Society of Antiquaries of Scotland

On the fringe of Neolithic Europe:

excavation of a chambered cairn on the Holm of Papa Westray, Orkney

Anna Ritchie

ISBN: 978-0-903903-47-9 (hardback) 978-1-908332-31-8 (PDF)

Ritchie, A 2009. *On the fringe of Neolithic Europe: excavation of the chambered cairn on the Holm of Papa Westray, Orkney.* Edinburgh: Society of Antiquaries of Scotland. https://doi.org/10.9750/9781908332318

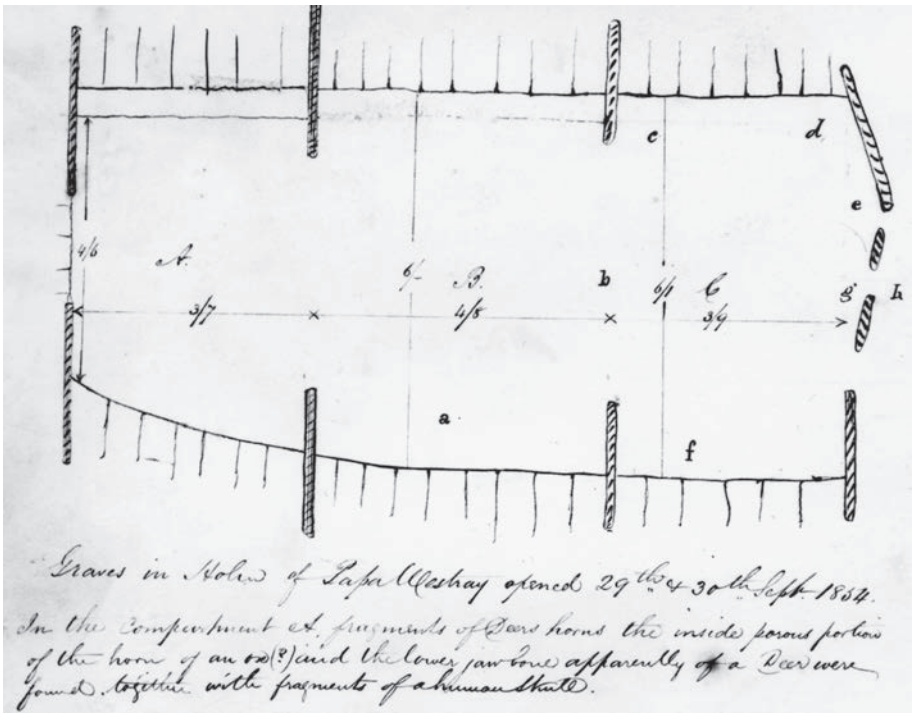
Society of Antiquaries of Scotland is a registered Scottish charity number SC 010440. Visit our website at www.socantscot.org or find us on Twitter @socantscot.

Part I

THE EXCAVATIONS

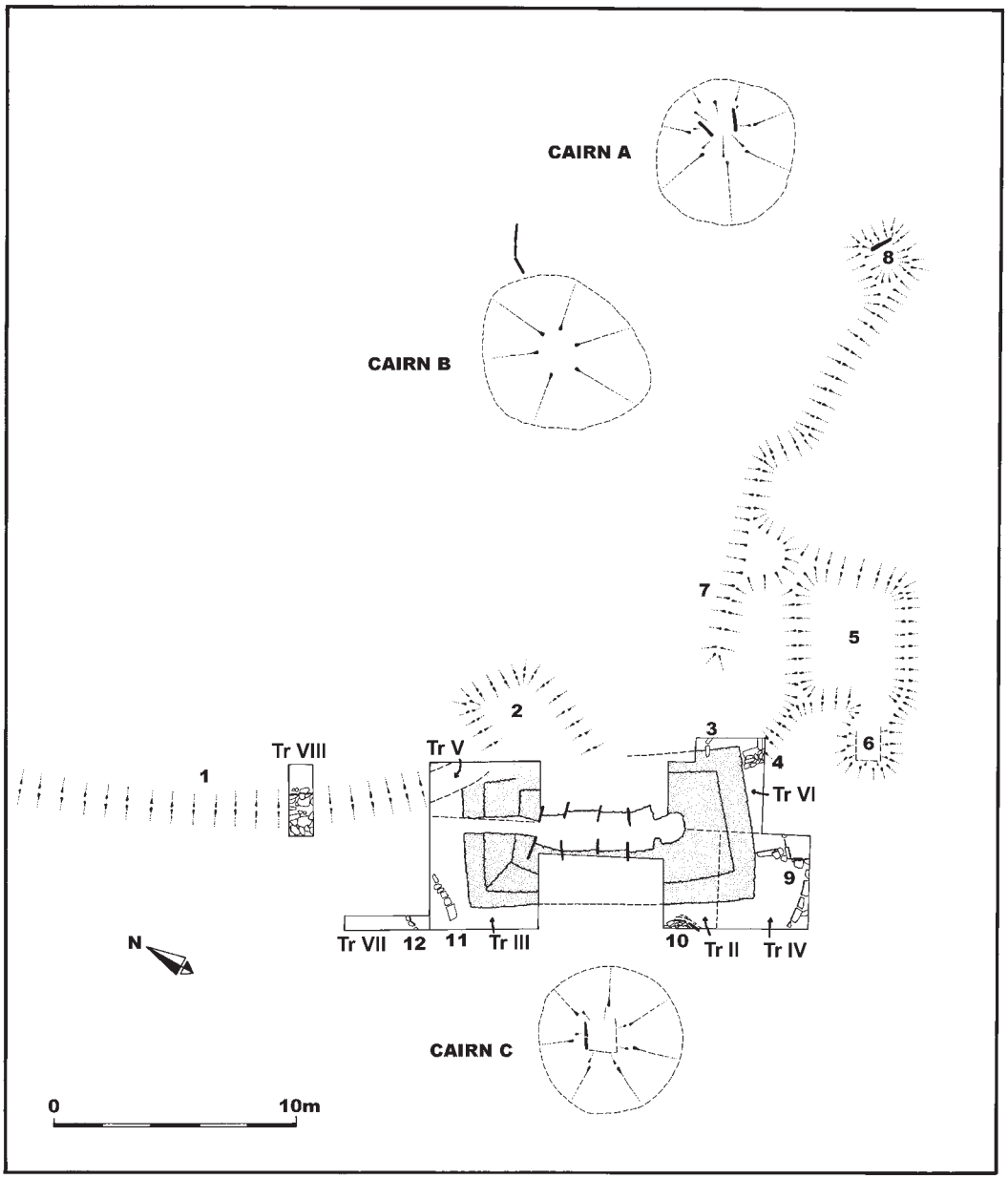
THE RESULTS OF PETRIE'S EXCAVATION OF 1854

George Petrie (1818–75) was born in Kirkwall, and after leaving school he became tutor for a year to the Traill family of Holland, Papa Westray, before entering the Sheriff Clerk's office in Kirkwall, later serving the Balfour estate in Shapinsay and finally becoming Clerk to the Commissioners of Supply (Watters, Cormack & Cormack 1995, 12). There was thus an early connection with Papa Westray, and one of his Traill pupils, Thomas, later gave him permission to excavate on the Holm of Papa Westray. Petrie was less interested in the structure of the chamber than in its contents, and his notebook plan (illus 3; the basis of the 1857 published plan) is somewhat schematic in its rendering of the stonework of the chamber walls, though reasonably accurate in its measurements. Although he identified its sepulchral nature, he saw it at this stage not as a chambered cairn but as 'an immense grave of double the ordinary dimensions'. The excavation was hurried and unfinished, and he was conscious of the need to test the depth of deposits below the point at which the workmen had stopped digging. 'Just before leaving the place, and while the vessel was waiting, I ascertained that there was a layer of sandy marl on the bottom of the graves and beneath the skeletons at *c* and *d*, flat stones were laid on the marl' (Petrie 1857, 62). The 'layer of sandy marl' can be identified as the leached surface of the boulder clay on which the cairn was built, and the 'flat stones' were in the east



Illus 3
Petrie's plan of his excavation in 1854 (ms 487(3), f.15v)

side of the third compartment. The mound was 'more or less covered with loose stones' when work began, but the tops of the transverse uprights were visible, and excavation began in the first compartment and finished in the third. Petrie was not to know that he was digging through both filling and floor deposits, but he was interested in evidence of burial ritual: 'In the third compartment were … the remains of two headless human skeletons, two skulls placed vertically with the faces towards the east and another skull on its side with the face towards the back of the other two. The headless skeletons had apparently not been disturbed since their interment as the ribs and other bones were in the position they might be expected to occupy. This is worthy of notice, as it shows that the dismemberment of the bodies occurred before



Illus 4
Plan of the cairn, Holm of Papa Westray North, and adjacent field walls, mounds and structures

interment, and was therefore the result of design and not of a subsequent disturbance of the remains' (Petrie ms 545, pp 9–10; see appendix). What Petrie had found was not in fact evidence of decapitation but of post-depositional processes whereby bones were moved. From Petrie's accounts it would appear that he found the remains of at least six individuals, along with antlers and animal and bird bones, and a small sherd of pottery. In particular, the claim that he had found parts of twelve pairs of antlers attracted subsequent comment.

Some support for Petrie's 'headless skeletons' in the third compartment comes from the three articulated vertebrae found in the modern excavations in compartment 3 E layer 1 near point c on Petrie's plan (illus 3). The rest of the bones that he encountered and left on site are those from the upper disturbed layers in all three compartments (comp 1.1, comp 2.1 & 2.2, comp 3.1) and those from the top of the cairn. He did not entirely clear any of the three compartments, although his work was most effective in compartment 3. The two small slabs shown between the fourth pair of orthostats on Petrie's plan were not found in the later excavation, nor were there sockets in the floor to suggest that they had any structural purpose.

The RCAHMS account, written in 1935, suggests that the site had been disturbed even before Petrie's operations, but Petrie's manuscript account records very clearly that 'The whole appearance indeed of the tomb and its contents was irreconcilable with the idea that it had been disturbed since the bodies and other relics were first placed in it'. His account is likely to be reliable, for Davidson and Henshall comment on their 'respect for the accuracy of his observations and the independence of his judgement' (1989, 6), and the accuracy of his plans has been demonstrated also at Bookan in mainland Orkney (Card 2005, 187).

EXCAVATIONS 1982–3

When Audrey Henshall first visited the site in August 1957, the innermost top portions of the passage walls were visible, as was the top of the west wall of the fourth compartment (1963, 200). These had not been seen by Petrie, and it must be assumed that they became visible partly as a result of the collapse of his trench edges and partly through later erosion caused by sheep sheltering on the site. It is also likely that stones were robbed to help build the sheep stell to the east of the site. The excavation trenches of 1982–3 were laid out on a grid to either side of a line along the visible axis of the chamber (illus 4), with the intention of examining the front and back of the cairn, the burial chamber and the field wall at the north end of the cairn (trenches I–VIII). In total an area of 73sq m was examined, although the surface of the cairn was only cleaned and planned but not dismantled. Trench I is the area within the chamber and is referenced in the following text as compartments 1–4 and cell 5 (as numbered on illus 11a), and within each compartment as the east (E) or west (W) side, eg 3E and 3W, followed by the layer number. For ease of reference, the axis of the chamber is taken to be N/S, although in reality it is NE/SW.

Apart from the topsoil, all the deposits from the cell, stalled chamber and passage were wet-sieved in their entirety in the sea at the Holm of Papa Westray through two wire baskets set one inside the other: an inner basket with a mesh of 3mm and an outer basket with a mesh of 1.5mm. Material from contexts outside the cairn were sampled and sieved in the same way. The residues were washed and dried and part-sorted in Edinburgh by AOC (Scotland) Ltd in 1984. The rest of the sorting was done to extract the fish bones in Edinburgh and York in 2008.

Outline sequence of the history of the cairn

Prior to the construction of the stalled chamber, the internal area required was stripped of turf and soil down to the grey/white leached surface of the boulder clay. This was also the case at the domestic site of Knap of Howar (Ritchie 1983, fig 4) and at the chambered cairn at Point of Cott (Barber 1997, 22). In order to compare the character of the subsoil surface within the cairn with that outside the cairn, trench III was extended 3.5m northwards as a narrow trench VII and a small test pit was opened 40m to the north-west. In VII, the surface of the boulder clay was unleached with small natural hollows filled with clean mid brown clayey soil (similar to those in comp 1W4 and comp 2W6). In the test pit, beneath 0.2m of peat, was compact sand with the same grey/white leached surface as in the chamber.

The sequence of building activity as revealed through the 1982–3 excavations was as follows:

1. Cell 5 was built as a free-standing circular cairn with a corbelled chamber opening to the NW (Phase 1) (illus 4 & 22).
2. A rectangular stalled chamber was added to the front of the cell, first stripping the area of turf, thus incorporating the cell into a rectangular core-cairn

with an asymmetrical concave front and an entrance passage opening to the NW (Phase 2) (illus 4 & 11).

3. Cell 5 was sealed off (Phase 3) (illus 15d & 16). The concave front to the core-cairn was infilled with masonry to form a straight front (Phase 3) (illus 4 & 8).
4. An outer skin of cairn was built to enclose the whole structure, with the entrance to the NW (Phase 3) (illus 4 & 8).
5. The roofs of the chamber and passage were removed and their interiors filled (Phase 4). Parts of the exterior cairn were dismantled and new structures added (Phase 5) (illus 4).

