Excavation of an early medieval cemetery at St Patrick's Chapel, St Davids, Pembrokeshire

Final Report

By

Ken Murphy and Katie A Hemer

with contributions from R Comeau,[3] N Edwards,[4] C J Griffiths,[5] A Hadjikoumis,[6] J Horák,[7] H Gant,[1] O Lazzari,[7] A Maccarinelli,[6] M Redknap, [7] J Robertson, M Shiner,[1] P Sims-Williams,[8] E Walker, [7] P V Webster, [7] H Wilson[1] and T P Young.[9]

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SUMMARY

Coastal erosion has been affecting St Patrick's early medieval cemetery and medieval chapel at Whitesands, St Davids, Pembrokeshire since at least the mid-twentieth century. Storms in January and February 2014 exposed several burials, following which Dyfed Archaeological Trust in partnership with the University of Sheffield carried out five seasons of excavation: 2014–16, 2019 and 2021, funded by Cadw, the Nineveh Trust, the EU-funded Ancient Connections project and the Pembrokeshire Coast National Park Authority.

The earliest elements of the site consisted of an oval stone-built enclosure, 5.5m × 4.5m, with a centrally placed rectangular structure, 1.4m × 1.0m, dating to the mid-eighth century. Several of the stones of the structure were carved — a ring-cross with interlace design, a human figure dressed in a tunic with stick arms raised, and an inscription reading 'donoec' (an Irish compound name meaning something like 'dark youth' or 'noble warrior'). Evidence of occupation, mammal, bird and fish bones, cereal grains and other carbonised seeds, and craft production accompanied this early element, including the manufacture of copper alloy artefacts and amber working. Wind-blown sand rapidly covered these early elements.

In the mid- late eighth/ninth century a substantial stone-built cemetery enclosure wall was built over oval enclosure and rectangular structure, and the first burials appeared. The first burials were of young children. Sand continued to accumulate, and as it did so more burials were put in the ground. Over 250 burials were excavated, stacked up to eight deep in the sand, between the mid- late-eighth/ninth century and c. 1100. After the first phase of child burial, both children and adults were buried. The earliest burials were simple dug graves; later in the sequence cist graves appeared.

In the eleventh/twelfth century a layer of rubble was laid down covering the early medieval cemetery and a stone-built chapel constructed. Burials accompanying the chapel consisted of cist graves capped with quartz pebbles or in some examples with limpet shells. All were of children. The chapel was abandoned during the sixteenth century.

CRYNODEB

Mae erydiad arfordirol wedi bod yn effeithio ar fynwent ganoloesol gynnar a chapel canoloesol Sant Padrig yn Nhraeth Porth Mawr, Tyddewi, Sir Benfro ers canol yr ugeinfed ganrif o leiaf. Fe wnaeth stormydd ym misoedd Ionawr a Chwefror 2014 ddatgelu nifer o gladdiadau, ac yn dilyn hynny aeth Ymddiriedolaeth Archaeolegol Dyfed, mewn partneriaeth â Phrifysgol Sheffield, ati i gyflawni pum tymor o waith cloddio: 2014–16, 2019 a 2021, wedi'i ariannu gan Cadw, Ymddiriedolaeth Nineveh, y prosiect Cysylltiadau Hynafol a ariannwyd gan yr UE, ac Awdurdod Parc Cenedlaethol Arfordir Penfro.

Roedd elfennau cynharaf y safle yn cynnwys lloc hirgrwn wedi'i adeiladu o gerrig, 5.5m × 4.5m, gyda strwythur petryalog wedi'i osod yn ganolog, 1.4m × 1.0m, yn dyddio'n ôl i ganol yr wythfed ganrif. Roedd nifer o gerrig y strwythur wedi'u cerfio - croes-gylch gyda dyluniad cydblethu, ffigur dynol wedi'i wisgo mewn tiwnig gydag arfau pren wedi'u codi, ac arysgrif yn darllen 'donoec' (sef enw cyfansawdd Gwyddelig sy'n golygu rhywbeth tebyg i 'lanc tywyll' neu 'ryfelwr bonheddig'). Roedd tystiolaeth o feddiannaeth, esgyrn mamaliaid, adar a physgod, gronynnau grawn a hadau eraill wedi'u carboneiddio, a chynhyrchiant crefft yn cyd-fynd â'r elfen gynnar hon, gan gynnwys gwneud arteffactau aloi copr a gweithio ambr. Buan iawn y gorchuddiwyd yr elfennau cynnar hyn gan dywod wedi'i chwythu gan wynt.

Yng nghanol i ddiwedd yr wythfed/nawfed ganrif, adeiladwyd wal lloc sylweddol o gerrig i'r fynwent dros y lloc hirgrwn a'r strwythur petryalog, a daeth y claddiadau cyntaf i'r golwg. Plant ifanc oedd y claddiadau cyntaf. Roedd tywod yn parhau i gronni, ac wrth iddo wneud hynny, cafodd mwy o gladdiadau eu rhoi yn y ddaear. Cafodd dros 250 o gladdiadau eu cloddio, wedi'u pentyrru i ddyfnder o wyth yn y tywod, rhwng canol i ddiwedd yr wythfed/nawfed ganrif a c. 1100. Ar ôl y cyfnod cyntaf claddu plant, cafodd plant ac oedolion eu claddu. Roedd y claddiadau cynharaf yn feddau syml wedi'u tyllu; yn ddiweddarach yn y dilyniant, daeth beddau cist i'r golwg.

Yn yr unfed ganrif ar ddeg/deuddegfed ganrif, gosodwyd haenen o rwbel gan orchuddio'r fynwent ganoloesol gynnar, ac adeiladwyd capel o gerrig. Roedd claddiadau yn gysylltiedig â'r capel yn cynnwys beddau cist wedi'u capio â cherigos cwarts, neu mewn rhai enghreifftiau, cregyn llygaid meheryn. Claddiadau plant oeddent i gyd. Gadawyd y capel yn ystod yr unfed ganrif ar bymtheg.

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INTRODUCTION

A mound of wind-blown sand approximately 20m in diameter and 3.5m high occupying a strip of rough ground known as Parc y Capel (Chapel Field) immediately the north of Whitesands (Traeth Mawr in Welsh) car park in the parish of St Davids, Pembrokeshire (National Grid Reference SM 7337 2723) marks the site of St Patrick's Chapel. Coastal erosion is active along the western side of the site: the Pembrokeshire Coast Path runs immediately to the east (Fig. 1).

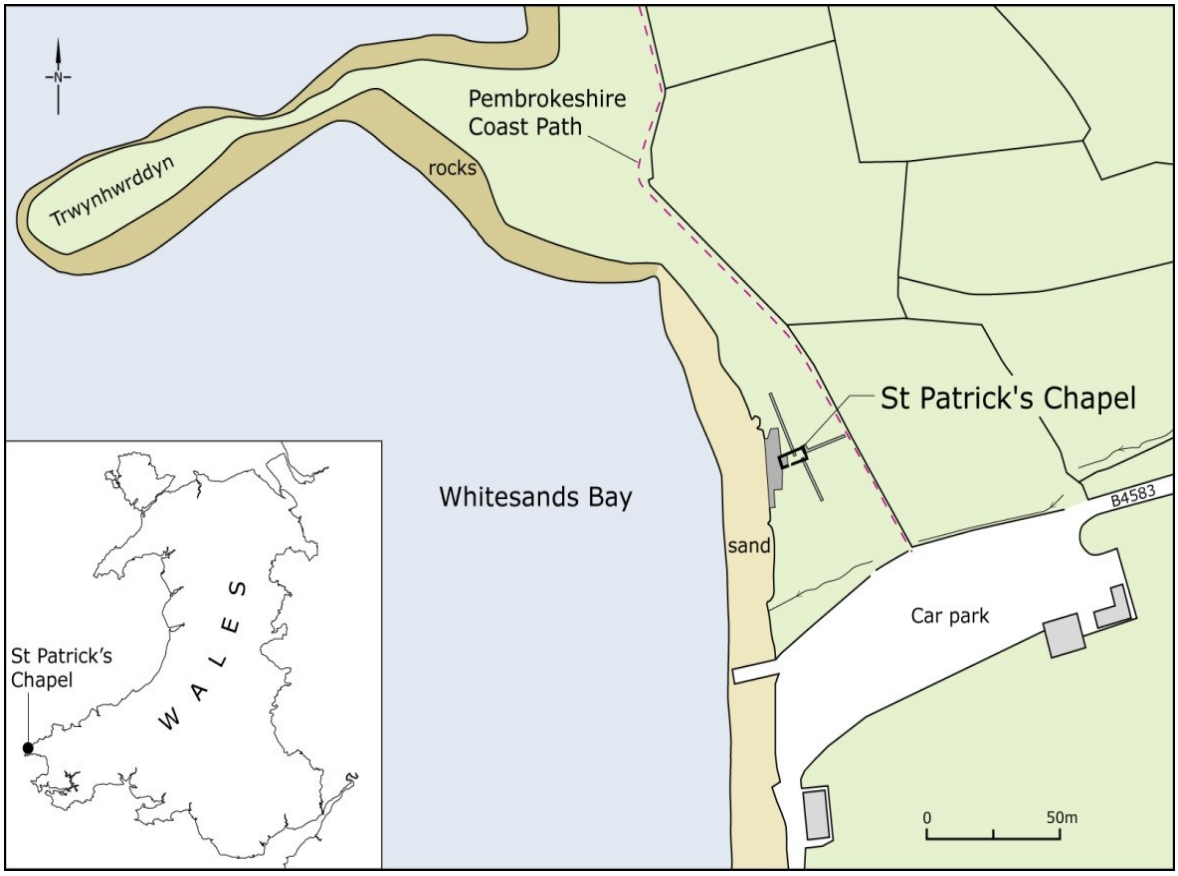


Figure 1. Location map of St Patrick's Chapel.

It is not certain when erosion started to directly affect the site, but the sea made considerable inroads at Whitesands during the nineteenth century (see below) and there is anecdotal evidence of burials being exposed during the early twentieth century. By 1970 coastal erosion was so severe, exacerbated by visitor erosion on the coast path which then ran along the seaward side of the site, that human remains were clearly visible and so a small-scale excavation took place. Subsequent to the excavation, Pembrokeshire Coast National Park Authority acquired the site, moved the coast path from the seaward side of the chapel to the landward side and restored the damage caused by visitors. Due to continuing coastal erosion, in about 2004 the Park Authority protected the eroding face of the sand with boulders. This protection was successful until January–February 2014 when the boulders were washed away by severe winter storms. They were replaced, and immediately washed away by more storms, at which point the Park Authority decided not to continue to protect the site (Fig. 2).

Following the 2014 storms, members of the public reported finding human bone sticking out of the sand dunes and loose on the beach below. Immediately, staff from Dyfed Archaeological Trust and the Pembrokeshire Coast National Park Authority recorded the exposed burials and recovered bone. It was clear that site was of considerable importance and so the decision was made to excavate the most vulnerable parts of it. This is a report on the excavations.

Figure 2. Photographs taken in February 2014 showing the damage caused to the site by winter storms (left) and the end of a cist grave with skull exposed by the storms.

In 1924, excavations by Alfred Badger and Francis Green (published in 1925) revealed the walls of a small, stone-built chapel (Fig. 3). The plan and photographs in the report suggest that excavation was confined to within the chapel walls, but evidence from the 2014–16 excavations indicates that that the outside west wall of the chapel was also exposed. At least eight burials were found within the confines of the chapel, and although the report provides no information on whether the excavators consider these to have been contemporary with the chapel or to have predated it, Badger in a letter (reproduced in Davies and Marks 2006, 12) to Green written during the excavation states that one skeleton lay beneath the west wall and was thus earlier than the chapel.

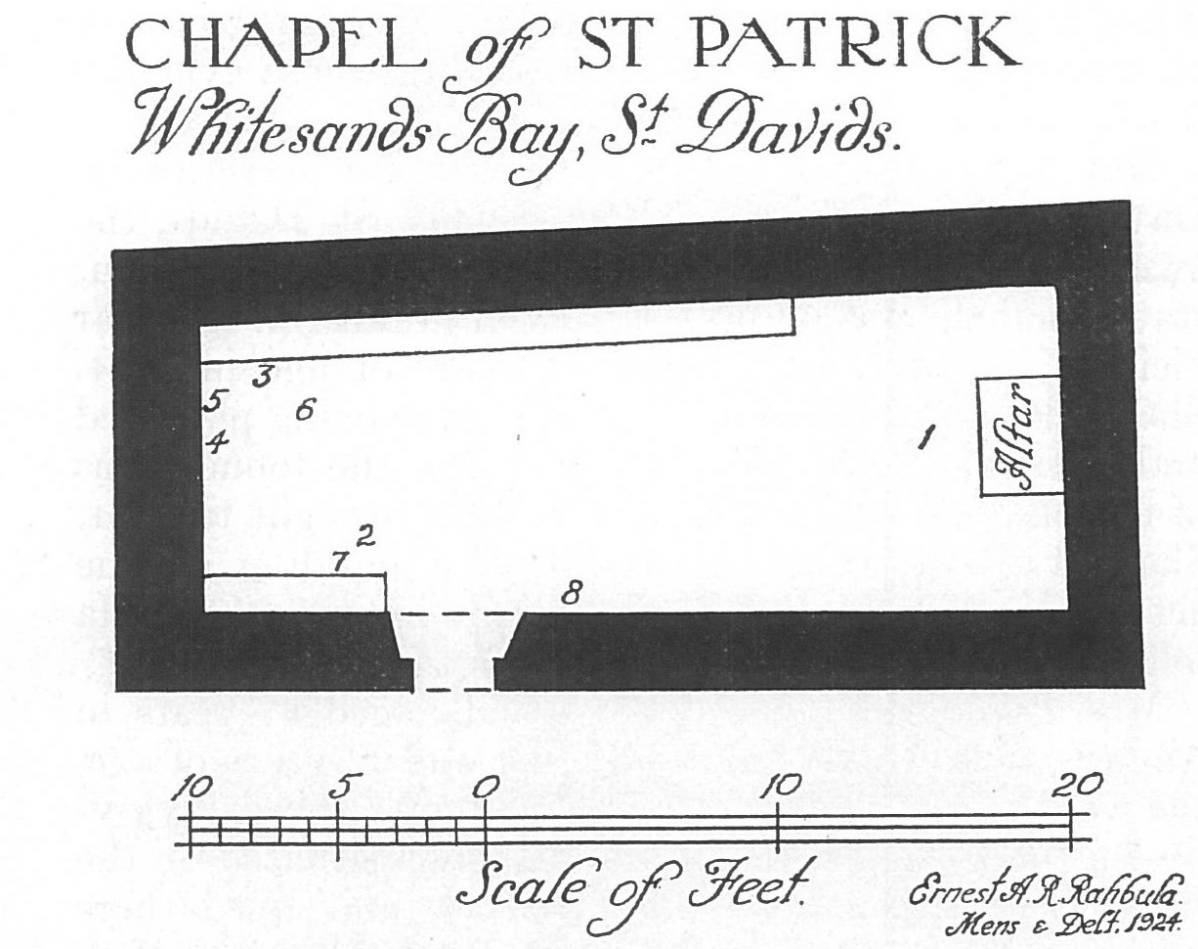


Figure 3. Plan of St Patrick's Chapel published by Badger and Green (1925). Reproduced wth kind permission of the Cambrian Archaeological Association.

Five skeletons some in long cist graves were uncovered by Douglas Hague of the RCAHMW in a small-scale excavation of 1970.[10] A cist grave lintel-stone had a cross lightly scratched on one face (Edwards 2007, 520-21) (Figs 4 and 5). Hague's excavation demonstrated the high archaeological potential of the site, in particular the good bone preservation in the calcareous wind-blown sand; good bone preservation is unusual in the acidic soils that characterise most of Wales.

Since 1970, as well as human bone exposed in the eroding face of the wind-blown sand, artefacts have occasionally been found on the beach immediately below the site. These include part of a shale bracelet and a blue glass bead. Other early medieval artefacts from the beach include a ring-headed pin and a silver penny of Eadred. On the first day of excavation in 2014 a cross incised stone was found immediately below the site, presumably having eroded out from the end of a grave during the winter storms (see reports below for details of all these finds).

Figure 4. Photograph from the Hague archive housed with the RCAHMW showing the cist graves excavated in 1970.

Figure 5. Photograph from the Hague archive housed with the RCAHMW of the cross-incised stone found during the 1970 excavations (see addendum for a drawing of the stone).

The excavation was carried out by Dyfed Archaeological Trust in partnership with

the University of Sheffield. Cadw and the Pembrokeshire Coast National Park Authority funded the 2014 excavation, this was supplemented in 2015–16 with funds from the Nineveh Trust. Funds for the 2019 and 2021 excavation mainly came from the EU-funded Ancient Connections project, with additional support from Cadw and the Pembrokeshire Coast National Park.

HISTORICAL SUMMARY

By R Comeau

The site of St Patrick's chapel and cemetery lies at the western edge of Britain where the Atlantic Ocean and Irish Sea meet, on a beach now known as Whitesands or Traeth Mawr (Fig. 6). It forms part of an extensive zone of early Christian cult, marked by crosses and wells, where farms replace the small hamlets of medieval records (HLC, areas 285-9; James 2007). One of these farms, Ty Gwyn ('white/ holy house') lies close to St Patrick's Chapel and is itself the location of cist burials, discovered in the nineteenth century (Laws and Owen 1897, 31). The site's association with the cult of St Patrick has early roots, although the chapel is not recorded until the early seventeenth century when it was 'wholly decayed', the writer (probably the local antiquary George Owen) noting that the offerings of seafarers and pilgrims had once made it a source of great revenue to St David's Cathedral (BrownE/Willis 1717, 54; Owen 1892, xxvi n.2). Shipping no longer calls at Whitesands, but its former significance is encoded in the bay's medieval name, Porth Mawr or *Portu Magno*, the 'Great Harbour' mentioned circa 1188 by Gerald of Wales and by Rhygyfarch of St Davids (d. 1099) a century before that (Sharpe and Davies 2007, 112/ s3; Thorpe 1978, 16, 220; Wade-Evans 1923, 70).

Figure 6. View of the site taken during the 2014 excavation looking north-east from the beach with Carn Llidi in the background.

The name of this apparently remote site indicates a place of maritime connections, some of them represented by a Chester mint silver coin of Eadred (AD 946–55) found on the northern edge of the beach, and a tenth century Hiberno-Norse ringed pin from the nearby farm of Pen-Arthur (Redknap 2007). Whilst these may bring to mind accounts of Viking attacks on St Davids, a broader reading suggests a long-term context of trade and cultural contact with the Hiberno-Norse and Irish Sea world that extends back at least as far as the post-Roman period (Griffiths 2010; Thomas 1994). Porth Mawr embodies this: it was, according to Rhygyfarch's late eleventh-century Life of St David, the place from which Patrick sailed to evangelise Ireland after an angel ousted him from the local area in favour of David, and there is a possible allusion to the cemetery in its mention of Patrick resurrecting a priest, Cruimther, 'who had been buried near that shore [i.e Porth Mawr] for twelve years' (Sharpe and Davies 2007, 112/ s3). Some commentators suggest that the monastic establishment at St Davids was originally Patrician (Evans 2003, 15; Owen 1892, 219-220), and there is some similarity between its Irish early medieval name, *Cill Muine*, and one of Patrick's other names, 'Maun/ Magonius', though Gerald of Wales and subsequent commentators link the *muine* element with the Gaelic term for a thicket, making *Cill Muine* mean 'church of the thicket' rather than 'church of Patrick' (Brewer 1863, 384; Dumville 1993, 89-90; Hennessy 1866, 63; Morris 1980, 34; cf Charles 1992, 283-4). There is another early reference to *Portmaur* as an embarkation point for Ireland in *De Situ Brecheniauc,* a twelfth-century account of an earlier tradition which records how the Welsh princess Marchell and one hundred retainers travelled from here to marry an Irish king, possibly (Charles Thomas argues) in the late fifth century (Thomas 1994, 131-153; Wade-Evans 1944, 313, 316).

Earlier travellers still are implied by the inclusion of the adjacent St David's Head or *Octapitarum Promontorium* in Ptolemy's Geography, a reference approximately contemporary with Romano-British occupation at Clawdd y Milwyr, a substantial multivallate promontory fort of Iron Age origin on the tip of the headland (Baring-Gould et al. 1899; James 2016b, 293-5, 321; Murphy 2016, 250-2). A Roman presence at Whitesands has long been the subject of speculation, fuelled by forged medieval references to a Roman road and settlement, and by nineteenth-century discoveries of walls in the sand dunes which later commentators considered to be medieval structures (James 2016b, 306-8, 314; Fenton 1811, 115-6; Jones and Freeman 1856, 38-9, 238-9; Laws and Owen 1897, 31). Material evidence of Roman-period activity is nonetheless provided by finds from the beach of coins and a 'decorated bronze cloak pin' reportedly of third century AD type, the latter beyond the mouth of the stream that forms the southern boundary of the field around the chapel (Davies and Marks 2006, 7). The coins consist largely of a scattered hoard of 112 third and fourth century bronze coins, found on the beach below the chapel between 1983 and 1996; several other coins, the earliest dating to the second century AD, are also reported (Guest and Wells 2007).

The documentary and archaeological record therefore suggest that this bay was a nexus of activity in the Roman and early medieval periods, when it was used for travel to Ireland and the north. It is consequently notable that there is no evidence of the fifth- to seventh-century pottery and glass of Mediterranean and continental origin that are found at early medieval landing sites elsewhere in south-west Britain (Campbell 2007, 117; Griffiths 2009, 272, 276). Such evidence is also lacking from other sites around and to the north-west of Whitesands where there are strong indications of post-Roman Irish settlement, and it has been speculated that this may relate to differences in cultural traditions (Campbell and Lane 1993, 70; cf James 2016a, 478-487 for a recent summary).

Another reason may lie in processes of landscape change. These are represented by the coastal erosion that necessitated the excavations reported on here, and sand dune

formation that elsewhere in Britain and Ireland engulfed coastal settlements in the medieval period, with the fourteenth and fifteenth centuries particularly implicated in Wales (Griffiths 2015). At Whitesands, it is clear that the landscape we see today is very different to that of earlier periods. A British Association report of 1886 on the erosion of the English and Welsh sea coasts notes 'considerable inroads' of the sea here: a 40 feet (12 metres) wide shingle bar was moving landwards, and the course of a sea-edge road of the 1840s was 20 yards (18 metres) out to sea (Davies and Marks 2006, 32; Topley 1887, 860). The field around the chapel, Parc-y-Capel, had lost 34 yards (31 metres) in the 50 years running up to 1886, a substantial loss that older residents also recalled during the 1924 excavation of the chapel (Badger and Green 1925, 89, 118-9). One described the foundations of a structure, apparently a large building, some 40 feet (12 metres) from the chapel in an area that by 1924 was under the high-water mark, its stones having been removed in the 1850s for building work.

An earlier configuration of the coastal edge is described *c*. 1536 in Leland's reference to 'Port Maure, where is a greate sande with a shorte estuary into the lande' (Leland 1906, 65). No estuary is visible today but work by St Davids Historical Society suggests that the stream mouth once curved in from the small rocky promontory at the northern edge of the modern beach, behind the shingle bar which has also disappeared (Davies and Marks 2006, 32). The cemetery and later chapel would have been within the land on the northern edge of the 'estuary' or stream mouth, with the Roman coin hoard, brooch and tenth century silver coin all probably deriving from an eroded land surface (incorporating the lost westward extent of 'Parc y Capel' and the area of the nineteenth-century ruins) that extended to the shingle bar where shallow-draught boats like curraghs and Viking longships could be pulled up.

EXCAVATION RESULTS

There was a total of 17 weeks' excavation: two weeks in May 2014, three weeks in May 2015, three weeks in May 2016, three weeks in September 2019 and six weeks in June – July 2021. Work concentrated on that part of the site most vulnerable to coastal erosion where a *c*. 23m × 10m trench (Trench 1) was completely excavated, revealing a complex sequence which included over 250 burials plus a quantity of loose bone that could not be assigned to a burial. In Trenches 4 and 5 only superficial layers and recently accumulated sand were removed revealing the upper surfaces of archaeological deposits. Trenches 2 and 3 were incorporated into Trench 1 (Fig. 7).

The archaeological sequence lay entirely within wind-blown sand, which at its maximum was *c*. 4m thick. It is unknown when this sand began to form, but it was already up to 1.5–2m thick when the site began to be used in the early medieval period. Sand continued to accumulate during the lifetime of the cemetery, burying and preserving archaeological features and deposits. As the depth of sand increased, burying the earliest features and graves, new graves were excavated which in turn were also rapidly covered as sand continued to accumulate. New graves were then dug, which in turn soon disappeared. The deepest recognised stratigraphic sequence consisted of at least eight superimposed graves.

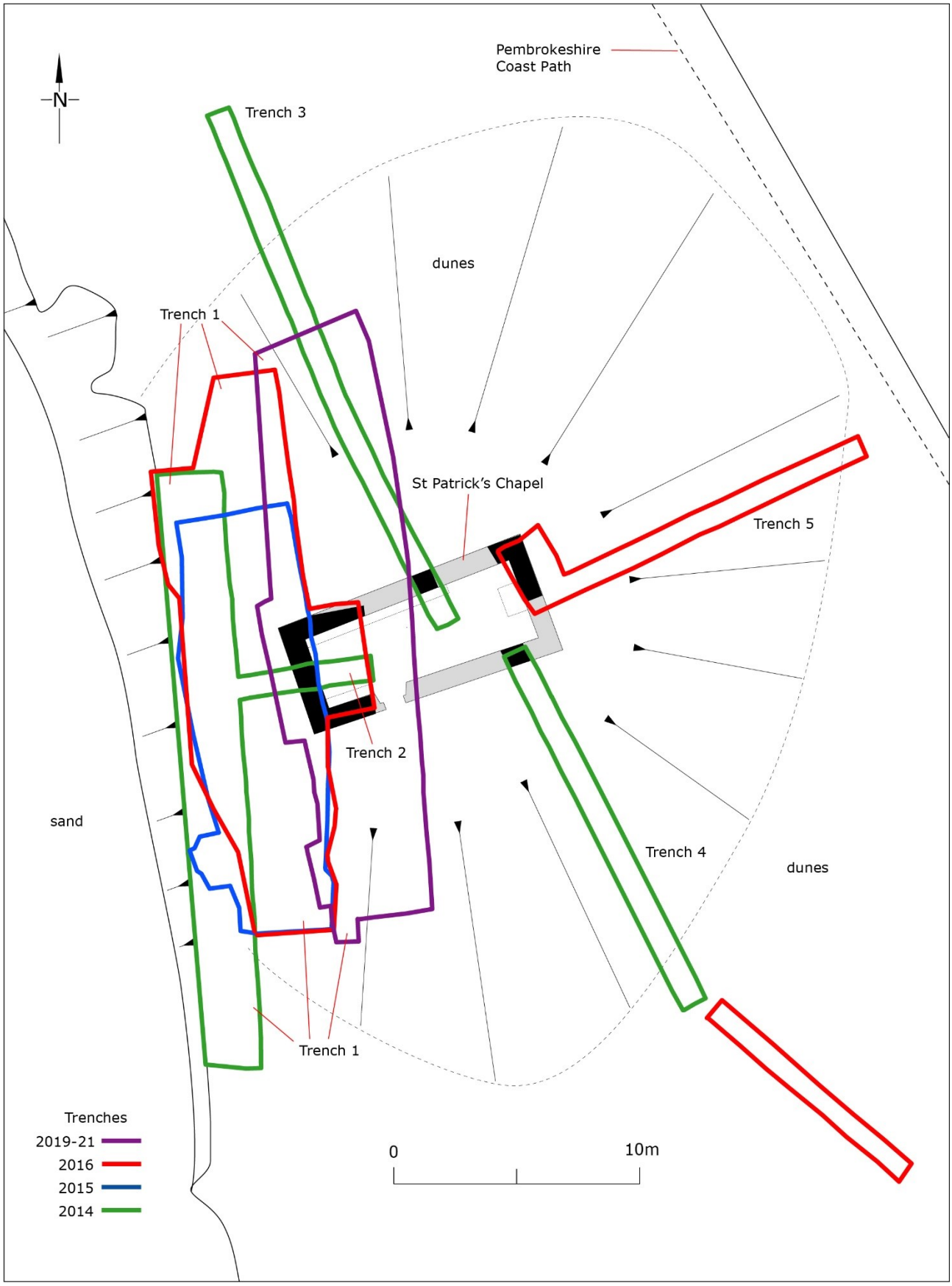


Figure 7. Plan showing the location of the 2014, 2015, 2016, 2019 and 2021 excavation trenches.

Archaeological features such as grave cuts were rarely visible. The main reason for this was the highly mobile character of the sand due to the almost constant wind, exacerbated by the churning of the sand layers by grave digging and the passage of feet during the use of the cemetery. Vegetation had only taken hold hard up against walls and other stonework, evidenced by dark bands in the sand, elsewhere for most of the life of the cemetery there would have been bare, mobile sand. Grave cuts, in the few instances where they were visible during excavation, rapidly disappeared as the surface of sand dried and sand driven by the wind obscured them.

Across most of Trench 1 the integrity of the archaeological evidence was good, with no evidence of modern disturbance. This was not the case, however, along the western edge of Trench 1. This area had been subjected to severe visitor erosion followed by restoration in the 1970s, during which, along with the dumping of brick and concrete, a car had been buried in a deep erosional hollow. It is suspected that at least an upper layer of graves had been lost to erosion, as the car was found to rest directly on several long cist graves and during its removal human bone was found intermixed with bits of carburettor and other car parts.

The Stratigraphic Sequence

The following stratigraphic sequence is based on evidence from Trench 1. Although burials have been assigned to a particular phase it must be borne in mind that we are looking at a continuum. Within this continuum some very clear stratigraphic horizons separating phases of burial and some unambiguous burial sequences were present. However, some burials 'float' in the sequence, and indicators such as relationship, similarity to other burials and depth within the wind-blown sand were amongst the criteria used to assign them to a particular phase. The reasoning for the broad date ranges is provided in the chronology section below.

No human activity has been identified in Period I when wind-blown sand began to accumulate. An oval enclosure with a central rectangular feature was constructed in Period II, AD eighth century. In Period III a walled cemetery enclosure was constructed towards the end of the eighth century and the first burials were placed in the ground. The cemetery continued in use until at least the eleventh century. This was followed by the construction of a stone-built chapel, accompanied by burials (Period IV), in the eleventh–twelfth century. A period of decay and disuse then set in the sixteenth century (Period V).

The deep stratigraphy of the site is shown in Figures 8 and 9.

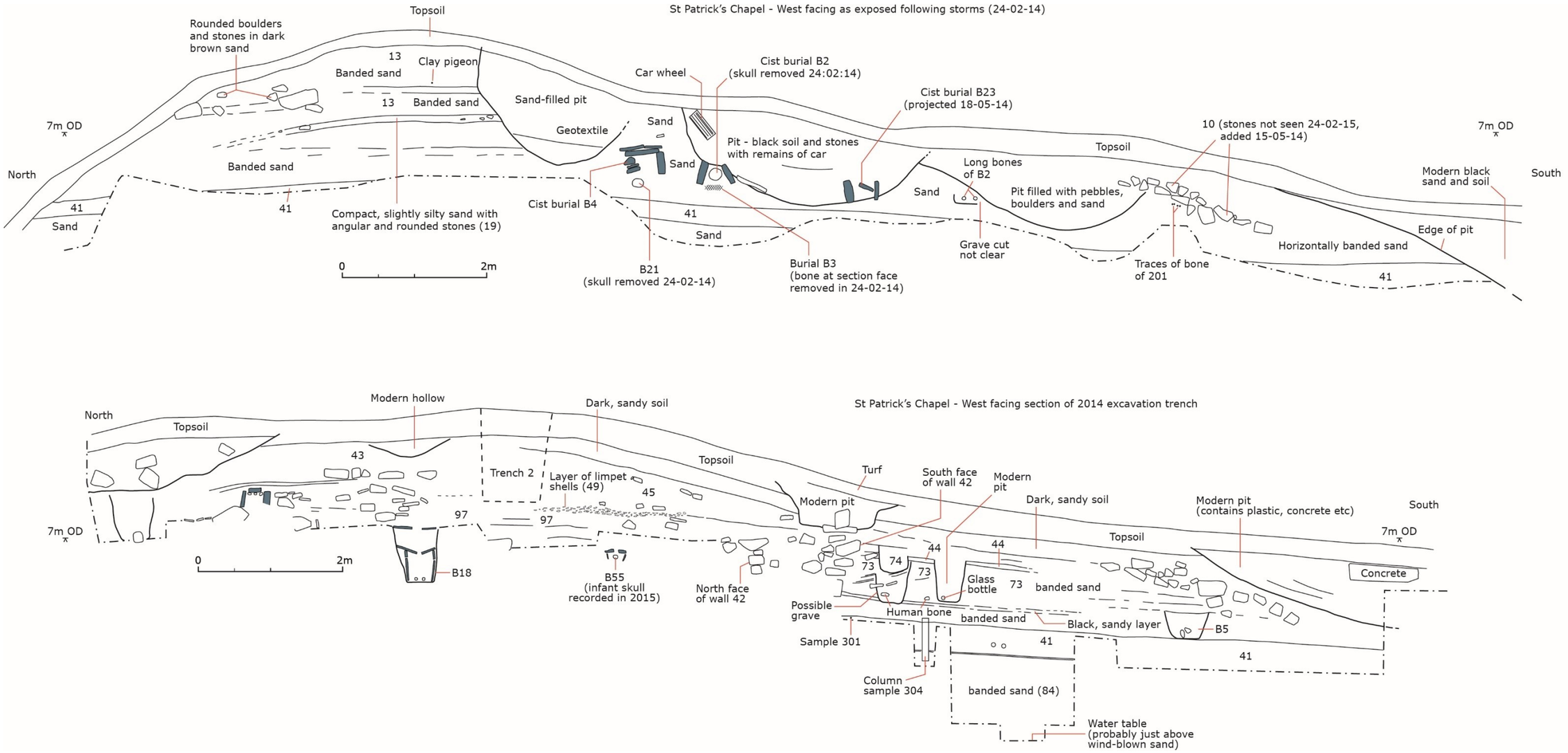


Figure 8. The top drawing shows the face of the site exposed by the winter storms of 2014. The bottom drawing shows the section of the east side (west-facing) of Trench 1 exposed in the 2014 excavation (see Fig. 7 for locations).

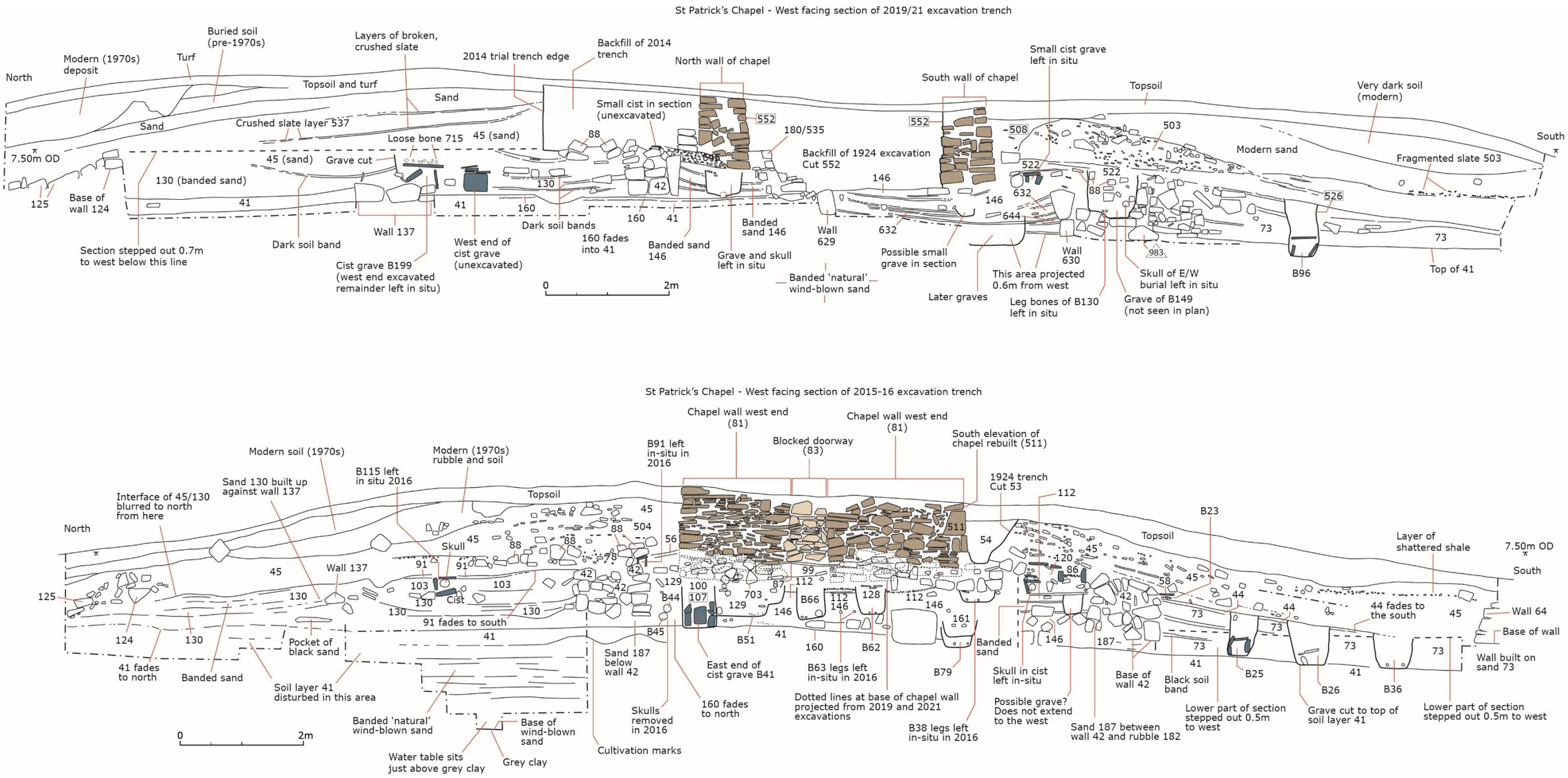


Figure 9. The top drawing shows the section of the east side (west-facing) of Trench 1 exposed in the 2019/21 excavation. The bottom drawing shows the section of the east side (west-facing) of Trench 1 exposed in the 2015-16 excavation (see Fig. 7 for locations).

