EXCAVATION OF MEDIEVAL GRAVES AT ST THOMAS' KIRK, HALL OF RENDALL, ORKNEY

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ABSTRACT

In early 2005 a particularly severe storm exposed human bones on the foreshore immediately east of the ruins of St Thomas' Kirk. The subsequent excavation recovered 14 individual inhumations. The skeletons exhibited a relatively high number of pathological conditions and evidence of a diet that included fish, meat and dairy products. Isotopic analysis confirms that one of the individuals was from either the Outer Hebrides or Northern Shetland while the rest originated from Orkney. The graves were arranged in distinct grave plots on a north/south aligned row, clustered particularly close to the east side of St Thomas' Kirk. Imported medieval pottery, of a type unknown in Orkney or indeed Scotland, was recovered from the graves.

BACKGROUND

The ruins of St Thomas' Kirk, or Tammaskirk as it is locally known, lie on the eastern coastline of the district of Rendall on Mainland Orkney, facing the island of Gairsay (NGR: HY 4251 2104; Illus 1). It was partly excavated in 1931, revealing a two-chambered building consisting of a nave and a chancel defined by walls between 0.30m and 0.61m high and 0.91m – 1.37m thick (Clouston 1932, 9-12). The excavator, Clouston, considered that the form of the structure suggested a mid-12th century origin for the church and postulated that it had been built by Svein Asleifarson, whose exploits and association with Gairsay and Rendall are recorded in the *Orkneyinga Saga* and from whose descent the Gunns are attributed (Clouston 1932, 14-16; Anderson 1981, 155-192; Pálsson & Edwards 1981, 128-218; Gray 1922, 56-57).

More recently a geophysics survey and cliff-section recording were carried out to evaluate the coastal erosion threat to St Thomas' Kirk and the adjacent Hall of Rendall settlement mound (Martlew 2000, 63-4). A resistivity survey carried out during this work indicated that the southern boundary of the churchyard lay approximately 10 m from the church, and returned to the junction of the north wall as had been reported by Clouston (Martlew 2000a, 4). Coastal erosion of the settlement mound had exposed two main sections of massive stone walling, suggestive of a broch. Occupation levels were apparent between these stone walls and extra-mural structures defined by further coursed masonry and vertical slabs. Pottery and midden material recovered from the eroding edge of the mound, as well as a bone weaving comb that had previously been recovered from detritus on the northern side of the broch, indicated an Iron Age date for the occupation of the settlement mound (Martlew 2000, 63-4).

The recurrent exposure of skeletal remains within the intertidal area of the site had been observed over subsequent years by the local *Shorewatch* group and the Orkney Archaeological Trust. Coastal erosion during storms in January 2005 exposed further human bones within this intertidal area to the immediate east of St Thomas' Kirk. Under the terms of the Historic Scotland Human Remains Call Off Contract, an AOC Archaeology Group team were sent to survey the site, evaluate the damage to the archaeological remains and excavate those exposed remains in immediate danger from coastal erosion.

FIELDWORK

A topographic survey was undertaken of the church remains, the graveyard and the adjacent settlement mound. This work tied in recorded sections and *Shorewatch* baseline markers for the monitoring of coastal erosion into the overall survey plan of the site (Illus 2). The survey also recorded the exposed coastal section of the settlement mound, revealing intra-mural and extra-mural elements of the drystone structure (Illus 3). During the survey fragments of animal bone, oyster shell and pottery were recovered from the base of the section.

Five trenches, within the intertidal area where human remains had previously been reported, were then cleared of the overlying shingle and rubble from the storm-driven collapse of the eastern churchyard wall (Illus 2). Of these trenches, only Trench 3, to the immediate east of St Thomas' Kirk, revealed any graves (Illus 4). Out of the 20 individual inhumations revealed, only 14 were excavated due to the immediate threat of

further coastal erosion. Six other inhumations (Skeletons 7 & 9-13) were partially exposed and recorded but left *in situ* as their excavation would have necessitated disturbance of intact soil and turf that would then inevitably have increased the vulnerability of the graveyard and the remains of St Thomas' Kirk to further coastal erosion.

Generally, the skeletons were in poor condition. Many had lost their lower legs or torsos due to the action of coastal erosion. All of the skeletons were buried in a supine position, on an east/west alignment with the head originally at the west. The lower arms, and by inference the hands, of the deceased were observed to overlie the pelvis (Skeletons 1, 2 & 8), overlie the chest (Skeletons 4, 18) or to lie at the side of the body (Skeletons 3, 5, 6, 14, 16 & 19).

In general the graves were of uniform size, measuring 1.60-1.80 m in length, 0.60-0.70 m in width and up to 0.40 m in depth. The graves were cut into a mid brown silty loam with frequent inclusions of medium sized pebbles, which overlay the natural subsoil composed of dark brown silty clay with frequent small to large beach cobbles.

No grave markers were apparent. Edge set stones lined several of the graves, solely around the head and shoulders of the inhumations (Skeletons 1, 2, 4, 5, 8, 14 & 16). Within one grave (Skeleton 2) the skull rested on a horizontal stone slab. Only in one grave (Skeleton 8) was a stone cap placed over the head.

No associated grave goods were found within any of the graves. Two pottery sherds were recovered from the grave fill of Skeleton 14. An iron object and some bird bones were found in proximity to Skeleton 10, though given the storm action that had exposed the skeletal remains, the context for these was considered insecure.

A measure of stratigraphic deposition (Illus 5), particularly close to the eastern side of St Thomas' Kirk, was apparent where discrete clusters of intercutting graves were encountered. There were a number of pairs of graves, where one grave cut the other, such as that of Skeleton 1 which cut the grave of Skeleton 2. Likewise the grave of Skeleton 16 cut the grave of Skeleton 20 while the grave of Skeleton 6 was cut by the grave of Skeleton 5. A further two sets of graves demonstrated sequential relationships between three graves. The grave of Skeleton 17 cut the grave of Skeleton 14, which itself cut the grave of Skeleton 18, while the grave of Skeleton 19 cut the grave of Skeleton 21 but was itself recut by the grave of Skeleton 8 (Illus 5). Nevertheless, except for these discrete clusters of graves, the exposed inhumations were arranged separately and distinct from each other on a north/south aligned row.

THE HUMAN BONE

Melissa Melikian

with contributions by James Barrett, Jane Evans, Mike Richards, N. Boulton & Carolyn Chenery

Dramatic long-term changes in human diet in late prehistoric and early historic Orkney have been demonstrated by zooarchaeology and the stable isotope analysis of human bone (Barrett *et al.* 2001; Barrett and Richards 2004; Bond 1998; Mulville *et al* 2005). However, the High Middle Ages have been poorly represented in these studies. Little zooarchaeological research has been published regarding settlements of 13th to 14th

century date within Orkney. Moreover, only a few human burials of this period have been the subject of stable isotope analysis (from the Bu of Cairston and Newark Bay; see Barrett and Richards 2004). The 14 articulated skeletons excavated from the St Thomas' Kirk graveyard provided an opportunity to fill this chronological gap (Table 1).

Skeleton 1

Skeleton 1 appeared truncated at the pelvis and was consequently represented by 55% of the skeleton (skull, upper limbs, torso and pelvis). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of a male aged 36-45 years at death. Stature was estimated as 1.72m ± 0.05m based on humeral length. This individual had the congenital occurrence of one additional thoracic vertebra. For vertebral pathology osteoarthritis was recorded on the seventh cervical and first thoracic vertebrae, osteophytes were identified on the third cervical, fifth cervical to first thoracic and seventh to fourteenth thoracic vertebrae, and Schmorl's nodes on the thirteenth thoracic and second lumbar vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. Enthesopathies were recorded bilaterally at the olecranon process, medial epicondyle of the humerus and the ischial tuberosity. No gross pathology was recorded.

Skeleton 2

Skeleton 2 appeared truncated mid-femur and was consequently represented by 80% of the skeleton (skull, torso, upper limbs, pelvis and partial lower limbs). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The

remains are of a male aged over 46 years at death. Stature was estimated as 1.75m ± 0.05m based on humeral length. Osteoarthritis was recorded on the ninth to tenth thoracic vertebrae, osteophytes were seen on the third to fifth cervical, third thoracic, fifth thoracic and the seventh thoracic to fifth lumbar vertebrae, and Schmorl's nodes on the fourth thoracic to fourth lumbar vertebrae. The third and fourth cervical vertebrae were fused, with slight scoliosis (curvature of the spine). This condition is Klippel-Feil syndrome and is characterised by the congenital fusion of two or more cervical vertebrae. Shortening of the neck is uniformly present and its prevalence is one in 30,000-40,000 (Aufderheide & Rodriguez-Martin 1998). A right, unilateral *os acromiale* was observed. No osteoarthritis was recorded in any other joints of the skeleton. No enthesopathies were observed. Spina bifida occulta was observed in four of five sacral segments. This is a relatively common, often asymptomatic, spinal congenital defect that consists of incomplete fusion of the neural arch.

Skeleton 3

Skeleton 3 appeared truncated mid torso and represented 25% of the skeleton (partial torso and partial right upper limb). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are those of an adult; the elements required for more detailed age estimation were not present. Similarly none of the elements used for sex estimation were present, however, the remains were significantly robust which may suggest a probable male. Stature was estimated as 1.63m ± 0.05m based on humeral length. Osteoarthritis was recorded on the third cervical to first thoracic vertebrae, osteophytes were seen on the third cervical to first thoracic and

third thoracic to fourth lumbar vertebrae and inter-vertebral disc disease was seen on the fourth thoracic to third lumbar vertebrae. Osteoarthritis was also recorded in the right glenohumeral joint (glenoid and humerus). Enthesopathies were seen at the right rotator cuff. No gross pathology was observed.

