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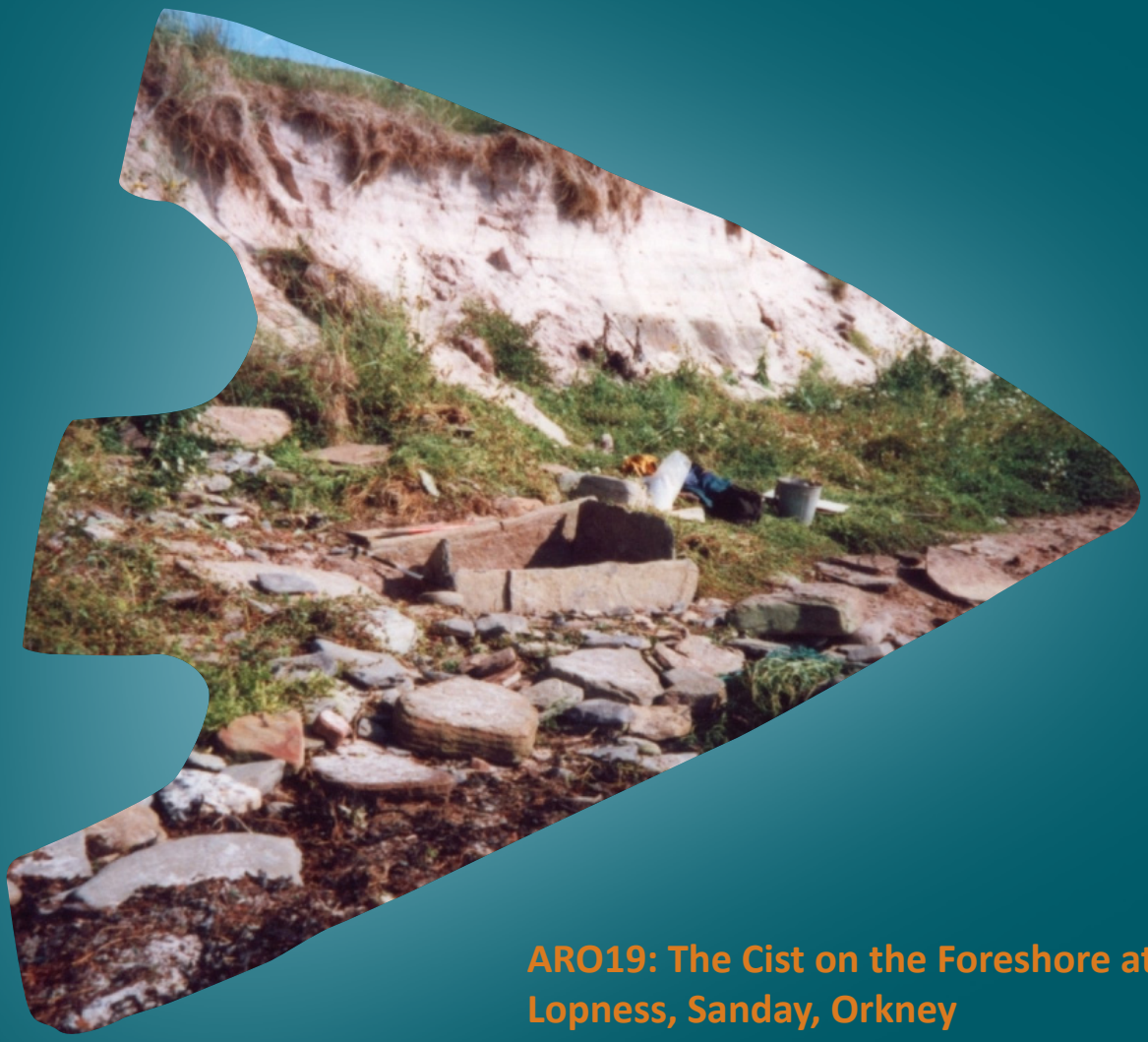

# ARO19: The Cist on the Foreshore at Lopness, Sanday, Orkney

by Lorna Innes

with contributions by Gordon Cook, Jane Downes, Michael Donnelly, Mary Harris, Gavin MacGregor, Jennifer Miller, Susan Ramsay, Julie A Roberts, Judith Robertson and Catherine Smith

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**ARO19: The Cist on the Foreshore at Lopness, Sanday, Orkney Lopness, Sanday, Orkney**

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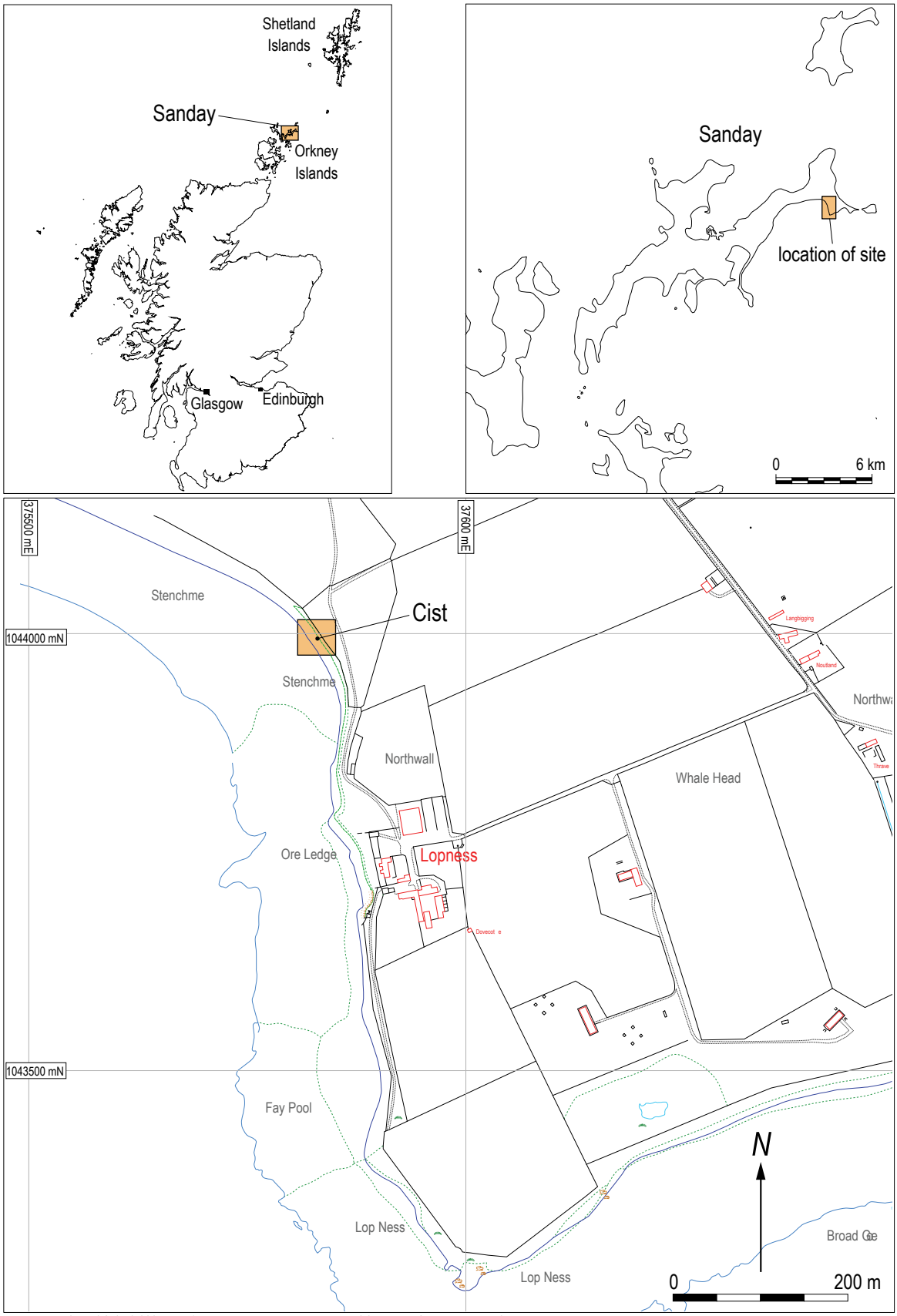




*Figure 1: Site location.*

## Summary

A cist, which was in danger of being eroded by the sea, was excavated and recorded in September 2000 as part of the Historic Scotland's Human Remains Call Off Contract by Orkney Archaeological Trust (OAT) and on behalf of the then Glasgow University Archaeological Research Division (GUARD). The cist, located on the foreshore at Lopness on the island of Sanday was constructed from large beach flags and contained an incomplete crouched inhumation within a midden-like fill. The remains were identified as those of a female of approximately 40 to 50 years of age. The cist appears to have been an isolated discovery although there is the possibility that a nearby upright may once have formed part of a similar structure.

