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A re-interpretation of the Levens Park ring cairn, Cumbria, based on the original excavation archives

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ABSTRACT

The site of a Beaker burial excavated in Levens Park, Cumbria was published by David Sturdy in 1972 as that of a farmstead or place for the living altered into a ring cairn or place for the dead. However, the recent discovery of the excavation archive and contemporary correspondence reveals a far more complex monument than previously understood. We draw attention to a series of important omissions from the excavation report, provide a detailed account of the excavated monument and seek to create a new narrative regarding its development and purpose. We argue that the monument was built as a series of changing structures and demonstrates the idea of monuments in progress and, thereby, the creation of communal memory and identity. The absence of a full report of this excavation means that its wider significance has remained unknown. It represents one of the earliest examples of what Sturdy called 'rescue archaeology' and demonstrates a complex sequence of structural components and burial that contributes to our understanding of the Early Bronze Age. The broader archaeological appraisal of Levens Park, which provided the context for this excavation, represents one of the earlier examples of landscape archaeological survey in Britain.

Introduction

Excavations in Levens Park, Cumbria, North West England, between 1968 and 1971 led to the discovery of a complex monument, described by the excavator, David Sturdy, as a ring cairn but which, he argued, had initially been a farmstead of the Beaker period (Sturdy 1972). This interpretation was important as it allowed the site, designated Site B by Sturdy, to be viewed as an example of 'a house for the living becoming a house for the dead', a concept subsequently developed by Ritchie 1973 and discussed more generally by Bradley (1998). However, contemporary photographs provided by Julian Munby, one of the original student excavators, and the recent re-discovery of a significant part of Sturdy's archive in Kendal Museum, together with other material, suggest that the original published site description is incomplete and requires major re-evaluation. We here draw attention to the salient documents within the archive and

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their implication for understanding better this and other similar monuments within the region and beyond.

The aim of Sturdy's fieldwork and excavations, which he described in his notes as 'rescue archaeology', a phrase then in its infancy, was to evaluate the archaeological impact of a proposed A590 link between the M6 and southern Lake District. Its primary purpose was to present evidence to the associated public enquiry. As such the evaluation was part of a wider landscape appraisal and record, including unpublished fieldwork by Don Benson (pers. comm.). The work included a training 'dig' for students, which may explain why some plans are duplicated or signed and dated as if they were coursework. The lack of a satisfactory report of this excavation (only four pages long and now 50 years old) means that its wider significance has remained largely unknown. In reality, it can now be seen to demonstrate that some monuments developed as sequences indicating practises and purposes much wider than burial alone.

Sturdy's unpublished fieldwork identified several sites of potential interest. These included, among others, his Site A (rectangular 'pillow mounds', overlain by ridge and furrow), Site B (a circular mound) and Site C (a rectangular earthwork long confused under the names of *Diana's Temple* or *Kirkstead*) (Sturdy 1971; Hodkinson 2015). Gibson (1695), for example, referred these names to two separate sites. Whether Sturdy recognised this distinction is unclear. Presumably influenced by the name 'Kirksteads', he considered the earthworks, including elements of Site B to be the remains of a 'Dark Age' monastery thought to have existed at nearby Heversham.

There have always appeared to be mismatches between the circular monument as seen on the ground today and the published site plan. The extent to which the site was 'reconstructed' by Sturdy following his excavation remains, therefore, unclear. The recent discovery of Sturdy's Levens Park excavation archive has shed new light on the monument. Levens Local History Group has now catalogued and digitised this archive that had lain 'hidden' in Kendal Museum for many years (Accession No. KMA 2017 10). Accession numbers with the prefix KMA, used herein, indicate the individual images referred to in this paper. The archive catalogue is now publicly available in Kendal Museum and Cumbria Archives (Kendal). It has also been possible to locate several letters and unpublished interim reports written by Sturdy in connection with his work in the Park. Finds from the excavation, stored in numbered boxes, have also been discovered separately in the muniments room at nearby Levens Hall. Together these archives, which include many photographs, plans, section diagrams, sherds and skeletal remains, permit a detailed re-analysis and interpretation of Sturdy's Site B, the ring cairn structure. Our new interpretation is presented below. It draws attention to a series of surprising and important omissions from the original excavation report, provides a detailed description of the excavated monument and proposes a new narrative regarding its development and purpose.

Site location and context

Levens Park, in Cumbria, North West England (Figure 1(a)), was created in 1393 and its avenue of mature trees laid out in about 1700 (Historic England website). Its original boundaries are unknown but probably extended, much as today, along either side of the River Kent. The Park, including the 'ring cairn' (at 54° 16′ 0.07.59" N, 2° 45′ 40.71" W,

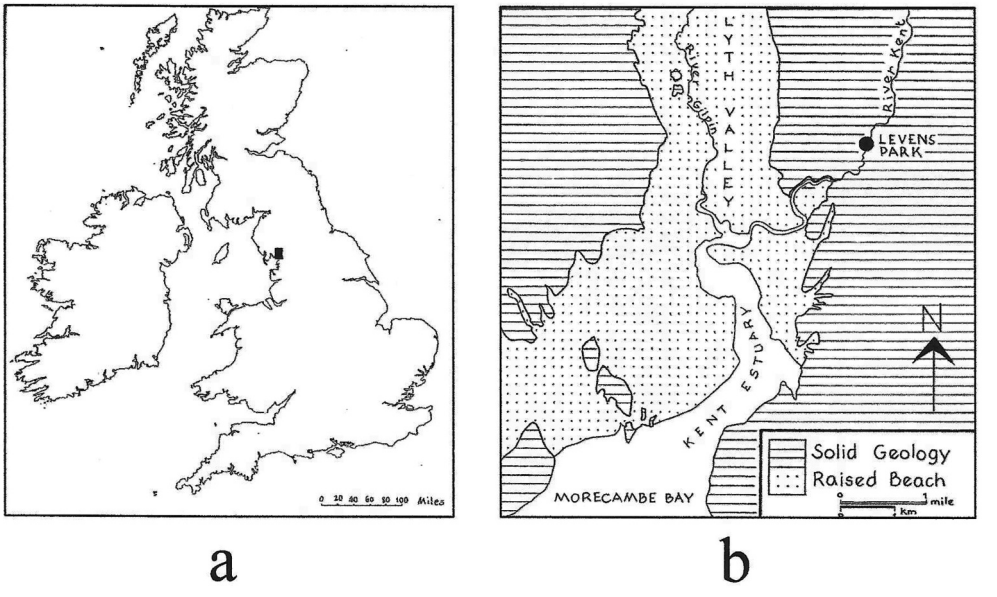

Figure 1. Site location s in Levens Park. (a) within Britain and Ireland; (b) relative to Morecambe Bay (courtesy of Geoff Brambles).

Grid reference SD505863), is located just above the point where the river ceases to be tidal and below the first of a series of cascades where the narrow bed cuts deeply into the carboniferous limestone bedrock of the wider Kent valley between Kendal and Morecambe Bay.

In the Late Mesolithic to Early Neolithic, contemporary with the earliest archaeological material from the site, raised bogs were developing on the extensive beaches around the fringes of what is now Morecambe Bay (Figure 1(b); Smith 1959; Powell, Oldfield, and Corcoran 1971; Hodgkinson et al. 2000). The most extensive was in the Lyth Valley, lying immediately west of Levens and the limestone ridge that extends southwards from Kendal Fell and Cunswick Scar. Sizergh Fell, at the southern end of this ridge and overlooking the Kent Valley and Levens Park, is topped by a prominent, glacially-moulded rocky knoll resembling a large burial mound, but with three genuine burial mounds nearby (McKenny Hughes 1904a; Edmonds and Evans 2007). At least one of the latter is of Beaker date, but significantly one can also be described as a ring cairn or dished mound of the middle to late Neolithic period (Edmonds and Evans 2007). South of the Kent and Levens Park the limestone continues to the putative Neolithic habitation site of Storrs Moss (Powell, Oldfield, and Corcoran 1971), to the east of which, at the head of a former wetland, lies the early Bronze Age ring cairn/dished mound at Borwick Manor Farm, 14 km south of Levens (Olivier et al. 1987).

The Levens Park ring cairn lies in what in Mesolithic and Neolithic times would have been a 'resource rich area.' It would have lain at the head of an estuary, just below the first of a series of river rapids where migratory salmon were abundant (Figure 1(b)). It was also near a spring and was located on a shelf of carboniferous limestone with a veneer of glacial drift, offering good browse or arable potential.

Original excavation and interpretation

One fundamental problem with Sturdy's (1972) short published account is that it did not describe or illustrate the site's appearance before excavation. It was, however, *not* the site '700 yards N of Levens Bridge' described by the Royal Commission in 1936 (RCHME (1936), current schedule CU94), as confusingly suggested by Turnbull and Walsh (1996) in a paper on the Levens Park beakers. This site lies outside the Park.

In his brief published account and plan (Figure 2(a)) Sturdy reported several key structural components. Essentially these were an outer ring of boulders within which were two main features. These were, firstly, a circular wall with an entrance and a central, disturbed Beaker burial, and, secondly, built against that wall, was a small cairn, at the centre of which was a boulder, with another grave beneath. At least two additional burials were found (see Figure 2(b,c)), and below everything were numerous flints of Late Mesolithic character (Cherry and Cherry 2000).

The structural elements recorded in Figure 2(a) were interpreted by Sturdy as those of a Beaker farmstead that had subsequently been used for burial. In his opinion a round house had stood within a circular enclosure and at some point the dwelling had been partly demolished and a grave inserted into it; the obvious inference being that the grave contained the body of the person who had lived in the 'house'.

The excavations also revealed a structure thought to be a kiln near the southern edge of the monument, some disturbance possibly by early antiquarians, and other details that did not appear to fit the Beaker farmstead hypothesis and which Sturdy suggested might belong to 'Dark Age' activity. Although these different phases were only briefly mentioned in Sturdy's published account there is, in the unpublished archive, a sketch (Figure 3) that reveals how he envisaged the development/sequence of the site over the last four thousand years, excluding the flints and antiquarian digging (Sturdy 1971).

Considerable doubt, however, has always existed as to precisely what was found. For example, the number of Beakers reported at the time of excavation was three (Sturdy 1971) but Turnbull and Walsh (1996) found only two represented by the sherds now in Levens Hall. Re-examination of these sherds suggests, however, that whilst the majority do belong to two Beakers one sherd may be from a third vessel (Blaise Vyner pers. comm.). Similarly, the four burials reported by Sturdy in his unpublished report of 1971 and the four shown on the plan of Turnbull and Walsh (1996) (Figure 2(b)) are difficult to reconcile with the evidence of Figure 2(c) where at least five more are indicated. Likewise, whilst Turnbull and Walsh (1996) (Figure 2(b)) designated the Beaker burial 'B1′ and the boulder burial 'B4′, the beaker sherds in Levens Hall are labelled, presumably by Sturdy, as being from 'burial 2′.

For over forty years we have relied on Sturdy's published account, subject to later nuanced interpretation. Clare (1973, 2007), for example, suggested that the central penannular structure was not a dwelling but a ring bank/ring cairn against and into which subsequent burials were made and that they were all 'sealed by a circular mound with kerb' (Clare 1973). Rather than the monument being a house for the living converted into a house for the dead, he suggested that it was a place for the dead built in imitation of one for the living. Sturdy himself suggested that the structures/rings he described did not appear to have been very substantial walls, stating that above the footings the circular walls were built like 'tennis balls resting on footballs' (Sturdy 1972).