Skeleton 4

Skeleton 4 appeared truncated mid torso and was represented by 45% of the skeleton (skull, partial upper limbs and upper torso). Bone preservation was good and no disarticulated material was found associated with the skeleton. The remains are of a probable male aged over 46 years at death. The long bones were not sufficiently intact to derive stature estimation. Osteoarthritis was recorded on the ninth to eleventh thoracic vertebrae, osteophytes were seen on the first to seventh cervical, second to fifth thoracic and seventh to eleventh thoracic vertebrae and Schmorl's nodes were seen in the sixth and eight thoracic vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. Enthesopathies were seen at the right rotator cuff. The right humeral head displayed pathology consistent with rotator cuff disease. Rotator Cuff Disease is a disorder of the musculotendinous cuff surrounding the glenohumeral (shoulder) joint. This can be caused by a number of factors including; poor blood supply, normal attrition or degeneration with ageing, calcific invasion of the tendon(s), a traumatic tear in the tendon(s) from a fall or accident, overuse injuries from repetitive lifting, pushing, pulling, or throwing.

Skeleton 5

Skeleton 5 appears truncated mid femur and was represented by 70% of the skeleton (skull, upper limbs, torso, pelvis and partial lower limbs). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of a female aged 26-35 years at death. Stature was estimated as 1.73m ± 0.04m based on radial length. Osteoarthritis was recorded on the eighth to twelfth thoracic vertebrae, osteophytes were seen on the eighth to twelfth thoracic and fourth to fifth lumbar vertebrae, inter-vertebral disc disease was seen on the fifth cervical, seventh thoracic and fourth lumbar to first sacral vertebrae and Schmorl's nodes on the eleventh to twelfth thoracic vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. No enthesopathies were observed. Complete spondylolysis of the fifth lumbar vertebrae was present. Spondylolysis is the ossification failure of the *pars interarticularis* of the vertebra, resulting in the separation of the posterior part of the vertebra. The aetiology is believed to be a combination of congenital and traumatic factors. The condition is relatively common occurring in 4-8% of the general population (Aufderheide & Rodriguez-Martin 1998). In most instances the defect does not cause symptoms.

Skeleton 6

Skeleton 6 appeared truncated and was represented by 50% of the skeleton (torso, upper limbs, partial pelvis and partial lower limbs). Bone preservation was moderate. Intrusive human bone was present within the grave fill. The remains are of a probable female aged 36-45 years at death. Stature was estimated as 1.61m ± 0.04m based on femoral length. Osteoarthritis was present on the fourth to sixth cervical vertebrae, osteophytes were seen in the fourth to seventh cervical, tenth thoracic to fourth lumbar vertebrae and one unidentified thoracic vertebra. Inter-vertebral disc disease was seen on the fifth to seventh

cervical vertebrae and Schmorl's nodes on the tenth thoracic to fifth lumbar vertebrae and one unidentified thoracic vertebra. Osteoarthritis was recorded in the glenohumeral joint (shoulder) of the right humerus. Enthesopathies were recorded at the left radial tuberosity, left iliac crest, left ischial tuberosity and bilaterally at the olecranon process and lateral epicondyle of the humerus. The right shoulder displayed pathology consistent with rotator cuff disease with impingement syndrome and secondary osteoarthritis.

Skeleton 8

Skeleton 8 appeared truncated at the pelvis and was represented by 70% of the skeleton (skull, upper limbs, torso and pelvis). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of a male aged over 46 years at death. Stature was estimated as 1.68m ± 0.05m based on radial length. Osteoarthritis was present on the third to fourth cervical, sixth to seventh cervical and fifth lumbar to first sacral vertebrae, osteophytes were seen on the third to seventh cervical, fifth lumbar, seventh to eighth thoracic, first lumbar and fourth lumbar to first sacral vertebrae. Inter-vertebral disc disease was seen on the third to fifth cervical and sixth to seventh thoracic vertebrae and Schmorl's nodes were seen on the fifth thoracic and seventh thoracic to first lumbar vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. No enthesopathies were observed. No gross pathology was present.

Skeleton 14

Skeleton 14 appeared truncated on the right side of the skeleton. The individual was represented by 75% of the skeleton (skull, partial upper limbs, torso, pelvis, partial lower limbs) and bone preservation was good. One intrusive human bone was present (fifth

metacarpal). The remains are of a probable male aged 36-45 years at death. Stature was estimated as 1.67m ± 0.04m based on tibial and femoral length. Osteoarthritis was present on the seventh to twelfth thoracic vertebrae; osteophytes were seen on the first thoracic, fourth to twelfth thoracic and third lumbar vertebrae. Inter-vertebral disc disease was seen on the fifth to eleventh thoracic vertebrae and Schmorl's nodes were seen on the fifth to eighth thoracic vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. Enthesopathies were observed at the left ischial tuberosity and bilaterally at the tibial tubercle. No gross pathology was present.

Skeleton 16

Skeleton 16 appeared truncated at the pelvis and represented 60% of the skeleton (skull, upper limbs, torso and pelvis). Bone preservation was good. Disarticulated human bone was present in the grave fill in the form of a juvenile humerus and a neonate radius and ulna. The remains are of an individual of undetermined sex aged over 46 years at death. Stature estimation could not be calculated as the formulae are sex specific. Osteoarthritis was present on the fourth to fifth lumbar vertebrae and osteophytes were seen on the ninth to twelfth thoracic and third to fifth lumbar vertebrae. Inter-vertebral disc disease was seen on the ninth to twelfth thoracic vertbare and Schmorl's nodes were seen on the seventh thoracic to fourth lumbar vertebrae. No osteoarthritis was recorded in any other joints of the skeleton. Enthesopathies were observed bilaterally at the deltoid tubercle. No gross pathology was present.

Skeleton 17

Skeleton 17 was heavily truncated and represented by only the partial lower limbs (15%). Disarticulated human bone was present in the grave fill in the form of a metacarpal and vertebral fragments. Bone preservation was moderate. The remains are of an adult of unidentified sex. Stature estimation could not be calculated as the formulae are sex specific. Osteoarthritis was present at the right talocrural (tibia and talus) and talofibular (talus) joints. Enthesopathies were observed bilaterally at the posterior surface of the calcaneus. A congenital or developmental abnormality was present in the feet. A pseudo-joint was present between the navicular and calcaneus in both feet. In the left foot the 'joint' surface was irregular and macroporotic. In the right foot this 'joint' had fused. Chopart's joint, as this group of tarsals is known, is used to invert and evert the foot. Secondary osteoarthritis was present in the right foot (described above), a result of restricted movement and compensatory mobility of the joint.

Skeleton 18

Skeleton 18 appeared truncated at the neck and lower limbs and was represented by 65 % of the skeleton (upper limbs, torso, pelvis, partial lower limbs). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of a male aged 36-45 years at death. Stature was estimated as 1.79m ± 0.04m based on femoral length. Osteoarthritis was present on the third thoracic, fifth lumbar to first sacral vertebrae and osteophytes were seen on the fifth to seventh cervical, third thoracic, fifth thoracic to first sacral vertebrae. Inter-vertebral disc disease was seen on the sixth to seventh cervical and fifth to twelfth thoracic vertebrae and Schmorl's nodes were seen on the fourth thoracic to second lumbar vertebrae. Osteoarthritis was present in

the left strenoclavicular joint (manubrium and sternum); the right acromioclavicular joint (clavicle); bilaterally at the glenohumeral joints, in the right glenoid cavity and the left glenoid cavity and humeral head; the right distal radioulnar joint (ulna) and the first right proximal inter-phalangeal joint. Enthesopathies were present bilaterally at the rotator cuff, the humeral lateral epicondyle, the linea aspera and unilaterally at the right olecranon process and right lesser trochanter. No gross pathology was present.

Skeleton 19

Skeleton 19 appeared truncated at the level of the femora and was represented by 70% of the skeleton (skull, upper limbs, torso, pelvis and partial lower limbs). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of a probable female aged 26-35 years at death. Stature was estimated as 1.69m ± 0.04m based on radial length. Osteophytes were present in the third cervical and fifth lumbar vertebrae. No osteoarthritis was recorded in any joints of the skeleton. No enthesopathies were observed. Remodelling of the spinous process was observed in the fifth cervical vertebrae. The spinous process was reduced with an irregular surface with osteophytes. This is likely to be the result of an overlying tissue infection.

Skeleton 20

Skeleton 20 was heavily truncated and represented by 15% of the skeleton (partial torso). Bone preservation was moderate and no disarticulated material was found associated with the skeleton. The remains are of an adult of unidentified sex, as no long bones were present it was not possible to derive a stature estimation. Osteoarthritis was present on the

fourth cervical to first thoracic and third to sixth thoracic vertebrae. Osteophytes were seen on the fourth cervical to first thoracic vertebrae and the third to sixth thoracic vertebrae and Schmorl's nodes were seen on the fifth to ninth thoracic vertebrae. No osteoarthritis was recorded in any joints of the skeleton. No enthesopathies were observed. The spinous processes of the fifth thoracic vertebrae and one unidentified thoracic vertebra had a trauma related injury. This may have derived from a blade or break.