Period I. Early sand accumulation

Period I. Phase 1. The prE/Wind-blown sand ground surface consisted of grey clay, revealed in two deep sondages at between 4.2m and 4.65m O.D. At this depth the sand immediately overlying the clay was saturated with ground water causing rapid slumping and collapsing of the sides of the sondages, and thus it was not possible to examine the clay in any detail. However, similar clays have been recognised beneath foreshore peats (the submerged forest) at Whitesands and elsewhere on the Pembrokeshire coast. These peats have been dated to the Mesolithic period (Lewis 1992).

Period I. Phase 2. A 1.2m–1.6m thick deposit of wind-blown sand (84) accumulated over the old ground surface. The date when sand began to form is unknown.

Period I, Phase 3. The wind-blown sand stabilised and a 0.4m thick soil formed (41). This was very distinct in the middle and southern parts of Trench 1; less so in the northern part. It sloped gently up from south-west to north-east.

Period II. Pre-cemetery features

Period II Phase 1. An east/west wall (150) was constructed from water-worn beach boulders and stones. Soil (41) had built up against this wall making it the earliest recognised built element of the site (Figs 10, 11 and 12). The date of its construction is unknown (it is possible that it was built at the same time as the oval enclosure and rectangular structure of Period II, Phase 2), but it remained a persistent landscape feature and was maintained and added to when the site was used as a cemetery, until it eventually disappeared beneath wind-blown sand. To the south a single episode of cultivation, possibly the result of ploughing but more likely spade cultivation, represented by parallel soil marks (191) within soil 41, was possibly contemporaneous with the construction wall 190. These soil marks were recognised in a small pocket during the 2016 excavation. They may have originally extended further east, but the dry conditions of the 2021 excavation were not conducive to their recognition. Wall 150 was left *in situ* at the end of the excavation.

Figure 10. Left: wall 150, right, with later wall 42 to the left, looking west. The curved soil mark is probably a natural, erosional feature. Right: wall 150 in the foreground with wall 42 in the middle ground, looking south. Scales 1m intervals.

Figure 11. Cultivation marks 191 in soil 41. Either the result of ploughing or spade cultivation. Scale 0.1m intervals.

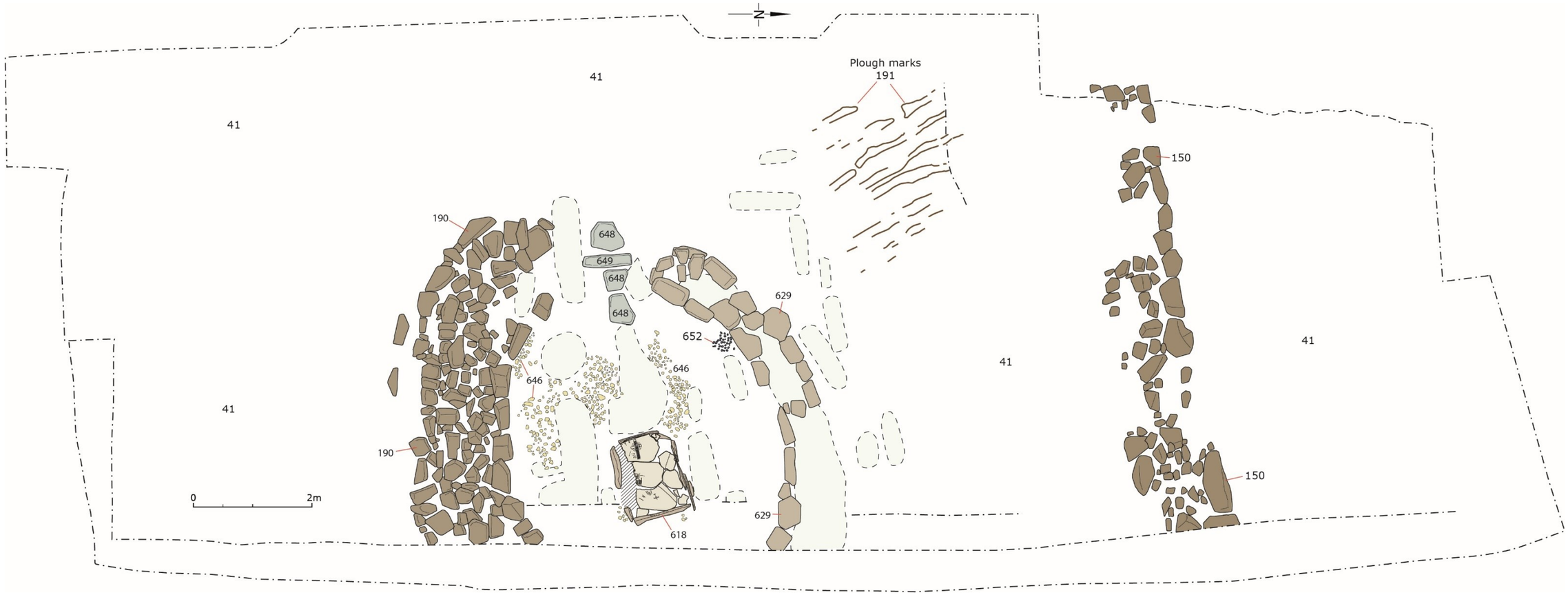


Figure 12. Plan of Period II Phases 1 and 2.

Period II, Phase 2 (mid-eighth century). Apart from wall 150 described above, the earliest elements of the site consisted of an oval stone-built enclosure with a roughly centrally placed rectangular structure (Figs 12–15).

The builders of the enclosure wanted to create a level internal area and level tops to the enclosure walls. As the pre-existing soil (41) sloped gently up from south-west to north-east, this required them building a higher wall on the west and south-west side and removing some of the soil (41) from the internal area.

Internally, the oval enclosure measured 4.5m north/south and 5.7m east/west (projected). The wall on the north side (629) had been partially removed by later burials, but sufficient survived to determine its character. It consisted of two concentric lines of rounded boulders — inner and outer wall faces — infilled with slightly smaller boulders and rounded stones, giving a wall between 0.9m and 1.0m wide. To provide a reasonably firm foundation the pre-existing soil (41) had been removed and the boulders bedded into the underlying wind-blown sand.

Figure 13. The oval enclosure looking east, showing the central rectangular structure (618), wall (629) to the left, wall (190) to the right and the entrance stones (648, 649) lower centre. Scale 0.10m intervals.

Figure 14. The oval enclosure looking east, after removal of the central rectangular structure and selected wall stones. Scale 0.10m intervals.

The wall on the south side (190) was up to 2.0m wide and survived up to three courses externally on its south-west side. It was similar to the wall (629) on the north side, but in addition to internal and external wall faces, concentric lines of boulders had been placed within the makeup of the wall. On its south-west side the wall (190) rested on the pre-existing soil (41) but had been cut into soil as it ran towards the east. A section was cut through wall 190 (visible on Fig. 14) from which a fragment of animal bone from directly beneath a boulder returned a radiocarbon determination of 657-775 cal AD at two sigma calibration (SUERC-100762). This date provides a *terminus post quem* for the construction of the oval enclosure and by extension the central rectangular structure.

The walls (190 and 629) never stood more than few courses high. There was no evidence to indicate that the enclosure was roofed or had a superstructure.

The entrance to the enclosure was west-facing and well defined on its north side by the clear terminal of wall 629, less so on the south side where a later grave had removed the terminal (190). The entrance was at least 1.0m wide. The main elements were three flat boulders (648) acting as steps and an upright boulder (649) between the outer step and middle step (Fig. 15). Initially, the upright boulder was interpreted as a blocking stone, effectively closing off the entrance, but on closer examination it was clearly an integral part of the entrance functioning as a stile; the upper edge of the upright was worn and slightly polished, the result of people climbing over it in antiquity. A thin piece of shale (988) with incised decoration had been placed face down between two of the step slabs.

Figure 15. The entrance to the oval enclosure. East to the left. Scale 0.10m intervals.

The rectangular structure (618) occupied a position on the east/west axis of the oval enclosure, slightly to the east of centre. It measured 1.4m east/west and 1.0 north/south. Essentially it consisted of upright end and side stone slabs with a covering of horizontally laid stone slabs which were later covered with quartz stones (Figs 16 and 17).

Figure 16. Plans and sections of rectangular structure 618, showing the earliest elements top left through to the latest bottom right.

Figure 17. Near vertical view of the rectangular structure (618) as first exposed. West is to the top. Scale 0.10m intervals.

The west- and east-end angular shale slabs, each 900 mm long, 400–450 mm deep and *c*. 40 mm thick, were lightly bedded on a long edge into the underlying sand. A faint inscription reading 'donoec' with an adjacent image of a boat and a spiral (see the report by N Edwards this volume including Fig. 85 and Patrick Sims-Williams including Figs 102 and 103) had been scratched onto the outer face, towards the top right corner of the west end slab (1145). The east end slab was featureless apart from a hollow that has been carved out in a later period into its upper edge to accommodate a burial.

The north and south side slabs and stones had been placed in position after wind-blown sand had accumulated against the rectangular structure and were much more shallowly bedded than the end slabs; it is probable that they were either replacements or had been reset. Three slabs with a supporting stone formed the north side of the structure. The central stone (1149) measured 540 mm × 150 mm × 70 mm and had a small cross and other markings lightly scratched onto its uppermost edge (see N Edwards this volume including Fig. 89).

The slab (1144) at the east end of the north side measured 600mm × 210mm × 20mm and had a sharply incised cross on one face. The cross faced inwards and would not have been visible — this slab was almost certainly a reused upright grave marker (see N Edwards this volume including Fig. 80).

Figure 18. Slab 1144 in situ. Scale 0.10m intervals.

The main slab on the south side of the altar had splayed out to the south. It measured 800mm × 370mmm × 60mm. It had been crudely shaped. There was a gap between this slab and the south-east corner of the structure, any upright slab that had stood here having been removed, probably when graves were later inserted. A small stone lay at the extreme east end of the south side of the structure.

The earliest element inside the rectangular structure was a circular, bowl-shaped, shallow pit (628), 0.6m diameter and 0.1m deep, filled with mid-brown sand capped with a group of rounded boulders and stones (627) (Figs 16 and 19). It was not possible to determine whether the pit immediately predated the rectangular structure or was dug following the placing of the structure's end and side-slabs. Only small fragments of charcoal and a single grain of bread/club wheat (*Triticum aestivum/compactum* L.) was identified in an analysis of a sample from 627. Nothing was recorded during oN/Site fine sieving of the remainder of fill 627. Above the pit, and filling the lower half of the rectangular structure, was a layer of mid-brown sand (623) similar to the fill of pit (627) and capped by ten rounded large stones/shale slabs (Fig. 20), including a slab with incised decoration (955 - (see N Edwards this volume including Fig. 90)). A layer of sand (620) containing occasional quartz stones and shale fragments occupied the upper half of the rectangular structure. The sandy matrices from within the structure (620, 623) were fine sieved on site — there were no traces of a burial or of artefacts.

Figure 19, left. The top of the fill (627) of the pit (628) with the rectangular structure. Scale 0.10m intervals. Note: the slide slab on the left side of the photograph has slipped during excavation.
Figure 20, right. The stones of layer 623. The decorated stone (955) is to the top left. Scale 0.10m intervals.

Shale slabs had been laid on top of the sandy layer (620); three large slabs up to 500mm × 500mm × 50mm and six smaller slabs, forming a capping to the rectangular

structure (Figs. 21-22). The southern edges of the larger slabs had been damaged when later burials had been placed in the structure. An interlaced cross had been incised onto the upper face of the large northern slab (1146). A figure, a gaming-board design and other motifs were on the upper face of the central large slab (1147), and cross on the upper face of the southernmost large slab (1148). See N Edwards this volume including Figures 81–84

Figure 21. The capping slabs of the rectangular structure. Scale 0.10m intervals.

Figure 22. An image of the rectangular structure captured from a 3D model. The model can be viewed at https://sketchfab.com/3d-models/st-patricks-chapel-8th-century-altar-4f2bbc2a9da649ce86948c019f43abd8

A layer of quartz stones had been placed over the capping stones, resting on a thin layer of sand. A shale slab with an incised gaming-board motif (933) had been placed on the quartz stones and a small piece of shale with incised concentric rings (984), apparently a broken fragment of a larger monument, had been placed hard against the outside, lower face of the shale slab forming the east end of the structure. See Figure 23 and N Edwards this volume including Figures 91 and 94).

Figure 23. The gaming-board (933) placed on the quartz stones on top of the structure. Scale 0.10m intervals.

A paving of a single layer quartz stones, plus other occasional stones, (646) had been laid within the oval enclosure (Fig. 24). It survived only in pockets; later graves had removed most of it. Where it did survive it butted up against the south wall (190) of the enclosure and against the northwest wall of the rectangular structure (618). It was fragile, and it's difficult to imagine it would have survived at all if it had been regularly walked on. A small carved stone (987) rested on the surface of the quartz pavement (see N Edwards this volume including Fig. 95)

Figure 24. The quartz pavement (646) looking west. Scale 0.10m intervals.

The oval enclosure, the quartz pavement and the rectangular structure disappeared from the landscape as wind-blown sand accumulated, but the location of the rectangular structure was not forgotten — its position was marked by the erection of a large upright shale slab (946), 500mm × 340mm × 30mm, at its west end (Figs. 25 and 26). This slab had been crudely shaped into a point at the bottom end which rested on the top edge of the structure's west end slab; the top part of it had snapped off. For it to have remained upright it could only have been erected once at least 0.20–0.30m of sand had accumulated over the structure. It is possible that this marker was an original element of the structure and was repositioned at a higher level as it began to disappear beneath accumulating sand. It remained a highly visible element of the cemetery for many decades, if not centuries, until its top was snapped off.

Figure 25. View looking north of the rectangular structure showing the marker stone (946) in situ. Scale 0.10m intervals.

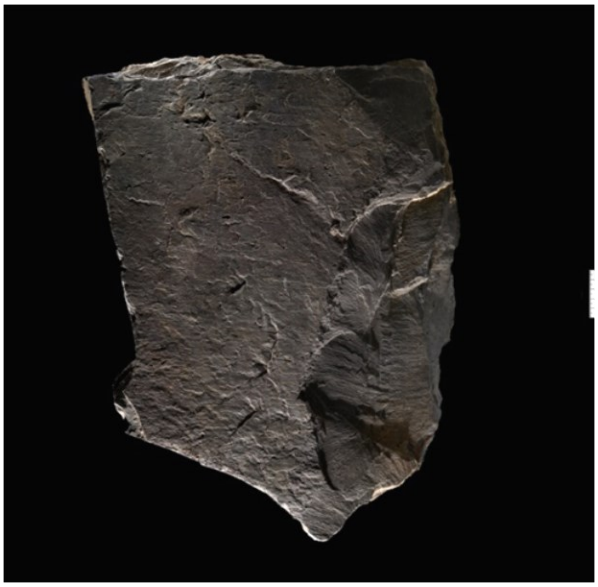


Figure 26. Photograph of stone 946 (NMW Photo reference 15937).

Figure 27. The oval enclosure after removal of superficial deposits and loose stone. The stones of the oval enclosure shown in the photograph were not removed at the end of the excavation. They were covered with geotextile which was covered in backfilled sand.

Period II, Phase 3 (mid-eighth century). Two distinct pockets of a dense, black layer (160) accumulated over soil 41 immediately outside and to the north and south of the entrance to the oval enclosure (Figs 28–32). The layer butted up against the kerb stones of wall 190 and possibly against those of wall 629. A separate, but less dense, area of layer 160 lay to the north of the oval enclosure. Here layer 160 merged with the underlying soil (41) and although less dense than the material in the two pockets outside the entrance, a small hearth was located in this area. All of the layer that was not sampled for environmental and other analyses was sieved, either dry sieved on site or wet sieved by University of Liverpool students under the supervision of Prof. Harold Mytum during their field project at Norton Priory.

Evidence for copper alloy casting in the form of sherds of crucible, slag and ceramic moulds was recovered from the two pockets of layer 160 outside the entrance to the oval enclosure. Also present was an assemblage of animal bone, cereal and other plant remains, numerous tiny fragments of amber, iron artefacts and glass beads (see reports by C J Griffiths, A Hadjikoumis, J Horák, O Lazzari, A Maccarinelli, M Redknap J Robertson, P V Webster and T Young this volume). Slag and further sherds of crucible, animal bone and other small artefacts in levels higher in the stratigraphic sequence were almost certainly derived from this layer.

A radiocarbon determination of 725-938 cal AD (SUERC-74443) was obtained from gorse charcoal from layer 160.

Figure 28. Layer 160 immediately outside, west, of the oval enclosure. Looking north.

Figure 29. Layer 160 immediately outside, west, of the oval enclosure. Looking north.

Within the oval enclosure lenses of black material (632, 644), similar to layer 160 outside the enclosure, interleaved with thin deposits of pure wind-blown sand built up over the quartz pavement (646) and against the oval enclosure walls and the central rectangular structure. Relatively thin towards the west side of the enclosure close to the entrance, this black material increased in depth (up to 0.30m thick) to the east where it was built up, probably driven by the prevailing westerly winds, against inner face of the enclosure wall. A circular, shallow, bowl-shaped pit (651) had been dug into layer 644. Environment analyses of the fill of pit 651 and of layers 632 and 644 produced little evidence of domestic or other activity apart from a mixed assemblage of charcoal fragments and single grain of bread/club wheat. A piece of slag was found in pit 651.

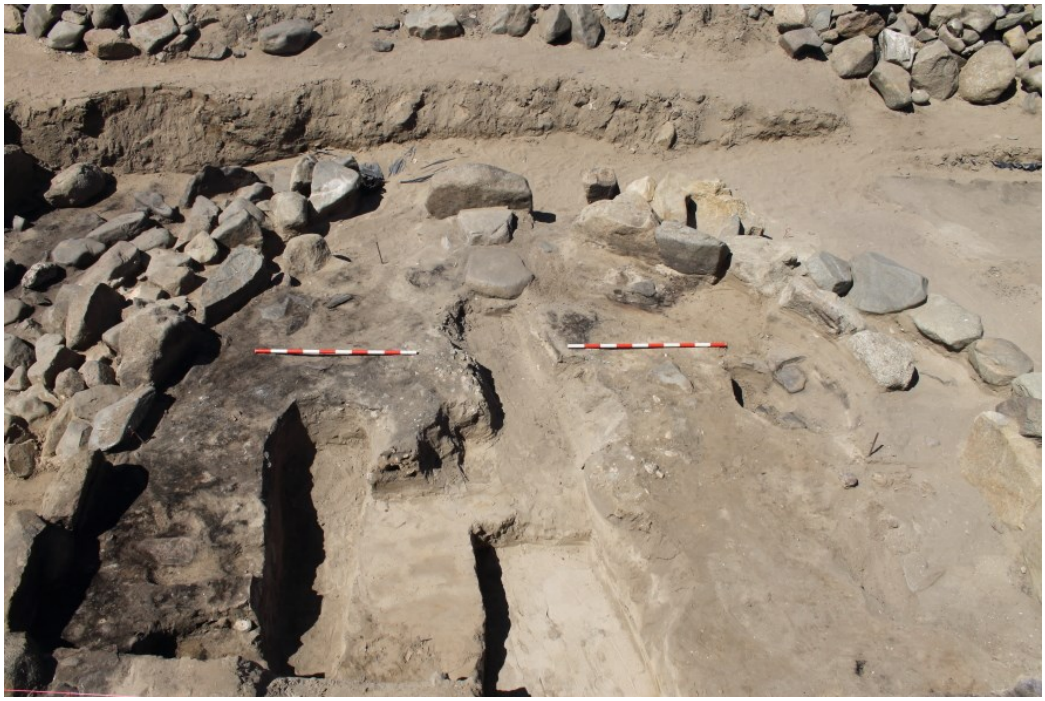


Figure 30. Banded black sand (632, 644) within the oval enclosure. Looking west. Scale 0.10m intervals.

Figure 31. An image of the oval enclosure and rectangular structure captured from a 3D model looking east. The model can be viewed at https://sketchfab.com/3d-models/st-patricks-chapel-8th-century-structure-49c3aebf4527471797e7654a1e5bd167

Figure 32. Plan of Period II Phase 3.

Period II, Phase 4 (mid-eighth century). A layer of rubble (182) in the form of water-worn stones was laid down over wall 190, with a similar but smaller layer (172) placed over the terminal of wall 629 (Figs 31 and 33). Both these layers lay partly over the black soil 160. Significantly there was no intervening wind-blown sand between the rubble layers and walls 190/629 and layer 160, indicating very little time had elapsed between the construction of the oval enclosure, the deposition of layer 160 and the laying down of rubble 172/182, perhaps just weeks or even days.

Period II, Phase 5 (mid- to late eighth century). Wind-blown sand accumulated and buried soil 41, layers 160, 632 and 634 and built up against and began to engulf the walls of the oval enclosure and central rectangular structure. This sand was best preserved beneath the northern arm of the later wall 42 (see below) where it was allocated context 187. An assemblage of animal bone was recovered from 187. It is likely that most of the animal bone found in contexts higher in the stratigraphic sequence were derived from sand 187 and the underlying black layer 160. A radiocarbon determination of 775-968 cal AD (SUERC-74428) was obtained from a cattle bone in sand 187 from directly beneath wall 42, providing a *terminus post quem* for the construction of the wall.

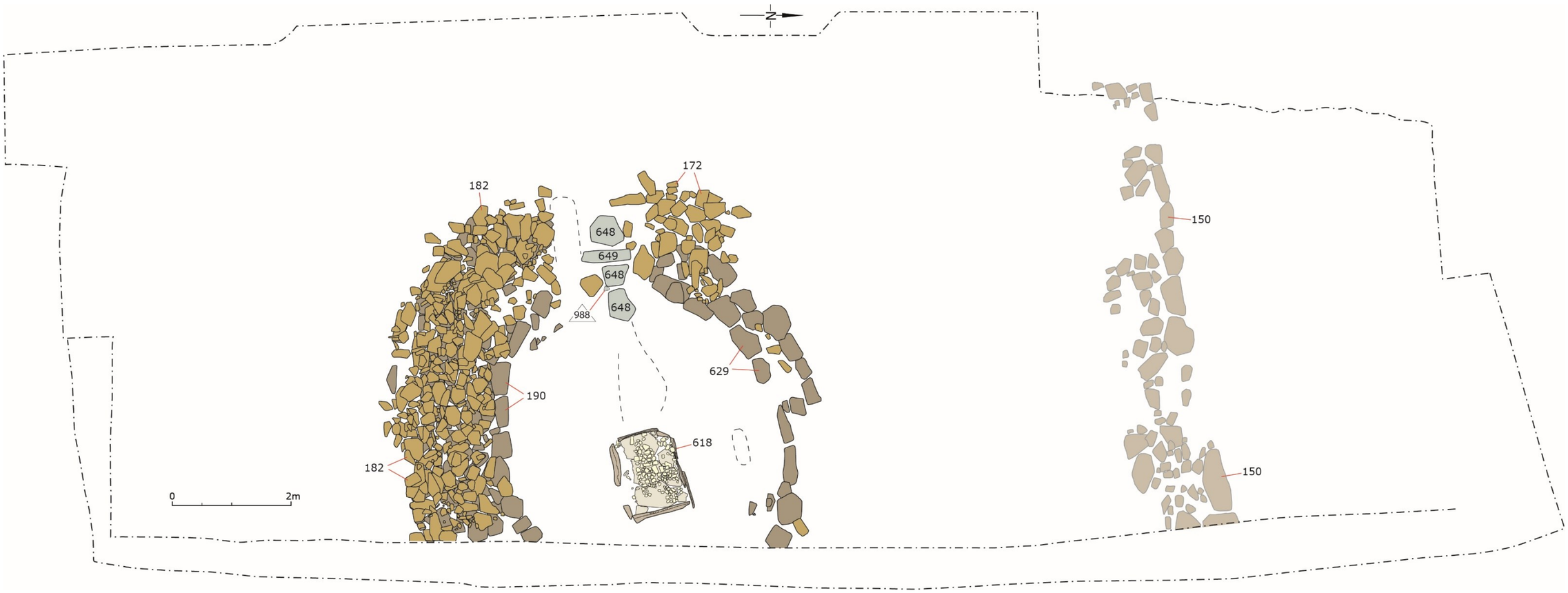


Figure 33. Plan of Period II Phase 4.

Period III. The early medieval cemetery

Period III Phase 1 (late eighth century–ninth century). A substantial wall (42) composed of water-worn stones and boulders (some massive) defining what is presumed to be a roughly rectangular area, internally 6–8m north/south and at least 6.5m east/west, with a *c*. 1m wide entrance mid-way along its west side defined by two massive, on edge boulders (Figs 34–37). The southern arm of the wall was built in part directly onto rubble 182/wall 190 with no intervening build-up of wind-blown sand. Indeed, in places it was difficult to determine what was rubble 182 and what was base of wall 42. The northern and western arms were built on wind-blown sand 187. In places some sand may have been removed to provide a level surface on which to build the wall. Gaps and missing stones in the wall on the north side of the earlier oval enclosure (629) may be the result of stone robbing to build wall 42. Best preserved in its southern arm, wall 42 was 1m high and 1.2m wide, with a rounded top. Later graves removed some parts of the wall, particularly on its western arm.

Figure 34. Drone photograph taken during the 2016 excavation showing the cemetery wall (42) and the west end of the eleventh-twelfth century stone-built chapel.

Figure 35. Cemetery wall (42) during the 2016 excavation. Left: looking north with the wall in the foreground and the west end of the eleventh-twelfth century stone-built chapel resting on a plinth of unexcavated material. Right: the section of the wall in the east side of the site following its dismantling. Note the wall sits directly on rubble 182. Scale 0.1m intervals.

Figure 36. 2021 photograph showing the lower course of stones of wall 42 after removal of the upper courses. The truncated north wall of the eleventh/twelfth chapel is visible in the background, looking east. Scale 0.1 intervals.

Figure 37. Plan of Period III Phase 1. By this period the earlier oval enclosure and central rectangular structure of Phase II had largely disappeared beneath windblown sand.

Period III Phase 2 (ninth century). Wind-blown sand continued to accumulate inside and outside the confines of wall 42, and as it did so graves were dug into it, but only in sand within the enclosure defined by the wall. It was not possible to determine which graves were the earliest. Some assigned to this phase may sit better in Phase 3 and some assigned to Phase 3 may fit better in Phase 2, but it would seem as if the earliest burials were of young children, mostly east/west aligned with heads to the west in simple dug graves (Fig. 40).

Some elements of the earlier oval enclosure, such as the upright entrance stone (649) and the upright marker stone (946) at the west end of the rectangular structure, must still have been visible when these first graves were dug. Certainly, location of the rectangular structure (618) was known as a triple infant burial (B218) was inserted into the south side of it; this necessitated the chopping away the south sides of the three large capping stones, the removal of one of the edge slabs and the moving of some of the quartz covering stones (Figs 16 and 38). Skeleton 1058 was first placed in the ground followed by 1033 and then 1034. It is possible that these burials are three different events. Supporting this is slight damage to the skull of 1033 which may have occurred when 1034 was buried. However, as the skeletons were closely packed and none had evidence of having been disturbed, it would seem more likely that were buried at the same time. Several of the quartz covering stones had also been removed to place burial 237 on the top of the rectangular structure capping slabs (Fig. 39). Unusually the head of this east/west aligned infant skeleton (1053) had the head to the east, with the head, had it been present, resting of the top edge of the east end slab of the structure, but in order for the head to rest at the same height as the rest of the body part the top edge of the east-end slab had been cut away, forming a hollow. Burial B218 — a radiocarbon determination of 705–885 cal AD (SUERC-101166) was obtained from skeleton 1058 and a determination of 700–990 cal AD (SUERC-101165) from skeleton 1033, both at two sigma calibration. A determination of 772–976 cal AD (SUERC-101167) was obtained from burial B250, a two sigma calibration.

Stone and boulders (137) were added to the early east/west wall (150), maintaining it as a landscape feature to the north of wall 42.

Figure 38. Burial B218 inserted into the south side of the rectangular structure (618) and burial B219 immediately outside the structure. Scale 0.10m intervals.

Figure 39. Burial B237 placed on the top of rectangular structure 618. Note the east-end slab cutaway to accommodate the head of the skeleton. The head had been removed by an unknown agency. Scale 0.10m intervals.

Burials allocated to Period III Phase 2: B45, B176, B183, B185, B189, B190, B197, B201, B204, B207, B208, B210, B211, B212, B213, B216, B217, B218, B219, B221, B222, B223, B225, B226, B228, B229, B231, B232, B233, B234, B237, B239, B240, B241, B243, B248, B249, B250, B251, B252, B253, B254, B255, B256

Figure 40. Plan of Period III Phase 2.

Period III Phase 3 (ninth century). Wind-blown sand continued to accumulate, covering earlier graves Fig. 42). More graves were dug within the confines of wall 42. Adults and non-adults were now being buried; these included six north/south aligned burials, four with heads to the north and two with heads to the south. A prone burial (B156) was allocated to this phase. By now the oval enclosure and central rectangular feature were no longer visible, although the upright marker stone (946) would have been a prominent feature close to the centre of the cemetery. As the depth of sand became greater the entrance through wall 42 was blocked (Fig. 41). A radiocarbon determination of 680–878 cal AD (SUERC-69156) was obtained from B75 and 678–871 cal AD (SUERC-74427) from burial B77, both at two sigma calibration.

Burials allocated to Period III Phase 3: B71, B72, B76, B78, B79, B141, B156, B160, B186, B187, B192, B194, B195, B196, B198, B203, B206, B215, B227, B230, B236, B238, B242, B244, B245, B246, B247

Figure 41. Photograph showing the blocking stones of the entrance through wall 42, looking south-east. Scale 0.1 intervals.

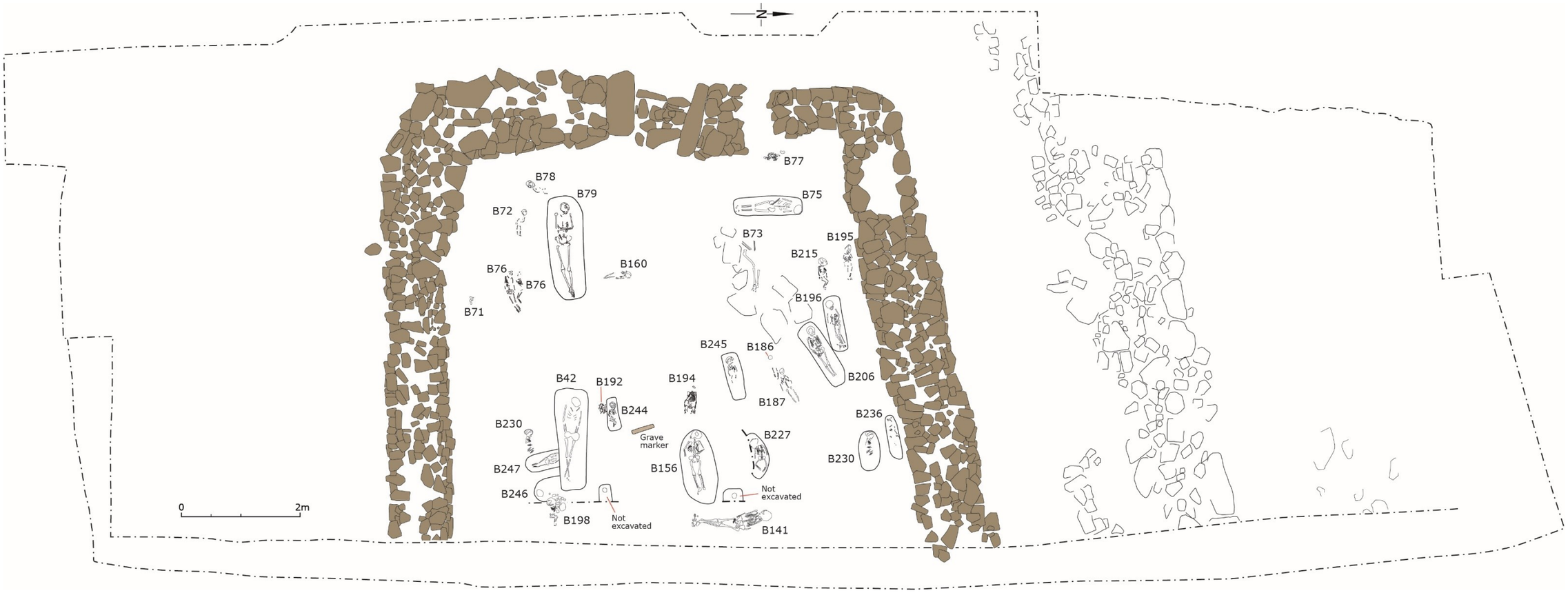


Figure 42. Plan of Period III Phase 3.

Period III Phase 4 (ninth century). Sand continued to accumulate inside and outside wall 42 (Fig. 44). Burial continued inside the confines of the wall, including a double, prone adult burial (B125), other prone burials (B48, B67, B118, B220) and a tightly crouched burial, possibly a 'bag' burial (B188) — a radiocarbon determination of 706–886 (SUERC-101164) at two sigma calibration was obtained from this burial (Fig. 43).

Burials allocated to Period III Phase 4: B48, B60, B67, B68, B63, B73, B75, B125, B141, B142, B144, B158, B164, B165, B166, B168, B173, B178, B179, B180, B188, B193, B200, B202, B203, B209, B220, B224, B235

Figure 43. The possible 'bag' burial B188. Scale 0.10m intervals.

Figure 44. Plan of Period III Phase 4.

Period III Phase 5 (ninth century). Sand continued to accumulate and by now perhaps just the upper few courses of wall 42 were visible (Fig. 45). Burial was still mainly confined to within the confines of wall 42, but for the first-time burial took place outside the walls, to the north, west and south. A radiocarbon determination of 684–878 cal AD (SUERC-59873) was obtained from burial B11, one of 777–987 cal AD (SUERC-59874) from burial B16, and one of 681–880 cal AD (SUERC-65289) from B30, all at two sigma calibration.

Burials allocated to Period III Phase 5: B10, B11, B12, B16, B21, B30, B38, B39, B49, B51, B52, B57, B59, B64, B69, B89, B97, B109, B114, B116, B117, B119, B120, B121, B123, B126, B127, B129, B130, B131, B132, B134, B135, B136, B137, B138, B139, B140, B143, B145, B146, B147, B148, B149, B150, B154, B155, B157, B159, B161, B162, B167, B169, B170, B171, B174, B175, B177, B181, B182, B184, B191, B205, B275.

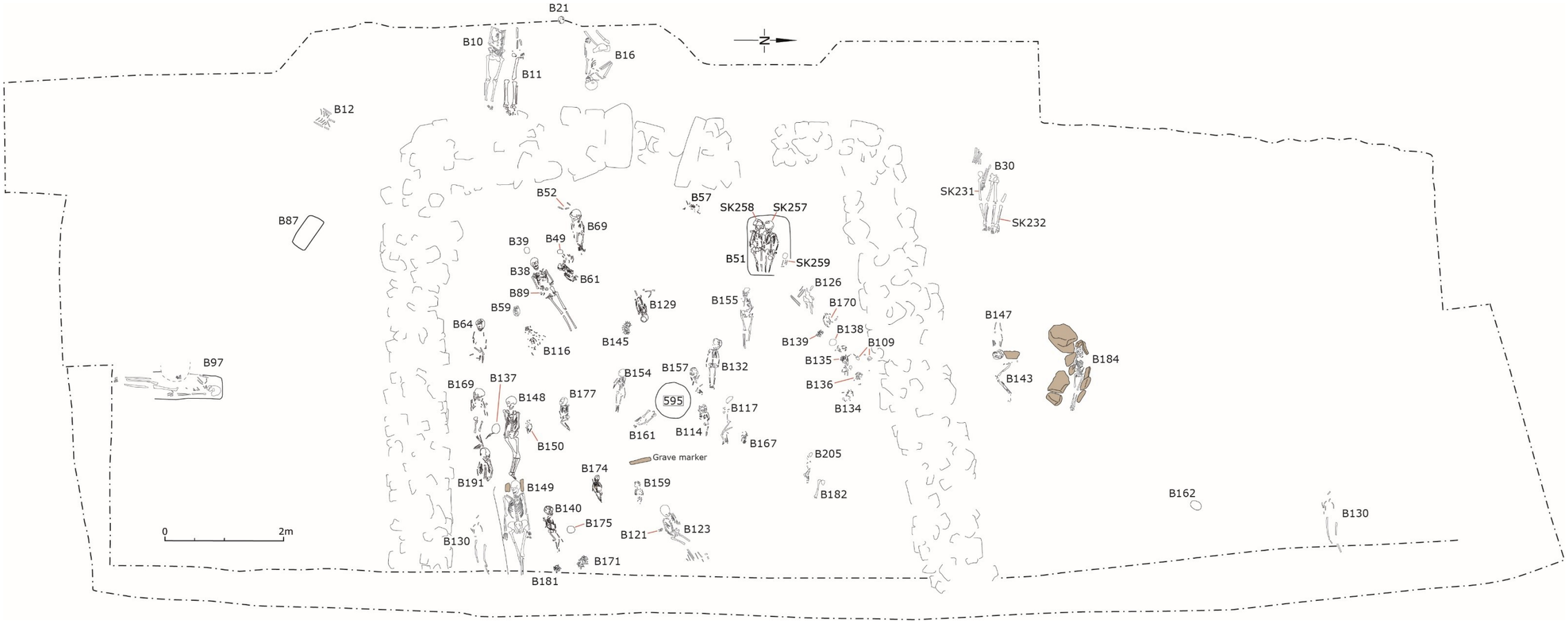


Figure 45. Plan of Period III Phase 5.

Period III Phase 6 (ninth century). By this phase wall 42 had disappeared from the landscape, apart from wall tops on the north and south sides; the area defined by the wall was now a raised platform of wind-blown sand (Fig. 51). It is possible that the top of the upright marker stone was still visible (see Figs 45). However, by this phase it may have been replaced by a marker that stood in circular pit 595. Definite evidence for this pit was only detected at lower levels in the stratigraphic sequence, but originally it had been excavated from higher in the sequence as heads and torsos of earlier burials had been removed or disturbed when it was dug. Construction of the later stone-built chapel and the 1924 archaeological excavation within the chapel had undoubtedly removed some burials of this phase.

