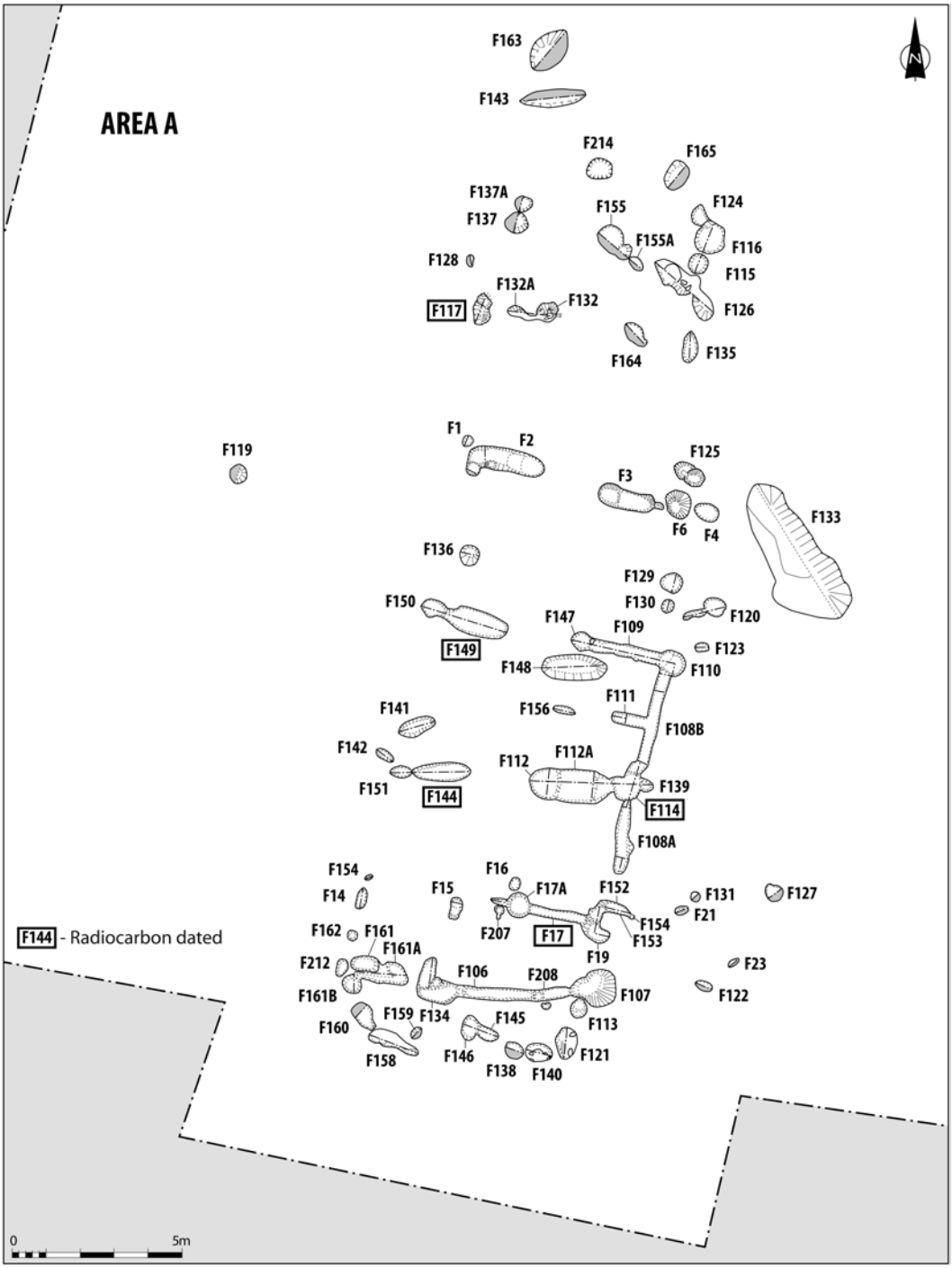
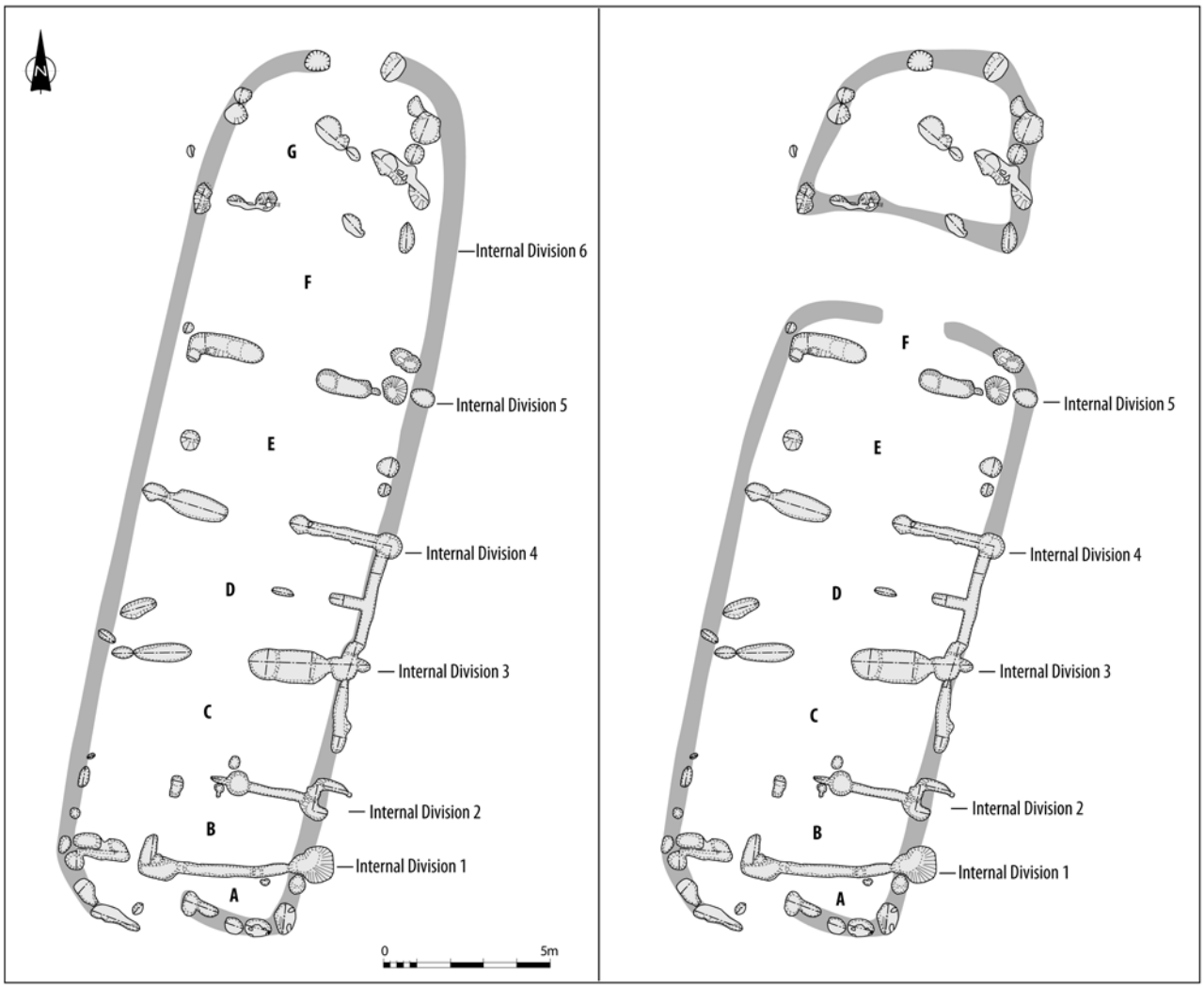
3 NEOLITHIC STRUCTURE (Area A)

3.1 Introduction

The Neolithic timber structure (illus 3–7) was situated in a prominent raised position at the top of a flat plateau and its foundations had been cut into free-draining sandy gravel subsoil. Overall, the structure appeared to measure up to *c* 27m north-to-south by *c* 8m east-to-west, giving it a ratio of almost 3.5:1. Ian Ralston (*pers comm*) has suggested that the broadly east–west alignment of the Neolithic structures excavated at Balbridie, Claish and Warren Field related to the direction of



Illus 3 Plan of Area A: Neolithic structure and other features



Illus 4 Possible interpretations of the structure

the prevailing wind in their respective valleys and the north–south alignment of the Lockerbie Academy hall might relate to northerly winds being funnelled through Dryfedale where it narrows to the north. The northern end of the structure was slightly offset from the southern end, meaning that an alternative interpretation of these features as two separate structures measuring *c* 19m × 8m and 7.5m × 5.5m respectively is possible. The excavators consider it to be possible that the offset nature of this part of the structure may have been the result of structural features having been removed by plough truncation. However, it was not clear why the degree of truncation should have been more severe within certain parts of the structure than it was in others. Both interpretations of the remains, that they constituted a single structure or two juxtaposed ones, will be considered in the following text (illus 4).

The walls of the structure, where they survived and could clearly be identified, were defined by a combination of construction trenches, post-pits, and separate post-holes, which were of varying sizes and had been cut to varying depths into the subsoil. These features appear to have represented a single phase of construction. Some of the post-holes showed evidence of having been re-cut, but it is thought that this is most likely to represent the replacement of single posts after they had started to rot. The fill of the features predominantly consisted of silty sand, with the ratio of sand to silt increasing towards the base.

Internally, the building appeared to be divided into compartments by walls that ran at right angles from the external western and eastern walls towards the centre of the building, creating a wide central aisle running much of the length of the building from north to south. The internal divisions comprised substantial post-holes, suggesting that this was a roofed structure. Slight reddening of the subsoil within the interior of the building, which is visible on some of the site photographs, and charcoal from within some of the post-holes, suggests that the building may have burnt down. Pottery and lithics recovered from the structure also showed evidence of burning.