A secondary deposit of limpet shells and animal bones, including the remains of two foetal or new born lambs, were recorded as overlying the feet of the female skeleton lying in the cist. They may have been introduced into the cist at a later date following its disturbance and after the collapse of the cist lid. Although such deposits are not unknown from funerary contexts they are unusual. The purposeful or accidental incursion of later deposits into the cist is therefore considered.

The Lopness site archive, including the full account of all specialist reports, is deposited with the National Monuments Record for Scotland, RCAHMS, now Historic Environment Scotland, Edinburgh. The finds were allocated to the Orkney Museums, Tankerness House, Orkney by the Treasure Trove Unit.


## Introduction

The cist at Lopness, Sanday, Orkney, NGR: HY 7583 4399 (Figure 1) was revealed following storms in early 2000 when upright slabs were noted on the beach in front of an eroded section of dune at Lopness, Sanday (Plate 1). Dr Jim Hansom of the School of Geographical and Earth Sciences at the University of Glasgow reported the discovery to Julie Gibson of Orkney Archaeological Trust (OAT). Jane Downes of the Orkney College, University of the Highlands and Islands and Mary Harris, evaluated the site and established the presence of human remains within the cist. GUARD was commissioned to undertake the rescue excavation of the site as part of the Historic Scotland's Human Remains Call-Off Contract. Due to the need for rapid recovery and associated logistical issues the work was subcontracted to Orkney Archaeological Trust with agreement by Historic Scotland. The rescue excavation was supervised by Jane Downes and carried out by Judith Robertson and Mary Harris in September 2000.

*Plate 1: The cist prior to excavation.*

## Site location and background to the excavation

The Lopness cist is situated on the east side of Sanday, an island, measuring c. 20 km long by 11 km wide, and which is located to the north-east of the Orkney Mainland. The lower lying eastern areas of the island are formed of Rousay flagstone and the higher land to the west comprises Eday sandstone. The highest point on Sanday is The Wart (NGR: HY 630 378), which rises to a height of 65 m in the south-west of the island. The soils are light and sandy, and are now largely given over to grazing. Sanday is rich in archaeological sites with monuments dating from prehistoric times, including several cist burials. Coastal erosion is currently exposing previously unknown monuments on the island, such as a Bronze Age settlement at Tresness discovered in 2015 (Towrie 2015).

## The excavation

This account is based on the excavation records and notes of Janes Downes, Judith Robertson and Mary Harris.

### The cist

An oval, steep-sided and flat-bottomed pit (context 012) had been dug through clay into a subsoil of till, to receive a trapezoid-

shaped cist aligned north/south and measuring approximately 1.3 m by 0.9 m. The cist was built of large beach flagstones (002) (Figures 2 and 3), set on edge and supported by small pinning stones. Additional beach boulders (013) gave further external support on the north and west sides of the structure. The eastern side of the cist was packed by extra flagstones while further stability was provided by the interior paved floor (014) and its bedding layer (016). Redeposited clayey till and sandstone fragments (005) were used to pack the sides of the structure and infill the pit. The upper portion of this material had been eroded by the sea and replaced with modern beach material (010). During the excavation fragments of stone recovered from within the cist were interpreted as being the collapsed cist capstone. There was no evidence of an associated mound or other accompanying features. The cist appeared to be an isolated discovery but its location was considered to relate to buried soil horizons observed in the dunes to the east.

## The cist contents

The upper fill of the cist consisted of sand and beach stones (001) and was found to be extensively disturbed. Context 001 contained fragments of probably recent animal and bird bone, undiagnostic pottery and two flint flakes. MacGregor (see below) suggests that the presence of sherds of pottery in these contexts may be representative of later insertions or of animal burrowing. The middle fill comprised silty-sands and clays (003, 004, 007 and 008) and included a discrete but densely packed deposit of limpet shells (006) (weighing 1350 g). In addition, it contained mammal, bird and fish bone, and carbonised barley. Context 006 also included fragments of carbonised heather stems, grass and sedges, a single flint flake and one sherd of pottery (sherd 4).

This material overlay a small deposit of animal bone (015) that included the remains of two foetal or newborn lambs, positioned over the feet of the inhumation at the south end of the cist. The material forming the lowest fill of the cist (009) contained the human skeletal material (Figures 2 and 3), which lay within it, and partly on the slabs (014 and 016) forming the base of the feature. Within this material (009) were coarse pottery, lithic artefacts, animal, fish and bird bone, seaweed, cereals, weed seeds, and peat/heathland material. It was a silty-sand deposit with fragments of stone which were thought likely to be representative of the collapsed capstone (Plate 2). The largest piece of stone was noted by the excavators to have damaged the skull and one arm of the skeleton (Plate 3).

*Plate 2: The collapsed capping slab of the cist.*

*Plate 3: The partly excavated lower fill of the cist with the fragment of capstone that crushed the skull and arm bones of the inhumation (not exposed).*

The majority of lithic artefacts recovered during the excavation came from (009) and proved to be predominantly fine knapping debris (see below). Amongst this material one core, one blade, approximately 20 flakes and an end scraper were noted. Six sherds of pottery were also recovered including a decorated rim fragment of three conjoining sherds from a bucket-style vessel with a flat rim. A separate vessel within the main cist fill is represented by the presence of Sherd 8, also decorated but with a slightly different design. Two further sherds from (009 and 001) may represent separate vessels.