Long cist graves appear for the first time, for adults and non-adults (Fig. 47). Some graves were cut through wall 42, some were excavated into the top of the wall and several others incorporated stones of the wall into their long cists. B18, a particularly good example of a long cist grave, had an upright stone-cross at its head-end and a small upright footstone (Fig. 48). Long cist grave B96 also had an *iN/Situ* stone marker stone at the head of the grave, but unfortunately this had snapped off at ground level. A cross had been lightly incised onto a lintel slab of small long-cist grave (B40) (Fig. 49) and a cross-marked stone had been placed by the head of the infant in grave B55 (Fig. 50). Two radiocarbon determinations from burials of this phase were obtained: B18 = 669–866 cal AD (SUERC-59871); B29 = 676–876 cal AD (SUERC-65290); both at two sigma calibration.

A small hearth or furnace (573) was located against the very top of the external side of north arm of wall 42 (Fig. 46), associated with a layer of black sand (91). The black sand overlay some burials; others were cut through it.

Figure 46. Hearth 573 and the top of wall 42. Scale 0.1m intervals.

Burials allocated to Period III Phase 6: B1, B2, B3, B4, B5, B13, B15, B17, B18, B19, B20, B23, B25, B26, B27, B28, B29, B34, B35, B36, B37, B40, B41, B42, B43, B44, B46, B47, B50, B53, B54, B55, B56, B58, B62, B63, B65, B66, B80, B83, B84, B86, B88, B96, B98, B99, B100, B101, B102, B104, B105, B106, B107, B108, B110, B111, B112, B113, B115, B122, B124, B133, B151, B152, B153, B163, B172, B199, B214, B257

Figure 47. A typical lintel long cist grave — burial B54 after the removal of the lintel slabs. Scale 0.10m intervals.

Figure 48. The upright stone cross at the west end of burial B18. Stone slabs resting on top of the grave and the upper grave fill have been removed showing the base of the cross resting on the top of the lintel slabs of the long cist. Scale 0.10m intervals.

Figure 49. The cross-incised lintel stone of long cist grave B40.

Figure 50. The cross-incised stone with burial B55.

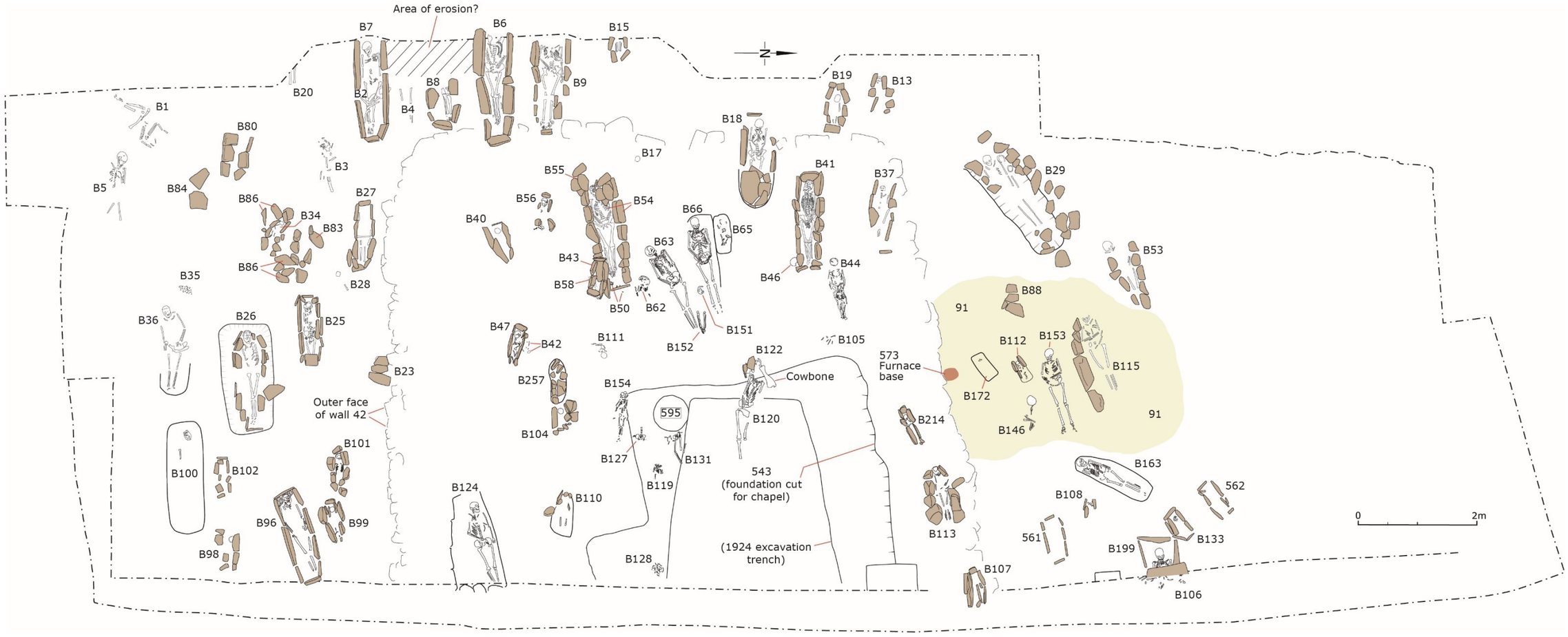


Figure 51. Plan of Period III Phases 6 and 7.

Period III Phase 7 (tenth century). Four long cist graves on the western edge of the excavation formed a distinctive group high in the stratigraphic sequence (Figs 52 and 53). These burials are shown on the plan of Period III Phase 6 (Fig. 51). A radiocarbon determination of 895–1025 cal AD (SUERC-59872) was obtained from B9, at two sigma calibration.

Burials allocated to Period III Phase 7: B6, B7, B8, B9.

Figure 52. The tops of long cist graves B6 and B9 during excavation in 2014. The upper levels of this part of the site along the beach edge suffered severe visitor erosion in the 1960s and 1970s. Restoration works in the 1970s included the dumping of building material and a squashed car in erosional hollows. The car rested directly over these long cist graves. Disarticulated human bone was mixed with the remains of the car and it is therefore likely that erosion and restoration had removed an upper layer of burials.

Figure 53. Burial B7. Left the top of the long cist grave and right skeleton 207 after removal of the lintel slabs. Scales 0.10m intervals.

Period IV. The medieval chapel

Period IV (eleventh–twelfth century). In this period a layer of boulders and stones was laid down sealing earlier deposits and burials, a stone chapel was constructed, a dry-stone wall was built defining an oval chapel yard and the final phase of burial occurred (Fig. 64).

The dimensions of the chapel are known from the 1924 excavation (Fig. 3). Internally it measured *c*. 3.2m N/S at its west end, slightly wider at its east end, and *c*. 9.1m E/W. A doorway lay towards the west end of the south wall and a blocked doorway in the centre of the west wall. The walls were on average 0.8m wide, survived up to 1.5m high, and were constructed from water-worn stones and boulders, angular slate and shale slabs, and small stones (Figs 54–59). All the walls had a foundation course of off-set masonry. The chapel was roofed with local shale/slate evidenced by finds in post-chapel abandonment deposits. Some of the roofing slates had traces of lime mortar adhering to them. Although the chapel had a simple plan, numerous structural details were noted during excavation.

Figure 54. The chapel after removal of the backfill from the 1924 excavation.

The walls either side of the west-facing entrance were different in character (Fig. 55). The wall (82) on the north side of the entrance was built mainly from angular shale slabs/stones of varying sizes and occasional water-worn stones and contrasted with that on the south side (81), which was mostly of water-worn stones and boulders with occasional shale slabs/stones. The southwest corner of this wall had been rebuilt with water-worn boulders. This rebuild (511) continued along the south-face of the south wall (Fig. 58). Rebuilding of the internal façade of wall 81 was evidenced by a vertical build-line close to the internal south corner of the building. Neither wall 82 nor 81 had bonding material; loose sand filled the interstices. A horizontally laid shale slab, the original

threshold stone in the entrance, was covered by *c*. 0.20 of wind-blown sand, over which three shale slabs were laid to create a new, higher threshold (509). These were retained on the inside of the wall by a vertically placed shale slab (Fig. 56). An upright shale slab stood up *c*. 0.20m from this new threshold, apparently an attempt to prevent sand blowing beneath the door into the chapel. This could not have been successful as a blocking wall (83) was built in the west doorway and a new entrance created in the south wall.

Figure 55. The internal west wall of the chapel showing the blocked doorway 83, the wall to the north of the doorway (82) and the wall to the south (81). Scale 0.10m intervals.

Figure 56. The threshold (509) of the west doorway to the chapel after removal of the blocking wall. Scale 0.10m intervals.

The north wall (527) of the chapel was constructed from a mixture of water-worn stones/boulders and angular shale slabs/stones (Fig. 57). It was bonded with sand mixed with a little clay or fine silt. The western end of the wall was of slightly different character from the rest, possibly having been rebuilt along with the northern end of the west wall (82). A layer of rounded platy stones (645) had been laid down presumably to provide a firm foundation on which to build the wall. However, this was not successful, and the lower courses of the wall had slipped resulting in the whole wall to lean at an alarming angle to the south. The construction of an internal bench or ledge (535) probably prevented collapse of the wall.

Figure 57. The external façade of the north wall of the chapel (527). Scale 0.10m intervals.

The south wall had undergone numerous repairs and modifications. The core of the wall (515) was similar to the north wall, although with sand as bonding. The external façade, including the south-west corner of the chapel, had been rebuilt with water-worn boulders (511). It is assumed that the external façade of wall 515 had collapsed and that sand had built up against this dilapidated wall; the rebuild (511) rested on this sand rather than on a firm foundation (Fig. 58). Following this rebuild a new doorway was opened up in the south wall, replacing the one in the west wall (Fig. 56). The quality of the masonry of this doorway was the best in chapel, using some roughly dressed shale slabs to form reveals for a tight-fitting door. This contrasts with the simple opening of the original south doorway.

Overall, the chapel was a simple, poorly built structure that required frequent repair and maintenance and was subject to relentless sand inundation. By the time the doorway was created in the south wall, the external ground surface was considerably higher than the internal floors.

Figure 58. The external rebuilt façade of the south wall of the chapel (511) showing resting on wind-blown sand. Scale 0.10m intervals.

All the wall elevations were drawn, and the stones numbered and the walls dismantled. Rebuilding the walls following the excavation was considered but given the poor quality of the original build it was decided this was impractical. The numbered stones from the walls were therefore placed in two piles prior to backfilling, one to the north and one to the south of the chapel.

Figure 59. The partially dismantled chapel walls.

The 1924 excavations in the chapel had removed evidence of floors with no record made. During the 2019 excavation it was thought possible that pockets of compact sandy deposits interleaved with lenses of charcoal/burnt material could have been the remains of floors, but further investigation in 2021 confirmed that they were the result of trampling and backfilling in 1924. Fragments of lime mortar or plaster were recorded in these deposits.

A layer of water-worn large stones, boulders and pockets of smaller rounded stones (88) was laid down over an area roughly defined by the earlier wall 42 (Fig. 64). However, to the north layer 88 covered and extended a metre to the north of the wall, but to the south the outer face of the wall largely formed the boundary to the layer. To the west the original extent of this layer could not be determined as recent erosion had removed parts of it, although it is likely it did not continue much further than is shown on Figure 64. Initially this layer was interpreted as entirely predating the stone-built chapel, but during the 2019 and 2021 excavations it became clear that it was partly laid down prior to construction of the chapel and was added to following construction. Essentially the stones and boulders formed an erosion-resistant raised platform or apron surrounding the chapel. Some stones from this layer were removed during repairs to the chapel walls, resulting in a stone-free zone by the north and south chapel walls. An approach path to the west entrance of the chapel consisting of layers of large stones and small rounded stone (87, 93, 99) had developed in and on layer 88. An late eleventh/early twelfth century ringed-pin was found pushed vertically into layer 88 outside the west doorway of the chapel (see M Redknap this volume).

Several burials, mostly non-adults, were later than layer 88 and contemporaneous with the chapel. On the south and west side of the chapel these were recorded lying directly on layer 88, but it is likely that some sand build-up had occurred prior their deposition; to the north of the chapel a grave (B90) had been cut through sandy layers (504, 514 — not shown on Figure 64) that had built up against the chapel wall and over layer 88; other burials were sealed by these layers.

Several unusual small cist graves belong to this phase. Burials B24, B81, B82 and B90 consisted of upright and horizontal shale slabs forming a box on which quartz pebbles had been placed (Figs 60–62). Burial B85 was similar but was capped with limpet shells. The tops of these graves were designed to be seen and would have stood proud of the ground surface. Two small cist graves (B92, B93) had cross-incised stones in their construction. Burial B33 was a partial, 'folded' adult. Three radiocarbon determinations were obtained from burials assigned to this period: B22 = 1027–1183 cal AD (SUERC-65288); B33 = 1044–1218 (SUERC-101162); B95 = 890–1150 cal AD (SUERC-101163).

Figure 60. Photographs of burial B90. This was one of the latest, if not the last, burial recognised during the excavation. The top of the grave was visible as six upright shale slabs one at the west end, one at east and two on either side. A pavement of quartz pebbles and other rounded stones occupied the rectangular space formed by the slabs. Upright rounded stones lay at the NE, SE and SW corners (presumably there once had been a NW corner stone). A small, upright shale slab had been positioned midway along the external east end of the grave. This slab, probably a grave marker, had been shaped to a point and buried in the sand, point down, to a depth of 0.3m. What had probably been the upper portion of the slab had broken off at ground level. Unfortunately, the slab was cracked and laminated and disintegrated on removal. Removal of the quartz pebbles revealed that they sat on horizontal shale slabs. During excavation it was discovered that several rounded boulders had been placed around the outside of the grave to help support the upright shale slabs. No skeletal remains survived. Scales 0.10m intervals.

Figure 61. Burial B92 showing the top of the cist and the cross incised stone (903) after excavation. Scale 0.10m intervals.

Figure 62. The cross incised stone (904) on top of the cist of burial B93. Scales 0.10m intervals.

A wall (64, 124) constructed from water-worn boulders defined an oval area, approximately 25m east/west and 22m north/south, with the chapel in its centre. This was essentially a revetment wall to the raised area of the cemetery and, with the chapel, would have been a prominent feature of the landscape (Figs 63 and 64).

Figure 63. Revetment wall (124) to the chapel cemetery exposed in Trench 3 of the 2014 excavation with the later quartz/slate layer behind it.

Burials allocated to Period IV: B14, B22, B24, B31, B32, B33, B81, B82, B85, B90, B91, B92, B93, B94, B95

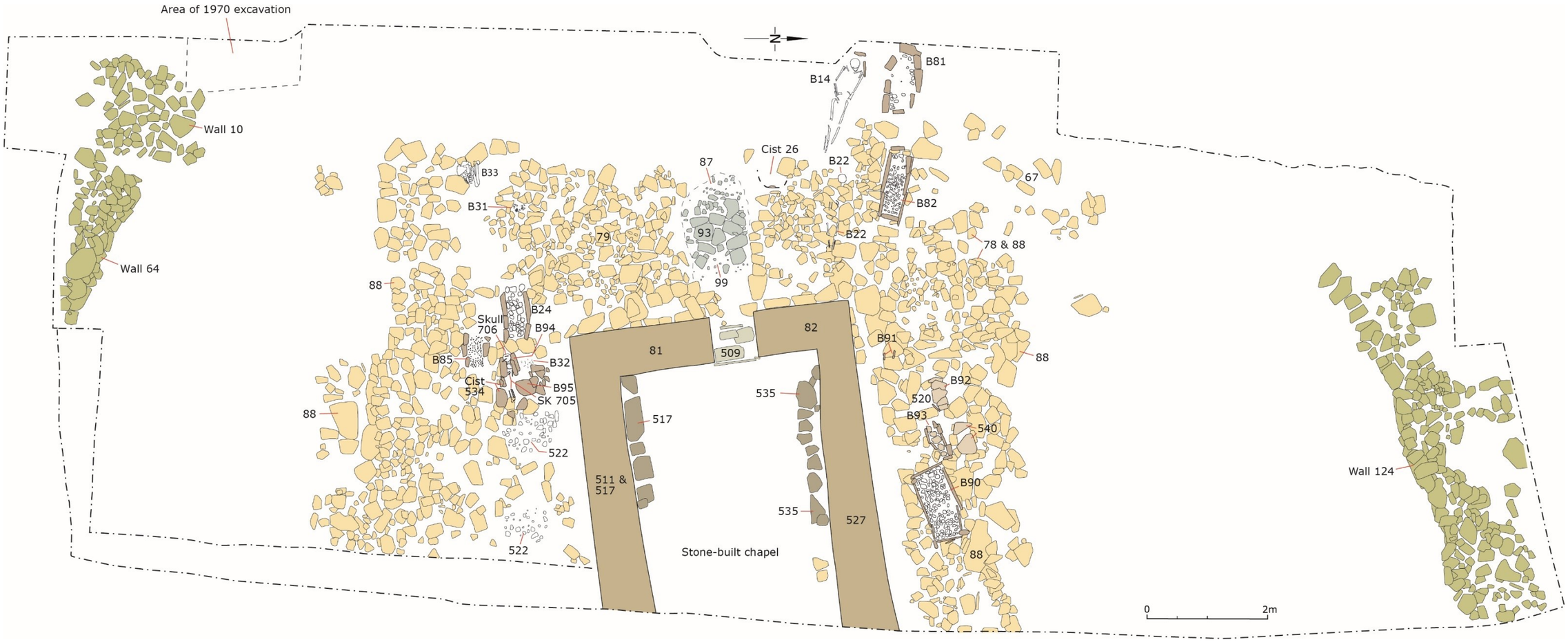


Figure 64. Plan of Period IV.

Period V Chapel decay

At some point, probably during the sixteenth century if the single historical reference is correct, the chapel was abandoned. The archaeological evidence shows that it was simply left to decay and may have stood as a semi-roofed ruin for many decades as sand slowing engulfed it. Slates were then stripped from the roof. Rather strangely waste slates were formed into a rectangle and covered with quartz pebbles (537) (Figs 65 and 66). Rubble and other material that had accumulated inside the building was shovelled out and piled into a heap (503, 505) outside the south door. A penny of Edmund (939-946) was found in this layer (see M Redknap this volume). The upper courses of the walls were removed, presumably for building purposes elsewhere.

Only the interior of the chapel was excavated in 1924. The records are poor, but it would seem that the excavators dug through floors without recognising them and uncovered and removed burials predating the chapel. The excavation was backfilled; no surface evidence of the chapel remained apart from a commemorative stone placed over the altar after the 1924 excavation (the stone incorrectly states the excavation took place in 1925).

Figure 65. The rectangular area of waste roofing slate (537). Left showing the quartz pebbles placed over the slates and right after the removal of the pebbles. The top of wall 124 is visible on the right side of the photograph. Scales 0.1m intervals.

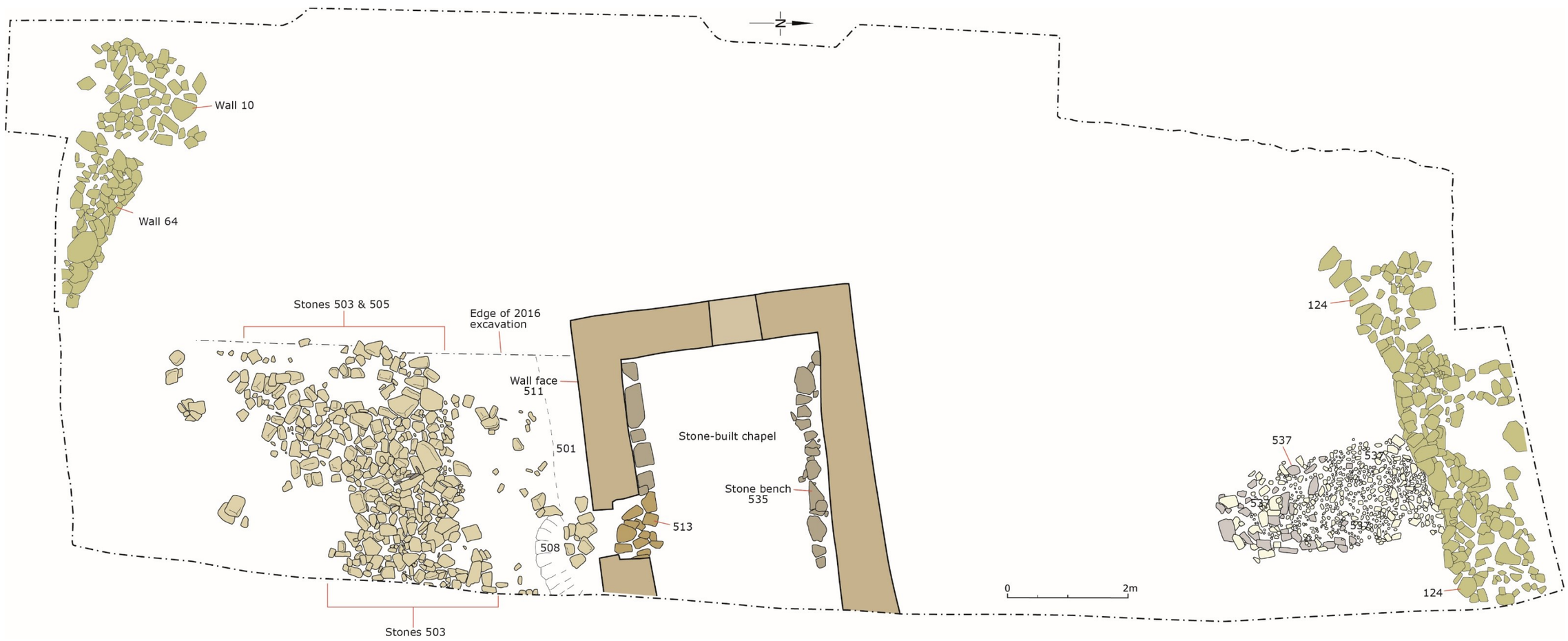


Figure 66. Plan of Period V.

Chronology

Eighteen radiocarbon determinations provide the main dating evidence. However, the *flourit* of the cemetery coincides with a plateau in the radiocarbon calibration curve, resulting in a high degree of uncertainty. The radiocarbon determinations are shown graphically in Figure 67.

The radiocarbon determination of 657–775 cal AD (SUERC-100762) from an animal bone below wall 190 provides a *terminus post quem* for the construction of the oval enclosure and the central rectangular structure (Period II, Phase 2). A date of 725–938 cal AD (SUERC-74443) was obtained from charcoal from layer 160 associated with oval enclosure (Period II, Phase 3), and a date of 775–968 cal AD (SUERC-74428) from a cattle bone in sand sealing layer 160 and underlying wall 42. The latter date providing a *terminus post quem* for the construction of wall 42 (Period III, Phase 1).

A date of 700–990 cal AD (SUERC-101165) was obtained from one of the earliest stratified burials (Period III Phase 2) and 676–876 cal AD (SUERC-65290) from one of the later burials (Period III Phase 6). Up to one metre of stratified deposits containing sequences of up to eight superimposed burials (Period III Phases 3-5) separated these two burials. Nine radiocarbon determinations were obtained from burials in these sequences, the calibrations of which overlap with each other, with those from Period III Phase 2 and Period III Phase 6, and indeed with those from the pre-cemetery phases (Period II, Phase 3, Period III, Phase 1). At the top of the cemetery sequence (Period III Phase 7) a date of 895–1025 cal AD (SUERC-59872) was obtained from a cist grave.

Three radiocarbon determinations were obtained from burials associated with the stone-built chapel (Period IV): 1027–1183 cal AD (SUERC-65288), 1044–1218 (SUERC-101162), 890–1150 cal AD (SUERC-101163).

Other dating evidence: an eighth-century date has been ascribed to the inscription ‘donoec’ on the rectangular structure (618) of Period II, Phase 2 and an eleventh–twelfth century pin was found in rubble associated with the stone-built chapel of Period IV. The pin provides a *terminus ante quem* for the cemetery below the chapel.

Based on the evidence presented above, at the bottom of the sequence the oval enclosure and central rectangular structure (Period II, Phase 2) were built in the eighth century and at the top construction of the stone-built chapel (Period IV) belongs to the eleventh–twelfth century. If we accept a mid-point date of AD 750 for the oval enclosure and central rectangular structure and a mid-point date of AD 1100 for the stone-built chapel, we have a *c*. 350-year period for the *floruit* of the early medieval cemetery, but with the radiocarbon determinations indicating most burials date from the late eight century to the late ninth century. However, it is possible to argue, on the basis of overlapping radiocarbon determinations, that, apart from at the top of the sequence (Period III, Phase 7), all the early medieval burials were placed in the ground a few decades either side of the year AD 800.

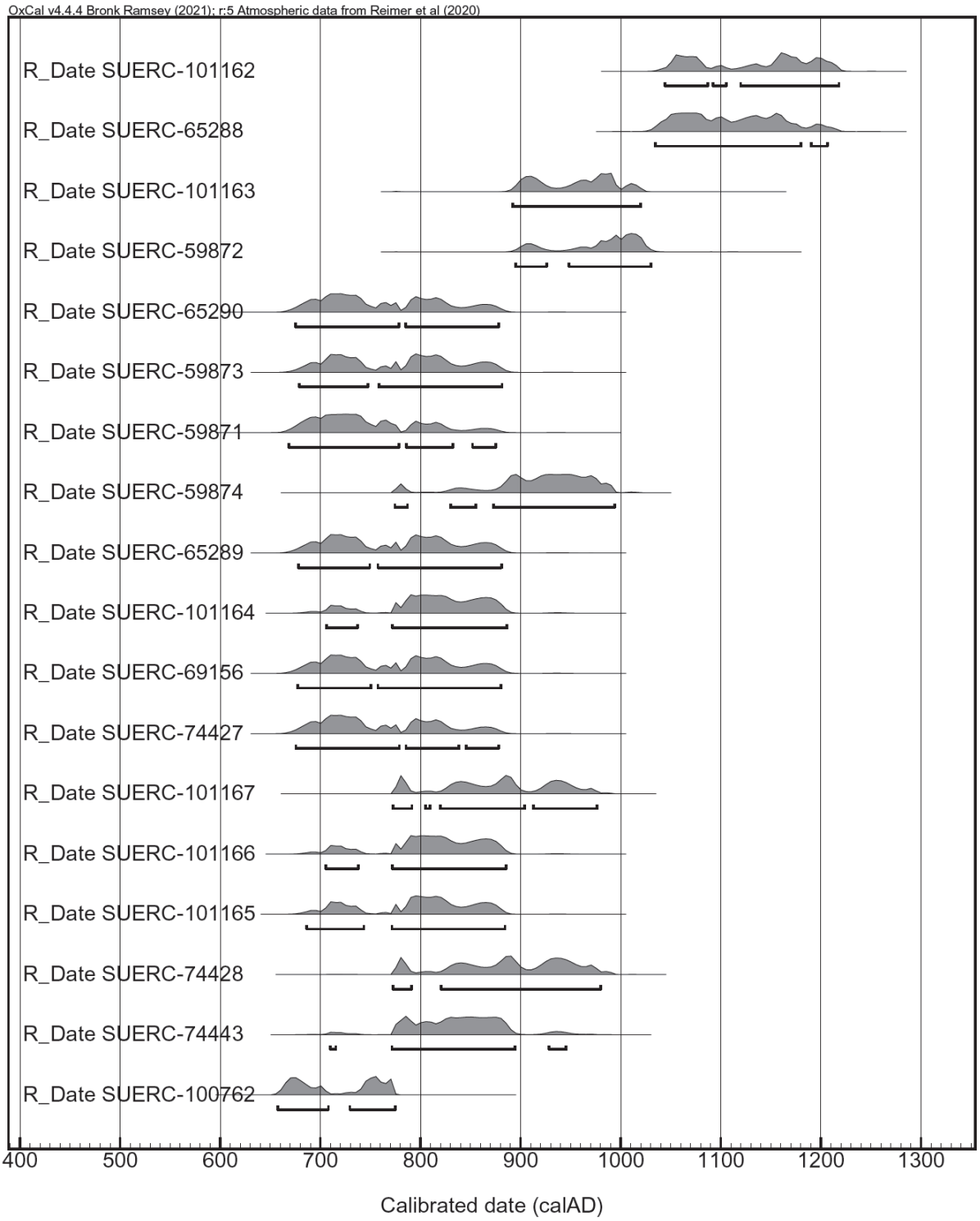


Figure 67. Calibrated radiocarbon determinations arranged in stratigraphic sequence — lowest at the bottom.

Grave Types

A total of 257 graves were recognised. The several types of grave are described below. There was no evidence for coffins. The attitude of some of the skeletons suggests they may have been wrapped in shrouds.

Dug grave. Total present 170. Simple grave with no evidence for a cist or grave marker. This was the most common type of grave. This was the only type of grave present in the early phases of the cemetery but occurred in later phases with other grave types.

Lintel long cist grave. Total present 32. The most complex grave type. Upright stone slabs lined the sides and ends of the grave (no basal slabs were present) and after the body had been placed in the ground stone lintel slabs were laid on the uprights. The grave was then backfilled covering the lintel slabs. Locally obtained shale was the most commonly used material, with the occasional water-worn beach stones used for side and end slabs. They did not occur until Period III Phase 6 of the cemetery.

Long cist grave. Total present 14. Similar to a lintel long cist grave but no lintel slabs (or basal slabs) were present.

Lintel stone grave. Total present 11. This type comprised a simple dug grave with lintel slabs placed over the body.

Cist grave with water-worn quartz pebbles or shells. Total present 6. In this grave type a long cist grave was capped with water-worn quartz pebbles mixed with a few small pieces of shale, or by limpet shells. This grave type only occurs in Period IV. The cists would have stood proud of the ground surface with the quartz pebbles or shells visible. B90 was the best example of this type of grave. All were graves of young children. No skeletal remains survived. In additional, two discrete rectangular areas of limpet shells may have marked child graves, but no skeletal material was associated with them.

Other graves/unknown. Total present 24.

Several Burials were specially marked and warrant further description. B18, a lintel long cist, had an upright stone cross (403) at its west end, a small upright marker at its east end and stone slabs placed over the surface of the grave (in additional to the lintel slabs placed over the cist). Crosses (422, 904) had been scratched on lintel stones of B40 and B93, and a cross incised stone (444) had been placed upright against the head end of B55. A line of stones/boulders marked the surface of the north side of B29. A pavement of water-worn quartz pebbles and other stones had been placed on the surface of B51. The east end stone of B82, a cist grave with quartz pebbles, stood upright as a grave marker.

Water-worn quartz pebbles, limpet shells, shale slabs and beach stones and boulders were brought to the cemetery to construct and to mark graves and during the use of the cemetery these materials became distributed throughout the stratified deposits. Thus, when these materials were found in a grave or associated with a skeleton it was not always possible to be certain that they had been deliberately placed or whether they had been accidentally incorporated. There were, however, a few instances where deliberate positioning seems the most likely explanation. For instance, a small stone slab rested on

the base of the skull of prone burial (B48), and several slabs lay directly on the skeleton of B74. Limpet shells lay beneath the lintel slabs and above the skeleton of B23.

Skeletal Positions

In some cases, for instance where there were no skeletal remains surviving, it was only possible to obtain a general E/W alignment or similar for the burial. However, in most instances more precise information was obtained. In total, the alignment and other skeletal positions were obtained for 262 skeletons/graves. This is slightly higher than number of grave types (above) due to the presence of multiple burials.

Most of the skeletons/graves were E/W aligned, 196 in total. For 16 of these it was only possible to state that they E/W aligned, as no skeletal material survived. One hundred and seventy-four were E/W aligned with their heads to the west, with just six E/W aligned with their heads to the east.

Eleven skeletons were sufficiently off the E/W alignment to place them in different category: eight were NE/SW aligned with their heads to the SW, one was NE/SW aligned with the head to the NE and two were NW/SE aligned with the head to the NW.

Fifteen skeletons/burials were clearly N/S aligned. Of these nine had their heads to the north and five to the south. One could only be determined to be N/S aligned.

It was not possible to determine the alignment of 40 skeletons/burials.

Most skeletons, 185 in number, were supine, that is on their back. Of these 135 were extended and 50 flexed. The position of the arms had little variation with most extended along the sides of the body or with the hands resting on the pelvic area. Only two skeletons had been placed on the sides and flexed. Seven skeletons were prone, on their front, including a double prone burial. One skeleton was in a kneeling position and one folded, probably as a result of having been placed in a bag or similar container. It was not possible to determine the position of 66 skeletons/burials.

Multiple Burials

B30 was an adult double burial of which only the legs survived and B76 was a child double burial, with both skeletons in a slightly flexed position. B51 was a child triple burial. Skeleton 290 lay directly beneath skeleton 284 and seemingly in the same grave cut and may have been a double burial (B74 and B79). B125 was an adult, double prone burial and B255 a double infant burial. One of the earliest burials (B218) was a triple infant/early child burial placed in the rectangular structure of Period III Phase 2.

RADIOCARBON DATES

The following radiocarbon dates have been provided by SUERC (Scottish Universities Environmental Research Council). The calibrated ranges have been determined from the University of Oxford Radiocarbon Accelerator Unit calibration programme (OxCal v4.3).

Lab Code: SUERC-59871
Context: Human bone Skeleton 218 (B18)
Radiocarbon Age BP: 1259±31
Calibrated range at 2 sigma (95.4% probability): 669 (83.3%) 779 cal. AD; 791 (7%) 830 cal. AD; 837 (5.1%) 866 cal. AD

Lab Code: SUERC-59872
Context: Human bone Skeleton 209 (B9)
Radiocarbon Age BP: 1059±31
Calibrated range at 2 sigma (95.4% probability): 895 (14.6%) 930 cal. AD; 940 (80.8%) 1025 cal. AD

Lab Code: SUERC-59873
Context: Human bone Skeleton 211 (B11)
Radiocarbon Age BP: 1239±31
Calibrated range at 2 sigma (95.4% probability): 684 (59.2%) 782 cal AD; 787 (36.2%) 878 cal.AD

Lab Code: SUERC-59874
Context: Human bone Skeleton 216 (B16)
Radiocarbon Age BP: 1133±31
Calibrated range at 2 sigma (95.4% probability): 777 (4.1%) 792 cal. AD; 803 (7.7%) 844 cal. AD; 858 (83.6%) 987 cal. AD

Lab Code: SUERC-65288
Context: Human bone Skeleton 222 (B22)
Radiocarbon Age BP: 923±30
Calibrated range at 2 sigma (95.4% probability): 1027 (95.4%) 1183 cal AD

Lab Code: SUERC-65289
Context: Human bone Skeleton 231 (B30)
Radiocarbon Age BP: 1241±33
Calibrated range at 2 sigma (95.4% probability): 681 (95.4%) 880 cal AD

Lab Code: SUERC-65290
Context: Human bone Skeleton 230 (B29)
Radiocarbon Age BP: 1248±33
Calibrated range at 2 sigma (95.4% probability): 676 (69.0%) 780 cal AD; 787 (26.4%) 876 cal AD

Lab Code: SUERC-69156
Context: Human bone Skeleton 285 (B75)
Radiocarbon Age BP: 1242±33
Calibrated range at 2 sigma (95.4% probability): 680 (95.4%) 878 cal AD

Lab Code: SUERC-74427
Context: Human bone Skeleton 285 (B75)
Radiocarbon Age BP: 1248±30

Calibrated range at 2 sigma (95.4% probability): 678 (72.4%) 779 cal AD; 789 (23.0%) 871 cal AD

Lab Code: SUERC-74428
Context: Cattle bone from layer 187
Radiocarbon Age BP: 1156±30
Calibrated range at 2 sigma (95.4% probability): 775 (67.6%) 907 cal AD; 915 (27.8%) 968 cal AD

Lab Code: SUERC-74443
Context: Charcoal – Ulex europaeus L. (gorse) from layer 160
Radiocarbon Age BP: 1194±27
Calibrated range at 2 sigma (95.4% probability): 725 (2.4%) 739 cal AD; 767 (91.9%) 894 cal AD; 930 (1.1%) 938 cal AD

Lab Code: SUERC-100762
Context: Animal bone from beneath wall 190
Radiocarbon Age BP: 1312±22
Calibrated range at 2 sigma (95.4% probability): 657 (48.7%) 708 cal AD; 729 (46.7%) 775 cal AD

Lab Code: SUERC-101162
Context: Human bone Skeleton 235 (B33)
Radiocarbon Age BP: 902±26
Calibrated range at 2 sigma (95.4% probability): 1044 (31.5%) 1087 cal AD; 1092 (4.0%) 1105 cal AD; 1120 (60%) 1218 cal AD

Lab Code: SUERC-101163
Context: Human bone Skeleton 705/706 (B95)
Radiocarbon Age BP: 1086±26
Calibrated range at 2 sigma (95.4% probability): 890 (84.0%) 1060 cal AD; 1070 (11.4%) 1150 cal AD

Lab Code: SUERC-101164
Context: Human bone Skeleton 1002 (188)
Radiocarbon Age BP: 1216±26
Calibrated range at 2 sigma (95.4% probability): 706 (9.7%) 737 cal AD, 772 (85.7%) 886 cal AD

Lab Code: SUERC-101165
Context: Human bone Skeleton 1033 (B218)
Radiocarbon Age BP: 1228±26
Calibrated range at 2 sigma (95.4% probability): 700 (4%) 740 cal AD; 770 (91.4%) 990 cal AD

Lab Code: SUERC-101166
Context: Human bone Skeleton 1058 (B218)
Radiocarbon Age BP: 1218±26
Calibrated range at 2 sigma (95.4% probability): 705 (11.2%) 738 cal AD, 772 (84.2%) 885 cal AD

Lab Code: SUERC-101167
Context: Human bone Skeleton 1067 (B250)
Radiocarbon Age BP: 1162±26
Calibrated range at 2 sigma (95.4% probability): 772 (11.7%) 791 cal AD, 805 (0.8%) 809 cal AD, 820 (51.9%) 904 cal AD, 913 (31.0%) 976 cal AD

GAZETTEER OF BURIALS

By K Murphy, Katie A Hemer and Helen Gant

Note: Details of the age, sex and pathology of some of the skeletons may be refined and modified as reports on future analyses become available.