All features thought to be associated with the

Illus 5 The excavated structure from the north

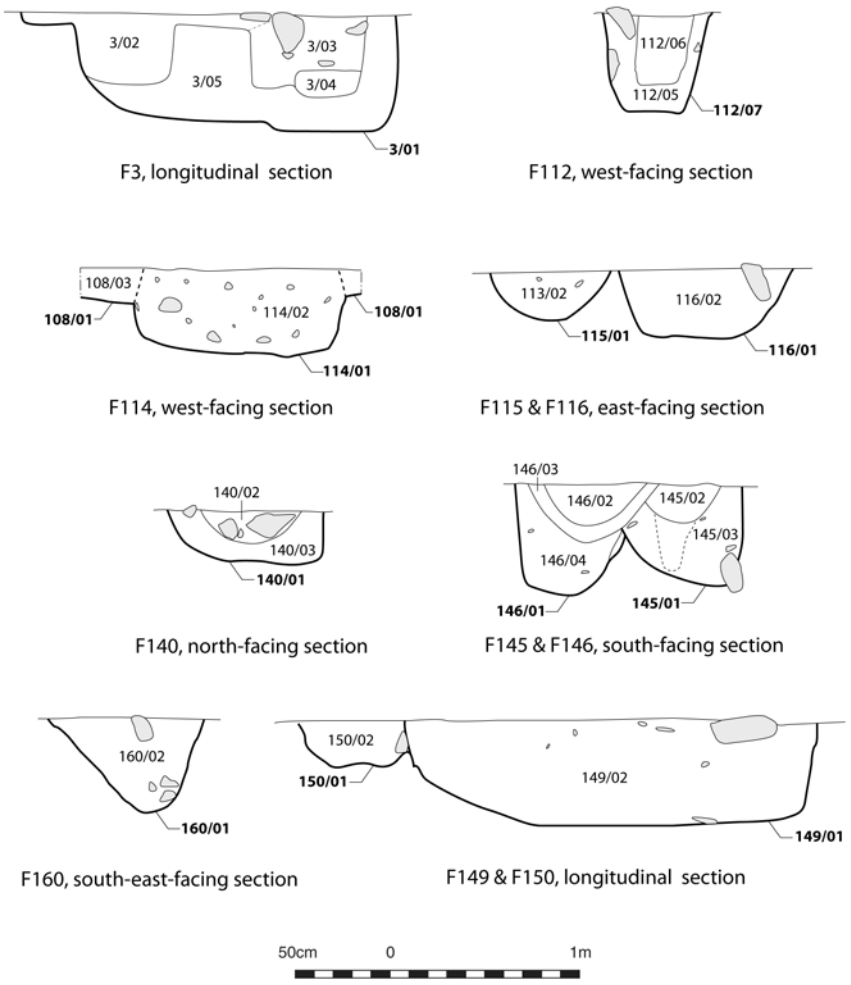
Illus 6 The excavated structure from the south

structure of the hall were 100% excavated with the exception of F137A, F137B, F138, F155, F155A, F159, F160, F164 and F165 which, due to time constraints, were 50% excavated. Samples were taken from *c* 50% of the features, giving good spatial coverage from throughout the structure, and from all charcoal-rich deposits for environmental sampling.

3.2 Description of the structure / structures

3.2.1 The terminals

The southern terminal of the structure (or southernmost of the two structures, depending on whether it is interpreted as a single structure or two separate structures) was defined by eight post-holes (from



Illus 7 Selected sections of post-holes and construction trenches

east to west: F161B, F160, F158, F146/F145, F138, F140, F121 and F113). Post-holes F161B, F160, F158, F138, F140, F121 and F113 curved inward from the external sidewalls, with post-hole F145, of which post-hole F146 is a re-cut (illus 7), being slightly inset from a straight line drawn between post-hole F158 and F138. A gap between post-holes F158 and F145/F146 may have been an entranceway, which was slightly offset from the centre towards the western side of the structure. Packing stones were identified in post-holes F121, F140, F145, F146 and F158 and Neolithic pottery was recovered from post-holes F158 and F160 (illus 7).

Based on the assumption that that the ground plan identified represented a single structure, the northern terminal consisted of post-holes F137A, F214, F165, F124 and F116. This part of the structure had suffered from a considerably greater level of truncation than the southern terminal, with one post-hole (F165) only surviving to a depth of 0.12m. The curvature of the arc of this end-wall thus appeared to be considerably tighter than that displayed at the southern terminal, with the northern end of the building thus being slightly narrower than the southern as well as appearing slightly offset from it. However, it is possible that there were further post-holes to the east of F115 that had been totally removed by truncation, and the hypothetical existence of additional features could be postulated to allow for a much more symmetrical arrangement, bringing it into line in both scale and form with the southern end of the structure. No Neolithic pottery was recovered from the terminal post-holes, but sherds were recovered from F115, which lay immediately to the south of F116 (illus 7).

Based on the alternative interpretation that this was two separate structures, the description just given would relate to the northern wall of a smaller structure, set north of and separate from the main building. In this hypothesis, its southern end is most likely to be represented by post-holes F117, F132A, F132, F164 and F135. In this case, the northern terminal of the main hall would probably have consisted of an arc of posts, again largely removed by truncation, to the north of F2/F3, and is likely to have incorporated F1 and F125.

3.2.2 The side walls

The southern part of the eastern wall was represented by post-holes F107, F19, F152/F153, construction trench F108A, post-hole F114 (illus 7), construction trench F108B and post-hole F110. To the north of F110, the continuation of the line of this wall appeared to have been largely removed by plough truncation, with F4 being the only surviving post-hole. Projecting a straight line through F107/F110/F4 would place the eastern side wall slightly to the east of F116, the easternmost feature of the northern terminal of the building as it survived at the time of excavation, but as already mentioned the heavily truncated nature of the terminal means that it is possible that the arc of post-holes may have extended to the east of F116.

The better-preserved southern part of the eastern side wall consisted of a combination of post-holes and construction trenches. A line of carbonised wood running along the base of the construction trenches suggests that they contained closely positioned squared-off timber planking uprights measuring *c* 0.4m × 0.4m at the base. Features of this nature were also noted at Balbridie (I Ralston, *pers comm*). Post-holes F107, F114 and F110 appear to have contained substantial timbers, suggesting that they served a major structural function. Charred emmer wheat recovered from F114 produced radiocarbon dates of 3800–3650 cal BC and 3770–3640 cal BC (2σ).

The western side of the structure appears to have suffered from an even more considerable degree of plough truncation, which had almost completely removed this part of the structure. This is not easy to explain, for there are no noteworthy changes of gradient in the vicinity which might explain why truncation should have been locally more severe here. The line of this wall is thought to be represented by post-holes F212, F162, F14, F154, F142 and F117. Post-holes F212, F162 and F14 survived to a maximum depth of 0.3m and post-holes F154, F142 and F117 only survived to a maximum depth of 0.13m. There was no evidence for construction trenches of the type that formed part of the eastern wall, but on that side of the building these were up to *c* 0.2m shallower than the neighbouring post-holes, suggesting that more severe plough truncation seen on the western side of the structure could have removed any equivalent slots completely. Radiocarbon dates on paired samples of charred emmer wheat taken from F117 produced dates of 3920–3660 cal BC and 3720–3630 cal BC (2σ).

The alternative interpretation based on two separate structures would suggest that the walls followed the same alignment, but as already mentioned, they started to turn inwards at F4 and opposite F2 to form a curved terminal. F117 would then have become the south-western corner of the smaller northern structure. This would have given the main structure an overall length of *c* 19m and the smaller structure a length of *c* 7m (east–west).

3.2.3 Internal structural elements

Based on the assumption that this was a single structure, it appears to have had six possible internal transversal divisions (Internal Divisions 1–6 from south to north) dividing it into seven possible compartments (Internal Compartments A–G from south to north), broadly paralleling the internal arrangement identified at Claish (Barclay *et al* 2002).

Interpreting these features as two separate structures would reduce the number of internal divisions within the main building to five, creating six compartments. The smaller northern structure would thus have consisted of a single compartment with a possible centre post (F155).

The southernmost internal division (Internal Division 1) consisted of two suites of features. To the east lay a linear construction trench (F106), which extended from external post-hole F107 and terminated at internal post-hole F134. The aisle here comprised a narrow gap measuring only *c* 0.3m wide, which divided post-hole F134 from post-hole F161. This last feature was part of the western part of this arrangement, and was conjoined to post-holes 161A and 161B. Three post-pipes were identified within construction trench F106. In common with all the internal construction trenches, it is envisaged that construction trench F106 may have contained a line of posts of decreasing height in relation to the pitch of the roof. It is noteworthy that this transversal arrangement is set obliquely to those further north within the building.

Internal Division 2, again better preserved to the east, consisted of a linear construction trench (F17), which extended from post-hole F152, suggested to have lain on the eastern longitudinal wall line, and terminated at internal post-hole F17A. Post-hole F17A measured 0.62m in diameter and contained several packing stones, suggesting that it held a substantial timber upright. A gap of 0.7m divided post-hole F17A from post-hole F15, which was separated by 2.3m from the western side wall marked by F14. Again, this postulated traverse lacks internal symmetry. A construction trench similar to F17 may originally have run between F15 and F14/F154, but if it did, it had been entirely removed by plough truncation before this intervention. A sherd of Iron Age pottery was recovered from the upper fill of post-hole F15, but it is thought that it was intrusive and it is not considered to constitute reliable dating evidence for this feature. Radiocarbon dates on paired samples of charred emmer wheat taken from F17 produced dates of 3940–3650 cal BC and 3950–3700 cal BC (2σ).

The eastern portion of Internal Division 3 consisted of a substantial 1m-wide construction trench (F112A), which extended from external post-hole F114 and terminated at internal post-hole F112. A gap of 1.6m divided F112 from construction trench F144, which was conjoined to post-hole F51. Post-hole F112 measured *c* 1m in diameter by 0.52m deep and contained a post-pipe measuring 0.38m in

diameter by 0.4m deep (illus 7). The post had been held in place by packing stones. Construction trench F144 measured 1.5m by 0.6m by 0.48m deep, but post-hole F151 had a depth of only 0.1m, suggesting that the substantial holes immediately on either side of the central aisle held the main structural timbers, again an arrangement readily paralleled at Balbridie. Radiocarbon dates on paired samples of charred emmer wheat taken from F144 produced two dates of 3770–3640 cal BC (2σ).

Internal Division 4 consisted on the eastern side of a construction trench (F109) measuring 1.7m long by 0.2m wide by 0.18m deep, which extended from external post-hole F110 and terminated at internal post-hole F147. Post-hole F147 measured 0.75m in diameter by 0.4m deep and contained some fairly large packing stones, again suggesting the presence of a substantial timber upright. A gap of 1.8m divided post-hole F147 from the western portion of this traverse, which consisted of construction trench F149, which cut post-hole F150 (illus 7). F149 contained Neolithic pottery, burnt worked flint and charcoal. Again, these two halves are not symmetrical, and are on slightly different alignments. The eastern side of the compartment between Internal Divisions 3 and 4 may have been further subdivided by F111 and F156, but both these features were less than 0.2m deep, suggesting that they had been heavily truncated, or that they formed a less solid sub-division within the structure. Radiocarbon dates on paired samples of charred emmer wheat taken from F149 produced dates of 3800–3650 cal BC and 3760–3640 cal BC (2σ).

As it survived, the eastern part of Internal Division 5 consisted of one individual post-hole (F6) and a construction trench (F3). Construction trench F3 itself contained two post-holes (illus 7). The western post-hole, which was the larger of the two, measured 0.66m in diameter by 0.56m in depth and contained a number of packing stones. A possible post-pipe was identified in post-hole F6. To the west of the central aisle, packing stones were also identified at the eastern end of F2, suggesting that it held a substantial timber upright here. A possible subdivision of the compartment, or further individual roof supports is/are represented by post-holes F129 and F136, which are directly positioned on opposite sides of the structure.