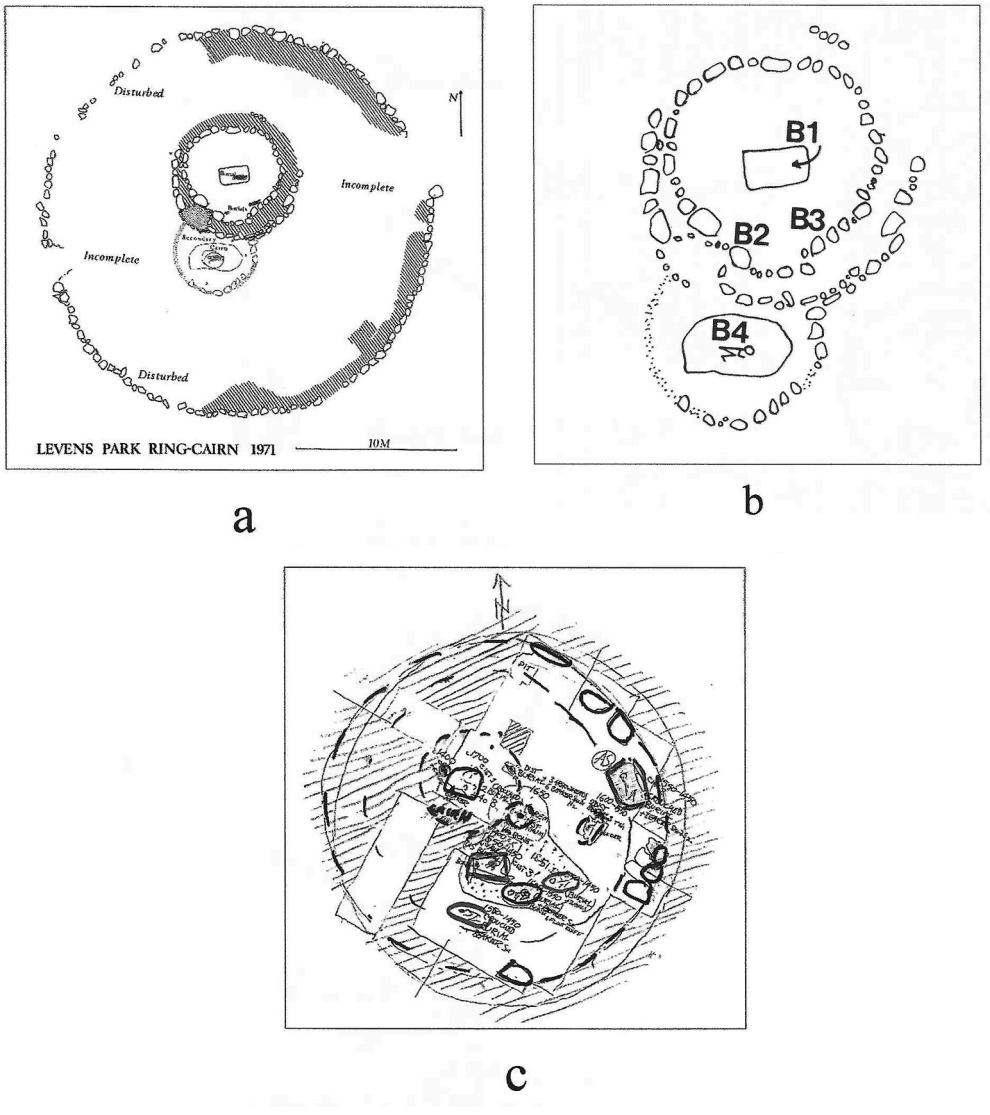

Figure 2. Published and unpublished plans of the site and burials. (a) Sturdy's (1972) published site plan (KMA B072); (b) position of the burials relative to the internal structures (from Turnbull and Walsh 1996) (c) unpublished drawing showing several *additional* burials to those shown in Figure 2(b) (KMA B001).

New evidence and site re-interpretation

The appearance of the site before excavation

Sturdy began his excavation in 1968 and continued in the following two years (Sturdy 1969, 1971). In these two unpublished accounts he referred to Site B before excavation as a 'circular feature … evident on the ground and from air photographs'. He reported commencing work on this site with a trench from the 'north' stating that 'The lower

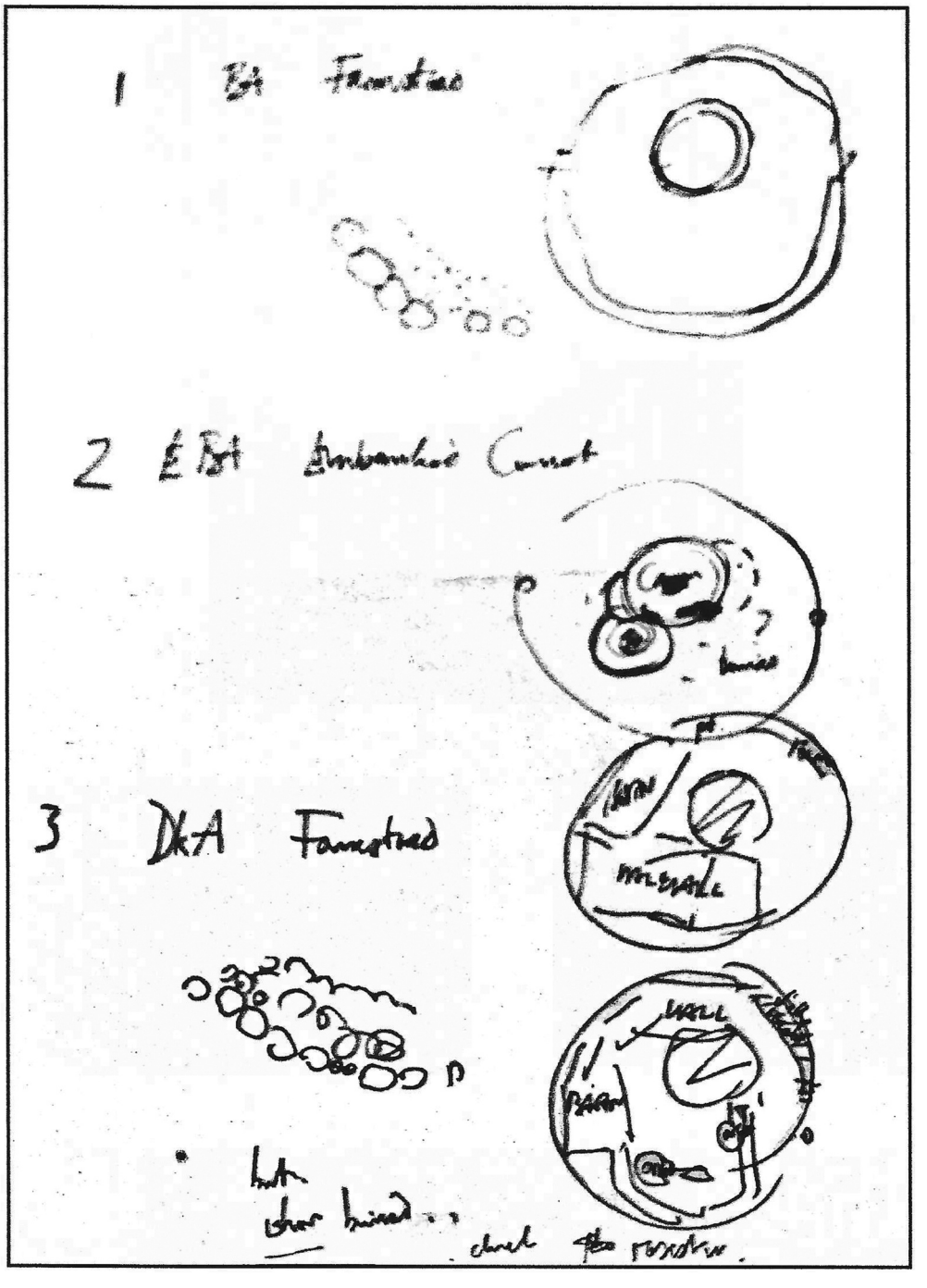

Figure 3. Drawing indicating how Sturdy envisaged the monument developing over time (KMA B002).

southern and western quadrants of this circle were de-turfed and revealed a continuous scatter of stones on which an apparent tumbled circular retaining wall could be defined'. A cutting through this supposed wall 'displayed, in section and plan, a series

of heavy footing boulders, suggesting a wall, at base 1.75 m. in thickness' (Sturdy 1969, 1971). A further description of the site prior to excavation was provided, albeit some years later and on the occasion of the Prehistoric Society's first visit to the site, by Clare Fell who wrote that 'Before excavation this appeared as a large, grass-covered mound, as quantities of stone and boulders had been dumped on it during the mid-19th century' (Fell 1982).

Sturdy and Fell's descriptions are consistent with unpublished plans in the Sturdy archive: one (Figure 4(a)) is a detailed hachured plan, the other (Figure 4(b)) a contour survey as part of a record of earthworks in the area. Importantly, they show the same details, with a bank being prominent in the bottom of both images and a peculiar junction of bank and mound (LB arrowed). Consequently, we are confident that both plans are accurate records of the site prior to excavation, describing a mound occupying just over half of the circular area, the other half being enclosed by a bank, perhaps resulting from quarrying. This interpretation fits with Sturdy's account that by August 1969 he had de-turfed 'The lower southern and western quadrants' (Sturdy 1969). Figure 4(a,b) clearly show this western half of the site to be lower. Sturdy's 1969 reference to a 'circular' wall might also explain the curving black line in Figure 4(a). This interpretation of the mound and bank is further reinforced by two more photographs taken from almost opposite directions (Figure 4(c,d)), while Figure 4(e), and other evidence discussed later, suggest the mound was about 1 m deep. We use the phrase 'deep', rather than 'high' because Figure 4(b) demonstrates something which is still visible on the ground and was recorded in a section (Figure 12(b), below); namely that the monument was located on a discrete terrace within the glacial deposits of the limestone shelf noted above. More importantly, as Figure 4(b) also records, the surface of the 'mound' was effectively a terraced extension of the natural ground surface, albeit that the 'terrace' or platform was slightly dome-shaped (Figure 4(e)) allowing it to be portrayed by hachures.

Figure 4(a) suggests that the 'lower' southwestern half of the monument was the remains of a quarried mound, which survived in the eastern half. Certainly, the present appearance of a nearby scheduled site, mentioned by Turnbull and Walsh (1996) near Lawrence House Farm (Figure 4(f)), support this possibility, albeit that this is essentially a quarried fluvio-glacial mound (McKenny Hughes 1904b). Significantly, at this latter site quarrying resulted in the current earthwork appearing as a circular bank with stones tipped within the excavated central enclosure.

Late-Mesolithic activity

Evidence for the earliest activity at Site B, in the late Mesolithic, is the number of pieces of flint collected from beneath the ring cairn structure (Cherry and Cherry 2000). Sturdy (1971) also reported flints below the pillow mounds/ridge and furrow (Site A). Indeed, flints have also been recovered from other scatters within Levens Park and from beneath the route of the A590 link, while microliths have been found more recently in exposures along the edge of the river cliff a few metres to the north of Sites A and B (pers. comm. with Levens Group members).

Sturdy's plan for Site B shows 975 flints distributed across 197 grid squares; a number only slightly more than the 928 now in Kendal Museum and analysed by

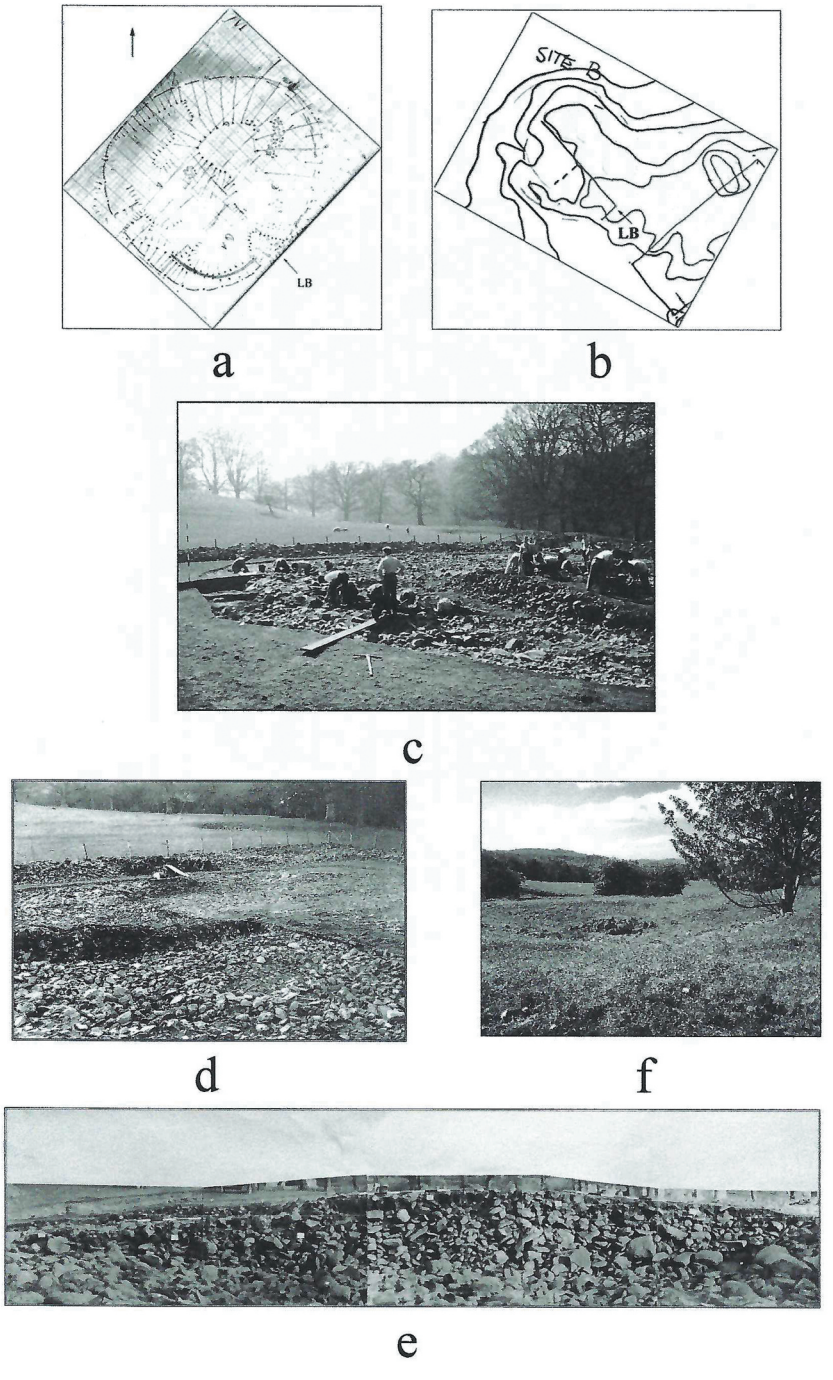

Figure 4. Site before excavation. (a) Sturdy's hachured plan; the purpose of the curving line, bottom left, is unknown (based on KMA B007); (b) Sturdy's contour plan showing the circular mound as in Figure 4(a), delineated by our added shading, and an adjacent smaller extant mound to the right (based on KMA B115); (c) image showing the cairn on the right higher than the area on the left (KMA B152); (d) image of the baulks and the profile of the mound dipping in the centre of the site, consistent with 4b and 4 c (KMA B021); (e) composite image showing the low curved surface of the mound (KMA B071); (f) quarried glacial mound at Lawrence House Farm showing the outer ring embankment, with stones tipped inside (photograph by Tom Clare, see also McKenny Hughes 1904b).