Burial 1 Adult Skeleton 201	No grave cut. Not in a cist. Below stone spread 10 and above skeleton 205. Head to the west, but with the head missing (due to erosion). The body was on its back but with the legs and arms slightly flexed.	 *Scale: 0.5m*
Burial 2 Adult Skeleton 202		No grave cut. Not in a cist. Overlies skeleton 207/cist 23. Partial skeleton, largely disarticulated with the bones in a rough heap. Articulation of some bones suggests the body was not entirely de-fleshed when deposited. Analysis showed that this was a young adult (18 – 25 years of age). *Scale: 0.5m*

Burial 3 Adult Skeleton 203		No grave cut. Covered by a stone spread (11). Head to west. Poorly preserved, with the upper body dissolved. Analysis indicated that this was a middle adult (26-45 years of age) and possibly female. *Scale: 0.5m*
Burial 4 Adult Skeleton 204		No grave cut. Not in a cist. Head to west. Only parts of leg bones survived. The upper part of the skeleton is likely to have been removed by recent human action. *Scale: 0.5m*

Burial 5 Adult Skeleton 205		0.5m deep grave cut visible in section. Not in a cist. Head to west. Supine with left arm crossed over chest. Partly excavated in 2014, the lower part of the body was excavated in 2015. It lay beneath wall 10/64. Analysis confirmed that this was an older adult (46 years or older), and possibly male. It showed evidence of periosteal new bone growth. *Scale: 0.5m*
Burial 6 Adult Skeleton 206	*Scale:*  *0.5m*	Cist grave 21. Cist grave with lintel and side slabs, no base slabs. The east end cut into the top of the wall 42, and some of the cist slabs were probably reused wall material. Directly overlay skeleton 210. Head to west. Supine with hands crossed over pelvis. Good preservation. A sherd of medieval pottery was found in the fill of this grave, possibly fallen in from overlying deposits. Analysis showed that this was a female middle adult (26-45 years of age), with signs of trauma. 

Burial 7 Adult Skeleton 207	Cist grave 23. Cist grave with lintel and side slabs, no base slabs. West end of cist missing due to coastal erosion. Head to west. Supine with hands crossed over pelvis. Fair preservation. Analysis showed that this was an older adult (46 years of age or over), and possibly female.	*Scales: 0.5m* 
		

Burial 8 Adult Skeleton 208	Cist grave 24. Cist grave with lintel and side slabs, no base slabs. The west end of the cist with the upper part of the body is likely to have been removed by recent human activity. Only parts of the leg bones survive. Head to the west. *Scale:0.5m*	
Burial 9 Adult Skeleton 209	Cist grave 22. Cist grave with lintel and side slabs, no base slabs. The east end cut into the top of wall 42, and some of the cist slabs were probably reused wall material. Head to west. Supine with right hand crossed over pelvis, left hand by side. Good preservation. A radiocarbon determination (SUERC-59872 1239±31 BP) with a 2-sigma calibrated range of 897-1025 cal. AD was obtained from this skeleton. 	 Analysis showed that this was a young adult (18-25) and possibly female. *Scale: 0.5m*

Burial 10 Adult Skeleton 210	Not in a cist. Directly below skeleton 206/cist grave 21, and later than skeleton 211. Head to west but missing due to coastal erosion. Supine with hands crossed over pelvis. Good condition. Analysis confirmed that this was a young adult (18-25 years of age), possibly female. *Scale: 0.5m*	
Burial 11 Adult Skeleton 211	Not in a cist. The right side of this adult skeleton was cut away when skeleton 210 was inserted. Head to west but missing due to erosion. Supine. Surviving bone in good condition. A radiocarbon determination (SUERC-59873 1239±31 BP) with a 2-sigma calibrated range of 684-878 cal. AD was obtained from this skeleton. The age of this adult skeleton was undetermined. *Scale: 0.5m*	

Burial 12 Adult Skeleton 212	Not in a cist, but under a large boulder and with a boulder at the head end of the grave. NE/SW aligned with the head to the NE. Pre-dating skeleton 203. Poorly preserved with just part of the torso surviving. Analysis showed that this was an adult skeleton, but the age was not determined.	 *Scale: 0.5m*
Burial 13 Infant Skeleton 213	Infant cist grave 47. In a small cist, 0.7m long with sides made of rounded boulders and lintel slabs. Head to west. Only part of the skull survived. A possible pottery sherd (409) came from the fill of the cist grave. 	 *Scale: 0.5m*

Burial 14 Adult Skeleton (child bones present) 214	Adult cist grave 48. A rough cist grave made mostly from boulders. Cut into the top of the wall 42. Aligned roughly E/W, but a slightly different alignment to the other E/W graves. Head to the west. Supine with hand over pelvis. Variable bone preservation. Quartz stone placed over a clavicle. Two samples were analysed, showing two mixed burials: 214a was that of an older adult (46 years of age or older), possibly female. 214b was that of a child (1-5 years of age).	*Scale: 0.5m* 
Burial 15 Inf/Child Skeleton 215	Infant cist grave 50. Only the legs, east end survives – the remainder removed by erosion. E/W aligned with head to west. Only lower leg bones remain. Analysis showed that this child was 1-5 years of age.	 *Scale: 0.5m*

Burial 16 Adult Skeleton 216	Adult grave. Not in cist. Partly below skeleton 209/cist 22. E/W aligned with head to E-facing south. Arms and legs slightly flexed. Variable bone preservation. The foot bones of this skeleton may have been removed in February 2014 and included with skeleton 221. A radiocarbon determination (SUERC-59874 1133±31BP) with a 2-sigma calibrated range of 777-987 cal. AD was obtained from this skeleton. Analysis showed that this was a young female adult (18-25 years of age). The skull showed signs of cribra orbitalia.  *Scale: 0.5m*	
Burial 17 Infant Skeleton 217	Part of child's skull and teeth and possible long bone in loose sand – probably from a disturbed grave. Analysis showed that this child was 0-12 months old.	

Burial 18 Adult Skeleton 218

Adult cist grave 26 with grave marker 27 (Find no. 403). Cut through wall 42 and using some of the wall stones as part of the cist. The grave was 0.7m deep, with the cist's lintel slabs 0.3m below the top of the grave cut. No base slabs. E/W aligned with head to the west. Supine with hands crossed over the pelvis. Bone in good condition, but lower legs decayed. Skull slightly damaged and distorted due to pressure from lintel slabs. The east end of the grave lay beneath the edge of the site, and some foot bones were recovered in 2015. The cist's side slabs were left *in situ* at the end of the excavation. A possible copper alloy shroud pin (411) was found amongst the hand bones. In 2015, the east end of this grave was excavated – here a small, unmarked, upright stone marked the foot end of the grave. A radiocarbon determination (SUERC-59871 1259±31 BP) with a 2-sigma calibrated range of 669-866 cal. AD was obtained from this skeleton. Analysis showed that this was a female in the age range of 18-25 years old, and the skull showed signs of cribra orbitalia.
Scales: 0.5m

Burial 19 Infant Skeleton 219	Infant cist grave 52. Small cist, 0.7m long, composed of rounded stones. E/W aligned with head to the W. Well-preserved skeleton of an infant, supine. Adult foot bones also in grave. Analysis showed that the infant was 1-12 months of age, and the skull showed evidence of Endocranial Lesions. *Scale: 0.5m* 	
Burial 20 Adult Skeleton 220	Adult burial. Not in cist. Identified and removed from the eroding sand dunes in February 2014. Only the lower leg bones survived, the remainder of the skeleton having been removed by erosion. E/W aligned with head to west.	
Burial 21 Child Skeleton 221	The very crushed skull, (found in analysis to be a child 1-5 years of age). Other bone was removed in February 2014 from directly beneath cist grave 22. It was then assumed to be the head, western end, of a complete skeleton. However, in May 2014 no further bones of this skeleton were discovered. They may have been removed when skeleton 216 was placed in the ground, or the skull may have been loose in the foot end of the grave of skeleton 216. Some foot bones of 216 may have been mixed with those of skeleton 221.	

Burial 22 Child Skeleton 222	Child burial. Poorly preserved skeleton lying in a hollow in the top of rubble 88. It lay within an arc of stones (60), which seems to have been centred on the skeleton. Aligned E/W. The skull lay beneath large stones. A radiocarbon determination (SUERC-65288 923±30 BP) with a 2-sigma calibrated range of 1027 - 1183 cal. AD was obtained from this skeleton. Analysis showed the child's age to be 1-5 years. 	
Burial 23 Infant Skeleton 223	Infant burial. Aligned E/W, supine with legs slightly flexed. Very well preserved. Three shale slabs had been placed over it and limpet shells lay in the sand over between the slabs and the skeleton. Analysis showed that this was a foetal burial, 38 weeks gestation or less. *Scales: 1m* 	

Burial 24 Infant Skeleton(s) 225	Infant cist grave 59. Cist aligned E/W, 0.89m long by 0.47m wide. The vertically pitched side stones of the cist were visible after removed of sand 55. A layer of quartz pebbles had been laid on the top of the cist, below which were ten small lintel slabs. Only a few traces of the skeleton survived. A 'pillow' stone had been placed in the cist at the west end. There were no basal slabs. It seems likely that the quartz pebbles of this cist were meant to be seen. Two samples were analysed. 225a indicated a foetal burial (38 weeks gestation or less), 225b indicated an early child (1-5 years of age). This was therefore possibly a mixed burial. *Scales: 1m*	
		

Burial 25 Adult Skeleton and foetal remains 226

Adult cist grave 68. Cist grave aligned E/W, with head to W. The E end lies under the E side of the trench. At least 1.5m long and 0.5m wide. Cist with lintel slabs and side slabs, no base slabs. Well preserved skeleton, supine with hands over pelvis.
Analysis of two samples were undertaken: 226a showed that this was a young adult burial, 18-25 years of age and female. 226b were foetal remains.

Scales: 1m

Burial 26 Adult Skeleton 227

Adult cist grave 72. Cist grave aligned E/W with head to W end. Cist up to 0.7m wide. Well preserved skeleton, tightly confined within cist, supine, with hand crossed over pelvis. West end excavated in 2015, east end in 2021.
Analysis showed that this was an older adult, 46 years of age or older, and female.

Scale: 1m

Scale: 1m

Scale: 0.5m

Scale: 1m

Burial 27 Child/ Juvenile Skeleton 228	Juvenile burial. cist grave 75. Cist grave aligned E/W, with head to W end, 1.33m long, 0.5m wide, with lintel slabs and side slabs, no basal slabs. Poorly preserved supine skeleton with arms likely to have been positioned alongside the body – some long bone and skull fragments survive. Analysis showed that this was a child, aged 6-11 years.	 *Scale: 1m*
		
Burial 28 Infant Skeleton 229	Very poorly preserved infant burial - a few skull fragments and a part of a long bone survive. Under lintel slabs 76. At analysis, the infant was found to be 1-12 months of age, and female (ancient DNA analysis).	

Burial 29 Adult Skeleton 230	Adult burial. Detected in 2014 when the skull was visible in the section edge of the site. The top of this grave was marked by two parallel lines of stones aligned SW/NE. The well-preserved supine skeleton lay *c*.0.5m below these in wind-blown sand with the head to the SW end. The grave had cut through two earlier skeletons 231, 232), with some of bones, including the two skulls, placed over or alongside skeleton 230. Half an amber(?) bead and a possible piece of amber was found directly beneath skeleton 230. A radiocarbon determination (SUERC-65290 1248±33 BP) with a 2-sigma calibrated range of 676 -780 and 787 – 876 cal. AD was obtained from this skeleton. This adult was found to be in the age range of 46 years or older, and female.	*Scale: 1m* 
Burial 30 Double adult burial. Skeletons 231 and 232	The upper portions of both these E/W aligned skeletons were disturbed by the excavation of the grave for skeleton 230 and the disturbed bones placed in the grave of 230. The bone is well preserved with an arm of 232 lying across 231. A grave cut visible only in the section retained at the E end of the grave shows that the grave was cut from c.0.4-0.5m above the skeletons. A radiocarbon determination (SUERC-65289 1241±33 BP) with a 2-sigma calibrated range of 681 - 880 cal. AD was obtained from skeleton 231. Both skeletons were found to be male, 232 being middle adult (26-45 years of age). The age of 231 was undetermined. *Scale: 1m*	
Burial 31 Skeleton 233	The partial remains of two feet. The bones articulated, but nothing else present. Analysis showed that this was an adult burial, but the age was undetermined.	
Burial 32 Infant Skeleton 234	Infant burial. A collection of small bones may represent the remains of an infant burial. Analysis showed that this was a foetal burial (38 weeks gestation or less).	

Burial 33 Adult Skeleton 235	A partial adult skeleton, missing the head and other bones, placed in a 'folded' or kneeling position. Placed on rubble, not in a grave. Associated with limpet shells. A radiocarbon determination (SUERC-101162 902±26) with a 2-sigma calibrated range of 1044 (31.5%) 1087 cal AD; 1092 (4.0%) 1105 cal AD; 1120 (60%) 1218 cal AD was obtained from this skeleton. Analysis showed that this was a middle adult (26-45 years of age) and possibly male.	 *Scale: 1m*
Burial 34 Infant Skeleton 236	Infant burial. Cist grave 89. E/W aligned cist grave 0.8m long, 0.3m wide, internally 0.65 x 0.15, with lintel slabs and side slabs/stone, containing an infant skeleton in poor condition. Head to W. Analysis showed that this early child was 1-5 years of age, and male (ancient DNA analysis). *Scale: 1m*	 
Burial 35 Child Skeleton 238	Child burial. A concentration of bone fragments, possibly the remains of a child's skeleton. Analysis showed that this was a foetal burial, 38 weeks gestation or less.	
Burial 36 Adult Skeleton 239/240	 *Scale: 1m*	Adult skeleton with grave cut visible in section edge of site. Roughly E/W aligned, head to W. Supine. Right arm straight, left resting on pelvis. The upper, west end of this burial, a lintel long cist grave, was excavated in 2015, the lower, east end in 2019. Skeleton 239/240. This grave had cut through the earlier grave Burial B97 disturbing the right-side leg and pelvis - these bones had been placed in the grave of B36. Skeleton 240 was found to be a young adult (18-25) and female.

Burial 37
Infant
Skeleton
241

Infant burial. Cist grave 104. Cist grave with small lintel slabs and side slabs. No basal slabs. E/W aligned, 1.4m long, 0.6m wide. Head at W end, supine. Poorly preserved skeleton.
At analysis this was found to be the skeleton of a late child, 6-11 years of age.

Scale: 1m

Burial 38 Adult and infant Skeletons 242, 247 and 248	Grave fill 118. Skull of 242 noted at end of 2015. Upper, W, part excavated in 2016, the leg bones in 2021. In a dug grave below boulders 113. 242 - the head to west. Supine. Young adult. Possibly with foetus 248, but this is not certain. The partial skeleton of a young child, 247, lay directly on this skeleton. Initially it was considered that this was contemporaneous with 242, but it may be the remains of a disturbed skeleton placed in the grave of 242. Skeleton 242 was an adolescent with signs of maxillary sinusitis. Skeleton 247 was that of a female, 1-5 years of age (ancient DNA analysis). This skeleton also showed poretic hyperostosis. Skeleton 248 was found to be a foetus, 38 week or less gestation.	
	 *Scale: 0.5m*	 *Scale: 0.5m*
Burial 39 Infant Skeleton 243	The very fragile remains of an infant's skull were noted at the end of the 2015 excavation. It was not possible to recover any of it in 2016.	

Burial 40 Infant Skeleton 244

Infant burial. Cist grave 111. Small, 0.6m x 04m E/W aligned cist with lintel slabs and a side slab. No basal slabs. A cross had been inscribed on the top face of one of the lintel slabs. Skeletal remains comprised skull fragment and little else. Head to W. Analysis showed that this was an infant, 0-12 months. The remains showed signs of poretic hyperostosis and endocranial lesions.

Scale: 0.5m

Scale:0.5m

Scale: 1M

B41 Adult. Skeleton **245**	Adult burial. Cist grave 106. E/W aligned cist, 1.7m x 0.65m, with lintel slabs and side slabs, no basal slabs. Very well-preserved skeleton. Supine, head to W, hands crossed over pelvis. Possible infant bones present near right femur. At least five skulls of earlier burials were visible in the sides of this grave. The adult was found to be 18-45 years of age and male. The infant bones were found to be 0-12 months of age.	*Scale: 0.5m*
		
Burial 42 Infant Skeleton 246	Infant burial. Poor condition, skull displaced. Roughly aligned E/W. It lies above cist 126. *Scale: 0.5m*	

Burial 43 Infant Skeleton 249	Infant burial. Cist grave 127 consisting of 2 lintel slabs and 6 vertically placed side slabs/flat boulders (internal length 0.5m) containing an infant skeleton in very poor condition. E/W aligned, head to the W. 	 *Scale: 0.5m*
Burial 44 Juvenile Skeleton 250	Juvenile burial. Exposed in 2015 in the side of grave 107 when it was considered to be displaced. In 2016 it was found to be *in situ*, with the remainder of the skeleton running under the E side of the trench. E/W aligned with head to W. Skull removed, remainder of skeleton left *in situ* in 2016. Remainder of skeleton excavated in 2021. Juvenile, extended with arms to the side, feet together. In 2021 it was given skeleton number 774.  *Scale: 0.5m*	

Burial 45 Adult Skeletons 251/1009	Adult burials. Directly beneath skeleton 250. Exposed in 2015 in the side of grave 107 when it was considered to be displaced. In 2016 it was found to be *in situ*, with the remainder of the skeleton running under the E side of the trench., E/W aligned with head to W. Skull removed, remainder of skeleton left *in situ* in 2016 and excavated in 2021. Legs not present, as removed by later skeleton 1010. Skull = 251, remainder of skeleton = 1009.  *Scale: 0.5m*	
Burial 46 Adult Skeleton 252	Adult. As with 250 and 251 this was exposed in 2015 in the side of grave 107 when it was considered to be displaced.	
Burial 47 Infant Skeleton 253	Infant burial. Cist grave 126. Top of cist consists of 2 large shale slabs and several smaller slabs and the sides by upright shale slabs. Internal length 0.7m.E/W aligned. Head to W, flexed legs. Good condition. 	 *Scale: 0.5m*

Burial 48 Adult Skeleton 254	Adult burial. Grave fill 136/Grave 143. Directly below skeletons 257, 258, 259 and skeleton 736. E/W aligned, head to W. Prone (face down). Shale slabs laid over base of skull and over lower ribs. Upper part excavated in 2016, lower legs in 2021. In good condition. Analysis showed that this was a female adult skeleton aged 46 years or older.  	 *Skeleton 254, photographs of 2016 and one of 2021. Scales 10cm intervals.*
Burial 49 Infant Skeleton 255		Infant burial. E/W aligned, head to west. Slightly flexed. Ancient DNA analysis showed that this was a male. *Scale: 0.5m*

Burial 50 Infant Skeleton 256		Infant burial, E/W aligned, head to W. This skeleton partly underlies lintel slabs at the E end of cist grave 138. It seems likely that this burial was placed in the ground at the same time, or soon after, the construction of cist 138. *Scale5m*
Burial 51 Double /triple child burial. Skeletons 257, 258, 259	Grave fills 116, 129, 136/Grave 143. A double burial 257, 258, and possibly a triple burial if 259 is part of it. The later, large graves 26 and 107 cut through this grave. The top of this grave was capped by stones composed of a quartz 'pavement' and shale slabs and boulders. This overlay a distinct grave fill 116 containing a quantity of small finds and loose bone. The lower part of the fill was assigned number 136. This overlay two child skeletons – clearly buried at the same time. An infant skeleton may be contemporary with these two skeletons. Skeletons E/W aligned with heads to W. The upper parts of the skeletons were excavated in 2016, the lower legs in 2021. Analysis: 257 early child with signs of maxillary sinusitis, 258 early child male with signs of cribra orbitalia and maxillary sinusitis, 259 foetus.  *Lower legs of 257, 258 on excavation edge.* *Scale: 0.2m* *Scale (right): 1m* *Scale (top right): 0.5m*	 

Burial 52 Infant Skeleton 260	Infant burial. Only legs survive, remainder of body cut through by cist grave 141. N/S aligned, with head to S.	 *Scale: 0.5m*
Burial 53 Adult/ Juvenile Skeleton 261	Adult/Juvenile burial. Cist grave 139. Cist dug into top of wall 137, reusing stones from the wall. The cist narrows at the E end, and thus the feet of the burial were jammed in. E/W aligned, head to W, poor condition.	 *Scale: 0.5m*

Burial 54 Adult Skeleton 262	Adult. Cist grave 138. Large well-constructed cist grave, capped with several large stone slabs and with boulders as sides. Contains well-preserved adult burial, E/W aligned with head to W. The feet rest on a flat stone. Boulders of wall 42 form the W end of the cist. The top of the cist was only detected following the removal of sand 112; it is likely that this grave was cut from quite a high level through sand 112. Analysis showed that this was possibly a male skeleton aged 26-45 years. The skeleton showed signs of cribra orbitalia. 	*Scale: 0.5m*  *Scale: (left) 1m*
Burial 55 Infant Skeleton 263/224	Infant. Cist grave 140. E/W aligned, head to the W. Three small shale slabs formed the lintel to the cist. These lay directly over the wall 42 and the lintel slabs of the large cist grave 138, and at first were thought to be part of 138. An infant skull, 224, was found during initial cleaning in 2015, the location of which corresponds to the location of this cist, and therefore it is likely that 263 and 224 are the same skeleton. Poor condition. The cist was c.0.6m long. Cross incised on a stone placed on the edge of the grave (SF444).	

Burial 56 Infant Skeleton 264	Cist grave 141. Poorly constructed cist with no surviving lintel slabs and just 5 stones forming the sides. Poorly preserved, E/W aligned, with head to W. Analysis showed a child, 1-5 years of age, showing maxillary sinusitis. *Scale: 0.5m*	
Burial 57 Infant Skeleton 265	Poorly preserved and fragmentary. Alignment uncertain. Analysis showed that this was a foetal burial, (38 weeks gestation or less). *Scale: 0.5m*	
Burial 58 Infant Skeleton 266	E/W aligned, head to W. Legs raised up at knees. Good preservation. Analysis showed that this was a foetal burial, (38 weeks gestation or less). *Scale: 0.5m*	

Burial 59 Child Skeleton 267	Only a skull survived. The remainder of the skeleton was possibly removed by the insertion of cist 126. Analysis showed that this was a child's skull, 1-5 years of age. *Scale: 0.5m*	
Burial 60 Infant Skeleton 268	Loose, poorly preserved, and possibly disturbed bones of an infant burial. Directly below skeleton 267 and above 286, 287. *Scale: 0.5m*	
Burial 61 Child Skeleton 270	Aligned SW-NW with head to SW. Lower pelvis and legs were missing, truncated by an unknown agency. This skeleton had been inserted into the grave fill 161, some 0.2m above the skeleton, 284, in the grave. Analysis showed that this was an infant male burial 0-12 months old (ancient DNA analysis).	 *Scale: 0.5m*

Burial 62 Juvenile? Skeleton 271

Cist 128/Grave fill 132/Grave 151. E/W aligned, head to W, legs flexed. Shale slabs, 128, formed a capping to this grave approximately 0.4m above the skeleton. Most of the grave lay to the E of the 2016 trench edge. Only the skull and the upper parts of the skeleton were removed in 2016, the lower part of the skeleton was excavated in 2021.

2021 photo

Scale: 0.2m

Skeleton 271, 2016 photos and 2021 photo showing flexed legs. Scale: 0.5m

Burial 63 Adult Skeleton 272	Aligned SSW-NNE, with head to SSW. Legs crossed at the ankle with left foot overlying the right. Good condition. Lies below grave 151. Upper part of skeleton excavated in 2016, lower part in 2021. Shown on analysis to be an adolescent. 	 *Skeleton 272 – the legs of 272 are on the right of the above photograph.* *Scale: 0.5m*
Burial 64 Child Skeleton 273	E/W aligned with head to W. The skeleton rests on some of the higher protruding boulders of layer 182, this seems to the cause of the partially flexed nature of this skeleton. No grave for this skeleton was detected, but it may be cut from a relatively high level, ie through sand 112. A flat stone rested on the pelvic area of this skeleton. Analysis showed that this was an early child, 1-5 years of age and male (ancient DNA analysis). *Scale: 0.5m*	

Burial 65 Infant Skeleton 274	Grave 152/Grave fill 131. E/W aligned with head to W. Poor condition. Quartz pebble rested on the centre of the body. The grave fill, 131, contained a quantity of loose, redeposited bone. *Scale: 0.5m*	
Burial 66 Young Adult Skeleton 275 (and loose bone).	Grave 155/Grave fill 154. E/W aligned with head to the W. Good condition. Lower part of body excavated in 2016, lower legs in 2021. A quantity of loose, redeposited bone was present in the grave fill. Two analyses were conducted: Analysis 1 showed that this was a young adult, 18- 25 years of age and possibly male. The skeleton showed signs of poretic hyperstosis. Analysis 2 showed the bones to be those of an early child (1-5 years of age).  *Scale: 0.3m*	 *Scale: 0.5m* 

Burial 67 **Adult** **Skeleton** **276**	Grave 157/Grave fill 156. E/W aligned with head to W. Prone – face down. Legs slightly flexed. Upper (W) part of skeleton excavated in 2016, lower part in 2021. Lies beneath skeleton 767. Later analysis showed this to be a young adult, 18-25 years of age and probably female. 	 *Skeleton 276. Left in 2016, right in 2021. Scales 10cm divisions.* *Scale: 0.5m*
Burial 68 **Child** **Skeleton** **277**	Grave 159/Grave fill 158. E/W aligned with head to the W. Lying partly on side with legs flexed. Lower left leg missing? Stone placed over foot area and one over chest immediately below head. Analysis showed that this was a child, 1-5 years of age. *Scale: 0.5m*	

Burial 69 Infant Skeleton 278.	E/W aligned, head to W. Fair condition. Over grave fill 161/grave 162, into which it had slumped slightly. Analysis showed that this was a child, 1-5 years of age. *Scale: 0.5m*	
Burial 70 Infant Skeleton 280	Very poorly preserved. Alignment uncertain. Analysis showed that this was a foetal burial, 38 weeks gestation or less, and female (ancient DNA analysis). *Scale: 0.5m*	
Burial 71 Infant Skeleton 281	Poorly preserved and disturbed. Alignment uncertain. Lying on stones 182. Analysis showed that this was a foetal burial (38 weeks gestation or less). *Scale: 0.5m*	

Burial 72 Infant Skeleton 282	E/W aligned with head to W. Fair preservation. *Scale 0.5m*	
Burial 73 Adult Skeleton 283	Grave 166/Grave fill 165. E/W aligned with head to W. Directly below skeleton 276. Only the upper part of the body lay within the excavated area. *Scale: 0.5m*	
Burial 74 Adult Skeleton 284	Grave 162/Grave fill 161. E/W aligned with head to W. Position of head indicates the body had been squashed into the grave. Stone slabs on skeleton and quartz pebble between the legs. Good Condition. This skeleton lay directly over skeleton 290 – possible double burial, or skeleton 284 was placed in the short grave originally dug for 290; this would account for the unusual position of the head. Analysis showed that this was a female skeleton aged 18-25 years. 	 *Scale: 0.5m*

Burial 75 Juvenile Skeleton 285	Grave 168/Grave fill 167. N/S aligned with head to N. Quartz pebble below legs. Good condition. Two radiocarbon determinations (SUERC-69156 1242±33 BP; SUERC-74427 1248±30 BP) were obtained from this skeleton with a 2-sigma calibrated ranges of 680 (95.4%) 878 cal AD and 678 (72.4%) 779 cal AD, 789 (23.0%) 871 cal AD. Analysis showed that this was a child, 6-11 years old and female (ancient DNA analysis). The skeleton showed signs of cribra orbitalia. *Scale: 0.5m*	
Burial 76 Double child burial Skeletons 286/287	E/W aligned, heads to W. The body of 286 lay partly on its side with legs slightly flexed. 287 is in a slightly curved attitude. Skeleton 286 analysis showed that this was an infant (0-12 months of age), and male (ancient DNA analysis), showing signs of cribra orbitalia. Skeleton 287 was an early child, 1-6 years of age.  *Scale: 0.5m*	

Burial 77 Infant Skeleton 288	N/S aligned, head to the N. Fair preservation but with lower part of body missing. Slate slab placed over centre of body.  *Scale: 0.5m* 	
Burial 78 Infant Skeleton 289	NE/SW aligned with head to SW. Fair to good condition. *Scale: 0.5m*	

Burial 79 Adult Skeleton 290	Grave 189/Grave fill 188. Directly beneath skeleton 284. Possibly in the same grave as 284 – i.e., possibly 284 and 290 are a double burial. E/W aligned with head to the W. Upper part of skeleton excavated in 2016, lower part in 2021. Analysis showed that this was a female, 18-25 years of age.  *Scale: 0.5m*	
Burial 80 Cist grave 20	The east end of a cist grave with lintel and side slabs – the west end removed during the 1970 excavation? No bone survived – possibly removed in 1970? *Scale: 0.5m*	

Burial 81 Infant Cist grave 28	Small E/W aligned cist grave, 0.88m long. Side slabs of slate and rounded stones. One large lintel slab surrounded by 20 small, rounded quartz stones. No skeletal remains. In the photograph the emptied cist grave is shown with the excavated quartz pebbles in a pile. *Scale: 0.5m*	
Burial 82 Child Cist grave 61(30).	Recognised in 2014 and assigned number 30. E/W aligned cist grave, 1.28m x 0.43m. No skeletal remains present. The cist comprised substantial side slabs and an upright east end slab/marker. This would have been the foot end of the grave, assuming the head was to the W. A layer of quartz pebbles was spread over the top of the cist.  *Scale: 0.5m*	 

Burial 83 Infant Possible cist 69	Eight boulders set on edge surrounding central area 0.5m x 0.2m may be the remains of a small cist grave. No skeletal material survived. *Scale: 0.5m*	
Burial 84 Cist grave 85	Two slabs mark (in total 0.7m E/W, 0.3m wide) what was probably the top of an infant's grave. No skeletal remains and there were no side or basal slabs. *Scale: 0.5m*	
Burial 85 Cist grave 86	Protruding from the east side of the site – not excavated. Upright side slabs of a small cist between which was a layer of limpet shells. Child? *Scale: 0.5m*	

Burial 86 Cist grave 98	Cist grave cut through by later cist grave 89. E/W aligned, 1.40m x 45m. Represented by several upright slabs that would have formed the sides of the cist. No skeletal remains. The photograph below shows the cist 89 cutting through 98, and grave 115. Juvenile? *Scale: 0.5m*	
Burial 87 Grave 115	Shallow rectangular pit aligned NW-SE, 0.6m x 0.3m, with a small stone slab upright at its NW end. No skeletal remains, although likely to have been an infant's grave.  *Scale: 0.5m*	

Burial 88 **Grave 134**	Fill 133/Slabs 121. Three shale slabs overlay a fill containing a jumble of loose, disarticulated bone in a 0.6m long, 0.3m wide pit. This may have been dug in order to dispose of burials disturbed by later graves. 	 *Scale: 0.5m*
Burial 89 – see Burial 38		

Burial 90 infant/child grave 506	The cist of this burial (506) measured 1.15m E/W and 0.6m N/S. The top of the grave was flush with the top of layer 504 and was visible as six upright shale slabs one at the west end, one at east and two on either side. A pavement of quartz pebbles and other rounded stones occupied the rectangular space formed by the slabs. Upright rounded stones lay at the NE, SE and SW corners (presumably there once had been a NW corner stone). A small, upright shale slab had been positioned midway along the external east end of the grave. This slab, probably a grave marker, had been shaped to a point and buried in the sand, point down, to a depth of 0.3m. What had probably been the upper portion of the slab had broken off at ground level. Unfortunately, the slab was cracked and laminated and disintegrated on removal. Removal of the quartz pebbles revealed that they sat on horizontal shale slabs. During excavation it was discovered that several rounded boulders had been placed around the outside of the grave to help support the upright shale slabs. No skeletal remains were present in the cist grave – this has been the same with all the graves that have quartz pebbles over them.  	   *Photographs of Burial B90 showing the grave at various stages of excavation (starting top right) and the grave marker (below). Scales: 1m and 0.5m.* 

Burial 91 **Skeleton 702**	Small cist grave noted in the edge of the 2016 excavation. The grave comprised two small upright slabs at the west end and several small upright slabs at the east end. Large, rounded stones placed over these may have been a deliberate action or be part of a later rubble deposit. The cist measured c.0.5m in length E/W. Skeletal remains (702) were poorly preserved. The remains of the skull lay at the west end; other bones could not be identified with confidence.  *Scale: 0.5m*	
Burial 92 **Skeleton 703**	Small lintel long cist grave, 0.6m in length E/W and covered by 8-9 flat slabs. The slab over the west (head) end had a cross lightly scratched on the downward-facing side (Small Find 903). Several upright stones formed the sides of the cist. The only skeletal remains were teeth found at the west end (703). 	 *Burial B92 showing the top of the cist and the cross incised stone after excavation. Scale: 0.5m.*

Burial 93 **Cist grave 521**	A coffiN/Shaped shale slab (small find number 904), 0.62m by 0.18m and 0.03m thick capped lintel long cist grave 521. A cross had been lightly scratched onto the upper surface of the slab and a more distinct cross on the underside. Removal of this capping stone revealed a small cist grave composed of 6-7 small upright slabs and four flat basal slabs. Basal slabs have been rarely recorded at St Patrick's. No skeletal remains were present.   *Scale: 0.5m*	

Burial 94 Skeleton 704	Lintel stone grave 523 comprised three horizontally laid shale slabs. These covered the skeletal remains - there were no obvious side slabs to the cist. The skeletal remains (704) were difficult to identify and seemed to be disarticulated and possibly from several individuals.  *Burial B94 top of the cist grave. Scale: 0.5m.*
Burial 95 – Skeletons (infant and older child) 705 and 706	Lintel long cist grave of 20 small lintel slabs which covered a poorly constructed cist. The east end of the grave comprised a gap in the boulders of rubble 88. Two upright shale slabs formed the west end. Internally the cist measured 0.8m. There appeared to the two individuals buried in the cist, an infant and an older child (705, 706). It was not possible to separate the bones. Heads to the west. A radiocarbon determination (SUERC-101163 1086±26) with a 2-sigma calibrated range of 890 (84.0%) 1060 cal AD; 1070 (11.4%) 1150 cal AD was obtained from a rib bone from one of these skeletons. Analysis showed these were both aged 1-6 years of age, with signs of cribra orbitalia. *Scale: 0.5m.*  *Burial B95 after removal of the lintel slabs showing the two skeletons 705 and 706.*

Burial 96 Adult Skeleton 701

A lintel long cist grave. This burial was marked by a distinct soil mark (516) outlined by large stones place around its edge after the grave had been backfilled. A glass bead (908) was found in the upper levels of the grave fill. At 0.95m it was one of the deepest graves discovered on the site. It was E/W aligned. The top of the lintel grave (518) lay 0.6m below the top of the grave fill and consisted of numerous roughly laid flat shale slabs overlying a neat cist composed of nine vertically set shale slabs. A single shale slab lay beneath the pelvis of the skeleton. An upright shale slab (small find 914) shaped to a pointed end rested on the top of the lintel slabs at the west end of the grave, with the point resting on a lintel slab. This grave marker had snapped off at the top of the grave fill some time in the past. The skeleton (701) was in fair condition, with the skull and some long bones surviving. Head to the west, supine, with arms straight by the side. A small quartz pebble had been placed to the right side of the skull and a larger one to the left side.

Skeleton 701

Scale: 0.5m

Detail of skull showing quartz stones

Burial B96 showing the top of the grave Scale: 1m

The top of the cist with grave marker Scale: 0.5m

Empty cist with basal slab Scales: 1m and 0.5m

Burial 97 Adult Skeleton 707	No cist was visible. The skeleton (707) lay in sand 73 just above the buried soil 41. It was N/S aligned with the head to the N. Supine, legs extended. Left arm alongside the body with thumb beneath the femur. Right arm flexed with hand up to neck. At a later date burial B36 had cut through this burial removing part of the pelvis, the right femur and parts of the tibia and fibula. These bones were found in the grave of Burial B36. Other than this damage the skeleton was in good condition with the bones of the hands and feet surviving. 	Later analysis showed that this was propbably a male, and the skeleton showed periosteal new bone.  *Scale: 0.5m*
Burial 98 Infant Skeleton 708	A small lintel long cist grave (525) within sand 73. Five horizontally placed small shale slabs lay over the cist. The sides of the cist consisted of 6-7 medium-sized platy, rounded stones set on edge pushed into the soft sand. The cist was aligned E/W and was 0.7m long. The skeleton (708) was very poorly preserved, with just part of the skull surviving at the west end. The skeleton measured about 0.5m in length.   *Scale: 0.5m*	
Burial 99 Infant Skeleton 709	Revealed after removal of stone rubble 532. A small lintel long cist grave (528). Three horizontally placed shale slabs marked the top of the cist. The sides were formed from five upright rounded stones and a shale slab at the west end. The cist was E/W aligned and was 0.76m long. The skeleton (709) was poorly preserved with just the base of the skull and traces of leg bones surviving. Head at west end.	