Internal Division 6 consisted of a line of four differently-sized post-holes (F132A, F132A, F164 and F135) measuring between 0.19m diameter by 0.08m deep and 0.78m by 0.72m by 0.48m deep. Post-hole F164 contained large quantities of charcoal. If the separate structures interpretation is preferred, this would have been the external southern wall of the northern structure.

The evidence for axial posts is somewhat ambiguous, but two post-holes (F155 and F134) that may have served this function have been identified. At the northern end of the structure, post-hole F155 measured 0.92m from east to west by 0.63m from north to south and had a depth of 0.42m. Large packing stones within the primary fill suggest that it held a substantial timber upright. Post-hole F134 at the southern end of the building is rather more problematic when viewed as an axial post. This feature was positioned closer to the western side of the building, and even though the post appears to have been positioned at the eastern end of the post-hole where it adjoins F106, this would have placed the axial line to the west of centre when projected directly to post-hole F155. However, it is considered likely that the axial beam consisted of a series of short lengths of timber supported by the internal divisions rather than a single continuous length, and a slight zig-zagging of the timbers would probably have allowed them to track the axial line without compromising the integrity of the structure. Post-hole F146 was also briefly considered as a possible candidate for the axial post, but this appears to have been a re-cut of F145, which is on the same alignment as F17A, F112, F147 and F3.

There was no evidence of a possible axial post within the vicinity of F2/F3, which is where it is likely to have been positioned if this had been the northern end of the main structure. Given that F2 and F3 survived to depths of 0.44m and 0.67m respectively, it seems unlikely that an axial post-hole within this location would have been removed completely. However, it has been noted by Ian Ralston (*pers comm*) that the probable axial posts at Balbridie were some of the least substantial identified and this post may have been of a similar nature. It could also be that the substantial nature of F2/F3 removed the need for an axial post.

3.2.4 Internal features

There were no features that were considered to be non-structural identified within the Neolithic structure. The lack of occupation layers, surfaces or hearths is a further indication of the degree of plough truncation that has been inflicted on this site.

3.2.5 External features

Several additional features were identified outwith the structure. Of particular note was a large pit (F133) that was situated immediately to the east of the structure. The pit was rather irregular in shape and measured 4.6m long by 2m wide by 0.5m deep. A quantity of Neolithic pottery recovered from the primary fill of the pit all proved to belong to the same vessel (Pot 31, Sheridan below). This feature may have been a borrow pit for the procurement of sand.

Features F120, F123, F131, F21, E127, F23 and F122 were situated close in to the eastern wall of the structure and may relate to structural repairs (F120 and F123) or to external features such as animal pens. Other scattered pits included F119,

F143, F163 and F10. Pit F119 contained charcoal and burnt bone, but there were no finds from the other pits and their relationship to the structure is unclear.

A pit (F12) containing a large quantity of fire-cracked stone was situated *c* 25m to the east of the structure (not illustrated). It measured 1.1m in diameter by 0.32m deep. The quantity of fire-cracked stone suggests that it may have been a cooking pit. It is unclear if this pit related to the Neolithic activity on the site, as it was not dated.

3.2.6 Modern feature

The level of root action within F148, combined with the presence of modern pottery at the base, suggests that this was a recent feature, possibly a tree bole.

3.3 Radiocarbon dates

Five pairs of samples were submitted for dating, all of which were charred emmer wheat. The samples were selected to give good spatial coverage across the structure and to determine whether the smaller northern group of features relating to the possible separate northern structure dated to the same period as the southern group of features constituting the main hall or the southern end of a single hall. An earliest date of 3950–3700 cal BC (2σ) (5020 BP) came from F17 and a latest date of 3720–3630 cal BC (2σ) (4890 BP) came from F117. Although the latest date was obtained from the northern group of features, the other paired sample from F117 produced a date of 3920–3660 cal BC (2σ), which is earlier than the majority of dates obtained for the southern group of features. The spread of dates suggests that they relate to the ongoing usage of the structure rather than a single burning episode.

The dates obtained for the Lockerbie Academy Neolithic hall (5020±30–4890±30 BP) are broadly contemporary with those obtained for Claish (5080±40–4845±40 BP), Balbridie (5010±125–4745 ±135 BP) and Warren Field (5200±35–4975±45 BP).

3.4 Prehistoric pottery, by Alison Sheridan

3.4.1 Introduction

The Area A ceramic assemblage comprises 146 sherds and 63 fragments (pieces smaller than 10mm across) weighing just over 0.8kg overall. With the exception of one sherd of Early Iron Age pottery (described below), the assemblage is of Early Neolithic date, and belongs to the early part of the Carinated Bowl tradition (Sheridan 2007a). Full details of each pot are presented in the archive; general characteristics are described here.

3.4.2 Early Neolithic pottery

The Early Neolithic assemblage comprises small parts from a large number of vessels: a minimum of 46 pots have been identified, but the total may have been slightly higher. Sherd size is small, with the largest single sherd (from Pot 14) measuring *c* 66 by 48mm. In most cases, no more than 5% of any individual pot is represented. With the exception of the sherds from Pot 31 that were found in pit F133, all the pottery came from the fills of the pits, post-holes and wall slots inside the structure (illus 8a); where found in post-hole fills, the sherds were mostly towards the edge of the fill, indicating the deposition of these sherds while the posts were standing. The pottery was fairly evenly distributed along the length of the structure, and spatial scattering of sherds from individual pots was minimal: three sherds, from three neighbouring features (F106, F140 and F208; Internal Division 1 and end wall), conjoin to form the rim and neck of Pot 1. Most sherds show no or minimal sign of abrasion, suggesting that they had not lain around for long before being incorporated in these fills. A plausible explanation for their presence in the fills in this condition is that as pots broke during the use of the structure, smallish sherds were swept towards the walls.

There is a high incidence of burnt sherds, and also of spalling, which can be a sign of heat damage. In most cases, this damage probably occurred during the burning down of the structure, and the effects were localised, with some sherds from the same pot or context being burnt, while others were unaffected (eg in F19). Similarly, the intensity of the burning varied, with the heavily burnt sherds (comprising a third of the assemblage) being oxidised throughout. Burning had also softened some of these sherds, making them prone to subsequent abrasion (eg Pots 18 and 36).

A narrow range of vessel forms is represented, with carinated and sinuous-profiled bowls dominating the assemblage. Twenty-one such vessels are attested from sherds from the rim, neck or neck–belly junction (illus 9–10), and a further two are suggested by the flattish base sherds of Pots 22 and 23: carinated and sinuous-profiled bowls often have slightly flattish, yet still rounded, bases. The sherds representing Pots 24–45 – almost all belly sherds – could equally well have come from bowls of these shapes, as their curvature, wall thickness (6.1–12.5mm) and fabric fall within the range seen for such vessels. The only pot that is demonstrably not of carinated or sinuous-profiled form is Pot 46, a roughly hemispherical, thick-walled vessel (illus 10). This will be described below.

The reconstruction drawings, shown in illus 9 and 10, show the range of carinated and sinuous-profiled vessel forms present in the assemblage. These drawings have been based on diameter measurements using a standard diameter estimation chart; the angle of the neck has been assessed by examining details of its shape, in particular the

Illus 8 Distribution of the pottery and the lithics

relative curvature (if present) of the inner and outer surfaces. The angle of the neck–belly junction has similarly been assessed by comparing the curvature of the inner and outer surfaces (which also provides clues as to whether the neck had been upright and straight or curved, and whether the belly had been shallow or deep). Breakage patterns along ring joint lines also provide clues as to the original angle of the neck and neck–belly junction. Rim and carination shapes, where absent, have been extrapolated from the forms represented elsewhere in the assemblage.

Eight bowls (Pots 1–8) – and possibly a ninth, represented only by a small rim sherd (Pot 9) – have widely splaying necks and generally shallow bellies. These include three exceptionally large vessels, with rim diameters estimated at 396, 390 and 366mm respectively; the smallest example has an estimated rim diameter of 215mm. Despite their considerable size, Pots 1–3 are thin-walled: at its narrowest, the Pot 5 neck is only 4.85mm thick, for example, making this the thinnest-walled pot in the assemblage. The rim on Pot 1 is rounded and neatly rolled over to form a beading, while that on Pot 9 (too small to allow a reconstruction, but probably from this shape of bowl) is rounded and gently everted. The necks, generally long, are either straight or virtually so (as in Pots 1 and 2), or else slightly concave (Pots 5 and 7). That on Pot 2 is more curved on its inner surface and increases in thickness towards the rim, lending the bowl a top-heavy appearance. The neck–belly junction is either sinuous (Pots 4 and 8) or very gently carinated (Pot 7).

The other reconstructible carinated or sinuous-profiled vessels (Pots 10–18, and probably also Pots 19–21, represented only by small sherds) have upright or slightly everted necks and shallow to deep bellies. The largest of these (Pot 10) has an estimated rim diameter of 290mm; the smallest (Pot 18), 178mm. With the exception of the relatively thick-walled Pot 21, which is at least 14.3mm thick, all these bowls have wall thicknesses (away from rims and carinations) of less than 10mm. Rims are rounded, everted and gently hooked (Pots 14, 19) or else partly rounded and partly flattish, and minimally everted (Pots 16, 20). Necks are straight (Pots 11–15, 17, 18) or concave (Pot 16). The neck–belly junction is either sinuous (Pot 15) or carinated, gently so in the case of Pots 10, 11 and 21 and more markedly so in Pot 13.

Regarding manufacture, these pots were all made by adding successive clay rings to a basal pad, flattening each one before adding the next. Breaks along ring joint lines are relatively common and indicate that in some areas the constituent flattened rings had been fairly narrow, especially around the neck–belly junction (as in Pot 10) and near the base (in Pot 23, where burning has caused the pot to crack along joint lines: illus 10). The prominent carination on Pot 13 had been made by adding a strip to the outside of the body. Before building the pots, the clay had probably, in most cases, been refined by levigation; crushed stone was added to all pots as a filler, to prevent cracking during drying and firing.

The size of these lithic inclusions varies within and between pots, but none is larger than 7 × 4mm. The density also varies, from very sparse (below 3%) to 7–10%, and while the thin-walled pots (<10mm thick) tend to contain few and small inclusions, this is not always the case (as seen in Pot 24, for instance). The most frequently used type of stone is micaceous quartz, featuring large, golden-coloured mica platelets: this occurs as the sole or main inclusion in 33 pots. In a further six pots, its place is taken by non-micaceous quartz; and in six more, by a speckly, black and white granitic stone. The fact that small fragments of all these stone types are also present in the Iron Age sherd suggests that they were probably obtained locally. Only one pot (Pot 3) does not contain these types of stone, instead having various kinds of grey, fine-grained stone.