Activities within each stage were not necessarily contemporary, and surviving burial deposits began between stages 2 and 3 (Phase 3) and ceased by the start of stage 5 (Phase 4).

Structural description of cairn and chamber

Phase 1 Round cairn and cell 5 (illus 4 & 5)

The primary structure on the site consisted of cell 5 within a small and roughly built 'round' cairn. The

Illus 5
Cell 5 emptied of its filling

cairn as visible within the later rectangular cairn appears to be oval in shape and to measure some 2.2m by 3.4m, but its dimensions at ground level may be a little larger. For the most part it was constructed of medium-sized beach boulders, which made flush internal and external faces impossible to achieve. It survives to a height of 0.8m in 5–9 courses, and although the apex of its corbelled dome is missing the full original external height is unlikely to have been more than about 1.2m and less if it were finished with lintels rather than a dome.

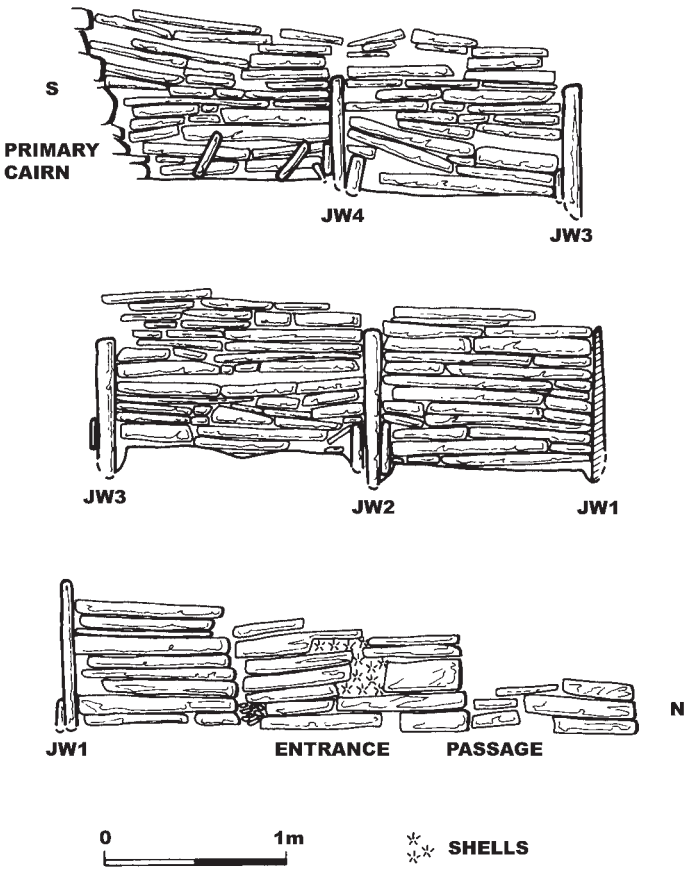
The floor plan of the cell appears to be sub-rectangular rather than circular, but this is largely the effect of the two large slabs or portals that flank the entrance (P1 & P2), one of which (P1) extends 1.1m into the cell area (illus 11a & 15b). The floor area is about 1.0m × 1.1m. Corbelling begins at the level of the tops of the portal slabs. Both slabs are set on the surface of the boulder clay rather than into slots, and both slope outwards from their bases, but the soil-filled gap between the secondary blocking slabs and the west portal (P2) suggests that the latter was originally more upright. Damage to the top of P2 indicates that there has been some slumping of the west side of the cairn in antiquity, which caused the slab to slope further and the corbelling above to move outwards (with a knock-on effect on the end of the west wall of the stalled chamber).

At the base of the portals, the entrance into cell 5 is about 0.60m wide. A lintel slab some 1.10–1.20m would have been required to span the entrance at a height of about 0.70m. (The various plans were drawn at different levels, and the portals are sloping, hence the apparent discrepancies in the width of the entrance.)

Phase 2 Rectangular cairn and entrance passage

The south end of the later stalled cairn abuts the exterior face of the round cairn in such a way that there is a common central axis to the two chambers, although that axis was not maintained very accurately by the entrance passage at the north end of the stalled chamber. There is a marked contrast in appearance between the irregularly coursed rounded boulders of the exterior of the round cairn and the neatly laid flat slabs of the interior walls of the stalled chamber, which was accentuated after the entrance to cell 5 was blocked, again with neat walling (illus 6a & 12).

The façade to the first stage of the core cairn appears to have been crescentic to the west of the entrance and straight to the east, though the degree of dismantlement at the north-east corner confuses the issue (illus 7 & 8). This façade was then infilled to create a uniformly straight façade, thereby lengthening the passage from 0.94m to 2.26m. These two wall-faces are visible both on plan and as straight joints in the walling on either side of the passage (illus 6, lower elevation). The rear of the rectangular cairn was at an angle because the long sides measure 21.1m long on the west and 19.6m long on the east.



Illus 6
Elevation drawings of the west side of the main chamber (a & b) and of the passage (c)

The stalled cairn in its final form is rectangular, 23.4m × 12.4m, with a carefully built external face of horizontal masonry surviving two to seven courses

Illus 7
The stalled chamber and passage. Holm of Papa Westray South cairn is visible on the horizon to the left

high, a maximum of 0.5m (there is no projecting basal plinth as is sometimes the case with stalled cairns). There are squared corners at the NW, SW and SE, but the NE corner and part of the east side of the cairn have been removed and masked by upright slabs. The entrance to the chamber is off-centre in the north face of the cairn. A passage 3.20m long and 0.62m wide leads to the portal jambstones (JE1 & JW1) at the north end of the chamber, where entry narrows to 0.58m. It was built in three sections, corresponding to the three main stages in the construction of the cairn. The walls of the passage survive three to ten courses high, the best preserved section being the innermost where the west wall is 0.72m high. There were no roofing lintels still in place and the original height of the passage is uncertain. At Point of Cott, the passage was roofed with thick upright slabs at an average height of 1.1m, with the innermost slab set against the two portal jambstones (Barber 1997, 11, fig 5). At Holm, no suitably thick slabs for upright lintels were found during the excavation, but two slabs found amongst the stones in front of the entrance were of a size appropriate for horizontal roofing lintels (0.93m × 0.61m × 0.09m and 0.86m × 0.33m × 0.75m) and others could have been broken lintels. If, as seems likely, the innermost lintel was set up against the portal jambstones, the top of the

west wall as it survives may well have been the point at which the passage was roofed, at a height of 0.7m. This is lower than is the case with the passages of the other four Orkney–Cromarty cairns where the roof height is known, which varies between 0.85m and 1.2m, but it is well within the range of heights of Maes Howe cairns at 0.4m to 0.86m (Davidson & Henshall 1989, 19, 43).

Two courses of sill-stones and a layer of paving at the outer end of the passage appeared to be contemporary

Illus 8
The front of the cairn showing the three skins of walling and the primary floor level in the passage

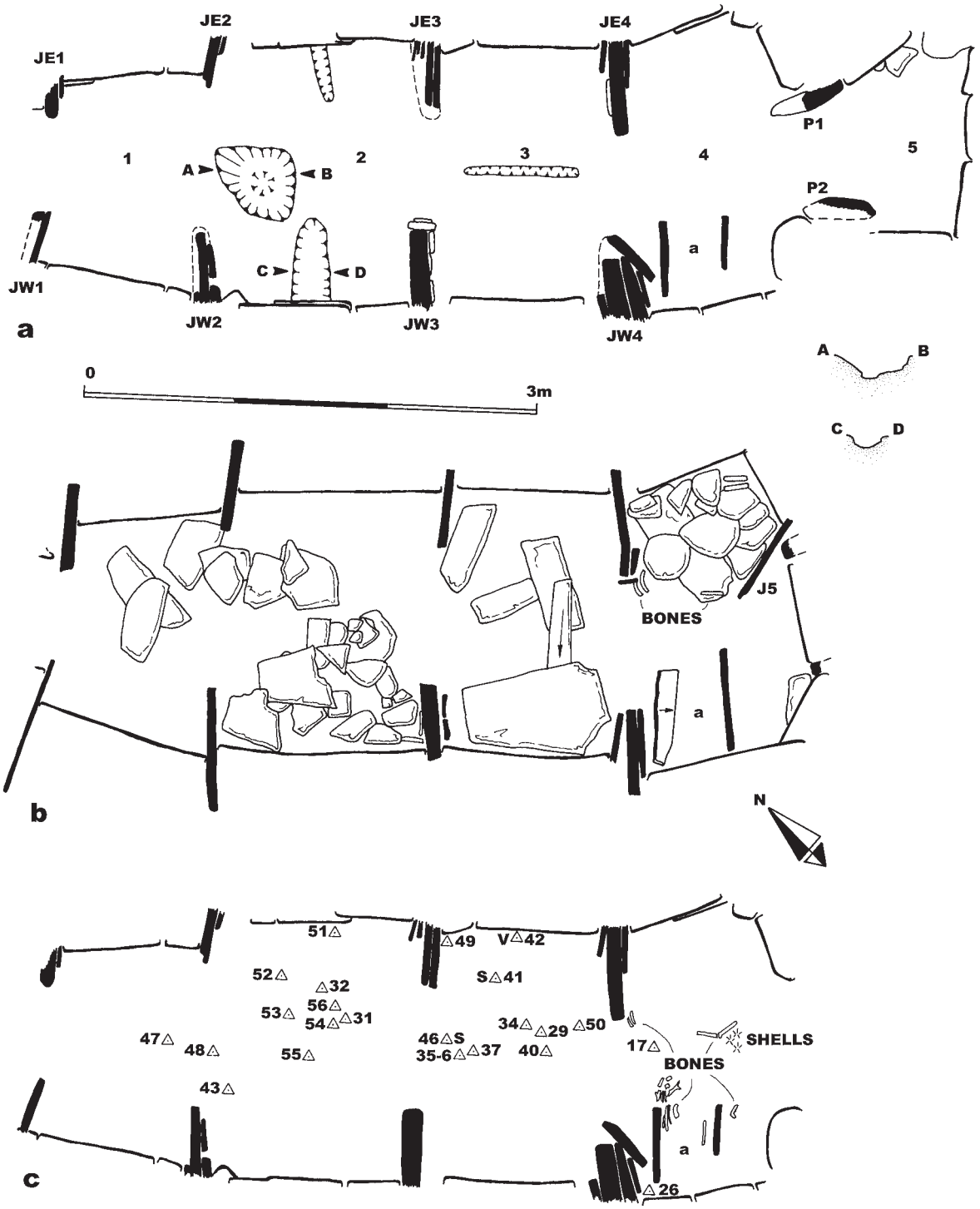
Illus 9
The front of the cairn with sill stones at the entrance to the passage. Two straight joints are visible in the passage wall to the left

with the addition of the outermost skin of cairn (illus 8 & 9).

Stalled chamber (illus 10–14)

The main stalled chamber measures some 4.80m in length from the portal jambstones to the end-wall of the fourth compartment, and its width varies from 1.24m in the first compartment to 1.86m in the fourth. It is divided into four compartments by a further three pairs of jambstones, each set into the side walls and protruding approximately at a right angle into the chamber (the width and thickness of these slabs on plan varies according to the level at which the plan was drawn). Varying in thickness at the base from 0.06m to 0.14m, the maximum surviving heights of the jambstones, numbered in pairs from the entrance inwards, are JE1 0.86m, JW1 0.80m, JE2 1.08m, JW2 0.65m, JE3 1.21m, JW3 0.74m, JE4 1.04m and JW4 0.70m. As they survive, the orthostats on the east side of the chamber are consistently taller than those on the west, but those on the west are broken to a greater degree (except JW1) and were originally taller, as can be seen from the voids in the walling above (illus 6b). They are set upright in sockets dug into the boulder clay and chocked with small slabs, some of which protrude well above floor level, but it was not possible to measure the depths of the sockets without harming the monument. (At Point of Cott, where the orthostats were both taller and thicker, the ratio of depth of socket to height above floor level was on

Illus 10
Compartment 3E with the broken jambstone J4E to the right



Illus 11
Main chamber: plans of primary (a) and secondary (b) floor levels and distribution of artefacts (c) (with their SF numbers)

Illus 12
Compartment 4W with the shelf supports. On the left is the junction between the irregular outer face of the Cell 5 cairn and the horizontal walling of the stalled chamber

average 1:5; Barber 1997, fig 5.) Damage to the inner edges of most orthostats makes it difficult to gauge the original width of the transverse gaps between the pairs of jambstones, through which access is gained to each compartment. The first pair, the portal stones at the chamber entrance (JE1 & JW1), appears to be intact, which suggests that they were markedly shorter in height than those within the chamber, with a transverse gap between them of 0.6m. The sockets for some orthostats protrude farther into the chamber than the stones as they survive, and the break in JE4 demonstrates how this might have happened, with the slab shearing off diagonally (illus 10). The amount of damage to the inner jambstones is significant, for Petrie's plan shows that the slabs were at the time of his excavation already the width that they are today, which suggests that the damage happened in antiquity rather than in recent times. Study of the sheep bones from the chamber has shown that the tomb was left open during at least part of its lifetime and that it was used as a refuge by sheep, which could well account for the damage to the jambstones.