Skeleton 21

Skeleton 21 was heavily truncated and represented by 40% of the skeleton (partial upper limbs, partial torso, partial pelvis and partial lower limbs). Bone preservation was moderate. Intrusive human bone was found within the grave fill. The remains are of an adult probable female. Stature was estimated as 1.61m ± 0.04m based on femoral length. No vertebral pathology was identified in the remains. No osteoarthritis was recorded in any joints of the skeleton. No enthesopathies were observed. No gross pathology was present.

The Dietary Study

James Barrett, Melissa Melikian & Mike Richards

In a Western European context, dietary reconstruction using isotopes allows one to evaluate the relative importance of marine and terrestrial foods, and the 'trophic level' of these foods. The potential significance of marine diet is self-evident in an island context and it must also be evaluated in order to correctly calibrate radiocarbon dates. Trophic

level is also of interest, however, because it can reveal the relative importance of cereals versus meat or of shellfish versus carnivorous fish such as cod. The values used for dietary reconstruction are $\delta^{13}C$ and $\delta^{15}N$ which are measured on purified collagen extracted from small samples of bone. A number of measures exist (such as C:N ratios) which allow one to evaluate the preservation of extracted collagen and thus the reliability of the results.

Bone collagen carbon and nitrogen isotope values are indicators of the sources of dietary protein consumed by humans over their lifetimes (Sealy 2001). Mammal bone collagen $\delta^{13}C$ and $\delta^{15}N$ values are long-term averages (e.g. 5–20 years) of dietary protein $\delta^{13}C$ and $\delta^{15}N$ values (Ambrose & Norr 1993). In a Scottish context, human $\delta^{13}C$ values are indicators of the amount of marine protein consumed by humans over the years before they died, with values of $\delta^{13}C$ =-21 ± 1 ‰ indicative of approximately 100% terrestrial protein, and –12 ± 1 ‰ indicative of approximately 100% marine protein (Barrett and Richards 2004). Nitrogen isotopes generally reflect trophic position; with consumer bone collagen values enriched by 2–4 ‰ over the protein they consume (Schoeninger & DeNiro 1984; Hedges & Reynard in press). In marine ecosystems there are many more trophic levels than in terrestrial systems, and therefore top-level consumers such as marine mammals have much higher $\delta^{15}N$ values (e.g. 15–20 ‰) compared to top-level terrestrial carnivores from temperate environments (e.g. 9–10 ‰).

Ten individuals were examined, and exhibited a wide range of $\delta^{13}C$ values (Illus 6), suggesting the consumption of varying proportions of marine protein. The high $\delta^{15}N$ values and the correlation between $\delta^{13}C$ and $\delta^{15}N$ ($r=0.89$, $p=0.001$) imply that this

marine protein typically took the form of predators, such as the cod family fish found in medieval middens (Barrett *et al.* 1999; Harland 2006), rather than shellfish for example.

No clear gender-based patterns were evident in this group. Nevertheless, in light of previous studies from Orkney that did recognize associations between diet and sex (Barrett & Richards 2004; Richards *et al*. 2006) it may be relevant that the most 'marine' signature was from a male (Skeleton 8) and the most 'terrestrial' from a probable female (Skeleton 19).

Although the observed $\delta^{15}N$ values are largely explicable as a result of consuming marine protein, they are also high for the individuals with $\delta^{13}C$ values indicative of a predominately terrestrial diet. The lowest $\delta^{15}N$ value in the group is 12.0 ‰, whereas 72 cattle, sheep and pig samples from the medieval site of Quoygrew in Orkney produced a mean $\delta^{15}N$ of 6.3 ‰ (Barrett & Richards pers comm). The nitrogen data may thus also imply the manuring of crops with animal dung and/or substantial consumption of animal protein, in the form of meat and milk products (Hedges & Reynard in press). Given the zooarchaeological evidence for intensive dairying in Atlantic Scotland (Bond 1998; Mulville *et al* 2005), milk products may have been particularly important.

The quantities of marine protein consumed by the individuals buried at St Thomas' Kirk were less, on average, than in the immediately preceding centuries in Orkney. Illus 7 and 8 plot the radiocarbon dates (two sigma, following marine reservoir correction) and $\delta^{13}C$ values for skeletons from Newark Bay, Deerness, Orkney and St Thomas' Kirk (Table 1). Newark Bay was the site of another medieval chapel in Mainland Orkney, the cemetery of which was in use from at least the late Viking Age until the late Middle Ages (Barrett *et al*. 2000; Barrett and Richards 2004). It

demonstrates a peak in marine protein consumption between the 11th and 13th to14th centuries, which has come to be known as the fish event horizon (Barrett & Richards 2004). The few later medieval burials from Newark Bay have $\delta^{13}C$ values consistent with less extreme reliance on seafood. The St Thomas' Kirk graves, which are of 13th to14th century date, corroborate this trend. Only one of the ten skeletons (Skeleton 8) produced a $\delta^{13}C$ value higher than c.-18 ‰, whereas many of the earlier Newark Bay burials did so.

The Origins Study

Jane Evans, N. Boulton, Carolyn Chenery & Melissa Melikian

In later prehistoric and historic contexts the most important isotopes for detecting place of childhood origin are oxygen and strontium. Oxygen values vary with climate and are incorporated into human tissues by ingestion of rainwater. Strontium values vary with geology and are passed up the food chain to humans via their diet. They are incorporated into the mineral component of bones and teeth, but it is only in tooth enamel that they are protected from diagenic changes after burial. Given that different tooth crowns develop at different ages, it is sometimes also possible to detect childhood migration by comparing different teeth from the same individual. Strontium and oxygen results (expressed as $^{87}Sr/^{86}Sr$ and $\delta\ ^{18}O$dw VSMOW) are typically compared to existing reference maps of low resolution. These can, however, be augmented by measuring local strontium values using site samples (of soil, terrestrial molluscs or plants). Interpretation can be complicated by the consumption of marine foods (with characteristic strontium signatures) or plants and animals from machair environments (given the maritime origin

of shell sand). Nevertheless, it is often possible to detect migrants and sometimes possible to suggest their specific place of origin.

The human bone shows a restricted range of $^{87}Sr/^{86}Sr$ ratios, close to the seawater value of 0.7092, between 0.70930 and 0.70960 and Sr concentrations between 200 and 400 ppm (Illus 9 & Table 2). The Sr concentrations are high by comparison with the majority of British human populations so far studied (Montgomery *et al* 2000, Evans and Tatham 2004, Evans *et al* 2006, Montgomery *et al* 2005) but most closely resemble the Norse machair dwelling populations of Lewis, Outer Hebrides (Montgomery *et al* 2003). The marine-like signature (McArthur *et al* 2001) could be derived either from direct consumption of marine products e.g. fish and shellfish, or, as in the case on Lewis, be derived from the cultivation of Machair soils which are dominated by marine shells and fertilized with seaweed. The strontium isotope values would argue against an origin on a juvenile volcanic terrain such as Iceland or the Faeroes, or an ancient cratonic area such as dominates Norway and Sweden.

The oxygen isotope data are presented as measured (Illus 10) and then as calculated drinking water values (i.e. the composition of the water the individual would have drunk) using the Levinson *et al* (1987) conversion equation (Illus 11). On the whole these samples show a narrow range of enamel and calculated drinking water oxygen values, which give values of only slightly higher than expected for modern day Orkney. One individual, Skeleton 8, has a somewhat higher oxygen isotope value, which may indicate a place of origin in the western Outer Hebrides or northern Shetland Isles. However, it must be noted that values this high can also be obtained in the far southwest of Ireland, the western tip of Cornwall or the isles of Scilly (Illus 12).

Discussion of human bone

Melissa Melikian

A summary of the osteological analysis can be found in Table 3. No juveniles were present. The youngest age group represented was 26-35 years and the oldest 46+ years at death. The assemblage consists of seven males or probable males, four females or probable females, and three individuals of undetermined sex. A number of pathological conditions were observed in this small assemblage and, if the pathological lesions seen are typical of the population, there would be high frequency of pathological conditions. The pathologies identified, however, are relatively common in archaeological skeletal assemblages. None of these conditions are indicative of cause of death; most are congenital or degenerative conditions.

The results of the isotopic study enhance our knowledge of the small assemblage from St Thomas' Kirk and are a valuable dataset for future comparative studies. The strontium and oxygen isotope study define a useful data set for local values. The results indicate a tightly clustered group, indicative of local people brought up on the machair. The relatively high levels of strontium are symptomatic of a population that lived on the machair or coastal dwellings. There is a direct comparison with the signature from a Hebridean population at Lewis (Montgomery *et al* 2003) which suggests these levels are a developing indicator of coastal populations.

THE MEDIEVAL POTTERY

Derek Hall

Two sherds of pottery were discovered in the fill of the grave that contained Skeleton 14. These two joining sherds are from the base of a small unglazed vessel in a micaceous Redware fabric.

The fabric does not resemble any of the fabrics known to the author from excavations at Quoygrew on Westray (Hall forthcoming) or Kirkwall (MacAskill 1982, 405-413) and must be regarded as an unprovenanced import; it does not match any known fabrics from the Scottish mainland (Hall 1998, 170-178).

Absolute dating of these sherds is impossible as they do not possess any obvious diagnostic elements but the fact that the vessel appears to be wheel-made and is manufactured in a well-sorted fabric would suggest that a medieval date is not out of the question.

THE PREHISTORIC POTTERY

Ann MacSween

Three sherds from three vessels were recovered from the base of the exposed coastal section of the adjacent settlement mound. The sherds are undiagnostic but their character suggests a date of the Iron Age or later.