Surface finish varies, but in every case an attempt was made to achieve a smooth surface. Wet-smoothing, using a soft material such as an animal-skin pad, has created a thin, slip-like effect that is visible on most sherds. This would have been undertaken when the vessel was leather-hard, and in many cases it has created very smooth surfaces (although on the interior of Pot 3, a piece of grit on the pad has left scratches on the surface). Additional treatment is visible on some pots: the fairly high sheen on both surfaces of Pot 1 may have been achieved by polishing with a pad, while on other pots, a pebble or some other blunt tool had been used to smooth the surface to a matte finish in some cases (as on the outside of Pots 14 and 45), to a low sheen (as on the outside of Pot 3 and the inside of Pot 14), a medium sheen (outside of Pot 4, both surfaces of Pots 11 and 13) or a fairly high sheen (Pot 2, both surfaces). The tool had been rubbed horizontally around the pots. Some of the bowls with splaying necks have particularly fine surface finishes, on their interior as well as exterior, emphasising their role as display objects as well as functioning pots. With the other pots, the thicker-walled examples (>10mm) are generally less carefully finished than those with walls less than 10mm thick. There is no trace of decoration on any of the pots.

The colour of the sherds varies, not least because some have been heat-altered, but with eleven vessels (Pots 1, 3, 7, 9, 11–13, 15, 16 and 28) a deliberate attempt has been made to create black pots (or pots with one black surface and one black-brown surface). This suggests good control over the firing process. With these pots, the core is the same colour as one or both of the surfaces. With some other pots, the core is darker than one or both of the surfaces, suggesting a rapid firing.

Regarding the function of these bowls, the presence of a thin black encrustation on the interior and/or exterior of ten vessels suggests their use as cooking pots. These include the largest bowl (Pot 1), which has a patch of encrustation just below the rim on the exterior, and Pot 31, from F133, where

many of the belly sherds have encrustation on their interior. Whether other pots had also been used for cooking would require analysis for absorbed lipids to be undertaken. To judge from the size and shape of the other carinated and sinuous-profile pots, they were probably used for serving foodstuffs; they are not an ideal shape or size for storage, unless small quantities of material are concerned.

Finally, the globular pot (Pot 46) stands out in several respects as being different from the rest of the assemblage. It is a thick-walled (up to 14.4mm thick), roughly hemispherical bowl with a simple rounded, slightly inturned rim; the estimated rim diameter is *c* 210mm and the estimated height of the pot, 139mm. The surfaces were probably wet-smoothed but are slightly uneven. Inclusions are fairly abundant (*c* 7% density), in some cases large (up to 8.3 by 6.5mm), and consist of quartz. One of the three constituent sherds was heavily burnt. The other two have pale exteriors and black interiors, and while no organic encrustation is visible, it is possible that this pot was used for cooking.

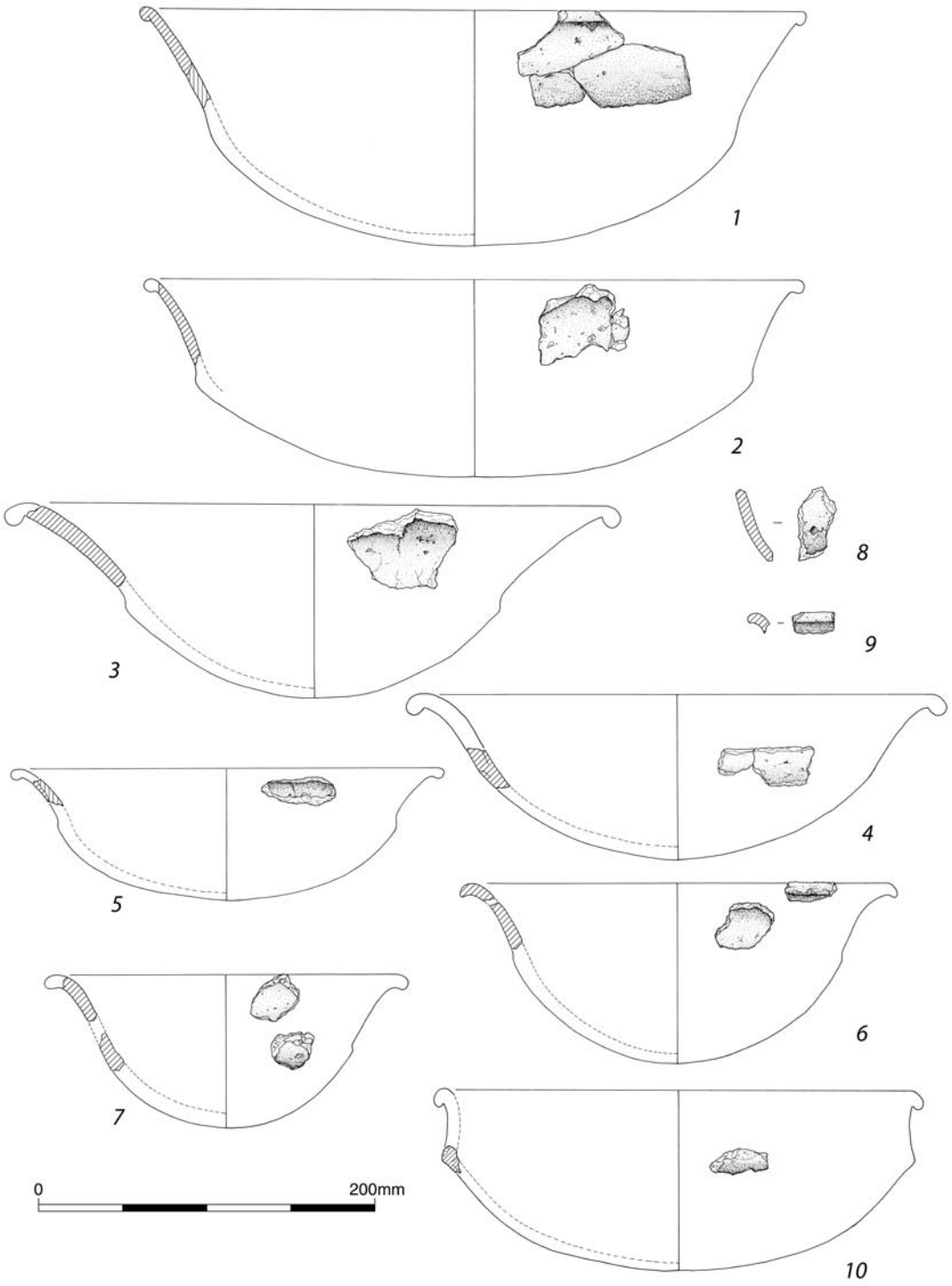
3.4.3 Early Iron Age pottery

The Early Iron Age sherd, which was found at a high level in F15, differs from the Neolithic pottery in its form and fabric; it is also noticeably harder. It is a rim and upper body sherd from a flat-based, bucket-like vessel with a slightly inturned rim (*c* 200mm in estimated diameter) and a steep internal bevel immediately below the rim. Extensive burnt-on organic residues on the exterior and interior indicate its use as a cooking pot. Inclusions are sparse (<3%) and comprise a few small fragments of the micaceous quartz and granitic stone as seen in the Neolithic pottery, along with some dull grey fine-grained stone fragments. The edges of this sherd are not abraded, indicating that it had not lain around long before being buried. *Comparanda* (eg from Traprain Law, East Lothian) suggest a mid to late first millennium BC date (F Hunter *pers comm*). The presence of a single intrusive late sherd in an otherwise entirely Early Neolithic structure is puzzling, but given the degree of truncation of the site, it is impossible to tell whether there had once been more extensive evidence for an Early Iron Age presence there.

3.4.4 Summary description of the illustrated vessels (illus 9–10)

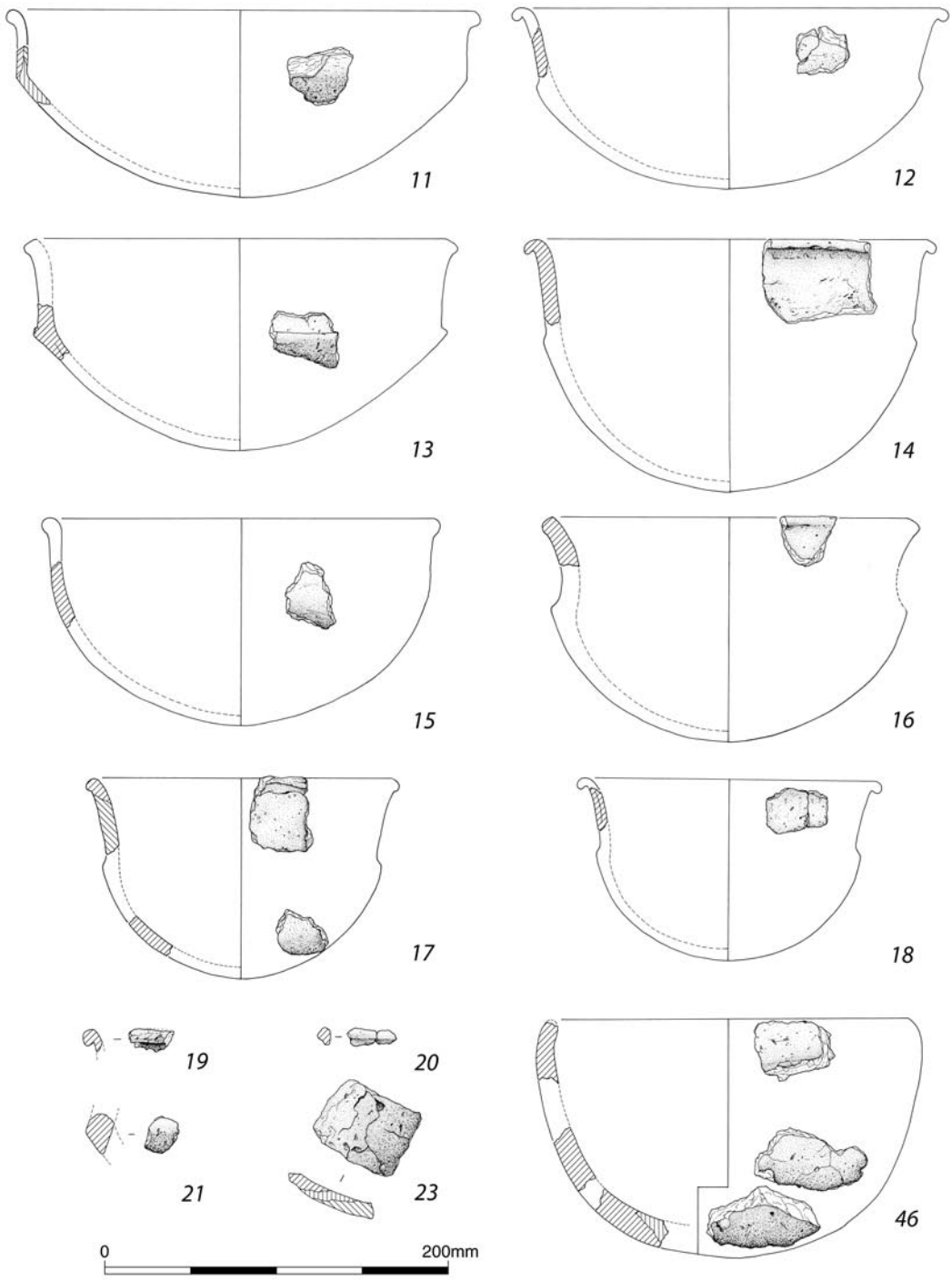
Note: 'open' = profile descriptor where rim diameter exceeds carination diameter by more than a few mm; 'neutral' = rim and carination diameter roughly the same. Inclusion density: very sparse = 3% or less; fairly sparse = *c* 5%; medium-density = 7–10%. All inclusions are of stone.