The west wall of the chamber has a distinct outward batter above the level of the tops of the jambstones, as can be seen in illus 13 where the base and the top of the wall are shown. The east wall of compartment 1 projects about 0.20m forward of the line of the wall in the adjacent compartment, a feature noticed by Petrie (1857).

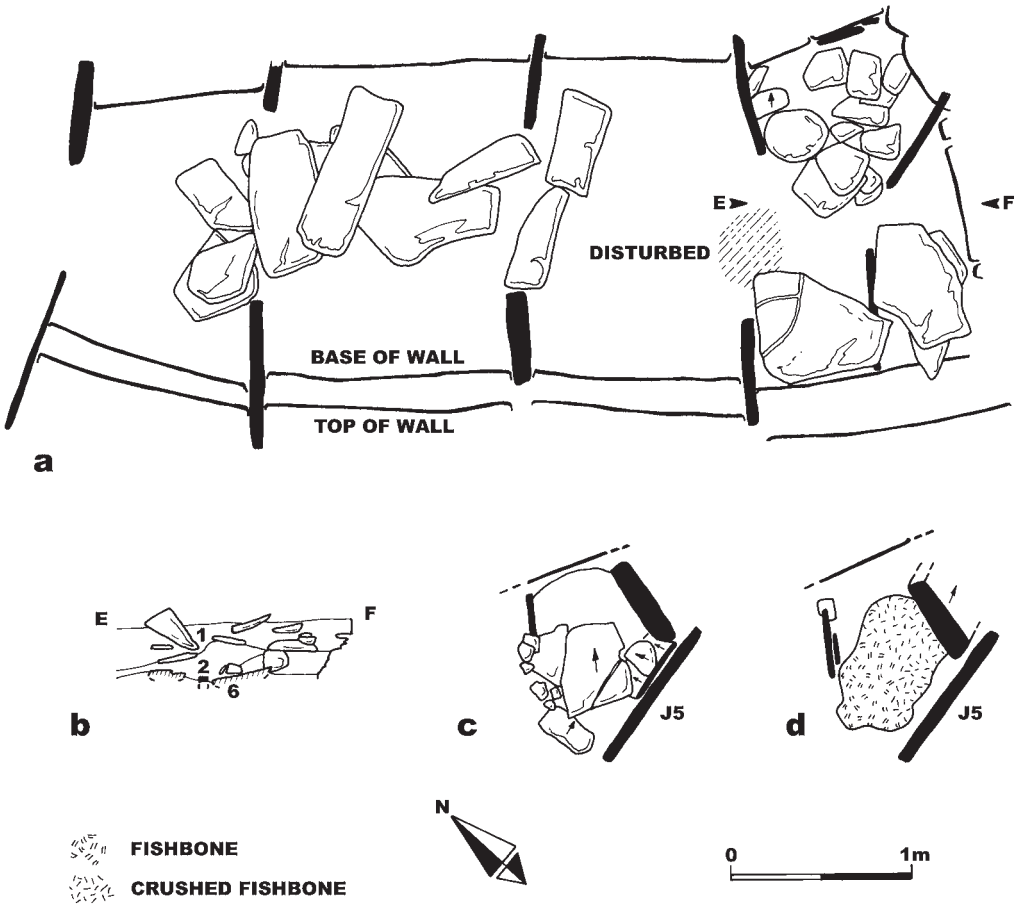
The floor of the chamber was the surface of the underlying boulder clay, which had been levelled in the south-east corner by cutting the clay back to the face of the side-wall. It was a leached grey-white in colour apart from the central area of compartment 1 where it was pale orange. There were several shallow features cut into the floor (illus 11a), all of which were filled with floor deposit and, in the case of pit 4 in the central area of compartment 2, small stones. The axial gully in compartment 3 may have played a role in the initial laying out of the chamber, while the two transverse gullies in compartment 2, which underlie the side-walls, may have been cut in readiness for jambstones that were never erected, perhaps a mistake in the laying out process. It is also possible that all

these features were natural hollows in the clay subsoil like those in trench VII.

Chamber furniture

On the west side of the innermost compartment 4, a low bench was built by setting two upright slabs into the floor (illus 11a), which later slumped slightly to the north (illus 11b & 12). A large thin slab of stone was laid on top of these two supports at a height of about 0.30m (illus 13 & 19); cracked and broken, it had clearly once been larger and probably filled the south-west compartment, thereby providing two alcoves for burial deposits beneath it (4NW and 4SW). The length of the south support showed that the bench could have been 0.68m or more deep from the side-wall of the chamber. There was no means of determining whether this bench was integral to the original design, or whether it had been added later, but the former seems most likely. The lower of the two slabs to the south may have been part of the bench top; it lay at an angle against the side-wall and could have reached that position when the upper slab landed on it, presumably during the process of filling the chamber.

Undoubtedly a later addition was the large horizontal slab filling the west side of compartment 3 (illus 11b), for there were undisturbed burial deposits beneath it. It seems likely that this slab may have been lifted at least partially by Petrie, to account for the intrusive slab tucked just under its east edge, but a slab in this position would not be unexpected (Davidson & Henshall 1989, 30). Petrie makes no mention of a slab but he records that 'a headless skeleton lay at f' on this side of the



Illus 13
Main chamber: plan of shelf in compartment 4W, second level of slabs in compartment 4NE and fallen roof slabs (a), axial section A–B in compartment 4 (b) and plans of the stone setting in 4NE (c) for the deposit of fish bones (d)

Illus 14
Stone setting in compartment 4E in which the fishbone deposit was placed

compartment, which was presumably lying on this slab (1857). The 'cavity' that Petrie mentions beneath a stone in the south-east corner of compartment 3E must have been a void beneath a fallen slab, because there was no pit in the floor.

In chamber A at Calf of Eday Long, the shelves in the innermost compartment were built into the end-wall and were clearly part of the original design, while in chamber B a large horizontal slab at or near floor level filled the north side of the first compartment (Calder 1937, 121, fig 8) as in 3W3 at Holm of Papa Westray.

Phase 3 The use of the monument

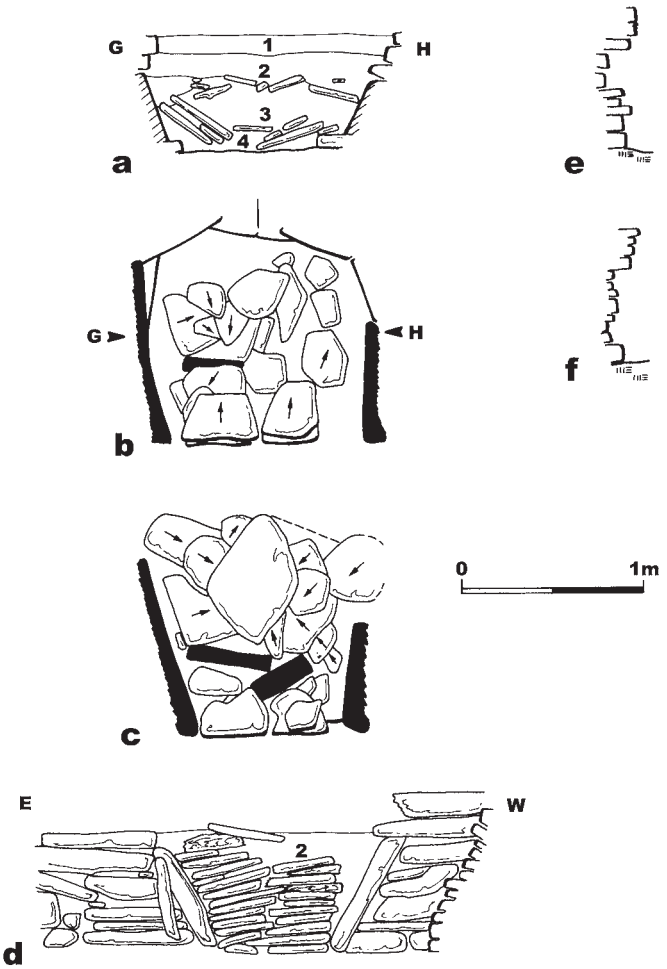
Cell 5 (illus 11, 15–17)

There was no evidence at floor level of the function of cell 5. If it had been used for burials, all trace of them had been removed, although the old land surface was still present as a layer up to 30mm thick of black soil with some charcoal. After the stalled chamber had been in use for an unknown period of time, the cell was filled and its entrance blocked with twelve courses of horizontal walling to a height of almost 0.6m (illus 15, 16 & 17). The processes of filling and wall-building happened concurrently and in stages, as did their excavation, as no other method was physically possible without removing the roof. The filling consisted of three layers of medium, light and dark brown soil and organic material (layers 5.2, 5.3 and 5.4) separated by two layers of horizontal stone slabs, with two stones set upright on (but not into) the floor of the cell. These two stones protruded upwards into the first layer of horizontal slabs. This first layer of stones coincided with and slightly overlapped the fifth course of walling, while the second layer of stones coincided with the eighth course of walling. Many of the slabs lay at an angle owing to voids in the soil beneath. The intervening layers of soil all contained human bones, bones of sheep, deer, rodents and fish, and marine shells (7kg in total), but there were also marked differences that suggested deliberate selection. No skulls were included in the lowest layer (layer 5.4) whereas human, sheep and otter skulls were a feature of the other two layers, and deer tines were included only in the last layer (layer 5.2). In layers 5.3 and 5.2 the pockets of pale orange bone material had been placed in discrete deposits against the walls of the cell, and, as one of the deposits extended through both layers and

Table 1
Human bone fragments from the filling of cell 5 (Phase 3)

Frags	*5.2/3*	*5.4*
Skull	5	–
Maxilla	1	–
Mandible	1	–
Teeth	4	–
Vertebra	7	–
Rib	5	2
Scapula	1	–
Ulna	1	–
Humerus	2	–
Femur	1	1
Tibia	1	–
Phalanx	2 ?foot	–
Total	34	

contained parts of the same skull, the human bones from these two layers have been amalgamated in Table 1. Parts of the same skull were found in layer 5.3 and the earliest deposit in the adjacent compartment 4E. The sole artefact from the cell was a very small sherd of undiagnostic pottery from layer 5.2. It seems likely that the sealing of cell 5 was a single event and that the material was derived from the stalled chamber. The



Illus 15
Section (a), plans (b & c) and profiles (e & f) of Cell 5, and elevation drawing of walling blocking the cell (d)

total weight of human and animal bone was 6.8kg, in addition to which was 800g of antler. Radiocarbon dates were obtained from human bone in layer 5.4 (GrA-25638, 4690±40 BP) and layer 5.3 (GU-2067, 4395±60 BP) (see below, Patrick Ashmore on radiocarbon dates).

Stalled chamber

On top of the clay subsoil was a black greasy deposit up to 20mm thick, which contained small amounts of carbonised material, fish bones, rodent bones and fragments of mammal bone too small to identify (layers 1.5, 2.5, 3.4, 3.5, 4.9). Above this was a layer of compacted dark brown soil up to 0.22m deep (layers 1.3, 1.4, 2.3, 3.3, 4NW4, 4NW5, 4NE8) containing carbonised material, human and animal bones, bird bones, rodent bones, fish bones and marine shells, which represented the earliest surviving period of use of the chamber. In compartment 4 it was possible to distinguish an upper floor deposit, averaging 0.13m thick in the west side and central area (layers 4NW2, 4SW2, 4SE2) and around the secondary stonework in the east side of the compartment (layer 4NE6). Human bones were found in all compartments, but artefacts were confined to the central area and east side of compartments 1–3. There was no evidence for association of artefacts with burials. Compartment 3 proved to be the most comprehensively disturbed by Petrie's activities, but even here there were intact floor deposits, particularly under the horizontal slab in 3W. Recognising the stratigraphy in the first three compartments was difficult, not simply on account of the 19th-century excavation but also because organic matter and artefacts that had lain upon the surface of the original floor deposit at the time of the sealing of the chamber would have been surrounded as well as covered by filling material. Compartment 4 was vital in providing a yardstick for the difference between undisturbed filling and floor deposits. Radiocarbon dates were obtained from vole bones in 1.3 and 1.4 (OxA-18665, 4054±28 BP; OxA-18666, 4089±29 BP), which are likely to represent the effects of bioturbation on the floor deposits.

