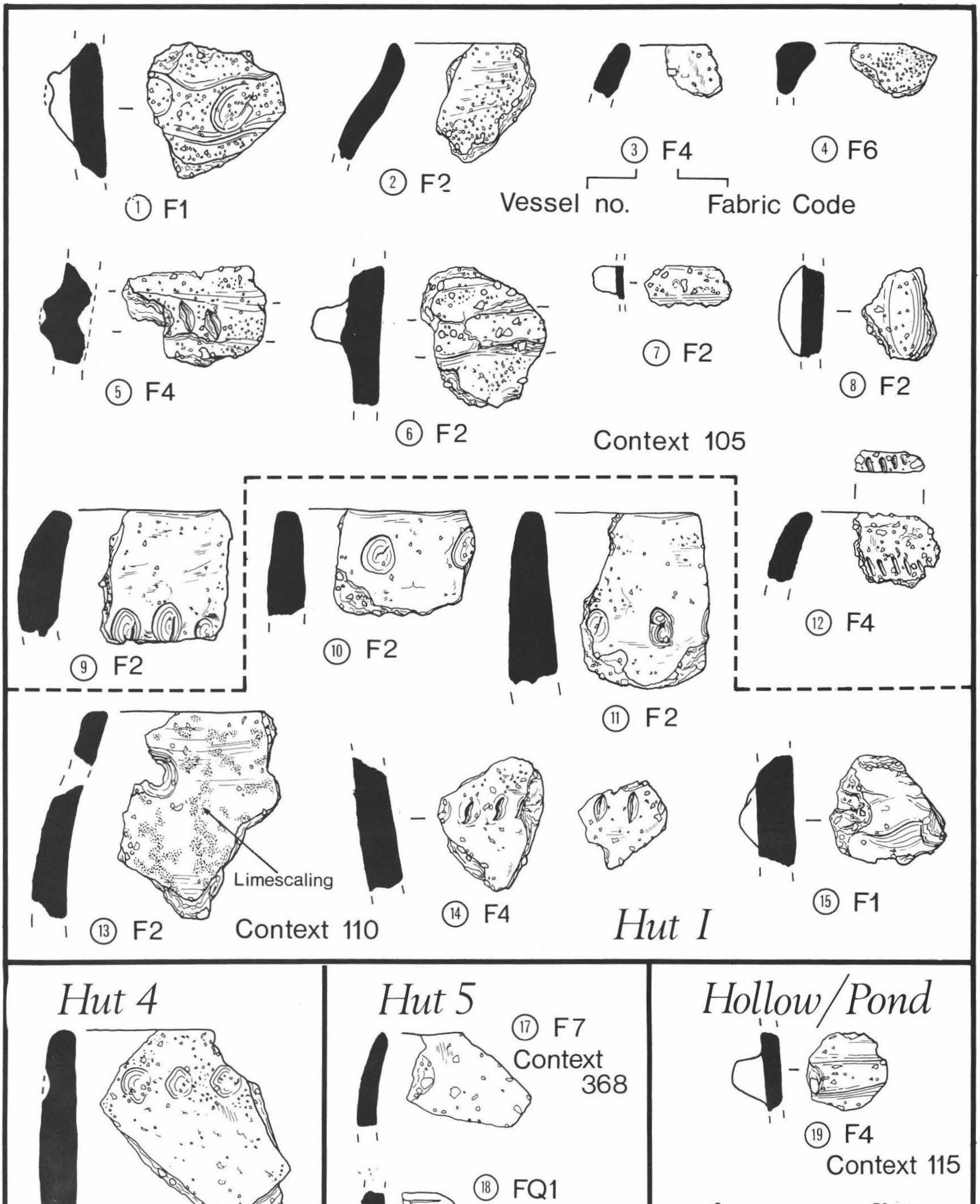

Fig. 14. Varley Halls. Pottery.

from both hut 1 and hut 2 (which are at the same slope level) have limescaling (e.g. Fig. 14:13 & Fig. 15:21) suggesting that cooking activities may have taken place in both huts. In addition to MBA sherds, the uppermost layer of colluvium (context 105) has a few sherds from LBA forms, notably convex-sided jars (Fig. 14:3 & 4) and a stick- or bone-impressed rim sherd (Fig. 14:12) from a bipartite? bowl. These LBA sherds suggest the presence of subsequent upslope Late Bronze Age activity.

Hut 2
Some 1.5 kg of Bronze Age pottery was recovered from hut 2. This comprises 127 sherds, weighing an average of 12.2 g per sherd. The colluvium (context 211) has four sherds of Romano-British date and later (Table 1). Additionally context 211 has sherds from a MBA bucket urn with an applied cordon decorated with line of fingertip impressions (Fig. 15:20) together with LBA forms, namely a convex jar (Fig. 15:23) and a shouldered bowl (Fig. 15:22). The pottery recovered from hut 2 terrace contexts below this colluvium comprised a MBA assemblage with diagnostic sherds from two bag-shaped urns (Ellison Type 1, Fig. 15:25 & 26). A total of 21 sherds have limescale accretions (particularly from contexts 256 & 271) suggesting cooking activities.

Hut 3
All of the pottery recovered from hut 3 is of Bronze Age date. A total of 18 sherds was recovered, and these together weighed 0.3 kg. Although the number of sherds present is quite small and concurs with hut 3 being the smallest of the hut structures, it is interesting that the average weight per sherd is high (16.7 g compared to 6.0 g for hut 1). This high weight per sherd suggests an *in situ* assemblage used for domestic/storage purposes. The diagnostic sherds include rounded base sherds, two flat-topped rim sherds from bucket shaped urn(s) (Ellison Type 9) and four conjoining rim sherds from an ovoid urn (Fig.15:27, Ellison Type 5 or 11). The hut 3 assemblage has an associated radiocarbon date (from context 218) of cal BC 1505–1380 or 1340–1320 (BM-2936), which is in agreement with the MBA dating of the assemblage (see dating for further discussion).

Hut 4
Only 12 sherds (0.12 kg) were recovered from this structure. All of these sherds were Bronze Age. With the exception of one Fabric F4 sherd (which was from the colluvium), the fabrics were those (Fabrics F1 & F2) exclusively associated with MBA forms. Only one diagnostic sherd was recovered (context 238), the rim of a bucket urn with a line of fingertip impressions below the rim (Fig. 14:16). This form is also present in hut 1 (*see* above).

Hut 5
Hut 5 produced 153 sherds of pottery weighing 0.96 kg and averaging a weight of 6.24 g per sherd. All of the diagnostic form sherds were LBA and occurred in fabrics (Fabrics IO1, IO2 & Q1) which, in Sussex, are exclusively associated with LBA/EIA forms. Part of a hemispherical bowl (Fig. 14:17) was recovered from context 368 (colluvium). The fill (context 380) of one post-pipe produced an incised decorated sherd (Fig. 14:18).

Unfinished terrace
This feature produced a total of 26 MBA and LBA sherds (0.1 kg) and one Romano-British sherd. The predominance of LBA sherds (e.g. LBA Fabric IO1) suggests the possibility of a LBA date for the construction of the platform.

Hollow/pond
Some 46 sherds (weighing 0.2 kg), all Bronze Age, were recovered from this depression. The sherds were eroded, weighing an average of 4.2 g per sherd. No exclusively LBA fabrics were present and the one form sherd present was a plain, narrow raised cordon of MBA type (Fig. 14:19) from context 115 (uppermost fill).

Lynchet
Nine Bronze Age sherds and one post-medieval sherd were recovered from the fill (context 357) of this shallow depression. Both MBA and LBA fabrics were present and the average weight per sherd in these fabrics was relatively low (7.7 g), suggesting that the feature was a catchment for downslope erosion. Only one diagnostic sherd was present, a LBA fingernail impressed decorated sherd (Fabric F3).

Hole 159
The fill (context 160) of this feature produced exclusively BA sherds (275 sherds weighing 1.63 kg). Some 96% of these sherds were in fabrics (Fabrics IO1 & Q1) which have exclusive LBA/EIA associations. All of the diagnosic sherds, both in these fabrics and in the flint-gritted fabrics (Fabrics F6 & F7), were of LBA forms. The cut closely corresponds with the size and shape of the most complete vessel in the fill assemblage (the carinated bowl described below). On this basis, the pottery is interpreted as a deliberately buried group which, as such, is an important LBA 'closed context' of associated forms. These forms comprise a splayed base (Fig. 16:34, Fabric F6), a near complete carinated bowl with a cable-decorated rim (Fig. 16:28, Fabric Q1), a slightly domed base (Fig. 16:33, Fabric IO1), the fingernail impressed rim of a bipartite bowl (Fig. 16:29, Fabric F7), and the out-turned rim of an angular bowl (Fig. 16:30, Fabric IO1) together with a decorated sherd with a triangular impressed decoration (Fig. 16:31, Fabric IO1) possibly from the same angular bowl.

Hole 398
The fill of this small hole (context 399) produced a total of three body sherds, all Bronze Age.

Animal burial pit
Fill 219 contained a single sherd of F4 fabric which is of LBA date on the basis of its association with LBA forms (Table 3).

Topsoil
Very little pottery was recovered from the topsoil with the exception of context 21 which comprised a concentration of 21 Romano-British sherds, all from an East Sussex Ware short-necked jar with a foot-ring base (Fig. 16:35).

Pottery fabrics
The fabrics types within each series were established and defined on the basis of macroscopic inspection in conjunction with microscopic analysis at X20 magnification. All inclusion/temper sizes are classified using the Wentworth sedimentary scale and descriptive terms (Krumbein & Pettijohn 1938, 30; Prehistoric Ceramics Research Group 1992, 35). Density charts (Prehistoric Ceramics Research Group 1992, appendix 3) were used to standardize assessment of the quantity of inclusion/

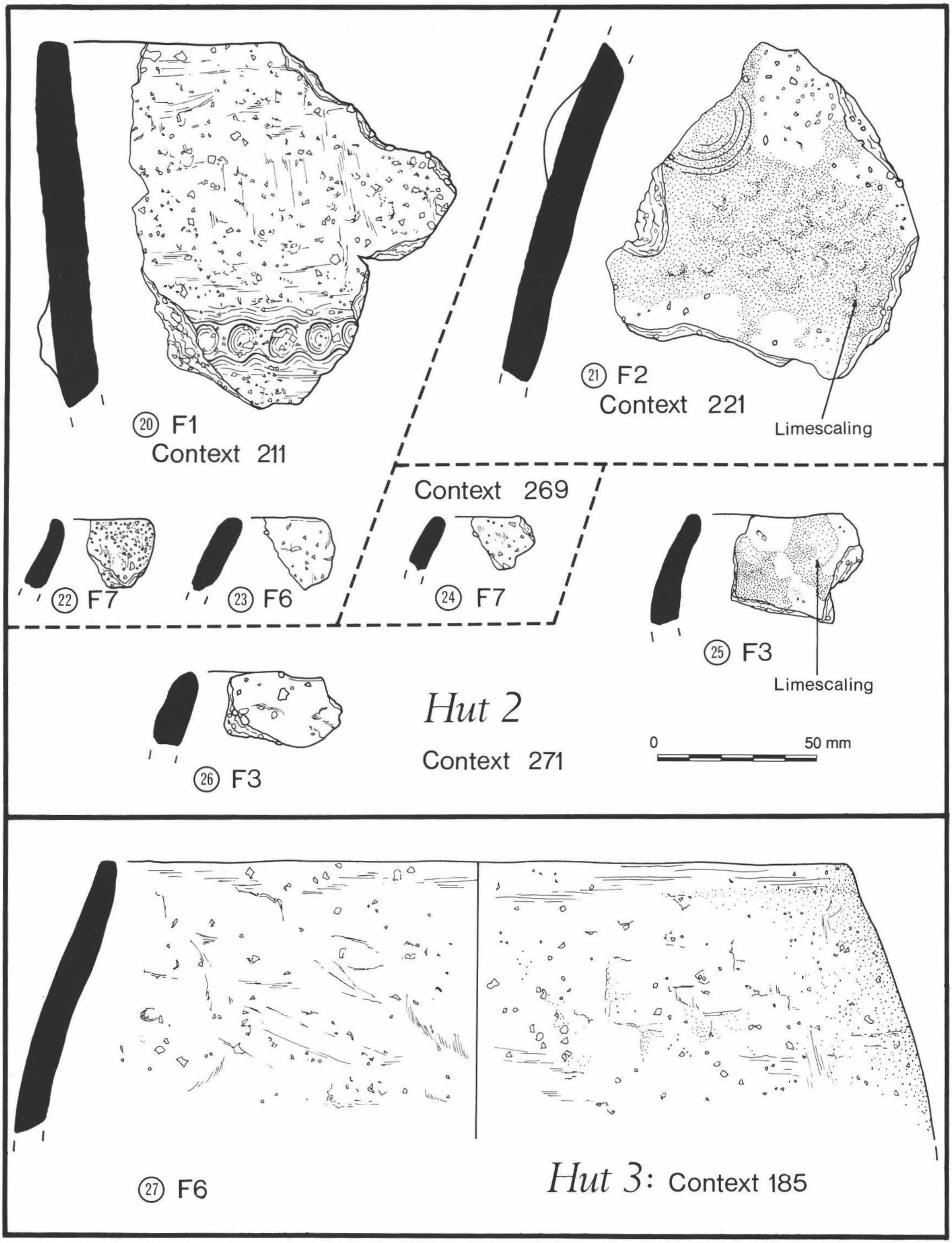

Fig. 15. Varley Halls. Pottery.

Table 1. Varley Halls pottery assemblage. Sherd counts according to context and fabric categories.

Fabrics **Contexts**	**1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**IO1**	**O2**	**Q1**	**RB**	**M**	**PM**	**g/wgt**
Us				2					1			4			48
21 (us)												26			353
Hut 1:															
100				2											5
105	13	27		4		1									290
110	13	6		53											417
112		1													8
154		1													10
196		1													4
253		1													6
Hut 2:															
211	7			9		3	1					1	2	1	311
221	18	3				8	1								341
248				5											12
256	1	2		20		3	3								192
271	23	5	13												701
273				1											3
321							1								2
Hut 3:															
114		1		3											21
185						4									108
191		1		1		2									113
218		2													11
259		2													29
261		4													27
Hut 4:															
237		8													59
238				1											20
285	1	1													32
352		1													6
Hut 5:															
368						2	4		28	56	39				785
374										3	1				33
377										3	1				21
378									1						6
380									1	1	1				27
383										4					12
387									1		4				64
402											3				9
Unfinished terrace:															
367		2		4		12	1		7			1			112
Lynchet 435:															
357			1	1	2				5					1	75
Hollow/pond:															
115	9			10		10		1							145
194		1													4
291		13													31
Animal burial pit:															
219				1											3
Other:															
160						9	2	0	133		131				1632
399				3											6
Total	**85**	**83**	**14**	**120**	**2**	**54**	**13**	**1**	**177**	**67**	**180**	**32**	**2**	**2**	**6094**

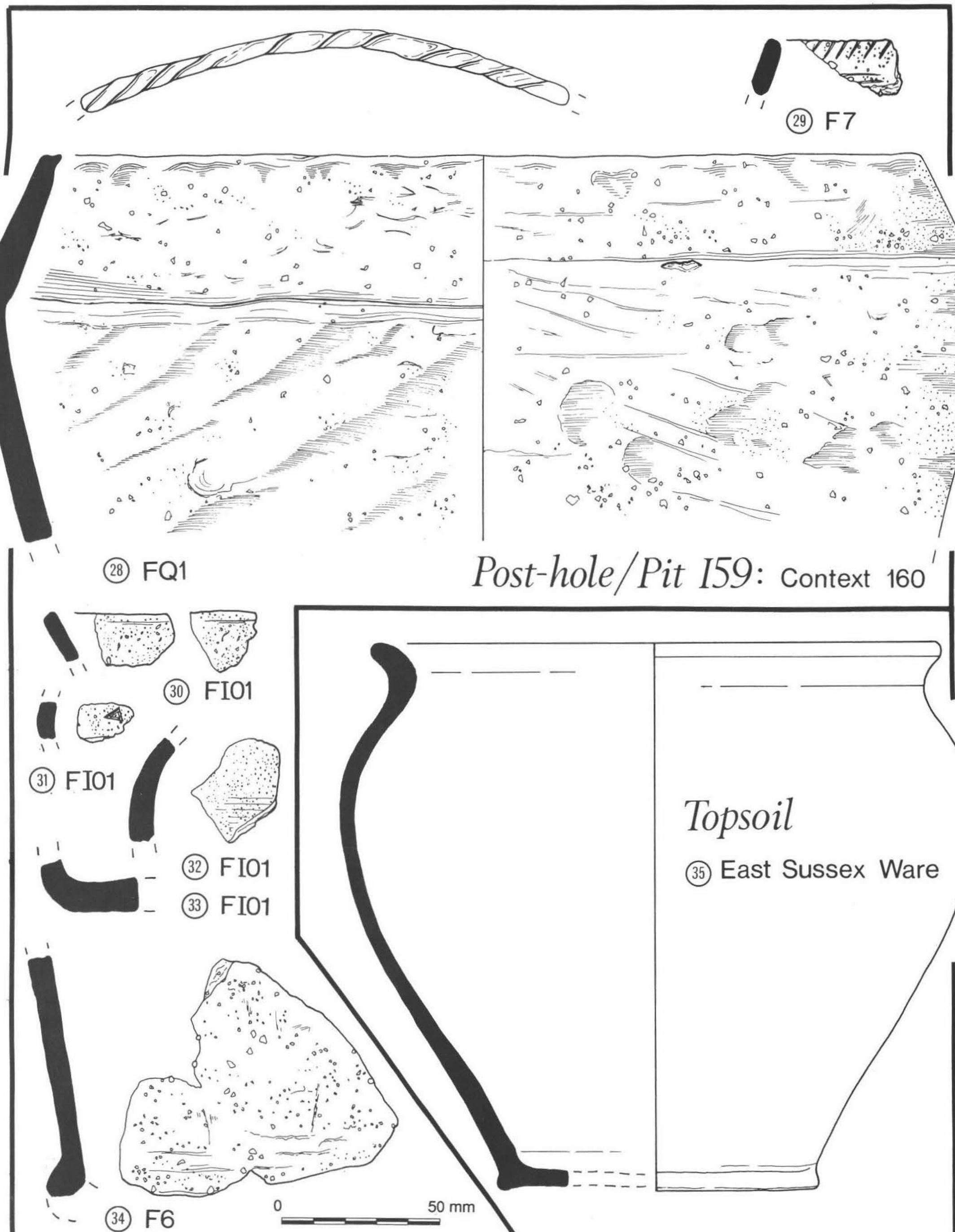

Fig. 16. Varley Halls. Pottery.

temper present in fabric matrices.