1. Sherds from the rim and neck of a large open gently carinated bowl with fairly shallow belly. Very sparse angular inclusions. Contexts 106/02, 140/02, 208/2.
2. Sherds from neck of a large open gently carinated bowl with shallow belly. Very sparse angular inclusions. Context 19/02.
3. Neck sherd from large, open carinated bowl with widely splaying neck and shallow to medium-depth belly. Very sparse angular and sub-angular inclusions. Context 115/02.
4. Two conjoining sherds spanning the neck–belly junction of a large open carinated/S-profiled bowl with widely splaying neck, gentle sinuous carination and shallow belly. Very sparse angular and sub-angular inclusions. Context 114/02.
5. Neck sherd from open carinated bowl with splaying neck and shallow belly. Very sparse angular inclusions. Context 115/02.
6. Sherds from the rim, neck and (not shown) belly of a medium-sized open carinated/S-profiled bowl with splaying neck and medium to deep belly. Fairly sparse angular and rounded inclusions. Heavily burnt. Context 17/02.
7. Sherds from the neck, neck–belly junction and (not shown) belly of a medium-sized open carinated/S-profiled bowl with splaying neck, very gentle sinuous carination and medium-deep belly. Medium-density angular and sub-angular inclusions. Context 116/02.
8. Sherds from the neck–belly 'junction', belly and possibly the neck (of which only the sinuous 'carination' at the neck–belly junction is shown) of what had probably been a medium-sized, open S-profiled bowl with medium-depth belly. Fairly sparse angular, sub-angular and rounded inclusions. Twelve of the sixteen constituent sherds are heavily burnt. Context 152/02.
9. Small rimsherd from medium-sized to large open carinated or S-profiled bowl. Very sparse angular and sub-angular inclusions. Context 161/02.
10. Sherds from the carination and (not shown) belly of a medium-sized to large neutral carinated bowl with medium-depth belly. Fairly sparse angular and sub-angular inclusions. Belly sherd (which might possibly belong to a different pot) burnt. Context 155/02.
11. Sherds from the carination and (not shown) belly of a medium-sized neutral carinated bowl with medium-depth belly. Fairly sparse angular inclusions. Context 146/04.
12. Two conjoining neck sherds from medium-sized neutral carinated bowl with medium-depth belly. Very sparse angular and sub-angular inclusions. Context 1/02.
13. Carination sherd of a medium-sized open carinated bowl with medium to deep belly. Medium-density angular and sub-angular inclusions. Context 149/02.
14. Sherd from the rim and neck of a medium-sized, neutral carinated bowl with deep belly. Very sparse angular and rounded inclusions. Outside of sherd probably scorched. Context 15/02.



Illus 9 Neolithic pottery

15. Sherd from the neck–belly junction of a medium-sized neutral S-profiled bowl with deep belly. Fairly sparse angular inclusions. Context 158/02.
16. Sherd from the rim of a medium-sized neutral carinated bowl with deep belly. Mostly angular inclusions, one rounded, 5–7%. Context 146/02.
17. Sherds from the rim, neck and belly of a medium-sized neutral carinated bowl with deep belly. Fairly sparse angular and sub-angular inclusions. Heavily burnt. Context 114/02.
18. Two conjoining neck sherds from a medium-sized neutral carinated bowl with deep belly. Fairly sparse angular and sub-angular inclusions. Heavily burnt. Context 112/04.



Illus 10 Neolithic pottery

19. Small rimsherd from carinated or S-profiled bowl, probably with an upright or slightly everted neck. Too small for reliable diameter estimation, but could have been as large as very to fairly sparse (3–5%) inclusions, mostly angular. Context 112/05.
20. Even smaller rimsherd from carinated or S-profiled bowl, probably with an upright or slightly everted neck. Too small for reliable diameter estimation. Very sparse angular inclusions. Heavily burnt. Context 3/02.
21. Carination sherd from large, thick-walled carinated bowl with gentle carination and probably deep belly. Very sparse angular inclusions. Heavily burnt. Context 117/02.
23. Sherds from the gently curving base and (not illustrated) belly of a large, probably carinated or S-profiled bowl. Very sparse angular and

sub-angular inclusions. Heavily burnt, and has cracked along coil joint lines, showing clearly how the base was built up. Context 117/02 and 117/05.

46. Sherds from the rim and belly of a medium-sized, uncarinated, roughly hemispherical coarseware bowl with a minimally inturned rounded rim. Medium-density but large angular and sub-angular inclusions, up to *c* 8.3 by 6.5, just quartz. One sherd heavily burnt. Context 161A/02.

3.4.5 Discussion of the pottery

The Early Neolithic assemblage is instantly recognisable as belonging to the Carinated Bowl (henceforth 'CB') tradition, in its earliest, 'traditional', form (see Sheridan 2007a for the most recent discussion of CB pottery). This is characterised by a predominance of carinated and sinuous-profiled bowls of various sizes, mostly thin-walled, with simple rounded and everted rims. The fabric of these pots ranges from very fine, with small and sparse lithic inclusions, to relatively coarse, and the range of surface finishes seen in the Lockerbie Academy assemblage is typical (although the occasional decorative use of fingertip fluting, seen on some other traditional CB assemblages, is absent here). Simple hemispherical bowls and cups – smaller and finer than the large Pot 46 – are usually present as a minor element in CB assemblages, and occasionally collared jars are found (as at Biggar Common in South Lanarkshire: Sheridan 1997, Fig. 17.3, and at Claish, Stirling: Sheridan 2002); this form is absent from the Lockerbie Academy assemblage. The consistency of the earliest CB tradition is reflected not only in vessel form, fabric and finish, but also in such characteristics as the thickening of the neck towards the rim in some shallow-bellied bowls (as, for example, at Pencraig Hill, East Lothian: Sheridan 2007b; MacGregor & McLellan 2007, Fig. 2.24, V3).

The CB assemblage at Lockerbie Academy is closely comparable with that found at the other large Early Neolithic house structures in Scotland at Claish, Stirling and at Crathes Warren Field, Aberdeenshire (Sheridan 2009); the assemblage at the other excavated structure of this kind, at Balbridie in Aberdeenshire, represents an early modification of the CB canon. The similarity extends to the nature of the assemblage, with small amounts of a large number of vessels being present. The similarity is also echoed in the radiocarbon dates obtained for the Lockerbie Academy structure, which are very closely comparable with those obtained from short-lived species samples from Claish and Crathes (Sheridan 2007a, Fig. 7 and appendix). Recent Bayesian analysis of the Claish and Crathes dates indicate that use of both of these structures was short-lived (with 68% probability values of 1–50 years' use, dating between 3720–3670 and 3680–3640 cal BC for Claish, and of 1–65 years' use, between 3800–3740 and 3750–3695 cal BC, for Crathes: A Bayliss *pers comm*). Given the dates obtained for the Lockerbie structure (see above), it is very likely that Bayesian analysis would reveal a similarly short use life for the Lockerbie Academy structure.

As discussed elsewhere (eg Sheridan 2007a), the ceramic and dating evidence – not just from these large rectangular structures, but also from various domestic and funerary sites elsewhere in Britain and Ireland – points towards the introduction of a well-established Continental tradition of pottery manufacture to Britain and Ireland early in the fourth millennium BC. As far as its presence in Dumfries & Galloway is concerned, the closest findspot to the Lockerbie Academy structure is at Kirkburn, also in Lockerbie, where CB pottery was found in several pits (Cormack 1963, eg fig. 6, pits 14 and 54). This site is less than a kilometre from the Lockerbie Academy structure/s. Further afield, a pit at Carzield, Kirkton produced parts of two traditional CB vessels and radiocarbon dates of 5010±70 BP (Beta-68480, 3966–3649 cal BC at 2σ, from hazelnut shells plus short-lived tree charcoal) and 4920±110 BP (Beta-68481, 3962–3383 cal BC at 2σ, from hazelnut shells: Maynard 1993). Similar pottery was found sealed on the old land surface at Pict's Knowe, on the other side of Dumfries (Peterson & Roberts 2007, 132–3 and Fig. 14.1.1), and further examples were found at the long cairns excavated by Lionel Masters at Lochhill and Slewcairn (Masters 1973), and, further along the coast, at the simple megalithic monument at Cairnholy 1 (Piggott & Powell 1949, Fig. 7.1). As for the CB pottery found at the two cursus monuments at Holywood near Dumfries, that from Holywood South represents what has been described elsewhere as 'modified CB pottery' (Sheridan 2002; 2007a) – a type developed from 'traditional CB' pottery – while that from Holywood North is closer to traditional CB in form (Peterson & Roberts 2007, 221–2). The Holywood South pottery came from a pit (undated) that is believed by the excavator to pre-date the cursus bank (Thomas 2007, 241). The Holywood North pottery is believed to relate to the first phase of cursus construction, and is associated with a radiocarbon date (from burnt hazelnut shell) of 4960±35 BP (SUERC-2115, 3890–3650 cal BC at 2σ); while subsequent phases of cursus construction there post-date this (Ashmore 2007a & b), this date is comparable with those obtained for the Lockerbie Academy structure/s.

3.5 Fired clay, by Sue Anderson

Ten small fragments (9g) of abraded fired clay in very fine pink and buff fabrics were found in two post-holes and a beam slot related to the Neolithic structure, F17A, F108 and F152. A fragment of very friable ?lime mortar with a flat surface, pinkish in colour and containing coarse quartz sand and pebbles, was found in post-hole F145. The latter is likely to be intrusive.