Compartment 4E

After cell 5 had been sealed off, an upright slab (J5) was placed at an angle to the rear of the main chamber and partially propped up against the east portal slab of the cell so as to subdivide the east side of compartment 4 (the larger area is 4NE and the smaller 4SE) (illus 13). This slab is 0.54m in height and has no socket in the chamber floor, although its weight drove it into the existing floor deposit and created a groove in the surface of the clay subsoil. The broken remains of an upright slab in a similar position

but set into a socket was found at Calf of Eday Long (chamber A, Calder 1937, 121). Underlying both the upright slab J5 and a large horizontal slab (4NE7) within sub-compartment 4NE was a deposit of human bones, including an articulated femur and patella, associated with a discrete deposit of 162 periwinkle shells (4NE8), and matching parts of an ankle in 4SE6 immediately south of jambstone J5 (Table 2). Parts likely to come from the same skull were found in layers 4NE8 and 4SE6. This burial deposit therefore pre-dated the subdivision of the compartment and may have pre-dated the sealing of cell 5, into which other bones from this skeleton could have been gathered. Ribs found close to jambstone JE4 (4NE7) are likely to belong to the same individual as bone deposit 4NE8. Also within layer 4SE6, in the small

Table 2
Human bone fragments from floor deposits in compartment 4 (Phase 3)

Frags	*4NW4*	*4NW5*	*4SW2*	*4NE6*	*4NE7*	*4NE8*	*4SE6*	*4SE2*
Skull	–	1+	–	–	–	1	1	–
Mandible	1	–	1	–	–	–	–	–
Teeth	1	–	1	1	–	1	–	–
Vertebra	3	–	–	–	–	–	–	2
Rib	8	–	1	1	2	3	–	14
Clavicle	–	–	–	–	–	–	–	1
Sternum	1	–	–	–	–	–	–	–
Humerus	2	–	–	–	–	–	–	–
Radius	2	1	–	1	–	–	–	–
Ulna	2	1	–	–	–	–	–	2
Metatarsal	–	–	1	–	–	–	–	5
Metacarpal	2	–	–	1	1	3	–	5
Pelvis	1	–	–	–	–	–	–	–
Femur	1	3	–	–	–	1	–	–
Patella	1	–	–	–	–	2	–	–
Tibia	3	1	–	–	–	1	1	–
Fibula	3	1	–	–	–	–	1	–
Calcaneum	–	–	–	–	–	–	1	–
Astragalus	–	–	–	–	–	–	1	1
Scaphoid	–	–	–	–	–	–	2	–
Tarsal	–	–	–	–	–	–	–	1
Phalanx	2 hand 1 foot	3 hand	–	4 hand	1 hand	2 hand	1 foot	–
Total	34	11+	4	8	4	14	–	31

Illus 16
Cell 5 with its filling at the level of layer 5.3, including a deposit of mixed human and animal bones

area between jambstone J5 and the rear wall of the chamber, was a deposit of loose fine soil dense with small fish bones and vole bones, which is likely to represent otter activity.

Other slabs were subsequently placed on top of the large basal slab (4NE7) (illus 13 & 17) interspersed with a yellow-brown soil (layer 4NE6), which contained eight human bones, which displayed joins with bones from layers 4NW4 and 4SE2. On top of the slabs of 4NE7 was built a box-like setting of slabs (4NE4) with a flat base and sloping sides (illus 13c & 14). One of the side-slabs was a large thick stone, 0.82m tall, which had been set upright against the exterior face of the cell 5 cairn and had subsequently slumped forward. Within the rough setting was a large deposit of small fish bones and powdered fish bone and very small stones (4NE3), which weighed in total 9kg (illus 13d). This deposit was orange in colour and, where it extended beyond the base slab of the setting, the soil beneath was stained orange. The character of the deposit, with powdered 'fishmeal' at its deepest end, 160mm deep against the upright on the east side, and tailing off upwards on the west, suggested that it may originally have been in some sort of bag. Around and above the deposit and its stone setting was undisturbed chamber filling (layers 4E1 and 4E2).

Compartment 4W

Beneath and spilling outside the bench were human bones, including long bones, vertebrae, ribs and part of a skull (Table 2; illus 11c). There appeared in terms of stratigraphy to have been two phases of deposition in the north alcove, the first in layer 4NW5 and the second in layer 4NW4, but there were matching fragments of radius and ulna and the two deposits may represent one skeleton. Other human bones lay in the south alcove in layer 4SW2. A fragment of human vertebra came from layer 4W2 on top of the bench. A radiocarbon date was obtained from bone in 4NW4 (GU-2068, 4430 ± 60 BP).

Between jambstones JE4 and JW4 was a hollow in the surface of the surviving undisturbed floor deposit (layer 3.2; illus 13), which corresponded with the location of *g* and *h* on Petrie's plans, and where he recorded that 'the skull at *g* appeared to belong to a skeleton extending in the direction of *h*' (1857) (illus 3 & 13a). The hollow was probably created by Petrie's workman in removing the skull.

Compartment 3

Despite Petrie's activities, more human bones remained in the undisturbed floor deposit in the east side of compartment 3 than in the whole of compartments 1 and 2 (Table 3), and joins were recognised between two bones found in 3E3 and disturbed Petrie spoil in compartments 1 and 2. Three articulated vertebrae lying against the side-wall of compartment 3E may be the remains of a burial laid in a crouched position with its back against the wall (illus 11c), probably one of the skeletons described by Petrie as undisturbed (ms 545). A partially articulated human foot lay

Illus 17
Cell 5 with its blocking in place and its left-hand portal stone (P1) hidden by secondary jambstone J5

Table 3
Human bone fragments from floor deposits in compartments 1–3 (Phase 3)

Frags	*1W3*	*1E3*	*2W3*	*2E3*	*3W3*	*3E3*
Skull	–	–	–	–	1	2+
Mandible	–	–	–	–	–	2
Teeth	–	–	1	1	1	13
Vertebra	–	–	–	–	–	3
Rib	1	–	2	1	–	–
Scapula	–	1	–	–	–	–
Carpal	–	–	–	–	–	4
Tarsal	–	–	–	–	–	6
Metacarpal	1	–	–	–	1	5
Metatarsal	–	–	–	–	–	8
Femur	–	2	–	–	–	–
Patella	–	–	–	–	–	1
Calcaneum	2	–	1	–	1	–
Phalanx	–	–	–	–	–	6 hand 7 foot
Total	4	3	4	2	4	57+

east of centre of the compartment. There were only four fragments of human bones in the west side of the compartment, but they included a large part of a human skull, found close to the NE edge of the slab filling compartment 3W and possibly belonging to Petrie's 'headless skeleton' at *f* (1857).

Compartment 2

There were only six fragments of human bones in the floor deposit (2.3) in this compartment, compared with more than 61 fragments in compartment 3 (Table 3) and 114 fragments in compartment 4 (Table 2).

Compartment 1

Again there were markedly fewer human bones in the floor deposit here (1.3, 7 fragments: table 3) than in compartments 3 and 4, but the presence of three articulated vertebrae lying against the east wall suggest that the compartment had been used for burials. The soil was a medium brown in colour, compact in texture with small stones, and the surface of the clay subsoil was pale orange in colour in the central area of the compartment, as if it had been in brief contact with burning material of some sort.

Artefacts and faunal remains associated with the use of the chamber

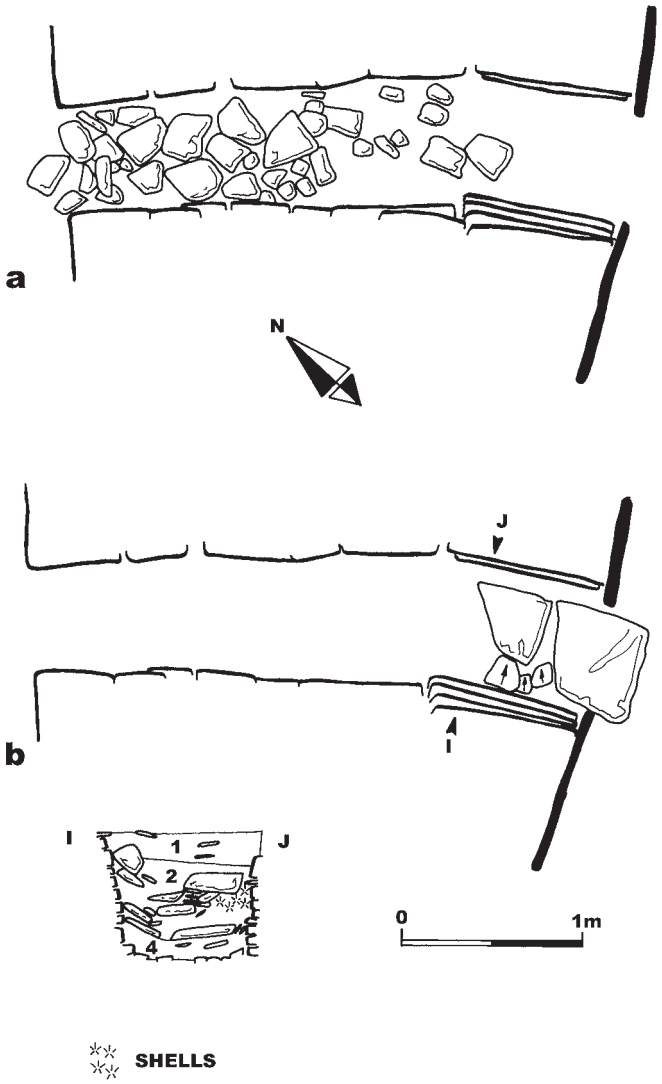
There were no artefacts from primary deposits in the western parts of burial compartments 1–3 or in the eastern parts of compartments 1 and 4, and only sherds of pottery came from the central area and the east side of compartments 2 and 3 (illus 11c). They represent simple undecorated bowls, apart from pot 7 from 3E4 which is Grooved Ware. A fish vertebra bead came from 4NW4. A worked flint flake came from the floor deposit in 4SW2 (illus 25, no 19), together with a small nodule of haematite (SF18), while a sherd of pottery was found in 4NW2 between the northern bench support and jambstone JW4 (SF26), and a

single small piece of unworked pumice was recovered from the central area of compartment 2 (SF38).

The report on animal bones was compiled by Mary Harman, who was kind enough to work on site during both seasons of excavation, and she has presented all the bones from the chamber, cell and passage together (Table 13), with no differentiation between filling and floor deposits, on the grounds that the bones showed no signs of damage by trampling (see report below). This approach ignores the archaeological evidence for stratigraphy, and subsequent work on the sheep bones by Marie Balasse and Anne Tresset suggests that sheep (and presumably other animals) were able to access the tomb for shelter and lambing (2007; Tresset 2003). Soil and other material would have been carried into the tomb on the animals' feet, which would have helped to protect the bones already in the chamber. Tables 4–6 were compiled by the author from the detailed data in Harman's archive report, and it should be noted that all bone fragments have been included, whereas Table 9 excludes loose teeth, vertebrae, ribs and loose epiphyses.

Sheep bones and deer antler were present in all compartments and otter bones in all but the first compartment (Table 4). Remains of dog were confined to the first two compartments and deer bones to the first, and the two deer bones from compartment 1.3 are likely to represent the results of scavenging carcasses outside the cairn. Numbers of sheep bone fragments decreased dramatically from 336 in the first compartment (to which might be added the 115 bones from the entrance passage) to 46 fragments in compartment 2, 23 fragments in compartment 3 and 39 in compartment 4. This pattern of deposition might suggest that most sheep penetrated no farther into the chamber than was necessary to find shelter, but, if the 782 sheep bones in cell 5 (Table 5) were derived from compartments 2–4, the combined total of 910 bones makes the overall distribution look more even. The greatest proportion of very young lambs was found in compartment 4 and cell 5. More puzzling, however, is the presence in the floor deposit in compartment 1 of 62 fragments of deer antler, including two cast bases and seven tine ends. It is unlikely that deer penetrated into the chamber and none of the fragments was gnawed. Marine shells were present throughout the chamber, although in the case of the innermost compartment they were confined to the periwinkle deposit in 4NE8. Rodent, amphibian and fish bones were present throughout and bird bones in all but the first compartment.

Fish remains included large cod and ling, indicating deep-water fishing, as well as inshore coastal species like wrasse. Small quantities of pierced vertebrae from ling and cod family fish were found throughout the tomb, which may have been used as beads. One cod vertebra was butchered with a stone tool and may represent the earliest evidence for fish butchery and processing in the Neolithic in Orkney. Much of the fish assemblage represents otter activity, but the presence of very large



Illus 18
Passage: plans of the secondary (a) and tertiary (b) floor levels, and section I–J

Table 4
Animal bone fragments from floor deposits in compartments 1–4 and the entrance passage (EP) (Phase 3)

Context	*sheep*		*red deer*		*otter*	*dog*	
	bones	*teeth*	*bones*	*antler*		*bones*	*teeth*
4SE2	14	–	–	–	1	–	–
4SW2	3	–	–	1	2	–	–
4NW4	9	–	–	1	1	–	–
4SE6	13	–	–	–	–	–	–
4NE6	20	–	2	–	3	–	–
3.3	23	3	–	2	2	–	–
2.3	46	4	–	10	2	2	1
1.3	336	24	2	62	–	2	2
EP5	115	28	2	–	–	1	–
Total	579	61	6	76	11	5	3

fish suggests that they may have been brought into the chamber deliberately by human hands.

Entrance passage

After an interval of unknown duration, a second level of rough paving was laid down in the outer two-thirds of the passage (illus 18a) and, as floor deposits in the passage continued to accumulate, a third area of paving was laid down at the inner end of the passage, including a large slab that protruded into the first compartment and overlay existing floor deposits there (illus 18b). These upper levels of paving will have had an impact upon the height of the passage for access, and they also imply considerable use of the passage, which may be associated with the fact that it was apparently open and used by animals as well as people. The maximum depth of floor deposit (EP5) in the passage was 0.24m and consisted of a gritty medium to dark brown soil, which contained fragments of sheep bones and antler (Table 5).

Forecourt

The base of the forecourt area in front of the cairn was a brown clayey soil with large slabs of stone (V.4, III.4), on top of which was a deposit of medium brown soil containing sheep, red deer, otter and cattle bones, which represented accumulation during the use of the passage and chamber (V.2, III.2). The total weight of animal bones was 3.8kg, of which almost 2kg showed signs of burning. A radiocarbon date was obtained from sheep bone in V.2 (OxA-16474, 4113 ± 40 BP).