The Varley Halls fabric types are grouped by general period. Some of the fabric types are already well defined, with known chronological parameters (e.g. the LBA/EIA fabrics of IO1 and IO2 and the Romano-British fabrics). Other fabric types were chronologically placed in the series on the basis of the range of diagnostic form types associated with specific fabrics.

MBA/LBA fabrics

Flint-tempered fabrics

F1 Very coarse flint-tempered fabric

A moderate to common amount (15–20% density) of flint temper comprising sparse (5–7% density) pebble (5–6 mm) and granule-sized (2 mm) pieces together with some very coarse (1 mm) sand-sized pieces; matrix colour/firing — exterior and interior surfaces variably buff/light orange to medium grey, unoxidized dark grey core; sherd thickness — *c.* 13–17 mm.

F2 Coarse flint-tempered fabric

Moderate (10% density) to common (20% density) flint temper comprising occasional pebbles (*c.* 6 mm), mostly granule-sized (*c.* 2–4 mm) pieces, and some very coarse (0.5–1 mm) sand-sized pieces of flint; rare quantities (2% density) of fine (0.25 mm) rounded quartz sand; matrix colour/firing — reddish brown oxidized exterior surface and mid-grey unoxidized interior surfaces and core; sherd thickness — *c.* 10–12 mm.

F3 Scattered coarse flint-tempered

Sparse (3% density) pebbles (4–6 mm), granule-sized and very coarse sand-sized (1.5–4 mm) pieces of flint; matrix colour/firing — patchy colouring with surfaces and core variably buff, orange and unoxidized dark brown. The surfaces have signs of smoothing; sherd thickness — 8–10 mm.

F4 Medium-coarse flint-tempered fabric

Moderate (7–10% density) flint temper of rare (2% density) small pebbles (4–6 mm), together with granule-sized (2–3 mm) and very coarse sand-sized (*c.* 1.5 mm) pieces; matrix colour/firing — exterior and interior surfaces variably brown, red, orange or dark grey/brown, core either unoxidized dark grey/brown or oxidized orange; sherd thickness — *c.* 9–11 mm.

F5 Medium-coarse flint-tempered with quartz sand fabric

Sparse to moderately abundant flint (7–10% density) mostly granule-sized (*c.* 3 mm) flint mixed with some very coarse sand-size (*c.* 1 mm) flint. The clay matrix also contains sparse (3% density) transparent to translucent coarse sand-sized (0.5 mm) quartz inclusions of low angularity; matrix colour/firing — surfaces and core generally buff or dark brown; sherd thickness — *c.* 7–8 mm.

F6 Medium flint-tempered fabric

Moderate (10% density) flint temper comprising occasional pebbles (*c.* 4–6 mm) together with more numerous granule-sized (*c.* 2 mm), and very coarse and coarse sand-sized (*c.* 1–0.5 mm), pieces of flint; matrix colour/firing — variable buff-orange oxidized to dark brown unoxidized exterior and interior surfaces and core; sherd thickness — *c.* 8–10 mm. Vessels in this fabric often have smoothed interior and exterior surfaces.

F7 Medium-fine flint-tempered with quartz sand fabric

Sparse to moderate (7–15% density) flint inclusions comprising granule-sized (*c.* 4 mm), very coarse sand-sized (1–2 mm), coarse sand-sized (0.5–1 mm), and medium sand-sized (0.25–0.5 mm) flint, together with sparse (5–7%) subrounded transparent quartz of predominantly medium sand (0.25–<0.5 mm) size grade; matrix colour/firing — exterior surface is oxidized buff-orange with some dark brown smudging, dark brown unoxidized interior surface and core; sherd thickness — *c.* 6–7 mm.

F8 Fine flint-tempered with some fine quartz sand fabric

Sparse to moderate (7–10% density) flint temper comprising very coarse sand-sized (1.5–2 mm) and coarse sand-sized (0.5–1 mm) flint, together with sparse (3% density) fine (0.25 mm) rounded quartz sand; matrix colouring/firing — buff/light orange oxidized interior and exterior surfaces and a dark brown unoxidized core; sherd thickness — 7–8 mm.

Iron-oxide fabrics

IO1 Iron oxide fabric with flint temper

The fabric is dominated by the presence of very common (30% density) pisolithic iron oxides of medium sand-sized (*c.* 0.4 mm) together with moderate (10% density) medium (*c.* 0.3 mm) transparent and translucent subrounded quartz sand. Additionally rare (1–2% density) very coarse sand-sized (1.5–2 mm) size pieces of flint are also sometimes present; matrix colouring/firing — leather-brown partially oxidized, sometimes burnished, exterior surface with dark brown unoxidized interior surface and core; sherd thickness — *c.* 7 mm.

IO2 Iron oxide fabric with flint and shell inclusions

The fabric has a very common (30% density) presence of pisolithic iron oxides of medium sand-sized (*c.* 0.4 mm) together with moderate (15% density) medium (*c.* 0.3 mm) translucent and transparent quartz sand. It additionally has rare to sparse (2–3% density) granule and pebble (2–4 mm) fragments of shell and rare (1% density) very coarse sand-sized (1.5–2 mm) pieces of flint; matrix colouring/firing — leather-brown partially oxidized, sometimes burnished, exterior surface with dark brown unoxidized interior surface and core; sherd thickness — 7–9 mm.

Sandy fabrics

Q1 Medium quartz sand fabric with flint temper

Moderate (10% density) coarse (*c.* 0.5 mm) translucent subrounded quartz sand together with rare (2% density) flint; matrix colour/firing — patchy buff to reddish brown (with dark brown areas) exterior and interior surfaces, and dark brown unoxidized core; sherd thickness — *c.* 8–9 mm.

Romano-British fabrics

The Romano-British fabrics were not studied in detail. A total of 32 Romano-British sherds were recovered and were ascribed to three general fabric groupings.

ESW East Sussex Ware (also known as Cooking Jar Fabric)

This grog-tempered fabric has been defined by Green (1977; 1980) and is particularly characterized by its 'soapy' feel.

Q2 Medium-grained, sandy wares

These wares comprise a moderate (10–15% density) to common (20–30% density) medium size (0.5 mm or less) sub-rounded to rounded quartz sand grains; matrix colour/firing — three wares are identified on the basis of surface fired colour: (i) unoxidized grey surfaces, (ii) oxidized orange surfaces, (iii) oxidized buff surfaces.

S Samian

Medieval fabrics
Two medieval sherds were recovered. These were both ascribed to the same general fabric category and were not studied in detail.

Q3 Medium quartz sand fabric
Moderately abundant (10–15% density) coarse and medium size grade quartz sand (0.2–1 mm), the quartz grains being polished and sub-rounded; matrix colour/firing — surfaces are oxidized orange and cores are dark grey/dark brown; sherd thickness — *c.* 7.5 mm.

Post-medieval fabrics
Two post-medieval sherds were recovered, both of the same fabric category.

RHE Red hard-fired earthernware

Clay and temper sources
There are no clay sources on-site. There are, however, extensive surface deposits of Clay-with-Flints within 1 km both west and east of the site on Hollingbury Hill and Falmer Hill respectively. Flint, the major clay tempering used for both MBA and LBA fabrics, could have similarly been obtained locally, or on-site, either from the Clay-with-Flints or the Chalk.

The quartz sand tempering in LBA Fabric DQ1 points to use of sandy clays, or quartz sand temper, derived from the Upper Greensand *c.* 4.5 km south of Varley Halls.

The LBA iron oxide fabrics (Fabrics IO1 & IO2) are characteristic of East Sussex LBA and EIA wares and suggest the use of alluvial clays weathered out of the Wealden ferruginous strata (Hamilton 1980, 58). The richest iron-bearing alluvial clays are approximately 20 km inland and derive from a High Wealden source such as Wadhurst Clay.

The Varley Halls pottery fabrics suggests reliance on locally available resources for ceramic production during the Middle Bronze Age. The LBA pottery assemblage indicates an increased diversity of resource exploitation, and the use of resources, or pottery, from more distant (4.5–20 km) locations north of the Chalk.

Forms, decoration and technology
Quantification of form, decoration and technology elements
The elements of form, decoration and technology present in the Varley Halls MBA and LBA assemblages are listed in Table 2. These elements are tabulated in Table 3 together with their association with identified pottery types (*see* below) and fabric types (*see* above). In tabulating forming and finishing technology, and decoration, some sherds received more than one count owing to the multiple presence of diagnostic elements.

MBA forms, decoration and technology
The assemblage comprises bag-shaped, bucket-shaped, ovoid, and slack biconical, urns. The discussion below uses the typology of Sussex MBA pottery devised by Ellison (Ellison 1978; 1980; 1982). The Varley Halls MBA pottery is best matched by the MBA assemblages from Downsview (Hamilton forthcoming b), Itford Hill (Burstow & Holleyman 1957; Holden 1972), and Plumpton Plain A (Holleyman & Curwen 1935). The fine ware, incised decorated globular jars present in some Sussex MBA assemblage (Type 7, Ellison 1980) are, however, conspicuous by their absence.

Ellison Type 1: this plain bag-shaped form is a type local to Sussex (Ellison 1975, 34). It has a major presence in the Varley Halls assemblage (Table 3) where it occurs with slightly rolled rims (R4; Fig. 15:25 & 26), or sometimes with a slight bevel on the inside of the rim (R5; Fig. 14:2).

Ellison Types 2 and 3: ovoid jars with unperforated lugs are also common components of Sussex MBA assemblages. Type 3 is distinguished by its flaring rim. Both types are more frequent east of the river Adur (Ellison 1978, 34). The presence of such vessels at Varley Halls is indicated by body sherds with plain unperforated applied lugs (D5) at, or above, the point of maximum vessel diameter (Fig. 14:8; Fig. 15:21).

Ellison Type 5: the profile of some of the Varley Halls flat-topped rims (R1; Fig. 15:27) indicates that they belong to squat ovoid urns, which is another type local to Sussex (Ellison 1978, 34).

Ellison Type 6: this type relates to plain urns with slack biconical profiles. At Varley Halls several sherds with plain, relatively narrow, raised horizontal cordons (D6; Fig. 15:7 & 19) are ascribed, on the basis of their profile, to the shoulder point of this type.

Ellison Types 9 and 10: these simple bucket-shaped urns occur at Varley Halls with fingertip or fingernail impressed decoration (D1, D2) direct on the vessel body (Ellison Type 9: Fig.14:9, 10, 11, 14 & 16), or with applied raised cordons decorated with fingertip or fingernail impressions (Type 10: Fig. 16:5 & 15). These types are common components of southern British MBA assemblages. In Sussex these bucket-shaped forms (particularly Ellison Type 10) have been isolated as occuring most frequently west of the river Adur (Ellison 1978, 34). The Varley Halls MBA assemblage, together with the Downsview MBA assemblage, now extend the regular occurrence of these types eastwards. The Varley Halls examples have flat-topped rims (R1).

Rivet holes: a rim sherd from Type E1 jar has a single 'rivet hole' (Fig. 14:13) which has been bored, at some time post-firing, from the exterior face of the vessel wall. These holes are interpreted as being repair holes bored either side of cracks in the fabric of the pottery to allow them to be secured with leather thonging. Similar repair holes occur in the Itford Hill cemetery MBA assemblage (Ellison 1972, 111) and Mile Oak (MBA and LBA assemblages (Hamilton forthcoming a). The need to repair vessels (rather than acquire replacements) could suggest off-site local production, or on-site seasonal production, or that pots were valued items due to the need for substantial time expenditure on resource procurement and production.

Limescale: several sherds from huts 1 and 2 have grey/white accretions of limescale on their outer surfaces (Fig. 16:13; Fig. 15:21 & 25). The accretions occur on the exterior walls of sherds from approximately 1 cm below the rim downwards. Some base under-sides also have limescaling. This suggests the heating of liquids by placing the pot containing the liquid inside a larger water-filled pot, which is then placed on a flame for heating. In chalky areas in particular this process leaves a residue on the exterior surfaces of the inner pot. Accretions also occur on some of the LBA sherds, suggesting continuing tradition of this method of heating.

Pre-cordon keying: one sherd from hut 1, context 105 (Fig. 14:6) has a 'roughened' surface suggesting the technique of pre-cordon keying by scoring the vessel wall prior to application of the cordon. This technological trait has been noted on LBA assemblages from East Kent (Macpherson-Grant 1991, 41).

Dating: comparison with the local Downsview assemblage, and the range of radiocarbon dates recovered from Varley Halls, particularly the date associated with MBA pottery from hut 3, favour a date within the 14th to 12th centuries BC for the MBA assemblage (*see* below, Regional Context and Dating, pp. 41–2, for more detailed discussion).

The LBA pottery

Forms

A number of characteristic LBA types are present in the Varley Halls assemblage. Their occurrence can be separated from the MBA pottery on stratigraphic grounds. The diagnostic LBA pottery occurs in the colluvium over huts 1 and 2, lynchet 435 and the unfinished terrace and is interpreted as being a result of downslope erosion of an upslope (location unknown) LBA activity area. hut 5, and post-hole 160 have securely stratified LBA pottery.

The Varley Halls LBA forms comprise convex-sided jars, a hemispherical bowl, bipartite bowls, and concave-shouldered bowls. The jar forms are predominantly associated with flint-gritted fabrics, and the shouldered bowls with finer-grained quartz sand (Fabric Q1), and iron oxide (Fabrics IO1, IO2), fabrics.

Table 2. Varley Halls MBA/LBA assemblage: form, decoration and technology elements.

Forms	**Varley Halls Code Description**
Urns and convex/ovoid jars	
rim sherds	R1 Flat-topped
	R2 Rounded
	R3 Incurved rounded
	R4 Slightly rolled
	R5 Internally bevelled
Bowls: rim sherds	
Hemispherical bowl	R6 Rounded
Bipartite bowl	R7 Flattened
Concave-shouldered bowl	R8 Up-turned, rounded
	R9 Up-turned, flattened
Shoulder sherds	A1 Carination
Base sherds	B1 Flat
	B2 Splayed
	B3 Domed
	B4 Flint-gritted underside
Decorated sherds	D1 Fingertip impressed (cable effect)
	D2 Fingernail impressed
	D3 Stick/bone impressed
	D4 Incised
	D5 Plain unperforated applied lug
	D6 Applied raised cordon
Other	O1 Rivet-hole
	O2 Cordon scar
	O3 Limescaling
Technology/surface finish	T1 Finger furrowed sherd
	F1 Smoothed sherd
	F2 Burnished sherd

Key: R = rim, A = angled body sherd, B = base type, D = decorated sherd, F = surface finish, T = forming technology

Convex-sided jars: convex jars comprise the earliest components of post-Deverel-Rimbury assemblages. These emerge within the late 2nd millennium BC and are associated with radiocarbon dates which fall within the range of cal BC 1400–900 at sites such as Aldermaston Wharf, Berkshire (Bradley *et al.* 1980), Cadbury Castle, Somerset (phase 4: Alcock 1980, 664), and Rams Hill, Berkshire (double palisade phase: Barrett 1975, fig. 3). The Varley Halls LBA assemblage has several convex jars. These occur in two rim forms; rounded (Fig. 14:3; Fig. 15:23 & 24), and flattened 14:4). The flattened rims are conspicuously incurved. Convex jars with incurving rims occur in the East Sussex LBA assemblages from Bishopstone (Hamilton 1977, figs 40:1,2 & 44:61), Heathy Brow (Hamilton 1982, fig. 33:10 & 13) and Plumpton Plain B (Hawkes 1935, fig. 10:m & 12:e,g). The Plumpton Plain assemblage may date as early as 11th century BC (Barrett 1980, 311). At Bishopstone plain convex jars and hemispherical jars are associated with a thermoluminescence date of 1250–650 BC (Hamilton 1977, figs 40:1,2 & 41:8,11; Bell 1977, 290). Additionally, the West Sussex Yapton LBA assemblage, which includes convex jars and hemispherical bowls, has an associated date of cal BC 824-777 (HAR-7038).