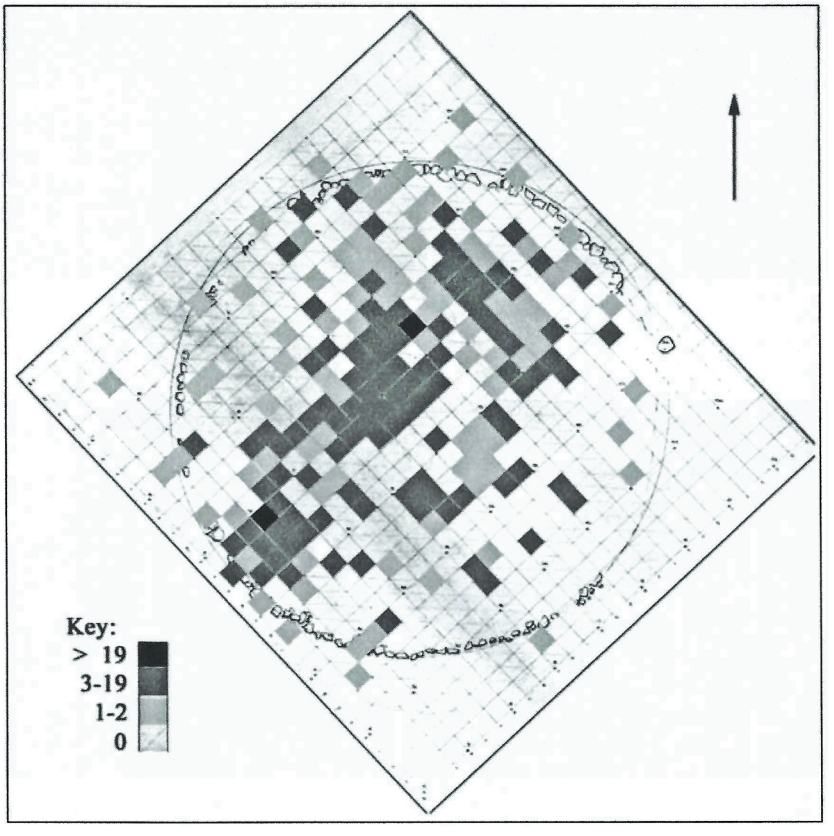

Figure 5. Distribution and abundance of flints, based on a plan by Sturdy (based on KMA B083). Each grid square represents 1 × 1 m.

Cherry and Cherry (2000). Importantly, this allows us to deduce that the analysis by Cherry and Cherry (2000) did not include a substantial number of flints picked up subsequent to the excavation (Turnbull and Walsh 1996). Figure 5, derived from Sturdy's original plan, gives a visual impression of the density of flints under different areas of the site. It shows that flints were concentrated in certain areas, an interpretation we confirmed statistically by a Chi-squared test comparing the actual distribution of flints among grid squares with the calculated number that would be expected if the 975 flints were evenly distributed ($chi^2 = 979$, $P < 0.001$).

An interesting, but probably unanswerable, question is whether the people who built the monument were aware of these flint aggregations as evidence of prior occupation and chose the site accordingly, or whether by mere chance they selected the same favourable terrace in the landscape. We should also not, however, rule out the idea that aggregations could be produced by differential collection during excavation: some archival evidence suggests that not all overlying structures were removed to expose the complete Mesolithic surface. Likewise, the excavation may have merely exposed part of a much broader scatter of lithics.

The concentric rings

Perhaps the most startling feature of the new evidence is the revelation that the site was structurally far more complex than previously reported and understood. In particular, photographs suggest that beneath the turf was a mass of stones with some gaps or cell-like spaces (Figure 6(a,b)) similar to those at the Borwick ring cairn 14 km to the south (Olivier 1987, Figure 5). When seen as a whole (Figure 6(c)) it is possible to identify, in addition to the previously recorded 'kerb' (A), at least two more rings (B) and (C) as well as the penannular arrangement and boulder burial, and, possibly, other discrete areas of stones (X), (Y) and (Z).

Moreover, when the photographs in Figure 6(c) are fitted to the published plan, as in Figure 7(a), the new rings (B) and (C) appear, circular and concentric with the outer 'kerb' (ring A). This interpretation of the oblique ground photographs is consistent both with an oblique air photograph (Figure 7(b)) and detailed drawings of the

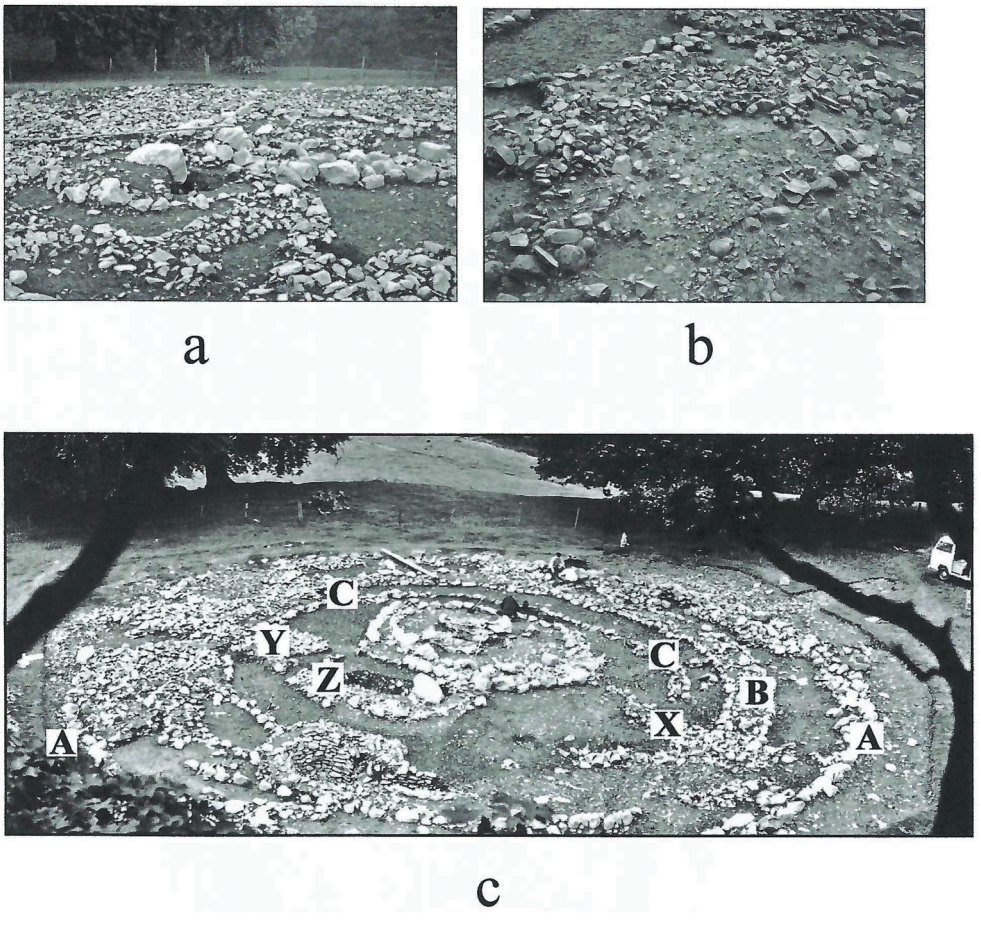

Figure 6. Images of the site during excavation. (a) and (b) cell-like gaps in the mass of stones (KMA B171 and B135); (c) composition by David Clare showing the multiple ring structure (originals courtesy of Julian Munby). See text above for explanation of added lettering.

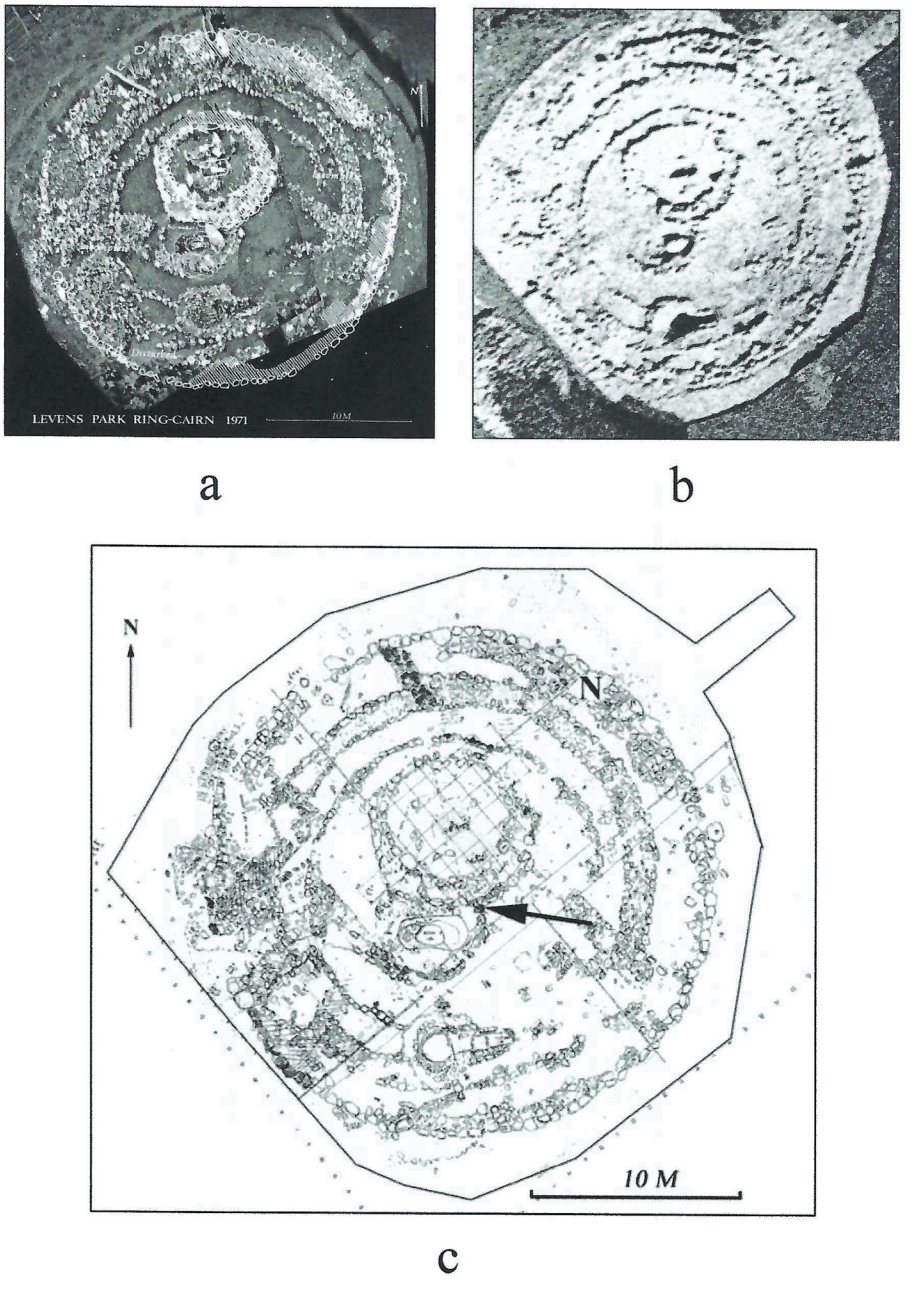

Figure 7. Images of the rings compared with Sturdy's published plan. (a) Munby's images (Figure 6(c)) fitted to the plan (Munby photographs and KMA B072); (b) oblique air photograph fitted to the plan (based on KMA B045); (c) composite image of several separate drawings overlain onto Sturdy's published plan (composite of KMA B079, B089, B090, B091, B092, B094 and B095 overlain onto B072). The arrow indicates centre of outer rings corresponding with boulder burial and we have indicated the options for the location of the long section reproduced in Figure 12(b).

excavations, which, when fitted together (Figure 7(c)), provide a radically new plan of the site; one in which there are several, apparently concentric, rings.