GENERAL DISCUSSION

The human bones recovered for analysis comprised the remains of 14 individuals buried in supine positions on an east/west alignment within that part of the churchyard immediately east of St Thomas Kirk. The graves were particularly clustered within the area closest to the church but not to an extent that obscured the arrangement of largely separate and distinct graves on a north/south aligned row. The discrete clusters of intercutting graves therefore probably represent reuse of the same grave plots. That discrete grave plots are apparent suggests that the graveyard was not universally available, at least on this side of the church. The careful reuse of these grave plots further suggests formal organization of burials within the graveyard.

The radiocarbon dates for the skeletons ranged between the late 11th and early 15th centuries (Table 1). It is difficult to completely accept this date range, however. For while the stratigraphic relationship between Skeleton 14 and Skeleton 18 is consistent with the consecutive if overlapping date ranges obtained by radiocarbon dating (AD 1207-1390 for Skeleton 14 and AD 1069-1304 for Skeleton 18), the stratigraphic relationship between Skeleton 8 and Skeleton 19 suggests that the date ranges cannot be taken at face value. Skeleton 19, which underlay Skeleton 8, was dated to AD 1243-1397, while Skeleton 8 was dated AD 1181-1388. The implication is that these date ranges must be pulled together so that neither burial can be dated to earlier than the 1240s and no later than the 1380s. Thus it may be that most graves date to between the early 13th century

and mid 14th century, with the very earliest perhaps no earlier than the late 12th century and the latest no later than perhaps the late 14th century.

The apparent duration of use of the graveyard, from perhaps the late 12th century, broadly accords with the stylistic analysis of the architectural plan of the church (Clouston 1932, 14; RCAHMS 1946, 73). Given the lack of any historical record for St Thomas' Kirk (Clouston 1932, 14), the date range provided by the excavated graves is probably the best evidence for the duration of St Thomas' Kirk recovered from the site so far. However, given that the earliest burials, as at St Magnus' Kirk in Birsay (Barber 1996, 15-19), may have been within the church and that burials may have continued after St Thomas' Kirk itself ceased to function, it is acknowledged that this evidence may merely reflect the duration of use of this part of the graveyard.

Like the broadly contemporary cemetery at Bu of Cairston (Stevens *et al* 2005, 371) there were no associated grave goods or markers recovered during the excavation, though given that the graves were in rows and largely separate indicates that they were probably marked on the surface in some way. Together with the east/west alignment of the skeletons, with the heads placed at the west end of the grave, and their association with a contemporary church, there is little doubt as to the Christian context of the graves at St Thomas' Kirk. At least half of the graves encountered contained a stone setting around the head and shoulders of the skeletons. The same form of grave has been observed elsewhere in Orkney and derives from traditions going back at least to the 7th century (Barber 1996, 20-22). It may be that these stones were placed to prevent soil slippage from the sides of the grave, hence keeping the faces of the deceased clean and exposed after they had been placed within the grave. These stone settings, predominantly

associated with senior male individuals, might then relate to funeral rites performed at the graveside before the grave was covered.

The individuals comprised of at least seven males and four females, unlikely to be proportionate to the gender balance of the living population and certainly not a representative sample in terms of age. There were no juveniles, children or babies, and it possible that other discrete areas of the churchyard were reserved for these; there is a locally recorded belief that unbaptised children, for instance, were buried under the eaves of churches so that they were continually being 'baptised' with holy water running from the roof of the church (Sarah Jane Gibbon pers comm). The youngest age apparent was 26-35 (2 females), the next age 36-45 (3 males & 1 female) and the oldest age was 46+ (3 males and 1 indeterminate). The remaining individuals were all adults of undetermined age. It is possible to discern possible variations between the sexes in the laying of the deceased. Where the lower arms, and by inference the hands, were observed to overlie the pelvis or chest, these skeletons were exclusively male. In contrast, where the lower arms, and also by inference the hands, were observed to lie at the side of the body, these skeletons were predominantly female. Like the differential use of stone settings within the graves, it may be that variations in funeral rites can be discerned between males and females at St Thomas' Kirk.

Given that the graves were more crowded closer to the church than they were further north, the association of status with location within the graveyard seems credible, especially as the east side of the church was that part of the graveyard closest to the altar and therefore, possibly considered the most desirable place outside the church for burial (Hadley 2001, 45). Given the limited excavation area, the small number of individuals

concerned and the lack of osteological evidence to suggest status, however, it is difficult to draw further conclusions. Nevertheless, the absence of juveniles and the preponderance of senior males are curious and prompts the question about whether the excavated population reflects more of a narrow, high status group within the local medieval Orcadian community rather than simply a small but representative sample of the general community.

Regardless, while all but one of the excavated individuals was an indigenous Orcadian, the isotopic evidence suggests that Skeleton 8, a male aged 46+ years, was an incomer possibly from the Western Isles or Northern Shetland. He probably died at some point between the mid 13th century and the mid 14th century. This evidence confirms mobility amongst the population in the North Atlantic region during the medieval period, consistent and probably continuous with population movement apparent in the same region in the earlier Norse period (Montgomery *et al* 2003, 652).

The two pottery sherds from the grave fill of Skeleton 14 also provide evidence of the movement of goods during this period. These foreign imports are of a type unknown in Orkney or indeed Scotland. Their uniqueness in the archaeological record in Scotland not only implies that members of the local community had access to imported goods, thus obliquely supporting speculations about the relatively high status of those buried at St Thomas' Kirk, but is consistent with the evidence for varied and long distance contacts from ecclesiastical sites in Orkney (Clouston 1932, 12; RCAHMS 1946, 113; Ritchie 1993, 112-3; Barber 1996, 31; Lowe 1998, 5-6).

It is perhaps noteworthy that the individual represented by Skeleton 8, who appears to have originated from outside Orkney, also provided the most marine signature

amongst the excavated population. Given the age difference between this individual and Skeleton 19, a young female from the same grave plot, who provided the most terrestrial signature, it is possible that the divergence in diet may have resulted from the man's lifestyle outwith Orkney earlier in life, though it has been noted elsewhere that Orcadian men ate more fish than their female contemporaries (Barrett 2007, 329). In general, however, the diet of the population buried at St Thomas' Kirk was varied and included meat and dairy products, and cod rather than shellfish. The community may have also practised manuring of crops with animal dung.

The density of burial at St Thomas' Kirk is not comparable with the concentration of clustered graves apparent within the excavated part of another medieval cemetery associated with a parish church in Orkney (Stevens *et al* 2005, 379), nor the occasional burials evident, for instance, at Brough of Deerness (Morris & Emery 1986, 358). The weight of the radiocarbon evidence indicates that this part of the graveyard was probably used for no more than 200 years. The cluster of graves excavated, therefore, only represents a few generations and even then only senior members of the community. The results, however, develop the archaeological record of St Thomas' Kirk first established by Clouston in his excavation of the remains of the church itself (1932, 9).

Survey work carried out along side the excavation revealed Iron Age pottery from a settlement mound that had previously produced an Iron Age bone comb (Martlew 2000, 63 – 4). It also became apparent that the structure within the settlement mound had intra-mural and extra-mural compartments (illus 3) suggesting it may have been a broch or other form of substantial roundhouse. The limited evidence from the survey, however, does not indicate when the structure fell into disuse. It may be that the stronghold at

Rendall referred to in the *Orkneyinga Saga*, written only a short time after the events they described (Gibbon 2007, 235-236; Barrett 2007 327), was not St Thomas Kirk, as Clouston interpreted (1932, 12) but the remains of this putative broch settlement. Norse 'occupation', or at least use of, brochs and other upstanding Iron Age settlement is known elsewhere (Pálsson & Edwards 1981, 190; Ritchie 1993, 122; Brooke 1991, 306; Cessford 1994, 76). It has been argued (Lowe 1998, 204) that the association of ecclesiastical sites with Late Iron Age settlements may not just be a reflection of the use of a convenient source of building stone (cf Clouston 1932, 15) but instead may represent a non-utilitarian consideration such as the continuation of the area as a centre of power and influence. Given the evidence that chapels on Orkney in any case relate to pre-existing settlements (Gibbon 2007, 239-240), this possibility is plausible. The imported pottery recovered from the grave fills at St Thomas' Kirk may therefore represent domestic detritus derived from such a closely proximate settlement.

CONCLUSION

The excavation of graves at St Thomas' Kirk was limited solely to those graves in imminent threat of coastal erosion at the time. Such a limited and non-representative sample can only provide partial answers as to the organisation of its medieval graveyard and how this might reflect the community of people buried there. The excavation and survey, nevertheless, recovered significant evidence for Orcadian diets, grave customs and mobility during the medieval period, and for the potential of this site to shed more light upon prehistoric and medieval settlement in Orkney. A potential, however, that remains under threat from continued coastal erosion.