Hemispherical bowl: hemispherical bowls are a particular feature of Sussex LBA assemblages. The Varley Halls assemblage produced a single rim from a hemispherical bowl (Fig. 14:17). Hemispherical bowls are present in Sussex assemblages from the end of the 2nd millennium BC, as is indicated by examples with rounded rims from Plumpton Plain B (Hawkes 1935, fig. 9:a,b) and a hemispherical bowl with a incurved, flat-topped rim from pre-hillfort enclosure assemblage at Thundersbarrow Hill (Hamilton 1993). Both the Bishopstone and Yapton LBA assemblages include hemisperical bowls (*see* above for dating) and they are also present in the Mile Oak (Hamilton forthcoming a), and Kingston Buci (Curwen 1931), LBA assemblages.

Bipartite bowls: parts of at least two bipartite bowls were present in the Varley Halls pottery assemblage. Both have rims with flattened tops. One bowl is decorated with an line of oblique stick/bone impressions along the rim top, and another similar line just below the rim, on the vessel exterior (Fig. 14:12). The rim top of the second bipartite bowl is decorated with a line of oblique fingernail impressions (Fig. 16:29). These decorated bowls are characteristic of West Sussex and currently have no other counterparts as far east as Varley Halls. Similarly decorated bipartite bowls occur in assemblages from Harting Beacon (Hamilton 1979, fig. 6:7–9), the Trundle (Curwen 1929, pl. XI), Chanctonbury Ring (Hamilton 1980, fig. 13:28, 29 & 33–5), Stoke Clump (Cunliffe 1966, fig. 1) and Highdown Hill (Wilson 1940, fig. 5). This type of decoration is exclusively associated with fine ware bipartite bowls and contrasts with the use of fingertip impressed plastic decoration on coarse

Table 3. Varley Halls MBA and LBA pottery: correlation between decorative and technological elements and fabric types.

Fabrics		**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**IO1**	**IO2**	**Q1**
MBA Types	**Elements**										
Ellison Type 1	R4			3							
	R5		2								
	R2		1	1							
	O1		1								
	O3			1							
Ellison Type 2/3	D5		2								
	O3		1								
Ellison Type 5	R1						4				
Ellison Type 6	D6		2		2						
Ellison Type 8/9	R1		1	1							
Ellison Type 9	R1+D1		7								
	D2			1	3						
Ellison Type 10	R1	1									
	D6+D1	4									
	D6+D2				3						
	O2		1								
LBA Types											
Convex jars	R2				2		1	1			
	R1			1			1	1			
Bowls	R6							1			
	R7				1			1			
	R8							1	4		
	R9									12	
	A1								1	2	7
Decoration											
	D1									12	
	D2							1			
	D3				1						
	D4										1
Bases	B1	10	1	1					1	2	
	B2						2				
	B3									10	
	B4					1					
Finishes	F1		1	9 25	12						
	F2	12	1	0	2	17	96	4			
	O3	4		3				1			

wares. The frequency of decoration in the Harting Beacon and Chanctonbury assemblages suggests that they are later in the West Sussex sequence than essentially undecorated 9th/8th-century BC LBA assemblages such as Yapton. With the possible exception of one sherd (*see* below), the absence of more elaborate incised chevron, triangle, and herring-bone designs which are are associated with bipartite bowls from the Caburn (Hawkes 1939, fig. E) and Hollingbury (attributed to the 6th or 5th century BC, Hamilton 1984; 1993) suggests a 7th-century BC date for the Varley Hall type decorated bipartite bowls.

In southern England as a whole plain bipartite bowls are present in assemblages from the beginning of the 1st millennium BC, for example, those from Minnis Bay Kent (Champion 1980, 33; Worsfold 1943, fig. 6: found in the same general area as a Carp's Tongue hoard) and Petters Sports Field Egham, Surrey (O'Connell 1986, figs 49:90–101; O'Connell & Needham 1977, 129, fig. 5:7,8). A 7th-/6th-century BC dating is ascribed to the Petters Sports Field assemblage based on the interpretation of the associated radiocarbon dates and nature of the hoard deposition (O'Connell 1986, 57, 60; O'Connell & Needham 1977, 75).

Decorated body sherds: the vessel form(s) that two of the Varley Halls decorated sherds belong to cannot be precisely ascertained, but it is likely that they belong to bipartite shouldered bowls. One small sherd from (context 380: Fabric Q1) has an lightly incised decoration comprising two parallel and one oblique line (Fig. 14:18). Another sherd (context 160: Fabric IO1) is decorated with a small triangular-shaped impression produced by impressing a pointed piece of bone or wood of sub-triangular cross-section. The latter is particularly interesting in an East Sussex assemblage. It is a decorative trait of Dorset/Hampshire LBA assemblages. In Sussex it is restricted to the West Sussex assemblage of Stoke Clump (Cunliffe 1966) and a few sherds from Harting Beacon (Hamilton 1993, fig. A4.14:15).

Concave-shouldered bowls: three possible examples of these bowls are present in the Varley Halls assemblage. They have a slightly concave carination above the neck leading to a short, up-turned rim. One example (Fig. 16:30 & 32) comprises rim and shoulder sherds from a plain, thin-walled bowl in an iron oxide fabric (Fabric IO1). Another occurs in a thinner-walled flint-gritted fabric (Fabric F7) and is evidenced by a single rim sherd (Fig. 15:22). The third comprises a near complete quartz gritted (Fabric Q1) bowl with its rim decorated with a finger-impressed rough 'cable' pattern (Fig. 16:28).

Sussex examples of plain-shouldered bowls with either slightly convex, or slightly concave, shoulders and short out-turned rims occur at Highdown Hill (Wilson 1940, fig. 4:h), Kingston Buci (Curwen 1931, fig. 6), and Yapton (Hamilton 1987, fig. 5:15). An example of a bowl, similar to the Varley Halls example with finger-tip impressed 'pie crusted' rim occurs at Knapp Farm (Hamilton this volume, pp. 78–85). Similar forms, with slightly longer rims, occur in the pre-hillfort enclosure at Thundersbarrow Hill (Rudling unpublished excavations; Hamilton 1993, fig. A4:7:132), and Rustington site B (Hamilton 1990, fig. 6:3). The latter example also has a finger-impressed rim. These Sussex examples all occur in assemblages which have convex jars and hemispherical bowls.

From Sussex there is no direct dating evidence for shouldered bowls with 'pie crusted' or 'cabled' rims. Comparison with the Surrey sequence of shouldered bowls (e.g. the shouldered bowls with 'pie crusted' rims from Queen Mary's Hospital Carshalton, Surrey) suggests a *c.* 8th-century BC date (Adkins & Needham 1985).

Domed base: a slightly domed base (Fig. 16:33) from context 160 probably belongs with the rim and shoulder from an angular bowl (Fig. 16:30 & 32) in the same fabric (Fabric IO1) from the same context. This base type may be related to the omphalos bases sometimes found on LBA fine ware cups, such as the two omphalos bases from the Thundersbarrow Hill LBA assemblage (Rudling, unpublished excavations; Hamilton 1993). Omphalos bases are current by the 9th century BC, based on their interpretation as a skeuomorphic representation of the base form of LBA cast bronze cups (Barrett 1980, 310).

Splayed bases: this form of base (Fig. 18:34) may be the bi-product of a construction method in which the base is formed from a slab of clay which is subsequently joined to the body of the vessel with the pinching of the clay at the join, resulting in a splayed form. This form of base is a characteristic LBA type (Hamilton 1987).

Heavily-gritted under-bases: several base sherds (Table 3) have a concentration of flint grits on their under-bases. This is a recurrent feature of LBA pottery (Longley 1980, 65). Potting on a bed of crushed flint may have been employed as a device to prevent vessels sticking during construction.

Finger-furrowed sherds: several of the Varley Hall sherds have diagonal or vertical finger-furrowing on their outer surfaces (e.g. Fig. 16:33). This trait occurs as the result of dragging the fingers across the plastic surface of a vessel's walls during the construction process. Finger-furrowing is prevalent in LBA assemblages (Adkins & Needham 1985, 29; Jones & Bond 1980, 477; Macpherson-Grant 1991, 39). It is a constructional technique used both for bonding coil or slab joins, and for extending the height of vessel walls. Finger-furrowing is well-documented for other Sussex LBA assemblages (Hamilton 1987, 58) and is also sometimes found on Sussex MBA pottery (e.g. Downsview: Hamilton forthcoming b; Itford Hill: Burstow & Holleyman 1957, fig. 20:e,f; Plumpton Plain A: Hawkes 1935, 39, fig. 2:9).

Dating: by comparison with pottery from other regions, and extrapolating from the limited stratigraphic and absolute dating available from within Sussex, the Varley Halls LBA pottery falls towards the end of an essentially plain ware post-Deverel-Rimbury pottery tradition which was emerging as early as the 11th century BC and lasted in its limited use of decoration until the 8th/7th century BC (*see* below, Regional Context and Dating, for more detailed discussion).

Regional context and dating

The Varley Halls pottery evidences both MBA and LBA on-site activity. In this respect the Varley Halls assemblage compares with the Downsview assemblage located *c.* 1.5 km north-west of Varley Halls. Sussex has several 'mixed' MBA and LBA assemblages where precise stratigraphic information is lacking (e.g. Kingston Buci; Highdown Hill). The nature of settlement continuity/relocation between the two ceramic phases is in need of definition. Both of the Varley Halls and Downsview assemblages have suffered downslope erosion, with the LBA pottery being found in the colluvial over the MBA hut terraces, suggesting LBA activity further upslope. At both sites there is also evidence of *in situ* LBA activity (pit 160, the unfinished terrace and hut 5 at Varley Halls) immediately downslope of the MBA structures. This suggests that MBA domestic sites did in fact provide a focus/nucleus for subsequent LBA settlement.

The Varley Halls assemblage importantly contributes to the limited number of East Sussex MBA Deverel-Rimbury assemblages which have associated radiocarbon dates. From East Sussex there are a total of four MBA assemblages with associated radiocarbon dates: Black Patch, Itford Hill settlement, Downsview, and Varley Halls. The date associated with the Varley Halls hut 3 MBA assemblage provides a date range of 1505–1380 or 1340–1320 BC (BM-2936). Another date, unassociated with pottery, from context 117 (ditch fill) takes this date to the very end of the MBA (1400–1265 BC, BM-2917) and may be subsequent to sustained MBA activity on the site. The radiocarbon dates associated with the nearby Downsview MBA assemblage (UB-3783-3786, OxA-4809, OxA-4811, GU-5429, GU-5430, GU-5432 and GU-5433) indicate a date range of the 15th to the 11th centuries cal BC, with the greater number of these dates falling within the 15th to 12th centuries cal BC. Both the Varley Halls dates, and the Downsview dates, are generally earlier than from Itford Hill (GrN-6167) which has a 1253–1245, 1211–1113 and 1095–1077 cal BC date range. The Varley Halls and Downsview dates, however, overlap with the seven dates associated with the Black Patch MBA assemblage which collectively provide a date range covering the 14th–11th centuries cal BC (HAR-2939/2940/2941/3735/3736/3737 and BM-1643). These Downsview/Black Patch/Varley Halls MBA dates are in line with the dates for Wessex early MBA assemblages (e.g. Barrett 1976; Barrett *et al.* 1991). The present evidence therefore suggests that Sussex MBA pottery traditions emerged in parallel with Wessex traditions and that the Itford Hill date may come from the latest phase of the settlement. The other two radiocarbon dates from Varley Halls (from features unassociated with pottery; BM-2918, BM-2919) collectively argue for a continuity of occupation, or repeated site use, into the LBA with a cut-off point towards the end of the 9th century BC. Varley Halls is one of a total of three sites from East Sussex which has radiometric dates associated with LBA pottery assemblages. The Varley Halls dates mirror the dates from Downsview hut terrace 4065 (OxA-4810) with a date range of cal BC 931–824, and fit within the thermoluminescent date range of 1270–650 BC (Bell 1977, 290; Hamilton 1977) associated with Bishopstone LBA assemblage. The Varley Halls LBA date is, however, not directly associated with the LBA pottery from the site and, on stylistic grounds, the Varley Halls LBA pottery may indicate site use into/during the 8th/7th century BC.

The increased range of vessel form and size in the LBA assemblages from Lowland Britain, compared to that of MBA assemblages, is widely recognized (Barrett 1980). The Varley Halls and other East Sussex LBA assemblages additionally provide striking evidence of a new interest in fine-grained fabrics (incorporating in the East Sussex examples quartz sand and pisolithic iron oxides). These new fabrics and vessel forms evidence not only a major change in production strategies, but also prospecting for special clays and tempers from non-local geologies north of the Chalk. The latter has implications for the movement of products and raw materials within LBA communities. In particular, it suggests a widening of exchange networks, or resource territories, perhaps within the context of craft specialization.

Romano-British and later pottery

A minor amount or Roman and post-Roman pottery was recovered. All of this pottery came from colluvial or unstratified contexts. It is summarized below according to fabric categories identified.

Romano-British pottery

ESW East Sussex Ware (also known as Cooking Jar Fabric)
Body sherds: 2 sherds (unstratified), 1 sherd (hut 4, context 211).

Jar with out-turned rim: 26 sherds from jar with out-turned rim (Fig. 16:35, context 21: unstratified pot cluster); 1 out-turned flattened rim sherd (hut platform 8, context 367).

Q2 Medium-grained, sandy wares
Out-turned flattened: 1 rim sherd (unstratified).

S Samian
Foot-ring base: 1 sherd (unstratified).

Medieval pottery
Q3 Medium quartz sand fabric
Body sherds: 2 sherds (hut 4, context 211).

Post-medieval fabrics
RHE Red hard-fired earthenware
Base sherds: 1 sherd (hut 4, context 211), 1 sherd (hut 7, context 357).

Illustrated sherds (Fig. 14)

Hut 1

1. Form: applied raised cordon decorated with fingertip impressions from bucket-shaped urn (Ellison Type 10), probably part of the same urn as Figure 16:15; Fabric: F1; Context: 105.

2. Form: internally bevelled rim from a bag-shaped jar (Ellison Type 1); Fabric: F2; Context: 105.

3. Form: rounded rim from convex-sided jar; Fabric: F4; Context: 105.

4. Form: in-turned, flattened rim from convex jar; Fabric: F6; Context: 105.

5. Form: applied raised cordon decorated with fingernail impressions from bucket-shaped urn (Ellison Type 10); Fabric: F4; Context: 105.

6. Form: body sherd with a cordon 'scar' suggesting pre-cordon keying; Fabric: F2; Context: 105.

7. Form: plain, narrow applied cordon, probably from a biconical-shaped urn (Ellison Type 6?); Fabric: F2; Context: 105.

8. Form: body sherd with an elongated oval, unperforated, lug from an ovoid urn (Ellison Type 2 or 3); Fabric: F2; Context: 105.

9. Form: incurving, slightly flattened rim from Ellison Type 9 bucket-shaped urn with a line of fingertip impressions below the rim; Fabric: F2; Context: 105.

10. Form: upper part of bucket-shaped urn with slightly flattened rim and a line of fingertip impressions below the rim (Ellison Type 9). Part of the same urn, or more possibly a similar urn to that from hut 4, context 238 (Fig. 14:15); Fabric: F2; Context: 110.

11. Form: upper part of bucket-shaped urn with slightly flattened rim and a line of fingertip impressions below the rim (Ellison Type 9). Part of the same urn or a similar urn, to Figure 16:10 and that from hut 4 context 238 (Fig. 14:16); Fabric: F2; Context: 110.