3.6 Flint, by Graeme Warren

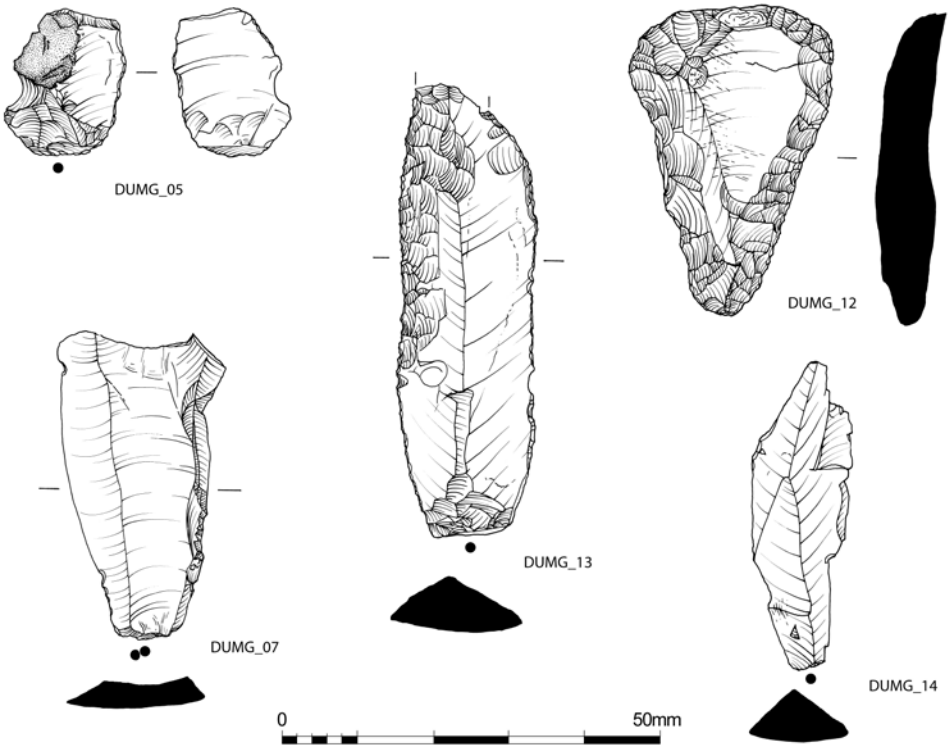
Twelve flint artefacts were recovered. The material is fragmentary, with 42% broken and 75% edge-damaged; in many cases this edge damage clearly does not relate to use of the artefacts. Material was recovered from a variety of pit, post-hole and construction trench fills (illus 8b). Notably, ten were found within the central compartments of the structure, with only a single flake being recovered from an irregular pit (F126) at the northern end, and a blade fragment (14) (illus 11) was recovered from F152 towards the southern end (illus 8b). Given the evidence of spatial patterning to the stone tools recovered from Warren Field indicating particular areas where stone tools were produced (Warren 2009), this pattern is of some interest, and should be compared to the distribution of other material, especially ceramics, at Lockerbie Academy.

Two-thirds of the flints were burnt, in some cases badly, and in all cases evidently after flaking. The deposit of three unburnt flints, two flakes and a blade in the primary fills of F3 is notable as the only concentration of material not affected by burning: this included a fragment of a polished flint object. These artefacts, from a primary phase of construction, are likely to be chronologically separate from the other artefacts, associated with use or destruction. However, technologically the assemblage is broadly homogeneous, and observations from other halls indicate that treating an assemblage from the hall as a unit is legitimate. As such, this assemblage is very much in keeping with other hall sites in Scotland. Assemblages from Balbridie and Warren Field are both larger, but include significant numbers of finds from topsoil. The assemblage from Claish did not include recovery from topsoil, and totalled only seven struck pieces (Barclay *et al* 2002).

Table 2 Composition of primary lithic technology

Blank	Total	No. retouched
Blade	4	1
Chunk	1	0
Flake – regular	3	2
Flake – indeterminate fragment	3	0
Frag of polished object	1	1

With one exception, the fragment of a polished object noted above, the assemblage consists entirely of debitage *sensu stricto* (Table 2). No cores are present. Evidence for primary technology on site is therefore limited to information gained from these flakes and blades, which are often fragmentary. They indicate the production of broad and narrow blades, and some broader flakes. In some cases these display strong evidence of platform lipping, and are likely to result from 'soft hammer' production. A single flake probably results from bipolar



Illus 11 Lithics

working. The characteristic forms of working, and the debitage-dominated structure to the assemblage is very much in keeping with halls from elsewhere in Scotland, and indeed with the characteristics of early Neolithic stone working in this region more generally (Warren 2007a). Assemblages, probably mainly later Neolithic, although with potential for mixing, from Beckton, within a few hundred metres of the current site (Pollard 1997), also include very few cores, although bipolar examples are present.
A total of four items are retouched (illus 11).

5. Lightly and irregularly retouched flake.
   This may be 'spontaneous' retouch resulting from use, sometimes described as 'nibbled' retouch (F3/04).
9. Small spall of a polished honey-coloured flint object removed from the working edge of that object.
   Fine polishing striae are clearly visible under magnification. It is not possible to classify the parent object based on this spall (F3/05). (Not illustrated.)
12. A formal end of flake convex scraper.
    A convex working edge has been created at the distal, and extensive modification of both laterals tapers to the platform, which has been removed. The artefact is both heavily abraded, possibly from use, and later burnt (F112/04).
13. Edge-retouched knife on a fine long blade of flint, presumably imported.
    Acute light retouch characterises one lateral, with the distal receiving more invasive treatment. At the distal, this approaches a plano-convex knife in treatment and a fragment may have been classified as such (F149/02).

Two blades are also illustrated (illus 11, nos 5 and 14).

The range of retouched pieces is broadly in keeping with timber halls in other parts of Scotland, with the presence of convex scrapers, a variety of edge retouched forms and ill-defined knives and edge-retouched forms (Warren 2007a). The presence of elongated plano-convex knives, arguably on blade blanks of imported flint, is also well attested in the region. The presence of a fragment of a polished artefact is much more unusual, with Warren (2007a, 42) commenting on the absence of polished stone axes from secure early Neolithic contexts in the region.

The small assemblage from the timber hall at Lockerbie Academy is therefore very much in keeping with the characteristics from such halls elsewhere in Scotland, and more broadly, with earlier Neolithic industries in the east of Scotland, which themselves are broadly comparable with industries in other parts of Britain and Ireland.

Our understanding of the structure of Neolithic stone working in the south of Scotland is weak, and the influence of different raw material regimes on stone working is difficult to assess. The south of Scotland is characterised by the 'superabundant' (Wickham-Jones & Collins 1978) presence of a blue/grey chert in primary and secondary geological contexts (one piece of this material was recovered from Area D, below). Most Mesolithic assemblages across the central and eastern parts of the Southern Uplands in general are often characterised by extensive use of this stone, which outcrops within 40 miles of Lockerbie, and was demonstrably quarried in early prehistory, probably in the Mesolithic (Warren 2007b). The local use of chert in the Mesolithic is also demonstrated at Star and Smittons (Finlayson 1990) whilst Ward and colleagues have identified Mesolithic activity at Daer Reservoir (*c* 8550–7950 cal BC) within 20 miles of Lockerbie, again relying on a variety of raw materials (Ward 1995; Ward 1997; Ward 1998). Small lithic assemblages from Beckton, Lockerbie, broadly associated with later Neolithic activity (Pollard 1997), are dominated by flint, but chert, pitchstone, mudstone and quartz are also present in significant proportions. In this broader context, the exclusive reliance on flint of the Early Neolithic industry at Lockerbie Academy is unusual, although the small sample size, and the absence of more detailed chronological modelling of changes in raw material use over time means that caution is needed in interpretation.

3.7 Bone, by Sue Anderson

Thirteen features (fourteen contexts) produced small quantities of burnt and calcined bone from samples or hand-collection, much of it chalky and abraded. Most groups weighed less than 5g and consisted of tiny fragments too small to identify to species. Most were identified as possibly or probably animal. Fragments from F13 were identified as possibly human. Two unburnt fragments of small mammal bone from F208 may be intrusive.

3.8 Charred plant remains, by Mhairi Hastie

3.8.1 Methods and results

Sixty-six samples were retained from deposits associated with the Neolithic timber hall. Fifty-two of these samples were processed for the retrieval of palaeobotanical remains and artefacts. No floor surfaces were preserved and all of the plant remains were recovered from negative features such as post-holes and pits.

Twenty-nine samples contained some carbonised plant remains including cereal grain, nutshell and seeds of wild taxa. The plant remains were generally spread throughout the structure, although the largest concentrations of cereal grain and hazelnut shell were observed to come from features located at the southern end of the timber hall. The grains were extremely abraded, indicated by the large number

Table 3 Neolithic timber hall: summary of carbonised cereal remains by feature type

		Feature type	SW	EW	WW	PIT	T1	T2	T3	T4	T5
Latin name	**Plant part**	**Common name**									
Wild taxa											
Corylus avellana	nutshell	hazel	+	+++	+	+	++	+++	++	++	+
Rumex sp.	seed	dock					1				1
Bud indet	bud	indeterminate			1						
Seed indet	seed	indeterminate		1	1						
Monocotyledon rhizomes			+	+			+	+			+
Other plant remains											
Linum utatissimum	seed	cultivated flax	6	14	18		1		2		
Linum cf. *utatissimum*	seed	cultivated flax					1		1		
Cereal indet											
Triticum sp.	caryopsis	wheat		8	5	13	2	2	2	9	
cf. *Triticum* sp.	caryopsis	wheat		2			1				
Triticum dicoccum L.	caryopsis	emmer wheat		9	2	10		2	5	19	
Triticum cf. *dicoccum*	caryopsis	emmer wheat		2						1	
Triticum sp.	spikelet fork	wheat	1			1					
Triticum dicoccum L.	glume base	emmer wheat						1			
Triticum cf. *aestivo-compactum*	caryopsis	bread/club wheat		1							
Hordeum sp.	caryopsis	barley		7		3	3	1	1	3	1
cf. *Hordeum* sp.	caryopsis	barley				1					
Hordeum naked	caryopsis	naked barley		2					1	1	
Hordeum naked (ST)	caryopsis	naked barley						1			
Avena sp.	caryopsis	oat		1						1	
cf. *Avena* sp.	caryopsis	oat				1			1		
Cereal indet	caryopsis	indeterminate	4	33	11	49	3	7	6	10	2

Key: SW = south wall, EW = east wall, WW = west wall, PIT = pits, T1–T5 = Transverse I–V, + = rare, ++ = occasional, +++ = common and ++++ = abundant

of grains that could not be identified to species level (highlighted in the 'cereal indet' row in Table 3).

The cereal grain was dominated by wheat (*Triticum* sp.), a small number of which were identified as emmer wheat (*Triticum dicoccum*) and one possible bread/club wheat (*Triticum aestivo-compactum*). In addition, small quantities of naked barley (*Hordeum* sp.) and grains of oat (*Avena* sp.) were recovered. None of the oat had palea and lemma attached, and it was not possible to distinguish between the wild and cultivated species. A small assemblage of wheat chaff was recovered, comprising glume bases and spikelet fork fragments. One of the chaff remains was sufficiently preserved to be identified as emmer.

Small burnt fragments of hazelnut shell (*Corylus avellana*) were recovered from twenty-five samples, and cultivated flax seeds were present in seven of the samples. In addition, small fragments of charred rhizomes (underground stems) and what may be culm bases were recovered from a small number of the samples.