Figure 8(a) shows Sturdy apparently testing the hypothesis that these rings were indeed concentric. We estimate that the centre of these circles would be near the junction of the southern face of the penannular ring and the eastern arc of stones around the boulder burial (arrowed in Figure 7(c)). This is almost exactly below the centre of the circular 'mound' recorded in Figure 4(b) and, perhaps not surprisingly appears to be reflected in the layout of baulks/sections of Sturdy (see below).

By contrast, Figure 8(a,b) show Sturdy exploring whether some other arrangements of stones and cell-like spaces might have been rectangular buildings. Figure 8(a) also shows he thought there might have been two diametrically opposed gaps/entrances in ring (A), entrances which he illustrated on his published plan. However, the other evidence does not support the idea of a break in the north east arc of ring (A), while ring (C) is intact in its south western arc.

Character of the concentric rings

All of the rings and internal structures, excepting the 'boulder' burial and the two stones flanking the entrance of the penannular ring, are composed of stones of a size that could be lifted by one or two people. However, as Sturdy recognised in a working drawing, the way they were used differed considerably as evident in Figures 6(c) and 9(a,b). The 'kerb' or circle (A) was mostly a single stone in width, as it appears was ring (C). By contrast, ring (B) appeared much like the footing of a normal wall, with an inner and outer face and infill. In the southern half of the site ring (B) is less intact, having been destroyed by the kiln and, apparently, by the cell-like spaces. Whilst the discontinuity could be

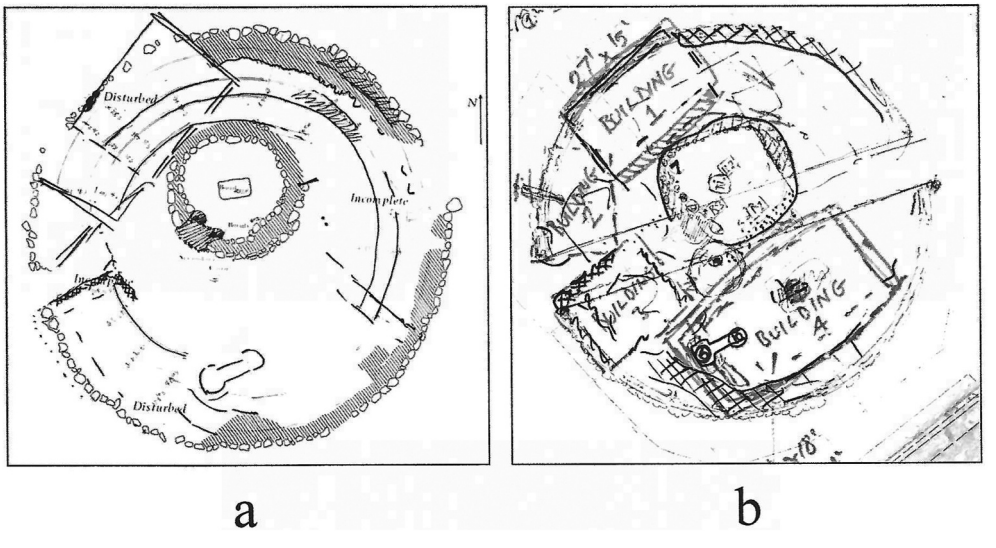

Figure 8. Sturdy's concentric rings and rectangular buildings. (a) sketch showing his awareness that stones formed concentric rings (based on KMA B084); (b) his unlikely ideas for putative rectangular buildings (based on KMA B103).

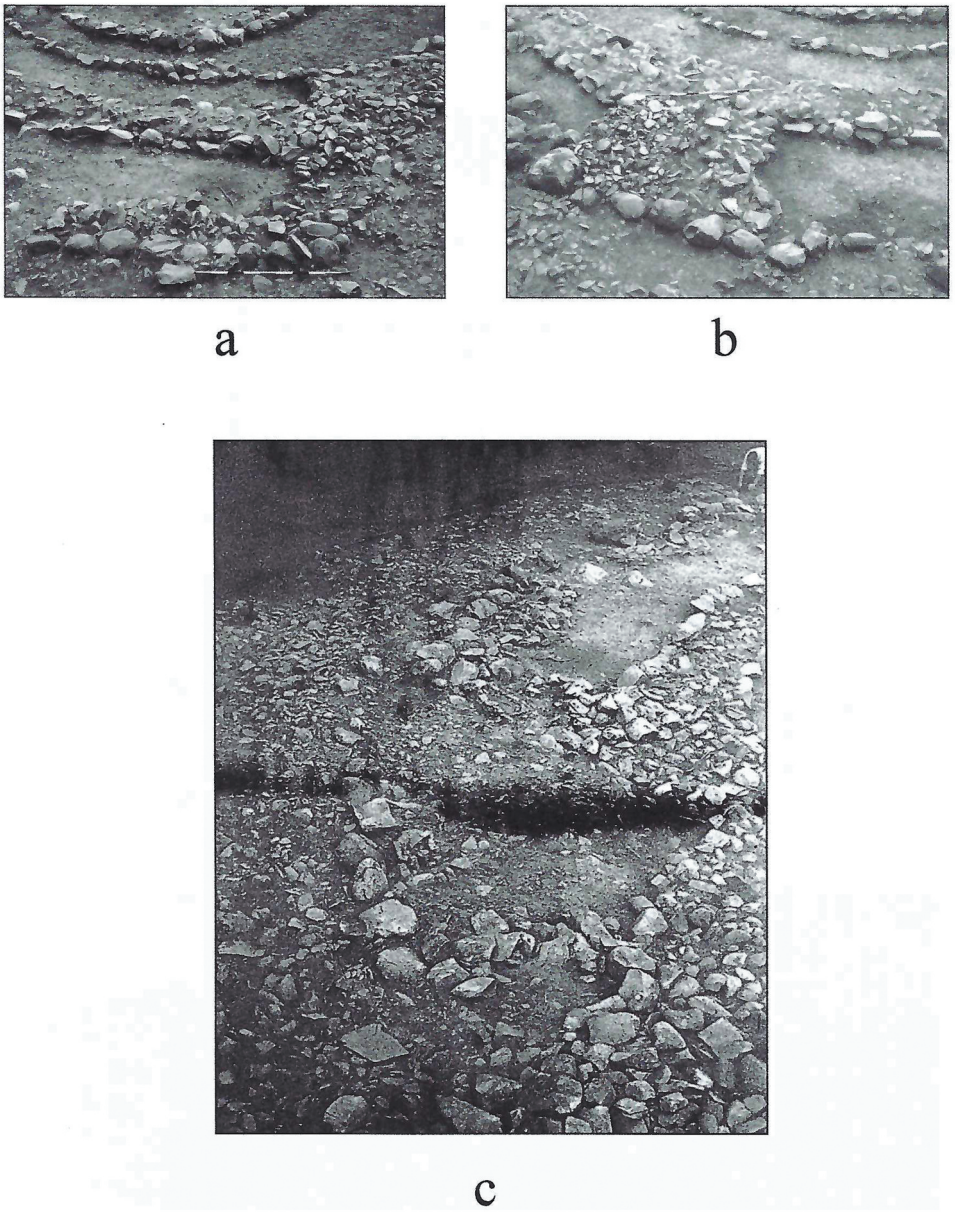

Figure 9. Images of rings as recorded. (a) the north-west quadrant showing what appear to be sections (KMA B134); (b) variation in the infill material between rings (A) and (B) (KMA B140); (c): another section, most probably of that shown in 9b (KMA B181).

explained by later quarrying, it is also worth noting that some other ring cairns, such as Barrow III on Irton Moor in Yorkshire, display similar discontinuous rings. (Simpson, Gibson, and Malazarte-Smith 2015).

Figure 9(a-c) show that clearance of the spaces between the rings included the excavation of sections, but it is unclear whether some photographs are of these or of the 'cell-like' spaces within the cairn. Drawn records of these sections are missing from

the archive, although Figure 9(c) suggests they might have existed. However, these figures prompt three further observations. First, Sturdy did not remove the material between the inner and outer 'faces' of ring (B) to investigate whether the rings represented faces of a single wall or merely two separate rings. Second, Figure 9(b) appears to record two different fills in the space between 'kerb' (A) and the outer face of (B). Third, ring (A) was, in places, more than a single stone in width.

This latter detail, visible in Figure 9(a) and most obvious in Figure 7(c) (labelled N), is consistent with Sturdy's published account, which reported that the northern segment of ring (A) consisted of a double skin of stones, a feature that he interpreted as a possible 'Dark Age 'reconstruction' of the Beaker farmstead wall. Why, was not explained, but for such a repair to have taken place ring (A) must have been free-standing at that time, which seems unlikely. Nevertheless, Sturdy (1969) stated that there was evidence for a bank of clay and turf behind the kerb (A). Earlier, when reporting on the 'lower southern and western' half of the site, he stated that soil analysis showed the wall to be of a 'clayey' character (Sturdy 1969). He compared this with the 'clay and turf' wall of a Romano-British settlement at Old Brampton, 70 km to the north (Blake 1959).

Clarifying the nature of ring (A) is important as we had assumed that Sturdy's published plan was that of his putative Beaker farmstead and that ring (A) and its shaded areas was the outer perimeter wall. This interpretation is questionable because it was not clear how ring (A) could have functioned as a barrier to animals. It may have formed the base of a hedge but ring (B) would have provided a better 'perimeter wall' for any farmstead. Moreover, the shaded area in his published plan appears to include part of the stony area 'X' in Figure 6(c). Perhaps not surprisingly, but importantly, there is a sketch showing Sturdy considered ring (B) and not ring (A) to have formed the wall of his Beaker farmstead. It may be, therefore, that the published plan was not, as previously assumed, that of the Beaker farmstead (Sturdy never said it was) but a schematic one showing a circular 'mound' (shaded), below which was a penannular ring with an adjacent boulder burial. This new interpretation explains why the site was left as we now see it, with the circular bank being the cairn peeled back to reveal the structures beneath. Whatever the explanation for the shaded areas, both images (Figure 10(b)) and ground measurement, confirm that the inner face of the bank we see today is actually ring (B).

The penannular ring and boulder burial

Both original drawings and photographs (e.g. Figure 10(a)) show that the gap in the penannular ring was widened after excavation and, in its original form, would have been less practical as a house entrance than the space seen today. In addition, the two 'boulders' flanking that entrance did not serve the practical purpose of closing off the ends of the rubble infill of the 'wall', as might be expected (Figure 10(b)).