12. Form: rounded rim from a bipartite? bowl decorated with a line of oblique stick/bone impressions along the rim top and with a similar line of decoration on the outside wall just below the rim; Fabric: F4; Context: 105.

13. Form: upper part of bag-shaped urn (Ellison Type 1) with rivet hole beneath the rim and limescale accretions; Fabric: F2; Context: 110.

14. Form: body sherds decorated with fingernail impressions, from a bucket-shaped urn (Ellison Type 9); Fabric: F4 with smoothed surfaces; Context: 110.

15. Form: applied raised cordon decorated with a line of fingertip impressions from a bucket-shaped urn (Ellison Type 10), part of same vessel Figure 16:1, context 105; Fabric: F1; Context: 110.

Hut 4

16. Form: upper part of an bucket-shaped urn (Ellison Type 9) rounded rim and a line of fingertip impressions below the rim. Similar to a vessel from hut 1 (context 105: Fig. 14:11); Fabric: F2; Context: 238.

Hut 5

17. Form: rounded rim of a hemispherical bowl; Fabric: F7; Context: 368.

18. Form: body sherd with incised decoration comprising two parallel lines and one oblique line; Fabric: Q1; Context: 380.

Hollow/?pond

19. Form: plain, narrow raised cordon from slack, biconical urn (Ellison Type 6); Fabric: F4; Context: 115.

(Fig. 15)
Hut 2
20. Form: the upper part of a bucket-shaped urn with flat-topped rim and applied, raised cordon decorated with a line of fingertip impressions (Ellison Type 10). Similar, or part of the same, urn as one from hut 1 (46:1); Fabric: F1; Context: 211.

21. Form: body sherd with circular keying for a lug, and limescale accretions below the keying (from and ovoid urn?: Ellison Type 2 or 3); Fabric: F2; Context: 221.

22. Form: slightly out-turned rim of shouldered bowl; Fabric: F7; Context: 211.

23. Form: rounded rim from a bag-shaped, or convex, jar; Fabric: F6; Context: 211.

24. Form: rounded rim of bag-shaped, or convex, jar; Fabric: F7; Context: 269.

25. Form: slightly rolled rim (Ellison Type 1) and part of the upper body of a bag-shaped urn, with limescale accretion just below the rim; Fabric: F3; Context: 271.

26. Form: slightly rolled rim from bag-shaped urn (Ellison Type 1); Fabric: F3; Context: 271.

Hut 3
27. Form: flat-topped rim from squat ovoid urn (Ellison Type 5 or Ellison Type 11); Fabric: F6; Context: 185.

(Fig. 16)
Post-hole/Pit 159
28. Form: near-complete shouldered bowl with a finger-impressed rim decorated with a cable pattern. There is evidence of finger-pressing above the carination, and of diagonal smearing below the carination; Fabric: Q1; Context: 160.

29. Form: fingernail impressed rim from a bipartite bowl; Fabric: F7; Context: 160.

30. Form: out-turned rim from an angular bowl; Fabric: IO1; Context: 160.

31. Form: sherd decorated with a triangular-shaped impression; Fabric: IO1; Context: 160.

32. Form: shoulder of angular bowl, probably part of Figure 16:30; Fabric: IO1; Context: 160.

33. Form: slightly domed base; Fabric: IO1; Context: 160.

34. Form: splayed base; Fabric: F6; Context: 160.

Context 21: pottery scatter in topsoil
35. Form: short-necked jar with out-turned rim and base with slight foot-ring; Fabric: East Sussex Ware.

WORKED FLINT

By Chris Place

During the course of extensive excavations a small collection of worked flint (404 pieces) was recovered from 39 contexts. Artefacts from the machine excavated topsoil are not included within this total or with the following discussion. The quantity totals for each class of artefact are provided in Table 4 (microfiche).

All of the tools and debitage utilized nodular flint as their raw material and there were no obvious visual indications that more than one source accounted for all of the pieces collected. It is quite probable that an on-site source was used. The flint was dark greyish brown with lighter patches and had a thick (up to 5 mm), light yellowish brown cortex. Although some pieces were not patinated, the majority were patinated to a light whitish grey with a slightly darker marbling. Occasionally, an almost pure white patina was attained as well as a medium bluish grey variant. Surface calcium carbonate (?) concretions were abundant.

The collection is restricted in size and yet dispersed between 39 contexts. It is not surprising, therefore, that only one context contains over 100 pieces (context 211) of worked flint; of these, only 89 of the flakes are considered unbroken. In addition, most of those contexts which contain moderate amounts of worked flint, (i.e. over 20 pieces) are open and their contents could not be considered as secure groups; this is also true for context 211. Consequently the collection is not suitable for statistical analysis.

Waste flakes (i.e. non-retouched) account for 97.3% of all worked flint from the collection as a whole; a figure exactly mirrored by context 211. Such a high percentage of apparent waste is not unusual and has been recorded from several other Sussex chalkland located sites, e.g. Black Patch (Drewett 1982a, 371–7), Offham Hill (Drewett 1977, 214) and Bishopstone (Bell 1977, 31). Saville (1980, 19) has suggested that a figure over 90% is to be considered the norm for Neolithic and Bronze Age sites. Such a high figure seems hard to explain when core tools are not being produced. Almost any one of the waste flakes could have been retouched for utilization as a point, scraper or retouched flake. High percentages of waste flakes are recorded from a multitude of site types and it is stretching the argument a bit thin to always imply sampling bias. Either we are misjudging the suitability of waste debitage for subsequent modification as tools, or more of the waste flakes have been utilized without subsequent modification.

Of the 89 unbroken flakes from context 211, primary flakes account for 7.8% of the total, secondary flakes 77.5% and tertiary flakes 14.6% (*see* Table 4 for definitions). Assuming that the waste flakes are an unbiased sample the high percentage of secondary flakes, probably at the expense of tertiary examples, can be explained in one of two ways. Firstly, if core size is small and heavy robust flakes are required, there is little opportunity to produce the tertiary examples. Secondly, if single platform cores with flakes removed part of the way around (Clarke *et al.* 1960, 216) are the norm (both recorded examples are in this category), this profligacy will have the same effect. It could also be argued that only initial core preparation is recorded and is thus favouring primary and secondary flakes. Alternatively, context 211 contains a mixed collection of debitage which is not a true representation of knapping practice.

Only one of the flakes from context 211 could metrically, rather than aesthetically, be described as a blade. This need not imply intent on the part of the knapper as such debitage can be produced accidentally. Of the 89 flakes, 6 show evidence for being struck with a soft hammer, 5 have evidence for moderate platform preparation, in this case limited removal of overhangs on the core platform prior to striking, and 12

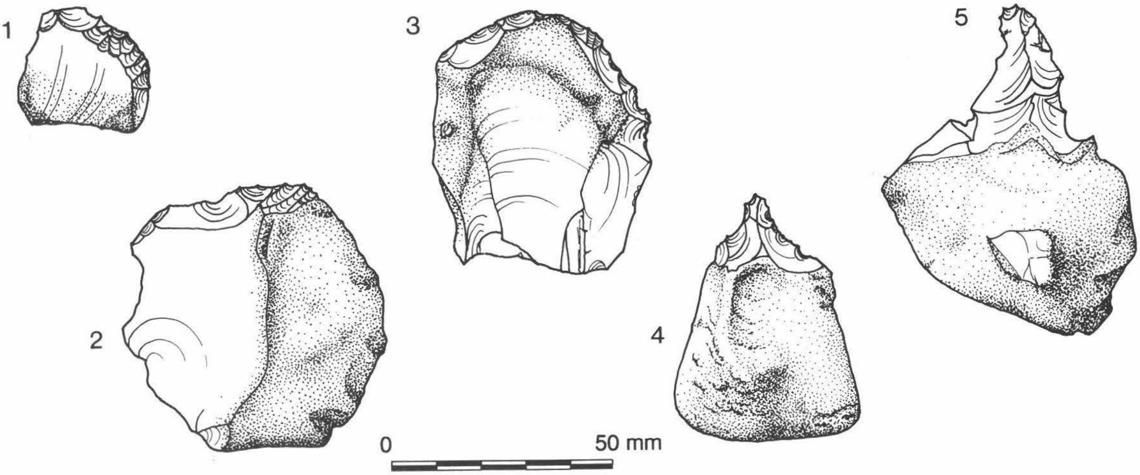

Fig. 17. Varley Halls. Worked flint.

flakes exhibit hinge fractures. Thus the overall impression is of a low technology core reduction strategy.

The recognizable tools are equally unprepossessing and include retouched flakes, scrapers and a point. The term point is used instead of awl or borer and thus follows Saville (1981, 9). (None of the implements are chronologically diagnostic.) The tools are illustrated in Figure 17.

The characteristics of the collection suggest a Bronze Age date and there is, therefore, every reason to assume that the worked flint is contemporary with the Bronze Age occupation of the site. The core reduction technology is similar to other contemporary sites (Holgate 1988, 276–80; Place 1985 unpubl.) and the tools, whilst infrequent and not diagnostic in themselves, are not out of place in a Bronze Age context (Saville 1980, 21).

THE FAIENCE ORNAMENT FRAGMENT: ITS TECHNOLOGY & PROVENANCE

By S. G. E. Bowman & C. P. Stapleton
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The find

Within the infill of one of the hut scoops (context 110, hut 1) was a fragment of a quoit-shaped faience ornament. The fragment represented approximately one quarter of the circumference of the original, with an estimated outer diameter of 15 mm, estimated inner diameter of 7 mm and maximum thickness 15 mm (Fig. 18:1). It has a triangular section with one flat face inwards and a small facet on the outer apex. The outer glassy surface is a translucent pale green with an area of deep red on the inward-facing surface. The core material of each of the broken surfaces was opaque and off-white when submitted for scientific examination, with one seemingly cleaner and thus giving the impression of a relatively fresh break: examination showed, however, that neither was a recently exposed surface (*see* below).

The distribution of faience ornaments in the British Isles was published by Beck and Stone (1935), updated by Stone and Thomas (1956), and relatively few additions have been made to this corpus in subsequent decades. Published finds of quoit-shaped faience ornaments from Sussex are limited to two examples, one at Oxsettle (Oxteddle) Bottom (Beck & Stone 1935, S60) and another from Clayton Hill (Beck & Stone 1935, S60; S.59). These ornaments can also occur in amber and in shale (or shale-like materials) and with a variety of cross-sectional shapes. Both those in faience and their counterparts also occur either as simple rings or with a perforated projection and hence might be termed pendants rather than beads. Both the Oxsettle Bottom and the Clayton Hill examples have an integral suspension loop (*contra* Gerloff 1975, 205, who suggests that the suspension loop of the latter is fashioned from sheet gold). Given the fragmentary nature of the Varley Halls example, there is no way of knowing whether or not it originally had any loop.

In southern Britain, all of these quoit-shaped ornaments have previously occurred predominantly, if not solely, in funerary contexts, and, according to Gerloff (1975, 205), are associated with female burials of the Aldbourne series (Wessex II). The Varley Halls example is therefore unusual in coming from an established habitation site.

Scientific examination

As used in prehistoric archaeology, the term 'faience' denotes a ceramic material with a glazed surface covering an interior (core) composed mainly of quartz. There have been several studies of the composition of prehistoric faience from north-west Europe, not least that of Stone and Thomas (1956) (*see* also, for example, McKerrell 1972; Aspinal *et al.* 1972; Magee 1993); however, there have been no studies of its method of manufacture to parallel those on Greek and Egyptian faience (Vandiver 1983; Tite & Bimson 1986; Tite *et al.* 1983; 1987: note that the examination by Henderson 1988, of three Swiss finds presents no interpretation of the microstructure). Largely this dearth of technology studies is a result of the rarity, small size and relative intactness of faience objects from north-west Europe, where faience occurs as small ornaments such as beads: the study of faience technology requires scanning electron microscopy of a polished cross-section through the glaze and the body. The Varley Halls fragment therefore presented a relatively rare opportunity for appropriate sampling.

Using a diamond-impregnated wheel, a thin slice was cut from the seemingly cleaner end of the fragment. The freshly exposed surface of the slice was prepared for examination in the scanning electron microscope (SEM) which has analytical facilities (energy dispersive x-ray analysis) (*see*, for example, Tite 1992, for an account of the use of the SEM in the study of ceramic materials). A detailed account of the technological examination and compositional data will be published elsewhere; only the main points are summarized here.

The surface layer

Figure 18:3 clearly shows the surface layer in relation to the core material. At higher magnification, it can be seen that the extant surface layer, while containing a high proportion of a glassy phase, also contains quartz grains (Fig. 18:4). It is possible that an original glaze surface (glass only) has weathered away; if present at all, it may indeed have been very thin.

Chemically, the surface is coloured green by copper present as cupric oxide in the order of 10% by weight in the glassy phase. Lead is present at an unusually high level (PbO *c.* 5–7%), the ratio of PbO:CuO in the glassy phase varying between about 0.5 and 0.7. Both McKerrell (1972) and Magee (1993) found examples with high lead levels, but none as high as this. For Wessex faience, McKerrell indicates lead to copper ratios up to about 0.1 (only relative data are plotted and the provenances, other than 'Wessex', and the ornament types are not given). For the Irish material, Magee cites six examples of faience ornament with lead oxide levels in the range 1–2%; the corresponding copper oxide values are in the order of 10%. One of these examples is quoit-shaped, but two others of this type have lead levels below the detection limit.

The core

The cut surface of the fragment is particularly interesting. Visually, it is a deep red, in contrast with the opaque off-white of the core at the fractured and weathered surfaces. In the SEM (Fig. 18:3 & 4), this core can be seen to be composed of quartz grains and a glassy phase which contains dissolved copper and lead, as well as the glass forming components (silicon and alkalis). The copper oxide content is in the range 6–7% by weight, and, present in the form of cuprite or as copper droplets, is responsible for the red colour. The lead oxide level is little, if any, lower than in the glassy phase of the surface, hence the PbO:CuO ratio is roughly 1:1.

With the much greater porosity of the core relative to the surface layer, penetration of ground water will have had a greater dissolution and leaching effect on the red copper-containing glass, leaving the exposed surfaces of core material white. Hence neither of the fracture surfaces on the 'as excavated' fragment were recent breaks.

There are few references to the cores of British faience artefacts being other than white or brown, both being assumed to represent the colour of the original quartz material used in the manufacture of the faience. However, Beck and Stone refer to two examples from Stanton Moor, Derbyshire, with 'dark reddish' cores: one is an eight-rayed star bead with a chip revealing the interior colour and the other a segmented bead (Beck and Stone 1935, S49; S4).

Turning to comparanda for lead levels, the analyses of Stone and Thomas (1956) did not distinguish between surface and core, nevertheless none of the British faience has a high lead level. Only McKerrell (1972) refers to the lead level specifically of core material, commenting briefly that where such material was accessible for non-destructive surface analysis by x-ray fluorescence the lead was present at trace levels only (less than 0.005%). All other analytical studies of British faience have examined the surface or near surface layers rather than the core.

Provenance

Analytical data for British faience have been used in the past to infer whether or not the material was likely to be imported or was of local manufacture. In particular, McKerrell (1972) considered that the relatively high lead levels in the surface layers of some faience was significant, commenting that the contemporary bronzes had considerably lower lead to copper ratios. Assuming that the bronzes were local and that the copper ores being exploited for their manufacture could not have been in association with lead, McKerrell (1972) inferred, in the apparent absence of any metallic lead in use in EBA Britain, that the high-lead faience must be imported. In fact, at several recently discovered Bronze Age copper mines, in Wales for example, the copper ore was in close association with lead minerals; however, the two sets of minerals were microscopically separable, and in practice the Bronze Age miners appear to have discarded the lead ore (Craddock 1995, 57–8). In addition there are now known to be EBA artefacts of lead, albeit rare (see Hunter & Davies 1994).

The high lead content of the Varley Halls faience is nevertheless significant: with a lead to copper ratio of about 1:1 in the glass of the core, it is clear that recycled bronze was not used in its manufacture. To provide such a lead level, metallic lead, a lead-bearing ore or possibly lead-bearing metallurgical debris must have been used. Furthermore, this exceptional lead level made it a highly suitable candidate for lead isotope analysis as the core provided a sample uncontaminated by any burial effects. The analyses, the first to our knowledge on faience of any provenance or period, were kindly undertaken by Dr Brenda Rohl, at the Isotrace Laboratory, Oxford University. In contrast with the lead beads from West Water Reservoir (Hunter & Davies 1994), no match for the Varley Halls faience was found with the isotope ratios of any of the numerous British lead ore samples analyzed and collated by Rohl (Rohl & Needham forthcoming), however, its isotopic composition was found to be similar to that of some Arreton Phase metalwork (Rohl 1995, 166). These data therefore do suggest that the Varley Halls ornament was imported and that its source may correspond with that for some of the Arreton metalwork.