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Site & burial	Lab no	$\delta^{13}C$	$\delta^{15}N$	C:N	% marine carbon	Date bp	Calibration AD	Age	Sex
St Thomas' Kirk									
SK16	SUERC-10688	-17.9	14.3	3.2	34	870±35	1167-1381	adult	?
SK5	SUERC-10684	-18.6	12.6	3.2	27	740±35	1275-1410	adult	female
SK19	SUERC-10693	-19.9	12.0	3.3	12	745±35	1243-1397	adult	female?
SK6	SUERC-10685	-19.2	13.0	3.2	20	820±35	1181-1384	adult	female?
SK1	SUERC-10678	-19.5	13.3	3.2	17	705±35	1279-1407	adult	male
SK2	SUERC-10682	-19.0	13.5	3.2	22	735±35	1271-1407	adult	male
SK18	SUERC-10692	-18.7	14.0	2.9	26	880±35	1069-1304	adult	male
SK8	SUERC-10686	-17.0	16.0	3.3	44	890±35	1181-1388	adult	male
SK4	SUERC-10683	-18.9	13.1	3.3	23	810±35	1210-1392	adult	male?
SK14	SUERC-10687	-18.7	13.6	3.2	26	820±35	1207-1390	adult	male?
Newark Bay									
71/5	TO-6933	-20.3	10.3	3.3	8	1170±50	775-1018	infant	?
69/36	TO-7182	-20.3	8.6	3.3	8	1090±40	885-1149	adult	female
68/16A	TO-7174	-20.0	10.9	3.4	12	1190±40	774-999	adult	male
69/34	TO-7181	-19.7	10.9	3.4	15	930±40	1039-1254	adult	female
68/20	AA-54931	-19.6	10.4	3.3	15	1055±40	899-1164	adult	female
69/85	TO-7186	-19.6	10.8	3.3	15	1000±40	1014-1212	adult	female
69/11	TO-7180	-19.6	9.9	3.3	16	1380±30	640-782	adult	female
69/104B	TO-7189	-19.4	11.0	3.3	18	1130±50	783-1122	adult	female
70/1	TO-7192	-19.2	12.0	3.3	20	1010±60	981-1242	adult	female
70/5	TO-6939	-19.1	12.2	3.3	21	520±30	1407-1623	adolescent	male
71/3	TO-7193	-19.1	10.4	3.3	21	1200±40	778-1012	adult	female
69/105	TO-7190	-18.7	11.6	3.3	26	990±50	1022-1250	adult	male
69/99	TO-7187	-18.5	12.0	3.2	28	1060±40	980-1202	adult	female
1968/2	TO-6940	-18.4	13.0	3.3	28	550±40	1400-1626	adult	female
70/6	TO-6937	-18.4	14.4	3.4	29	700±40	1289-1430	adult	female
69/37	TO-6944	-18.1	14.7	3.3	32	910±50	1049-1300	infant	?
68/14	GU-10955	-18.0	13.4	3.3	33	630±50	1299-1500	adult	male
69/107	TO-7191	-17.9	12.1	3.3	35	1340±60	665-954	adult	female
69/8	TO-7178	-17.8	13.7	3.3	35	830±30	1222-1391	adult	?
68/5	AA-54930	-17.8	13.4	3.3	35	590±40	1322-1621	adult	male
69/67a	TO-7183	-17.7	13.7	3.3	36	990±40	1043-1262	adult	male
71/8	TO-6934	-17.7	13.8	3.3	36	1160±60	821-1163	adult	male
71/8	AA-54938	-17.7	13.8	3.3	36	1020±45	1024-1243	adult	male
71/8 combined	TO-6934 & AA-54938	-17.7	13.8	3.3	36	1070±36	995-1204	adult	male
70/37	AA-54934	-17.5	13.7	3.3	39	1130±40	900-1167	adult	male
69/69	TO-7184	-17.5	14.4	3.3	39	910±40	1070-1322	adult	female
69/83	TO-7185	-17.5	13.8	3.3	39	1060±40	1015-1220	adult	male
69/83	AA-54932	-17.5	13.8	3.3	39	1070±45	998-1217	adult	male
69/83 combined	TO-7185 & AA-54932	-17.5	13.8	3.3	39	1064±30	1020-1206	adult	male
99/6	OxA-10409	-17.4	13.9	3.4	40	1015±37	1036-1253	adolescent	male

70/39	AA-54935	-17.3	14.4	3.3	41	965±40	1051-1285	adult	male
70/2	TO-6935	-17.3	13.9	3.3	41	1060±50	1001-1239	adolescent	female
71/2	AA-54937	-17.1	14.6	3.3	43	1075±35	1017-1214	adult	female
CC4	TO-6941	-17.0	14.1	3.3	45	920±40	1154-1383	adolescent	male
68/12	TO-7173	-16.9	14.4	3.3	46	930±40	1152-1384	adult	male
70/15	AA-54933	-16.9	13.5	3.3	46	1060±35	1025-1225	adult	female
SK001	OxA-10407	-16.6	14.1	3.4	49	1070±36	1025-1227	adult	female
69/104A	TO-7188	-16.3	15.6	3.3	52	1030±40	1049-1270	adult	female
71/1	AA-54936	-15.4	15.6	3.2	62	1075±35	1045-1265	adult	male

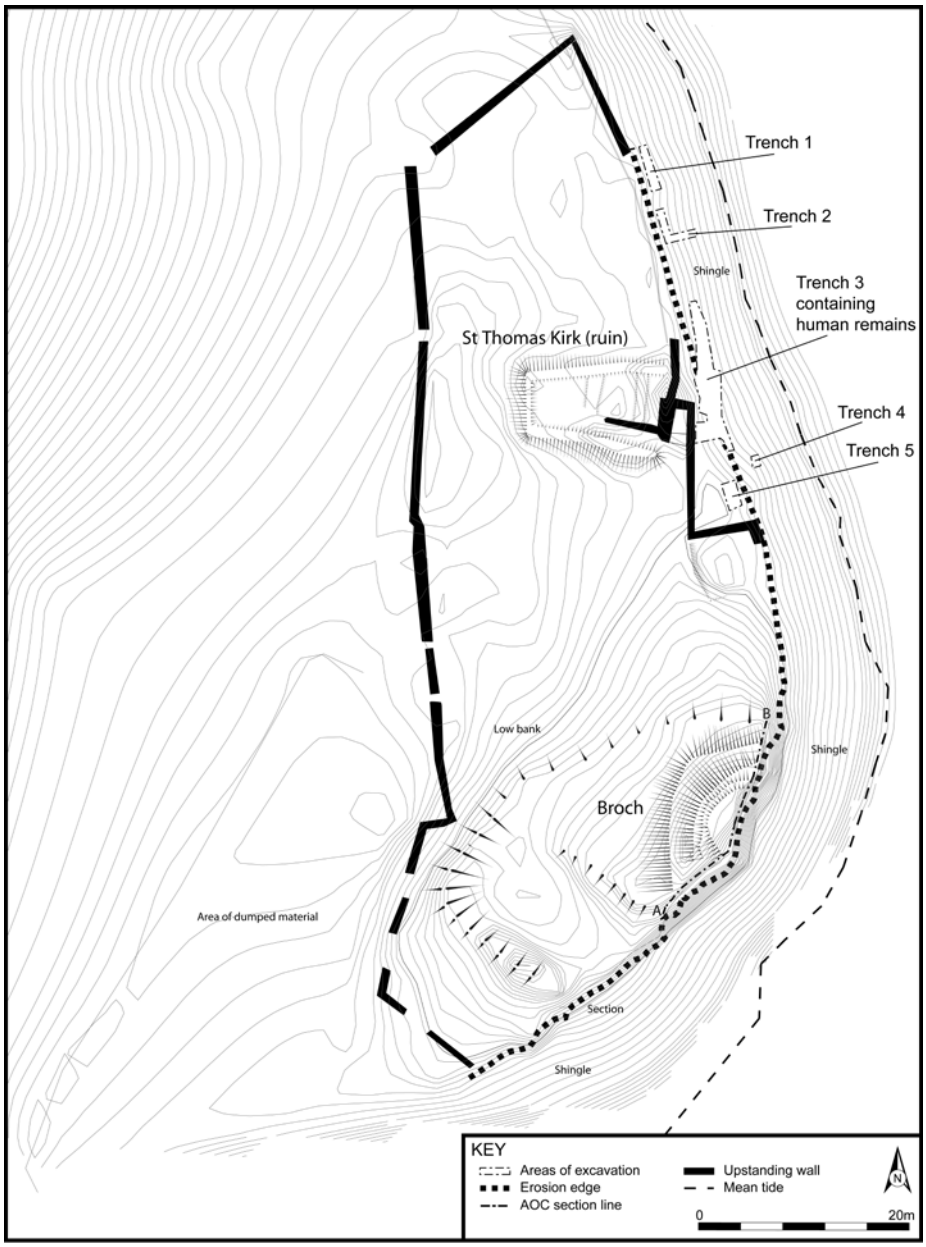
Table 1: $\delta^{13}C$ and $\delta^{15}N$ values, C:N ratios, % marine carbon estimates, radiocarbon dates, two sigma mixed atmospheric/marine calibrations and burial characteristics for graves considered in this study. All analyses were on human bone collagen. Calibrations were modeled using OxCal Version 4.0 (Bronk Ramsey 1995; 2001), the 2004 marine and terrestrial calibration curves (Hughen et al. 2004; Reimer et al. 2004) and a ΔR value of -33±93 (Reimer et al. 2002).