Low concentrations of charcoal were recovered from all of the processed samples; thirty-six samples containing charcoal fragments suitable for species identifications (4mm or greater). The charcoal was dominated by plate-like fragments of oak with large concentrations of oak charcoal recovered from features F112, F117, F125, F149 and F161. Occasional small amorphous fragments of alder (*Alnus* sp.) and hazel (*Corylus* sp.) were also recovered. One particularly small fragment of possible willow (cf. *Salix* sp.) was present in the fill of a post-hole (F114) forming part of the eastern wall of the hall.

3.8.2 Cereal processing and collection of wild resources

The Neolithic plant assemblage was dominated by wheat along with small quantities of naked barley. Although the quantity of the grain recovered is small it does correlate with a repeated pattern throughout Britain, with emmer often the most

abundant species identified, along with barley. The small quantity of oat grains recovered is likely to be the wild variety (*Avena fatua*) growing as weeds in arable fields.

The small cereal assemblage recovered from the timber hall contrasts markedly with the high concentrations of grain found at other similar structures, for instance at Hambledon Hill, Dorset (Robinson 2000), Lismore Fields, Derbyshire (Jones forthcoming) and Balbridie, Aberdeenshire (Fairweather & Ralston 1993). The recovery of carbonised grain from numerous internal features does indicate that like the other sites, grain was being handled within the structure. The largest quantity of nutshell and grains was recovered from F15, F114, F149, F152, all located in the southern half of the hall, and this may indicate that food processing or storage was being carried out towards this end of the building.

The large grain assemblages recovered from a number of timber structures, namely Balbridie and Lismore Fields, might demonstrate that large-scale cereal growing, processing and storage was being carried out in the Neolithic period. There was no evidence, from either site, for grain storage pits, and Fairweather & Ralston (1993) suggest that the grain was being stored in the timber hall, on floors raised above ground level. Whether this storage was long- or short-term cannot be gleaned from the evidence to date. The presence of large-scale grain stores does, however, suggest that cereal cultivation was managed and enclosed, rather than produced through an informal system. Production of large quantities of grain would have required the organisation of cultivation plots and the management of these areas, although as yet there is very little data to indicate the size and arrangement of these plots, and whether they were permanent features. Evidence from a Neolithic farm at the Knap of Howar (Ritchie 1983) indicated that, to the south of the houses, midden material had been spread out to form a layer of uniform thickness over an area stretching 20m, and Ritchie suggests that this surface had been created specifically for intensive cultivation.

Cereal chaff from Neolithic contexts tends to be extremely scarce and the plant remains at Lockerbie Academy follow this trend, with only two chaff fragments being present. In most cases the chaff material recovered from British Neolithic sites is from hulled cereals, including emmer and possible einkorn (*Triticum monococcum*). The removal of the hulls can be aided by parching of the grains over the fire. Any charred chaff remains from this process would be less susceptible to fungal attach and degradation, and are more likely to survive in the archaeological record compared to uncharred remains. The general scarcity of this material, from Neolithic contexts, may augment the possibility that de-husking of the grains was carried out by other processes that did not require fire – such as pounding or rubbing – crop-cleaning by-products remaining from such processes are less likely to be preserved in the archaeological record.

The range of wild taxa recovered from British Neolithic sites is more limited than those identified from European sites, and Lockerbie Academy is no different in this case. Only a small quantity of hazelnut shell, waste nutshell fragments, have been recovered from the Neolithic contexts; unlike European sites, no fruit stones/remains of legumes or other wild plants were recovered. This is principally a factor of the processing activities used to prepare these plant types; unless the plant material being used has become charred it is unlikely to be preserved in the archaeological record. Much of the plant material recovered from European sites is recovered from waterlogged deposits, the plant remains being preserved in anaerobic conditions. Such waterlogged deposits are rarely encountered on British Neolithic sites, although on the rare occasion when waterlogged plant assemblages are uncovered it is clear that a range of fruits were collected from the wild during this period, including apples, sloe berries and blackberries (Robinson 2000).

The charcoal assemblage recovered from the structure consisted principally of plate-like oak charcoal fragments. These plate-like fragments probably originated from large oak timbers rather than fragments of roundwood, and given the spread of the oak charcoal, within post-holes which run the length of the structure, the charred timber fragments are most likely structural timbers and suggest that the building was destroyed by fire. Evidence from other Neolithic halls, including Claish, Lismore Fields, Balbridie and Warren Field (Murray & Murray 2006) also indicate that these structures were destroyed by fire; the hall uncovered at Lockerbie Academy therefore fits into a well-established pattern.

Aside from oak charcoal, occasional small fragments of scrubby species, including alder, hazel and willow, were also present in post-holes and pit fills. Hazel is typical of mixed deciduous woodland, probably deriving from the woodland under-storey, while alder and willow would be more typical of wetland or streamside locations. All species would have been collected for use as flooring, bedding, fuel and building materials. Due to the small assemblage recovered from Lockerbie Academy, no meaningful observations can be made about woodland management or fuel use.

3.8.3 Cultivation of flax

Recently, there has been an increase in the recovery of linseed (flax) from archaeological deposits, probably as a result of the greater use of soil flotation methods and finer mesh sizes during the processing of bulk soil samples. As a result, flax seeds are now commonly found on medieval and Norse sites, and have been recovered from several later prehistoric sites. The recovery of flax from

Neolithic deposits is, however, still rare. A few seeds have been found at Windmill Hill, Wiltshire and Balbridie (Fairweather & Ralston 1993), Lismore Fields (Jones forthcoming), The Stumble, Essex (Greig 1991), and Achnasavil, Kintyre (Carter & Tipping 1993). The presence of a number of cultivated flax seeds within Neolithic deposits at Lockerbie Academy affirms that flax was indeed being cultivated during this period of prehistory. Compared to other Neolithic sites the quantity of flax seeds recovered at Lockerbie Academy was proportionally much higher relative to the number of cereal grains recovered (Bishop 2007).

There are two possibilities for the recovery of flax seeds from the building: seeds charred during the processing of linseed oil, or a store of flax seeds burnt during the destruction of the building.

Flax processed for linen does not require to be dried, therefore limiting the chance of the flax becoming charred and being preserved in the archaeological record, and the small numbers of flax seeds recovered from prehistoric or later sites are likely to be the result of seeds accidentally burnt during the processing of linseed oil. Linseed oil could have been used for a number of different processes, for instance food preparation/cooking, medicinal uses, for the oiling of wood and/or leather objects, and preserving hemp rope. The crushed seeds left over from production of the linseed oil could also have provided a nutritious animal fodder. While the spread of flax seeds from Lockerbie Academy could also be interpreted as being the remnants of seed processed for oil, it is equally possible that the charred seeds, recovered from the structure, are the remains of a store of flax burnt when the building was destroyed by fire. The bulk of the flax seeds were recovered from the southern end of the building, within postholes associated with the wall of the structure, and may suggest that a store of flax seeds was being kept at this end of the building, burnt seeds finding their way into posthole fills as the remaining unburnt posts rotted.

The cultivation of flax requires good preparation of the land where it is to be grown. Boase (1918) states that 'the land must be deeply worked and firm, with a shallow surface layer to cover the seed after sowing. This is important as the crops grow very rapidly', and intensive weeding is required so that the weeds 'do not spring up and choke it'. Crop rotation is necessary as flax is an exhausting crop, and a gap of seven years between sowing in the same fields is required (Clapham 1986). It is not a restorative crop, as it is pulled rather than cut during harvesting; the seeds are saved for sowing and the straw for fibre, so nothing goes back to the land. The cultivation of flax is, therefore, time-consuming and laborious. With this in mind, it is likely that the growing of flax and production of linseed oil were seen as an important commodity; for instance linseed oil being used particularly for ceremonial activities, or considered to be high status.

3.9 Discussion of the Neolithic structure

Despite the degree of plough truncation that has affected the external western wall and much of the northern end of the Lockerbie Academy timber hall, the hall shows a number of similarities with those excavated at Balbridie, Claish and Warren Field. Although it is by no means certain that all of these structures would have served the same function, many of the similarities between them are remarkable; they all have fairly similar dimensions (Balbridie 24m × 12m, Claish 24m × 8.5m, Warren Field 24m × 9m and Lockerbie Academy up to 27m × 8 m), they all had substantial internal divisions and they all contained fairly large assemblages of material culture. It is also of note that all four timber halls are situated within areas that are particularly fertile and would have been capable of sustaining a comparatively large population density.

3.9.1 Structure

From the surviving ground plan, it is hard to ascertain exactly how the building was laid out and constructed. It has been noted by Ian Ralston (*pers comm*) that there is a lack of post-holes along the axial line. This situation was also apparent at Warren Field, where the axial line was defined by just two massive post-holes, one placed towards either end of the structure. Murray *et al* (2009) have suggested that the axial posts were positioned first and the rest of the building was laid out in relation to them. Possible axial posts (F134 and F155) were present at Lockerbie Academy, but these were not on the massive scale that they were at Warren Field, suggesting that they played a much less pivotal role in the structure of the building. The plan of the Warren Field hall also suggests that the external walls may have provided a significant element of its structural integrity, whereas the timbers of the internal divisions appear to have been fairly insubstantial in comparison. In contrast, at Lockerbie Academy the layout of the internal divisions suggests that the support for the roof was provided by longitudinal beams positioned on either side of a central aisle, with a much lesser structural role being played by the less substantial external timbers. This appears broadly to parallel the layout at Claish, suggesting structural similarities between these two timber halls. The structural importance of the internal elements at Lockerbie Academy would perhaps explain why they have survived, whereas the less substantial external elements may have been removed by plough truncation.

In the majority of cases, the internal divisions extended towards the axial aisle running through the building approximately at right angles from both the postulated positions of the longitudinal north–south orientated side walls, leaving a 1.6m wide aisle running up the centre of the building. This central aisle is largely unencumbered by any

internal structural features, such as posts underlying an axial ridge beam. Substantial post-holes situated on either side of the aisle would probably have supported the two main roof beams set atop the following features respectively: F145, F17A, F112, F147, F3 (eastern side) and F161A, F144, F149, F2 (western side). Further longitudinal roof purlins would have been positioned at decreasing heights dictated by the pitch of the roof and could also have been supported by the internal divisions as they extended from the central aisle of the structure towards the external longitudinal walls. Such purlins would not necessarily have had to consist of a single length of timber running the full length of the structure, as the gaps between the internal divisions were no greater than *c* 4.5m. Indeed cutting and raising a single longitudinal beam to such a position would have been a major engineering task, as would placing a longitudinal beam along the ridge of the building. Once a selection of shorter beams was set in place, this would have allowed a framework of smaller timber to be lashed together to provide the structural rigidity necessary to support the weight of the roof. Support for an axial ridge beam may have been provided by king-posts that sat on cross-beams bridging the central aisle between the two halves of each internal division.