Technology of manufacture

The microstructure of a cross-section through a faience artefact can, under favourable conditions, indicate its method of manufacture (*see*, for example, Vandiver 1983; Tite & Bimson 1986; Tite *et al.* 1983; 1987). Given its chemical composition and microstructure, the Varley Halls fragment does not readily fall into any of the manufacturing schemes previously outlined for Near Eastern faience. In this case, a glaze mixture or frit appears to have been mixed with quartz to act as a binding agent for the core and was also applied to the exterior surface to form a glaze.

Summary

The Varley Halls faience fragment is an important addition to the limited number of quoit-shaped ornaments in Britain, furthermore it is of interest as a non-funerary find. Like the great majority of other faience artefacts the surface colour is

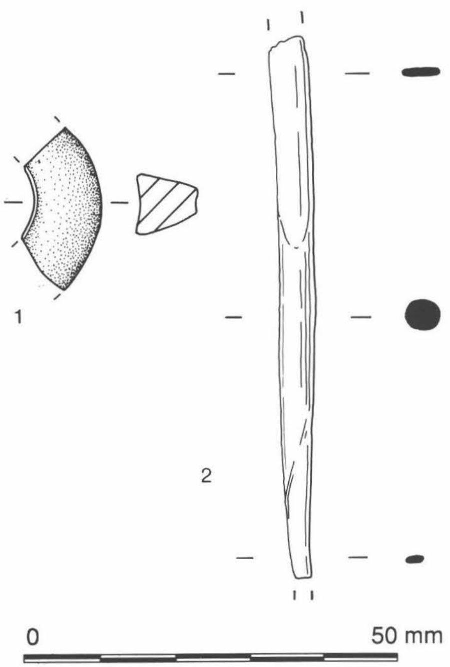
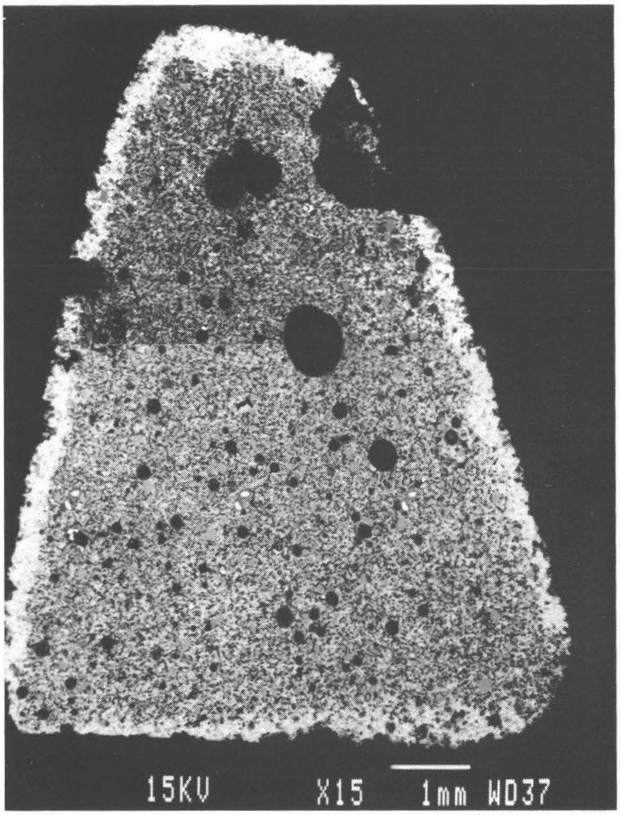


Fig. 18:1 & 2. Varley Halls. Faience and metalwork.

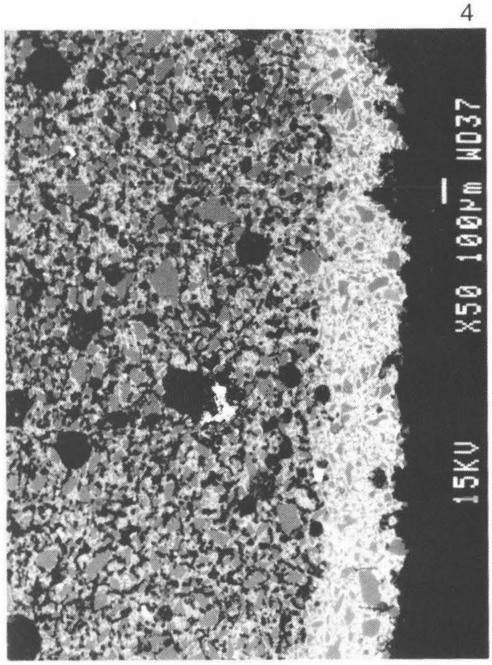
Fig. 18:3 (*below*). SEM photomicrograph of the cross-section Varley Halls faience fragment. The grey levels reflect atomic weight of the different phases: brighter areas are the areas containing heavier elements. Relative to the core, the surface layer appears particularly bright because it has a lower proportion of voids (black) and a higher proportion of glass (white) relative to quartz (mid-grey). The scale bar is 1 mm long. (Note: this figure is a composite of two micrographs hence there is a change of contrast just over half-way up the picture; the three pairs of bright spots about a third of the way up are a defect in the Polaroid film processing.)

Fig. 18:4 (*below*). SEM photomicrograph showing the surface layer and core in more detail than in Figure 20:3 (scale bar is 100 1 m, i.e. 0.1 mm). In the surface layer, angular quartz grains (mid-grey) can be seen in the glassy copper- and lead-containing phase (white): no separate glaze layer (i.e. glass only) is apparent. In the core, the quartz grains (mid-grey) are connected by glass (white) which again contains both copper and lead; voids appear black.

3



4



from dissolved copper (cupric oxide), however, this example is unusual in having high levels of copper and lead in the glassy phase of the core of the faience. The copper in the core (present as cuprite or as copper droplets) is visible in the dark red appearance of the freshly exposed surface. The amount of glass in the core shows that a glaze mix or a frit was added to the quartz as a binding agent as well as to the surface to form a glaze. The lead isotope composition of the ornament suggests that it is imported and that the source of the lead in it has affinities with the copper-ore source exploited for certain Arreton metalwork.

Acknowledgements
We are grateful to our colleagues Dr S. P. Needham and Dr I. C. Freestone for providing much valuable information, especially on EBA metalwork (SPN), and for reading and commenting on a draft of this paper. We also wish to thank Dr B. M. Rohl and the Isotrace Laboratory, Oxford, for undertaking the lead isotope analysis, as well as Ian Greig and South East Archaeological Services for providing the opportunity to study this unusual object.

METALWORK
By I. M. Greig

Tracer/awl

A copper alloy tracer/awl (Fig. 18:2) was recovered from context 105 (colluvial layer overlying the terrace of hut 1). This is a typical Bronze Age type, the presence of which in Middle Bronze Age assemblages is discussed by Needham (1991) and not considered in detail here.

HUMAN BONES
By Wendy Wood

Skeletal remains of adult *Homo* were identified from fill 338.

The burial took the form of a crouched inhumation orientated west–east in an oval grave 339, terraced into the slope. The skeleton had been badly damaged by recent ploughing activity.

Age

Dentition

The individual possessed a full set of permanent teeth, with the lower third molars fully erupted. The upper wisdom were in the process of eruption at the time of death. Teeth exhibited little wear.

Epiphyseal fusion

Bones appear to have reached full size; although articulations have been lost for most bones, the superior and inferior epiphyseal rings of the centre of the vertebra have yet to fuse.

Wisdom teeth generally erupt between 15 and 21 years, whilst the toothwear pattern suggests a younger adult. Vertebral epiphyses fuse largely by the 25th year; thus this individual is aged between 15 and 25 years, probably in the late teens.

Sex

Although bones could not be measured owing to their fragmentary nature, some morphological characteristics survive:

1. The posterior end of the zygomatic process extends past the external auditory meatus.
2. The humerus displays a septal aperture above the trochlea.
3. The mandible is rounded.

(1) is usually interpreted as a male characteristic. However, a septal aperture is more likely to occur in females (Hrdlicka 1932), and the relatively small size of bones and the mandible suggest that this is more likely to be a female individual.

Pathology

None.

THE ANIMAL BONE
By Wendy Wood

The animal bone assemblage from the site numbered 1817 fragments, of which a total of 802 fragments (44.14%) could be identified according to bone type and species. The three main food species, cow (*Bos Taurus*), sheep/goat (*Ovi ares/Capra hocus*) and pig (*Sus domesticus*) were represented. It is a safe assumption that the remaining fragments fall into these categories.

Cow dominated the assemblage, forming over 75% of identified fragments, with sheep/goat and pig attributing to *c.* 19% and *c.* 6% of the identified sample respectively.

Rodent bones were recovered only from contexts 110 and 381. Both of these contexts showed some disturbance from animal activity; these bones are therefore likely to be intrusive.

Stratigraphic context

Ditch

This feature provided four bone-producing contexts, fills 102 and 122 contained mature fragments of sheep/goat, whilst mature pig was found in fill 117. All contexts contained mature fragments of *Bos*, with 121 a silting layer, containing examples of the deciduous (juvenile) dentition of *Bos*. Skeletal material is likely to have been incorporated into these layers as rubbish deposits.

Hut 1

Context 100 represents the S.T.E.T over hut 1. This layer produced a single fragment of bone; a tibia of *Ovi/Capra*.

The topmost fill, 105, produced mature bones of *Bos* and *Ovi/Capra*, and a deciduous premolar of *Sus*. Bones from 110 represented all three species, including a juvenile metatarsal of *Ovi/Capra*. Also present in this context were two ribs of adult *Bos* exhibiting butchery marks in the form of knife cuts.

Post-hole fills 172, 189, 204, 206 and 217 produced a small amount of bone. A pig rib showing three to four knife cuts was present in fill 172, whilst 189, 204, 206 and 217 contained mature specimens of *Bos* and *Ovi/Capra*.

Hut 2

Fills 211 and 221 contained bones representing adult individuals of *Bos*; mature *Ovi/Capra* and *Sus* were also in this context.

Mature *Ovi/Capra* specimens were present in post-hole fills 271, 299 and 337, with 271 and 273 also containing mature specimens of *Bos*.

Hut 3

Layer 191 produced a mature tibia of *Bos*.

Hut 4

Mature *Bos* was represented from fills 237 and 238, 285 and 295. Juvenile sheep/goat was represented by the deciduous dentition from fills 237.

The only post-hole fill to produce bone, 342, contributed a mature ulna of *Bos*.

Hut 5
Fill 368 contained bones from an adult specimen of *Bos*.

Post-hole fill 377 produced an adult tibia of *Sus*. Juvenile *Ovi/Capra* was present in (post-hole) fills 380 and 387 in the form of unfused examples of the humerus and tibia respectively. A thoracic vertebra of *Bos* came from 381, and a fragment of *Ovi/Capra* skull from 385. 383 was a general number given to finds from this area, and produced juvenile pig and sheep.

Hollow/pond
Fills 115, 120, 290 and 291 produced bone. All contexts contained mature individuals for cow and sheep/goat, with pig also being represented for 290. A scapula of *Bos* from this context had knife marks to the blade. Fill 291 contained a mature femur of *Bos* showing signs of gnawing by dog (*Canis familiaris*).

Post-hole fills 164 and 215 contained adult bones of *Bos*.

Unfinished terrace
A single, fused, metatarsal of *Bos* was present in layer 367.

Animal burial
To the south-east of the hollow/pond, a pit (220) was found to contain the articulated skeleton of an adult cow. Although incomplete, all elements of the skeleton were represented.

Age
The majority of specimens were adults at the time of death, and toothwear stages indicated that these were more mature individuals. Juvenile individuals were represented for all species.

Pathology
Unfortunately, bone surfaces were badly eroded and suffered from both root and insect action, thus pathological changes to bone could not be detected.

Discussion
The majority of bones represented the skeletal extremities (i.e. feet and skull) and presumably suggest an on-site butchery process. However, exceptions were distributed evenly throughout the sample, thus it is not possible to assign specific activities to areas. Bones are likely to have become incorporated into archaeological contexts as general rubbish deposits.

Bos dominates the sample, largely as mature individuals. This suggests the *Bos* species were kept primarily on the site as a source of milk. Younger males would have been a more sensible meat resource. The species may also have been employed as a draught animal. The majority of juvenile specimens were of *Ovi/Capra*, and it may be that this animal was the primary meat resource on the site, although sheep no doubt should also have been exploited for wool. Pig presumably provided meat and fat.

CHARRED PLANT REMAINS (except wood charcoal)
By Pat Hinton

The samples were received after wet-sieving (mesh 1 mm) and the extraction of charcoal and were sorted with stereo microscope at 7–40X magnification. Two samples (from contexts 117 and 358) contained no charred seeds.

Preservation, particularly of the cereals, is poor. Many are incomplete with few retaining any original surface and identification therefore is based on overall morphology. Only from context 170 is the identification of some of the wheat as emmer (*Triticum dicoccum*) made more confidently, and this is supported by the small amount of distinguishing chaff.

The barley is in slightly better condition than the wheat and the angularity still visible identifies it as hulled barley (*Hordeum vulgare*). One grain from context 132 with a slightly askew axis indicates the presence of the 6-row form.

The one oat grain is incomplete, but in any case could not be identified as a wild or cultivated species without the diagnostic floret base. It is likely to have grown with another crop, probably wheat.

The other seeds could occur as arable weeds and are appropriate to soils in the vicinity of the site. They probably derive from the preparation of cereals for consumption and, with the cereal remains themselves, in most contexts are likely to have resulted from the general scattering through time of charred fragments from hearths. The samples from contexts 132 and 174 in hut 1, however, might perhaps be more closely related to the feature, and the larger number of cereal remains, with no weed seeds, from the post-hole in context 170 suggests an origin in an assemblage of cleaned grain.

These results are typical for the Bronze Age and similar to those from nearby Bronze Age sites in Sussex, such as Downsview (Rudling forthcoming) and Mile Oak (Russell, in Rudling forthcoming) except that beans were not found in the Varley Halls samples. The seeds from the Late Bronze Age hut 5 are too few to allow any comparison.

WOOD CHARCOAL
By V. Berzins

(*See* microfiche for figures)

A considerable quantity of wood charcoal was recovered from a layer in hut terrace 3 (context 218) which also contained substantial amounts of baked clay daub. The charcoal and daub were considered to represent the remains of a building destroyed by fire, and a thorough examination was made of the charcoal to investigate what woods were used in the structure of the building (or at least in that part of the building that was burnt) and also what sizes of material were used. This meant that in addition to the standard methods of taxa identification from wood charcoal, a method had to be used to derive from the fragments of charcoal an estimate of the original size of the wood.

Many of the pieces of daub contained wattle impressions. From the impressions in daub, the diameters of some of the rods of the wattle could be measured as being about 10–12 mm, but much of the material was clearly of larger diameter, perhaps 20–30 mm. Also there were a few impressions of roundwood of a diameter of several centimetres. Impressions of cleft (split) timbers were also present.

Methods
Charcoal collected by hand, as well as charcoal recovered by wet-sieving, was examined. To determine what wood taxa were represented in the charcoal material, fragments of 5 mm or longer were examined from both the hand-collected and wet-sieved samples. From the wet-sieved samples all the fragments above this minimum size were examined, but from the hand-collected material a sub-sample was used. In addition, from the hand-collected material were selected large fragments

which because of their size seemed suitable for taking the measurements necessary for estimating the size of the original wood. These fragments were also identified to wood taxon, but were not incorporated in the results tables showing the weights of the various taxa, because these fragments did not make up a representative sub-sample. The measurements were also taken on the fragments that made up the sub-sample from the hand-collected material and on the fragments from the wet-sieved samples, although most of these fragments were too small to provide much useful information.

Each fragment was, fractured with a razor blade, mounted in sand and viewed under an epi-illuminating microscope at magnifications up to approximately 200X to identify the taxon.

In order to estimate the size of the original wood, it was important to distinguish immature wood, where the boundaries of the annual growth-rings are visibly curved when viewed in transverse section and where the rays appear to converge, from mature wood, where there is no visible curvature of the growth-rings' boundaries and where the rays appear to run almost parallel. However, the smaller the fragments, the fewer will have noticeable curvature of growth-rings or convergence of rays. In order to eliminate this bias, the following procedure was followed: the lens of the microscope was scanned across the whole of the transverse surface of the charcoal fragment, but only that part of the transverse section visible at any one time was taken into account when assessing whether there was discernible curvature of the growth-ring or whether the rays appeared to converge. If curvature of the growth-ring or convergence of rays was visible, then the fragment was described as being 'twiggy'. Otherwise it was regarded as 'not twiggy', or if wood structure could not be seen across the whole of the field of view (because the transverse section of the charcoal fragment was too small or too poorly fractured), then no estimate of twigginess was made. This method was applied both at 45X and (if the fragment had a large enough transverse surface) at 25X magnifications. Since the field of view covers a larger area at 25X magnification than at 45X, curvature of the growth-ring boundary and convergence of rays is more easily seen: some growth-rings which appear straight at 45X magnification may be seen to be somewhat curved at 25X because a longer section of the boundary is visible in the field of view. Similarly, rays which appear to run parallel at 45X are often seen to converge when viewed at 25X. Thus, each charcoal fragment of sufficient size could be separately assigned as 'twiggy' or 'not twiggy' both at 25X and 45X magnifications, and some of the fragments which were not derived from wood close enough to the pith to appear 'twiggy' at 45X, may appear 'twiggy' at 25X. Charcoal from the outer parts of large branches or mature timbers will appear 'non-twiggy' at both 45X and 25X magnifications.