	 *Scale: 0.5m*	
Burial 100 Adult/ Juvenile Skeleton 710	This grave showed as a distinct soil mark (529) towards the base of sand deposit 73. The grave measured 1.8m E/W. There was no cist. The skeleton (710) was very poorly preserved with just a crushed and fragmentary skull surviving at the west end of the grave and traces of right arm. The body appears too short for the length of the grave.  *Scale: 0.5m*	
Burial 101 Infant Skeleton 711	This small lintel long infant cist grave (530) was revealed after the removal of a massive boulder, part of rubble 532. The grave lay within sandy deposit 73. Five shale slabs lay over the cist. The sides of the cist were formed from eight large upright rounded stones. The cist was aligned E/W and was 0.8m long. The upper part of the skeleton was well preserved; the lower part had almost entirely disintegrated. Head to the west; the skeleton measured 0.5m long. Later analysis showed this to be an early child (1-5 years of age) with signs of cribra orbitalia. *After removal of the lintel stone and skull. Scale: 0.5m*	

		
Burial 102 Infant grave 524	A small cist grave (524) within sandy layer 73. No lintel slabs. The sides of the cist consisted of six upright shale slabs and two rounded stones. No skeletal material survived. It was E/W aligned and 0.6m long. *Scale: 0.5m*	
Burial 103 Juvenile Skeleton 712	A small cist grave (540), 0.90m long, defined by rounded boulders and capped by a single boulder, roughly E/W aligned. Only traces of skeleton 712 survived. Head to W. *Scale: 0.5m*	

Burial 104 Infant Skeleton 713	A small cist grave (541), 0.58m long, defined by a single upright slab on the S side, 4-5 smaller slabs on the N side and one upright stone at the E end. E/W aligned. Only part of the skull of skeleton 713 survived. Head to W. *Scale: 0.5m*	
Burial 105 Child Skeleton 714	Mixed, disturbed bones, possible of a single child burial, but more likely to have been the bones of several individuals.	
Burial 106 – loose bone SK 715	A collection of bones from several individuals redeposited on the top of a large cist grave. The cist grave did not cut through earlier burials and so this loose bone must have come from disturbed burials elsewhere in the cemetery. *Scale: 0.5m*	
Burial 107 Infant grave, skeleton 716	An infant cist grave (545), 0.70m long, E/W aligned with the head to the W. The cist was built on top of an earlier wall. No bone survived, only traces of teeth. 	 *Scale: 0.5m*

Burial 108 Infant Skeleton 717	Small, partial cist grave (548), 0.31m long, aligned E/W. The cist is defined by three vertically placed stones. Only fragments of the skull of skeleton 717 survived. Head to the W.	 *Scale: 0.5m*
Burial 109 Collection of bones 718. Child/ Infant burial.	A disturbed area containing a collection of bones of a least on individual, but probably the disturbed remains of more.	 *Scale: 0.5m*
Burial 110 Infant Skeleton 719	A cist grave (547) defined by 2/3 upright small slabs and 3 rounded stones, no lintel slabs, E/W aligned, 0.60m long. The skeleton, 719, was in very poor condition with just the skull and parts of the major long bones surviving. Head to the W.	 *Scale: 0.5m*
Burial 111 Infant Skeleton 720	Some of the bones of this skeleton (720) seem to have been disturbed at some time, and possible mixed with other bones. The skeleton was flexed, and N/S aligned with the head to the S. The bone was in good condition, but very fragile and so was lifted in bulk and sieved to ensure full recovery. Two samples were analysed, 720a were foetal remains, and 720b were juvenile remains. *Scale: 0.5m*	
Burial 112 Infant Skeleton 721	A lintel long cist grave (549), E/W aligned, 0.47m long. Three lintel slabs capped the grave, but the edges were defined by just three upright stones. Skeleton (721) preservation was good. It was possibly lying on its right side with legs slightly flexed. Head to the W. Two samples were analysed: 721a indicated and infant burial (0-12 months) and 721b indicated a foetal burial (38 weeks gestation or less). *Scale: 0.5m*	

	 	
Burial 113 Juvenile Skeleton 722	Grave (551) dug into the top of wall 42. Although not a cist as such, the stones of the wall form a surround to the grave. It is 1.10m long, E/W aligned. The skeleton (722) is well-preserved, supine, extended, with head to the W. Later analysis showed that this was a late child (6-11 years of age), with cribra orbitalia and linear enamel hypoplasia. *Scale: 0.5m*	
Burial 114 Infant Skeleton 723	This skeleton (723) was partially exposed in the 1924 excavation when the right leg, feet and lower right arm were removed. The remaining bones were in good condition. It was E/W aligned, head to the W, supine, but slightly flexed with left hand resting on the pelvis.Later analysis showed: periosteal new bone, cribra orbitalia, porotic hyperostosis, endocranial lesions and metabolic disease. *Scale: 0.5m*	
Burial 115 Adult Skeleton 724	The west end of this grave was revealed but not excavated in the edge of the 2016 excavation. The grave (550) showed as a soil mark, 1.88m long, E/W. Several stones had been placed along the edges of the grave, but it cannot be termed a cist. The skeleton (724) was generally well-preserved, although some smaller bones had rotted. Supine and extended, with the left arm across the abdomen and the right across the pelvis. Head to the W. Later analysis showed that this was a middle-adult, 25-46 years of age, with dental disease, degenerative joint disease and also had a kidney stone.	 *Skeleton 724* *Scale: 1m*

	 *Burial B115 showing left the soil mark of the grave*	
Burial 116 Infant Skeleton 725	Skeleton 725, in loose sand, aligned SW/NE, with head to the SW. Supine. Lifted in bulk and sieved to ensure full bone recovery. Later analysis showed periosteal new bone, endocranial lesions and signs of infectious disease. *Scale: 0.5m*	
Burial 117 Child Skeleton 726	The skeleton, 726, of this burial predates a large cist grave (553) and was slightly damaged when the cist was constructed. The skeleton was E/W aligned with the head to the W. It lay on its right side, slightly flexed with the head facing S. Later analysis showed the likely age was 1-5 years of age, with metabolic disease and linear enamel hypoplasia. *Scale: 0.5m*	
Burial 118 Adult Skeleton 728	A possible grave cut (555) was detected for skeleton 728. The skeleton was prone, that is face down, with the torso sightly twisted, otherwise extended. The left hand lay beneath the stomach, the right under the pelvis. E/W aligned with head to the W. This skeleton was shown to be a female, 26-45 years of age, with signs of cribra orbitalia. *Scale: 0.5m*	

Burial 119 Infant Skeleton 729	E/W aligned skeleton, 729, with head at W end, supine, extended. Skull crushed and lower part on body missing. Later analysis showed this to be an early child, 1-5 years of age.	 *Scale: 0.2m*
Burial 120 Adult Skeleton 730	This adult skeleton, 730, was in a lintel stone grave (553). The skeleton was in good condition, although some disturbance had occurred to the feet and the skull was detached from the neck. It was E/W aligned, head to the W, supine and extended. Bones from a disturbed burial had been placed on this skeleton. Later analysis showed this to be a juvenile.  *Scale: 1m*	 *Scale: 0.5m*
Burial 121 Infant Skeletons 731 and 733	Very fragmentary and disturbed skeleton 731. Part of a skull and vertebrae of 731 within grave 556 containing skeleton 733. 731 was probably disturbed by the digging of grave 556. 731 was an infant burial showing signs of periosteal new bone. 733 was in the age range of 1-5 years of age with cribra orbitalia.	
Burial 122 Child and adult Skeletal remains 732	Fragmentary and disturbed bone of skeleton 732 lying within a small cist. The cist comprises a single edge slab and a basal slab. Two samples were analysed, 732a was from a child aged 1-5 years of age and showing endocranial lesions. Sample 732b was from an adult, age undetermined.	 *Scale: 0.5m*

Burial 123 Juvenile Skeleton 733	Skeleton 733 aligned E/W with head to the W. Supine with the legs slightly flexed. This skeleton was later found to be an early child (1-5 years) with signs of cribra orbitalia.  *Scale: 0.5m*
Burial 124 Adult Skeleton 734	Skeleton 734, supine, but slightly on left side, extended, with left arm extended down the side and the right across pelvis. The lower legs were left *in situ*. The grave, 559, was dug hard up against wall 42. Analysis showed an adult, 26-45 years of age, female. The skeleton showed signs of degenerative joint disease, dental decay and linear enamel hypoplasia.

Scale: 0.5m

Burial 125 Double adult burial Skeletons 735 and 748	A double, prone adult burial, skeletons 735, 748. The skeletons had been partly exposed during the 1924 excavation and long bones placed over the legs of skeleton 735 probably occurred at this time. The skeletons were headless, almost certainly the result of a later, circular pit having been excavated – this exact nature of this pit was not revealed until lower in the excavation trench. Later analysis showed that 735 was in the age range of 18-25 and male, with signs of infectious disease.	

		 *Scale: 1m*
Burial 126 Adult Skeleton 736	The upper and lower parts of this skeleton, 736, had been removed by an unknown agency. It overlay the feet bones of skeleton 254. Later analysis showed that this was probable a female and juvenile.  *Scale: 0.3m*	
Burial 127 Infant Skeleton 737	Very little survived of skeleton 737, just the spine, pelvis and part of the right hand. E/W aligned with head to the W.	

Infant Burial 128 Mixed bone	A pocket of small, mixed bone was probably of one infant, but bones from other individuals may have been mixed with them.	
Burial 129 Infant Skeleton 739	Infant Burial. Only the upper part of skeleton 739 survived. The lower part having been removed by cist 138. E/W aligned, head to the W, supine and extended. Later analysis showed that this skeleton was 1-5 years of age, and showed signs of endocranial lesions and periosteal new bone growth.  *Scale: 0.3m*	
Burial 130 Adult Skeleton 740	A very poorly preserved adult skeleton, 740, with right leg and lower left leg surviving to any extent. The feet lay under the edge of the site and were left *in situ*. The upper part of the skeleton had been cut away by grave 559, with most of the bones of 740 ending up in the fill 557 of grave 559. Later analysis showed this to be a juvenile.	 *Scale: 1m*

Burial 131 Adult Skeleton 741	This child skeleton 741 had been cut off at the pelvis with just the legs surviving. The lower legs were removed during the 1924 excavation. E/W aligned with the head to the W. Supine and extended with the legs slightly flexed. It overlies the two prone burials 735 and 748.  *Scale: 0.5m*
Burial 132 child Skeleton 742	Child burial in excellent condition. E/W aligned, with head to W. Supine, extended. Analysis showed this to be an early child (1-5 years).  *Scale: 0.5m*

Burial 133 Infant Skeleton 743	A lintel long cist grave (560), 0.55m long, containing an infant skeleton 743. A poorly preserved skull was the only surviving skeletal remain. E/W aligned, head to W. Two samples were analysed. 743a indicated and early child (1-5 years). 743b indicated a foetus.   *Scale: 0.5m*	
Burial 134 Infant Skeleton 744	Fragmentary infant skeleton 744 with just spine, pelvis and ribs surviving. N/S aligned. Later analysis indicated a juvenile skeleton.	 *Scale: 0.2m*
Burial 135 Infant Skeleton 745	This infant skeleton had been disturbed at some time – part of the skull rested on the pelvis and the lower legs were missing. E/W aligned, head to W. Supine and extended. It overlay skeleton 754. Later analysis showed that this skeleton was 1-5 years of age, showing ectocranial lesions.	 *Scale: 0.3m*

Burial 136 Infant? Skeleton 746	Only a fragmented skull 746 remained of this possible infant burial. Later analysis showed that was possible a juvenile burial.	 *Scale: 0.3m*
Burial 137 Infant Skeleton 747	Infant burial. Head at NW end. Very fragile and lifted in a block to sieve. Possibly in foetal position.	
Burial 138 Skull only 749	Not is situ and detached from the rest of the body. Analysis showed mixed remains: 749a indicated a child 6-11 years of age with linear enamel hypoplasia. 749b were foetal remains.	*Scale: 0.4m* 
Burial 139 ?Infant Skeleton 750	A collection of fragmentary, small bones, 750. May have been the remains of an infant burial. Analysis showed the bones to be the remains of an infant 0-12 months.	

Burial 140 Infant Skeleton 752	Infant burial, E/W aligned with head to W facing north. Slightly flexed. Hands resting on pelvis. Right foot over left foot. It directly overlies skeletons 777 and 776. Analysis showed this to be a child 1-5 years of age. *Scale: 0.5m*	
Burial 141 Juvenile Skeleton 753	Juvenile burial. N/S aligned with head to the N. Well-preserved skeleton, supine, extended. Hands resting on pelvis, legs crossed at ankles. The grave lay at the base of the 1924 excavation trench, but not disturbed by the trench. Later analysis showed this juvenile to display signs of cribra orbitalia, linear enamel hypoplasia and dental disease. *Scale: 1m*	
Burial 142 Child Skeleton 754	Child burial, E/W aligned, head to W. Supine and slightly flexed. Parts of the right side had been removed by an unknown agency. The skull was removed before the remainder of the skeleton was excatvated. It lay directly below skeletons 745 and 749. *Scale:0.5m*	

Burial 143 Adult Skeleton 755	Adult burial. Only the pelvis and parts of legs survived. Legs bent a knee. Skeleton supine, E/W aligned with head to W.  *Scale: 0.3m*	
Burial 144 Infant Skeleton 756	Infant burial, supine, extended, E/W aligned, head to W. Later analysis showed this to be an early child (1-5 years of age), with signs of cribra orbitalia, periosteal new bone, endocranial lesions and porotic hyperostosis.	*Scale: 0.3m* 
Burial 145 Infant Skeleton 757	A pocket of very fragmented bone, skeleton 757, may be the remains of a disturbed infant burial. Later analysis showed this to be foetal remains, 38 weeks gestation or less.	
Burial 146 Infant Skeleton 758	Infant burial. E/W aligned, head to W, supine, flexed. Poor condition, fragmented skull and leg bones survived, little else. Later determined as 1-5 years of age.	

Scale: 0.5m

Burial 147 Infant Skeleton 759

Scale: 0.5m

Infant burial, E/W aligned, head to E, supine, extended. Very poor condition, fragmented skull and long bones survived, little else. Later determined as 1-5 years of age.

Burial 148 Adult Skeleton 760

Adult burial. E/W aligned, head to W, supine, extended but slightly flexed. Hands over pelvis. A number, c.25, small, flat pebbles were found over the thorax and in the mouth. The feet lie under the skull of skeleton 761. Analysis showed this to be an adolescent.

Scales: 0.5m and 0.2m

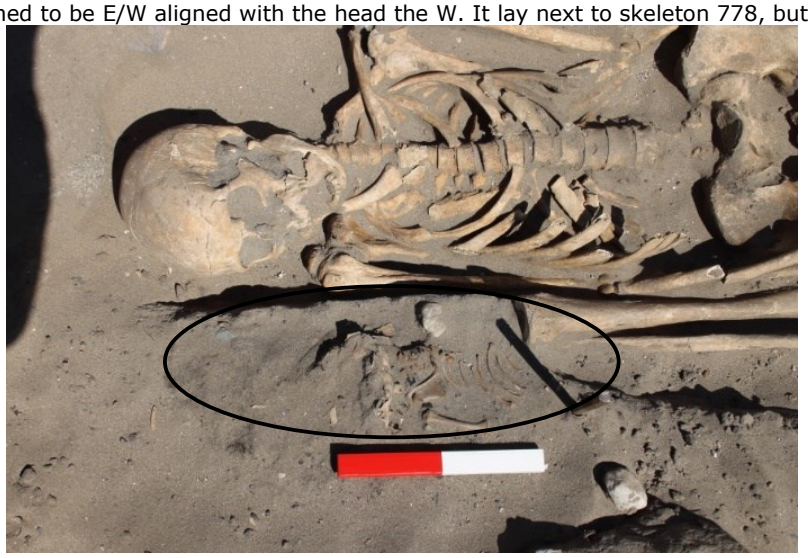
		
Burial 149 Adult Skeleton 761	Young adult burial (18-25). E/W aligned, head to W, supine, extended. Hands by side, left leg crossed over right. Good condition. Skull overlies the feet of 760.  *Scale: 0.5m*	
Burial 150 Infant Skeleton 762	Infant burial. NW-SE aligned with head to the NW. Fragmentary. Bulk lifted to ensure full recovery of bone during sieving. Showed signs of porotic hyperostosis. Skeleton 762 is to the right of the small scale. *Scales: 0.5m and 0.2m*	

Burial 151 Skeleton 763	Loose skull, skeleton 763, possibly displaced from the skeleton 764 of which only the lower leg bones survived. *Skull of B151 with lower legs of B152 to left. Scale: 0.5m*	
Burial 152 Adult Skeleton 764	Lower legs only, adult skeleton 764. E/W aligned, head to W, supine, extended. The displaced skull 763 may be from this burial. See photograph of B151.	
Burial 153 Adult Skeleton 765	Adult male burial, E/W aligned, head to W, supine, extended. Left arm across torso, right hand resting on pelvis. 26-45 years old (analysis). Good condition. *Scale: 0.5m*	
Burial 154 Infant Skeleton 766	 *Scale: 0.3m*	Infant burial, E/W aligned, head to the W, supine, extended. Good condition. Small purple stone on chest. Later determined as 1-5 years of age.

Burial 155 Juvenile Skeleton 767	Juvenile burial, E/W aligned, head to W, supine, extended. Right hand on pelvis, left arm extended. Overlies skeleton 276. Later determined as 6-11 years of age. *Scale: 0.3m*	
Burial 156 Child Skeleton 768	Child burial, E/W aligned, head to W, prone, extended. Left arm by side, right arm bent and hand lying under spine. Analysis shows this child was 1-5 years of age. *Scale: 0.5m*	
Burial 157 Infant Skeleton 769	Infant burial, W-E aligned, head to E, supine, legs flexed. Leg bones disturbed. *Scale: 0.2m*	
Burial 158 Infant Skeleton 770	Infant burial, W-E aligned, head to E, supine, legs flexed. Partial skeleton, bones disturbed. *Scale: 0.2m*	

Burial 159 Infant Skeleton 771	Infant burial, E/W aligned, head to W, supine, extended. Lower legs decayed. Right arm bent at elbow with arm resting on chest, left arm extended. *Scale: 0.3m*	
Burial 160 Infant Skeleton 772	Infant burial, N/S aligned, head to N, supine, extended. *Scale: 0.5m*	
Burial 161 Early child Skeleton 773	 *Scale: 0.2m*	Analysis showed that this was an early child burial, aged 1-5 years. Only the legs survived. SE-NW aligned, head to NW, supine, extended?
Burial 162 Skull only 774b	Loose skull, skeleton 774b, no traces of other skeletal remains. Analysis determined this as a child 6-11 years of age, or juvenile burial.	

Burial 163 Adult Skeleton 775	Adult burial (26-45 years of age), N/S aligned, head to S, supine, extended. The skull showed anti mortem tooth loss. *Scale: 0.5m*	
Burial 164 Infant Skeleton 776	Infant burial, N/S aligned, head to N, supine, legs flexed. Cuts away skeleton 777. Lies beneath 752.  *Skeleton 776 on left of photograph, skeleton 777 in centre. Scales: 0.4m and 0.2m*	
Burial 165 Child Skeleton 777	Child burial, E/W aligned, head to W, supine, extended. Arms by side. Lower part of the skeleton was removed or disturbed when skeleton 776 was placed in the ground. A single upright shale slab lay immediately to the south of B165, but the grave cannot be considered a cist. See photograph of burial B164 above. Later determined as 6-11 years old.	

Burial 166 Adult Skeleton 778	Adult male burial (46 years of age or older), E/W aligned, head to W, supine, extended, arms extended with hands on hips. Showed dental decay and ante-mortem tooth loss.  *Scale: 0.5m*
Burial 167 Infant Skeleton 779	Infant burial. This skeleton lay at the base of the 1924 excavation trench and probably had been disturbed. It was incomplete, but seemed to be E/W aligned with the head the W. It lay next to skeleton 778, but not related to it.  *Skeleton 779 next to 778.Scale: 0.2m*

Burial 168 Infant Skeleton 780	Infant burial, a collection of small bones, probably the remains of an infant burial had been placed over the feet of skeleton 778, disturbing some of the feet bones of 778. 780 was placed in the ground sometime after 778.  *Skeleton 780 is visible as the small bones overlying the feet of the adult skeleton 778* *Scale: 0.5m*	
Burial 169 Infant Skeleton 781	Infant skeleton 781, E/W aligned, head to W, supine, extended. It is unclear how it relates to the adjacent skeletons 734, 760. Later determined as 1-5 years of age. *Scale: 0.2m*	
Burial 170 Infant Skeleton 782	Infant skeleton 782, Disturbed and incomplete, just legs and part of pelvis survived. E/W aligned, head to W? supine *Scale: 0.2m*	

Burial 171 Infant Skeleton 783	Infant skeleton 783, very small bones in cist grave 580. The cist consisted of upright shale slabs on the N and S sides between which were c.10 quartz stones. Cist 0.6m long. Skeleton E/W aligned, head to W.  *The top of cist grave 580. Scale:0.2m*	
Burial 172 Infant Skeleton 784	Infant burial, only small skull fragments survived.	
Burial 173 Juvenile Skeleton 785	Juvenile burial, E/W aligned, head a W end, supine, extended, right arm extended, left arm folded across abdomen. Skull damaged and placed on abdomen. Skeleton inserted between stones giving the appearance of a cist. Later determined as an older adult, 46 years of age, or above. Showed signs of degenerative Joint disease. Possibly female.	

Scale: 0.5m

Burial 174 Infant Skeleton 786

Infant burial, E/W aligned, head to W, supine, extended.

Scale: 0.3m

Burial 175 Skull only 787	Loose skull, probably displaced, no other skeletal remains. Shown on analysis to be 1-5 years of age.
Burial 176 Infant Skeleton 788	Infant burial, E/W aligned, head to W, supine but slightly tilted to right side, slightly flexed. Shown on analysis to be 1-5 years of age.  *Scale: 0.5m*
Burial 177 Infant Skeleton 789	Infant burial, E/W aligned, head to W, supine, flexed. Head pushed forward. Later than skeleton 790. Shown on analysis to be 1-5 years of age.  *Skeleton 789 to right, 790 to left.* *Scale: 0.5m*

Burial 178 Infant Skeleton 790	Infant burial, E/W aligned, head to W, supine, extended. See photograph above. Determined by analysis as an early child, 1-5 years old.	
Burial 179 Infant Skeleton 791	Skeleton 791, a collection of small bones, presumed to be an infant burial. Lift in bulk to ensure full bone recovery during sieving.	
Burial 180 Infant Skeleton 792	Infant burial, E/W aligned, head to W, supine, slightly flexed, in grave 584.  *Scale: 0.4m*	
Burial 181 Skeleton 793	Skeleton 793, a small collection of bones, possibly articulated feet bones, but could be the disturbed bones from several individuals. Age determined as 1-5 years old.	

Burial 182 Adult Skeleton 794	A single femur and part of the pelvis is all that remained of this burial, the remainder having been disturbed/removed during the 1924 excavation. E/W aligned, head to W, flexed?	
Burial 183 Infant Skeleton 795	Infant burial, E/W aligned, head to W, supine, extended.  *Scale: 0.3m*	
Burial 184 Juvenile Skeleton 796	Juvenile burial, E/W aligned, head to W, supine, extended. In a cist grave, 592, partly formed by the stones of a wall and partly by upright shale slabs. Analysis showed an adolescent, 12-17 years of age.  *Scale: 0.5m*	

Burial 185 Infant Skeleton 797	Infant burial, E/W aligned, head to W, supine, flexed. Later analysis showed endocranial lesions.	 *Scale: 0.2m*
Burial 186 Infant Skeleton 799	Infant burial, E/W aligned, head to W, supine, extended.  *Skeleton 799 at top of photograph, 1001 at bottom. Scale: 0.4m*	
Burial 187 Child Skeleton 1001	Child burial, E/W aligned, head to W, supine, extended. See photograph above. Analysis showed that this was a infant burial, 0-12 months.	
Burial 188 Adult Skeleton 1002	Adult skeleton, folded burial, probably the result of having been in a bag or similar container. Head to the W. A radiocarbon determination (SUERC-101164 1216±26 BP) with a 2-sigma calibrated range of 706 (9.7%) 737 cal AD, 772 (85.7%) 886 cal AD was obtained from this skeleton. Later analysis showed this to be an adolescent.	

	 *Scale: 0.5m*	
Burial189 Infant Skeleton 1003		Infant burial, E/W aligned, head to W, supine, slightly flexed. Later analysis showed this to be an early child burial (1-5 years). *Scale: 0.2m*
Burial 190 Infant Skeleton 1004		Infant burial, E/W aligned, head to W, supine, extended, legs crossed at ankles. Beneath two large flat shale slabs. *Scale: 0.2m*

		
Burial 191 Juvenile Skeleton 1005	Juvenile burial, E/W aligned, head to W, supine, extended, lower part of body removed by later grave/disturbance. Analysis showed this to be an early child burial (1-5 years of age).  *Scale: 0.3m*	
Burial 192 Infant? Skeleton 1006	Infant? burial, disturbed, unarticulated bones directly beneath skeleton 1002. Analysis showed this to be a foetal burial, 38 weeks gestation or less.	

Burial 193 Skull only Skeleton 1007		Skull only. Analysis showed this to be a late child, 6-11 years of age. *Scale: 0.2m*
Burial 194 Child Skeleton 1008	Child burial, E/W aligned, head to W, supine, extended. Head and Legs were not present. Analysis showed this to be a late child, 6-11 years old. *Scale: 0.3m* 	
Skeleton 1009 – see Skeleton 251, burial 45	Skull lifted previously as skeleton 251 in 2016. Remainder of skeleton lifted as 1009.	
Burial 195 Infant Skeleton 1010	Infant burial, E/W aligned, head to W, supine, extended. This burial was later than B45 (skeleton 251/1009) and had removed the legs of 251/1009.	

	 *Scale: 0.5m*
Burial 196 Infant Skeleton 1011	Infant burial, E/W aligned, head to W, supine, extended. Later analysis showed this to be an early child (1-5 years of age), with cribra orbitalia.  *Scale: 0.5m*

Burial 197 Infant Skeleton 1012	 Infant burial, E/W aligned, head to W, supine, extended. Mostly skull (crushed) and long bones survived. *Scale: 0.3m*
Burial 198 Infant Skeleton 1013	Infant burial, E/W aligned, head to W, Supine, flexed. Skeleton rested on quartz pebbles.  *Scale: 0.3m*
Burial 199 Adult Skeleton 1014	Adult burial in long lintel cist grave, E/W aligned, head to W. The skull and upper part of the skeleton was removed along with the W end of the cist. The remainder was left *in situ*. Later analysis showed this to be a middle-adult, aged 26-45 years of age. Probably male. *Scale: 0.5m*

		
Burial 200 Infant Skeleton 1015		Infant burial, E/W aligned, head to W, supine, slightly flexed. Skull crushed and lower legs in poor condition. Analysis showed that this was a child, aged 1-5 years. *Scale: 0.3m*
Burial 201 Infant Skeleton 1016		Infant burial, E/W aligned, head to E, supine, extended. Copper alloy pleb found above ribcage. Analysis showed that the infant was 0-12 months of age and the skull contained signs of cribra orbitalia. *Scale: 0.2m*

		
Burial 202 Child Skeleton 1017		Child burial, E/W aligned, head to W, supine, extended. Quartz pebbles at L shoulder behind head and between femurs. *Scale: 0.5m*
Burial 203 Skull only 1018	Skeleton 1018, skull only, displaced. Analysis showed that this was a juvenile skeleton. *Skull of skeleton 1018 in the centre of the photograph.*	

		 *Scale: 0.2m*
Burial 204 Infant Skeleton 1019	Infant burial, E/W aligned, head to W, supine. Disturbed (probably by burial of skeleton 1017) and incomplete. *Skeleton 1019 is visible above skull of skeleton 1017.*	 *Scale: 0.2m*
Burial 205 Infant Skeleton 1020	Infant burial, E/W aligned, head to W, supine, flexed.	 *Scale: 0.2m*
Burial 206 Juvenile Skeleton 1021	Juvenile burial, E/W aligned, head to W, supine, extended. In grave 599. The feet were jammed into a grave which was too short for the body, hence feet higher and detached. Analysis showed that this was a child aged 6-11 years, and the skull showed signs of cribra orbitalia.	

	 *Scale: 0.5m*
Burial 207 Child Skeleton 1022	Child burial, E/W aligned, head to W, supine, extended. Left arm extended with hand on pelvis, right arm folded across body. Flat stone placed beneath knees. Analysis showed that this child was aged 6-11 years.  *Scale: 0.5m*
Burial 208 Infant Skeleton 1023	Infant burial, E/W aligned, head to W, supine, flexed. Slate flat pebble placed over pelvis, and tiny pebble between left hand and arm.

	 *Scale: 0.2m*	
Burial 209 Adult Skeleton 1024	 *Scale: 0.5m*	Adult burial, E/W aligned, head to W, supine, extended. Left arm folded across the body; right arm extended. Grave (601) detected from well above the skeleton. Three on edge shale slabs mark the east end of the north side of the grave – these do not constitute a cist. Later analysis showed this to be a middle-adult, 26-45 years of age. Probably female.
Burial 210 Infant Skeleton 1025		Infant burial, N/S aligned, head to N, supine, flexed. Analysis showed that this was an early child burial (1-5 years of age). *Scale: 0.2m*
Burial 211 Juvenile Skeleton 1026		Analysis showed that this was a juvenile burial, E/W aligned, head to E, supine, extended. *Scale: 0.2m*

		
Burial 212 Infant Skeleton 1027		Infant burial, E/W aligned, head to W, supine, extended. Skull not present and lower left leg missing having being cut by later grave 598. A loose skull found on lying on the left arm of skeleton 1030, B215, may have been from skeleton 1027. *Scale: 0.3m*
Burial 213 Infant Skeleton 1028		Infant burial, NE/SW aligned, head to SW, supine, extended. Lies over prone skeleton. Laid on a bed of small quartz stones and slate. *Scale: 0.2m*

Burial 214 **Skull only** **1029**	A small, 0.8m long, cist grave, 603, built into the top of wall 42, with four lintel slabs. Only the skull of the skeleton survived. E/W aligned, head to the W. Analysis showed that this was an infant skull, 0-12 months of age.  *Scale: 0.5m*  *Scale: 0.2m*	
Burial 215 **Infant** **Skeleton** **1030**	Infant burial, E/W aligned, head to W, supine, flexed. Partly underlying skeleton 1027. Analysis of this infant showed signs of cribra orbitalia, linear enamel hyperplasia and porotic hyperostosis. *Scale: 0.4m*	
Burial 216 **Infant** **Skeleton** **1031**		Infant burial, E/W aligned, head to W, supine, flexed. Analysis showed a child 1-5 years of age, with porotic hyperostosis and endocranial lesions. *Scale: 0.3m*

		
Burial 217 Infant Skeleton 1032		Infant burial, E/W aligned, head to W, supine, probably flexed. Leg bones disturbed. Placed in ground with head hard against the E side of the central rectangular feature/altar. Beneath two large flat shale slabs. Later analysis showed signs of periosteal new bone formation and cribra orbitalia. *Scale: 0.2m*
Burial 218 Triple infant burial. Skeletons 1033, 1034 and 1058	Triple infant burial. E/W aligned, heads to the W. Three infants had been placed in the south side of the rectangular feature. In order to do this, parts of the shale capping stones of the altar had been cut away, and an upright side slab cut through and removed. The first burial was skeleton 1058, followed by 1033 and then 1034. It is possible that these burials are three different events, supporting this is slight damage to the skull of 1033 which may have occurred when 1034 was buried. However, it would seem more likely that the three skeletons were buried at the same time. A radiocarbon determination (SUERC-101165 1228±26 BP) with a 2-sigma calibrated range of 700 (4%) 740 cal AD; 770 (91.4%) 990 cal AD was obtained from skeleton 1003, and a radiocarbon determination (SUERC-101166 1218±26 BP) with a 2-sigma calibrated range of 705 (11.2%) 738 cal AD, 772 (84.2%) 885 cal AD was obtained from skeleton 1058.	

Burial 218 Cont'd	   

Top left skeleton 1034, top middle skeleton 1033, centre left skeletons 1033 and 1034 with skeleton 1035 visible, top right skeleton 1058, middle right skeleton 1058 after partial dismantling of the central feature, bottom skeletons 1033 and 1034 prior to dismantling the central feature.

Later analysis showed that infant 1033 showed signs of endocranial lesions, periosteal new bone formation and cribra orbitalia. Infant 1034 showed periosteal new bone formation, metabolic disease and possible intervertebral disc disease. Infant 1058 showed signs of cribra orbitalia and porotic hyperostosis.

Scales: 10cm intervals

Burial 219 Infant Skeleton 1035		Infant burial, E/W, head to W, supine, flexed. Showed signs of periosteal new bone formation. *Scale: 0.2m*

		
Burial 220 Adult Skeleton 1036		Prone adult burial, E/W aligned, head to the W, prone, flexed. Elongated skull. Twisted spine. Analysis showed that this adult was 46 years of age or older, and possibly male. The skeleton showed signs of anti-mortem tooth loss and dental disease. *Scale: 0.3m*
Burial 221 Infant Skeleton 1037	Infant burial, semi-articulated, E/W aligned, head to W. Analysis showed that this was a foetal burial.	
Burial 222 Infant Skeleton 1038		Infant burial. E/W aligned, head to W, supine, extended, with knees bent up. Analysis showed that this was a foetal burial (38 weeks gestation or less), with a possible congenital condition. *Scale: 0.3m*

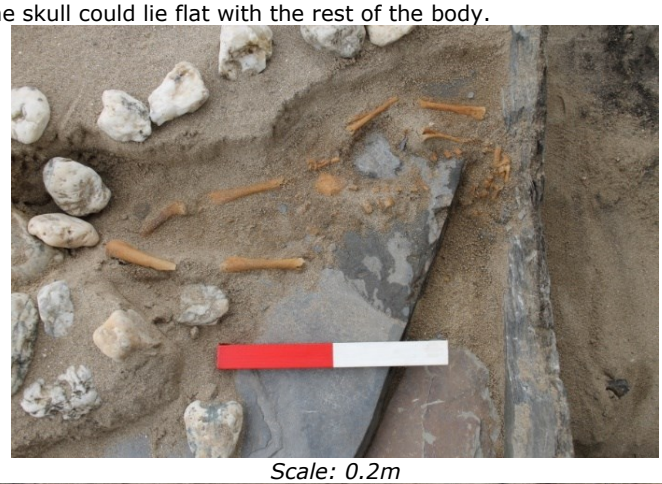
		
Burial 223 Infant Skeleton 1039		Infant burial, E/W aligned, head to W, supine, extended. Showed signs of periosteal new bone formation. *Scale: 0.3m*
Burial 224 Infant Skeleton 1040		Infant burial, E/W aligned, head to W, supine, extended. In grave 610. Analysis showed this to be an early child burial (1-5 years of age). *Scale: 0.5m*
Burial 225 Infant Skeleton 1041		Infant burial, E/W aligned, head to W, supine, flexed with legs slightly raised. *Scale: 0.2m*

		
Burial 226 Infant Skeleton 1042		Infant burial, E/W aligned, head to W, supine, flexed. *Scale: 0.2m*
Burial 227 Infant Skeleton 1043		Infant burial, E/W aligned, head to W, supine, extended with legs apart. *Scale: 0.3m*
Burial 228 Infant Skeleton 1044		Infant burial, E/W aligned, head to W, supine, extended. Head and lower legs not present due to being cut away be later graves. *Scale: 0.2m*

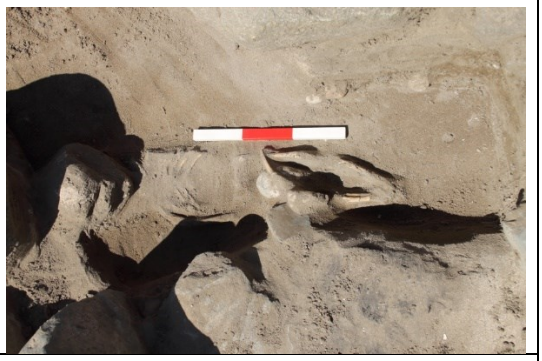
Burial 229 Infant Skeleton 1045	Infant burial, E/W aligned, head to W, supine, extended. Three quartz stones behind pelvis. *Scale: 0.3m*	
Burial 230 Infant Skeleton 1046		Infant burial, E/W aligned, head to W, on left side, flexed. In grave 614. *Scale: 0.3m*
Burial 231 Infant Skeleton 1047	Infant burial, E/W aligned, head to W, supine, extended. Later analysis showed signs of endocranial lesions.	

	 *Scale: 0.3m*	
Burial 232 Infant Skeleton 1048		Infant burial, E/W aligned, head to E, supine, flexed. Left arm, left leg and lower right leg not present. *Scale: 0.2m*
Burial 233 Infant Skeleton 1049		Infant burial disturbed and poorly preserved, with no clear arrangement of bones – not articulated. Just parts of the skull and long bones survived. *Scale: 0.2m*

		
Burial 234 Infant Skeleton 1050		Infant burial, E/W aligned, head to W, lying on right side facing S, slightly flexed. Appeared to be laying on a pile of limpet shells. *Scale: 0.3m*
Burial 235 Infant Skeleton 1051		Infant burial, placed between stones of earlier wall, E/W aligned, head to W, supine, extended, with legs bowed. Analysis showed this to be an early child, 1-5 years of age. *Scale: 0.2m*
Burial 236 Infant Skeleton 1052		Infant burial, E/W aligned, head to W, supine, slightly flexed. Very poor condition. In a distinctive grave cut, 619. White quartz pebble placed on the chest. Analysis showed this to be an early child, 1-5 years of age. *Scale: 0.5m*

		
Burial 237 Infant Skeleton 1053	Infant burial, E/W aligned, head to E, supine, extended. Skull not present. This skeleton had been placed directly onto the covering slabs of the rectangular 'altar'. Some of the quartz stones overlying the covering slabs had been removed to accommodate this burial, and part of the top edge of the substantial upright east end slab of the 'altar' had been shaped so that the skull could lie flat with the rest of the body.  *Scale: 0.2m* 	
Burial 238 Infant Skeleton 1054		Infant burial, E/W aligned, head to W, supine, extended. Lies directly over skeleton 1055. Showed signs of cribra orbitalia.

	Skeleton 1054 to left, skeleton 1055 to right. Scale: 0.5m	
Burial 239 Infant Skeleton 1055		Infant burial, E/W aligned, head to W, supine, extended. Lies directly beneath skeleton 1054. Lower disturbed, possibly when 1054 was buried. *Scale: 0.3m*
Burial 240 Juvenile Skull only 1056	Loose skull. Part of the skull of a juvenile, cut by grave 619.	
Burial 241 Infant Skeleton 1057	Infant burial, E/W aligned, head to W, flexed? Very poor condition and so bulk lifted to ensure full bone recovery during sieving. *Scale: 0.2m*	
Burial 242 Adult Skeleton 1059	Adult burial. E/W aligned, head to W. In grave 625. The E end of the grave was defined by thin upright shale slabs, but they did not form a cist. Later analysis showed this to be a middle-adult (26-45 years of age), and probably male.	