As mentioned previously, the Lockerbie Academy timber hall had six possible internal divisions (Internal Divisions 1–6 numbered from south to north), dividing it into seven separate compartments (Compartments 1–7 from south to north) or five internal divisions dividing it into six compartments if the separate structures interpretation is adopted. The southernmost compartment was very narrow, with the entranceway into the neighbouring compartment being offset towards the western side of the structure, while the entranceway from the outside appears to have been fairly centrally placed. This narrow first compartment with a screen placed directly in front of the entranceway is broadly paralleled at Balbridie and may have been intended to prevent the wind from blowing straight up the middle of the building.

The following compartment was also fairly narrow, with the combined length of the compartments A and B being approximately equal to the length of each of the following individual compartments. This would give a fairly standard gap of *c* 4–4.5m between the transversal posts supporting the longitudinal purlins in the roof, meaning that the longitudinal purlins would not go unsupported over a greater distance than the aforementioned measurements. The approximately equal size of each compartment might simply relate to the structural integrity of the hall or it could give an indication of social divisions, be they of function, gender, kinship or even age.

Viewed as a separate structure, the smaller northern structure would have been almost trapezoidal in shape, measuring *c* 7.5m × 5.5m externally. For a structure of this size, the post-holes appear to have been particularly massive, with the largest (F116) measuring up to 0.9m in diameter and the post-hole for the possible centre post (F155) measuring 0.92m × 0.63m. Post-holes of this magnitude are on a par with the largest identified for the southern part of the structure and seem out of proportion to the size of the northern structure. It is also unclear why such a massive central post was required, as this would have severely restricted the internal space. It is also perhaps of note that the gap between the southern wall of the northern structure and the northernmost internal division of the main structure was almost identical to the width of the two internal compartments that lay immediately to the south.

While these factors would appear to tip the balance in favour of the single structure interpretation, the misalignment of the internal posts to the north of the F2/F3 transverse combined with lack of features remains problematic. Certainly, it would be difficult to project a meaningful beam-line beyond F2/F3 based on the position of post-holes F132 and F164, but a transversal beam between F117 and F135 would have meant that the beam-lines would not necessarily have had to directly overlie the post-holes. However, this explanation fails to explain why the building technique changed from aligned post-pits creating a broad central aisle to a row of misaligned post-holes.

Another question that remains unanswered is why the western side and the north-eastern side should have suffered from such a considerable degree of truncation when compared with the southern and northern ends and the southern part of the eastern side. Pauketat and Alt (2005) have suggested that a team of excavators would have produced post-holes of differing depths according to arm length, while Loveday (2008) has suggested that turf rather than wood may have been used where there was no evidence of the side walls. While the ideas put forward by Pauketat and Alt are probably not applicable to Lockerbie Academy, the use of turf is an interesting suggestion, as this material would leave little or no trace in the archaeological record after several decades of ploughing. The use of turf could certainly explain the missing western wall and allow the two parts of the building to be linked up to create a single larger structure. Furthermore, even where it was apparent that wood had been used for the outer walls, there is no reason why it could not have been faced with turf to provide better insulation and additional structural support. However, with no direct evidence the use of turf is largely speculative.

The arguments for the two interpretations can be summarised as follows:

Single structure (illus 4.1)

- Possible axial posts can be identified at the northern and southern ends of the structure.
- The misalignment of the northern part of the structure can perhaps be explained by plough truncation or the former presence of an archaeo-

logically undetectable material such as turf that may have extended the line of the outer walls further to the north.
- The post-holes at the northern end of the structure are of similar size to those at the southern end, and appear disproportionately large for them to be forming a smaller separate structure.
- There is no evidence of a post-hole between F2 and F3, which might have indicated the northern axial post of a shorter main hall with a separate structure to the north.
- The misalignment of the posts forming Internal Division 6 can be explained by a possible transversal beam that could have supported the longitudinal beams without them having to sit directly on top of the posts.
- At *c* 4.5m, the gap between Internal Divisions 5 and 6 is broadly the same as it is for the three preceeding compartments.
- Radiocarbon dates suggest that the northern end of the structure is contemporary with the southern end.

Separate structures (illus 4.2)

- The northern part of the structure is misaligned with the southern part. It is also slightly narrower, and the curve of the gable appears to be considerably tighter than that at the southern end.
- Internal Division 6 consists of separate post-holes, whereas those of the other internal divisions consist of construction trenches that are separated by a broad central aisle.
- The post-holes constituting Internal Division 6 are misaligned with the perceived line of the longitudinal beams.
- There is a large gap between Internal Divisions 5 and 6 containing no obvious features.
- The post-hole for the northern axial post of the southern structure may have been removed by plough truncation, or some other system of structural support may have been in place at this end of the structure.

Due to the poor survival of this structure it has not been possible to ascertain which interpretation is most likely to be correct and based on the available evidence the author considers both to be of equal merit.

3.9.2 Function

Since the excavation of Balbridie, there has been a significant increase in the number of structures in Scotland that have been classified as 'timber halls'. Much of this increase can be attributed to an Aerial Survey Programme commenced by the Royal Commission for Ancient and Historical Monuments of Scotland (RCAHMS) in 1976 and consequently, a number of sites are known only from cropmarks and remain undated. This has sparked a considerable amount of debate as to whether structures of a superficially similar morphology would have served the same function, or indeed, would even have dated to the same period. In a recent article Kenneth Brophy (2007) has argued for two separate phases of timber hall construction during the Neolithic; an early Neolithic phase consisting of roofed or roofable halls and a Later Neolithic phase consisting of unroofed structures. The radiocarbon dates obtained for the Lockerbie Academy hall place it firmly in the former category and make it broadly contemporary with the previously excavated examples of Balbridie, Warren Field and Claish.

While the similarities between these structures are undeniable, there is considerable debate as to their function. Early interpretations (Kinnes 1985) suggested a largely domestic function reflecting an early farming community that was both permanent and sedentary, and parallels have been drawn with the European longhouses. There can be little doubt that the Lockerbie Academy timber could have functioned as a domestic dwelling. The size of the structure would have easily housed an extended family and the internal divisions may indicate that different activities were carried out in different areas of the building.

Others (Topping 1997; Barclay *et al* 2002; Cross 2003) have argued for a more multi-faceted role, Brophy (2007) suggesting that they served a purpose that went beyond the purely functional. One suggestion is that they served as buildings for communal gatherings (Cross 2003) and were perhaps used for large-scale feasting. The animal bone, nutshell and pottery identified at Lockerbie Academy certainly indicate that food preparation was undertaken within the structure, but there was no clear evidence that this was carried out on anything more than a domestic scale. It is also perhaps of note that the internal compartments were of approximately the same dimensions, with no apparent effort being made to create a single large open space that would have accommodated a large gathering. This was also the case at Claish, where the closely spaced post-holes do not appear to have been conducive to large volumes of people, but at Balbridie, Ralston has suggested the structure 'had been laid out so as to provide two substantial blocks of space with little in the way of structural encumbrances (Ralston 1982, 242). Furthermore, Ashmore (1996, 32–3) has suggested that if Balbridie had been used for feasting, it could have perhaps accommodated somewhere in the region of 30–50 people. Warren Field also had the kind of substantial blocks of space that would have made it suitable for communal gatherings. This would perhaps indicate that despite the many apparent similarities between the structures, not all Early Neolithic timber halls served the same function.

A more ritual role has been suggested by Topping (1997) and Barclay *et al* (2002) with the internal divisions representing the control of movement

within the building. Topping (1997) in particular has speculated that Balbridie was a 'cult house of regional significance'. However, ritualism and symbolism pervade many aspects of everyday life so interpretations of this nature would not necessarily preclude a primarily domestic function.

The excavation of the Lockerbie Academy site has now extended the known distribution of Brophy's (2007) 'roofed' timber halls into south-west Scotland and possible further examples are known from aerial photographs at Noranbank, Angus and at Sprouston, Borders. Recently obtained radiocarbon dates would also indicate that Doon Hill A (East Lothian), previously thought to be Early Historic, is in fact Neolithic (I. Ralston *pers comm*). Outwith Scotland, rectangular Neolithic buildings have been excavated at White Horse Stone, Kent (Hayden 2007), Llandygai, Bangor (Kenney 2008), and Parc Cybi, Holyhead (J. Kenney *pers comm*), while in Ireland over 90 rectangular Neolithic structures have been identified (Armit *et al* 2003). However, the majority of these structures were on a considerably smaller scale than the Scottish examples and are more likely to have served a purely domestic function.

The discovery of a previously unknown example so far removed spatially from the known examples, yet being contemporary in dating terms to the previously excavated examples, suggests that large timber halls may have been more widespread than previously thought. Given that the known examples lie within highly fertile areas, it is reasonable to suppose that further examples have fallen victim to plough truncation and that not all surviving structures will be visible on aerial photographs. However, this should not be taken to imply that they were ever commonplace. There are no known examples to the north of Aberdeen, and aside from a possible example at Kirkconnel (Dumfries & Galloway), which is actually considered more likely to be Early Historic in date, there are no other examples towards the western side of the country. While it is unclear exactly what kind of function these structures would have served, any kind of building of this magnitude would imply a degree of social control or co-operation that was beyond the ordinary for the period. Their occurrence within highly fertile areas of the country is likely to imply control over large areas of agricultural ground, and whatever their function, be it primarily domestic, communal or ritual, there can be little doubt that these structures were of great significance to the people of the time.

3.9.3 Destruction

In common with the other excavated examples at Balbridie, Warren Field and Claish, the Lockerbie Academy timber hall appears to have been burnt down at the end of its lifespan. Large concentrations of oak charcoal were recovered from features F112, F117, F125, F149 and F161, and pottery and lithics from the structure showed evidence of burning. A possible slight reddening of the subsoil is also apparent in some of the site photographs, but this evidence is possibly rather conjectural as the site appears to have been heavily truncated and it seems unlikely that even a very severe fire would have scorched the subsoil to any great depth. The experimental burning of ground-set posts by Murray *et al* (2009) suggests that the posts were unlikely to be affected below ground level, and therefore the oak charcoal within the post-holes is likely to represent material that was charred above ground level and dropped down into holes as the unburnt remainder of the post rotted away. It is also unlikely that any material such as lithics or pottery that had already found its way into the post-holes prior to the destruction of the structure would have been affected by the fire. This would appear to leave two possibilities; either that the lithics and pottery were already burnt and were deposited in the post-holes prior to destruction, or that they were above ground at the time of the fire and represent a post-destruction deposition within the post-holes. The spread of radiocarbon dates obtained from charred emmer wheat suggests that burnt material was finding its way into the post-holes during the time that the hall was in use and it could be that there was a similar situation regarding the lithics and pottery. Consequently, the best evidence for the burning of the structure is provided by the concentrations of oak charcoal which was found within post-holes running much of the length of the structure. The destruction of Neolithic structures using fire appears to be a recurring theme, suggesting that it was a deliberate act marking the end of the use of that particular structure.