A very similar method had been used to characterize material from the sites of Downsview, Red Hill and Eastwick Barn as part of the Brighton By-Pass project (Rudling forthcoming), but at Varley Halls this approach was taken a step further: specially produced templates were used with which to compare the degree of curvature of the growth-ring boundaries and the degree to which the rays appeared to converge for those fragments which appeared 'twiggy'. One set of templates represented the field of view as it would appear at 45X for wood at various distances from the centre of the branch, and another set showed the field of view as it would appear at 25X. Each template showed a growth-ring boundary with the degree of curvature that should be expected at that distance from the pith, and, similarly, showed rays converging to the degree that should be expected. Thus, at 45X magnification, the growth-ring boundary appears to curve markedly and the rays converge very noticeably near the centre of the branch, and the curvature of the growth-ring boundaries and convergence of rays become gradually less noticeable towards the outside of the branch, until at about 10 mm from the centre (i.e. with a diameter of 20 mm) the growth-ring boundary appears more or less straight, and the rays appear to run parallel. The templates for 25X magnification can similarly be used up to a diameter of about 80 mm.

These measurements were taken in conjunction with taxon identifications, the aim being to give an idea of the size of material being used from each particular taxon.

It is the outer part of a branch, the most recent years' growth, that makes up the bulk of the volume of the wood. The growth from the first years of life is represented by a comparatively small volume of wood. Because of this, the charcoal derived from the branch should be dominated by material from the outer parts of the branch — the later years of growth. Thus, among charcoal fragments from a large branch or mature timber, fragments of 'non-twiggy' wood will dominate, with only a very small proportion of 'twiggy' wood representing the first years of growth.

There are several problems associated with this method of analysis. First, the method of using templates assumes that the annual growth-ring boundaries form concentric circles around the centre of the branch, with the rays radiating with perfect regularity from the centre — however, because of the irregular pattern of growth of wood, both of these assumptions are clearly only approximations. Secondly, shrinkage of wood on charring must distort the results, although the degree of shrinkage is known to vary considerably, and so cannot be readily accounted for. Thirdly, there is the distinct possibility that more charcoal is formed from the centres of branches of burning wood than from the outer parts (or possibly vice versa). This would tend to produce proportionately more 'twiggy' wood. Fourthly, the method of use of templates is to some degree subjective, in that the fragments of charcoal were compared to the templates simply by visual comparison, not by any measurement.

Because of all these sources of inaccuracy, this method produces only a gross estimate of the size of the original wood used, and interpretation is only possible if enough fragments are studied for a clear pattern to emerge.

Additional measurements were also taken: where part of the outside of the wood was present, the curvature of the outside was compared with the templates to derive an estimate of the maximum diameter of the wood. For branches where the whole or half of the transverse section of the branch was present, the actual diameter of the branch was measured. Where both the pith of the wood and part of the outside of the branch were present on the fragment of charcoal, the radius of the branch could be measured.

Results

The following is a list of the taxa identified in the charcoal, together with a list of the native British species that these taxa include:

Identified to genus level:

Oak (*Quercus*)	pedunculate oak (*Q. robur L.*)
	sessile oak (*Q. petraea (Matt.) Liebl.*)
Hazel (*Corylus*)	hazel (*C. avellana L.*)
Maple (*Acer*)	field maple (*A. campestre L.*).
Ash (*Fraxinus*)	ash (*F. excelsior L.*)
Prunus	blackthorn (*P. spinosa L.*)
	wild cherry (*P. avium L.*)
	bird cherry (*P. padus L.*)
Dogwood (*Cornus*)	dogwood (*C. sanguinea L.*)

Identified to sub-family level:

Pomoideae	common hawthorn (*Crataegus monogyna Jacauin.*)
	woodland hawthorn (*Crataegus oxycanthoides*)
	crab apple (*Pyrus malus L.*)
	pear (*Pyrus communis L.*)
	whitebeam (*Sorbus aria (L.) Crantz.*)
	rowan (*Sorbus aucuparia L.*)
	wild service (*Sorbus torminalis (L.) Crantz*)

The weights of charcoal of the different taxa recorded in the sub-samples were adjusted to give an estimate of the total weight of charcoal of each taxon recovered:

Hand-collected material (77 fragments in total)

Oak	31.92
Pomoideae	47.86
Hazel	12.89
Ash	0.80
Unidentified	12.26

Wet-sieved: sample 1 (16 fragments in total)

Oak	2.98
Pomoideae	0.28
Maple	0.06
Hazel	present

Wet-sieved: sample 2 (12 fragments in total)

Oak	0.30
Prunus	0.17
Maple	0.06
Dogwood	0.04

As can be seen, the identifiable material in the hand-collected sample consisted of a large amount of Pomoideae and oak charcoal (much of it in the form of large fragments, longer than 10 mm), with a smaller, but still considerable quantity of hazel and a comparatively insignificant amount of ash. The flotation samples produced much smaller amounts of charcoal, but between them produced three additional taxa: maple, dogwood and *Prunus*, all of this material being present as small fragments.

Several fragments of charcoal were found embedded in pieces of daub: these included four fragments of oak, two of hazel and one of Pomoideae.

Figure 19 shows that the oak was present almost exclusively as 'non-twiggy' material; on the other hand, the hazel was all 'twiggy' wood; the Pomoideae material contained a mixture of 'twiggy' and 'non-twiggy' wood.

Figures 20 and 21 show the results of the comparisons with templates. Little significance should be attached to the results from the oak, since they represent only the small proportion of fragments that were 'non-twiggy'. Almost all the hazel material produced estimates of distance from the pith corresponding to diameters of less than 30 mm, and there is a concentration of estimated diameters in the 10–15 mm range. The Pomoideae material had many fragments from small diameters, but there is also a considerable proportion of larger values. This may be taken to suggest that wood of various sizes contributed to the assemblage.

Discussion

The discrepancy between the type of material present in the hand-collected material and the flotation samples can be explained in terms of the different recovery strategies employed: namely, the hand-collected material was mostly recovered from discrete patches of charcoal-rich sediment, and large fragments, being more easily seen, would have been preferentially recovered. On the other hand, the wet-sieved material was derived from bulk samples that would have included both charcoal-rich areas and areas not particularly rich in charcoal within the same context; large pieces of charcoal are likely to have broken up in the course of wet-sieving; and the method of wet-sieving obviously allows much more of the small-sized material to be picked out than does hand-collection during excavation.

The large amounts of comparatively large oak, Pomoideae and hazel charcoal that were recovered from discrete patches associated with baked clay daub clearly represent the remains of structural materials of the hut. The fragments of charcoal of these taxa embedded in daub show that all of these woods were used in parts of the structure where they came into contact with the daub. On the other hand, the small fragments of *Prunus*, dogwood and maple from the flotation samples are likely to have been deposited in the context in some other way, and this process evidently produced only small amounts of charcoal compared to the destruction of the house, and produced only fragmented, small-sized material. It seems reasonable to suggest that this material represents some of the residue from firewood burnt in a hearth in the house during its period of occupation, especially since dogwood, maple and *Prunus* charcoal is particularly associated with hearths, firepits and midden deposits on other Bronze Age sites in the area: Downsview, Red Hill, Mile Oak. The small-sized oak, hazel and Pomoideae material recovered from the flotation samples could also represent this sort of firewood residue, or it may equally represent charcoal from the destruction of the building.

Oak

Judging by the results of the size estimation, almost all the oak fragments are derived from mature timbers. The few fragments that did have noticeable 'twiggy' features could represent the inner parts of such mature timbers. Although much of the oak was in the form of large fragments of up to 19 mm in a radial direction, they are usually much narrower in the tangential direction, thus forming flat, platy fragments. This is caused by breakage along the large multiseriate rays that are found in oak wood. Probably it is the presence of these multiseriate rays that makes oak very suitable for splitting or cleaving in a radial direction, and this was the traditional way of working oak timbers in historical times (Edlin 1949). Bearing this in mind, and also the fact that oak is the only wood taxon present that has a very large proportion of mature material, it is clear that the split timbers represented by impressions in the daub must have largely been of oak.

Hazel

The hazel material clearly represents immature wood: there are no fragments with an estimated diameter of more than 40 mm, and much of the material has an estimated diameter of 10–12 mm. Many of the charcoal fragments appear to have either whole or half cross-sections of branches, but most of the fragments did not clearly show the outside of the wood where it meets the bark. Either this had been abraded off, or the fragment actually represented the inner part of a larger branch, which had fractured tangential, parallel to the annual rings. Whatever the case, the material was certainly derived from hazel of small diameter that could have been used for wattling. This is clearly the material that produced some, if not all of the wattle impressions on the associated daub. Small hazel rods may have been used whole, whereas larger rods may have been split in half. Slightly stouter hazel branches could also have been used for the uprights ('sails') between which the horizontal rods would have been woven. (Or the supporting 'sails' could have been horizontal, with vertically oriented rods.)

With this type of fragmented material it was impossible to measure the age of the wood or to derive any conclusions as to whether a regular coppice rotation was employed.

Pomoideae

This taxon produced more charcoal than any other, but the role of woods from the sub-family Pomoideae in the structure is less clear than that of oak and hazel wood. Some anatomical features of the Pomoideae material suggests that at least a proportion of this material, if not all of it, represents hawthorn. The charcoal is on the whole derived from much more mature material than that from the hazel, but, unlike the oak, there is a considerable proportion of wood that does show 'twiggy' features, and this would seem to indicate that the Pomoideae material represents branches of several centimetres in diameter, but perhaps some younger or more mature material as well. Hawthorn stems tend to be too fluted and irregular to make good rods for wattling (Edlin 1949). This wood may instead have been used for the 'sails' where the wood does not have to be pliant, with hazel being used for the rods.

Other taxa

As explained above, the ash, maple, *Prunus* and dogwood charcoal is more likely to represent the residue from firewood than the remains of part of the structure. Ash and the species within the genus *Prunus* burn well; maple burns less well; no information is available for dogwood.

The site is located on an area where the Upper Chalk dominates the surface geology. On the hill on whose slope the site lies, there is also a cap of Clay-with-Flints, and Middle Chalk outcrops in the valley to the south-east.

Dogwood and maple are associated with soils of high base status, dogwood being particularly characteristic of chalk scrub, and both were almost certainly growing on the chalk, rather than the Clay-with-Flints. All the other trees represented are more tolerant of soil conditions and could conceivably have been present both on the chalk and on the Clay-with-Flints. Beech, rather than oak, would normally be expected on the chalk today, but different soil conditions in the past may have allowed oak to compete more successfully (Berzins, in Rudling forthcoming).

The charcoal remains indicate that both mature woodland (to provide the oak timber) and chalk scrub (with dogwood, maple and probably hawthorn) were utilized.

THE GEOLOGICAL MATERIAL

By Luke Barber
(incorporating comments by John Cooper, Booth Museum, Brighton)

The excavations at Varley Halls yielded a total of 54 pieces of geological material representing seven different stone types. It should be noted, however, that only one example of fissure-fill deposit was retained in the field for post-excavation analysis. Most pieces of this stone, owing to its quantity, were discarded in the field and this has obviously meant that the quantifications shown in Table 6 (microfiche) are severely under-representative of this type. A full list of geological material by context forms part of the Archive.

The most common stone amongst the retained material was Sarsen sandstone. Sarsen boulders occur naturally in the Brighton district and have been discussed elsewhere (Mantell 1822; Dixon 1878; Summerfield & Goudie 1980; Young & Lake 1988). The Sarsen from the site was usually of a coarse 'sugary' texture with colours ranging from light to dark grey or off-white to pink. Some iron-rich examples range from oranges to browns and purples. A few pieces were very friable and showed zonation of colouring suggestive of burning. Although no definite pieces of quern stone were present in the assemblage, two samples showed smoothing on one face (contexts 211 & 305). It is possible these examples were used for grinding cereals by rubbing, although this could not be proved. Generally the sarsens from the site were too friable to make good querns.

The second most common stone was the iron-rich fissure-fill deposits. This porous, almost breccia-like deposit, is thought to have formed in solution pipes in the chalk and was thus also available locally. Similar material was found on the nearby site at Downsview (Barber forthcoming).

A few pieces of Wealden Sandstone, all iron-rich, suggest material was being brought in from the north, but for what reason is unknown. More exotic stone types were also present, although all in low numbers. A single water-washed, hard white quartzite pebble (context 344) is possibly a rubbing stone of some type although apparently not a hone. It is possible this could have been collected from the coast. West Country material is present: a single piece of Cornish granite (context 367) and west country slate (context 368). However, both these contexts may have received material postdating the Bronze Age and thus this material cannot be directly linked to the site's occupation. Two pieces of siliceous material (context 368) may be artificial in nature and again may postdate the Bronze Age.

MARINE AND NON-MARINE MOLLUSCA

By Keith N. Wilkinson

Non-marine mollusca

Introduction

Samples were examined for their molluscan content at four separate locations at the site of Varley Halls. These were: a, the modern soil profile; b, the fill of the ditch; c, deposits filling hut terrace 2, and d, deposits infilling the hollow/pond. The object of the analysis was, in the case of b and c, to determine the nature of the local environment in which deposition occurred, and to see how this compared across similarly dated features. The modern soil profile (a) was examined as a control with a known environment from which the molluscan assemblages from other samples could be compared.

During the analysis 16 bulk samples were examined and a total of 4606 mollusc shells identified.

Sample collection and laboratory procedure

Samples of between one and two kilograms removed from a cleaned section face at intervals of 10 cm were collected in the field by the excavator after the methods outlined by Shackley (1981, 127). This method of sampling is less likely to produce a detailed record of faunal and hence environmental changes (particularly when sampling is carried out in situations where sedimentation patterns are complex, such as in ditches) than sampling from a continuous column at five or six centimetres (Carter 1990b), but does have the advantage of allowing analysis of several locations in a short space of time. All samples were labelled and double-bagged in the field prior to transport to the laboratory for further analysis.

Prior to processing the samples were initially described in terms of their colour (Munsell value) and morphology prior to being air-dried and weighed. Subsequent processing procedure followed that of Evans (1972). All material retained on the 500 micron sieve was air-dried and sorted for mollusc shells. Sorting was carried out by eye for material greater than 2 mm, and with the aid of a low power binocular microscope for fractions finer than this. All shell apices, plates of the Limacidae, operculae of *Pomatias elegans* and lips of *Carychium*, *Vertigo* and *Pupilla* were removed for identification and quantification. Identification was carried out on the basis of morphological characteristics of the shells and with the aid of a modern comparative reference collection. Nomenclature throughout this report follows that of Kerney and Cameron (1979). All stages of analysis were carried out in the Wolfson Archaeological Science Laboratories, Institute of Archaeology, University College London.

Preservation of mollusc shell in most samples was very good owing to the carbonate-rich nature of the bedrock. Indeed the highest proportion of inorganic clastic material in the mollusc samples was made up of chalk gravel and granules. However, preservation in the deposits from the hollow/pond was noticeably poorer. The samples from this area were found to contain a greater proportion of charcoal than elsewhere.

In the tables (microfiche), samples have been listed in order of reference number, but in the percentage histograms they have been plotted in stratigraphic order.

The modern soil profile

Three samples were examined from the modern profile at the north-eastern edge of the excavation. The description of the profile from which the samples were taken is given in Table 7 (microfiche).

Details of the molluscan shells recovered are tabulated in Table 8 (microfiche) and presented as a percentage histogram in Figure 22. The molluscan assemblages recorded from all samples are dominated by open-country species, although there are faunal changes that can be observed in the profile. Context A contains an assemblage dominated by *Pupilla muscorum*, *Vallonia* sp. and *Trichia hispida*. This type of assemblage is typical of those described by Bell (1983) in colluvial dry valley fills. Indeed it is suggested above that context A was formed by erosion of material further up slope, as it is poorly sorted and is not morphologically similar to either the subsoil (context B) or the topsoil (context C). The dominance by *P. muscorum* suggests that the environment was open and with very little vegetation, i.e. *P. muscorum* is commonly found on bare ground between patches of shorter vegetation. The almost total absence of shade-lovers and the presence of *Helicella itala* (a species that normally lives on south-facing slopes on ground almost totally devoid of vegetation: Kerney & Cameron 1979), would seem to confirm this hypothesis. If the deposit is colluvial, it is likely that the shells found are derived from a large spatial area and may not necessarily be contemporary with the erosion that led to the deposition of the colluvium. However, the erosion is likely to have been a result of arable agriculture, and probably at some point in the medieval period or later as *Monacha cantiana*, a species thought to have migrated to Britain during this period (Evans 1972), was recovered.