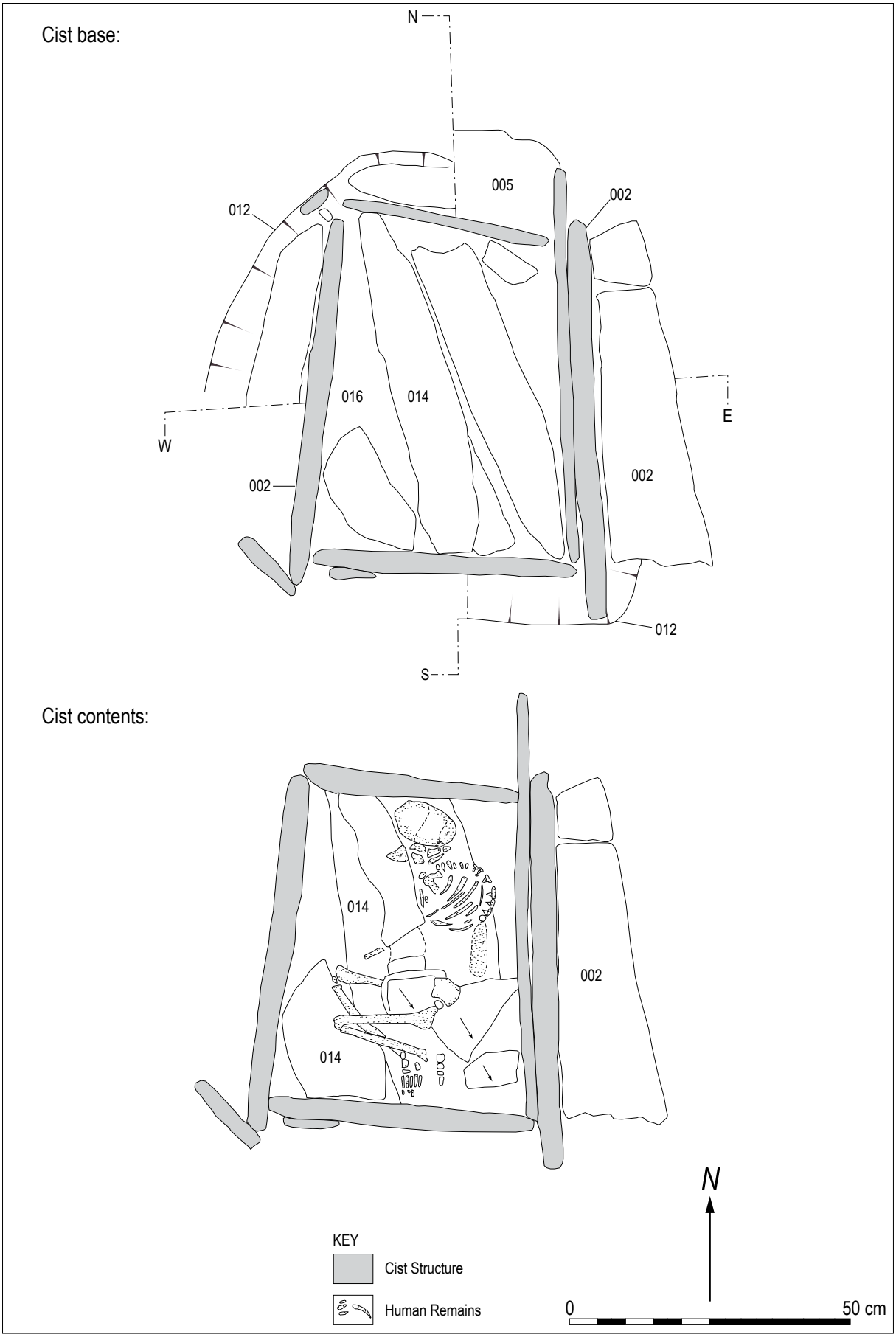


*Figure 2: Plans of the cist and its contents.*

The human skeletal remains were crouched and were later identified (see below) as the remains of a female aged between 40 and 50 years old, of average build and approximately 1.5 m in height. The incomplete skeleton was positioned on its right side (Figure 2 and Plate 4), and was in a poor overall condition. The skull was crushed by the collapsed cap stone which possibly accelerated the deterioration of part of the upper body.

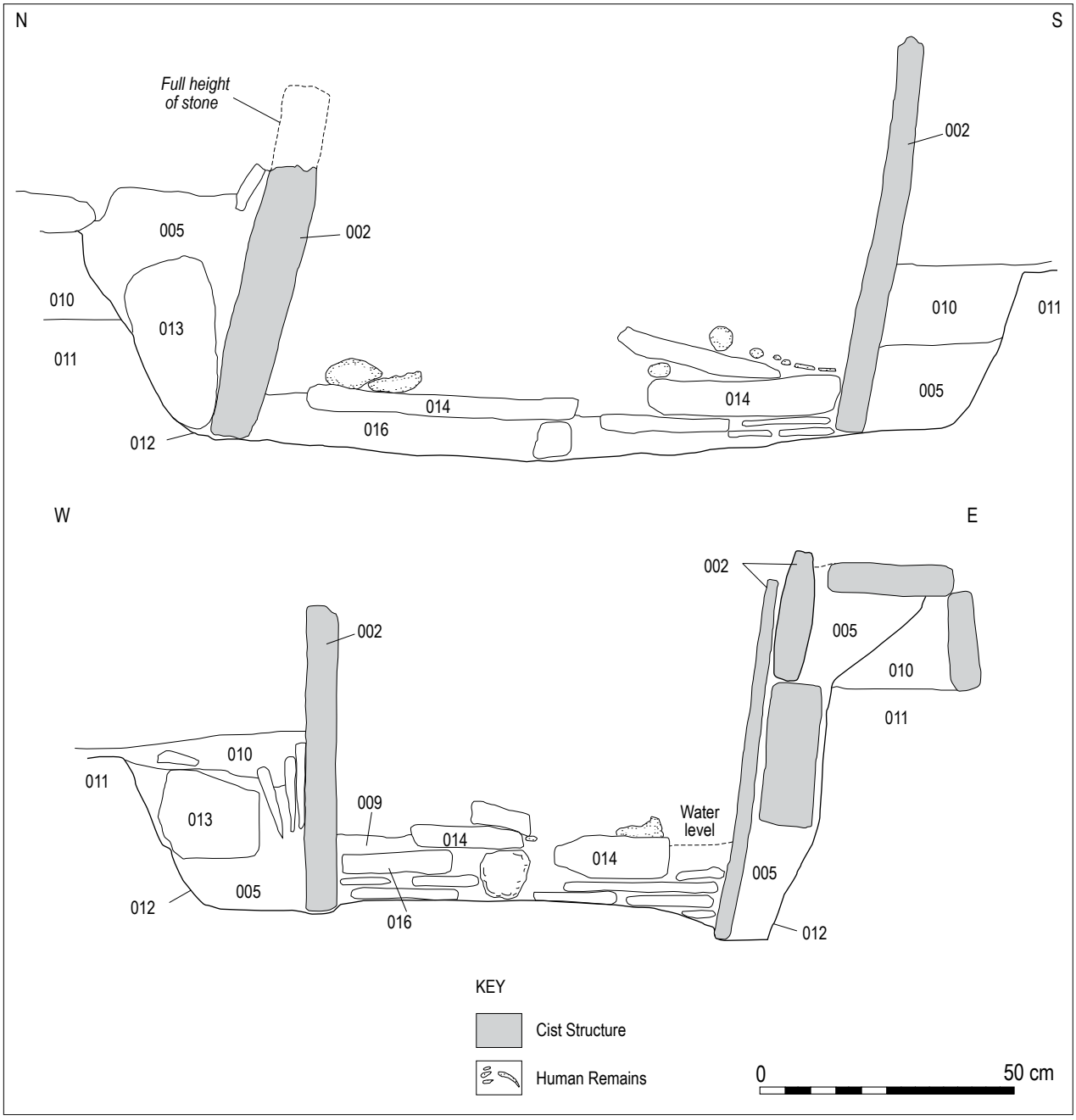


*Figure 3: North/South and West/East profiles through the cist.*

*Plate 4: The inhumation fully excavated.*

## The human remains

### by Julie Ann Roberts

The human remains were in poor condition and although the skeleton was approximately 60% complete, it was in a fragmentary state with a large amount of surface erosion to the bones. The right forearm and hand, and the left hand were entirely missing. It was also evident that the right-sided skeletal elements and dentition were in a more degraded condition than the left, presumably because the individual had lain crouched on her right side.

### Sex and age at death

Sex and age at death were determined using standards outlined by Buikstra and Ubelaker (1994), Krogman and Iscan (1986) and Ubelaker (1989). Fortunately, despite the fragmentary nature of the remains, some sexually dimorphic features on the pelvis and cranium had survived. The sciatic notch of the ilium was wide, and a pre-auricular sulcus was present, the acetabulum was small and deep, and the sub-pubic angle was wide. Although the ischial tuberosities were rugged (particularly on the right) they were small and there was ischial flaring. All of these traits indicate a female sex, as did the sacral curvature. The cranium was slightly more ambiguous, most notably because the individual had a pronounce glabella and large supra-orbital ridges, features normally associated with a male sex. The mastoid processes were small, however, the external occipital protruberance was slight, and there was marked frontal bossing, suggesting a female sex. In addition the supra meatal creat and the temporal ridges were slight.

It was possible to estimate the age of the individual from the appearance of the auricular surface of the ilium, the pubic symphyses (although these were not fully complete), and the sternal ends of the ribs. These indicators gave an age of greater than forty years and a probable age range of between 40 and 50 years at death. Heavy attrition of the teeth, fusion of the cranial sutures and the amount of degenerative change in the spine concurred with this estimate.