In front of the entrance passage was a patch of black to dark brown soil containing 300g unburnt animal bone, which extended from just inside the entrance to about 1.6m outside (V.3). There were also large slabs of stone in this patch and amongst them an almost

Table 5
Animal bone fragments from the primary filling of cell 5 (excluding teeth) (Phase 3)

Context	*sheep*	*red deer*		*otter*
		bones	*antler*	
Cell 5.2	169	–	28	50
Cell 5.3	562	4	24	72
Cell 5.4	51	–	4	4
Total	782	4	56	126

Illus 19
Compartment 4W with the shelf in place and fallen roof slabs

intact and unburnt human skull, probably female (SF82). Whatever the activity that had resulted in these remains, it occurred late in the use of the forecourt and only just preceded the filling of the passage.

Phase 4 The end of the monument

The presence of soil, stones and organic material above floor level in the chamber and passage implies that they were deliberately filled when the use of the monument came to an end. Only in compartment 4 was the original filling intact and undisturbed, and its depth there probably reflects that throughout the chamber, for although much stonework has been robbed from the upper levels of the cairn its soil fill is unlikely either to have been removed or to have been augmented other than by natural processes. Thus the chamber appears to have received 0.55–0.65m of filling above its floor deposits (illus 19). In theory, the filling in the chamber could have been inserted, with difficulty, without removing the roof, but the fallen slab, probably a roof lintel, in compartment 4W suggests that a more economical explanation is that the roof was dismantled. About 0.54m of filling survived in the passage (illus 18), where it can only have been inserted from above. In cell 5, the uppermost layer of filling (5.1) was about 170mm thick and can only have been inserted by removing the roof. Thus it must be assumed that the roofs of the cell, chamber and passage were all removed in order to facilitate the insertion of filling material.

Throughout the first three compartments, layer 1 represented original chamber filling that had not only been disturbed by Petrie's workmen but had

also been augmented by material derived by them from floor deposits. Thus joins could be recognised between human bones excavated in surviving floor deposits and those in disturbed filling (list in archive). It was thought at the time of excavation that a more compacted character distinguished filling that had been trodden by Petrie's workmen but was otherwise undisturbed, and this was given the layer number 2, but in compartments 2 and 3 this layer not only produced much human bone but in 2 a metal button and it is therefore safer to regard all filling in compartments 1–3 as disturbed.

Cell 5

The roof and entrance lintel of cell 5 were removed and on top of the last layer of filling (5.2) was placed a final layer of black soil (5.1) containing animal bones (1.4kg), including for the first time pig bones, numerous limpet shells and deer antler (710g: two cast bases, 12 tines and 28 fragments) (illus 15a & 17). (Unfortunately at this stage in the excavation the significance of this layer was not appreciated and the limpets were not retained or counted.) A radiocarbon date was obtained from deer bone in 5.1 (OxA-16471, 4046 ± 38 BP).

Entrance passage

Petrie's plan (illus 3) shows walling between the portal jambstones, because he was not expecting there to be an entrance and he interpreted the slabs in the filling of the passage as rough walling (1857), though the more experienced eyes of RCAHMS investigators recognised signs of an entrance at the north end (1946, no 545; visited in 1928 and 1935). No lintels were *in*

Illus 20
The entrance passage with its filling seen from inside the chamber

Illus 21
Collapsed stones in the forecourt in front of the cairn. In the middle background is the walling of a later sheep stell

situ and it would have been necessary to remove most if not all in order to fill the passage. There were two distinct layers of fill: the lower consisted of medium brown soil and small to medium stone slabs with many animal bones and a few marine shells (EP3, EP4), while the upper filling consisted of very dark brown soil and small to medium stone slabs with some bone and, confined within the middle section of the passage, huge numbers of limpet shells and fish bones (EP2) (illus 18 & 20). Some temporary device must have been employed during the filling process to confine the shells and fish bones within the area marked by the two straight joints in the passage, perhaps wattle divisions. This layer was so dense with limpet shells that they were often stacked one inside the other: a total of 10,871 were counted, together with 208 small fragments of razor shell and a single winkle. Shells had spilled out over the surviving surface of the cairn in an apron extending up to 0.5m on either side of the middle section of the passage, an event that presumably took place at the time that the front of the cairn was reduced by robbing in Phase 5. A small deposit rich in very small fish and rodent bones, clearly otter faeces or spraint, was found at the inner end of the passage and high in the filling (EP2). A radiocarbon date was obtained from sheep bone in EP4 (GU-2069, 4070 ± 60 BP).

Forecourt and rear of cairn

The cairn was surrounded by collapsed stonework and gravelly soil, including the forecourt area, and there was no reason to suppose that the forecourt had been deliberately blocked (illus 21). The collapsed slabs were mostly horizontal, apart from an area of slabs on end at the north-east corner of the cairn, which are considered below. A large slab protruding from the west side of trench II/IV could have been the lintel that originally topped the dome of the cell 5 cairn (illus 22). Sheep bones, a few cattle and pig bones, and deer bones and antler fragments were recovered from this phase (layer V.1), and a radiocarbon date was obtained from a deer bone (OxA-16473, 4127 ± 39 BP).

Artefacts and faunal remains associated with the filling of the chamber and entrance passage

Grooved Ware sherds were associated with the filling of the passage (illus 25, pot 10b). A small bead cut from a sheep long bone was found in the undisturbed filling in compartment 4NE1 (SF19; illus 26, no 15), as was a small nodule of haematite (SF9). Beads made from fish vertebrae were found in layers 2W2, 5.1, II.1 and V.1. Three pieces of flint came from the disturbed filling of the chamber, including a scraper from 3W2 (SF3; illus 26, no 17).

The evidence for selective use of faunal remains in the filling has been set out above, and Table 6 details the animal bone assemblage. Sheep dominate heavily the filling of compartments 1–3 and the entrance passage, whereas the figures for deer are comparable across the entire tomb. There are more otter bones from the filling of compartment 4 than from compartments 1–3. Comparing Tables 4 and 6, compartment 4 appears to have been more attractive to otters after the removal of the roof than during the use of the chamber. It should also be noted from Table 6 that cattle bones appear in the filling of the main chamber, whereas none was found in floor deposits.

Of the total of 2.23kg of animal bone from layer EP4, 525g showed scorching, which suggests that some at least of the bone was derived from the forecourt, where there were also burnt animal bones in layer V.2.

Phase 5 Later structures outside the cairn

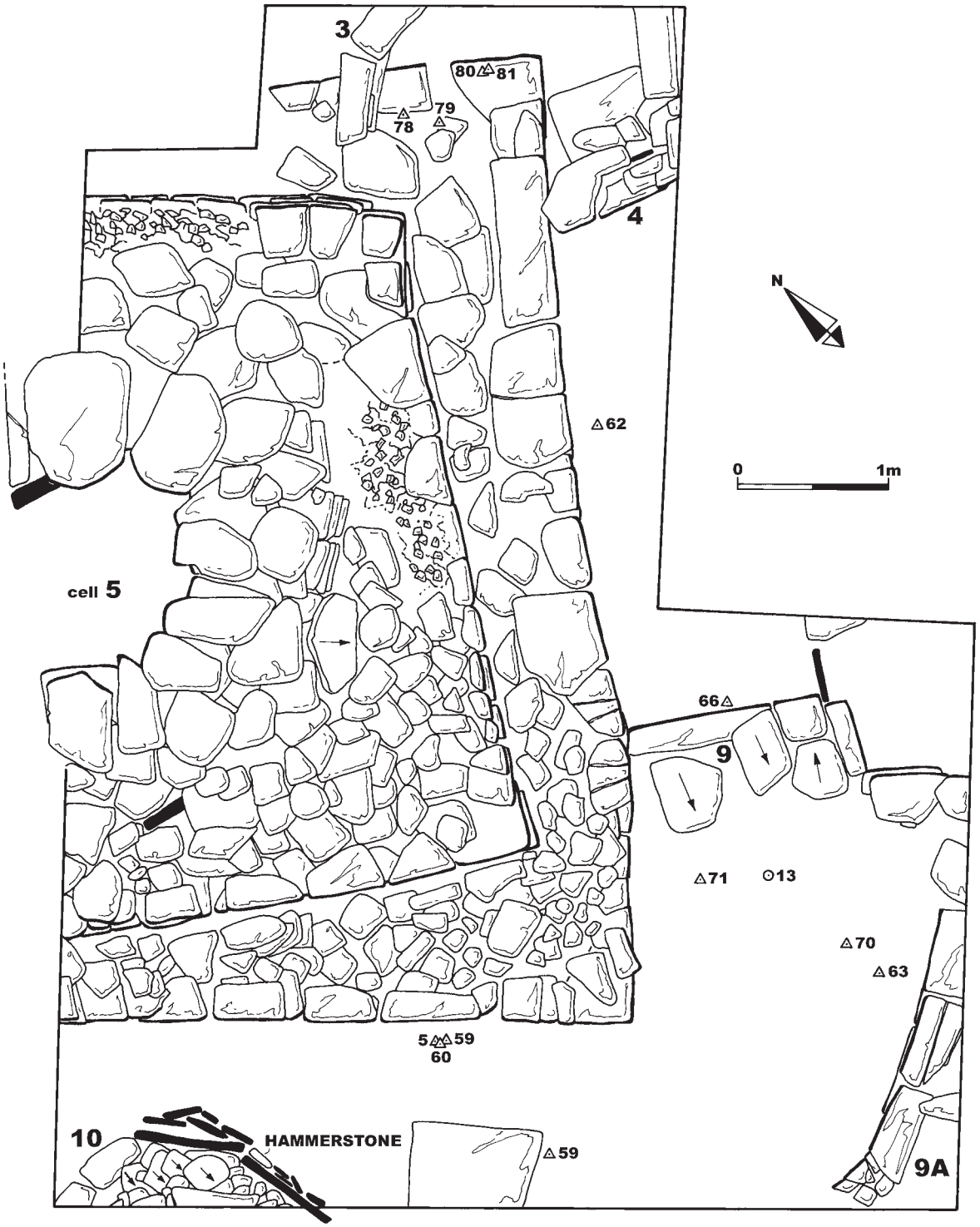
The NE corner of the cairn had been dismantled in antiquity to build a field wall (1) which extended in a slight curve northwards as a low grassy bank for some 20m before it petered out (illus 4). It was sectioned in trench VIII, 6m from the front face of the cairn, and proved to consist of a foundation of 2–3 courses of flat stone slabs, 1.3m wide, with a considerable quantity of fallen slabs on either side. It had clearly been built entirely of stone. Within trench V, it was associated with large stones that are likely to have been robbed from the chambered cairn, many of which had slipped or been deliberately placed to lie on end against the east face of both the wall and the cairn (illus 8). Between these vertical slabs was a heavy brown clayey soil, devoid of finds and unlike soil found anywhere else, which may suggest that the slabs were deliberately laid. At Point of Cott, vertical slabs were dumped between the skins of cairn material (Barber 1997, fig 28), but at Holm they extend beyond the front of the cairn. The outer skin of the cairn had been robbed back to the line of the inner cairn. The field wall appeared to link up with traces visible on the surface of a rectangular structure (2), some 4m wide overall and at least 4m long. The junction between the two was overlain by several large slabs that could be displaced lintels from the entrance passage and another potential lintel lay beside the W face of the field wall (illus 21).

Large slabs, perhaps robbed lintels, were used to build a slightly curving wall (11) in the NW part of trench III (illus 4 & 8). This survived as a short stretch of two courses of horizontal stones facing NW, which had been laid on top of the gravelly destruction layer in the forecourt. Across trench VII a curving line of three flat slabs may be the remains of another secondary wall (12) facing SW, perhaps part of the same structure as that in trench III (illus 8).

At the rear of the cairn in trench VI, the SE corner had also been modified by secondary structures. The outer skin of the cairn had been dismantled to its basal six courses, and two walls were built, wall 3 as a curving face of walling that survived three courses high and overlapped the cairn, and wall 4 as a wall 0.84m wide with faces on either side, which abutted and slightly overlapped the south face of the cairn (illus 22 & 23). Two courses survived of wall 4. Sherds of

Table 6
Animal bone fragments from the filling of the stalled chamber and entrance passage and the final filling of cell 5 (excluding teeth) (Phase 4)

Context	*sheep*	*red deer*		*otter*	*dog*	*pig*	*cattle*
		bones	*antler*				
Comp 4	35	18	79	42	–	–	3
Comp 1–3 and EP	1058	20	212	25	18	–	14
Cell 5.1	51	3	42	11	1	4	14
Total	1161	41	333	78	19	4	31



Illus 22
The rear of the cairn showing the circular primary cairn and two skins of rectangular cairn, together with external secondary structures. Triangles mark the findspots of pottery with its SF number, and circle 13 is the location of bone point no 13.

Grooved Ware were recovered from close to walls 3 and 9A (illus 25, pot 10a) and sherds possibly from the same pot came from the filling of the entrance passage to the tomb (pot 10b).

Wall 4 may belong to the same structure as wall 9, which was some 3.40m to the west and again abuts the rear face of the cairn (illus 22). Wall 9 had a regular face, three courses high, to the east but lacked a face to the west, though there was a face on the north side of the adjacent wall (9A) that extended westwards. Walls 3, 4 and 9 were built on top of rubble, whereas the outer face of the cairn lay directly on the old land surface. Sherds of beaker pottery were recovered from close to the outer kerb of the cairn at the SW corner (illus 25, pot 11), and two radiocarbon dates were obtained from deer bones in layer IV.1 (OxA-17782, 4111 ± 32 BP; OxA-17781, 4075 ± 30 BP).