Context B contains a molluscan assemblage very similar to that of context A except that *P. muscorum* declines at the expense of an increase in *H. itala*. Therefore the environment is likely to have remained as open as before, but was more likely to have been maintained by grazing rather than by arable agriculture, of which *H. itala* is thought to be less tolerant (Kerney & Cameron 1979). Context B is thought to be a B horizon of the present-day soil, which if correct, presents certain problems in the interpretation of molluscan data. Recent research by Carter (1990a) suggests that shells recovered from further down than the top five centimetres of soil profiles are likely to be mixed, including shells from periods spanning the whole history of the soil (as a result of biological mixing processes). Thus the environment postulated for context B may not have been present during the whole of the context's formation.

Context C contains a molluscan assemblage that is distinct both from those in contexts B and A. Furthermore, as context C is from the very top of a currently active soil, it is likely that most of the mollusc shells recovered represent relatively recent deaths (Carter 1990b). The assemblage is dominated by the 'Introduced Helicid' category and to a lesser extent by *Trichia hispida* and *Vallonia* sp. The 'Introduced Helicids', in this case include just two species that are thought to have colonized Britain in the Romano-British period and later; *Candidula intersecta* and *Cochlicella acuta*. Both live in open, dry environments and indeed *C. acuta* is frequently found on coastal sand dunes. Therefore the environment would appear to be have been both open and dry, but possibly with a thin vegetation cover (as both *P. muscorum* and *H. itala* are only present in low numbers). This may have been maintained by grazing rather than by arable agriculture and indeed both farming regimes have been utilized since 1945 (Greig pers. comm.).

Therefore it would appear that conditions have remained open through the entire history of the soil, and indeed even before the soil began to develop. However, it is possible that the land-use regime changed prior to the formation of context B from arable (during the formation of the colluvial context — A) to pastoral. It is even possible that this change in land-use (which cannot be dated) was the factor that produced a stable environment in which a soil could develop.

The palisade ditch

Five samples were examined from the palisade ditch. (For location of contexts see Fig. 13:30). The deposits sampled are detailed in Table 9 (microfiche).

This ditch profile is difficult to attribute within the terms of the theoretical model of 'primary', 'secondary' and 'tertiary' fills described by Evans (1972; 1990), Limbrey (1975) and Bell (1990). It is unlikely that any of the contexts are primary (i.e.

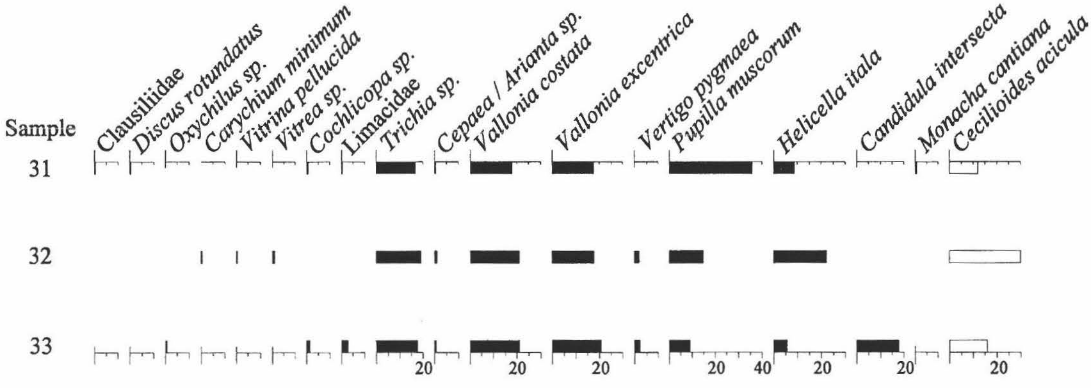


Fig. 22. Percentage histogram of mollusc shells from the modern soil profile.

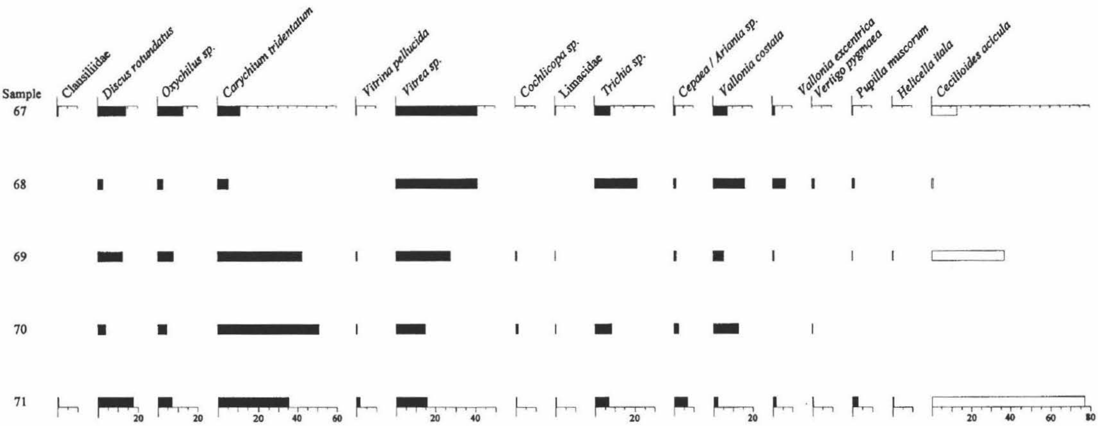


Fig. 23. Percentage histogram of mollusc shells from the palisade ditch.

material derived from the contemporary soil through low energy erosion) and therefore contemporary with the first use of the ditch. All the contexts have the properties of a secondary fill, which probably accumulated some time after the construction of the ditch, from material eroding in from the ditch sides and further afield. It is also a possibility that material was deliberately placed in the ditch as packing for a wooden palisade. If so, however, the fills were deposited in several distinct phases as the mollusc assemblages in each context are distinctive. Another possibility is that the ditch was initially used without a palisade (during which period secondary infilling took place) and was only later recut to take a palisade. In this scenario all the fills would be colluvial, accumulating as a result of erosion of surfaces adjacent to the ditch.

The mollusc shells recovered from the ditch are tabulated in Table 10 (microfiche) and presented as a percentage histogram in Figure 23. There are a number of obvious patterns that can be observed in Figure 23:

a. a decline in the *Vitrea/Vitrina* group upwards through the sequence from high quantities found at the base;

b. the appearance of *Carychium tridentatum* in large numbers in sample 70, and its subsequent decline;

c. a slight increase in *Discus rotundatus* and *Aegopinella* sp. in the top part of the sequence;

d. a decrease in the open-country component (i.e. *Vertigo pygmaea*, *P. muscorum*, *Vallonia* and *H. itala*) and *Trichia hispida* upwards through the sequence.

Preservation of mollusc shell declines with increased depth, while through the whole sequence species traditionally interpreted as being shade-loving dominate (Evans 1972). However, this does not necessarily indicate that the area was wooded during the accumulation of the ditch sediments. In fact *Vitrea contracta* (which is the most dominant member of the *Vitrea/Vitrina* group) has recently been shown to live in both short and long grassland conditions (Carter 1990a). There appear to be two mollusc zones, the first (zone A) is represented in samples 67 and 68 (contexts 125 & 126), and is dominated by *V. contracta*. The second (zone B) is found in samples 70, 69, and 71 (contexts 124, 122 & 103) and here *C. tridentatum* predominates. One other notable difference separating the zones is the higher percentage of open-country species found in zone A. Nevertheless, it is likely that the ditch fills began to accumulate in an environment of long grassland. It is also likely that this long vegetation only existed within the ditch itself as individuals of open-country species were also found in large numbers and probably derive from outside the ditch. As the *Vitrea/Vitrina* group and the open-country species decline upwards there is a corresponding increase in quantities of *C. tridentatum* and other shade-loving species. *C. tridentatum* probably has a greater tolerance of open conditions than originally thought by Evans (1972), but is nevertheless rarely found in open grassland conditions, whereas both *D. rotundatus* and *Aegopinella* sp. only live in shaded environments. This suggests that vegetation was increasing both in terms of quantity and extent during the accumulation of the upper ditch deposits and indeed the area outside the ditch may have been covered by scrub or perhaps long grassland. However, long grassland is less likely to be the source of the shade as neither *D. rotundatus* or *Aegopinella nitidula* are commonly encountered in this environment (Cameron & Morgan-Huws 1975). It is also unlikely that woodland existed as no species were encountered which are compulsive arbophiles.

There is also a sizeable open-country component including *Vallonia excentrica* and *H. itala*, neither of which are known to live in woodland.

To summarize, it is likely that the sediments filling the ditch were not deliberately placed there and are a result of erosion, probably occurring a long time after its construction (context 125 may be an exception to this). Molluscan evidence suggests the following course of events:

1. The ditch was constructed (in an undetermined environment).
2. The ditch was left to silt up and vegetation developed within it. The environment outside was open.
3. The centre of the ditch was recut for a palisade.
4. The site was abandoned and the palisade left in place.
5. Long grassland (or scrub) began to develop around the palisade and ditch.
6. The palisade either rotted or was removed while the vegetation remained as before.

Hut 2

For descriptions of the sedimentary layers sampled in the terrace of hut 2 *see* Table 11 (in microfiche). For location of contents *see* Figure 7:S13.

The deposits infilling the terrace of hut 2 almost certainly have a colluvial origin, being caused by erosion of material further upslope, presumably as a result of arable agriculture. These terrace infills all appear to have accumulated in an open environment, although it is possible that actual land-use was variable. Three molluscan biozones can be recognized:

Zone A (contexts 221 & 269)

The basal sample does not contain enough shells to interpret reliably. However, sample 27 and sample 22 from context 269 do contain sufficient. The molluscan assemblage is dominated by *Vallonia costata* to the exclusion of almost everything else. The next largest group is *Vitrea/Vitrina*, *D. rotundatus* and *C. tridentatum*. This combination of species suggests that although conditions were open there were also patches of longer vegetation. *V. costata* could either have been living in the terrace or in the sediments eroding in to it. Either way it is unlikely that an intense agricultural system was in place, at least in the immediate area of the terrace as shade-lovers are rare. It is possible that this zone is contemporary with the first ditch deposits.

Zone B (context 292)

This zone is similar to zone A in being dominated by *V. costata*, but has an even lower proportion of shade-lovers. This suggests that the amount of shade and therefore vegetation had decreased within the terrace. This is hardly surprising as by this time the terrace would have been largely infilled by colluvial sediments. It is possible that either an arable or pastoral agricultural regime was in place keeping the vegetation short.

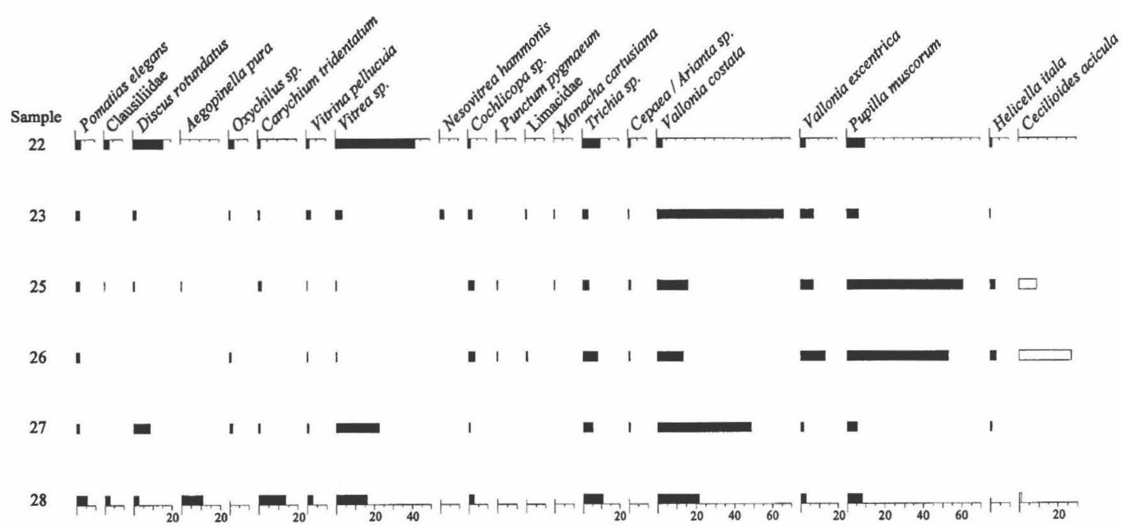


Fig. 24. Percentage histogram of mollusc shells from hut terrace 2.

Zone C (context 211)
A rapid change occurs in this zone as *V. costata* rapidly falls in number to be replaced by *P. muscorum* and to a lesser extent *V. excentrica* and *H. itala*. It is also notable that the shade-loving component almost completely disappears. Therefore a major change in environment has occurred and the agricultural regime was now almost certainly arable, causing disturbance of the ground surface (the ideal habitat for *P. muscorum*). *V. excentrica* and *H. itala* are also more tolerant of very open conditions than *V. costata*. The terrace by this time cannot have supported any shade at all, and was probably part of an arable field.

The assemblages from the terrace deposits demonstrate change from an open grassland environment to an environment utilized for arable agriculture. Unfortunately, it is by no means certain if there are hiatus in the sequence (although judging by the stratigraphy there is probably a notable time gap between zone B and zone C), as it has been shown that colluvium only accumulates slowly in vegetated environments (Morgan 1985).

Hollow/pond
Two sedimentary contexts were examined from this feature, for descriptions *see* Table 13 (microfiche).

Molluscan analysis of these two contexts demonstrated that shell preservation was extremely poor. Thus no percentage histogram was plotted and the data are only presented in tabular form (Table 14). The origin of the sediments filling this feature is unknown but the mollusc assemblage indicates that formation occurred in an open environment, although the shade-loving component present suggests that the feature itself provided some shade. From the morphology of the sediments and the fact that they are dominated by open-country species it would seem likely that the sediments are colluvial (i.e. poorly sorted), although how the feature originally formed cannot be determined from these lines of evidence alone.

Conclusions
Analysis of mollusc shells from various deposits at Varley Halls has demonstrated that a wide variety of micro-environments existed at the site both during and after its occupation in the Middle Bronze Age. Unfortunately, it has not been possible to link in detail the assemblages found from different features chronologically, although the following sequence of events seems the most likely.

During occupation of the site in the Middle Bronze Age there would obviously have been very little erosion of the terraces as they would been mostly covered by hut structures. The only deposits which may date from this period are those from the base of the ditch, which demonstrate that the environment outside (the ditch) was open. Erosion of the hut terraces began following the abandonment of the site, and it was probably during this early phase of abandonment that zone A (and possibly zone B) assemblages were formed in hut terrace 2. The zone B deposits from the ditch are also likely to date from this period. In this period an environment of scrub or long grassland is likely to have colonized the site, but as the cover on the hut terraces had been removed, erosion occurred. At some point following this, the long grassland/ scrub was cleared and the land was used for arable agriculture — as represented by zone C, hut terrace 2, which seems to have continued into the medieval period (context C in the modern soil profile). Only later (possibly also in the medieval period) did pastoral activity begin (context B in the modern soil profile), and since 1945 a variety of arable and pastoral uses have been made of the area (context A in the modern soil profile).

This interpretation is largely based on the excavators' stratigraphic interpretation of the various deposits, most of which did not extend over a large spatial area, but does fit in with previous knowledge of the environment in the Brighton area (Wilkinson 1993).

Marine mollusca (*see* microfiche)

RESISTIVITY SURVEY

By Ian Greig
A limited resistivity survey was carried out as part of the evaluation, in which the large hut terraces showed up quite well. The survey was subsequently continued over an extended area around the excavation by members of the Brighton and Hove Archaeological Society, co-ordinated by Mr J. Funnell, and suggests that there are at least two more terraces present in the immediate vicinity. It may be profitable to extend such a survey to other nearby undeveloped fields. Recent excavations on the downs to the north of Brighton are revealing widespread settlement evidence, and it would be interesting to establish the full extent of settlement on these steep slopes. The East Sussex County Council Sites and Monuments Record shows many chance finds in the area, and it is unfortunate that so much development took place after the Second World War, particularly on the opposite site of the valley to Varley Halls, without the opportunity for detailed archaeological investigation.