### Stature and body build

Living stature was estimated by measuring the only intact long bone, the left femur, and adding a precalculated factor for the "non-bone" contribution (Trotter 1970). From this, an estimated stature of 151.9 ± 3.7centimetres (4 feet 10 inches) was determined. Standard measurements of the upper shaft of the left femur were taken in order that the platymeric index could be calculated. This represents the degree of anterior-posterior flattening of the femoral shaft, which is thought to be related to physical activity (Brock and Ruff 1988). Standards used were after Bass (1995).

Platymeric: X - 84.9 broad or flat (from front to back)

Eurymeric: 85.0 - 99 rounded

Stenomeric: 100 - X usually only found in pathological cases

A value of 79 was obtained, indicating that the femur was platymeric, or flattened from front to back. This femoral shape is commonly found in individuals from pre-industrial societies. Because of post-mortem damage it was not possible to calculate the platymeric index of the right femur, or the right and left platycnemic index, which measures the shape of the upper shaft of the tibia.

Repeated usage of a muscle will result in associated bone production at the point where that muscle attaches to the bone. This can sometimes allow inferences to be made

regarding possible activities or occupation. In the female from Lopness, an interesting pattern was observed. On the right femur and right ischial tuberosity the attachment points for the gluteal muscles and the hamstring muscles (the extensor muscles at the back of the thigh) were far more pronounced than on the left. In addition, the attachments for the quadriceps muscles (the flexor muscles at the front of the thigh) were far more pronounced on the left patella than the right. This suggests a repeated activity in which the right leg was straight and possibly used as a 'stabiliser' or 'anchor', and the left leg was alternately bent at the hip and straightened at the knee. This type of motion might be employed in an activity such as weaving at an upright loom.

The attachment for *deltoid*, the powerful muscle involved in many movements of the shoulder, was pronounced on the right humerus. Unfortunately, the appropriate part of the left humerus had been destroyed post-mortem, therefore it was not possible to determine whether the development was unilateral or bilateral. It may have been related to a specific activity involving the left shoulder or more generalised heavy physical labour.

## Non-metric traits

Non-metric traits are skeletal variants, which cannot be measured on a metric scale, but are simply recorded as being present or absent. They are thought to be genetically or environmentally determined, and are generally used to compare differences between populations or even family groups. As such, little significance can be attached to their occurrence in a single individual, although a record of traits present may be useful for future comparison with populations from the same time period and/or geographical location. Table 1 illustrates the traits observed in the female from Lopness. All of the post-cranial traits are likely to have been related to muscular activity or habitual posture. For a full record of traits that were absent or unobservable, see skeletal inventory in the site archive.

| Trait | Right | Left | Both |
|---|---|---|---|
| *Cranial* | - | - | - |
| Ossicles in lambdoid | Bone not present | Trait present | - |
| Ossicle at parietal notch | Trait absent | Trait present | - |
| *Post-cranial* | - | - | - |
| Plaque | Trait absent | Trait present | - |
| Exostosis in trochlear fossa | - | - | Trait present |
| Third trochanter | Trait present | Trait absent | - |
| Lateral tibial squatting facet | - | - | Trait present |

*Table 1: Non-metric traits in the Lopness human remains*

## Pathology

The recognition of specific diseases is often dependent on the whole of the skeleton being present in order that the character and distribution of the lesions throughout the body might be observed. In this individual, many of the joint surfaces were absent or fragmented and the surfaces of the long bones in particular were badly eroded. This meant that there was a high probability that evidence of pathological conditions had been lost or obscured. Some conditions were, however, visible and they included degenerative joint disease (DJD), periostitis, and dental disease.

Degenerative joint disease, or osteoarthritis, is one of the most frequently observed diseases in archaeological populations. It is characterised by the breakdown of the articular surface of the joint and the formation of osteophytes (bony projections) around or away from the joint margins. In spinal degenerative joint disease, schmorls nodes may also be present. These lesions represent herniations of the contents of the inter-vertebral discs onto the surfaces of the vertebral body. Often they are the result of a compression force, which might be sustained during heavy lifting or in a fall onto the feet, and they may accompany actual compression fractures. The aetiology of DJD is multi-factoral, although the most common causes are age and repeated stress. It may also develop as a consequence of traumatic injury. In this instance, the severity of the condition was based on standards outlined by King (1995).

Severe degenerative changes were observed in the cervical and lumbar spine of the female. In the thoracic vertebrae (T4 to T10) the condition was characterised primarily by schmorls nodes. Degenerative changes to the sacrum and the

auricular surface of the right ilium had resulted in complete fusion of the sacro-iliac joint (the left side was not present). This would almost certainly have caused some pain (although perhaps less than it had before the two joint surfaces had actually fused), and some restriction of mobility. Slight degenerative changes were also observed in the left and right hips, and the tubercular facets of three left ribs. The arthritic changes seen in the spine and sacrum were conducive with a lifestyle that involved regular hard physical labour.

Periostitis, inflammation of the periosteum and soft tissues around the bone, is also frequently observed in archaeological populations. It may be related to a specific condition such as tuberculosis or leprosy, or caused by a non-specific organism transmitted, for example, via an open wound. In this instance the condition was evident on the right and left tibiae and fibulae, characterised by well remodelled pitted and striated lamellar bone. This is an indication that the infection was almost entirely healed and no longer active at the time of death.

The teeth were in a good state of health, although post-mortem degradation may have obscured some oral pathology. There was no evidence of ante-mortem tooth loss, dental abscesses or caries. The amount of attrition on the occlusal surfaces of the teeth indicated a relatively coarse diet. Some dental calculus was observed, of slight to moderate severity (Brothwell 1981), primarily on the lingual surfaces of the mandibular molars, around the gingival margin. Calculus is the mineralised form of plaque which accumulates on the tooth when oral hygiene is neglected. Again, it is a frequently observed pathological condition in archaeological skeletons.

Seven teeth were affected by dental enamel hypoplasia: all surviving mandibular premolars, both maxillary canines and the left maxillary central incisor and second premolar. These defects in the enamel represent a temporary cessation in the growth and development of the tooth, thought to be caused by physiological stress. Although the condition is not yet fully understood, possible causes include febrile infection, malnutrition and metabolic disorders (Aufderheide and Rodriguez-Martin 1998).

## The animal bone

### by Catherine Smith

### The results

The cist contained many fragments of animal bone which were recovered both during the excavation and through the sieving of selected soil samples (see tables in the site archive). The mammal bones were identified by direct comparison with modern material and were allocated to particular bone and species where possible. Where it was not possible to identify bones as far as species, the terms *large ungulate*, *small ungulate* and *indeterminate mammal* were used. On the basis of probability, large ungulate bones were most likely to have come from cattle, although it is possible they may have come from horse or red deer. Similarly, small ungulate bones were most likely to have come from sheep, but could possibly have originated from goat, pig or roe deer. All other larger mammalian fragments for which neither species nor bone could be ascertained were described as indeterminate mammal. The term *small mammal* was used to describe small rodent bones other than the skull, mandibles or maxillae.

The sieved samples were notable in that they contained the almost complete skeletons of two newborn or foetal lambs. The lamb skeletons came mainly from context 015, located over the foot area of the inhumation. A small number of bones, thought also to derive from these two lambs, were recovered from context 009, the lower fill of the cist.

Other mammalian species present were represented by small fragments of bones and teeth from cattle, sheep/goat (adult/immature), large ungulate, small ungulate, probable seal species, Orkney vole and Murid (mouse species). Small mammal bones presumably originated from the Orkney vole and mouse species.

The bird bones consisting mainly of shaft fragments were in a fragmentary condition, and the identifications are therefore tentative. Species recorded from the hand-excavated material were greater black-backed gull (*Larus* cf *marinus*) gull species (*Larus* sp), cf gannet (cf *Sula bassana*), cf cormorant (cf *Phalacrocorax carbo*) and duck species, cf mallard (*Anas* cf *platyrhynchos*) as well

as bones of indeterminate bird species. In the sampled contexts, birds identified were puffin (*Fratercula arctica*) and small Passerine, of a size and morphology compatible with the house sparrow (*Passer domesticus*). Small fish bones were also present.