	 *Scale: 0.5m*	
Burial 243 Child Skeleton 1060	Child burial, E/W aligned, head to the W, supine, extended. Right leg rising over a quartz pebble. Placed amongst stones of an earlier wall. Later analysis showed this child to be 1-5 years of age, and showing signs of dental disease. *Scale: 0.3m*	
Burial 244 Infant Skeleton 1061		Infant burial, E/W aligned, head to W, Supine, but slightly twisted to left side, flexed. Showed signs of Endocranial Lesions and cribra orbitalia. *Scale: 0.3m*

		
Burial 245 **Infant** **Skeleton** **1062**	Infant burial, E/W aligned, head to W, supine, extended, legs slightly apart. In grave cut 636. The grave was considerably longer than the skeleton – the skeleton occupied just the W half of the grave. Showed Signs of Cribra Orbitalia.  *Scale: 0.5m*	
Burial 246 **Child** **Skeleton** **1063**		Child burial, N/S aligned with head to S. Very poor condition with just the skull surviving. It is in a deep grave, 641. The north end of the grave had been cut away by a large, later grave 625. Analysis showed that this was a foetal burial, 38 weeks gestation or less. *Scale: 0.2m*

Burial 247 Child Skeleton 1064	 	Child burial, very young child, N/S aligned, head to N, supine, slightly flexed. In grave cut 642. The N end of the grave and the skull of 1064 had been removed by the later, large grave 625. *Skeleton 1064 left, skeletons 1064 and 1063 right.* *Scales: 0.3m (top) and 0.5m (bottom)*
Burial 248 Infant Skeleton 1065	Infant burial, E/W aligned, head to W, supine, flexed. Stone in left eye socket and mouth. Piece of animal jaw next to skull. *Scale: 0.3m*	
Burial 249 Infant Skeleton 1066	Infant burial, not articulated, a damaged skull and some long bones is all that survives. Later analysis showed signs of periosteal new bone formation.	
Burial 250 Infant Skeleton 1067		Infant burial, N- S aligned, head to S, supine, extended? – lower part of skeleton not present, removed when skeleton 1068 was buried. Some bones of 1067, 1068 and 1069 were mixed together. A radiocarbon determination (SUERC-101167 1162±26 BP) with a 2-sigma calibrated range of 772 (11.7%) 791 cal AD, 805 (0.8%) 809 cal AD, 820 (51.9%) 904 cal AD, 913 (31.0%) 976 cal AD was obtained from this skeleton. Later analysis confirmed that this was an infant (1-12 months), showing signs of endocranial lesions and periosteal new bone formation. *Scale: 0.2m*

Burial 251 Infant Skeleton 1068		Infant burial, E/W aligned, head to W, supine, extended. Lower legs disarticulated. Some bones of 1067, 1068 and 1069 were mixed together. *Skeleton 1067 centre bottom, 1068 centre left top and the mixed bones of 1069 centre right top. Scale: 0.5m*
Burial 252 Infant Skeleton 1069	Infant burial, a loose assemblage of bones, some articulated, but difficult to be certain on alignment of the skeleton. See photograph above. Some bones of 1067, 1068 and 1069 mixed together. Analysis showed that this was a foetal burial, 38 weeks gestation or less.	
Burial 253 Infant Skeleton 1070		Infant burial, N/S aligned, head to N, supine, flexed? Analysis showed that this was a foetal burial, 38 weeks gestation or less. *Scale: 0.2m*
Burial 254 Infant Skeleton 1071	Infant burial, E/W aligned, head to W, supine, slightly flexed, legs crossed. Only the lower part of the skeleton was present.	

		 *Scale: 0.3m*
Burial 255 Double infant burial Skeletons 1072, 1073	Double infant burial: twins? E/W aligned, heads to W, supine, slightly flexed. These two skeletons were buried at the same time, they lean towards each other, and the right arm of 1072 touched the left arm of 1073. It was not certain when lifting the skeletons which of the arms belonged to which skeleton. Quartz stone was placed under the ribs of 1073.  *Scale: 0.4m*	
Burial 256 Infant Skeleton 1074	Infant burial, E/W aligned, head to W, supine. Only the upper part of the skeleton present, the lower part having been removed by an unknown agency. *Scale: 0.4m*	

		
Burial 257 Infant	E/W aligned, no skeletal remains. Small cist grave, 0.8m long. The edges of the cist were formed from rounded, large stones and shale slabs. No lintel slabs or base slabs. Contexts 590, 591.  *Scale: 0.5m*	
Co-mingled bone from context 624	Analysis showed that these were child bones (1-5 years of age), showing extensive cribra orbitalia.	

HUMAN REMAINS

By Katie A Hemer

Introduction

Between 2013 and 2021, excavation of the early medieval cemetery beneath St Patrick's Chapel, Whitesands Bay, Pembrokeshire uncovered the skeletal remains of at least 253 individuals. Osteological and biomolecular analysis of the remains was undertaken and overseen by KH. The following report presents the findings of the post-excavation analyses, including the results of the osteological assessment, stable isotope and ancient DNA analysis and dental histology.

The size and scale of the assemblage from St. Patrick's Chapel, as well as the good degree of bone preservation make this population one of the most substantial and significant populations of this date from early medieval Wales, and means it is of both regional and national significance.

Methods

The assessment of the articulated skeletons followed guidance established by English Heritage (2002) and BABAO (1991). The specific methods used for the assessment are further outlined below.

Inventory

An inventory of the human remains present was completed using a recording system whereby the skull, dentition, torso, pelvis, legs, feet, arms and hands were recorded as present or absent.

Bone Preservation and Completeness

The degree of completeness (%) and condition of the bone (Pr) were recorded for each skeleton following a macroscopic assessment of the remains. The criteria used for recording preservation and completeness were adapted from Brickley and Mckinley (2004) as follows:

> Good (G) = Most bones are complete with very little cortical bone surface erosion. It is possible to see even the most minor pathological changes to the cortical surfaces.
>
> Moderate (M) = The bones show some degree of fragmentation with some remaining complete. Cortical surface preservation is moderate with reduced amounts of post-mortem erosion and damage. It should be possible to see sizeable areas of pathological bone changes.
>
> Poor (P) = The bones are fragmentary, and/or, in a poor condition, with cortical surfaces showing considerable post-mortem erosion. It may be possible to see some pathological bone changes, however, some new bone formation may have been lost.

Destroyed (D) = The bones are highly fragmentary, consisting of small/friable pieces. The bone shows extensive post-mortem erosion with considerable damage to cortical surfaces meaning pathological changes to the bone have been lost or difficult to see in its entirety.

The degree of completeness (%) for each skeleton was estimated based on a visual assessment of the skeleton and the number of skeletal elements present.

Sex Determination

Biological sex was estimated for each adult skeleton according to the sexually dimorphic regions of the pelvis and skull following the methods of Buikstra and Ubelaker (1994) and Brickley and McKinley (2004).

Individuals were classified as male, probable male, indeterminate, probable female or female (Table 1). Children (<18), who cannot be sexed morphologically, and adults who were missing the relevant skeletal elements for sex determination, were classified as 'Not applicable' and 'Undetermined' respectively (Buikstra and Ubelaker 1994: 21). Only those children whose biological sex was determined through ancient DNA analysis were assigned to a sex category, but these individuals were not included in the demographic analysis since that focused on the sexed adults only.

Table 1. Categories used for sex assessment.

Code	Sex
M	Male
?M	Possible male
NA	Not applicable (e.g. below 18 years)
F	Female
?F	Possible female
U	Undetermined

Age Determination

In adults, biological age is represented by the physical degeneration of the body. The estimation of adult age-at-death relied on recording the degenerative changes to the auricular surfaces (Lovejoy et al. 1985), the pubic symphysis (Brooks and Suchey 1990) and the sternal rib ends (Işçan et al., 1984, 1985).

For children and adolescents below 18 years of age, age-at-death estimation relied on the sequential mineralisation and eruption of the deciduous and permanent dentition (Moorrees et al., 1963; Al Qahtani 2010), the maturation and size of various skeletal elements (Scheuer and Black, 2000), and epiphyseal fusion (Schwarz 1995).

For purposes of this osteological assessment, individuals were classified to one of the following age categories (Table 2). If no ageing elements were present, or it was not possible to refine the age category, an individual was broadly classified as 'Adult' or 'Juvenile'.

Table 2. Adult and juvenile age cohorts.

Age cohort	Age range
Foetus	≦38 weeks gestation
Infant	Birth to 12 months
Early child	1 to 5 years
Late child	6 to 11 years
Adolescent	12 to17 years
Young adult	18 to 25 years
Middle adult	26 to 45 years
Old adult	≧ 46 years

Pathology

Any evidence of pathological changes to the skeleton and dentition was noted following standard osteological references including: Hillson (1996); Aufderheide and Rodrigues-Martin (1998); Ortner (2003); Roberts and Manchester (2005), as well as guidance issued in Roberts & Connell (2004).

Results

Please note, further analysis of the data reported in this section is ongoing and therefore the interpretation of the results may be subject to change. It is not permissible to use the data reported in this report for any purposes.

A total of 253 articulated skeletons were recorded from St. Patrick's Chapel. The majority of burials were represented by 50% of the skeleton or more (Fig. 68). Bone preservation was almost divided equally between those skeletons whose preservation was classed as Good/Moderate (n=124) and those classed as Poor/Destroyed (n=129) (Fig. 69). The greatest number of skeletons whose bones/bone surface was affected by taphonomic damage fall within the 'Poor' (n=70) category.

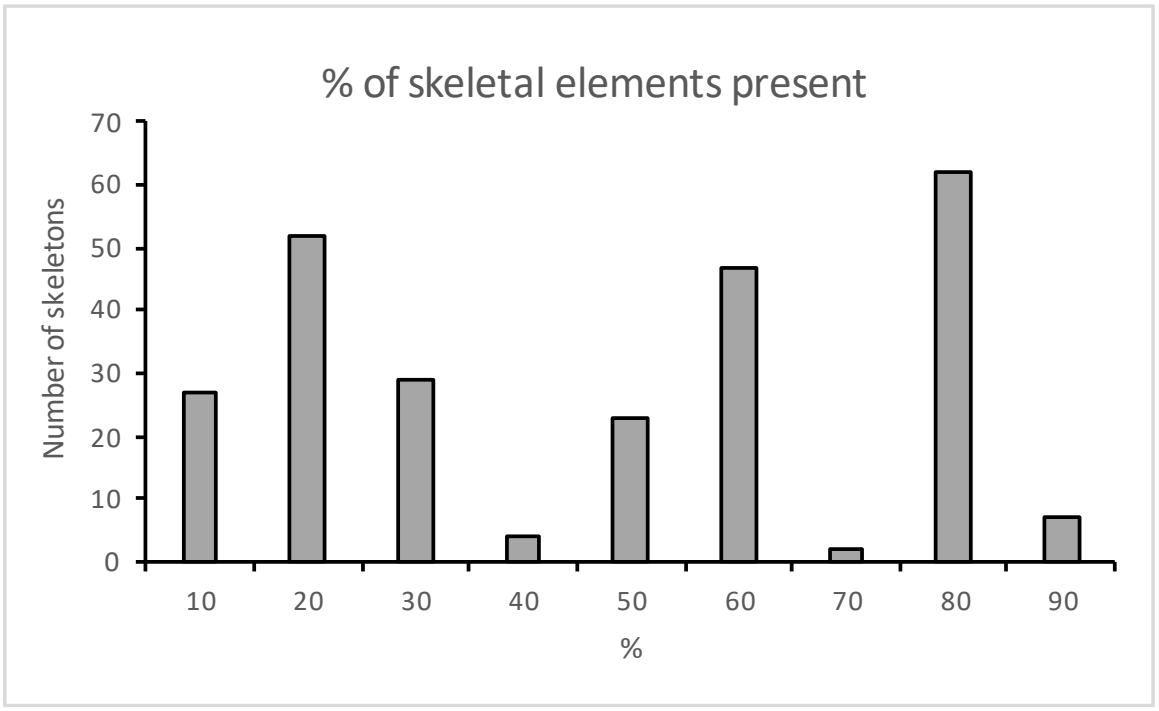


Figure 68. Number of individuals represented by the amount (%) of skeletal elements recorded as present.

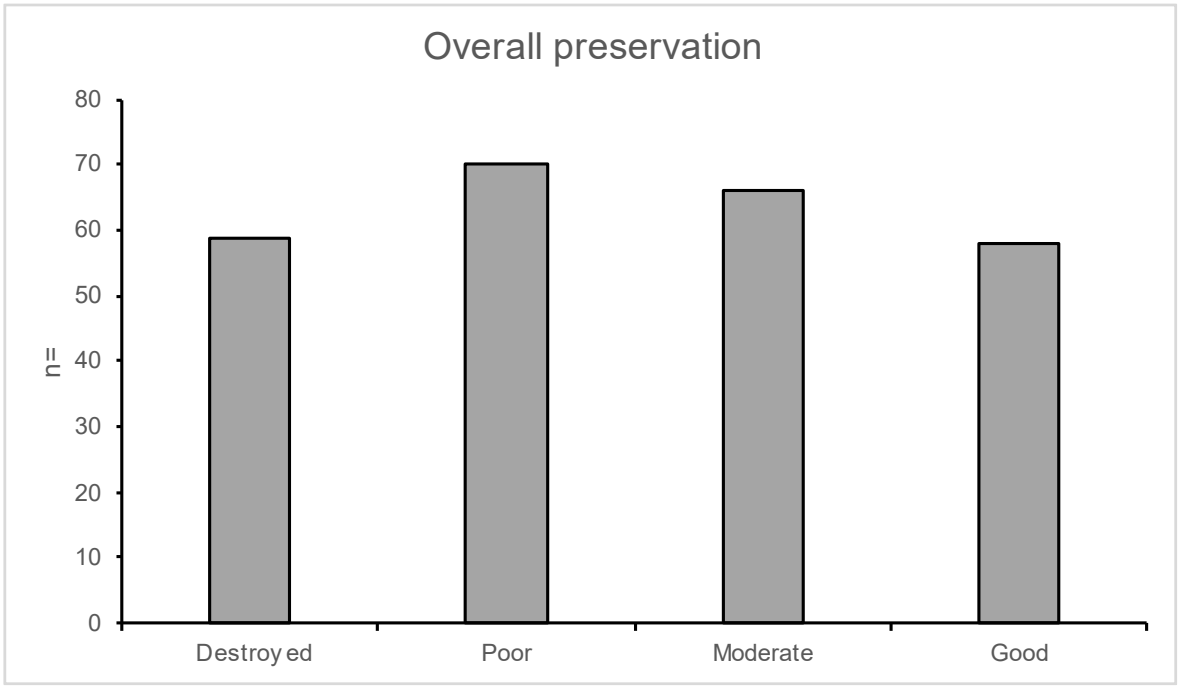


Figure 69. Number of individuals in the assemblage according to the overall degree of skeletal preservation.

The majority of the population (>50%) were juveniles below 18 years of age at death, whilst the remaining population were adults (Fig. 70). The youngest individuals in the sample were a group of pre-term foetuses (<38 weeks), the youngest of whom died at approximately 24-28 weeks gestation. The greatest proportion of juveniles were

'infants' who died between birth and 12 months of age. Children who died between 1 and 5 years of age represented the second largest group of juveniles within the sample, whilst there were notably fewer older children, whilst adolescents were the least represented non-adult group. Of the adult cohort, the majority of adults could not be assigned to a more specific age category, whilst of those who could be aged, there were slightly more young adults than middle and old adults.

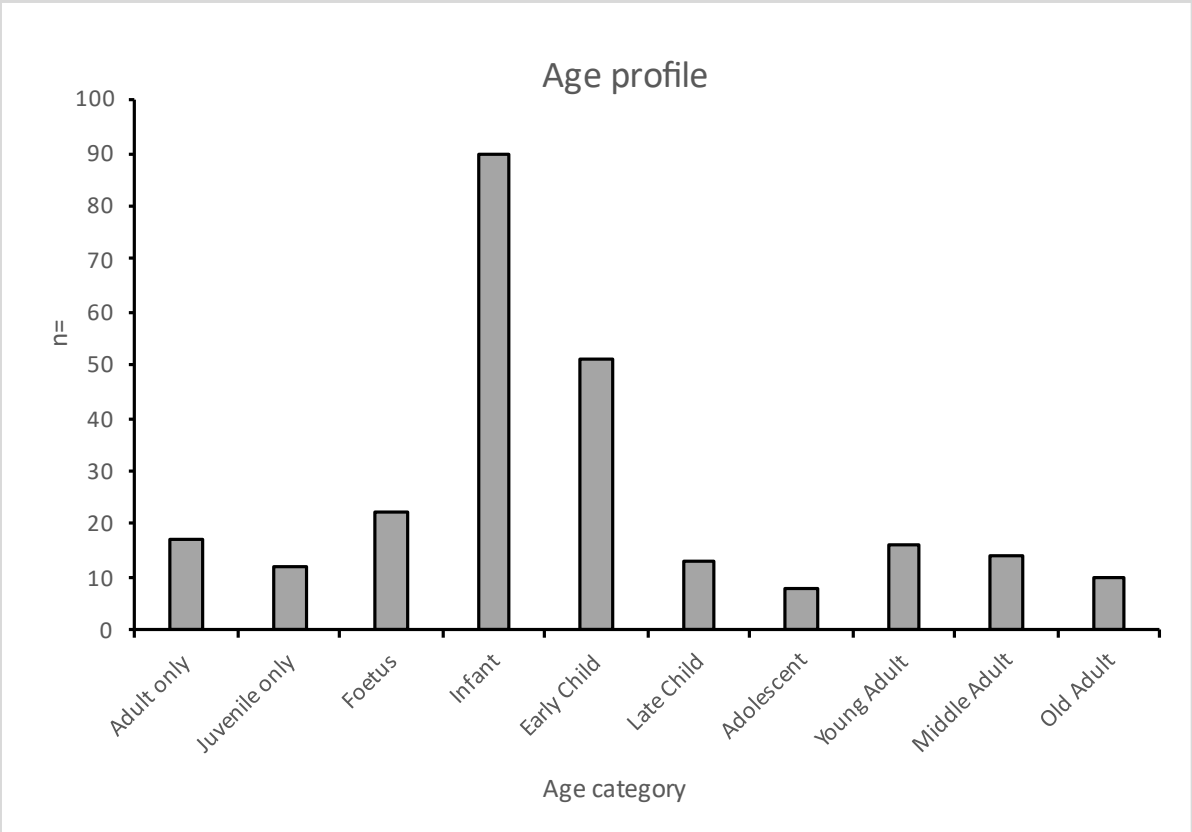


Figure 70. The age profile of the St Patrick's Chapel assemblage illustrating the significant proportion of infants and young children within the sample.

Sex could be determined for 40 adult individuals (Fig. 71). The ratio between adult males and females was 1:1.22 respectively; this suggests there are more females than males in the assemblage, but the difference is not significant. It was not possible to determine the biological sex of 17 adults.

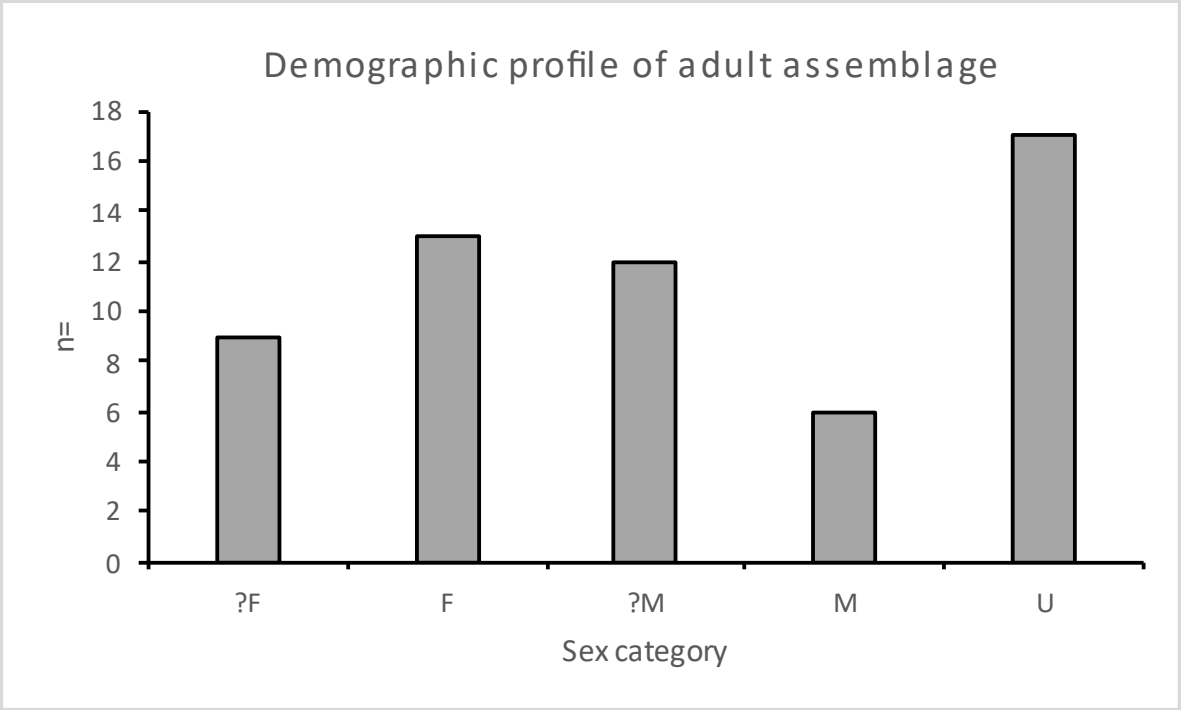


Figure 71. The number of males, females, and unsexed adults within the St Patrick's Chapel assemblage.

Pathology

Please note, further analysis of the data reported in this section is ongoing and therefore the interpretation of the results may be subject to change. It is not permissible to use the data reported in this report for any purposes.

Evidence for a range of pathological conditions was encountered during the osteological assessment. Dental diseases including calculus (deposits of mineralised plaque), carious lesions, and ante-mortem tooth loss were recorded. Calculus was the most prevalent dental disease, which affected both adults and children, some of whom were young individuals. Linear Enamel Hypoplasia, which is a general indicator of physiological stress at the time of tooth formation i.e. during childhood, was also recorded for a number of individuals, the majority of whom were in the 'early child' group. It is possible that the stress these individuals were under may have contributed to their death before the sixth year of life.

Metabolic conditions were identified amongst the assemblage, in particular cribra orbitalia and porotic hyperostosis, which affects the eye orbits and ectocranial surface respectively. The aetiology of these conditions is widely debated, but possible causes include iron deficiency anaemia and/or vitamin B12 deficiency.

Further metabolic diseases include evidence for vitamin D deficiency. Vitamin D deficiency arises from the body's inability to synthesise the hormone due to a lack of exposure to sunlight, or malnutrition, often during infancy. In some cases, the impact of this deficiency was observed upon the juvenile skeleton in the form of bowing deformities to the long bones, whilst in other individuals (both juveniles and adults) the deficiency was identified through the histological analysis of teeth (see Histology section below).

Degenerative joint conditions were observed in some of the adult individuals, including a case of spondylolysis and Schmorl's nodes affecting a mature adult male. Schmorl's nodes manifest as indentations to the superior and inferior surfaces of vertebral bodies due to the herniation of the intervertebral discs; they are often the result of

excessive strain being placed on the spine. Other minor conditions including the presence of minor degenerative changes such as osteophyte formation and/or degenerative joint pitting, mostly in the older adult individuals.

There were a small number of individuals showing evidence for minor developmental abnormalities, including a case of spina bifida occulta (unfused neural arches of the sacrum), and an adolescent whose cervical vertebra was missing a transverse foramen.

Some individuals displayed evidence of periosteal new bone formation on the cortical surface of the tibiae. These changes reflect a noN/Specific inflammatory process that could have arisen from a variety of infectious diseases as well as trauma.

Further evidence of an inflammatory response, in the form of endocranial lesions, was observed upon the crania of a number of juveniles, most of whom were infants below 12 months of age. Endocranial lesions have a multitude of causes such as the inflammation of the meninges from infections such as meningitis, trauma, and haemorrhage. Diseases such as scurvy and TB, which cause the inflammation and/or haemorrhage of the meningeal vessels, may also be responsible, whilst in the very young (<0.6 months), it is necessary to consider rapid cranial growth as part of normal development as a cause (Lewis 2004).

There were very few cases of trauma; one middle aged female displayed evidence of healed fractured ribs, whilst an older child, aged 7-8 years, showed changes to two finger bones consistent with trauma and possible secondary infection.

Biomolecular Analysis

Please note, further analysis of the data reported in this section is ongoing and therefore the interpretation of the results may be subject to change. It is not permissible to use the data reported in this report for any purposes.

Stable isotope analysis

Stable isotope analysis was undertaken on a sample of skeletons from St Patrick's Chapel. Carbon, nitrogen and sulphur analysis of rib bone collagen was undertaken to identify the primary source of protein (i.e. marine vs. terrestrial) consumed during the last five to ten years of life; this followed the modified Longin (1971) method. Strontium and oxygen analysis was undertaken on the second permanent molar tooth enamel to identify whether or not the sampled individuals were local to the St Patrick's Chapel region during childhood (between 3-7 years of age).

Dietary reconstruction. Carbon and nitrogen values show that those sampled were consuming a largely terrestrial diet consisting of animal protein. There are one or two individuals who have slightly enriched carbon and nitrogen values – they may have consumed some marine resources, but if they did, it was done so infrequently, or they only ate low trophic marine species (e.g. shellfish) and not large fish species (e.g. cod). The highest nitrogen isotope value (δ15N, 13.8‰) was recorded for an infant; their value is almost +3‰ higher than the mean nitrogen isotope value for the sampled population, and suggests that this infant was breastfeeding, or had only recently begun weaning, at the time of death.

The sulphur isotope values are consistent with a 'coastal' signature and are likely to reflect the influence of sea-spray and the introduction of marine sulphates to the local biosphere of this region. One outlier, an adult female, had a sulphur signature more consistent with 'inland/non-coastal regions' and was comparable to values obtained for populations local to southeast Wales. As such, there is a strong possibility that this woman moved to the region around St Patrick's Chapel at some point prior to death.

There was no significant difference between the carbon, nitrogen or sulphur isotope values of males and females suggesting there was no differential access to dietary resources on the basis of sex amongst the population.

Place of childhood origins. The 87Sr/86Sr values divides into three 'groups' all of which can be found across the various geologies of Wales. One group has strontium values that may be considered 'coastal', whilst the second and third groups have values consistent with more radiogenic or older geologies, but which are not unusual for parts of Wales or the borders with England, such as the Marches (Evans et al., 2009). The δ18Op data shows a range of values representing individuals who might be considered 'local' to a westerly, high-rainfall climate (as we would expect for Pembrokeshire), as well as those who came from elsewhere in the British Isles (Evans et al., 2012). Some individuals have oxygen values consistent with parts of east Wales, the Marches, and parts of mainland England. There are also a few individuals who have values consistent with a more easterly/colder climate, as can be found in parts of Scotland. The strontium and oxygen data are important to our understanding of migration in early medieval Britain more broadly, but also, to our understanding of St David's and the role it played (both religiously and secularly) in attracting people from elsewhere in the British Isles.

Ancient DNA

Please note, further analysis of the data reported in this section is ongoing and therefore the interpretation of the results may be subject to change. It is not permissible to use the data reported in this report for any purposes.

Ear ossicles were selected from 50 individuals (both adults and juveniles) for ancient DNA (aDNA) analysis at The Crick Institute. Analyses remain underway and once completed should identify the sex of unsexed individuals (mostly juveniles), evidence of pathogenic DNA, and evidence for ancestry.

To date, analysis has identified the biological sex of 11 juveniles. With this information, it will be possible to explore any differences in the health, disease, diet, mobility, and funerary of male and female children.

Histology

Please note, further analysis of the data reported in this section is ongoing and therefore the interpretation of the results may be subject to change. It is not permissible to use the data reported in this report for any purposes.

Histological analyses were undertaken on teeth sampled from 11 individuals (adults and juveniles) to further investigate the possibility of vitamin D deficiency in the population (following Hemer & Verlinden 2020). Vitamin D deficiency at the time of tooth formation results in the disruption of dentine formation and creates dark 'mottled' areas or bands known as interglobular dentine (IGD), which are visible under transmitted and polarised light. The timing of these IGD bands can be estimated, and preliminary findings suggest seasonality may have played a role in the populations' susceptibility to this metabolic disease (Fig. 72; Hemer & Verlinden 2020).

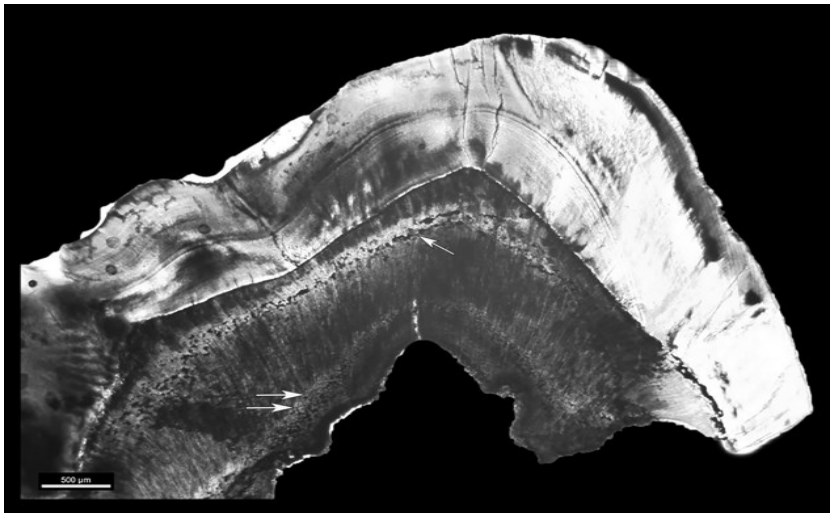


Figure 72. Thin section of the first permanent molar from Skeleton 278 - two bands of interglobular dentine are visible suggesting two episodes of deficiency between 6 months and 3 years of age (from Hemer & Verlinden 2020).

Discussion

Please note, the following interpretation of the data may be subject to change as further analyses are undertaken. It is not permissible to use the data reported in this report for any purposes.

253 articulated individuals were assessed osteologically following the excavation at St. Patrick's Chapel. Levels of bone preservation were good to moderate for the majority of the assemblage, and this – along with the efforts of the volunteer bone cleaners – ensured the recovery of even the smallest of bones such as the ear ossicles, which were sampled for aDNA analysis.

The age profile of the assemblage highlights a significant proportion of juveniles, especially infants and young children. The number of these young individuals is in contrast to the number of older children, adolescents, and adults as a whole. It raises the question of whether the site served as a particular focal point for infant burials at some point in its use, or, whether coastal erosion and the loss of the surrounding landscape over time means we are seeing a biased assemblage that is not truly representative of everyone who was buried here during the cemetery's use; the presence of older individuals suggests the latter scenario is a likely explanation.

The osteological analysis has highlighted similar numbers of adult males and females, in addition to a number of adults who could not be sexed due to the absence of the required skeletal elements.

Pathological conditions, especially amongst the young, include cribra oribitalia, porotic hyperostosis, endocranial lesions, and vitamin D deficiency, whilst adults exhibit evidence of dental disease (e.g. calculus), degenerative joint disease, and (occasionally) evidence of trauma.

The number of infants and young children buried at the cemetery suggest the risks associated with early life (e.g. exposure to pathogens, weaning) were very real for those communities living around St Patrick's Chapel, and it also raises questions around the health status of mothers and how that impacted on infant survival.

The application of biomolecular and histological analyses, coupled with the osteological study, means our understanding of this population will be unique for this region and period of Britain.

When the scientific data are interpreted in the context of the funerary and historical evidence for this site, period, and region, St Patrick's Chapel stands to be one of the most important archaeological discoveries in Wales to date.

CATALOGUE OF EARLY MEDIEVAL CARVED STONES

By Nancy Edwards

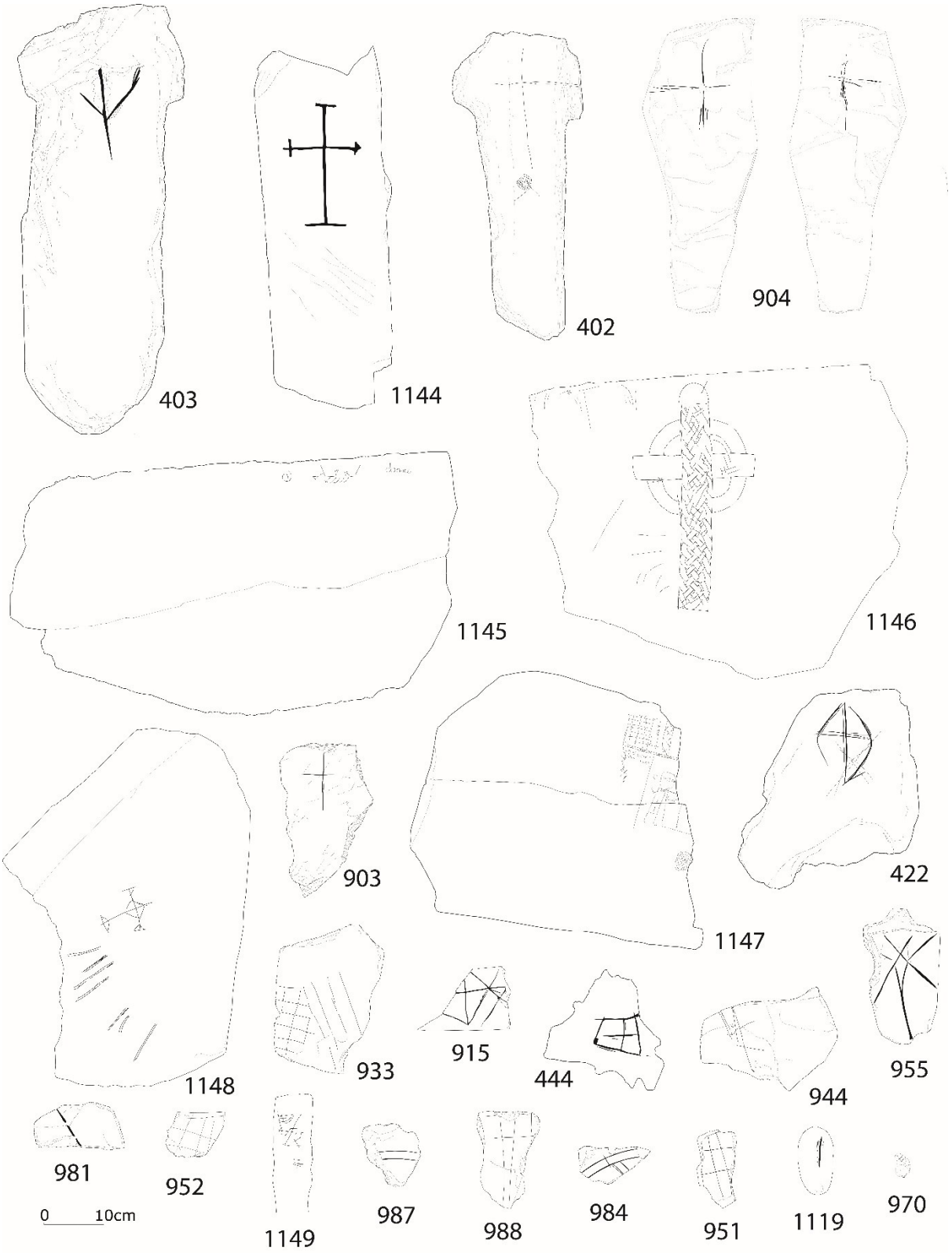


Figure 73. Drawing showing all stones in the catalogue.

Grave-markers

Small free-standing cross 403

Provenance: Found in situ during excavations in May 2014 in Trench 1. The monument was upright and marked the west (head) end of a cist-and-lintel grave (B18) containing an adult female (skeleton 218). There was also a small, undecorated upright stone at the east end of the grave.

Dimensions: h. 700mm × w. 270mm × d. 5mm.

Stone type: A dark grey, relatively homogenous, cleaved mudstone. Probably part of the Cambrian sequence locally derived to the find site (Jana Horák).

Present condition: Poor. The cross-head is badly damaged and the top of *A* heavily laminated, destroying the upper part of the incised cross. *C* is actively laminating.

Description: A thin, roughly shaped, free-standing cross with the remains of short horizontal cross-arms; the shaft has a rounded, V-shaped terminal. Only *A* is decorated.

A (broad): The cross-head is quite deeply incised using a thin line with the lower part of a linear cross with two rough diagonal lines forming the lower half of a lozenge joining the horizontal cross-arms to the stem.

Date: Skeleton 218 has been radiocarbon dated to cal. AD 669–866 (SUERC-59871, 2 sigma). Interrogation of the suite of radiocarbon dates alongside the stratigraphy currently assigns the burial to Period III, Phase 6 dating to the ninth century, thereby dating the cross.

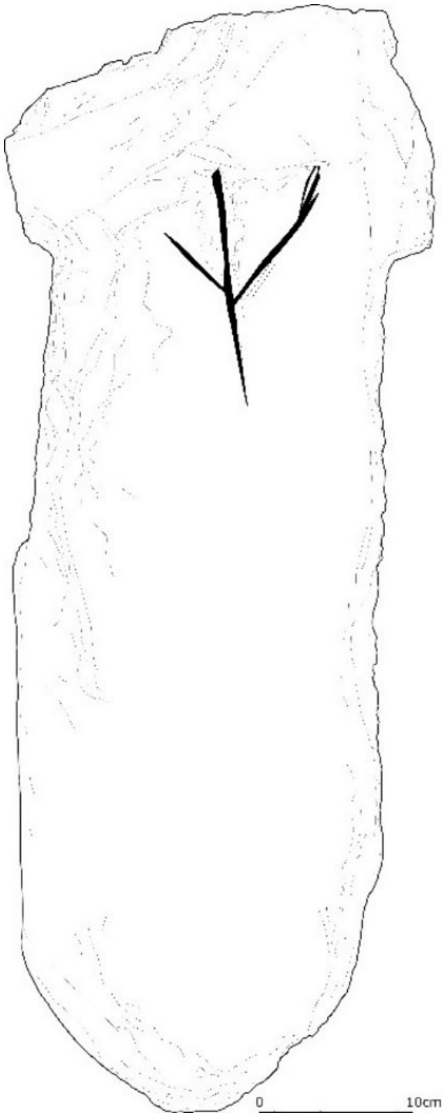


Figure 74. Cross 403, face A.