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REFERENCES

Adkins, L. & **Needham, S.** 1985. New research on a Late Bronze Age enclosure at Queen Marys Hospital, Carshalton, *Surrey Archaeol. Collect.* **76**, 11–50.

Alcock, L. 1980. The Cadbury Castle sequence in the first millennium BC, *Bulletin of the Board of Celtic Studies* **28**, 656–718.

Aspinal, A., Warren, S. E., Crummett, J. G. & **Newton, R. G.** 1972. Neutron activation analysis of faience beads, *Archaeometry* **14**, 27–40.

Barber, L. A. Forthcoming. The geological material, in D. R. Rudling.

Barrett, J. C. 1975. The later pottery, in R. J. Bradley & A. Ellison, 94–118.

—— 1976. Deverel-Rimbury: problems of chronology and interpretation, in C. Burgess & R. Miket (eds), 289–307.

—— 1980. The pottery of the later Bronze Age in lowland England, *Proc. Prehist. Soc.* **46**, 297–320.

Barrett, J. C. & **Bradley, R.** (eds). 1980. *Settlement and Society in Late Bronze Age Britain*. Brit. Archaeol. Rep., Brit. Ser. **83**.

Barrett, J. C., Bradley, R. & **Green, M.** 1991. *Landscape, Monuments and Society: the Prehistory of Cranborne Chase*. Cambridge: Cambridge University Press.

Beck, H. C. & **Stone, J. F. S.** 1935. Faience beads of the British Bronze Age, *Archaeologia* **85**, 203–52.

Bedwin, O. 1979. Excavations at Harting Beacon, West Sussex; second season 1977, *Sussex Archaeol. Collect.* **117**, 21–36.

—— 1980. Excavations at Chanctonbury Ring, Wiston, West Sussex 1977, *Britannia* **XI**, 173–222.

Bell, M. 1977. Excavations at Bishopstone, *Sussex Archaeol. Collect.* **115**, 1–299.

—— 1983. Valley sediments as evidence of prehistoric land-use on the South Downs, *Proc. Prehist. Soc.* **49**, 119–50.

—— 1990. *Experimentation and Reconstruction in Environmental Archaeology*. Oxford: Oxbow.

Berzins, V. Forthcoming. Report on wood charcoal from Mileoak, in D. R. Rudling.

Bradley, R. J. & **Ellison, A.** 1975. *Rams Hill: a Bronze Age Defended Enclosure and its Landscape*. Brit. Archaeol. Rep., Brit Ser. **19**.

Bradley, R. J., Lobb, S., Richards, J. & **Robinson, M.** 1980. Two Late Bronze Age settlements on the Kennet gravels: excavations at Aldermaston Wharf and Knights Farm, Burghfield, Berkshire, *Proc. Prehist. Soc.* **46**, 217–96.

Burgess, C. & **Miket, R.** (eds). 1976. *Settlement and Economy in the Third and Second Millennia BC*. Brit. Achaeol. Rep., Brit. Ser. **33**.

Burstow, G. P. & **Holleyman, G. A.** 1957. Late Bronze Age settlement on Itford Hill, Sussex, *Proc. Prehist. Soc.* **23**, 167–212.

Cameron, R. A. D. & **Morgan-Huws, D.** 1975. Snail faunas in the early stage of a chalk grassland succession. *Biological Journal of the Linnean Society* 7(3), 215–29.

Carter, S. P. 1990a. The distribution of the land snail *Vitrea contracta* (Westerlund) in a calcareous soil on Martin Down, Hampshire, England, *Circaea* **7/2**, 91–4.

—— 1990b. The stratification and taphonomy of shells in calcareous soils, implications for land snail analysis in archaeological, *Journal of Archaeological Science* **17**, 495–507.

Champion, T. C. 1980. Settlement and environment in Later Bronze Age Kent, in J. C. Barrett & R. Bradley (eds), 223–43.

Clarke, J. G. D., Higgs, E. S. & **Longworth, I. H.** 1960. Excavations at the Neolithic site at Hurst Fen, Mildenhall, Suffok 1954, 1957 and 1958, *Proc. Prehist. Soc.* **26**, 202–45.

Craddock, P. T. 1995. Early mining and metal production, *EUP*.

Cunliffe, B. 1966. Stoke Clump, Hollingbury and the Early pre-Roman Iron Age in Sussex, *Sussex Archaeol. Collect.* **104**, 109–20.

Curwen, E. 1929. Excavations at the Trundle, Goodwood 1928, *Sussex Archaeol. Collect.* **70**, 33–85.

—— 1931. Prehistoric remains from Kingston Buci, *Sussex Archaeol. Collect.* **72**, 185–217.

—— 1934. A Late Bronze Age farm and a Neolithic pit dwelling, *Sussex Archaeol. Collect.* **75**, 137–70.

—— 1937. *The Archaeology of Sussex*. London: Methuen.

Dixon, F. 1878. *The Geology of Sussex*. Revised by T. R. Jones. Brighton: William J. Smith. (1st edition 1850.)

Drewett, P. L. 1977. The excavation of a Neolithic causewayed enclosure on Offham Hill, East Sussex 1976, *Proc. Prehist. Soc.* **43**, 201–42.

—— (ed.). 1978. *Archaeology of Sussex to AD 1500*. Council for British Archaeology Research Report **29**.

—— 1982a. Later Bronze Age downland economy and excavations at Black Patch, East Sussex, *Proc. Prehist. Soc.* **48**, 321–400.

—— 1982b. *The Archaeology of Bullock Down, Eastbourne, East Sussex: the Development of a Landscape*. Sussex Archaeological Society Monograph **1**.

Drewett, P. L., Rudling, D. R. & **Gardiner, M. F.** 1988. *The South-East to AD 1000*. London: Longman.

Edlin, H. L. 1949. *Woodland Crafts of Britain*. London: Batsford.

Ellison, A. 1972. The Bronze Age pottery, in E. W. Holden, 104–13.

—— 1975. Pottery and Settlements of the Later Bronze Age in Southern England. Unpubl. Ph.D. Thesis, University Cambridge.

—— 1978. The Bronze Age of Sussex, in P. L. Drewett (ed.), 130–37.

—— 1980. The Bronze Age, in D. J. Freke (ed.), 31–42.

—— 1982. Middle Bronze Age pottery, in P. L. Drewett 1982a, 361–8.

Evans, J. G. 1972. *Land Snails in Archaeology*. London: Seminar Press.

—— 1990. Notes on some Late Neolithic and Bronze Age events in long barrow ditches in southern England, *Proc. Prehist. Soc.* **56**, 111–16.

Freke, D. J. (ed.) 1980. The archaeology of Sussex pottery, *Sussex Archaeol. Collect.* **118**, 1–405.

Gerloff, S. 1975. *The Early Bronze Age Daggers in Great Britain*. Munich: Præhistorische Bronzefunde **VI, 2**.

Green, C. 1977. The Roman pottery, in M. Bell, 152–78.

—— 1980. Handmade pottery and society in Late Iron Age and Roman East Sussex, in D. F. Freke (ed.), 69–86.

Hamilton, S. 1977. The Iron Age pottery, in M. Bell, 83–117.

—— 1979. The Iron Age pottery, in O. Bedwin, 27–9.

—— 1980. The Iron Age pottery, in O. Bedwin, 196–203.

—— 1982. The Iron Age pottery, in P. L. Drewett 1982b, 81–8.

—— 1984. Earlier first millennium BC pottery from the

excavations at Hollingbury Camp, Sussex, 1967–9, *Sussex Archaeol. Collect.* **122**, 55–62.
— — 1987. The Late Bronze Age pottery, in D. Rudling, 53–63.
— — 1990. Bronze Age pottery, in D. Rudling, 8–10.
— — 1993. First Millennium BC Pottery Traditions in Southern Britain, Unpubl. Ph.D. Thesis, Univ. of London.
— — 1997. Late Bronze Age pottery traditions in West Sussex: the Knapp Farm assemblage and its regional context, *Sussex Archaeol. Collect.* **135**, 78–85.
— — Forthcoming a. Bronze Age pottery traditions in Central Sussex: the Mile Oak assemblage, its stratigraphic context, forms, fabrics, chronology and regional significance, in D. Rudling (ed.).
— — Forthcoming b. The pottery from Downsview, East Sussex with specific reference to its Bronze Age assemblage and its regional significance, in D. Rudling, (ed.).
Hawkes, C. F. C. 1935. The pottery from the sites on Plumpton Plain, *Proc. Prehist. Soc.* **1**, 39–59.
— — 1939. The Caburn pottery and its implications, in A. E. Wilson, 217–62.
Henderson, J. 1988. Glass production and Bronze Age Europe, *Antiquity* **62**, 435–51.
Holden, E. W. 1972. A Bronze Age cemetery-barrow on Itford Hill, Beddingham, Sussex, *Sussex Archaeol. Collect.* **110**, 70–110.
Holgate, R. 1988. The flint, in N. A. Brown, Late Bronze Age enclosure at Lofts Farm, Essex, *Proc. Prehist. Soc.* **54**, 276–80.
Holleyman, G. A. & **Curwen E. C.** 1935. Late Bronze Age lynchet-settlements on Plumpton Plain, Sussex, *Proc. Prehist. Soc.* **1**, 16–38.
Hrdlicka, A. 1932. The principal dimensions, absolute and relative, of the humerus in the white race, *American Journal of Physical Anthropology* **16**, 431–50.
Hunter, F. & **Davies, M.** 1994. Early Bronze Age lead — a unique necklace from southeast Scotland, *Antiquity* **68**, 824–30.
International 14C conference, *Radiocarbon* **28**(2B), 839–62.
Jones, M. U. & **Bond, D.** 1980. Later Bronze Age settlement at Mucking, Essex, in J. C. Barrett & R. Bradley (eds), 471–82.
Kerney, M. P. & **Cameron, R. A. D.** 1979. *Field Guide to the Land Snails of Britain and North-West Europe*. London: Collins.
Krumbein, W. C. & **Pettijohn, F. J.** 1938. *Manual of Sedimentary Petrography*. New York (NY): Appleton-Century Cross.
Limbrey, S. 1975. *Soil Science and Archaeology*. London: Academic Press.
Longley, D. 1980. *Runnymede Bridge 1976: Excavations on the Site of a Late Bronze Age Settlement*. Surrey Archaeological Society Research **6**. Guildford.
McKerrell, H. 1972. On the origins of British faience beads and some aspects of the Wessex–Mycenae relationship, *Proc. Prehist. Soc.* **38**, 286–301.
Macpherson-Grant, N. 1991. A reappraisal of prehistoric pottery from Canterbury, Canterbury's Archaeology, *15th Annual Report of the Canterbury Archaeological Trust* (1990–91), 38–48.
Magee, R. W. 1993. Faience beads of the Irish Bronze Age, *Archaeomaterials* **7**, 115–25.
Mantell, G. A. 1822. *The Fossils of the South Downs*. London.
Mook, W. G. 1986. Business meeting: recommendations/resolutions adopted by the Twelfth International Radiocarbon Conference, *Radiocarbon* **28**, 799.
Morgan, R. P. C. 1985. Soil erosion measurement and soil conservation research in cultivated areas in the UK, *The Geographical Journal* **151**, 11–20.
Needham, S. P. 1991. The Grimes Graves metalwork in the context of other Middle Bronze Age assemblages, in I. Longworth, A. Herne, G. Vardell & S. Needham, *Excavations at Grimes Graves, Norfolk, 1972–1976*, Fascicule 3, 172–80. London: British Museum Press.
O'Connell, M. 1986. *Petters Sports Field Egham: Excavations of a Late Bronze Age/Early Iron Age Site*. Surrey Archaeological Society Research **10**.
O'Connell, M. & **Needham S. P.** 1977. A Late Bronze Age hoard from Petters Sports Field, Egham, Surrey, *London Archaeologist* **3**, 123–30.
O'Connor, T. P. 1982. Animal bones, in P. L. Drewett, 1982a, 378–80.
Pearson, G. W. & **Stuiver, M.** 1986. High-precision calibration of the radiocarbon time-scale, 500–2500 BC, in M. Stuiver & R. S. Kra (eds), Proceedings of the 12th International 14C Conference, *Radiocarbon* **28**(2B), 839–62.
Place, C. 1985. Some Metrical and Technological Aspects of Flint Debitage from Selected Sites of the Later Prehistoric Period in East Sussex. Unpubl. B.A. Report. London: Institute of Archaeology.
Prehistoric Ceramics Research Group. 1992. *The Study of Later Prehistoric Pottery: Guidelines for Analysis and Publication*. Prehistoric Ceramics Research Group Occasional Paper **2**.
Rohl, B. M. 1995. Application of Lead Isotope Analysis to Bronze Age Metalwork from England and Wales, Unpubl. D.Phil. thesis, Oxford University.
Rohl, B. M. & **Needham, S. P.** Forthcoming. *The Circulation of Metal in the British Bronze Age: the Application of Lead Isotope Analysis*. British Museum Occasional Paper **102**.
Rowley, T. 1986. *The High Middle Ages 1200–1550*. London: Routledge & Kegan Paul.
Rudling, D. R. 1987. The excavation of a Late Bronze Age site at Yapton, West Sussex, 1984, *Sussex Archaeol. Collect.* **125**, 51–68.
— — 1990. Archaeological finds at Rustington, West Sussex, *Sussex Archaeol. Collect.* **128**, 1–20.
— — Forthcoming. *Downland Settlement and Land Use: the Archaeology of the Brighton By-pass.*
Russell, M. Forthcoming. Report on excavations at Mileoak, in D. R. Rudling.
Saville, A. 1980. Five flint assemblages from excavated sites in Wiltshire, *Wiltshire Archaeological Magazine* **72/73**, 1–27.
— — 1981. *Grimes Graves, Norfolk: Excavations 1971–72*, vol. 2: *the Flint*. London: H.M.S.O.
Shackley, M. 1981. *Environmental Archaeology*. London: Allen & Unwin.
Stone, J. F. S. & **Thomas, L. C.** 1956. The use and distribution of faience in the ancient East and prehistoric Europe, *Proc. Prehist. Soc.* **22**, 37–84.
Stuiver, M. & **Polach, H. J.** 1977. Discussion: report of 14C data, *Radiocarbon* **19**(3), 355–63.
Stuiver, M. & **Reimer, P. J.** 1987. *Users Guide to the Programs CALIB and DISPLAY, Rev 2.1*. Quaternary Isotope Laboratory, University of Washington.

— — 1993. *CALIB Users Guide Rev. 3*. Quaternary Isotope Laboratory, University of Washington.
Summerfield, M. A. & **Goudie, A. S.** 1980. The sarsens of southern England: their palaeoenvironmental interpretation with reference to other silcretes, in O. K. Jones (ed.), *The Shaping of Southern England*. Inst. Brit. Geogr. Spec. Pub. No. **11**. London: Academic Press.
Tite, M. S. 1987. Characterisation of early vitreous materials, *Archaeometry* **29**, 21–34.
— — 1992. The impact of electron microscopy on ceramic studies, in A. M. Pollard (ed.), *New Developments in Archaeological Science*, 111–31. Oxford: Oxford University Press.
Tite, M. S. & **Bimson, M.** 1986. Faience: an investigation of the microstructures associated with the different methods of glazing, *Archaeometry* **28**, 69–78.
Tite, M. S., **Freestone, I. C.** & **Bimson, M.** 1983. Egyptian faience: an investigation of the methods of production, *Archaeometry* **25**, 17–27.
— — 1987. The scientific examination of pre-Hellenistic faience from Rhodes, in I. C. Freestone & M. Bimson (eds), *Early Vitreous Materials*, 127–32. British Museum Occasional Paper **56**.
Vandiver, P. 1983. Appendix A, in A. Kaczmarczyk & R. E. M. Hedges, *Ancient Egyptian Faience*. Warminster: Aris & Phillips.
Wilkinson, K. N. 1993. The Influence of Local Factors on Palaeoenvironment and Land-use: Evidence from Dry Valley Fills in the South Downs. Unpublished Ph.D. Thesis, University of London.
Wilson, A. E. 1939. Excavations at the Caburn 1938, *Sussex Archaeol. Collect.* **80**, 193–213.
— — 1940. Report on the excavations at Highdown Hill, Sussex, August 1939, *Sussex Archaeol. Collect.* **81**, 173–203.
Worsfold, F. H. 1943. A report on the Late Bronze Age site excavated at Minnis Bay, Birchington, Kent, 1938–1940, *Proc. Prehist. Soc.* **9**, 28–47.
Young, B. & **Lake, R. D.** 1988. *Geology of the Country around Brighton and Worthing*. London: H. M. S. O., Brit. Geol. Survey.
Worsfold, F. H. 1943. A report on the Late Bronze Age site excavated at Minnis Bay, Birchington, Kent, 1938–1940, *Proc. Prehist. Soc.* **9**, 28–47.