### Discussion

The occurrence of the animal bones in the cist is of some interest. While the presence of the Orkney vole and other small mammals may be regarded as intrusive, and indeed have been previously noted in cist contents from Werne, Harray (Hedges 1980, 53), the other species require some explanation. The cist appears to have contained shell midden (006) and this material also contained bone fragments. The presence of small fragments of mammalian teeth and bone as well as bird bone may originally have come from a midden deposit and are probably incidental to the other contents of the cist. With the exception of a single fragment of long bone from a large ungulate (probably cattle), which was apparently chopped in the sagittal plane, there was no evidence of butchery on any of the bones. This may be due in part to the small size of the fragments.

It is the skeletons of the two newborn or foetal lambs, which are of major interest. Found lying over the feet of the crouched inhumation, they may have been deposited deliberately.

At the Neolithic chambered tomb of Quanterness, Orkney, a range of different animal species was found accompanying the human skeletons (Clutton-Brock 1979, 112-135). These included bones of neonatal or foetal lambs, calf, red deer, foal and piglet, which may have had some ritual association (*ibid*, 113).

Of the 11 cist burials on Orkney summarised by Hedges (1980, 44-71), only one appears to have contained a fragment of bone which was not human (the Orkney vole excepted); this was a tooth root fragment which possibly came from a small carnivore, found in the cist at Garsetter, Birsay (Luke 1980, 66).

In mainland Scotland, animal bones have been found accompanying cist burials thought to date to the Bronze Age. Here, however, joints of pork seem to have been the preferred offering, and have been found in cists at Longniddry, East Lothian (McCormick 1991, 113-4), Gairneybank, Kinrossshire (Cowie and Ritchie 1991, 98), Uppermill, Cruden, Aberdeenshire (Harman 1977, 90) and Muirhall Farm, Perthshire (Stewart and Barclay 1997, 43). At the latter site, a further surprising find amongst the cist contents was a collection of sea urchin spines (*ibid*). Some unidentified animal ribs were recorded accompanying the human remains in a cist at East Campsie, Angus (Taylor *et al* 1998, 63). A grave at Burnmouth, Berwickshire, thought to be of Iron Age date, contained bones and jaws of a young pig (Craw 1924, 143).

Deposition of animal parts with human burials may have persisted into the Early Christian period. At Chapelhall, Inellan, Argyll (Smith, unpublished) a small collection of cattle teeth was retrieved from a long cist burial. These are paralleled by another collection of cattle teeth found alongside an inhumation in the Early Christian cemetery at Hallowhill in Fife (Smith 1996, 432). These teeth were thought to have originally been contained, along with other objects, in a bag or pouch (Proudfoot 1996). Cattle teeth have also been found in graves at Whithorn, dating to between 1250 and 1600 AD (Hill 1997, 472).

## The radiocarbon dates

### by Lorna Innes and Gordon Cook

Two samples were selected from the cist for radiocarbon dating. These samples included one from the left femur of the female skeleton and another from one of the foetal lamb skeletons. The samples were selected with a view to answering a number of questions about the burial. It was hoped that the dates would shed further light on Orcadian cist burials and their associated rituals. The most obvious question to be answered was whether the female and the foetal lambs had been deposited at the same time, or whether the lambs were a later insertion into the grave. The stratigraphic relationships recorded by the excavators suggests that the midden-like material (009) within which the human remains were found was either a purposeful deposit at the time of the burial or a later accidental incursion into the cist. The latter seems to be the most likely explanation given that part of the remains were unprotected and were crushed by a flag stone from the collapsed cist capstone. The accumulation of midden material (009) probably

occurred with the collapse of the cist roof. The presence of the midden material (009) between the human burial and the deposit of lambs and limpets suggests the latter are a slightly later inclusion. It was hoped that the radiocarbon dates would help clarify any discrepancy in date between the deposition of human and lamb bone through an examination of the $^{14}C$ and $^{13}C$ content of the bones. The results are outlined in Table 2 below, but they indicate that any interval between the deposition of the lambs and the burial of the female were inconclusive.

| | | | | Calibrated dates | Calibrated dates |
|---|---|---|---|---|---|
| Lab Code | Sample Material | Yrs BP | $d^{13}C$ ‰ | 1 sigma | 2 sigma |
| AA-43651 (GU-9481) | Skeleton: Left Femur (009) | 3520 ± 40 | -18.0% | 1890BC-1750BC | 1950BC-1730BC |
| AA-51418 (GU-10382) | Lamb bone (015) | 3320 ± 50 | -18.4% | 1640BC-1520BC | 1740BC-1490BC |

*Table 2: Radiocarbon dates from the cist*

## The radiocarbon dates and the marine context

The readings for carbon 13 ($\delta^{13}C$) of -18.0‰ and carbon 15 ($\delta^{15}N$) of 12.7‰ both suggest that the buried individual had a significant marine component to her diet. Had she had a completely terrestrial diet, the $\delta^{13}C$ reading would have been approximately -21‰, while someone with an entirely marine diet would have a $\delta^{13}C$ reading of –12.5‰. These are known and valid quantities when referring to human remains. The consumption of marine resources effectively adds to the radiocarbon age of an individual. This is because the marine element of any diet has a radiocarbon age of its own which effectively adds a 'reservoir age' to that of the individual who has consumed it. The carbon 13 reading suggests therefore that it is likely the human bone sampled for radiocarbon dating is slightly younger than the dates outlined in the table above suggest. The $\delta^{13}C$ of -18.0‰ implies that *approximately* 35% of the diet was marine based and using this percentage an *approximate* reservoir corrected age of 3377 ± 40 BP is produced. This figure was obtained using the University of Washington Calibration Program which, when calibrated using OxCal (the University of Oxford Radiocarbon Accelerator Unit calibration programme Oxcal3), gives a range of 1750 to 1520 cal BC at 95.4% probability. The neonatal lamb bones gave a range of 1740 to 1490 cal BC.

Cook suggests some caution is needed in interpreting these results and highlights that the figure of a 35% marine diet is an approximation and therefore the 40 year error attributed to the sample is undoubtedly an underestimate. It is currently unclear what the normal $\delta^{13}C$ reading for a neonatal lamb should be, but its value will be influenced by its mother's diet. If the mother had eaten seaweed there will be some effect as seaweed obtains much of its carbon content from the atmosphere. However, the reservoir effect will be much less than that which would be observed from a diet of shellfish or fish as consumed by the Lopness female.

In conclusion, it is necessary to account for a more substantial reservoir effect in the human remains than in those of a foetal or newborn lamb. To date there are few carbon 13 readings available from young or neonatal sheep and this area requires further, more detailed research in order to establish baseline readings. Various sites have yielded carbon 13 readings and these include An Corran, Staffin on the Isle of Skye ($\delta^{13}C$ of -22.0‰) (DES 1998, 127), Bornais, South Uist ($\delta^{13}C$ of -21.04‰) (DES 2001, 127) and from Orkney at the Holm of Papa Westray North ($\delta^{13}C$ of -12.8‰ and -14.6‰) (DES 2001, 125), the latter identified as being from a young sheep. The problems associated with radiocarbon dating and the marine reservoir effect have been addressed by Barber (2003, 220) who is undertaking further research into this problem. He suggests that caution be applied to the interpretation of radiocarbon dates from marine sites until research is undertaken. At present it remains inconclusive as to whether the lamb bones were inserted into the cist at the same time as the human remains or whether they were inserted or became incorporated into the cist at a slightly later date, after the collapse of the roof.

# The botanical remains

### by Jennifer Miller and Susan Ramsay

## The results

All the samples analysed contained abundant shell sand and fragments of local Rousay

flagstone. Organic remains from context 005, the redeposited clayey backfill of the construction pit for the cist, were scant. They consisted only of a few shell and echinoderm (sea urchin/starfish) fragments representing an entirely natural assemblage from the dune system.