Sample	material	ppm	$^{87}Sr/^{86}Sr$ n	Mean $^{18}O_{(PO4)}$	Mean ^{18}O (drinking water)
SK001	enamel	268	0.709513	17.88	-6.35
SK002	enamel	363	0.709437	18.34	-5.34
SK004	enamel	254	0.709303	18.55	-4.88
SK005	enamel	373	0.709456	18.00	-6.09
SK008	enamel	283	0.709340	19.19	-3.50
SK014	enamel	264	0.709494	18.26	-5.52
SK016	enamel	264	0.709585	18.36	-5.31
SK019	enamel	381	0.709604	18.14	-5.78
SK002	dentine	1097	0.709389		
SK005	dentine	540	0.709423		
SK019	dentine	460	0.709484		

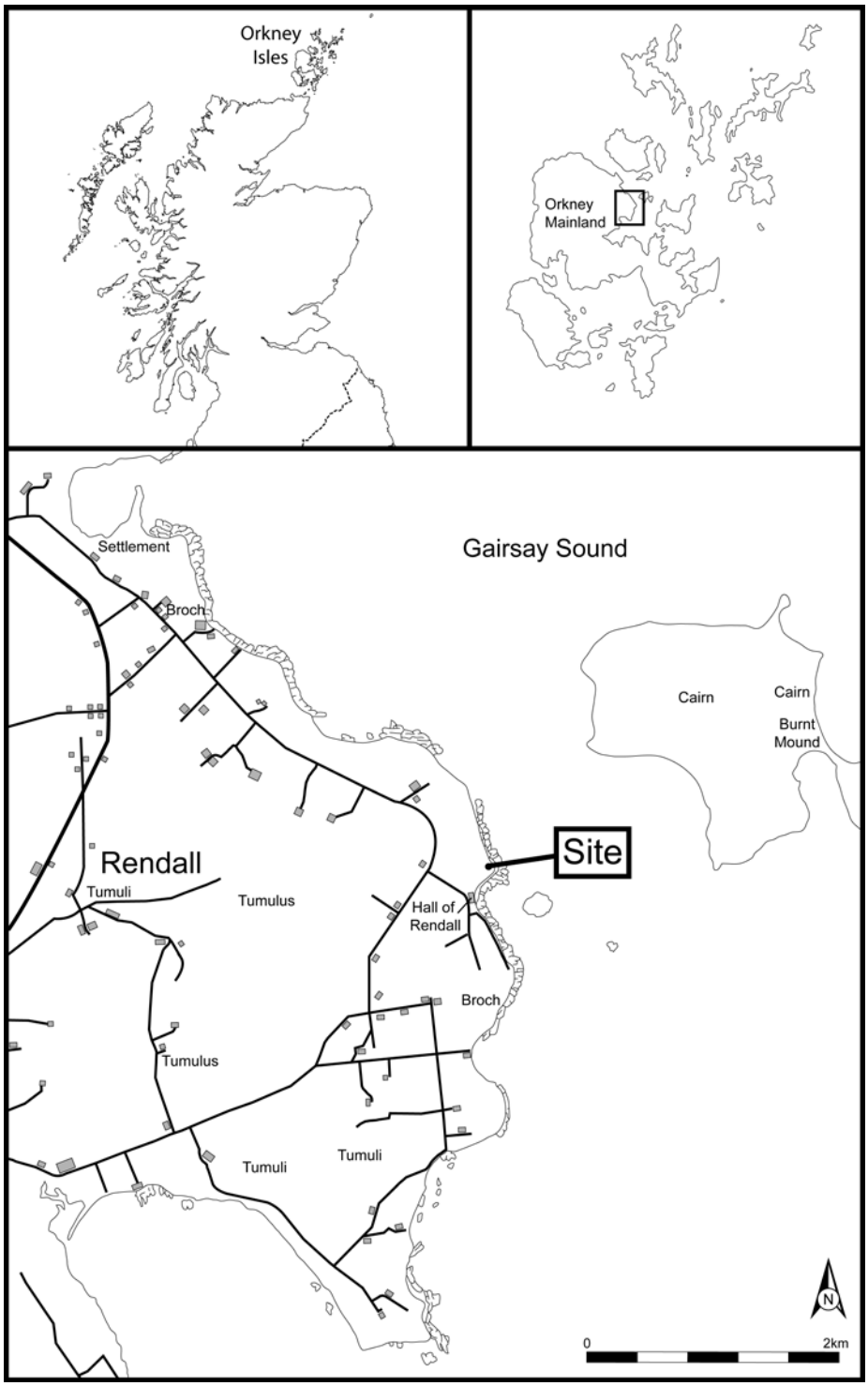
Table 2: The Sr concentrations and isotope $^{87}Sr/^{86}Sr$ ratios of dentine and enamel and the oxygen isotope ratios for the phosphate oxygen in enamel with calculated drinking water values from human teeth taken from individuals found at St Thomas Kirk, Orkney

Skeleton No.	Preservation	Completeness (%)	Sex	Age (years)	Pathology
1	moderate	55	male	35-45	N/A
2	moderate	80	male	46+	Klippel-Feil syndrome
3	moderate	25	male?	Adult	N/A
4	good	45	male?	46+	Rotator cuff disease
5	moderate	70	female	25-35	Spondylolysis
6	moderate	50	female?	36-45	Rotator cuff disease with 2º OA
8	moderate	70	male	46+	N/A
14	good	75	male?	36-45	N/A
16	good	60	undetermined	46+	N/A
17	moderate	15	undetermined	adult	Bilateral calcaneonavicular pseudo-joint with fusion and 2ºOA in right foot
18	moderate	65	male	36-45	Bilateral true shoulder joint OA
19	moderate	70	female?	25-35	Remodelled C7 – reaction to overlying soft tissue infection?
20	moderate	15	undetermined	adult	Trauma injury in T5
21	moderate	40	female?	adult	N/A

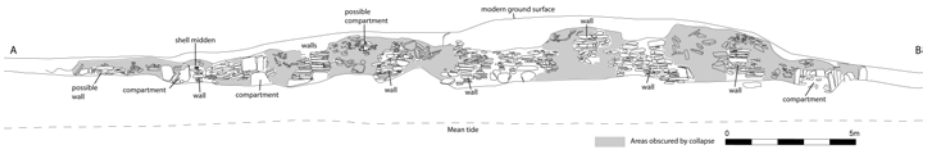
Table 3: Summary of the Skeletons from St Thomas' Kirk