To the west of the cairn in trench II, some 0.6m from the west outer face of the cairn, was part of a semi-circular kerbed structure (10), the rest of which was not excavated (illus 22). It had been dug into collapsed cairn material and as it lay at a higher level than walls 4 and 9 it may not have been contemporary with them. It consisted of two large upright slabs, which protruded above the turf before excavation and were supported by upright chocking stones (including a hammerstone, no 22), together with an arc of horizontal walling, within and to the west of which was a dense mass of stones. A peg-like artefact of cetacean bone (illus 27, no 16) came from a small area of loose back soil beside this structure in the NW corner of the trench. Immediately east of structure 10 was a midden deposit of 3586 limpet shells, and a pocket of 20 limpet shells close to the cairn was associated with a beaker sherd (illus 25, pot 11).

Field walls and small cairns (illus 3)

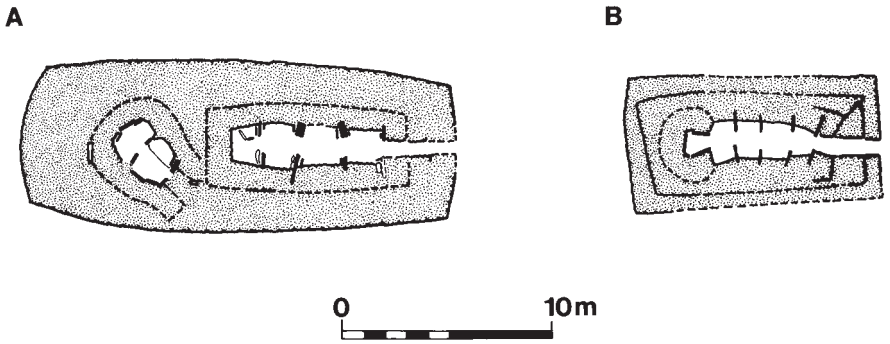
Two of the walls associated with the partially dismantled rear of the cairn appeared to be related to structures beyond the excavated area. Wall 4 continued as a visible low bank outside the trench to join the corner of another rectangular structure (5), some 6m × 5.6m, the SW corner of which opened into a small rectilinear cell (6) 1m × 1.5m internally. Wall 3 may have been part of another wall (7) running W/E about 2m to the north of structure 5 and extending some 16m south-eastwards to terminate in another rectangular cell (8) about 1.5m square internally with a large upright stone slab forming the E internal wall-face.

To the east of the chambered cairn are two small low cairns, each about 0.3m high (A & B). Cairn A appears to have been built of flat slabs, with a well-preserved kerb along its west flank and two large upright stone slabs set off-centre. Cairn B also has a well-preserved kerb on its W flank, and two upright slabs just beyond it to the E. A third low cairn (C) lies to the W of the chambered cairn and is about 0.3m high with a central square depression about 1m across, one side of which is lined by two upright slabs. All three cairns are about 6m in diameter and none has been excavated.

Illus 23
Secondary walling at the dismantled SE corner of the cairn

Dating

There is a satisfactory accordance between the radiocarbon results (kindly written up by Patrick Ashmore, Rick Schulting and Mike Richards, below) and the archaeological stratigraphy. Two of the earliest dates from human bone came from samples from disturbed fill in layers 3W1 and 3E1 (GrA-25636 and GrA-25637), thus confirming that material from Petrie's activity in 1854 was redeposited within the chamber.



Illus 24
Comparative plans of A, Calf of Eday Long (ORK 8) and B, Holm of Papa Westray North (ORK 21)

As is normal with excavations of chambered cairns, there are no dates relating to the initial construction of the monument, but the three ^{14}C AMS determinations discussed below by Schulting and Richards confirm that the tomb was in use by about 3520 cal BC. The latest date from animal bone found in the primary filling of cell 5 (OxA-17779) provides a *terminus post quem* for the sealing off of that cell in the period 2880–2630 BC (Table 20), which suggests that the secondary structures in compartment 4E (the subdividing jambstone J5, the stones filling the NE part of the compartment and the setting with the fishbone deposit) represent a late event in the use of the chamber, apparently after human burial had ceased. The burial under the shelf in compartment 4 was already in place before cell 5 was sealed off (4NW4, GU-2068: 3340–2910 cal BC). The two late dates from vole mandibles from layers 1.3 and 1.4 are evidence of bioturbation of the upper floor deposit in the first compartment during the later use of the chamber (OxA-18665 and OxA-18666; see report by Cucchi *et al* below). Apart from the vole dates, the latest dates are all from the filling of the chamber and cell or from secondary contexts outside the monument, and they confirm that the end of the use of the monument fell into the period 2800–2470 cal BC, perhaps several generations after the last dated burial deposit.

The radiocarbon dates suggest that there was a span of some 320 years in radiocarbon terms during which human bones were deposited in the chamber, up to around 800 calendar years, but of course not all human bones were sampled for dating. The bones found *in situ* under the shelf in compartment 4W yielded a calibrated date span of 3340–2910 cal BC (GU-2068), which may represent evidence for periodic clearance of the floor deposits since this falls into Patrick Ashmore's Late Human phase (see below) and cannot be strictly primary to the use of the chamber.

Patrick Ashmore's report combines very usefully the radiocarbon dates from Holm of Papa Westray North and Point of Cott to show that both, on the evidence of the human bones that were sampled, appear to have had two phases of deposition. He suggests also that the deposition of human bones was followed by a phase of deposition of animal bones, but this may be an illusion created by the samples selected for radiocarbon analysis, in that the only animal bones dated from floor deposits were two that had been redeposited in the filling of cell 5 (OxA-17779 and OxA-17780).

The deposition of human bones at both Holm of Papa Westray North and Point of Cott appears to have begun almost as early as occupation at the settlement of Knap of Howar (illus 29) and the construction of the burial monuments could have begun even earlier. Comparing the dates in illus 30, the entrance passages at both chambered cairns were filled within 40 years of each other (GU-2941, GU-2069 and OxA-16471). The original dates for Knap of Howar (Ritchie 1983, 117–18) have been refined by eight new dates (Sheridan & Higham 2006, 202–3; 2007, 225), which show that the settlement was not in use much before about 3500 cal BC and ceased around 3000 BC (these are also discussed below by Rick Schulting and Mike Richards).

The radiocarbon dates reflect what little artefactual evidence survived: pottery associated with the use of the chamber belongs broadly to an early Neolithic tradition but included a sherd of Grooved Ware, while

Grooved Ware was associated with the filling of the passage, and Grooved Ware and beaker sherds were associated with activities outside the cairn (illus 28). The bone beads were derived from the filling of the monument (illus 29) and have parallels in Grooved Ware contexts elsewhere, while none of the other artefacts is helpful for dating purposes.

Discussion

The primary object in excavating Holm of Papa Westray North was to discover whether this might have been the burial place of the community living at Knap of Howar. The link could only be proved if the pottery from the chamber matched that at the settlement and if the radiocarbon dates indicated contemporaneity. The pottery from Holm lacks the decorated Unstan Ware bowls found at Knap of Howar, but these dainty bowls, unlike the common robust forms, are a minor type in the Orcadian tombs, and plain bowls are common to both sites, although the precise form at Holm is difficult to parallel in Orkney. The presence of Grooved Ware elements in the Knap of Howar pottery (Henshall 1983b, 72–3) is mirrored by the sherds of Grooved Ware found both within the chamber and passage and outside the cairn, which may be connected with the final closure of the tomb and, as Audrey Henshall suggests below, with the building of the Maes Howe type cairn of Holm of Papa Westray South. The flanged-rim bowls found at Point of Cott (MacSween 1997) are absent from both Knap of Howar and Holm of Papa Westray North, and, although the radiocarbon dates from Point of Cott indicate that its use as an ossuary was contemporary with the two Papa Westray sites (Barber 1997, table 20), the pottery makes any link with Knap of Howar unlikely. Thus Holm of Papa Westray North remains the most likely candidate for the role of burial place for the Knap of Howar community, though the possibility must be acknowledged that coastal erosion or agricultural improvement may have obliterated the true candidate. To this extent the objective of the excavation was achieved and indeed augmented by the range and quality of the structural and environmental evidence, which has proved unusually informative.

Barber emphasised that there are no radiocarbon dates for the construction of chambered cairns, only for their use (1997, 7, 60), and this is true of Holm as well. He went further in suggesting that tombs may have been built originally as temples and only latterly used for burials (2000), but this is impossible to prove, given the possibility that earlier deposits have been cleared out. Nonetheless, the two primary structures at Holm of Papa Westray North and Calf of Eday Long, both empty of evidence of use, are attractive candidates for primary shrines (illus 24). Whereas the Calf of Eday 'shrine' was abandoned when the stalled cairn was built, the Holm 'shrine' continued in use as part of the larger stalled structure. The combined design of the Holm structure is markedly anthropomorphic, and it may be significant that the filling of the 'head' (cell 5) contained an unusual number of human and animal skulls. The same idea may lie behind the concentration of human skulls in the innermost compartments at Knowe of Yarso (ORK 32).

The two chambered cairns of Holm of Papa Westray North and South are almost 0.7km apart, not quite at opposite ends of the island. There are just two other known instances in which a stalled cairn and a Maes Howe type cairn were built in any proximity: at the north end of the island of Eday, where the stalled cairn of Linkataing (ORK 35) is some 1.4km from Vinquoy (ORK 53), and in Mainland Orkney where Unstan (ORK 51) is about 0.9km from Howe (ORK 66) as the crow flies but somewhat longer on land (though, with a lower sea level, they were presumably not separated by the narrow stretch of water now spanned by the Bridge of Waithe). Both the pairing of the two cairns and the sequence of primary and secondary cairns at Holm of Papa Westray North demonstrate a remarkable long-term commitment to a particular place, as Noble has discussed in relation to enlargement of monuments (2005, 35; 2006, 137). Given the presence of Grooved Ware in the floor deposit of the north cairn, it is quite possible that the stalled chamber was still in use while the great Maes Howe type cairn was being built, a possibility that underlines the preposterous scale of the latter in comparison. The stalled chamber of Holm North could fit into the main chamber of Holm South four times over, a contrast that must surely point to social upheaval, and the total lack of information about the contents and date of the south cairn is doubly to be regretted (the plans of the two cairns drawn to the same scale can be seen in Davidson & Henshall 1989, 121).

Both Grooved Ware and beaker pottery were associated with activities outside the Holm cairn, the former with structures (as at Pierowall, ORK 72) and the latter with two large dumps of limpet shells. Without further excavation, the precise nature of the Grooved Ware structures is uncertain, but superficially at least structures 2 and 5 are comparable in size and

shape to some of the smaller buildings at Barnhouse in mainland Orkney (Richards 2005). It should also be admitted, however, that the external structures at Holm hang on a very thin thread of attribution to users of Grooved Ware, not only because so little of the structures was excavated but also because the pottery could be residual. Nonetheless, it is clear that the community retained its interest in the site of the stalled cairn even as the Maes Howe type cairn was under construction and in use.

Orientation

As Fraser's work revealed (1983, 371–9), the entrances to most Orkney chambered cairns face south-east, and Holm of Papa Westray North is a rare example of a single-storey cairn with a different orientation where there is no obvious explanation in terms of topography. Davidson and Henshall suggested that the explanation may be connected with the earlier structure (1989, 85). At the other site where there is an earlier structure, Calf of Eday Long (ORK 8), there was no physical association of the two chambers and their orientations were slightly different: south-east and north-east. But here the earlier structure was a fully fledged chambered cairn rather than a single small cell like that at Holm. (The smaller structure at Bigland Long (ORK 1) is now thought to be secondary rather than earlier: Henshall & Ritchie 2001, 103.) It may be coincidental rather than intentional that the orientation of the entrance to the Holm cairn mirrors that of the houses at Knap of Howar.

The primary cairn

In Orkney, the closest free-standing parallel to cell 5 is the small Bookan-type chamber within its own small cairn which was incorporated into a large rectangular cairn containing a stalled chamber at Calf of Eday Long (ORK 8) (illus 24). Calder describes the construction of this chamber (B) as inferior in workmanship compared to the stalled chamber and notes 'the very rough rubble of the outside face' (1937, 119), which echoes the contrast between the cairn around cell 5 and the stalled cairn at Holm, though at Calf of Eday the quality of the interior walling of chamber B was certainly of higher quality than that of cell 5. The internal area of Chamber B was twice the size of cell 5, but their respective cairns were of similar size. The entrance to chamber B was deliberately blocked with 'well-laid' stones, an event that may have taken place before the outer skin of the rectangular cairn was built thereby making the chamber redundant.

In terms of internal size, cell 5 is very close to the mini-chamber outside the cairn at Taversoe Tuick (ORK 49), where Davidson and Henshall remark on the 'exquisite masonry' (1989, 30). There are also similarities between cell 5 and the side-cell at Unstan (ORK 51): their floor area (1.0m × 1.5m at Unstan, 1.0m × 1.1m at Holm), the use of slightly sloping portal slabs at the entrance (Davidson & Henshall 1989, pl 4) and a degree of corbelling. The construction of the Unstan cell is, however, of a better quality than Holm, and its rear wall consists of a single slab in the manner of tripartite and stalled chambers rather than the rounded walls of Bookan-type chambers. Entrance portals were also used in the side-passage linking the two domestic buildings at Knap of Howar.