Similarly, Figure 11(a,b) show that the 'outer skin' of the penannular wall, at least in the western sector, was not concentric with the inner one as might be expected in a normal practical hut wall. Moreover, some photographs, such as Figure 11(b), show the two 'skins' of the putative wall merging. Together such evidence suggests that the penannular ring was never a functional wall or hut. If, however, the structure had been a house for the living or even one for the dead then the outer skin of the 'rear' wall could have included part of ring (C). Figure 11(a) shows that Sturdy explored this

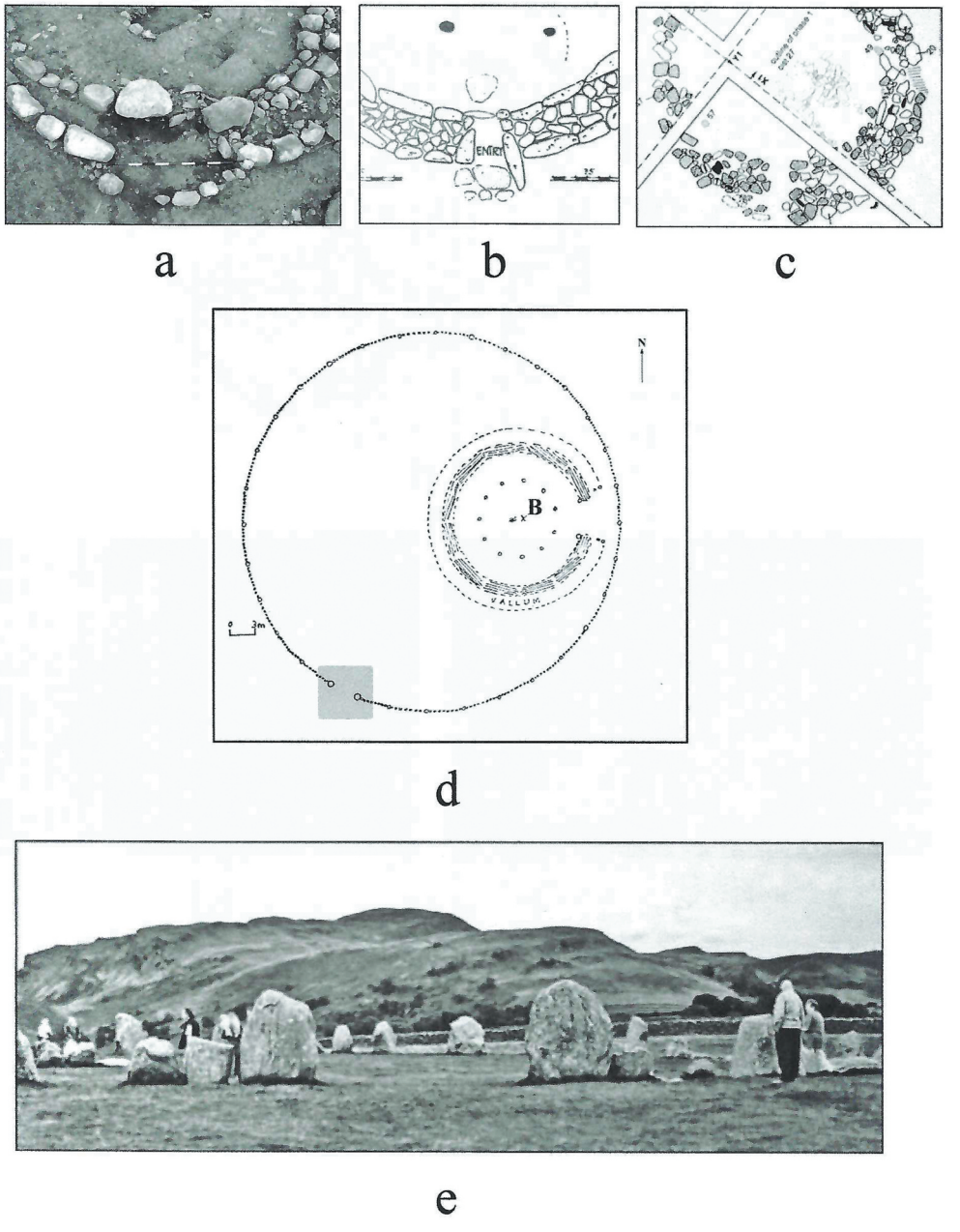

Figure 10. The entrance to the penannular ring at Levens compared with other similar sites. (a) Levens penannular ring (KMA B118); (b) hut at Kestor, Dartmoor showing the large upright stones sealing the wall infill (from Fox 1954); (c) the penannular structure at Hardendale Nab (based on Clare 2007); (d) timber monument at Bleasdale showing larger posts at the entrance into the palisaded enclosure: the central grave (our added B) within the ditched enclosure contained two collared urns and an accessory vessel (based on Varley 1938; Clare 2007); (e): Castlerigg stone circle (photograph by Tom Clare).

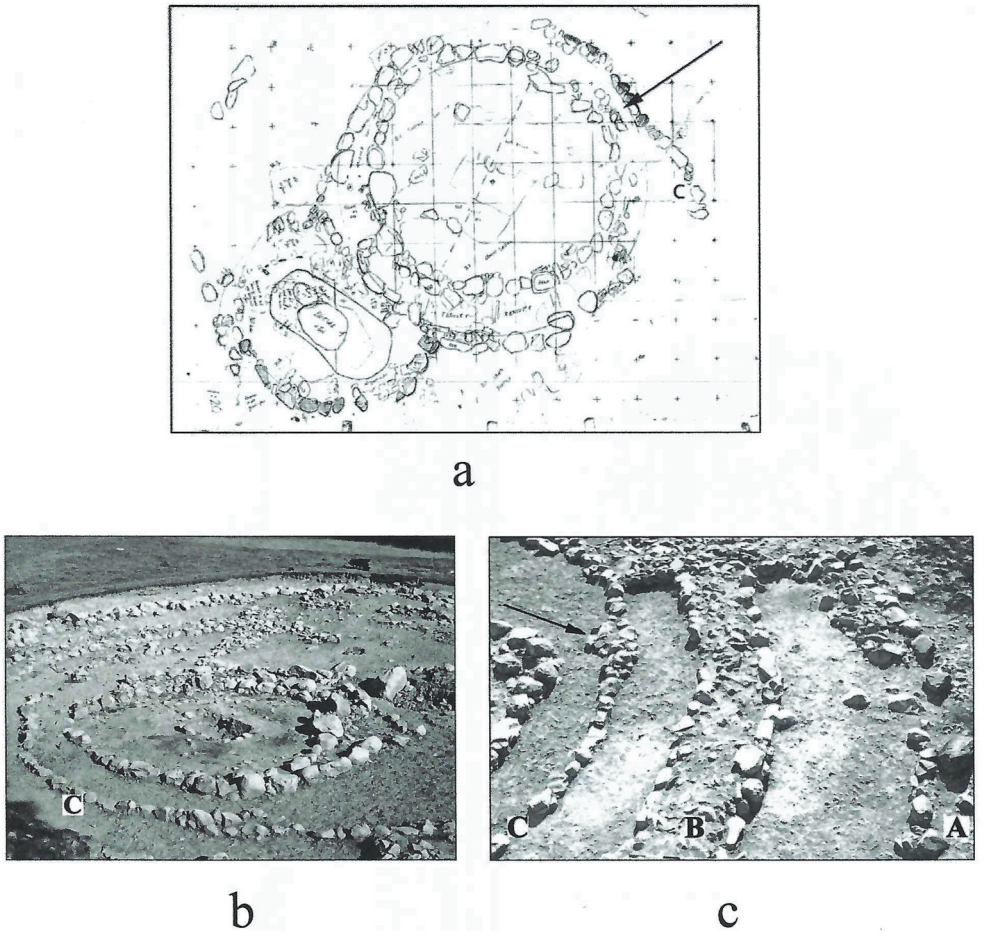

Figure 11. Characteristics of the penannular structure and other rings. (a) plan of the penannular structure and its 'wall' indicating Sturdy's awareness that the structure and parts of ring (B) may have formed perfect circles (based on KMA B109); (b) and (c) details of the central area showing (arrowed) the 'knot-like' arrangement of stones in ring (C) (based on KMA B031 and B142).

possibility and that both parts of the 'outer face' of the penannular structure and that of the boulder burial formed perfect circles.

It is, however, feasible that the penannular structure was built in two stages. In this interpretation, the first stage was a simple stone ring, with two larger stones forming the terminals. Such an arrangement echoes the 'entrance' (our shaded rectangle) at the timber palisaded circle at Bleasdale (Figure 10(d)) 55 km to the south and at the Castlerigg stone circle 45 km to the north (Figure 10(e)). The second stage, before the boulder burial, was an elaboration of the existing entrance/gap by the addition of a length of 'walling' either side of the entrance gap. However, the other ends of this putative 'elaboration' of the penannular ring were poorly formed. Nevertheless, the recorded details of the Site B entrance are similar 'to those of the Hardendale Nab 'ring cairn' 25 km to the north east (Williams and Howard-Davis 2004 and Figure 10(c) here).

The possibility that a short length of ring (C) had, however, formed part of an earlier demolished wall might, explain one other peculiar feature, a knot-like arrangement of stones left by the excavators, arrowed in Figure 11(c). Notwithstanding the correctness of this interpretation, the images do suggest that ring (C) was built as individual lengths or arcs.

In addition, some photographs, such as Figure 11(b), suggest another ring may have existed within the penannular one, for they show a group of stones around the central grave. We have observed no plan in which Sturdy tested this hypothesis but the stones were planned and in his sketch of the burials (Figure 2(c)), he drew a circle around the Beaker grave. This circle may, however, simply be a schematic representation of a pit resulting from later disturbance, which Sturdy reported had contained a metal button. This disturbance is clearly recorded in section drawings, Figures 12(a) and 13.

Site sections and a mound(s)

Unpublished section drawings provide more detail crucial to understanding the monument. Some short sections are through the boulder burial and central grave but there are also some longer ones, the position of which cannot be determined with absolute precision. Three versions of a long section exist, with one shown in its entirety in Figure 12(b). Further split versions of this are shown as Figure 12(c–e) and possibly 13. We believe the position of

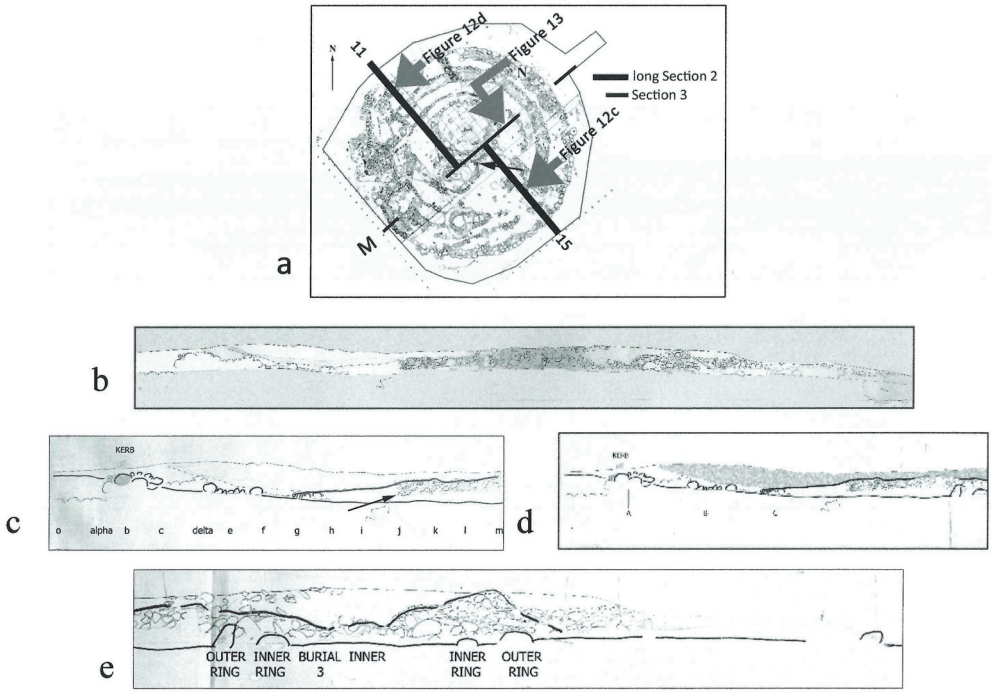

Figure 12. Selected drawings of the long section. (a) our suggested location of the section drawings (based on Figure 7(c)); (b) image showing Figure 12(c–e) as one continuous section (composite from KMA B105); (c,d): different versions of the left side of the long section, showing annotation and the excavator's emphasis of the outer 'kerb; and 'earlier' cairn; (d) repeats c but with the layer between that kerb and cairn with our shading added, as described in the text on page xx (based on KMA B105 and 4180); (e) another drawing of the left side of the long section (based on KMA B105 and 4179).

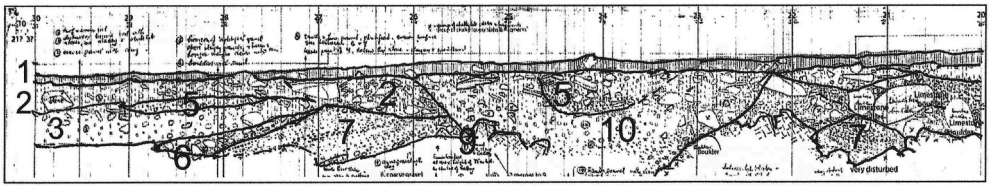

Figure 13. Short section with 'layer' boundaries suggested by us but retaining the original numbering system used by the excavators. Note, layer numbering was only provided for the left hand part of the drawing (based on KMA B102).

these sections may be indicated in the grid of Figure 7(c) and that the orientation of these long section drawings (Figure 12(b)) is as shown on Figure 12(a).

The principal interest of the Figure 12(b-e) is that they show

- apparent disturbance at the centre of the site.
- that Sturdy recognised the wall of the penannular structure as two separate 'inner' and 'outer rings' as in Figure 12(e), and also his awareness of rings (A-C), even if he failed to report them.
- the position of 'burial 3'.
- a buried cairn below the finished profile of the monument, with its edges coincident with ring (C).
- a later layer between this cairn and the outer ring (A). This we have shaded in Figure 12(d). In Figure 12(c), however, it can be seen to have had some discrete layers towards the bottom.