Small free-standing cross 402

Provenance: Found on the beach below St Patrick's Chapel in May 2014. It had fallen from a layer of eroding burials above during winter storms in 2013–14.

Dimensions: h. 500mm max. × w. 215mm across horizontal cross-arms; 120 < 140mm shaft × d. 30mm.

Stone type: Homogenous, soft, purple-grey, cleaved mudstone. The slightly undulating surface of the stone is a cleavage surface and reflects the less than perfect development of the cleavage in this lithology. The colour of this mudstone suggests it is derived from the Caerbwdy Sandstone sequence, part of the Caerfai Group. This is exposed on the coast south of St Davids but also outcrops across the headland from St Justinian's to the south side of Whitesands Bay. This confirms the lithology was locally derived (Jana Horák).

Present condition: Good. The carved roundel is still crisp and unweathered.

Description: A small, thin, roughly shaped, free-standing cross with stubby cross-arms. The shaft terminates on the diagonal. Only *A* is decorated.

A (broad): The face is vertically striated but comparatively smooth. There are traces of a rough cross incised to follow two parallel vertical striations running the length of the face with the addition of a faintly incised horizontal line across the horizontal cross-arms. Halfway down the shaft is a small, incised, roughly shaped lozenge (h. 27mm) with a perimeter moulding and two diagonal lines projecting from it bottom right. The interior is incised with a series of diagonal lines resembling plait-work.

Date: On analogy with 403, it is ninth century in date.

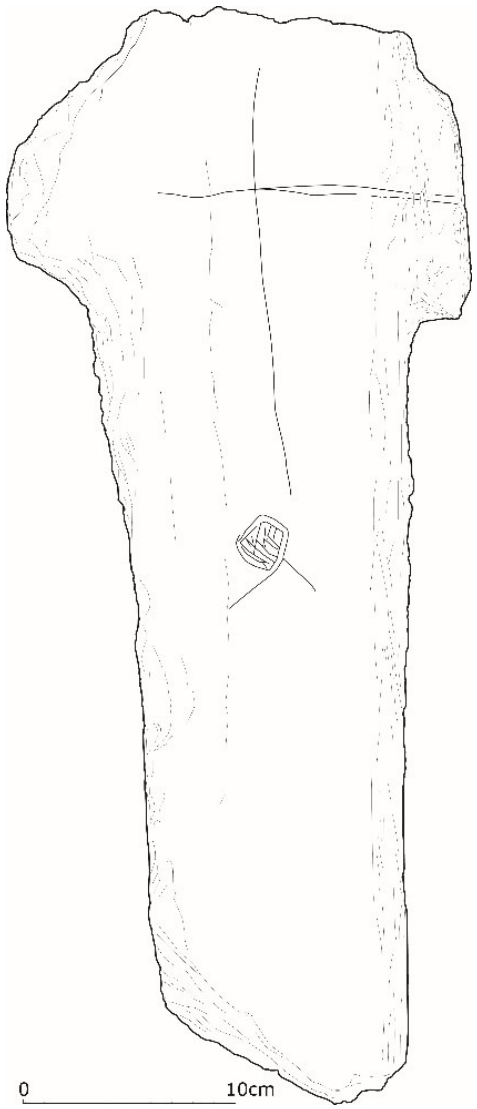


Figure 75. Cross 402, face A.

Free-standing grave marker 914

Provenance: Found in 2019. The bottom pointed end of this stone rested on the westernmost covering slab of lintel grave B96.

Dimensions: h. 530mm × w. 330mm × d. 30mm.

Stone type: Probably locally derived mudstone.

Present condition: Broken with top part missing.

Description: A slab with the bottom part shaped into a point. The point rested on the top of the lintel grave. All the surviving part of this stone would have been buried in grave fill. The stone had broken off at the ground level contemporaneous with the grave.

Date: Period III Phase 6, ninth century.

Not illustrated.

Cross-carved stones incorporated into cist-and-lintel graves

Cross-carved stone 422

Provenance: Found during excavations in May 2015 in Trench 1. It was in situ with the cross on *A* uppermost forming one of the lintels over the long-cist grave (B40) of an infant (Skeleton 244). It was at the eastern (foot) end of the grave.

Dimensions: h. 335mm max. × w. 290mm max. × d. 20mm max.

Stone type: Probably locally derived mudstone.

Present condition: Poor. The surface is actively laminating towards the bottom on the left edge of *A* and on *C*. The carving is, however, clear and unworn.

Description: A thin, unshaped, approximately trapezoidal slab. Only *A* is carved.

A (broad): Towards the narrower end of the slab is a linear Latin cross (h. 13mm) contained within a slightly curved lozenge which is incomplete on the lower left side. The carving is lightly incised using a knife, sometimes with multiple lines. The cross, the horizontal of which is formed from two lines, is more deeply cut than the lozenge.

Date: The burial is ascribed to Period III Phase 6 and is therefore dated to the ninth century.

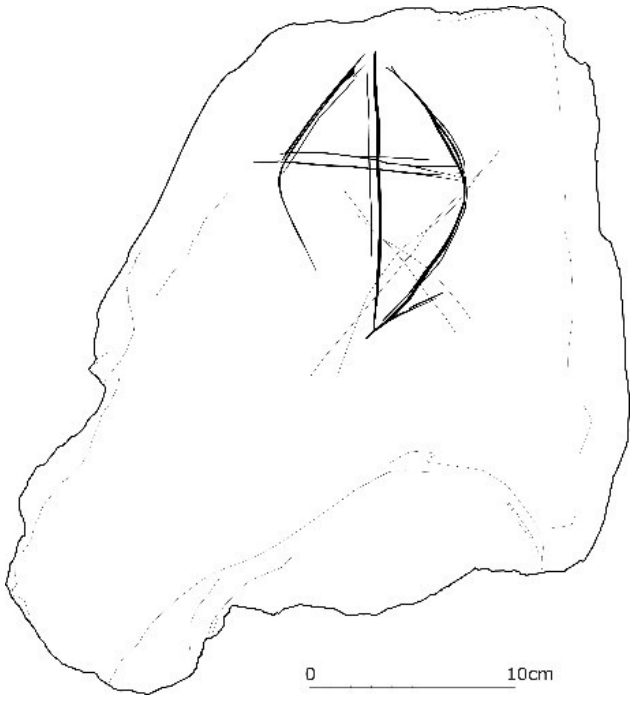


Figure 76. Stone 422, face A.

Cross-carved stone 444

Provenance: Found in situ in Trench 1 during excavations in May 2016 used as a side stone at the west (head) end in an infant cist-and-lintel grave (B55). The cross faced inwards.

Dimensions: h. 195mm max. × w. 160mm max. × d. 10mm max.

Stone type: Probably locally derived mudstone.

Present condition: Good. The carving is unworn.

Description: A small, thin, roughly triangular-shaped slab carved on *A* only. The edges of the slab are very uneven.

A (broad): Towards the bottom of the face of the slab as placed in the grave is a small, inverted, linear Latin cross (h. 65mm) set within a roughly rectilinear frame, the horizontals of which project slightly beyond the frame. It is quite deeply incised using a knife.

Date: Ascribed to Period III, Phase 6 and is dated to the ninth century.

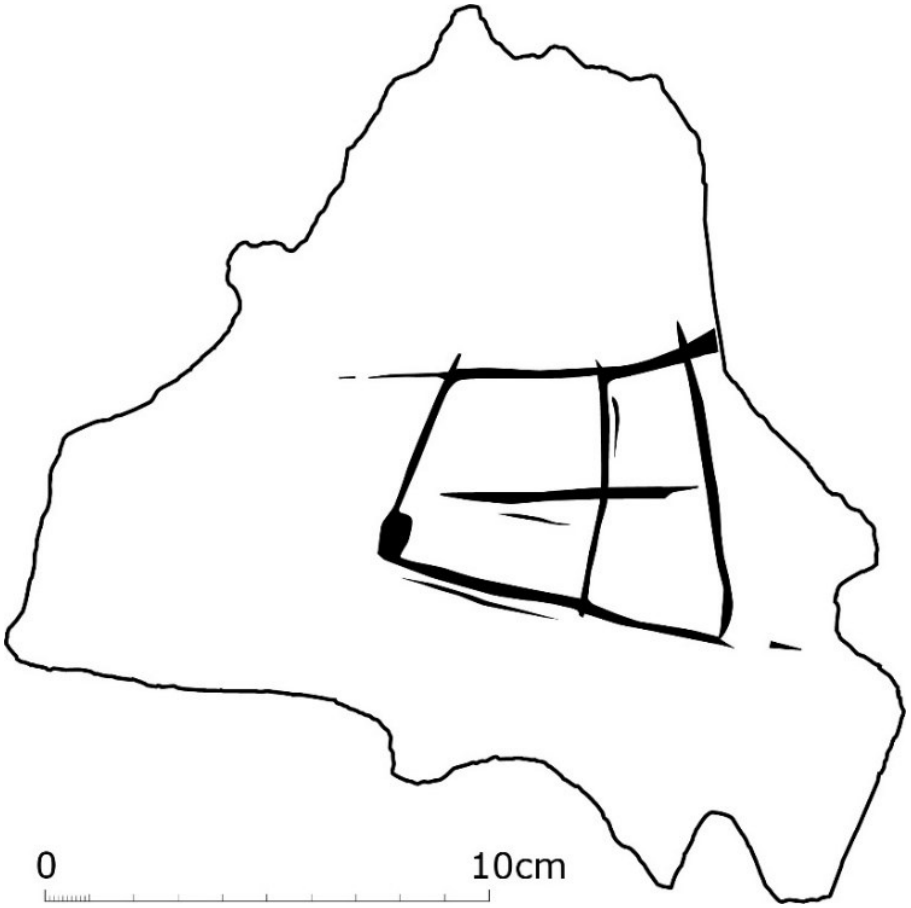


Figure 77. Stone 444, face A.

Cross-carved stone 903

Provenance: Found in situ north of the chapel during excavations in September 2019. It was used as a lintel at the west (head) end of an infant long-cist grave (B92). The cross was face-down.

Dimensions: h. 255mm × w. 125mm × d. 20mm

Stone type: Probably locally derived mudstone.

Present condition: Good

Description: A small, thin, approximately trapezoidal slab carved on *A* only.

A (broad): Towards the top is a linear Latin cross lightly incised using a knife.

Date: Period IV, eleventh or twelfth century.

Figure 78. Stone 903, face A.

Cross-carved stone 904

Provenance: Found in situ north of the chapel during excavations in September 2019. It formed the only lintel covering a roughly 'coffiN/Shaped' infant long-cist grave (B93).

Dimensions: h. 645mm x w. 190mm max. x d. 45mm

Stone type: Probably locally derived mudstone.

Present condition: Good

Description: A narrow, roughly quadrangular slab that narrows from top to bottom. Carved on both broad faces. The carving is lightly incised with several lines using a knife.

A (broad): Towards the top is an uneven, linear cross (h. 200mm). This cross faced inward.

C (broad): Towards the top is a small, very uneven, linear Latin cross (h. 125mm). This was on the top of the slab.

Date: Period IV, eleventh or twelfth century.

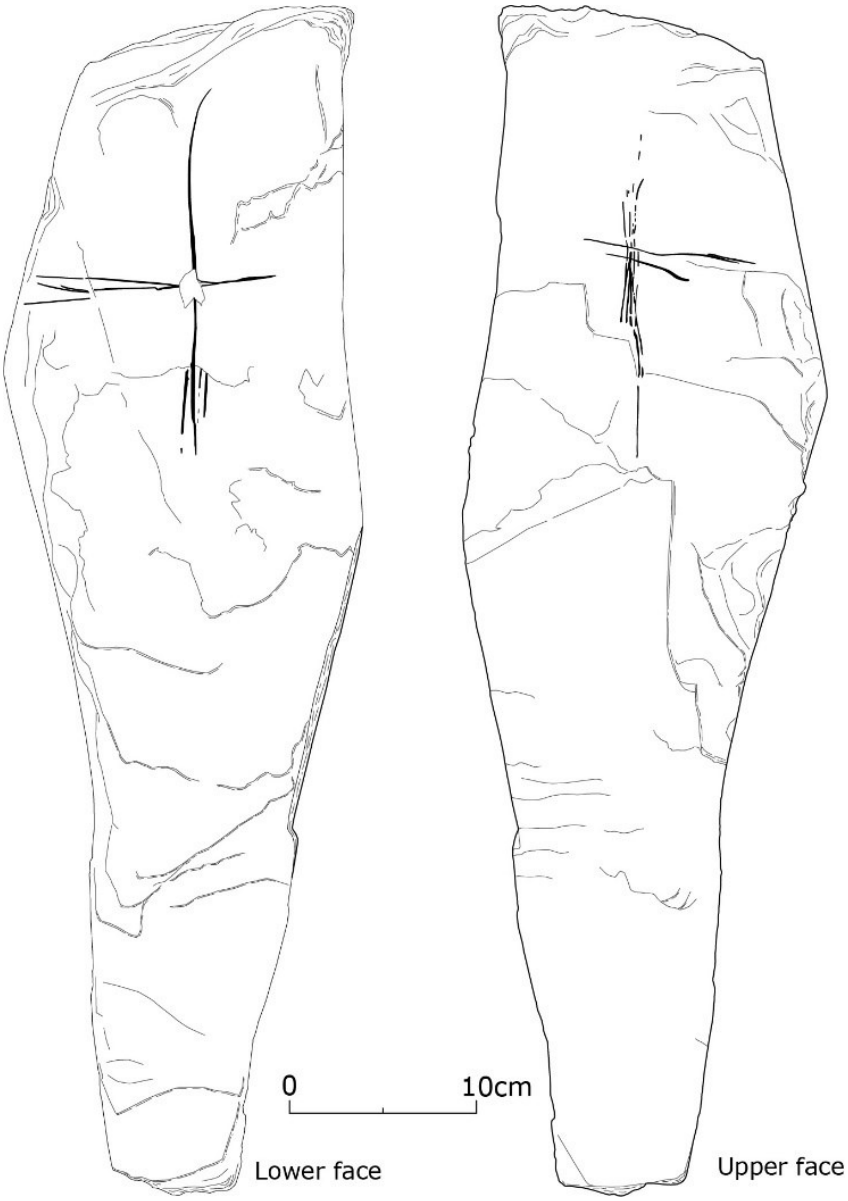


Figure 79. Stone 904, face A left, face C.

Carved stones associated rectangular structure 618

Cross-carved slab 1144

Provenance: Found during excavations in 2021 reused in the rectangular structure (618). It was set horizontally forming the east end of the north side of the structure. The cross faced inwards.

Dimensions: h. 600mm x w. 200 < 215mm x 25mm max.

Stone type: Probably locally derived mudstone.

Present condition: On the whole good. The top of the stone may be broken, and the bottom is damaged with some lamination in this area. The carving is unweathered.

Description: A thin slab with a relatively smooth surface carved on *A* only.

A (broad): Towards the top is a linear Latin cross (h. 200mm) with short bars at right-angles across the top and bottom and vertical bars close to the terminals of the horizontal cross-arms. It is sharply incised using a chisel with a slightly thicker vertical line.

Date: Period II, phase 2, mid-eighth century, but as the stone is reused, it may be somewhat earlier.

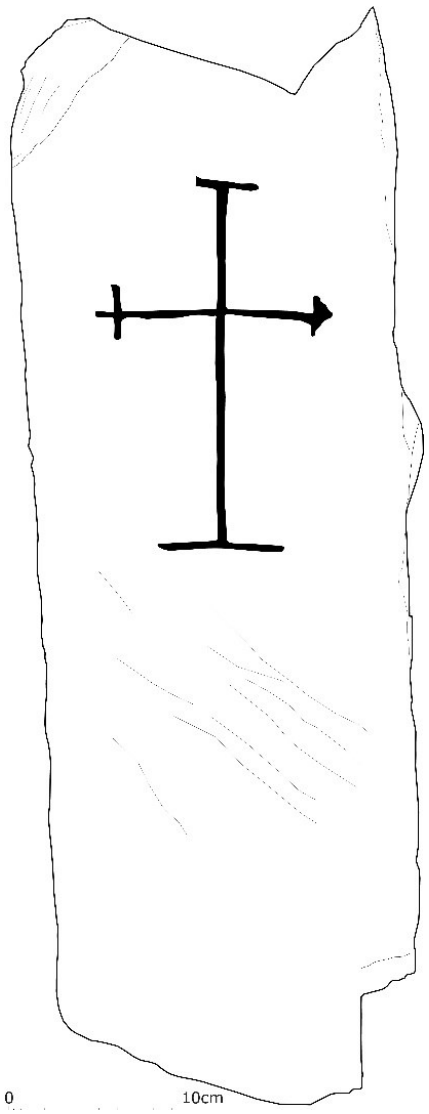


Figure 80. Stone 1444, face A.

Cross-carved stone 1146

Provenance: Found in situ in 2021. This slab formed the northernmost of three capstones on top of rectangular structure (618). The graffiti were on the upper face.

Dimensions: h. 520mm max. x w. 470 < 600mm x d. 40mm max.

Stone type: Probably locally derived mudstone.

Present condition: Incomplete but otherwise good. The carving is not worn.

Description: The left-hand side of the slab has been cut away during the insertion of a later grave. The rough slab has a somewhat uneven surface and is carved on *A* only. The carving is lightly incised using a sharp point.

A: An outline ring-cross with a half-circular cap (h. 350mm). The cross-arms project beyond the ring. The shaft and top cross-arm are decorated with a rough six-strand plait that disintegrates into a few unfinished lozenges on the top cross-arm.

Date: Period II, phase 2, mid-eighth century.

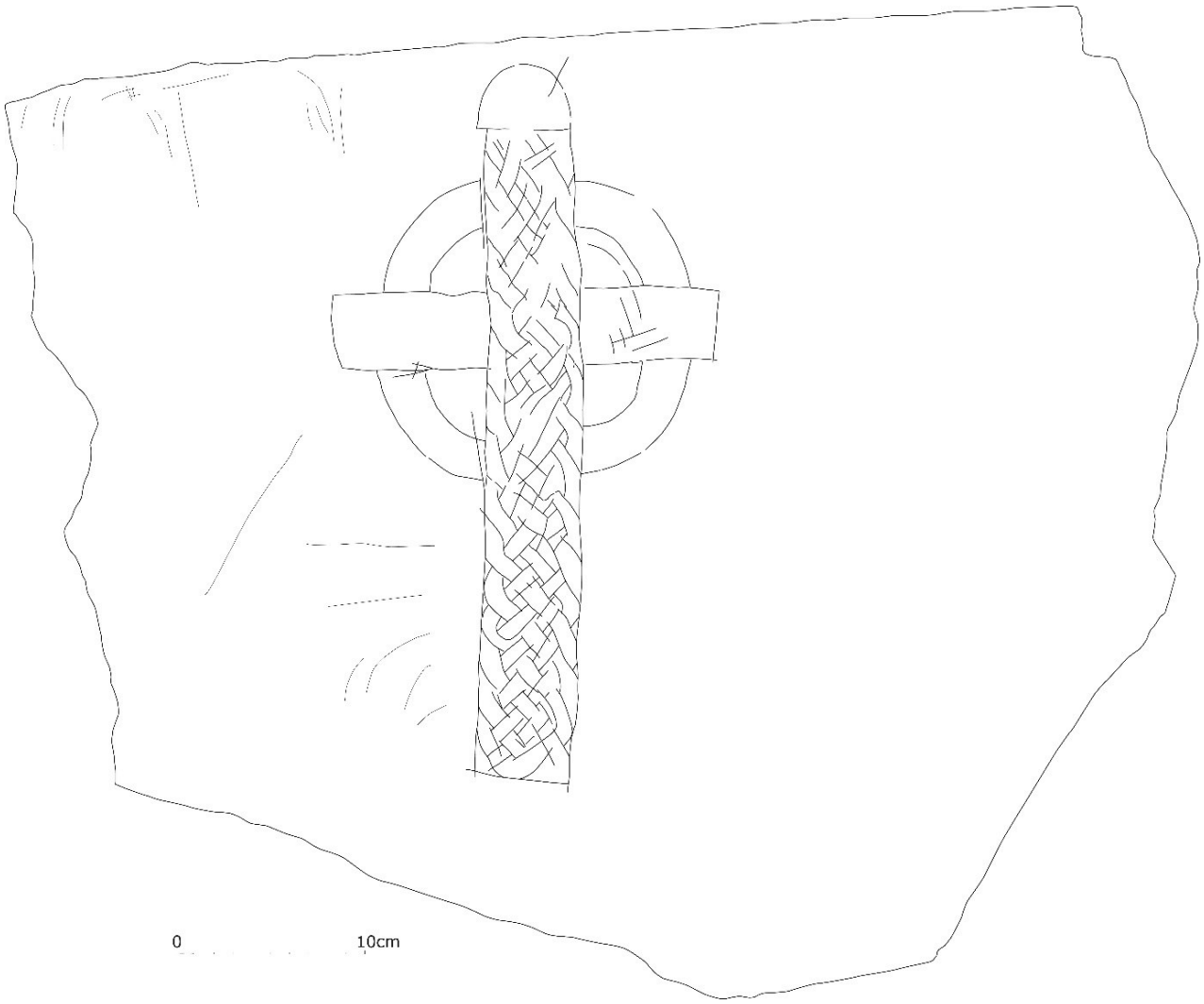


Figure 81. Stone 1146.

Figure 82. Detail of stone 1146 showing carvings (NMW Photo reference 158586).

Cross-carved stone 1148

Provenance: Found in situ in 2021. This slab formed the southernmost of three capstones on top of rectangular structure (618). The graffiti were on the upper face.

Dimensions: h. 610mm max. x w. 350mm max. x 20mm max.

Stone type: Probably locally derived mudstone.

Present condition: Incomplete and in two pieces, but otherwise good, but with a little lamination on the surface.

Description: One edge of the stone (the bottom edge as seen on the drawing) was cut-away during the insertion of a later grave. The slab is carved on one face only with a Latin cross (h. 100mm) set at an angle. It has been lightly incised with a point. There are triangles across the ends of the horizontal cross-arms, and a triangle across the stem near the base. The cross-arms are linked with a lozenge. To the right of the cross are seven roughly incised lines.

Date: Period II, phase 2, mid-eighth century.

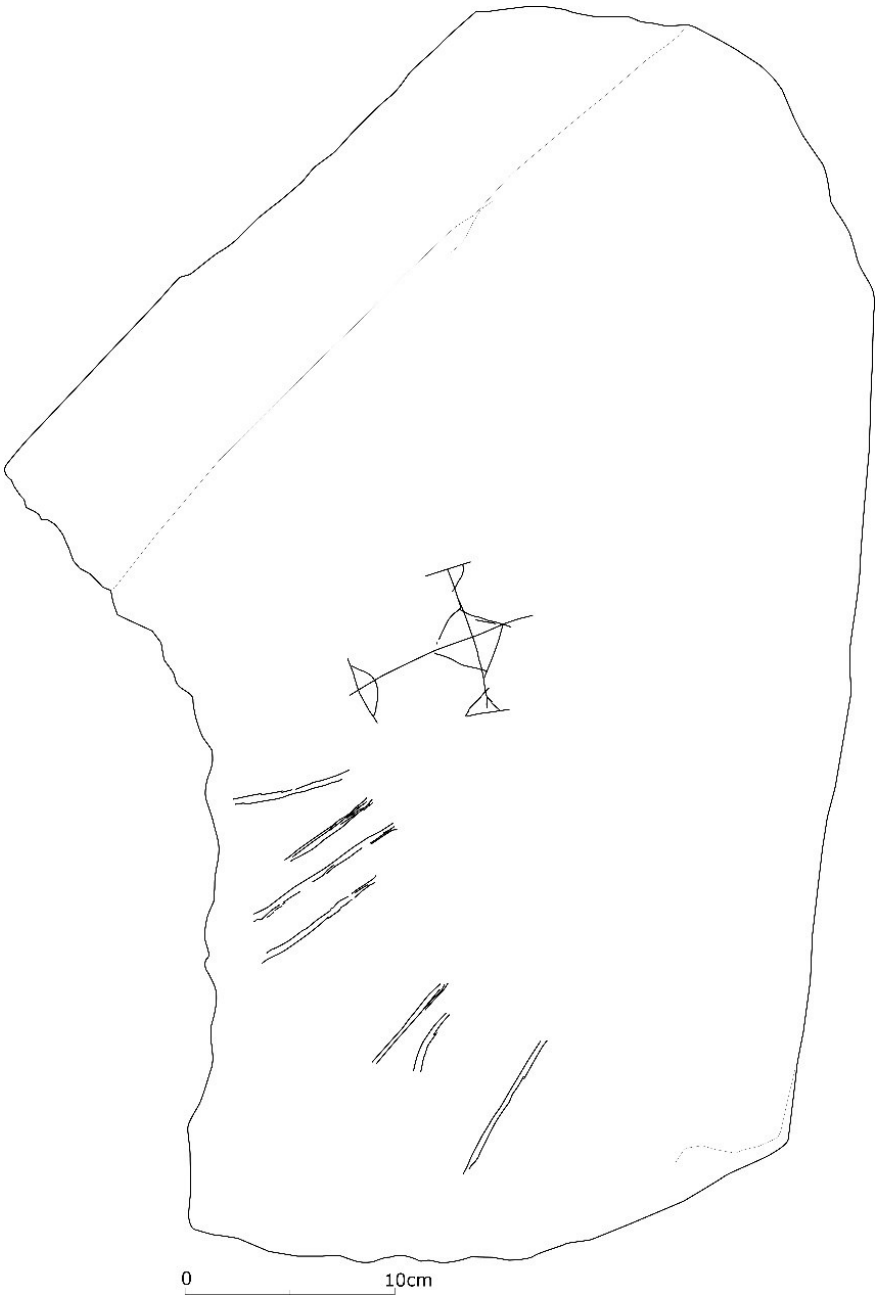


Figure 83. Stone 1148.

Figure 84. Detail of stone 1148 showing carvings (NMW Photo reference 153944).

Slab with inscription and other graffiti 1145

Provenance: Found in situ during excavations in summer 2021. This slab was set upright and horizontally to form the west side of rectangular structure (618) facing the oval enclosure entrance. The graffiti faced outwards.

Dimensions: h. 400mm × w. 760mm max. x d. 50mm.

Stone type: Probably locally derived mudstone.

Present condition: Broken into two parts. Conserved to rectify lamination, but the stone is generally in a delicate condition. The carving is not weathered.

Description: A thick rectangular slab carved on *A* only.

A (broad): The carvings are located in a horizontal row near the top of the slab close to the right-hand end. They are very finely and lightly incised with a sharp point.

Left: A loose anti-clockwise spiral.

Centre: The incomplete outline of a boat with an angular profile. The bow is on the right. The five 'L' shaped and curved lines indicate oars with a steering oar with a triangular blade in the stern. Within the boat is a central short vertical with traces of further lines to either side, including a diagonal 'L' shape to the right.

Right: A horizontal roman-letter inscription in rounded Insular minuscule (h. of letters 17mm max.) reading: DONOEC. See report on the inscription by Patrick Sims-Williams, plus a detailed drawing of the inscription and other carvings.

Date: Period II, phase 2, mid-eighth century.

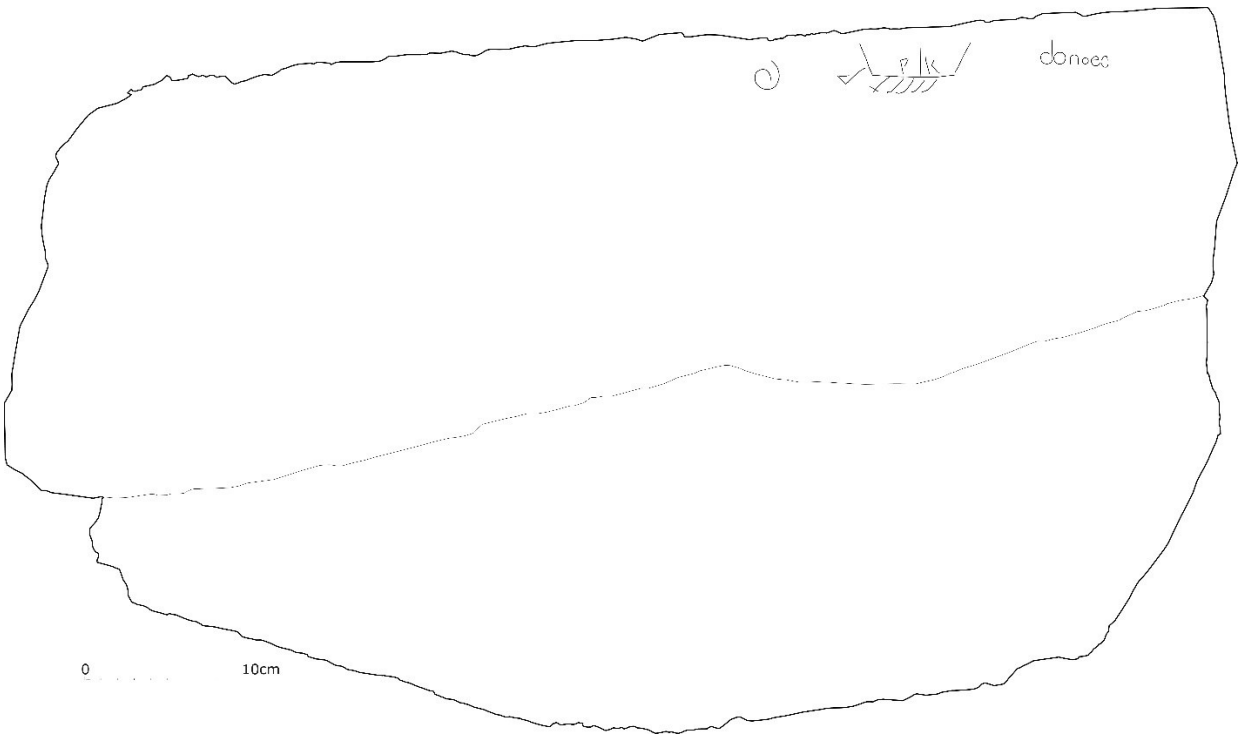


Figure 85. Stone 1145.

Figure 86. Detail of stone 1145 showing carvings (NMW Photo reference 153942).

Slab with lettering and other graffiti 1147

Provenance: Found during excavations in summer 2021. This slab had been placed centrally as one of the capstones on top of rectangular structure (618). The graffiti were on the upper face.

Dimensions: h. 470mm x w. 400mm x d. 40mm max.

Stone type: Probably locally derived mudstone.

Present condition: Incomplete. The slab consists of two adjoining pieces with some lamination apparent. The carving of the figure has been divided in two by the break and the lettering is faint.

Description: Only one face is carved and the right-hand side of the slab (as seen on the drawing) has been cut-away during the insertion of a later grave, removing part of the graffiti. The graffiti are located towards the top of the slab. They are very finely and lightly incised with a point. The main area of graffiti is divided into four by a long vertical line and double horizontal line. both with further cross decoration.

Top right: A small 4 x 6 grid of squares with further lines to the right.

Top left: A vertical band with a row of linked lozenges.

Bottom left: A roughly vertical line of linked lozenges with, to the right, a horizontal inscription with a squiggly line beneath. The letters are not easily legible but include minuscule D.

Bottom right: a human figure shown face on dressed in a tunic with stick arms raised and stick legs with feet facing right. The head is shown with eyes, the upper part of a nose and a pointed chin. To the right of the figure are two rectangles.

Beneath is a roundel with a central cross and two or more 'L' shapes in each quadrant.

Date: Period II, phase 2, mid-eighth century.

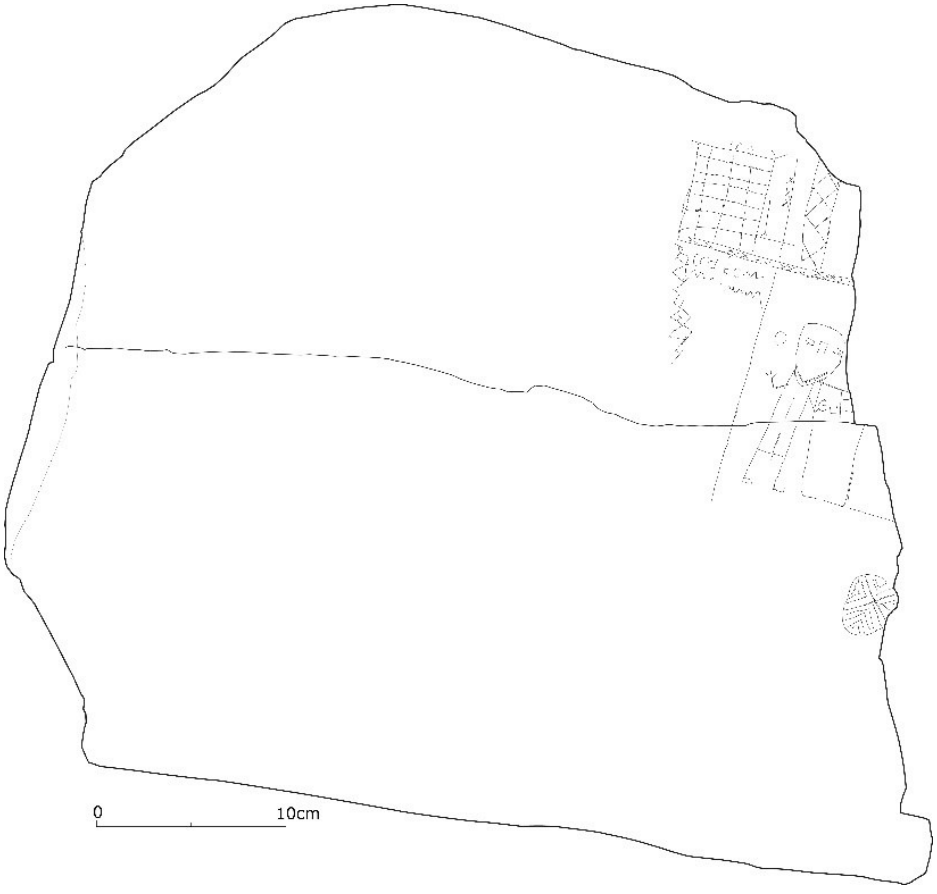


Figure 87. Stone 1147.

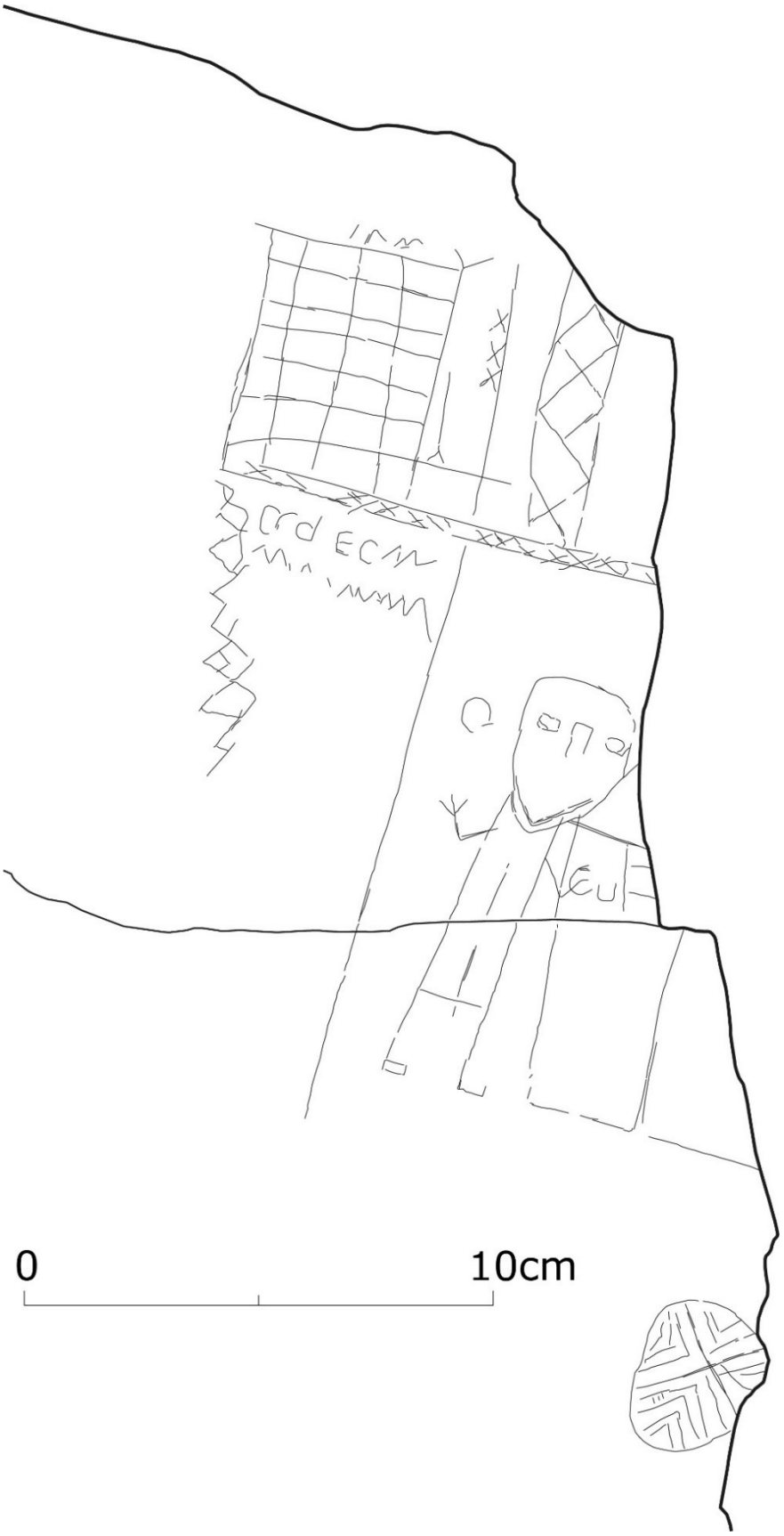


Figure 88. Detail of carvings on Stone 1147.