Contexts 006, 007 and 009 represent fills of the cist. Context 006 overlying the foot area of the inhumation contained 1350g of shells, mainly limpets, together with other organic finds including one fragment (<0.05g) of *Corylus* (hazel). Other carbonised finds from Context 006 included fragments of grass/sedge peat and rhizome, Ericaceae type (heather type) stems and several cereal grains. Many of the cereals were in poor condition, although *Hordeum vulgare* (six-row barley) was identified, including both hulled (var *vulgare)* and naked (var *nudum*) types. Context 009 the lowest fill of the cist, also contained charcoal of *Betula* (birch) and a single *Rumex* (dock) nutlet, a weed of arable agriculture. The general lack of arable/ruderal weed seeds would tend to suggest a well cleaned crop. The only other carbonised seeds found also came from context 009. The single seeds of *Carex viridula sl* (yellow sedge) and *Empetrum nigrum* (crowberry) are both heathland taxa, presumably burnt with the local peat resources.

### Discussion

The backfill of the cist pit (context 005) showed an entirely different organic taxon composition to any of the contexts examined from within the cist (006, 007 and 009). The clay backfill contrasts with the cist fills which contained an assemblage suggestive of midden deposits including cereals and marine food resources, together with fuel in the form of burnt peat from grass/sedge and heather type heathland areas. The only significant difference between the cist contexts examined was in the abundance of shells and bone fragments.

A total of 80 carbonised cereal grains were identified from the cist fills examined. Many were in poor condition, although some were able to be confidently identified as six-row barley, of which both hulled and naked varieties were found. Naked barley has been identified throughout the Northern Isles on sites from the Neolithic to the Norse period, including Tofts Ness and Pool on Sanday, Skara Brae and Howe on Mainland Orkney, and Scord of Brouster in Shetland (Dickson and Dickson 2000), although hulled barley has generally been the major cereal crop in Scotland from prehistoric times.

Fragments of burnt peat, grass/sedge rhizome and heather type stems and one seed each of yellow sedge and crowberry were associated with the carbonised cereal grains. Peat and heathy turf would have been the most commonly available source of fuel on the island, although the fragments of hazel and birch charcoal indicate the utilisation of other locally available resources too. A single dock (*Rumex* sp) nutlet from context 009 was the only evidence for arable/ruderal weeds found in any of the cist fills, which would suggest the cereals had been well gleaned. Together, this assemblage may represent the waste from the parching of a cereal crop, or simply the deposition of material from a domestic fire, since some of the animal bone and remains of crustacea were also burnt. Unfortunately, it is impossible to ascertain whether this is simply in-filling with midden material, or the remains of a ritually deposited last meal.

## The lithic artefact assemblage

**by Mike Donnelly**

*A full catalogue of the lithic artefacts can be found in the site archive.*

### Results

The assemblage comprises 84 pieces of worked stone recovered from the cist and its pit and it is dominated by 80 pieces of flint (based on beach pebbles) from the local vicinity. Also present is a single flake of quartzite and three pieces of an unidentified material, including two flakes and the only core recovered. Primary material is fairly common with nine examples relating to the initial reduction of locally acquired flint pebbles. Secondary material accounts for 20 examples (c. 24% of the assemblage) and inner material for 55 (c.65%).

The assemblage is dominated by flakes and fine waste/shatter which account for c. 42% and 56% of the assemblage, respectively. Only a single blade was recovered, suggesting that blade production may not have been important at this site, and that the lithic episode(s) relate more to tool production, use and/or repair as opposed

to the reduction of cores to produce tool blanks. The solitary core is a bifacial bipolar core with opposed terminals. Only flakes appear to have been removed from this core.

## Flakes

The flakes include 35 pieces, or c. 42% of the lithic artefacts recovered. The initial stages of core reduction are represented by 13 examples. They include nine primary pieces, representing the initial blow in the reduction of a beach pebble into a core; and a further three are core preparation flakes, representing the further modification of a pebble prior to blank production. A primary flake was modified into an end scraper while another end-scraper was formed from a core preparation flake. Conversion of flakes into basic tool forms is a recurring feature throughout Scottish prehistory.

There is no evidence for the curation of cores (such as core rejuvenation or core trimming flakes). This may be due to the small numerical size of the assemblage or it might relate to the use of bipolar technology.

Regular and irregular flakes are equally common. Apart from the two flake tools, none of the other examples display any signs of retouch or use. Bipolar examples are well represented with 16 definite and three probable pieces. These figures are minimum numbers as it was frequently difficult to determine if a flake had been made by the application of bipolar technique or other approaches.

## Blades

The blades include a single piece of flint, probably produced through the use of bipolar technology.

## Tools

Two formal tools were recovered, both of which are end-scrapers. Both are small and round and closely resemble so-called thumbnail-scrapers, although the retouch is less extensive than on most scrapers of this type. The morphology of the scrapers suggests that they may be late. One displays signs of moderate use whereas the other one appears to be unused.

## Waste products

A significant component of the assemblage (47 pieces or 56%) consists of waste products (removals so small, irregular and/or angular that they could never have been used), recovered from environmental samples. Most consist of shatter smaller than 10 mm in size (chips). In addition, there were three spalls, one chunk and one piece of shatter greater than 10 mm (indeterminate pieces or chunks). All the waste was of flint.

## Technology

The assemblage is characterised by the extensive use of bipolar technique which was used to produce small regular flakes. This process was particularly suited to the production of flakes from small beach pebbles or nodules. In total, 24 of the 37 non-waste lithics displayed evidence of bipolar technology.

## Discussion

Bipolar technique features throughout prehistory in Scotland but is particularly common in prehistoric assemblages recovered in western Scotland and in the Hebridean area. Since the excavation at Lopness in 2000, many new Orcadian lithic assemblages have been excavated or published, or they are in press, increasing our knowledge of Orcadian Mesolithic, Neolithic, and early Bronze Age assemblages substantially (e.g. Richards 2005; Hunter 2007; Dockrill 2007; Card 2013; Ballin and Bjerck 2016; Lee and Woodward forthcoming). There are obvious differences between assemblages from the central parts of the Orcadian mainland and assemblages from the islands around the mainland (e.g. raw material use, typology and technology), but the dominance of bipolar technique, and the two small scrapers, suggest a date within the late Neolithic/early Bronze Age period (Butler 2005).

The vast majority of recovered lithics originate from archaeologically significant contexts. Table 3 shows the assemblages by context.

| Context | Waste | Core | Blade | Flakes | Flake tool | Total |
|---|---|---|---|---|---|---|
| 001 | - | - | - | 2 | - | 2 |
| 003 | - | - | - | 8 | - | 8 |
| 005 | 1 | - | - | 2 | (1) | 3 |
| 006 | - | - | - | 1 | - | 1 |
| 008 | - | - | - | 1 | - | 1 |
| 009 | 45 | 1 | 1 | 19 | (1) | 66 |
| 003/009 | 1 | - | - | 2 | - | 3 |
| Total | 47 | 1 | 1 | 35 | (2) | 84 |

*Table 3: Summarised classification of the lithic assemblage*

Finds from context 009, the lower fill of the cist, dominate the assemblage, although the extent of this dominance is skewed by the fragments of fine waste/shatter recovered from samples which amounts to 54 of the 66 lithics artefacts recovered. These fragments show that context 009 contained fine knapping debris and must represent the accumulation of this waste in the cist when its lid collapsed. The majority of the other contexts produced flakes while two also produced knapping waste. Of note is context 003 which produced eight flakes and context 005, a redeposited till and sand used for filling the grave pit. This context produced only two flakes, one of which was an end scraper.

Lithic artefacts recovered from early Bronze Age funerary contexts are frequently prestige items intentionally deposited with the deceased (Ballin 2014, 9). In the case of Lopness, the assemblage is more reminiscent of domestic refuse and reflects the fact that the finds probably post-date the burial and represent domestic refuse deposited on top of the cist after it was closed.