Two interpretations might be offered as to the origins of this later layer. Based on the position relative to the hachured plan (Figure 4(a)) the layer might result from quarrying and subsequent agricultural 'tipping', consistent with Fell's description of the site before excavation. Alternatively, it is part of the final, sealing mound and the earlier structure(s), seen in profile below this shaded area, form the basis of the present monument as reconstructed by Sturdy. The shaded layer in Figure 12(d) continuing over the central cairn is consistent with both explanations.

A prominent feature in Figure 12(c) is a patch of angled stones shown within the earlier cairn and arrowed by us. This probably relates to a detail of Figure 13. This single drawing reproduces poorly and the annotation cannot be easily matched with Figure 7(c) or 12(b). Figure 13 is a detailed drawing, and whilst with some layers are numbered and described, its exact position cannot be located with certainty. The figure's importance lies in suggesting that there was an earlier 'layered mound' (our description) of smaller diameter and we believe the 'angled stones' of Figure 12(e) relate to this being perhaps (6) of Figure 13. Disturbance from the pre-excavation land surface is, however, clearly visible. On the left of that disturbance, layer (7) of Figure 13 is depicted as consisting of 10 discrete layers and a similar, smaller area occurs to the right of the disturbance. However, in both cases the discrete layers are shown sloping downwards from the centre of the disturbed area suggesting that they are the tip lines of a mound. This 'layered mound', assuming it was circular, had a diameter of

about 7 m, the same as the penannular structure. Sturdy (1971) appears to have drawn the same conclusion, stating 'Phase II. An Early Bronze Age enclosed cemetery with primary burial (disturbed c1850) with three Beakers, two flint scrapers and knives and burnt plank-lining to grave still in situ, in centre of house *which was then piled up as a small cairn*' (our italics).

The graves and human remains

The relationship of the 'layered mound' and reported burials is unclear. The published account records four burials in total: one in the centre of the penannular structure, one beneath a boulder outside that structure and two others. Only the first two are shown in Sturdy's published plan (Figure 2(a)), with the implication the other two were secondary. If so, were these latter two found inside or beyond the disturbed central area, perhaps having been displaced from elsewhere? Sturdy's interpretation (above) of an 'Early Bronze Age enclosed cemetery' can be compared with his working drawing (Figure 2(c)) which shows what must have been pockets of human bones, five flexed skeleton symbols, some 'cists' and some 'cremated' bones. Our transcription of the notes on the drawing (Table 1) suggests that Sturdy thought at that time that there were ten groups of bones within the penannular area. Clearly, he later abandoned this idea reporting just four burials for the whole site. Similarly, whilst Table 1 distinguished four Beakers (of types N2, AOC, S2 and S4, to use Sturdy's phraseology), the final count was three.

The principal archival drawings of the four burials show burial 3 having the word 'burial' in parenthesis. Also, whilst the position of burials 1 and 2 relative to each other is recorded (B101), Sturdy's burial 2, *contra* Turnbull and Walsh, was in the central grave. We believe Figure 14(d) shows the correct position of the burials.

The plan of the burial 4 (Figure 12(a)) shows the boulder covering much of a crouched skeleton but less than half the grave. Some photographs and plans show a second smaller boulder in this part of the grave. A long section through the grave (Figure 12(b)) indicates that the grave had been dug through boulder clay to limestone bedrock, as had that of burial 2 (Figure 14(c)). Whilst the latter was beneath the 'layered mound', that boulder covering burial 4 is recorded as being within another 'cairn'

Table 1. Transcriptions of the annotations of the 'burials' recorded in Figure 2(c). Note that the dates suggested for the Beakers, based presumably on Sturdy's reading of research, are omitted and that the arrowheads and awls are not mentioned elsewhere. Italics differentiate direct transcriptions.

Reference on plan	Burial type	Grave goods
AS CIST 2	*CROUCHED*	*+ BEAKER sherd S2*
DIST BURIAL		*3 ARROWHEADS + 6 BEAKER Sherds N2*
2 DIST BURIALS		*BONE + sh*
	CREM	*+ KNIFE*
CIST 1	*2 CROUCHED*	*+40 B., AND BEAKER AOC*
DIST INHUM	*CREM*	*BONE*
CIST 3		*AWL*
BURIAL	CROUCHED	*+ 2 AWLS*
BURIAL	CROUCHED	*+ BEAKER S2, BONE & FLINT KNIFE*
BURIAL	*CROUCHED*	*+ BEAKER S4*

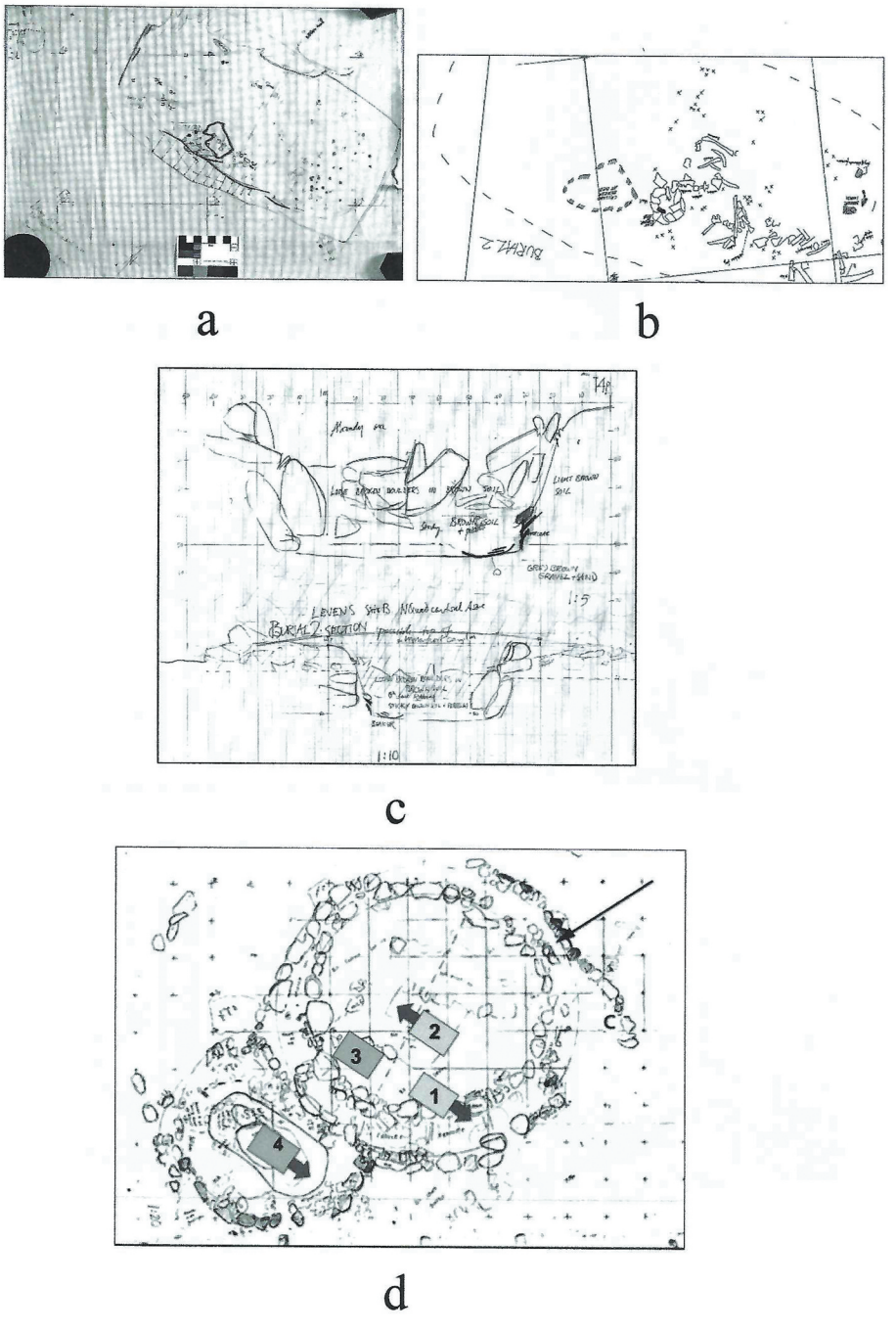

Figure 14. Sturdy's diagrams of the burials illustrating the sketchy nature of the records. (a) plan of central grave of the penannular structure showing plank 'lining' and 'base' of a Beaker (KMA B108); (b) plan of central grave of the penannular structure to same scale, showing position of skeletal and Beaker remains (based on KMA B082); (c) section across the same grave showing the plank 'lining' (KMA B005); (d) the suggested position of the four 'burials' based on the plan and sections in the archive (see KMA B109).

which, in contrast to the grave filling of 'loose stones and soft loose filling', was composed of 'hard brown soil with pebbles' and some stones. This distinct layer can be seen in Figure 6(a), although it is difficult to reconcile the position of the section there with KMA B005. Even so, the mound, about 5 m in diameter, appears to have had its own kerb, a situation consistent with that section drawing.

The seven bags of bones at Levens Hall were analysed for us by York Osteoarchaeology Ltd (Appendix A) and showed some mixing and some absences of bone amongst those retained. For example, part of skeleton 1 was found with the bones of skeleton 2 and the bag labelled burial 4 lacked vertebrae even though these were recorded in the plan. Nevertheless, the analysis of all the bagged bones identified 'four right temporal bones and four left femoral epiphyses … within the articular sample' indicating an overall MNI of four adults.

The potential mixing of the bones means that that the numbering of the skeletal samples cannot be reliably equated with the burial numbering system used by Sturdy. This has implications for interpretation, particularly of the radiocarbon dates in Table 2. The completeness of the individual skeletons, however, is similar to that which might be inferred from the archival plans, with burials 1, 2 and 4 being 60, 65 and 70% intact, compared with 20% in burial 3. This relative completeness of skeletons 1, 2 and 4, suggests that whilst there might have been disturbance and some mixing, these three burials were recovered *in situ*. Similarly, if skeleton 3 equates to 'burial 3′, near the 'inner gate' of the penannular structure as recorded in one version of Figure 12(d) and shown in Figure 14(c), it too was found *in situ*.

All the burials, except number four, were female (Table 2). Of these females, burial one was aged 17–35y and burial two 35–40. Burial three was an adult female of indeterminate age whereas burial four was a male aged 25–40. Tooth enamel, sampled from four molars, was subjected to strontium and oxygen isotope analysis by Prof. Jane Evans, British Geological Survey. Isotope values (Table 3) are 'consistent with the individuals having spent their childhood in the Cumbrian/north Lancashire region'.

Table 2. Sex, age and radio carbon dates for the skeletons. Analyses by Scottish Universities Environmental Research Centre.

Skeleton	Reference	Sex	Age	Radiocarbon Age BP	Sigma 2 Calibrated Date Range (95.4% probability)
1	GU51280	F	17–35	3626 ± 33	2090–1896 Cal BC
2	GU51281	F	35–50	3602 ± 33	2103–1883 Cal BC
3	GU51282	F?	adult	3587 ± 33	1878–1786 Cal BC
4	GU51283	M	25–45	3731 ± 34	2256–2029 Cal BC

Table 3. Isotope analyses from the four sample molars, with skeleton numbers as in the osteological report. L = left, R = right. Note the uncertainty over which molar LEV-04 represented.

Skeleton information	Sample code	Tooth position	$\delta^{13}C$ (‰) PDB	$\delta^{18}O$ (‰) SMOW	Sr ppm	$^{87}Sr/^{86}Sr$corr
Skeleton 1	LEV-01	LM_2	−15.83	25.62	74.8	0.71
Skeleton 2	No suitable material					
Skeleton 3	LEV-02	RM^2	−16.15	26.55	67.6	0.71
Skeleton 4	LEV-03	RM_2	−15.14	26.57	99.4	0.72
Skeleton 1, extra tooth	LEV-04	$LM_{2?}$	−15.5	26.69	40.5	0.71

However, 'they are such common values across Britain that the possibility of immigration cannot be entirely ruled out'.

Sturdy's burial 4, beneath the boulder, lacks associated artefacts. By contrast, the published account and archives record artefacts near to or associated with the three burials within the penannular structure. Crucially all three appear to have been associated with Beaker sherds. Some sherds, however, must have been moved by later disturbance with, as Table 1 records, pottery fragments associated with five groups of bones, yet Sturdy's published account reported just three Beakers. As already noted, the study of beaker remains in Levens Hall (Turnbull and Walsh 1996) concluded that only two Beakers had been found. Given this discrepancy Blaize Vyner re-examined the extant sherds and reported (*pers. comm.*) that all bar one were from two vessels. Sherds of all three putative vessels were subjected to fabric analysis by Dr Patrick Quinn, Institute of Archaeology. This showed that the clays used in the two main Beakers were similar but that the single sherd was of different origin (Appendix B).