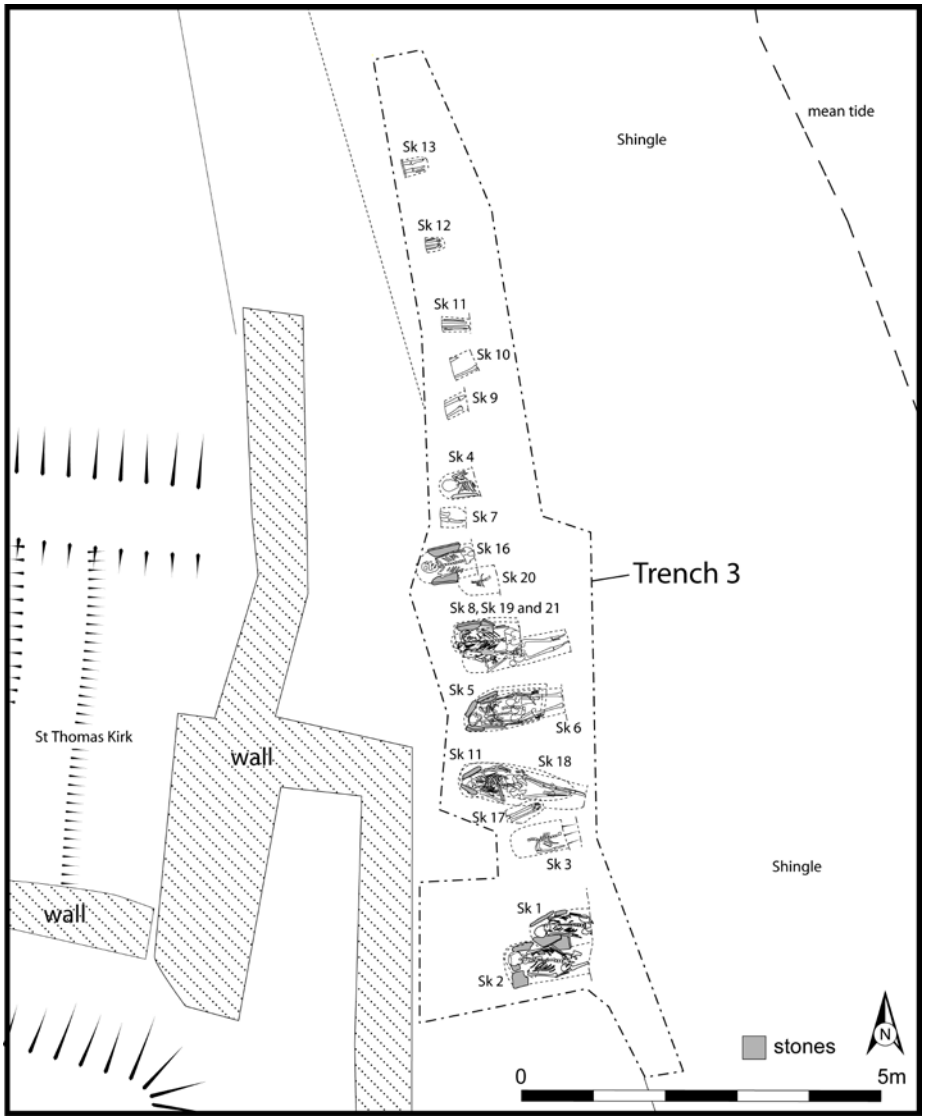
Illus 2: Site Plan



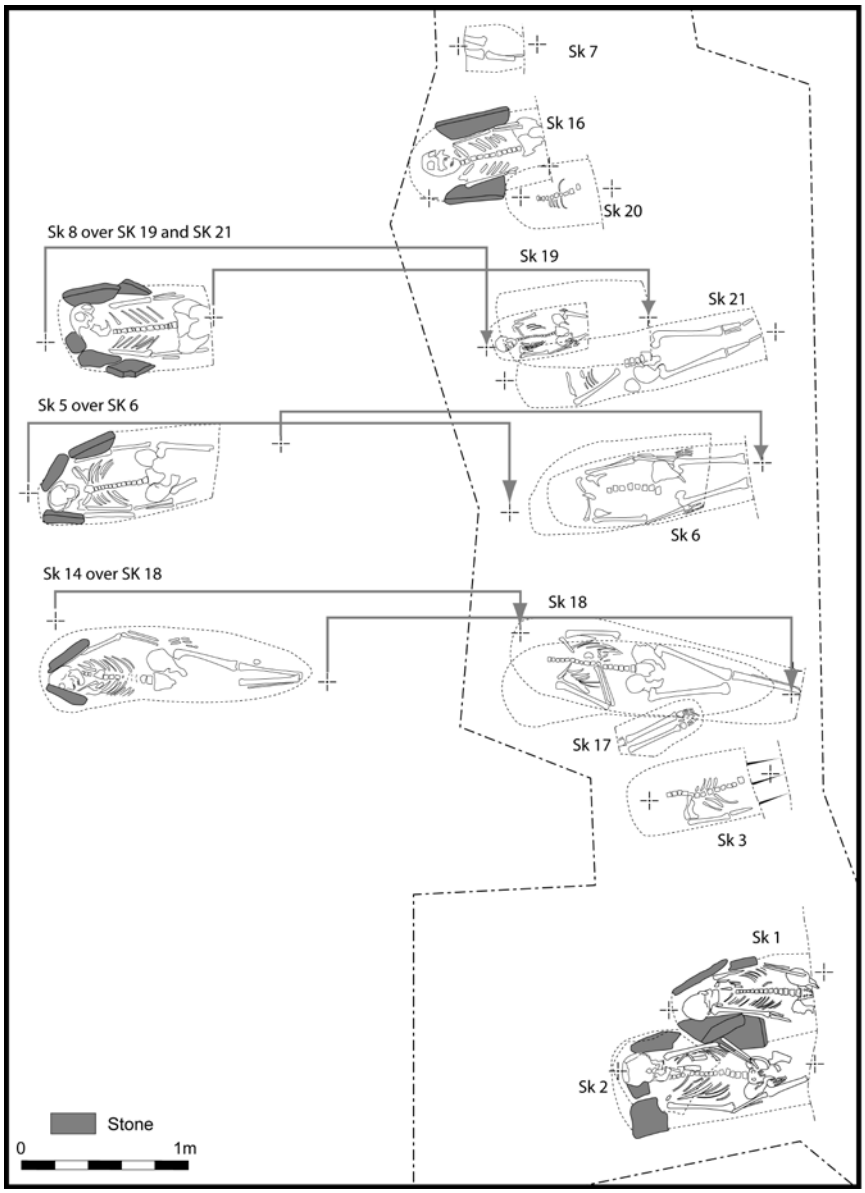
Illus 1: Location map



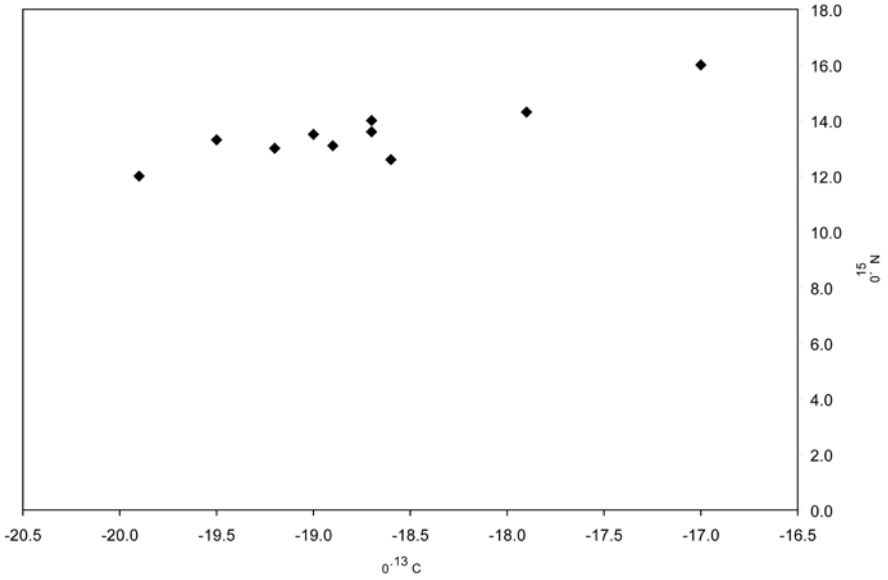
Illus 3: Section of broch exposed by coastal erosion



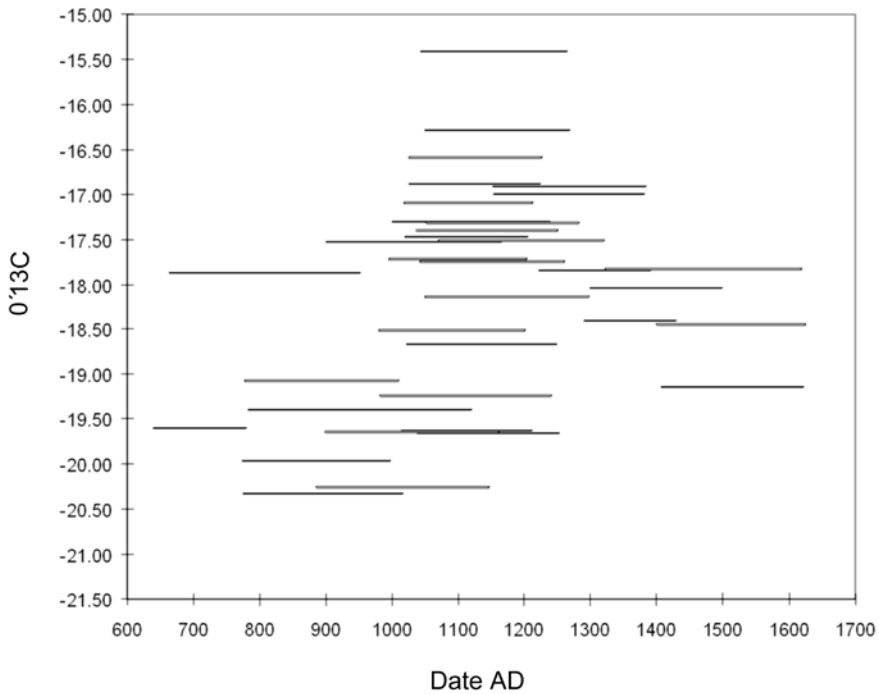
Illus 4: Plan of excavated graveyard



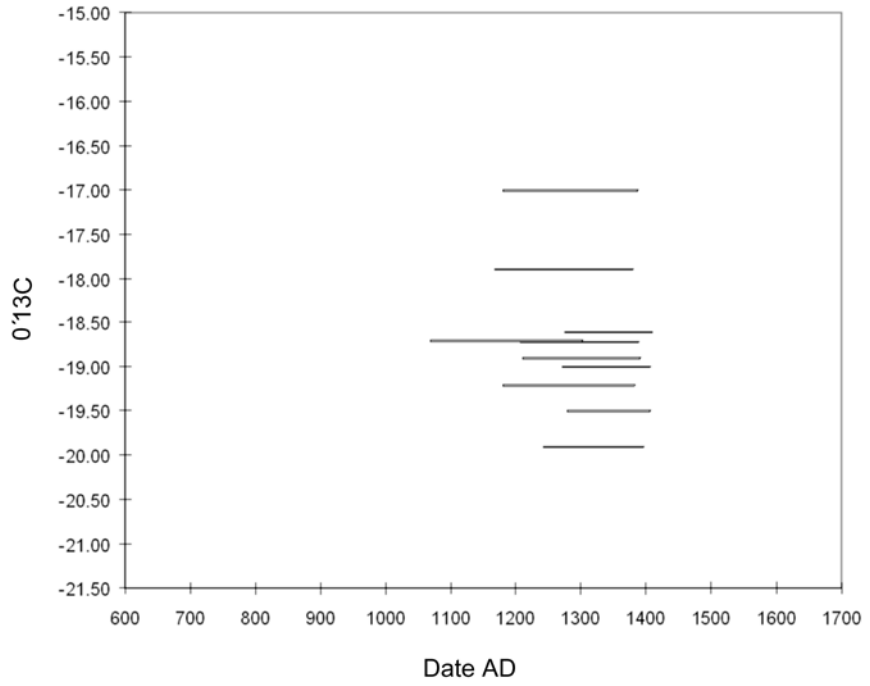
Illus 5: Stratigraphic deposition of skeletons at end of St Thomas' Kirk