## Prehistoric pottery

### by Gavin Macgregor

In total 14 sherds, five fragments and three crumbs of prehistoric pottery were recovered during excavations of the cist with a total weight of 289.6 g. The pottery is handmade, of coil construction with inclusions of grey angular igneous rock, and was probably fired in a bonfire. The assemblage dates to the mid to later second millennium BC, and a minimum number of two define vessels and two probable vessels are represented within the assemblage.

Vessel 1 (conjoined sherds 6a-6c.) from context 009 within the cist, derives from a flat-rimmed pot, most probably of bucket form, with an exterior diameter of 240 mm at the mouth. The vessel was decorated with incised lines to create a series roughly executed triangles or lozenges but, it is unclear from the limited amount of vessel preserved whether the decoration was restricted to the neck of the vessel or extended across its whole surface.

Vessel 2 (sherd 9b) has different inclusions from those present in all the other sherds in the assemblage and has a harder fabric. The size and form of the vessel is unclear from the single sherd.

Vessel 3 (sherd 8) forms a probable separate pot where the incised decoration and motive on this sherd is different from those present on Vessel 1.

Vessel 4 (sherds 9c-9e), have both grey and red igneous rock inclusions as opposed to solely the grey igneous rock inclusion found in the other vessels. The size and form of this probable vessel is unclear from the sherds present.

### Discussion

Sherds from contexts 001 and 003 may represent later insertions into the cist, but the presence of animal bone within context 007 in association with a sherd of pottery may suggest the fill of the cist had been burrowed. The sherds from within context 009 may indicate the formal insertion of a pottery vessel as part of the burial rite. However, the small proportion of the vessel represented suggests that a complete vessel may not have been placed within the cist. Equally, the possibility must be considered that the cist has been previously disturbed e.g. Werne I (Hedges 1980).

Bucket shaped vessels are common in funerary contexts from the second millennium BC. Vessel 1 finds some parallels in the sherds from Knowes of Quoyscottie (Hedges 1977). Similar forms of vessel are also found in domestic assemblages in the later second millennium BC from Orkney (e.g. Hedges 1975) and beyond.

A minimum number of two vessels are indicated by the assemblage but the possibility of at least another two vessels being represented must be considered. The distribution of sherds throughout the fills of the cist and the presence of sherds from several vessels indicate that there may have been later insertion of sherds and/or disturbance to the cist. The limited proportion of Vessel 1 may indicate that, rather than a complete vessel, a token was placed with the individual burial.

## General discussion

Variations in Orcadian cist structures, settings and contents are common but records of nineteenth and early twentieth century excavations are often limited when compared with modern archaeological investigations. Hedges (1980, 44-

45) highlighted some of the problems associated with dating and classifying cists and warned against attributing all that were not immediately datable to the Bronze Age (ibid, 49). The Lopness cist has produced two radiocarbon dates: one from the female skeleton and one from the foetal/newborn lamb remains. The radiocarbon date for the inhumation places the burial within the early Bronze Age, although, as highlighted above, it is likely that the remains could be slightly younger.

## The human remains

The cist contained the skeleton of a middle-aged to elderly woman. The osteological evidence points to a woman who led a physically demanding life, which involved repetitive actions over time and who at the time of her death was suffering from the crippling effects of osteoarthritis. During her working life she may have spent much of her time at a loom as suggested by Roberts, but other activities, such as net fishing may have contributed to her osteological profile.

Her role in her community could be inferred by the artefactual and environmental evidence within the cist, if we accept that they were a slightly later deposit and had a direct relationship with the burial. It could be interpreted that the limpets may be related to, or associated with, her role as a procurer of marine resources, and the lambs to her role in either farming or textile working, but this may be taking the evidence too far.

## Flora and fauna

The cist contained a relatively large amount of animal bone, present in several deposits including the lower cist fill (context 009). This is not a common phenomenon and Smith suggests the presence of the vast majority of this material is likely to be 'incidental', possibly derived from midden deposits. This suggestion is lent further credence by the presence of marine resources such as fragments of shell, lobster/crab, sea urchin/starfish, and fish bone. In addition, the botanical evidence points to the presence of midden material. A total of 80 carbonised cereal grains from both naked and hulled six-row barley were recovered from the cist fills. These remains, together with the recovered lithic artefacts and pottery are indicative of waste or midden material forming the upper fills of the cist.

## The artefacts

A significant quantity of lithic artefactual material was recovered from within the cist and particularly from the lower cist fill. This material was predominantly knapping debris, which suggests it was material derived from elsewhere. Lithics artefacts recovered from prehistoric funerary contexts are commonly 'prestige goods' such as flint knives and scrapers and are not normally indicative of domestic waste. The Lopness lithic artefacts are thought to date to the early to middle Bronze Age. Sherds of pottery were recovered from four contexts including the lower fill of the cist. At least two vessels were identified but it is unlikely, given the small number of sherds, that whole vessels were ever present. Stylistically the assemblage ranges from the mid to late second millennium BC. Vessel 1, a flat-rimmed decorated pot most likely of bucket form, is a style of vessel typically attributed to the middle or later Bronze Age (Hedges 1975, 69) and is likely to have entered the cist in association with the midden material. It is also possible that the occurrence of some of the sherds of pottery was accidental through the agency of burrowing rodent activity. Hedges (1980, 48) notes that grave goods were lacking from all the cist burials he examined, although Werne 1 contained some small sherds which he concluded were more likely to have come from the remains of the funeral pyre as opposed to being deliberately included. It is possible that the pottery sherds within the Lopness cist are also incidental. Similarly, a small number of pottery fragments were associated with the cist and the backfilling of its pit at Kewing, Rendall, Orkney. These were interpreted as the remains of a single Beaker vessel from the burial ritual which were broken and scattered around the cist rather than placed inside it (Ballin Smith 2014, 108-9).

## The sequence of events

The data (ð $^{13}$C date) indicates that the woman was buried slightly later than the early Bronze Age radiocarbon date (1890-1750 cal BC) suggests. The remains, taking account of the Carbon 13 effect, probably date to between 1890 (the upper radiocarbon reading) and 1520, (the speculative marine reservoir adapted lower end of the date range).

The woman was initially placed on the floor of

the cist probably without grave goods or other deposits and the cist was capped or sealed most likely by a lid of comprising a number of slabs. Sometime later the roof collapsed inwards bringing with it overlying midden material. The presence of a large piece of flagstone that partly crushed the skeleton suggests that no midden material had been introduced into the cist prior to the roof collapse. It seems therefore that the lid collapsed into the structure under the weight of midden deposits overlying the cist, or perhaps under the weight of a burial mound that contained midden or pyre material. The limpets shells and foetal/neonate lambs appear to have been placed in the cist following the collapse of the capstone and subsequent to the infiltration of midden material into the structure, but the precise dating of this event is uncertain, as is their relationship to the buried person.

## The cist and the local resources

The proximity of the Lopness cist to the sea has obviously changed due to coastal erosion, but it may never have been positioned very far from the shoreline (Figure 1 and Plate 1). The location may be indicative of the continued importance of the marine resource to the community to which this female belonged. This importance is confirmed by the carbon 13 value of the skeletal material, which indicates an *approximate* dietary intake of 35% marine resources. The presence of cereal grain and animal bones reveal that cultivation and animal husbandry were also highly significant aspects of subsistence in the vicinity, although this could relate to a slightly later period than the actual burial. The positioning of the burial close to two economic and resources areas (the sea and the land) may represent a continued claim of ownership over both resources.