Re-examination of the archival material also illuminates another feature recorded by Sturdy, namely that the central grave of the penannular structure had been 'plank lined' and burned. Details were clearly recorded at the time of excavation and are reproduced in Figure 14(a,d). Together they show either a plank lining or a box/chest/cist. Of these, plank lining seems the more likely as it appears to have fitted the grave closely. A coffin, such as that at Ravenstone in Buckinghamshire, required surrounding space for manoeuvring it into position (Allen et al. 2015). However, it is unlikely that the wood had been 'burned' as none of the human remains were reportedly scorched, although two fragments of 'cremated' bone were found in the disturbed area. There was also no charcoal amongst the bagged bones, further suggesting that the plank structure had been burned previously.

Discussion

Discrepancies between the published and unpublished records

Examination of the original archives identified several issues regarding the short, published account of Site B and interpretation is hindered by the lack of any published description of the form of the monument before excavation. It is, however, clear that the monument included two more obvious stone rings than were originally illustrated and the gap between the two large 'entrance' stones of the penannular ring was much narrower in the site drawings and photographs than in the published plans and reconstruction. These stones were not positioned to provide the end seals to the infill between the two faces of a hut wall as proposed, and later reconstructed, by Sturdy. Furthermore, the stone rings, claimed to be the hut walls, were too insubstantial to serve that purpose and the proposed modifications to the supposed outer face of the 'wall' cannot easily be reconciled with the stratigraphy of the site. The monument also contained other undescribed features such as gaps in the stoney fill between the rings as well as a knot of stones in ring (C). It is also apparent from Sturdy's unpublished correspondence and the site sections published here that an earlier cairn had existed within ring (C) below the main sealing mound, and beneath

this were two more, one associated with the 'boulder burial' and the other with the penannular structure. The latter had been disturbed as previously reported and whilst the archives show this resulted in the displacement of skeletal remains, the unpublished plans (Figure 14) and analyses indicate there were, as reported, four burials. Despite some disturbance all four burials recorded by Sturdy may have been located *in situ* with burials 1 and 3 secondary. The numbering of the burials used by Sturdy, however, differed from that of Turnbull and Walsh (1996).

The unpublished long section (Figure 12(b)) indicates that the monument was built on a natural terrace close to a break of slope, or terraced into a gentle slope, with the upper surface of the main mound merging into the natural surface, as recorded by the contour plan (Figure 4(b)). However, the section also shows that the present appearance of the monument and its description as a 'ring cairn' is based on other structures found beneath the final sealing mound.

Ring cairns and 'monuments in progress'

When Sturdy (1972) published his account, 'ring cairns' were then classified with a group of similar sites, such as 'embanked circles', 'ring banks' and 'enclosed cemeteries' (Sturdy's phrase for site B) that shared a circular plan but were 'different' from 'stone circles'. As a group, such sites acquired the title of 'variant circles'. Clare (1973, 1986) suggested that these circular monuments were not 'variants' but together *with* 'stone circles' and 'henges' formed part of a broader spectrum of circular sites, such that ring cairns and stone circles might be combined as in North East Scotland (Bradley 2000; Welfare 2011). Within this spectrum, close similarities and parallels can be recognised with Levens Park Site B. However, without detailed, modern excavation of many of these sites, comparisons must, of necessity, be based on the final forms of the monuments, which might simply represent the last phases of a complex temporal sequence of alterations (Bradley 1998). Such sequences of change over time, at least in the context of rectilinear Early Neolithic structures, have been referred to as 'monuments in progress' (Thomas 2001). Levens Park Site B, like the Avebury complex (e.g. Gillings et al. 2008), clearly demonstrates that similar sequences of transformation were not confined to the early Neolithic. Both monuments are in fact structures and associated features that have undergone progressive change over time, i.e. 'unfolding monuments' (Gillings et al. 2008, 120). Importantly the later dates for both Levens Park and Avebury are broadly contemporary with the circular monuments described by Bradley (1998).

The idea that a single site might have had a complex development has implications for monument 'classification'. For example, Barrow III on Irton Moor in eastern Yorkshire, which bears some structural similarities to Levens Park Site B, consisted of two shallow 'ditches' and three rings of stones, not all of which were concentric. Since the central area was not filled with cairn material this 'barrow' might at one stage be described as a ring cairn. Similarly, since Sturdy's published account, the site described herein has simply been referred to as 'Levens Park ring cairn', but it is now evident that such a classification applies to only part of its history and that in its final form it possessed a very different characteristic. The neutral name adopted here, and originally used by Sturdy, of 'Levens Park Site B' seems, therefore, more apt.

Regional parallels

The evidence suggests that Levens Park Site B at different stages of its development possessed different monument forms which, nevertheless, have regional parallels in Cumbria. For example, in its final form it would have appeared as a simple mound, as at Gaythorne Plain 1 and Mazonwath (Figure 15(a,b)) and, prior to that as a dished mound as on Orton Scar (Figure 15(c)) or a ring cairn as at Gaythorne Plain 2 (Figure 15(d)), Kirkby Moor (Figure 15(e)) and Casterton (Figure 15(f)). Importantly, both of the latter have been called ring cairns by some and stone circles by others. However, with the exception of Gaythorne Plain 1 and Mazonwath, all of these sites existed, prior to infilling or sealing, as circular banks, again as seen in the reconstruction at Levens. A similar structural sequence also occurs at Oddendale, 25 km to the north-east but there the bank had been built over the site of two concentric timber 'circles' that were removed and their positions marked by small cairns (Turnbull and Walsh 1997).

The time period over which such monuments may have 'been in progress' or 'unfolding', is suggested by dates from Levens Park and nearby sites. Even allowing for small statistical differences between the individual radiocarbon dates for Levens Park Site B it is possible to argue that it was a matter of centuries rather than a few decades. Certainly, a time span of centuries occurred at Oddendale where the timber structure yielded a date of 2800–2500 Cal BC and where sherds of Food Vessel Urn forms and fragments of cremated bone were recovered from the main cairn. The earlier date from this site is interesting in that a similar middle Neolithic date can also be suggested for the flat-topped mound at Mazonwath, north of Newbiggin-on-Lune (Clare, O'Regan, and Wilkinson 2008, and Figure 15(b) here) and with that from a site on Sizergh Fell just 1 km north-west of Levens Park. At the latter site, dates of 3790–3650 Cal BC (and of the Iron Age) were recovered from a few of the burials beneath and within a flat-topped/slightly-dished cairn covering a circular bank. This in turn may have been refaced in stone and/or slumped, with a possible boulder kerb added, before sealing (McKenny Hughes 1904a; Edmonds and Evans 2007).

Sizergh Fell offers another structural comparison with Levens Park Site B. The circular bank was depicted by McKenny Hughes (1904a) as piled stones whilst at Levens Park Site B the outer ring (A) and the penannular structure 'were based on footings of large glacial boulder … above these footings the structures were built up with smaller boulders' (Sturdy 1972, 52). Two questions remain regarding Sizergh Fell: did the ring bank have an entrance and was the platform within used for excarnation?

Interestingly, a platform, possibly for excarnation, was built against the ring bank at Oddendale, while two rectangular areas at the ring cairn on Hardendale Nab, 1 km away, may have served a similar purpose (Williams and Howard-Davis 2004). Hardendale, described like Oddendale as a dished mound when found, yielded human bone dated from 3030–2500 Cal BC (OxA1835) but this was thought to be residual, the first structural element being an open cist with two cremations and some animal bone. These were associated with a small cairn containing further inserted cremated remains and kept white by a covering of limestone. A penannular wall-like structure (Figure 10(c)) was then built

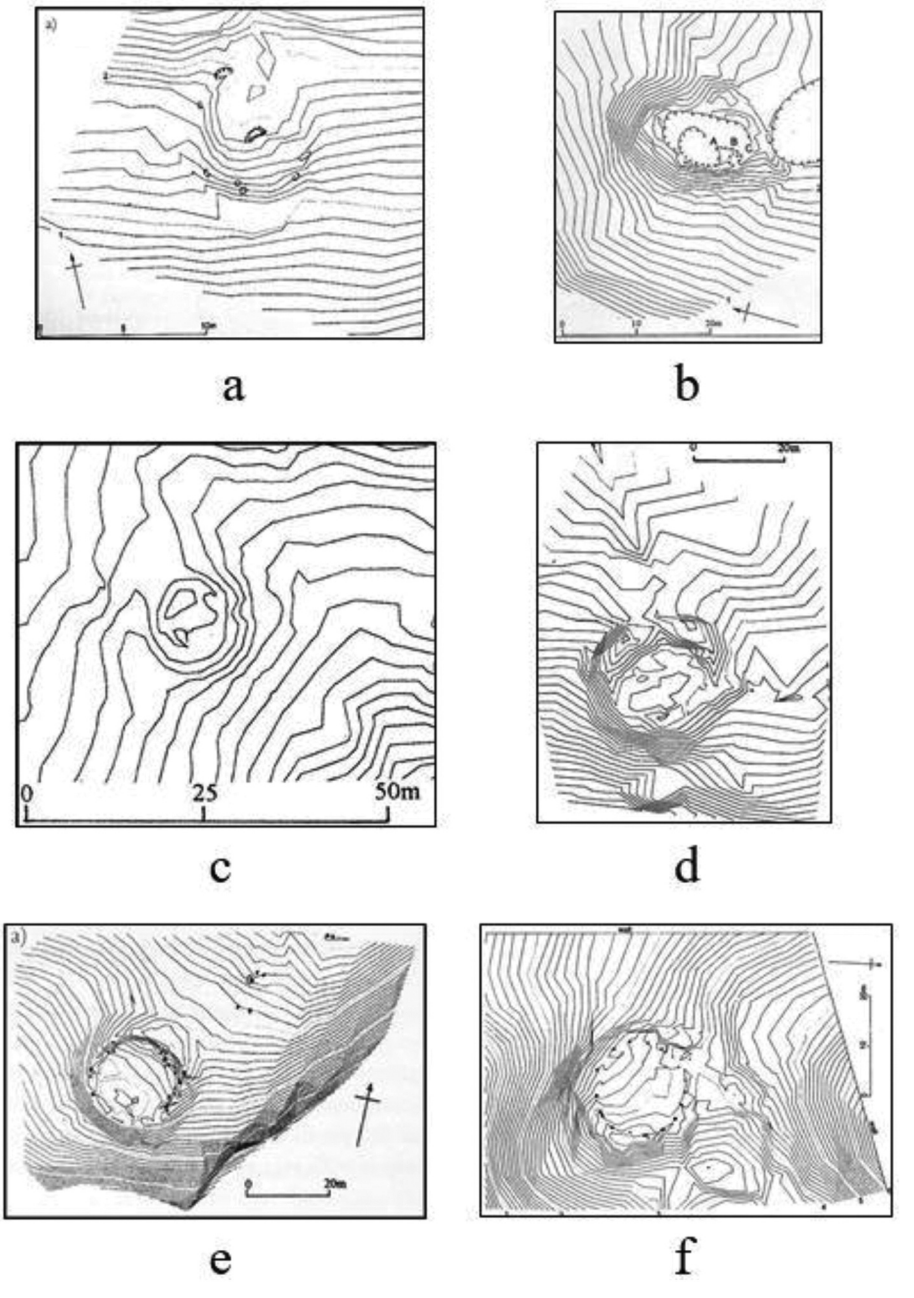

Figure 15. Contour diagrams for similar monument forms within a 30 km radius of Levens Park, all of which are built on natural platforms set into the hillside. (a) Gaythorne Plain 1; (b) Mazonwath; (c) Orton Scar; (d) Gaythorne Plain 2; (e) Kirkby Moor; (f) Casterton. All figures reproduced from Clare (2007).

and later infilled in two episodes. At least 19 individual deposits of human bone were recognised, with molluscan evidence suggesting accumulation over a 'considerable period of time' (Williams and Howard-Davis 2004). The 'finished' cairn contained 71 discrete groupings of human bone and three other cremations associated with collared urns.

While the numerous deposits of human material at Hardendale Nab echo Sizergh Fell, further details parallel Levens Park Site B. Firstly, discrete, individual dumps were used to construct mounds or cairns. Secondly, cairn infilling at Hardendale Nab may have left the north-east ring quadrant as a 'marked hollow', raising the question of whether the western half at Levens Park Site B (Figure 4(a,b) was quarried or never filled.