Beyond Orkney, there is good evidence for single compartment chambers that were later incorporated into long cairns in Caithness (Davidson & Henshall 1991, 22; CAT 12 & CAT 58), and in the Central Highlands there are three examples of bipartite chambers with a separate small cell behind, but not entered from, the main chamber (eg ROS 25, Henshall & Ritchie 2001, 48–9). In western Scotland there are small closed chambers within round cairns that were later incorporated into Clyde cairns, and at Achnacreebeag incorporated into the cairn of a passage grave (ARG 37; Ritchie 1970). Gordon Noble has usefully brought together examples of primary cairns from across Britain and drawn at the same scale (2006, fig 5.28), among which those at Mid Gleniron in Wigtownshire notably share with Holm a lack of entrance passage. These primary chambers are normally found on excavation to be empty, and Noble has suggested that their contents may have been removed and deposited in the new chambers in order to create a clear link with the past (2005, 33), though it is possible that they were not intended for formal burials. At Holm, the physical difficulties of adding the new chamber demonstrate the strength of the need to engage with the past, for it was a challenge to fit the horizontal coursing of the stalled chamber to the rounded boulders of the earlier cairn.

There is thus no precise parallel for the Holm sequence of a very small free-standing chamber which was incorporated into a stalled chamber and sealed off within the lifetime of the larger chamber. The close similarity in structural sequence from small primary cairn to stalled cairn between Holm and Calf of Eday Long is, however, strengthened by the fact that the latter is the only other known stalled chamber with an end-wall built of masonry rather than a single large

slab. The end-wall had a pronounced inward overhang (0.2m over a height of 1.0m), which would have created the impression of a corbelled end-cell, and it may be noted that there was a secondary dividing slab in front of the end-wall as at Holm. The drawn elevation of the chamber suggests that the side-walls were not bonded into the end-wall (Calder 1937, fig 3), as if, during the construction of the stalled chamber, there had been a symbolic sealing of the primary 'shrine'. The choice of rounded water-worn boulders for the construction of the primary cairn at Holm of Papa Westray North was deliberate, for flat slabs were easily accessible on the east side of the Holm, which suggests that the sea played an important and not unexpected role in the cosmology of its builders. This cross-reference to the sea was later reiterated in the deposit of fish bones in compartment 4. The top of that deposit was approximately level with the top of the cell 5 blocking and the two events may have been contemporary. Fraser Sturt has emphasised the importance of the relationship between the people of Neolithic Orkney and the sea, and he argued that a tomb such as Holm of Papa Westray North can be seen as a place of mediation within which the relationships between people, animals and fish could be explored and reworked (2005, 78).

The function of cell 5 remains a matter of speculation, both as primary 'shrine' and as part of the stalled cairn. If any material had been placed within it, all trace had been meticulously removed before it was sealed and filled, and this in itself is yet another warning that excavation of a chambered cairn cannot hope to reveal its entire history. Perhaps it was never used in any tangible way and existed simply as a sacred space. Whatever its function, it was considered sufficiently important to warrant formal closure.

Cairn construction

Excavation of Point of Cott and Holm has added to existing evidence which shows that straight joints in the walling of the passage were related to skins of cairn material and thus supports the interpretation of such joints in unexcavated cairns as inner lines of walling (Davidson & Henshall 1989, 19, 30). More difficult to ascertain is whether these stages in the construction of the cairns were part of one seamless process of building or whether there were chronological gaps between them. At Point of Cott, Barber argued that the 'onion-skin' walls were added to the core cairn as a third stage in the building of the monument, with the implication that this was a single process, and he interpreted the 'onion-skin' walls as having created a stepped appearance to the exterior of the cairn (1997, 17, 62–3). For Isbister, Hedges suggested that the final form of the monument may have been achieved only by a process of building spread over generations and that the outer face may have been vertical or steeply sloping (1983, 207–8), but the construction of the drum-shaped cairn has been otherwise interpreted as a single build essential to support the chamber following the standard design of round passage-graves in Northern Scotland (Davidson & Henshall 1989, 31; Henshall & Ritchie 2001, 102, plan 101; Henshall 2004, 80–1). Owing to dismantlement of the cairn in antiquity, the evidence from Holm has nothing to add on the subject of its original appearance, but the slightly curved character of the passage may imply that it was not of a single build. The fact that sheep were using the stalled chamber as a refuge may also suggest that the outermost skin was a later addition, on the grounds that they would have avoided a dark, low and narrow passage as long as the final passage of 3.20m. The passage through the core cairn was 0.94m and that through the infilled façade was about 2.26m, and the short original passage would probably have been more attractive to use by animals. On the other hand, the fact that there was paving in the outer part of the passage may imply that this section was not roofed and that the front of the cairn at least had a stepped appearance. Immature sheep bones were predominant in the bone assemblage from Point of Cott, though Barber singled out otters and dogs as 'the most likely culprits' to account for the chaotic state of the floor deposits in the chamber (1997, 67, 69). There the passage through the core cairn was 1.75m long and the final passage through the outer skins as well as the core was 4.25m long.

Few stalled cairns retain evidence of the height of their entrance passages (Davidson & Henshall 1989, 19), and it is likely that most were less, including Holm, than the 1.1m recorded at Point of Cott. People gathered in the forecourt stood little chance of seeing into the chamber.

Within the corpus of Orcadian stalled cairns, Holm of Papa Westray North possesses both the shortest known chamber and the smallest cairn. Fraser estimated the overall cairn to have consisted of 106 cubic metres of stone and used the generally accepted figure of 11.76 man-hours per cubic metre to arrive at a total of 1484 man-hours for the construction of the monument (1983, 356). Barber has since argued that the voids in the cairn at Point of Cott mean that Fraser's figures should be reduced by up to 50% (1987, 65), and an independent estimate kindly provided

for Holm by Don Glass suggests a figure of 72 cubic metres for the cairn and a total of 857 man-hours for its construction (detailed calculations in the archive). The creation of the final monument was thus not a huge undertaking, particularly if it was done in stages, while the primary cairn could probably have been built in a day or two.

Chamber furniture

Stone shelves, benches and basal slabs are common furniture in stalled chambers, and wooden equivalents may have existed (Davidson & Henshall 1989, 25–6). At Holm of Papa Westray North there was a bench in the west side of the fourth compartment and probable displaced basal slabs in the west side of the third and the east side of compartment 4 (4NE7). It is tempting to see the transverse grooves in either side of compartment 2 as representing wooden supports for benches, but they appear to underlie the side-walls and are probably natural in origin. The secondary stone setting or cist in compartment 4 may be compared to a small pentagonal cist found in the stalled chamber at Knowe of Ramsay in Rousay (Callander & Grant 1936, 412). It lay in the fifth compartment about 0.3m above floor level, although it is not clear how it was supported. It measured about 0.36m × 0.25m at the base, and two of the side slabs sloped outwards to make it about 0.5m × 0.46m at the top. It was 0.46m in depth and was empty. The stones beneath the Holm setting, which fill the east side of the compartment, are reminiscent of the blocked cupboard in house 2 at Knap of Howar (Ritchie 1983, 43). Once this 'blocking' was in place, and the west side filled with the bench, space in compartment 4 would have been very restricted, and this may explain the paucity of animal bones in the floor deposits there.

Burials

At Geirisclett in North Uist, the lack of burial deposits and paucity of artefacts were used to argue that 'considerable quantities of material had been exported from the chamber in antiquity' (Dunwell *et al* 2003, 26). At Holm, bones were clearly being manipulated during the use of the chamber, to account for the joins between bones in different compartments and cell 5, and none of the skeletons was complete. Taking the human bones as an assemblage, all parts of the body were represented, and there is no need to invoke excarnation to explain what is missing. The two 'headless skeletons' that Petrie found in compartment 3 may have been more intact than the rest and perhaps the last to be deposited in the chamber. The human population of the cairn was also very small (a minimum of eight or nine individuals), which again supports the idea that periodic clearing out of the chamber may have taken place (Davidson & Henshall 1989, 55). Bone preservation was good other than under the shelf in compartment 4W. It may be noted that the only complete skulls were in the initial filling of cell 5, apart from the well-preserved skull found by Petrie in compartment 3E. If, as the evidence of the sheep bones suggests, the chamber was left open, parts of corpses could have been removed by scavengers, though presumably only fresh and relatively fresh corpses would have been harvested. Among the surviving animal bones, the only scavengers represented are dogs.

Manipulation and redeposition of human bones has been postulated to explain the surviving evidence in a number of Orcadian tombs (Davidson & Henshall 1989, 93; Richards 1988; Reilly 2003), but it is perhaps only at Knowe of Yarso and Holm of Papa Westray North that these practices can be proved beyond doubt. At Knowe of Yarso (ORK 32), only human intervention can explain the careful arrangement of twenty-two skulls, while at Holm the redeposition of both human and animal remains in the filling of cell 5 can similarly only be attributed to deliberate intervention. Missing bones are not in themselves evidence of manipulation (Laurence 2006, 55).

The small size of the Holm chambered cairn and the low number of human individuals represented by the surviving bones suggest that it was the burial place of a small community, perhaps no more than an extended family. Both adults (the oldest aged over 40 years) and juveniles were present but no small children. Osteoarthritis was common among the older individuals, but the pathology of the assemblage suggests that there were no changes outside the normal range for everyday life. The work carried out by Schulting and Richards (below) on stable carbon isotope values in samples of human bone from the chamber suggests that, while the diet was predominantly terrestrial, there was a minor element of marine protein, derived perhaps from the consumption of seaweed-eating sheep. In view of the use of marine mollusca as deliberately selected filling material and as 'gravegoods' (the periwinkle deposit with human bones 4NE8), the human diet may have included direct consumption of marine protein. There were certainly quantities of marine mollusca in the midden at Knap of Howar, including oysters which are not likely to have been used as fishbait, a purpose

for which limpets may have been collected (Evans & Vaughan 1983).

Artefacts

The artefact assemblage is small and unremarkable, but the location of individual artefacts is informative. The distribution of finds, mostly pottery, from the floor deposits within the main chamber shows that most came from compartments 2 and 3 and were confined to the east side of the chamber and the axial area (illus 11c). The exceptions were three finds from the west side of compartment 4, which, given the voids created by the bench, could have filtered through from the filling, particularly since there were no finds from the east side of the compartment. A single undiagnostic sherd of pottery came from the filling of cell 5 and was presumably derived from the floor of the main chamber (SF67, 5.2). The rest of the artefacts came either from the chamber filling or from secondary contexts outside the cairn (illus 22). Their paucity suggests that, whatever the purpose of the secondary structures, they were marginal to domestic activities.

Audrey Henshall suggested that flanged-rim bowls were earlier than most Unstan Ware (Davidson & Henshall 1989, 64–5), and Ann MacSween took the point further by postulating a possible link between tomb type and the presence of either flanged-rim bowls or Unstan Ware (1997, 28–9). Flanged-rim bowls have been found in Orkney only in tripartite tombs and two stalled cairns: Point of Cott and Holm of Papa Westray North, and in a settlement at Pool in Sanday (MacSween 2007). The pottery evidence from both Pool and Holm support the idea of an overlapping chronological sequence from round-based bowls to Grooved Ware. As at Pool, the Grooved Ware from Holm includes both incised and applied decoration, but the contexts of the sherds preclude any chronological distinction, although sherd no 7 from a plain base came from a primary context in the chamber. Beaker pottery at Holm comes from contexts external to the cairn but associated with a concentration of limpets, which may possibly but not certainly be connected with the limpets used in the filling of the passage and the top layer of filling of cell 5. In all, the sherds represent a minimum number of 11 vessels.

Bone beads of the type represented by no 15 are numerous on Grooved Ware settlements such as Skara Brae and Links of Noltland but have not previously been associated with a chambered cairn. Other types of bead were found at Isbister (ORK 25) and Point of Cott (ORK 41; Barber 1997, 35–6). Possible beads made from fish vertebrae were identified during work on the fishbone by Jennifer Harland and Rachel Parks, all but one associated with the chamber filling or secondary contexts outside the cairn, and these can be matched by a single bead made from a fish vertebra from Quanterness (ORK 43; Renfrew 1979, 83, fig 35, no 57) and others from Skara Brae (Harland & Parks, below) and Tofts Ness (Davies 2007, 337). Bone points were found at Isbister and Quanterness and at the various Neolithic settlements. Stone pot lids were found in the chamber filling at Sandhill Smithy (ORK 47) and Quanterness and outside the cairns, as at Holm, at Huntersquoy (ORK 23) and Quoyness (ORK 44), pebble flakes at Quoyness and Quanterness and a hammerstone came from the side-cell at Unstan (see Davidson & Henshall 1989 for details).

Faunal remains

Stable carbon isotope analysis of sheep and cattle tooth enamel from Knap of Howar revealed an entirely terrestrial diet, whereas the enamel of teeth from sheep at Holm of Papa Westray North indicates a significant contribution of fresh seaweed to the winter diet (Balasse *et al* 2005; 2006; Balasse & Tresset and Wright *et al* this volume, below). This difference in diet may suggest that the separation of the Holm promontory from the rest of Papa Westray took place earlier than might be expected, although it is also possible that sheep were deliberately isolated on the promontory by some sort of artificial barrier. The difference may also be explained by the available pasture, for that in Papa Westray will always have been superior to that of the Holm, and the warmer climate of the Neolithic will have encouraged the grass to stay greener in the winter (even today, in an exceptionally mild winter, the grass stays green in Papa Westray: Jocelyn Rendall, pers comm). Of wider interest of course is the implication that the modern seaweed-eating sheep of the Holm and of North Ronaldsay and elsewhere in Orkney represent a grazing strategy already in place in Orkney five thousand years ago.