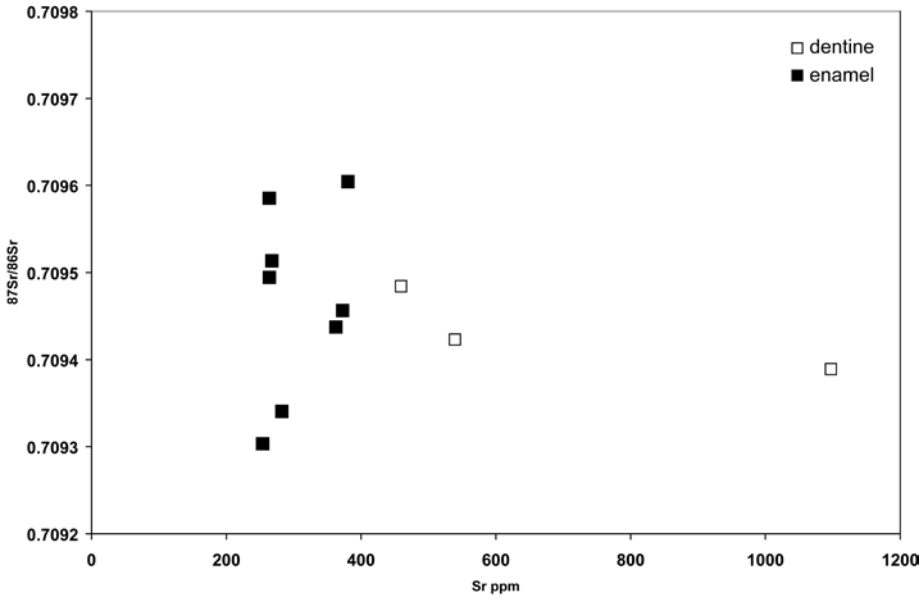
Illus 6: Scatterplot of δ13C and δ15N data for ten burials from St Thomas' Kirk



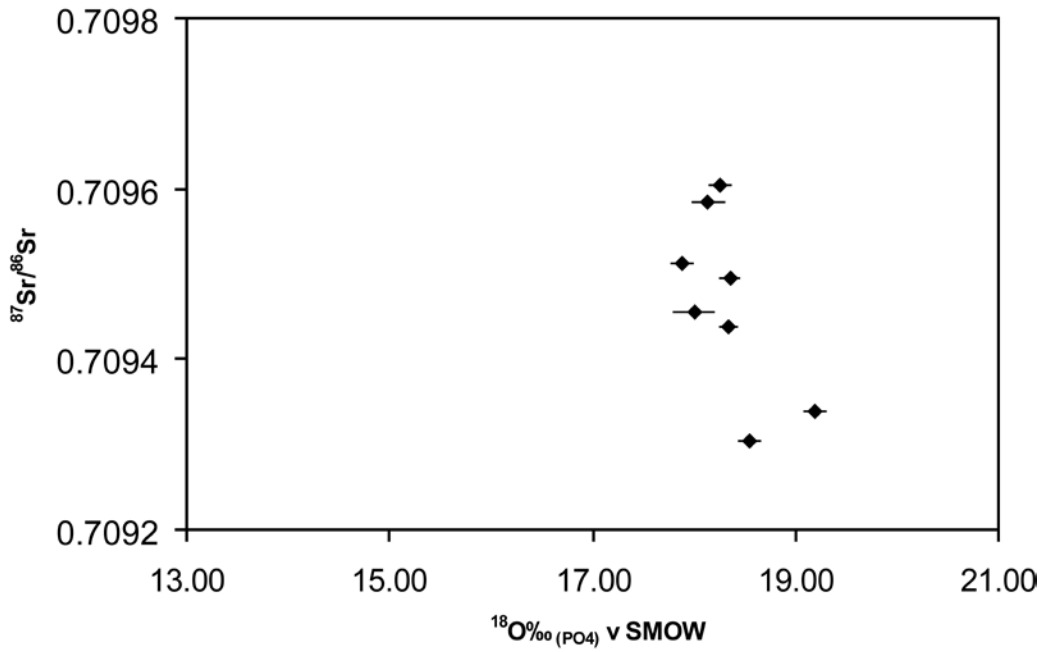
Illus 7: δ13C values and 2σ radiocarbon date ranges for burials from Newark Bay



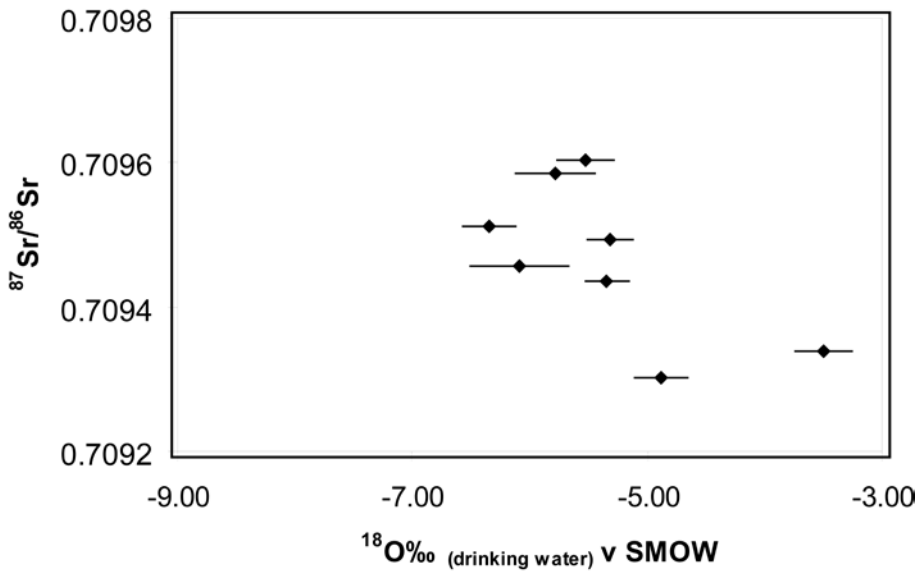
Illus 8: δ13C values and 2σ radiocarbon date ranges for burials from St Thomas' Kirk



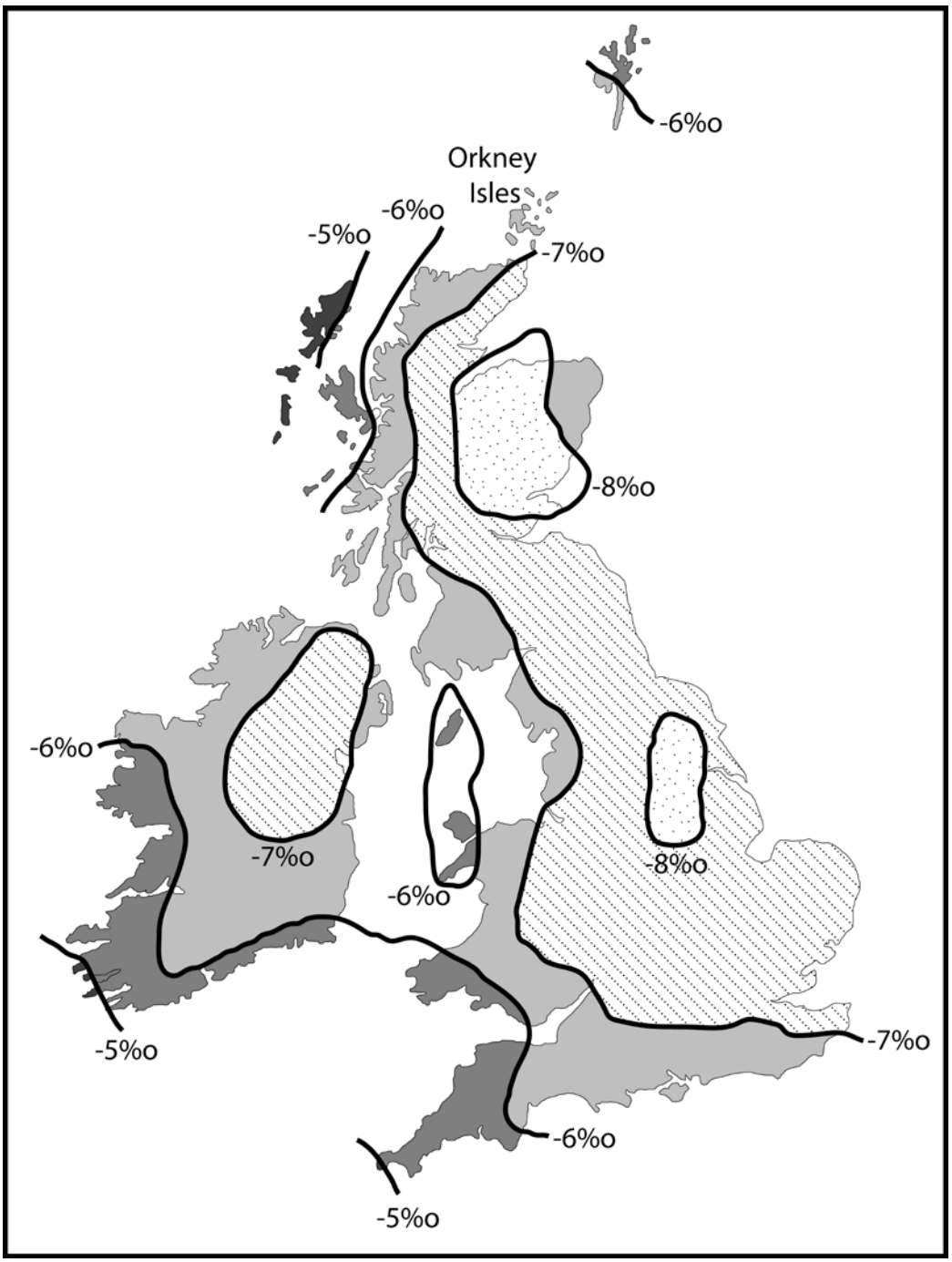
Illus 9: Dentine and enamel samples from individuals from St Thomas' Kirk, Orkney



Illus 10: Human tooth enamel phosphate oxygen and strontium data from Orkney presented graphically



Illus 11: Human tooth enamel calculated drinking water oxygen and strontium data from Orkney presented graphically



Illus 12: Oxygen isotope values in water for the UK