The dynamics of 'monuments in progress'

The monuments discussed above suggest they were the focus of attention over centuries during which time they were altered/elaborated by a regional repertoire of structural forms and practices. At Levens Park Site B this concept of an 'unfolding monument' or a 'monument in progress' crosses technological boundaries of stone and bronze working, the use of particular ceramic forms and burial practices. Why was this so and what dynamics might be represented at Levens Park Site B?

Part of the ritual associated with the Early Neolithic 'monuments in progress' was the use of fire to destroy existing structures. This has been viewed as a means of creating memory, a powerful mnemonic among participants, or even, among those excluded (Noble 2006; Jones 2006; Brophy, Goeckeritz, and MacGregor 2017). By analogy, the repeated construction and destruction of monuments in the later Neolithic/Early Bronze Age may have had similar significance and purpose. It is also unlikely that local stone monuments in Cumbria, such as the Shap stone rows resembling the Early Neolithic timber cursus monuments further north, and stone circles such as Long Meg, were created in a single episode. Likewise, some timber cursuses may have been built at separate times as suggested by Millican, Goodchild, and McKewan (2017).

Such monuments appear to represent an assemblage of labour on several occasions, a process which might be compared with the 'choreography of monuments' in Neolithic Orkney (Richards 2004, 2013). The structural sequence at Levens Park Site B is suggestive primarily of participation, exclusion and inclusion creating or reinforcing memory. Such 'memory' may help create a wider community or family identity, with the periods between episodes being related to community change, including crises.

The timescale of particular episodes of construction or destruction imply that individual burials do not date the whole monument. Thus, at Sizergh Fell, for example, the middle Neolithic dates of some of the burials may not conform in time with the construction of the ring bank or closing mound. Similarly, the Beaker and boulder burials at Levens Park Site B do not date the final phase of closure. Consequently, one can envisage some of these Early Bronze Age sites continuing to 'serve' a community over many centuries as manifestations of community identity.

The issue of date

Since the original excavation it has been accepted that the penannular ring and central Beaker grave at Levens Park Site B were the primary elements of the monument and that 'Burial 4′ and its associated boulder were secondary. This was indicated in both the published account and by the annotation 'secondary cairn' on an archive plan of the

burial. This interpretation is, however, not supported by the radiocarbon dates, provided we assume the statistical difference among them is real and that 'skeleton 4' is the same as 'burial 4'.

Examination of all photographs and drawings has revealed no stratigraphic evidence to support the primacy of either the boulder burial or the penannular structure, and the centre of the concentric rings (A-C) lay between the two (Figure 7(c)). The penannular structure is admittedly a complete circle but burial 4 is in the *centre* of another circle formed by a kerb (Figure 11), and, as such, could have been cut away during construction of the Beaker associated structure. However, if that were true, later elaboration of the penannular structure by the addition of an 'outer ring' would be difficult to postulate.

Accepting the primacy of burial 4 does not imply that the associated mound and kerb were contemporary and preceded the Beaker structure. One can envisage the Beaker burial and structure being built proximate to an earlier visible boulder-covered burial, with the importance of the latter recognised by its annexation to the Beaker burial structure.

Such explanations rely on the individuals buried rather than the relationship of structures. Our interpretations allow us to question previously held assumptions. In particular it has been suggested that Beakers are not usually found with females. However, whilst uncommon, such burials are not unknown. An unpublished example is at the Beaker grave at Achavanich, Caithness (Canmore website). Another, perhaps more apposite, is at Ravenstone in Buckinghamshire. There the female with a Beaker had been placed in a grave that had cut into an earlier timber coffin thought to be a cenotaph (Allen et al. 2015). Stratigraphic data at Levens Park Site B does not preclude a similar sequence. If so, then Burial 4 may have been placed adjacent to an existing (penannular) ring and cenotaph that was later used for Beaker burial. Again, this challenges the idea that Beaker burials are never secondary.

A sop to our belief in the supremacy of Beakers would be, however, to see Burial 4 as reflecting contemporary Beaker influences, except that other crouched burials without beakers are not unknown in the late Neolithic. For example, the site at Mazonwath (Figure 15(b)) also has a crouched burial, albeit with an antler mace-head. Duggleby Howe in eastern Yorkshire, not far from Irton Moor, similarly had crouched burials with grave goods (Gibson et al. 2009).

The crucial question is why, at Levens Park Site B, those who buried their female dead with Beakers did so in proximity to a male with no grave goods? The easiest explanation is familial relationships among the females and the male. The possibility that the male was Late Neolithic challenges models of Late Neolithic/Beaker interactions as does the Beaker building of a ring cairn, a form of monument with established Neolithic ancestry. Certainly, evidence from Levens Park Site B implies that monument dynamics may have crossed technological and ceramic boundaries. Whilst recent DNA analysis has suggested that the Late Neolithic population was replaced by that of Beakers, archaeologists have long considered that Bronze Age collared urns developed from some Late Neolithic ceramic forms (Gibson 2011; Olalde, Brace, and Reich 2018). Could the Levens Park Site B point towards a new narrative of how Late Neolithic society became that of the Bronze Age?

Conclusion

The circular mound in Levens Park, excavated in the early 1970s, was published as both a 'ring cairn' and a 'Beaker farmstead', a house for the living which had become a house for the dead' (Sturdy 1972, 54; Ritchie 1973). We conclude that it was only a ring cairn at a particular stage of its development and that it was never a Beaker farmstead. New evidence suggests that it was a monument in progress, the creation of a sequence of structural forms involving several individual episodes of building and alteration. This is something seen in other sites and appears to represent a means of creating, orchestrating and reinforcing identity, one which persisted from the earliest Neolithic into the Bronze Age, if not beyond. Similarly, the burials appear to challenge the narrative of the relationship between the Late Neolithic population and Beaker incomers.

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Appendix A. The human remains

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York Osteoarchaeology Ltd was commissioned by Levens Local History Group to carry out the osteological analysis of seven bags of human remains kept at Levens Hall as being from the excavations of Site B excavated by David Sturdy.

Aims and objectives

The aim of the skeletal analysis was to determine the age, sex and stature of the skeletons, as well as to record and diagnose any skeletal manifestations of disease and trauma.

Methodology

The skeletons were analysed in detail, assessing the preservation and completeness, calculating the minimum number of individuals present as well as determining the age, sex and stature of the individuals. All pathological lesions were recorded and described.

Osteological analysis

Osteological analysis is concerned with the determination of the identity of a skeleton, by estimating its age, sex and stature. Robustness and non-metric traits can provide further information on the appearance and familial affinities of the individual studied. This information is essential in order to determine the prevalence of disease types and age-related changes. It is crucial for identifying sex dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society.

Surface preservation, concerning the condition of the bone cortex, was assessed using the seven-category grading system defined by Brickley and McKinley (2004), ranging from 0 (excellent) to 5+ (extremely poor). Excellent preservation implied no bone surface erosion and a clear surface morphology, whereas extremely poor preservation indicated heavy and penetrating erosion of the bone surface resulting in complete loss of surface morphology and modification of the bone profile. Surface preservation could be variable throughout an individual skeleton, so the condition of the majority of bones in the skeleton was taken as the preservation grade for the whole skeleton. The degree of fragmentation was recorded, using categories ranging from 'minimal' (little or no fragmentation of bones) to 'extreme' (extensive fragmentation with bones in multiple small fragments). Finally, the completeness of the skeletons was assessed and expressed as a percentage: the higher the percentage, the more complete the skeleton.

All four skeletons had undergone moderate fragmentation; however, surface preservation was generally poor. This had led to a significant loss of surface detail, which subsequently hampered osteological analysis. In addition to the poor surface preservation, completeness was varied, ranging from 20–75%. While some of the skeletal elements were lost due to disturbance of the burials, it became clear during the osteological analysis that several skeletal elements from Skeletons 1 and 2, and probably 3, were mingled after the excavation. In an attempt to reconstruct the remains, some skeletal elements from Skeleton 2 were rearranged with Skeleton 1: a shaft fragment of fibula, which could be joined with the other fragments from Skeleton 1; the right epiphysis, the left distal shaft epiphysis, and six shaft fragments of femora; the left calcaneus; and the shaft of the right ulna. All the replaced fragments are clearly labelled as Skeleton 2. The rearrangement of skeletal elements was only possible where the fragments of the same bone could be joined, or by comparison of the colour and appearance of the bones. It cannot be excluded that some of the bones originally belonged to Skeleton 3, especially with regard to the additional skeletal elements currently placed in a separate bag with Skeleton 2 (right and left proximal ulnae, proximal end of the left femur, as well as two femoral and one humeral shaft fragments. These elements could not be associated with the more complete Skeletons 1, 2 and 4. Due to fragmentation, it is impossible to join any of the fragments or to clearly associate them with Skeleton 3, and currently, it remains only 20% complete. The drawings from the site, however, suggest that Skeleton 3 was the most badly disturbed of all four burials in this assemblage, with the least skeletal elements present.

The human remains were generally poorly preserved and moderately fragmented, as well as having been mingled after the excavation, Completeness varied from 20–75%, which meant that some skeletal elements had been lost post-mortem. During the osteological analysis, a number of skeletal elements were removed from Skeleton 2 and added to Skeleton 1, thus improving the completeness of Skeleton 1. This was only possible where the fragments of the same bone could be joined, and also by comparison of the colour and appearance of the bones. Unfortunately, the 20% completeness of Skeleton 3, as well as the considerable fragmentation of the existing skeletal elements prevented reliable reconstruction of this skeleton, although it is probable that the additional skeletal elements not associated with either Skeleton 1 or Skeleton 2, and currently placed with Skeleton 2, are actually from Skeleton 3. Skeleton 4 was the best preserved, because unlike Skeletons 1 to 3 it had not been disturbed, and it also did not appear to have been mixed with the other skeletons after the excavation. Despite these limitations, age and sex could reliably be determined in Skeletons 1, 2 and 4 (a female aged 18–35 years, a female older than 46 years, and a male aged 36–45 years old, respectively). Using the sexual dimorphism of some skull fragments, the biological sex of Skeleton 3 was also tentatively estimated as a possible female,

while it was not possible to obtain a more precise age category for this individual, other than an adult (18+ years).

Owing to fragmentation of the long bones, stature could not be estimated for any of the individuals. A small number of cranial and post-cranial non-metric traits were observed, including palatine torus in Skeleton 4, and leg measurements revealed that the femora in Skeletons 2 and 4 were flattened in shape, while the tibia of skeleton 2 was rounded.

A full version of this report is held at Kendal Museum.

Appendix B. Petrographic analysis of Early Bronze Age Beaker sherds from Levens Park, Cumbria, UK

Dr. Patrick Sean Quinn, Institute of Archaeology, London.

Background, materials and aims

Petrographic analysis has been undertaken on four beaker sherds from an Early Bronze Age burial complex at Levens Park, Cumbria in order to determine whether they came from the same parent vessel. In an account of a beaker grave at the site, the excavator David Sturdy noted that there were three Beakers in a 'plank lined grave'. However, a later report mentions only two samples and a possible odd sherd. Four samples have been analysed here, two sherds from Beaker 1 (samples 1a and 1b), one sherd from Beaker 2 (sample 2) and the single sherd (sample 3). The aim of the analysis was to determine whether sample 3 could have come from either Beaker 1 or Beaker 2.

Methodology

All samples were prepared as standard 30 μm petrographic thin sections at the Institute of Archaeology, University College London using a modification of the standard geological technique (Quinn 2013, 23–33). The thin sections were studied and compared under the polarising light microscope at magnifications of 40x and 100x without reference to which beaker they came from. They were characterised in terms of the nature of their inclusions, matrix and voids and possible relationships were determined. The results of this was then compared to the information on each sample.

Results

All four samples bear similarities on account of their non-calcareous clay matrix, varying amounts of quartz silt and the presence of grog temper. Nevertheless, three different petrographic fabrics are present. Samples 1a and 1b have a closely related petrographic fabric, confirming the suggestion that they both originate from Beaker 1. Sherd 3 differs significantly from these two thin sections on account of the absence of siltstone rock inclusions, the clean nature of the clay that was used and perhaps the greater abundance of grog. It is very unlikely that sample 3 originated from Beaker 1, unless it was made out or several components and with clay of a different paste. Sample 2 from Beaker 2 bears some similarities to sherds 1a and 1b but differs as a result of the absence of siltstone rock inclusions and the lower proportion of grog. More importantly, sherd 2 differs petrographically from sample 3, which has much more grog temper and less silt-sized inclusions in its base clay. For this reason it is unlikely that sherd 3 originated from Beaker 2, notwithstanding the scenario proposed above regarding the use of different paste recipes to make a single beaker vessel.

Location of samples and access

The thin sections analysed in this report are archived at the Institute of Archaeology, University College London. These can be accessed and studied for comparative purposes by arrangement with the author.