Barber demonstrated that the presence in chambers of bird, fish, rodent, otter and sheep remains is most likely to be the result of natural processes rather than human intervention, unless 'unequivocal evidence for their association with the funerary function of the tombs has been recovered' (1988, 60–1). At Holm, Anne Tresset's work on the sheep bones has supported this conclusion and shown that there must have been free access to the chamber for a considerable period, to account for 'the presence of thousands of bones of

very young lambs and sheep foetuses' (Tresset 2003; Balasse & Tresset this volume, below). The presence in the chamber of ungnawed deer antler cannot be explained, however, by natural processes, particularly as Neolithic red deer were normally larger than the Scottish red deer of today (Clutton-Brock 1979, 119) and the entrance passage was low in height.

Evidence for deliberate deposition of faunal remains in chambered cairns has been discussed by Ritchie (2004) and in a settlement context by Sharples (2000). At Holm, fish, marine mollusca, antler and skulls appear to have been selected for specific purposes, though it could be argued that the skulls in the initial filling of cell 5 are there simply because they were easy to locate in the dark conditions of the chamber. Assuming that the organic material in the filling of cell 5 was derived from the chamber floor, it is an important indicator of what was available there (Table 5). Fish and periwinkles were selected for specific purposes during the use of the chamber, while limpet shells and antler were deliberately incorporated into the final filling of the monument. There appears to have been a store of limpet shells at the south-west exterior of the cairn, but otherwise the origin of the filling matrix as a whole remains unclear.

Fish bone within the chamber at Geirisclett in North Uist was interpreted as the result of otter activity (Cerón-Carrasco 2003, 22), for the small size and species (inshore rock-dwellers and bottom-feeders) were typical of the favourite food of coastal otters. In her report on the fish bone from a Viking boat burial at Scar in Sanday, Orkney, Ruby Cerón-Carrasco differentiates between otter faeces and spraints, the latter of which are deposited in the open air as territorial markers (1999, 216). It is clear that most of the small fish found in the chamber at Holm are the result of otter activity, but the presence of very large fish suggests that there may also have been a desire on the part of the human users of the tomb to include fish in its contents. Harland and Parks (below) conclude that the deposit of tiny fish bones and small stones in the stone setting in compartment 4 (4NE3) should also be attributed to otter sprainting, but the process by which the stones arrived in the deposit remains unexplained and suggests that an anthropogenic element cannot be ruled out, particularly in view of the human interest in bringing large fish into the chamber.

Estimating the role of fishing in the lifestyle of the people buried at Holm of Papa Westray North is fraught with the problem that the choice of non-human bone remains for deliberate deposition in the tomb may not reflect human diet but rather what was considered appropriate. If the fishbone deposit in the fourth compartment can be accepted as a human act, it implies that fish were important to the community. Among the other fish remains are examples of large fish that represent deep-water fishing from boats, particularly ling whose vertebrae were also made into beads, and their presence can be explained in a number of ways, as Jennifer Harland and Rachel Parks discuss below, from offerings to rites of passage. Deep-water fish may not have been the target of dedicated fishing expeditions, however, for they could be a by-product of long-distance travel by sea for other purposes.

Overall, the large mammal assemblage from Holm is very similar to those at Point of Cott and Pierowall in Westray, where sheep were also the predominant species and where there was also a high proportion of neonatal lambs (Halpin 1997; McCormick 1984). Certainly at Point of Cott where floor deposits survived, the presence of sheep implies that, as at Holm, there was ready access to the shelter that the chamber provided. Deer were a very minor element at Point of Cott, however, and this may emphasise their importance at Holm, particularly as there were no deer at all from the contemporary Knap of Howar settlement. The range of bird species from Holm is similar to that at Point of Cott, including the white-tailed sea eagle, but the great auk is present at Holm and absent from the Cott assemblage (the bird remains from Holm are the subject of forthcoming research in the Département Ecologie et Gestion de la Biodiversité, Muséum national d'Histoire naturelle, Paris).

Despite the fact that no owl remains were recovered, owl activity in the form of roosting or nesting is considered to be the most likely explanation for the numerous teeth and bones of the Orkney vole that were found in floor deposits in the chamber, for they bear no signs of the severe erosion that would be expected if they had passed through the gut of mammals such as otters. The two radiocarbon dates obtained specifically from vole bones confirm that this activity took place during the later Neolithic life of the cairn. These early voles exhibit the features that make the modern Orkney vole unique and thus confirm that this divergence from the European norm dates back to later Neolithic times (Cucchi *et al* below).

The marine mollusca assemblage is almost entirely confined to limpets deposited in secondary contexts, and the absence of oyster shells is in notable contrast to Knap of Howar, where oysters contributed 7% of a relatively diverse assemblage (Evans & Vaughan 1983,

111). Marine shells were primarily associated with the filling of the chambered cairn, which explains their absence from the Point of Cott cairn, where a single limpet was recovered (Coy & Hamilton-Dyer 1997, 52), for here the chamber and passage were not filled. Other marked contrasts between the Knap of Howar settlement and the Holm burial cairn can be seen in the absence of deer and voles and the rarity even of parts of animal skulls of any species from the domestic settlement. The rarity of animal skulls is probably a reflection of butchery practices in the domestic context and supports the likelihood that the animal skulls in the burial cairn arrived in the first instance through natural causes, though deliberate human selection can be invoked to explain their presence in the filling of cell 5. The deer evidence may have both chronological and social implications. Pollard drew attention to the scarcity of deer on sites of the fourth millennium BC in southern Britain, whereas they become more common in the third millennium, attributing the change to the possibility that a greater social value was placed on prowess in the hunt in the later Neolithic (Pollard 2006, 143). Occupation at Knap of Howar ended around 3000 BC, perhaps before red deer were introduced into the northern islands of the Orkney group. In discussing the 'heap of at least fifteen red deer' at Links of Noltland in Westray, Orkney, Sharples suggested that consumption of red deer in the late Neolithic took place 'in a proscribed manner and only in special circumstances', reflecting the 'ambiguous status of deer, as a wild animal' (2000, 114), and the evidence for the deposition of deer antler at Holm of Papa Westray North supports this conclusion. The presence of deer bones as well as antler indicates that whole animals were involved at Holm, not simply imported antler, though the cast bases also suggest a particular interest in the antlers. There may have been occasions during the construction of the great cairn at the south end of the Holm and the dismantlement of the north cairn when consumption of red deer was appropriate. It is possible that Westray, Papa Westray and Holm of Papa Westray formed a single island in Neolithic times, in which case there was plenty of land available for managed herds of red deer. Aside from consumption, certain animals including deer may have been seen as the embodiment of ancestors (Pollard 2006, 140–2) and therefore had a special role to play in burial contexts.

The absence of vole remains from Knap of Howar is more puzzling, especially as the new dates for the settlement indicate that it began no earlier than the use of the stalled cairn on the Holm (even wet sieving through a mesh of 1.5mm failed to yield any vole remains: Ritchie 1983, 44).

Both voles and deer remains were found at Tofts Ness domestic settlement in Sanday (Nicholson 2007c) and, as at Holm, deer were more significant in late Neolithic phases and fragments of antler made up almost half the deer assemblage (Nicholson & Davies 2007, 174, 183). At the neighbouring Pool settlement, deer were rare and vole absent, but the very poor preservation of bone negates the value of this evidence (Bond 2007, 208). Vole remains were numerous at the stalled cairn of Isbister in South Ronaldsay (Barker 1983, 150).

Although small amounts of carbonised plant material were retrieved from the wet sieving residue, it was very small and worn and none was identifiable.

The sealing of the chambered cairn

The evidence is unambiguous for the deliberate filling of the main chamber and entrance passage and mirrors the earlier sealing by filling of cell 5. The sequence of events in the intact compartment 4 is crucial to the question of whether the cairn collapsed inwards or whether the filling was deliberate. Had collapse occurred, there would have been a large quantity of stone slabs in the chamber, and this was not the case in compartment 4, where, apart from one large slab that came to rest against the west wall, there was instead a filling of soil and small stones, which can only have been deliberately placed there.

The roofs of the chamber and passage must have been removed at least partially in order to insert the filling, and the final layer of filling in cell 5 appears to have been deposited at this time (layer 5.1 was entirely different in colour, texture and content to the layers below), which would have involved removing the apex of its domed roof. It is tempting to link the numerous limpet shells in the final filling of cell 5 with the shell dump in trench II and the huge number of shells used in filling the entrance passage. The slumping of the west side of the cell probably happened at the time of de-roofing, owing to the instability of its rounded-boulder construction. Deliberate filling of passages was relatively common but filling of chambers has been recognised only at one other stalled cairn (Isbister) and two Maes Howe type cairns (Wideford and Holm of Papa Westray South), and Davidson and Henshall suggest that the Maes Howe type chambers at Cuween and Quoyness may also have been sealed in this way (1989, 60–1). Isbister and Holm of Papa

Westray North share with Unstan the distinction of being stalled chambers with side- or end-cells, which are normally a feature of Maes Howe type cairns, and this may suggest that infilling chambers may have cultural associations. This possibility is strengthened at Holm by the evidence of activities associated with Grooved Ware and Beaker late in the sequence. At Bookan in Sandwick (ORK 4) there was evidence for deliberate dismantling of the tomb prior to the construction of the final cairn (Card 2005, 175, 184), while at Pierowall in Westray the demise of the tomb was far more dramatic and seems to have involved deliberate destruction (Sharples 1984), perhaps a measure of the importance of a tomb embellished with the finest decoration known in Scotland.

Filling deposits at Point of Cott were interpreted by Barber as natural collapse, and he argued that the fact that the radiocarbon dates from the entrance passage are 240 years apart means that the filling cannot have been a single event (1997, 65), but, if the filling material was derived from a long-existing midden, the dates are no bar to deliberate infilling.

Another feature that appears to be associated with the final sealing of the tomb is fire. Scorched bones were confined to layer V.2 in the forecourt and layer EP4 in the passage.

Later use of the cairn

The secondary walls overlying the dismantled outer skin of the cairn are best paralleled at Unstan, where two walls overlie the outer skin and abut the first inner wall-face (Davidson & Henshall 1989, 164–5), but there are also secondary walls abutting the outer wall-faces at Midhowe (ORK 37) and Knowe of Ramsay (ORK 30). The purpose of these later walls is unknown, and Hedges' suggestion that they delimited forecourts seems unlikely (1983, 208–9). The cairns were major features in their landscapes and may have been incorporated into boundaries, or, as at Holm, may have become the focus of later activities. At Holm, these later activities appear to have been contemporary with the construction and use of the great Maes Howe type of cairn at the south end of the island. Although direct dating evidence is lacking for Holm of Papa Westray South, the eyebrow motifs carved within its chamber are an artistic link with the users of Grooved Ware (Alison Sheridan, pers comm).

Although none of the small cairns has been investigated, a burial function is probably more likely than field clearance of stones, given that they appear to have central cist-like structures.

Conclusions

Excavation of the stalled cairn at Holm of Papa Westray North has demonstrated that its use was contemporary both with the settlement at Knap of Howar in Papa Westray and with the social changes marked by the development of Grooved Ware and Maes Howe type tombs. Holm has proved to be particularly interesting in terms of the way in which the chamber and cairn were used both by human and faunal agents. The fact that sheep used the chamber for lambing demonstrates that it was not closed between episodes of deposition of human remains and suggests that there was no desire to segregate either the dead from the everyday world of the living or human from animal. In terms of its design, the integration of a simple small cell in a round cairn into a standard stalled cairn suggests both historical continuity and an evolution from 'shrine' to burial monument. The fact that the cell was later filled and sealed off allows an appreciation of the way in which the monument was modified during its lifespan, and clear evidence of the infilling of the main chamber and passage is augmented by evidence of deliberate selection of organic material for the purpose. Both the radiocarbon dates and the small assemblage of artefacts indicate that this final sealing of the entire chambered cairn was associated with users of Grooved Ware. The cairn was subsequently robbed to build enclosure walls and small structures apparently of a domestic nature, and this later landscape would repay further study, particularly in the context of the construction of the Holm of Papa Westray South cairn.

The islands of Westray, Papa Westray and the Holm of Papa Westray lay on the fringe of Neolithic Europe but their inhabitants were in no sense remote or isolated. None of the excavated sites belongs to the pioneering phase of colonisation, though Knap of Howar and Holm of Papa Westray North are early among the known sites of Neolithic date in Orkney. As yet, there is no evidence of Neolithic settlement in North Ronaldsay to the east, perhaps because, as the text to Blaeu's map of 1654 relates, the island is separated from its nearest neighbour, Sanday, 'by far the most terrifying sea' (Irvine 2006, 25). Papa Westray and Westray were thus the farthest north of the Orkney islands inhabited before 3000 BC, and there is no evidence of Neolithic colonisation of Fair Isle away to the north, but beyond Fair Isle there was settlement in Shetland contemporary with the Papa Westray sites.