## The implications of midden material within the cist

It is suggested that the midden material found within the cist was an accidental inclusion and this is supported by the artefactual evidence. Structures containing midden deposits are not unknown from funerary contexts, as some cists have burnt pyre or mound material introduced to them, such as Mousland (Downes 1994, 146-147) and Holland (Neil 1981, 34). Miller and Ramsay suggest that the botanical evidence may be representative of the discarding of material from a domestic fire and highlights the presence of small fragments of burnt animal bone and crustacea derived from a nearby settlement. The deposition of midden deposits is well documented within Neolithic chambered tombs such as Midhowe and Isbister and limpets are a common feature of the environmental and artefactual record at both sites (Davidson and Henshall 1989, 56 and Hedges 1984, 149). At Isbister a large amount of faunal remains were recovered from the tomb including several immature species, (including lambs) which exhibited limited evidence of butchery (Hedges 1984, 147).

The collapse of the lid and unintentional inclusion of midden material into the cist is indicated by the presence of flagstone fragments and artefactual evidence, but it is also necessary to consider that some of the lowest deposit of material in the cist (context 009) could have been deliberate. The relationship between the domestic/economic and ritual/spiritual aspects of life in the Orcadian Neolithic and Bronze Age periods appear to have been closely inter-woven. This connection is illustrated by the distinctive layout of domestic and social space within and between the buildings in the settlements of Skara Brae and Barnhouse (Richards 1990a and b, and 1991). This, together with the presence of more obviously ritualised elements in some of the structures within the village of Barnhouse, such as the Ceremonial House 2, seems to clearly support such theories (Richards 2005, 154). The smaller buildings clustered around this building are similar to those at Skara Brae, while the larger chamber of this structure has been likened to the passage graves of Quoyness and Quanterness (Barclay 1996, 67). It is not implausible to suggest that some Bronze Age burials perhaps make reference to, and draw upon, earlier traditions and beliefs.

The presence of domestic deposits in the bottom of the Lopness cist is reminiscent of earlier traditions associated with the chambered tombs. Pollard notes that *'Some chambered tombs do provide evidence for economic practice, with animal bones and marine shells being recovered from the fill of chambers and in some cases from pits immediately outside the tombs…The majority of deposits in chambered tombs represent animal bones and shells in ashy deposits which include pot sherds, some of the bones with evidence for burning. In some cases this material represents the blocking of the chamber and passage, a process which marks a change in the use of the*

*tomb'* (1995, 91). The Lopness cist fills are similar to domestic refuse or midden-like material, perhaps for example, like that which might be recovered from the blocking of a chamber within a tomb such as at Midhowe – a process marking change (Callander and Grant 1934) and at the Holm of Papa Westray North (Ritchie 2009, 21-22). The continued use of the rite of inhumation in the early Bronze Age may have been a means of perpetuating past traditions or rituals in order to maintain them in a society changing from old beliefs to newer ones, and where cremation was central to the burial ritual (see Ballin Smith 2014, 137ff).

The limpets and lamb bones placed in the cist could represent an offering of food for the deceased, if the structure and its location were recognised as a grave and a specific person's grave. The most commonly recorded deposits of animal bone believed to represent ritualised food offerings in similar contexts, are pig bones from joints of meat (see Smith above). It has been argued that limpets are an unlikely food, however Pollard warns against such dismissive thinking and notes that '…*shellfish can represent an important fall-back resource, and their function in this role at various times during prehistory should not be underestimated*' (Pollard 1995, 141). Whether the limpets represent a food offering or have some other meaning is unclear, but it seems unlikely that the two lambs are representative of food as they were neonatal or newborn, and show no evidence of butchery.

The deposits overlying the feet of the woman could be interpreted as being purposeful later insertions, added to the cist some time after its initial closure. However, there is no evidence of deliberate removal or re-closure of the lid once the body had been interred. However, the inclusion of the lambs and limpets implies an intimate knowledge of the grave, and a response perhaps with some other ritualised meaning to the unscheduled disturbance of the burial. It is possible that they were deposited within living memory of the burial, as an offering or act of remembrance, as we leave flowers by gravestones today.

## The cist within its wider context

There are two problems concerning this inhumation burial. The majority of modern excavations investigating prehistoric cists relate to cremations, and there is a paucity of radiocarbon dates for inhumations cist graves in Orkney. Even though the Lopness cist burial has no known precise parallel it can be discussed within a wider Orcadian context.

At Sand Fiold, a rock cut burial chamber in Sandwick, Orkney, the remains of two inhumations and two cremated individuals were recovered during the course of the excavation (Dalland 1999). The inhumed remains were foetal and sub-adult and in poor overall condition. The cremated remains were two separate collections; one was contained within a Food Vessel Urn while the other formed a discrete pile of bone in the centre of the cist. Both were identified as the remains of two adult males. The radiocarbon dates from Sand Fiold suggest longevity of use of this burial place with cremation and inhumation rites taking place during the same period. The fuel ash slag or cramp (a product derived from a cremation pyre), located externally to the cist was found to be of similar date to the inhumed neonate (2855-2505 cal BC at c. 96% probability). This event was separated by some 700-900 years from the interment of the sub-adult inhumation and the urn cremation within the cist (1985-1750 cal BC at 95.7% probability and 2170-1880 cal BC at 95.5% probability respectively). The deposition of the separate cremation was much later and was dated to between 1000 and 800 cal BC. The construction of the cist took place between 2180-1905 cal BC (at 95.5% probability) and therefore the neonate and cramp are thought to be from an earlier burial within the rock cut chamber (Dalland 1999, 31).

The sub-adult inhumation within the Sand Fiold cist is of comparable date to the Lopness inhumation. These remains, dating to 1985-1750 cal BC bear testament to the continued use of inhumation into the Bronze Age period on Orkney despite the adoption of cremation. The cremation in the urn dating to 2170-1880 cal BC suggests the broadly contemporary use of two very different types of funerary rite, even within the same burial (Sand Fiold, Period 2, Dalland 1999, 30).

Linga Fiold, a middle Bronze Age barrow cemetery on the Orkney Mainland, was found to contain numerous cremation deposits with

 

inhumations inserted into large cists on top of two of the mounds (Downes 1995, 2005). There are considerable differences between cremation and inhumation rituals and use of one rite over another strongly suggests that '*quite different attitudes to the dead were involved*'' (Armit 1996, 98).

One or two more recently excavated cists with inhumations have been published since the Lopness site was excavated. A badly preserved inhumation was found in a third cist at Ferndale, in Rendall, the other two contained cremations. Radiocarbon dates from the latter suggested a date for burial of sometime in the first quarter of the second millennium BC (Duffy 2005, 18) and therefore roughly contemporary with Lopness. The cist with the inhumation was likened to those from Crantit and is discussed further in Ballin Smith (2014, 138). Another cist with an inhumation was discovered at Gyre Farm in 1971 and published in 2007 (Simpson et al). Similarly to Ferndale the cist was of an unusual construction and did not provide radiocarbon dates. The more regular construction of the Lopness cist may suggest it is later in date than these two examples, which are considered earlier (Ballin Smith 2014, 138). In 1991 a funerary site was discovered at Loth Road, Sanday, including two cists with cremations. Neither produced radiocarbon dates but they are considered to be early to middle Bronze Age in date (Sharman 2007, 6).

## Conclusions

The most likely sequence of events involves the burial of a deceased female in a cist without surviving grave goods in the early to middle Bronze Age. Accumulations of midden material, possibly from a slight mound capping the burial, subsequently fell into the cist with the collapse of its lid. The cist had become damaged and the burial was disturbed, and it is likely that the situation may have been rectified by the deliberate introduction of offerings (lamb bones and limpets) into the grave. However, there does not appear to have been any attempt made to repair the cist lid, even though the cist was likely to have been recognised as a grave. However, the subsequent collapse of midden into the cist brought with it the pottery and the lithic artefacts, but definitive interpretation remains unproven.

This paper has attempted to address issues raised by the evidence recovered from the Lopness burial. It has attempted to highlight various questions and issues raised by the individual elements of the excavation and explain them in light of the available evidence. The Lopness cist is an interesting isolated feature, but questions still remain as to where the community was located that constructed the cist, where the midden material came from and whether other cists were placed in close proximity. The cist highlights the vulnerability of the Orkney coastline and the wealth of archaeological information that it and cists contain.

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