Carved stone 1149

Provenance: Found in situ in 2021. The slab was the central one of three forming the north side of rectangular structure (618). The slab was set vertically with the carving visible on the upper edge.

Dimensions: h. 150mm x w. 540mm x d. 70mm.

Stone type: Probably locally derived mudstone.

Present condition: Good.

Description: A slab carved on one face only. Towards one end of the uppermost edge of the slab are a series of intersecting horizontal, vertical, diagonal and curved lines with further lines to one side. The carving is very lightly incised using a point.

Date: Period II, phase 2, mid-eighth century.

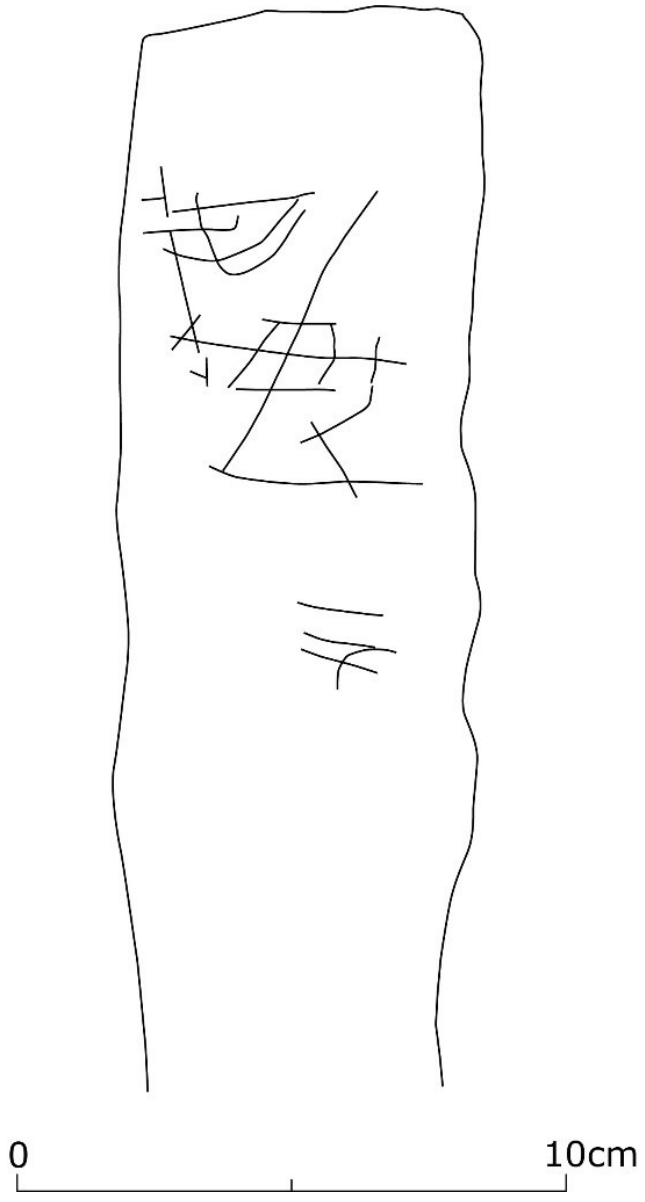


Figure 89. Detail of carving on Stone 1149, face A.

Carved stone 955

Provenance: Found in 2021. It was one of ten small stone slabs found in context 623, the sand fill of rectangular structure 618.

Dimensions: h. 220mm × w. 125mm × d. 20mm

Stone type: Probably locally derived mudstone.

Present condition: Complete? Good condition.

Description: This seems to be a complete or almost complete artefact with the edges of both long sides and part of the bottom edge rounded and the top shaped into a lug. It is incised with four deep intersecting lines, two of which are curved and join, but they form no clear pattern.

Date: Period II, phase 2, mid-eighth century.

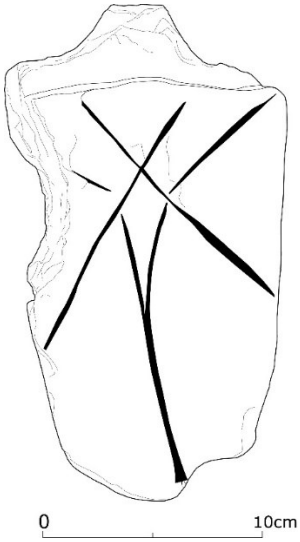


Figure 90. Stone 955.

Possible carved stone fragment 946

Provenance: Found in 2021. In situ, upright, leaning slightly to the east, on the west end of rectangular structure 618.

Dimensions: h. 510mm × w. 350mm × d. 30mm

Stone type: Probably locally derived mudstone.

Present condition: Broken with top part missing.

Description: An incomplete slab, the bottom of which had been shaped into a rough point. The point rested on the west end of the rectangular structure. The top of the stone had broken off — its original height is not known. It is also unknown if the lost part was decorated. The stone must have been set up in the position in which it was found after 0.2m-0.3m of sand had accumulated over the rectangular structure (618). It may have been an original element of 616, repositioned as sand built up, or a later marker positioned over the buried structure. It stood until at least Period III phase 6 (ninth century) before the top part broke off.

Date: Period II, phase 2, mid-eighth century, or a little later.

Not illustrated.

Possible gaming boards

Possible gaming board 933

Provenance: Found in 2021. The slab had been placed on top of the layer of quartz pebbles that overlay the covering slabs on top of rectangular structure (618). The carved face was uppermost.

Dimensions: h. 255mm × w. 150mm × d. 10mm.

Stone type: Probably locally derived mudstone.

Present condition: Incomplete, but otherwise in good condition.

Description: A small, thin slab carved on one face only with an incomplete, very lightly incised grid of squares and four diagonal parallel lines.

Date: Period II, phase 2, mid-eighth century.

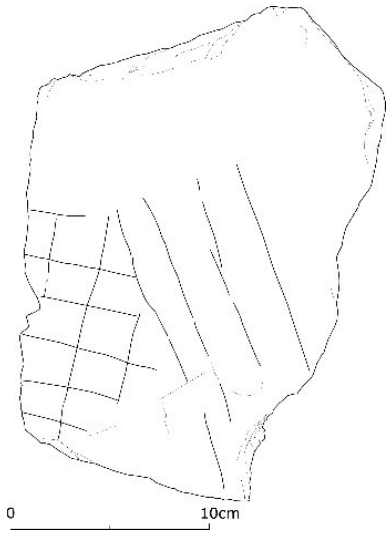


Figure 91. Possible gaming board fragment 933.

Possible gaming board fragment 951

Provenance: Found in 2021. In black material (160) outside oval enclosure.

Dimensions: h. 110mm × w. 50mm × d. 5mm.

Stone type: Probably locally derived mudstone.

Present condition: Good

Description: A small fragment roughly incised with an incomplete rectilinear grid. The intersections of some of the lines are marked with dots

Date: Period II, phase 3, mid-eighth century.

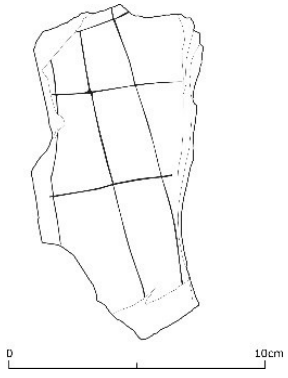


Figure 92. Possible gaming board fragment 951.

Possible gaming board fragment 952

Provenance: Found in 2021. In black material (160) outside oval enclosure.

Dimensions: h. 110mm × w. 80mm × d. 6mm

Stone type: Probably locally derived mudstone.

Present condition: Good.

Description: A small fragment roughly incised with an incomplete square grid.

Date: Period II, phase 3, mid-eighth century.

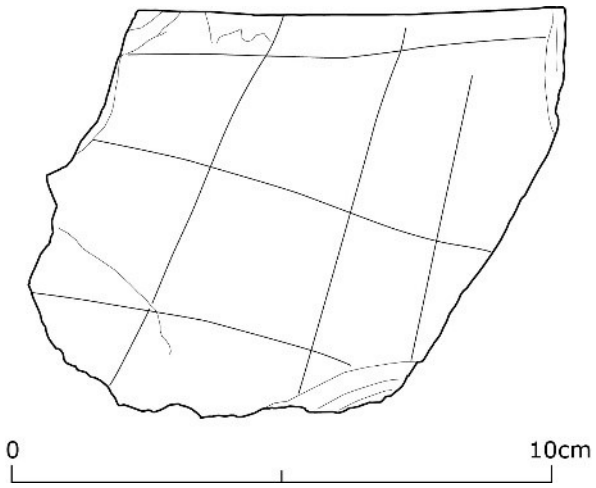


Figure 93. Possible gaming board fragment 952.

Other carved stones

Carved Stone Fragment 984

Provenance: Found in 2021 placed against the shale slab forming the east end of rectangular structure (618). It was placed there after the construction of 618.

Dimensions: h. 125mm × w. 60mm × d. 3mm.

Stone type: Probably locally derived mudstone.

Present condition: Fragmentary, but otherwise in good condition.

Description: A small fragment with two clearly incised concentric arcs with three more lightly incised concentric arcs meeting the inner line.

Date: Period II, phase 2, mid-eighth century.

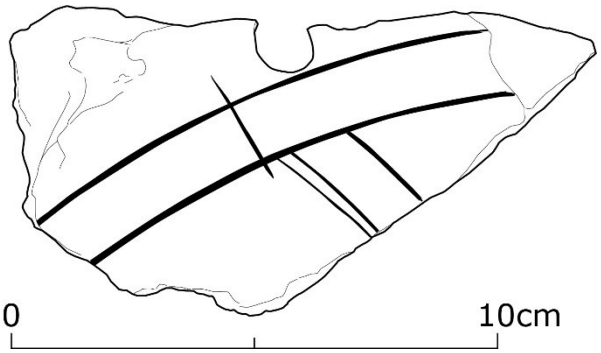


Figure 94. Stone 984.

Carved Stone Fragment 987

Provenance: Found in 2021. It was found resting on the surface of the quartz pavement (646) within the oval enclosure.

Dimensions: h. 105mm × w. 105mm × d. 10mm.

Stone type: Probably locally derived mudstone.

Present condition: Fragmentary, but otherwise in good condition.

Description: A small fragment incised with two concentric arcs.

Date: Period II, phase 2, mid-eighth century.

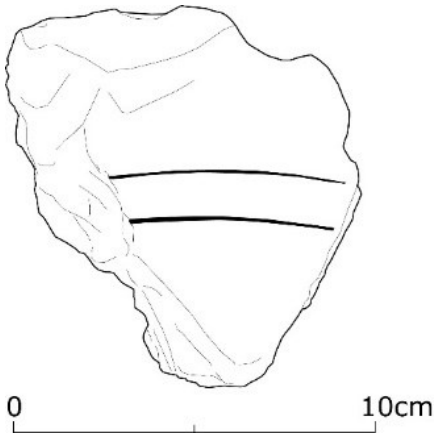


Figure 95. Stone 987.

Carved stone 988

Provenance: Found during excavations in 2021. The slab was found face down between two of the stone steps in the entrance to the oval stone enclosure surrounding rectangular structure (618).

Dimensions: h. 165mm x w. 110mm max. x d. 7mm.

Stone type: Probably locally derived mudstone.

Present condition: The slab is incomplete and has been broken into two adjoining pieces and there is damage at the top. It has been conserved to halt further lamination.

Description: A thin, roughly quadrangular slab that tapers towards the bottom carved on *A* only.

A (broad): The face is very lightly incised using a knife with intersecting horizontal and vertical lines.

Date: Period II, phase 2, mid-eighth century.

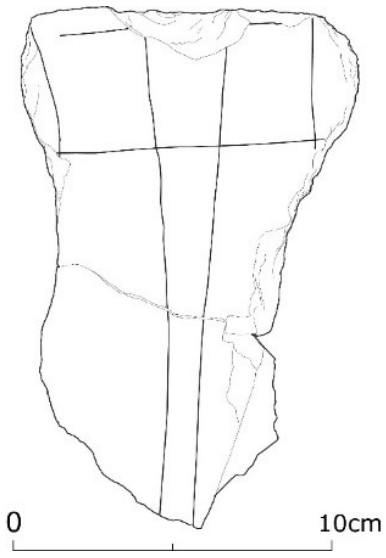


Figure 96. Stone 988, face A.

Carved stone fragment 915

Provenance: Found in 2021. Built into wall core work (wall 81) of the eleventh/twelfth century stone-built chapel.

Dimensions: h. 150mm × w. 100mm × d. 15mm

Stone type: Probably locally derived mudstone.

Present condition: Fragmentary.

Description: A small fragment incised with elements of a square and diagonal grid.

Date: Found in Period IV eleventh/twelfth context, but possibly of mid-eighth century.

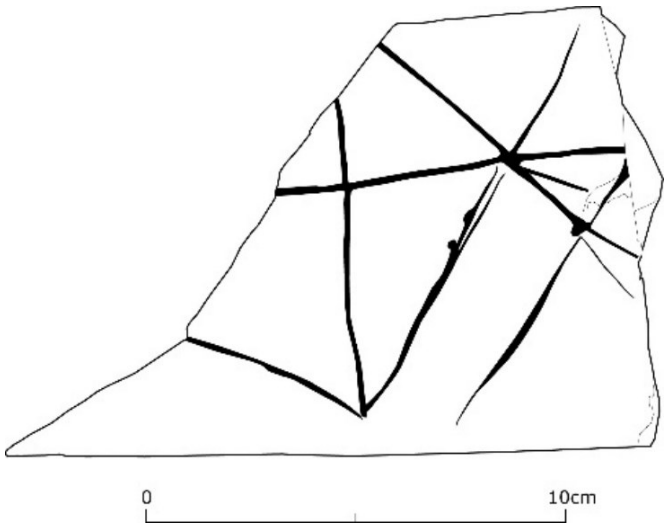


Figure 97. Stone 915.

Carved stone fragment 970

Provenance: Found in 2021 in black material (632) that had accumulated within the oval enclosure surrounding rectangular structure (618).

Dimensions: h. 40mm × w. 25mm × d. 2mm.

Stone type: Probably locally derived mudstone.

Present condition: Fragmentary, but otherwise good.

Description: A very small fragment incised with a horizontal line and parts of a diagonal grid of lozenges.

Date: Period II, phase 3, mid-eighth century.

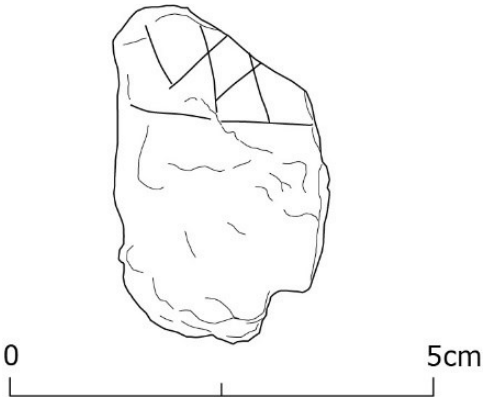


Figure 98. Stone 970.

Carved stone fragment 954

Provenance: Found in situ in 2021. In black material (160) outside oval enclosure.

Dimensions: h. 200mm × w. 130mm × d. 18mm.

Stone type: Probably locally derived mudstone.

Present condition: Very poor, broken in several pieces and laminating.

Description: The face is incised with a random group of lines.

Date: Period II, phase 3, mid-eighth century.

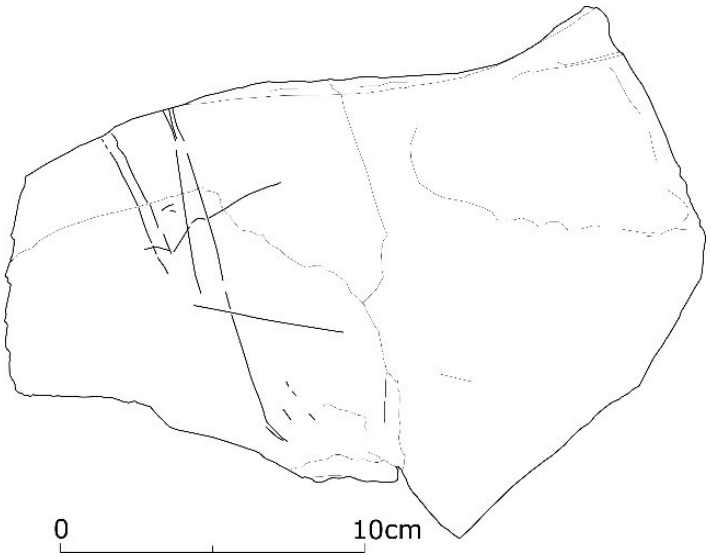


Figure 99. Stone 954.

Carved stone fragment 1119

Provenance: Found 2021. In sand layer (146) associated with graves.

Dimensions: h. 110mm × w. 60mm × d. 20mm.

Stone type: Probably locally derived mudstone.

Present condition: Good.

Description: Rounded pebble probably from the beach with a single incised line on one face.

Date: Period III, Phases 5-6, ninth century.

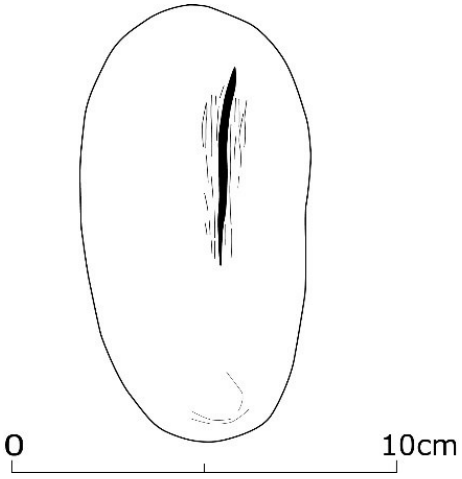


Figure 100. Stone 1119.

Carved stone fragment 981

Provenance: Found in situ in 2021. In black material (632) within oval enclosure.

Dimensions: h. 145mm × w. 75mm × d. 18mm.

Stone type: Probably locally derived mudstone.

Present condition: Fragmentary, but otherwise good.

Description: A single line incised into one face.

Date: Period II, phase 3, mid-eighth century.

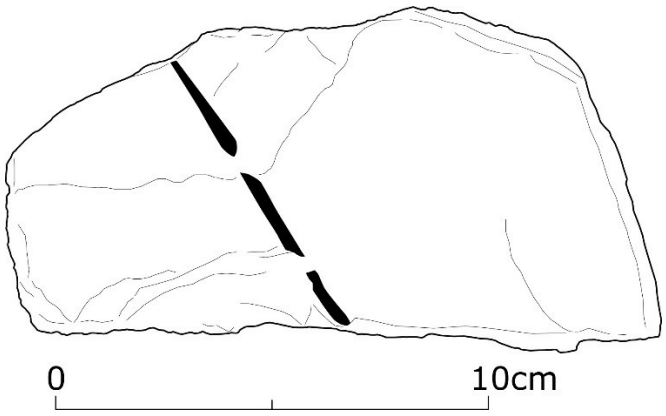


Figure 101. Stone 981.

OTHER EARLY MEDIEVAL STONE OBJECTS

By Mark Redknap and Jana Horák

SF 427. Slipstone/sharpening stone

Provenance: context skeleton 205, Burial 5 (found against right tibia of skeleton 205). (Period 3 Phase 6)

Description: fragment of longitudinally split half of an elongated natural water worn pebble. The pebble has evidence for use at one end.

Dimension: L 144mm x max W 34mm x surviving T 13.4mm.

Discussion: this would appear to be residual.

SF-27. NMW Photo reference 108258-60.

SF 462. Slipstone/sharpening stone

Provenance: context 160/41 black sandy soil underlying cemetery (Period II Phase 3).

Description: fragment of stone with multiple sharpening grooves of varying depth on one face; flat, smooth underside.

Geology (Jana Horak): very fine silicious rock, with fine-grained clastic rock with a high volcanic content, or an acid tuff.

Dimension: H 65.7mm; max. W 108.8mm; max. T 15.9mm.

Discussion: appears to have been used as a slipstone, and for sharpening blades or points (fine tools?).

SF 462. Sharpening stone

Provenance: context 160 black sandy soil underlying cemetery (Period II Phase 3).

Description: dark grey/black surface (burnt?). Single sharpening groove.

Geology (Jana Horak): grey medium to fine-grained sandstone with some reddening and intericial.

Dimensions: L 154mm x max. W 119.4mm; max. T 23.6mm.

THE NAME DON(N)OEC INSCRIBED ON STONE 1145

By Patrick Sims-Williams

Donn is a well-known Irish name, based on the adjectives *donn* 'brown, dark' or *donn* 'noble' (possibly different senses of a single adjective). This element occurs already in ancient Gaulish names such as *Donnos* and *Donnotaurus* ('dark/noble bull') (see *eDIL* under *Donn* and *donn*; Evans 1967: 84-85, 194-95; Vendryes 1996: 171-72; Delamarre 2003: 147; 2007: 88, 220). The Gaulish names are sometimes spelt with a single *n*, which in Irish is an unusual though not unparalleled spelling (see below). The single *n* in *donoec* is perhaps due to the engraver omitting the bar over *n* that would conventionally have indicated a second *n*. The second part of the name, *-oec*, is an early form of *óc*/*óg*, which means 'young' when it is an adjective and 'youth, (young) warrior' when a noun (see below).

At first sight, the obvious explanation of *donoec* is that it corresponds to what would be written Donn Óg in later times, i.e. the personal name *Donn* plus the epithet *óc/óg* 'young', which is typically used to distinguish a son from a father of the same name. According to the standard survey of Irish names up to the year 1000, however, 'a son's name may have an element found in the father's name; [but the] epithet *óc* [is] unknown' (O'Brien 1973: 218). In view of that, it is better to take *Donoec* as a compound name, meaning something like 'Dark youth' or 'Noble warrior'. For *óg* as second element in a compound compare *gallóg* 'foreign soldier' (*eDIL* under 1 *Gall*), and for *donn-* as the first element in names compare *Dongall* 'Dark foreigner?' and *Donfhiach* 'Dark raven', cited in *eDIL* under *Donn*. These examples have a single *n* which is unusual (cf. Uhlich 1993: 230-31). Note, however, that *eDIL*'s citation of 'Dongall' from the *Annals of Ulster* is not supported by the modern edition; it is *Donngal* ('Dark valour?') according to Mac Airt & Mac Niocaill (1983: 272, s.a. 817). *Donfhiach*, however, does have only one *n* in the manuscript (Jackson 1990: xii, 3 and 48). So does a third citation, *Donfraigh*, but this is not very significant as the name is split *Don*|*fraigh* at the end of a line, where a letter might easily be omitted (Bodleian Library, MS Rawlinson B.512, 48v). The citation of 'Dongamhna (gen.), Rawl. 145a15' in *eDIL* is a slip; O'Brien (1962: 166) correctly gives 'Con-ga*m*na' as the reading in MS Rawlinson B.502, 79r.

Irish *óg* 'young' is an Indo-European word related to Welsh *ieuanc*, Latin *iuvencus*, English *young*, etc. This occurs in Gaulish names such as *Iovinco-rix* ('Young king'), found, for example, in Latin inscriptions in Germany (*Ioincorigi* (dative) at Rheinzabern) and in France (*Iovinco[r]i[x]* at Horgne-au-Sablon, and *Iouigcorigis* (genitive) at Apt). (See Raybould & Sims-Williams 2007: 34, 75; 2013: 20, 97, 159; cf. Schmidt 1957: 227; De Bernardo Stempel 1987: 37, 132-34; Delamarre 2003: 191-92; 2007: 111-12.) Whatever the explanation of the *i* in *Iovinco-*, the Irish and Welsh forms can be derived regularly from **yuwankos* (McCone 1996: 51, 55-56, and 131; cf. Hamp 1970). Applying established sound laws (see McCone 1996; Sims-Williams 2003: 296-301), this should develop in Irish as follows: **yuwankos* > **yowænkos* > **owEgas* (*E* = an open /e/, possibly long to start with) > **owEga* > Early Old Irish **oëg*, written *oec* (as in *donoec*). In standard Old Irish *oec* has become *oac* (*a* in the unstressed syllable = schwa) and, with monophthongisation, *óc*. Both *óac* and *óc* occur in the glosses in St Gall MS 904, which were written after 825 (*eDIL* under *óc*). The only example of the archaic *oec* listed in *eDIL* occurs in *Audacht Morainn*, which according to Kelly (1976: xxxii) 'was first written down at the latest in the early eighth century and more probably towards the end of the seventh century'. Pokorny (1927) and Kelly (1976: xxxi, 6, 34) draw attention to one further example, written *ooec*, in a quotation from *Bretha Nemed*, a text dated to about the second quarter of the eighth century (Breatnach 2005: 190).

As there are not many early attestations of the word, it is not clear exactly when *oec* was superseded by *oac*, but a useful parallel (cf. Thurneysen 1946: 66 and 245) is provided by the word for '-teen' (as in 'thir*teen*, four*teen*', etc.), literally 'and ten': *déc* < *dëac* < *dëec* < **dexEg* < **dekank* < **dekm-k*^{w}*e* (Schrijver 1993). The spelling *déec* occurs in the Würzburg glosses in the later eighth century, but *deac* is the norm in the early-ninth-century (or slightly earlier) Stowe Missal (Stokes & Strachan 1903: 254-55; cf. Ó Néill 2000: 203-4) and in the ninth-century Milan glosses, and is confirmed by rhyme in the *Martyrology of Oengus c.* 800. However, *deec* lingered on, appearing in the early-ninth-century *Monastery of Tallaght* (Bergin 1905: 222), and it was sometimes revived for metrical purposes in later poetry, notably in *Saltair na Rann* in the late tenth century (see citations in *eDIL* under *deec*).

Of course, there are no metrical reasons for archaising in the case of *Donoec*, and *oec* and *deec* are not completely parallel forms (the first *e* in *deec* perhaps delayed the change of its second *e* to *a*). Nevertheless, the parallel suggests that while *Donoec* should probably be dated to before *c.* 800, a slightly later, early-ninth-century date cannot be wholly excluded.

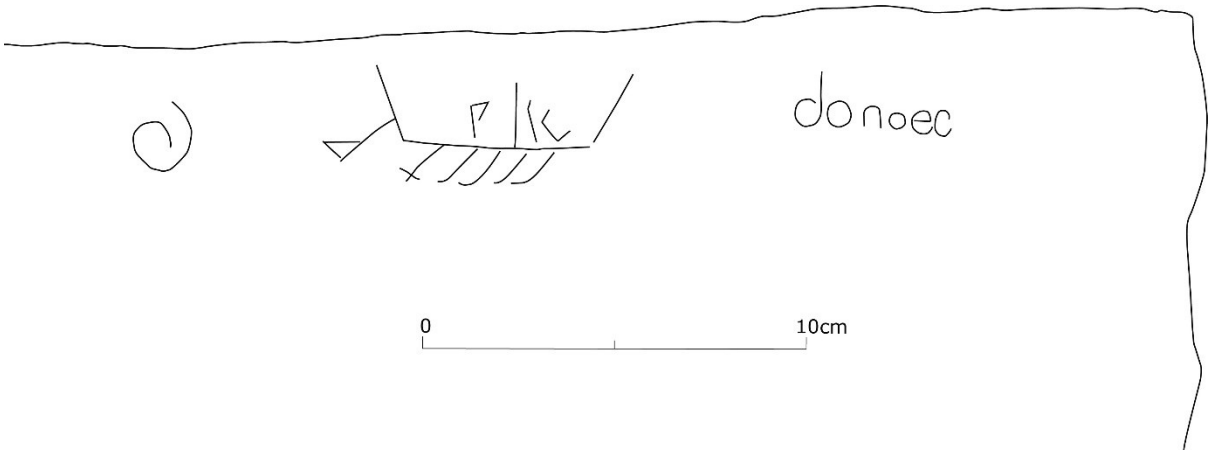


Figure 102. Drawing of the carvings on stone 1145.

Figure 103. Enhanced photograph of the inscription on the west end slab. Photo: Seán Vicary.

PREHISTORIC LITHICS

By Elizabeth Walker

Introduction

Excavations at St Patrick's Chapel 2014–2016 and 2019–2021 recovered a small assemblage comprising twenty-six pieces of flint and quartz and two worked stones. This was examined at Amgueddfa Caerdydd – National Museum Cardiff. Of these, seven pieces of flint and two of quartz were deemed to be natural and not knapped or worked in any way. The remaining seventeen pieces are reported on, and a full catalogue of all pieces examined are listed in the appendix. This report examines all the knapped flint and provides a statement about the nature of the prehistoric evidence for flint working at this site.

Methodology

All pieces have been subject to macroscopic analysis and identifications have been undertaken in accordance with Andrefsky's published methodology. This involves the examination of each individual piece with the eye under good, directional light (Andrefsky 2005). Any evidence for retouch, and for use along fine edges, is detectable in this way. All the pieces in the assemblage identified as being humanly, rather than naturally, fractured were examined. All these were identified on the basis of the technological characteristics they exhibit and were allocated to a broad time-period where this was possible.

All the artefacts have been described in more detail than the knapping debitage. The artefacts have been categorised wherever possible, using basic British Prehistoric artefact typologies (cf. Butler 2005). Retouch has been described in accordance with Odell's scheme; recording how invasive it is across the edge of the tool (Odell 2004).

Cores have been allocated within a typology for blade-cores devised by Ballin (1999). The knapping debitage has been separated as far as possible using a basic visual descriptor. This has generated groupings of flakes and blades. Blades are defined as being at least twice as long as they are wide. The term spall has been used for small flakes of generally less that 10mm in both length and width. If it has been impossible to determine whether the piece under examination is a flake, blade or a possible core fragment, it has been classified under the generic term of general knapping debitage.

Raw materials

Flint is the only raw material used in this assemblage. The exact source of the flint cannot easily be determined however, it is suggested that water-rolled nodules are being utilised owing to the smoothness of the cortex on the pieces. Such water-rolled cortex may indicate that the flint originates from secondary sources such as glacial moraine deposits that have become incorporated into river systems or the sea and then collected in the local area.

Post-manufacture changes

In some burial environments flint can develop a patination and the surface colour can change from black and grey to a white colour. Few of the pieces in this assemblage are patinated. In some circumstances patination can be an indicator of age or of the curation of older worked flints. This assemblage does not provide much evidence for patination,

and it is generally the natural colour of the flint that has been recorded. This ranges from brown, grey and honey coloured flint, suggestive of different sources of origin for this material.

None of the pieces in the assemblage show evidence of burning. Heat treatment is known to be an effective way to prepare flint for knapping, particularly in later prehistory. Other tools and pieces may have become incorporated into hearths, fires, or deposits and can be useful indicators for such.

Mesolithic or Neolithic forms

Four pieces in the assemblage might be considered either Mesolithic or Neolithic age on the basis of the forms represented. One of these, a cortical scraper (SF938) has a convex scraping edge. The tool is made on a large round flint flake of which the distal end is missing. The scraper has marginal retouch around the edges towards where the distal end would have been. This might be considered later Mesolithic or Neolithic in age.

A further scraper fragment (SF937) is also possibly of this date. This is made on a flake with a plain striking platform. The retouch is at the end, but there is damage to one side of the piece.

An anvil struck core (SF1110), generally known as écaillé technique is also most likely to be of this age. The core has scalar fracturing at both its ends.

A further core fragment (SF965) is harder to attribute to age, but because of a blade removal is included in this group. This possible core has what is apparently core preparation work on one edge, from which a single blade has been struck.

Neolithic tools

One tool, a knife fragment has a Neolithic form (SF948). It is the distal end of a flint knife and tapers to a point with irregular, but clear retouch along the entirety of the lengths leading to the point.

A fine blade knife of probable Neolithic or possible Bronze Age date (SF446) is made on pale grey, unpatinated flint and has a cortical distal termination. The marginal retouch runs along the entire length of one side of the tool, whereas the other is unmodified. This knife is residual in context 137, a 9th century line of stones or wall associated with the early medieval cemetery.

Prehistoric pieces

The remaining eleven pieces have not been attributed to a specific period during prehistory. One miscellaneous retouched piece (SF1124) is impossible to allocate to a specific time in prehistory based on what remains. This is a flake with possible retouch running along one length. The retouch is very marginal and there is no real form to the piece. A prehistoric retouched flint blade fragment was found unstratified on the site [no small finds number]. This is a heavily patinated distal end of a blade which has recent breaks at both the proximal end and the distal tip. There is some limited retouch along one length suggesting that the unmodified length may have been used as a cutting tool sometime during prehistory.

The rest of this assemblage are pieces of general knapping debitage. When undertaking a flint knapping episode, most of the pieces created are waste flakes, blades, spalls and general pieces of knapping debitage, those irregular shaped pieces that may be

caused by a badly placed blow, or a flawed piece of flint. As so many of these pieces are created during knapping, in the absence of good stratigraphical control these will inevitably end up being loosely grouped together in this way.

A thick patinated flint flake (SF414) was found residually in context 79 which dates to the 10th or 11th century. This is a waste flake with no evidence for use. Its edges have suffered more recent damage and crushing. One primary flake fragment made of brown unpatinated flint and one black unpatinated piece of unclassifiable flint knapping debitage (SF473) were recovered from context 160. These are deemed residual to this sandy layer that is dated to the 8th century. Two further flakes, including a fully cortical flake (SF913) from context 506 indicates it was one of the first flakes detached from the core. The second, is unremarkable (SF1124) from context 632. A small flint spall (SF1121) from context 146 is a typical waste piece from a knapping episode. Four pieces are of irregular form and are deemed general knapping debitage (SF419) found residually at the base of context 97; SF 930 found associated with SK730; SF991 from context 160A and SF1101 from context 160D are all undiagnostic.

A hammerstone [SF469] comes from an unstratified context. This is made on a beach cobble of very fine-grained sandstone containing occasional mica, with a cleavage (J. Horák pers. comm.). This hammerstone has a bevelled end with heavy wear suggestive of abrasive use, the other has crushing, suggesting it was used as a hammerstone. The tool is far larger than those that have been recovered from Pembrokeshire Mesolithic sites, and in the absence of a context it is only possible to say that it might be of Prehistoric age.

Discussion

The assemblage of lithic artefacts recovered from the excavations at St Patrick's Chapel is a very small group. The tools that have been identified include one Neolithic flint knife and a further knife fragment which would comfortably sit with the rest of the tools which here, in the absence of secure context have been called Neolithic or even Bronze Age. The complete knife is from a residual context. These knives, two scrapers, and two cores might even form part of the same knapping event. There are surprisingly few pieces of debitage in this small assemblage and these indicate knapping activity in the vicinity of the site at a time during prehistory.

Whitesands Bay is known to be an area which has generated assemblages of artefacts of prehistoric date. A broken fragment of a Neolithic axehead reportedly found below the high tide level on the beach at Whitesands Bay is made of rock originating from Preseli Hills area (Group VIII) and confirms Neolithic activity in the area (Burrow 2003, 63). Savory records a group of finds predominantly of early Bronze Age and prehistoric date, amongst which he records a flake from a Neolithic polished stone axehead from the burrows at Whitesands Bay (Savory 1950, 85). Also present in this assemblage are cores, a hollow-based arrowhead, 13 pieces of knapping debitage, 2 retouched pieces and 5 button scrapers (Savory 1950; Burrow 2003, 244). This group, with the exception of the arrowhead, is quite similar in composition to the St Patrick's Chapel assemblage. As is another group without detailed location information from the Whitesands Bay area comprising early Bronze Age and general prehistoric tool forms, including cores, a hollow-based arrowhead a plano-convex knife and 18 scrapers (Burrow 2003, 245).

These groups of finds indicate a late prehistoric presence at Whitesands Bay predominantly of Neolithic and early Bronze Age date. On balance it is probably fair to call the general assemblage recovered during these excavations as Neolithic, rather than

Mesolithic, on the basis that there is no further evidence of finds of such age from the vicinity.

Table 3. Catalogue of all lithics examined

Find No.	Context	Material	Description	Dating
No no.	Unstrat.	Flint	A white, patinated prehistoric miscellaneous retouched flint blade fragment. A distal end of a blade with a recent break at the proximal end revealing the natural grey colour of the flint. The distal end has an angled termination with recent damage to the tip. The tool has limited retouch along one length and has possibly been used along its other length.	Prehistoric
414	79	Flint	A thick white patinated flint flake with a facetted butt. The edges of the flake have undergone heavy crushing wear which his more recent than the general patination of the flake.	Prehistoric
416	103	Flint	A white patinated naturally thermally fractured piece of flint.	Natural
419	Base of 97	Flint	Natural piece of pale grey flint.	Natural
446	137	Flint	A Neolithic or Bronze Age flint knife. The tool is made on pale grey, unpatinated flint. The blade has a cortical distal termination. It has marginal retouch running along the entire length on one side whereas the other length is unmodified.	Neolithic or? Bronze Age
469	Unstrat.	Very fine-grained sandstone	A natural water worn pebble with evidence for use on both ends. One end is bevelled with heavy wear suggestive of abrasive use, the other has crushing suggestive of use as a hammer stone.	Prehistoric
473	160	Flint	A primary flake fragment of brown unpatinated flint. The piece has a cortical dorsal surface, but with a removal from a side which has some crushing on the edge.	Prehistoric
473	160	Flint	A piece of general flint knapping debitage of black unpatinated flint.	Prehistoric
473	160	Flint	Two pieces of flint. Probably natural as neither has evidence for conchoidal fractures. One is burnt grey flint, the other yellowish in colour.	Natural
913	506	Flint	A primary cortical flint flake with a water-rolled cortex.	Prehistoric
930	SK 730	Flint	A general piece of knapping debitage showing sand gloss from its burial context. The piece is irregular and squared in form probably shaped by post-prehistoric damage.	Prehistoric
937	130	Flint	A fragment of a scraper made on a flake with a plain striking platform. The retouch is at the end, but there is damage to the left of the piece.	Mesolithic or Neolithic
938	581	Flint	Cortical scraper with a convex scraping edge. The piece os made on a large round flint flake for which the distal end is missing. The retouch is marginal and is around the left and right edges of the piece with the end missing.	Mesolithic or Neolithic

948	160 G	Flint	The distal end of a flint knife. The piece tapers to a point and there is irregular, but distinct, retouch along the entirety of the lengths.	Neolithic
965	160 E	Flint	A possible flint core fragment. The core has what may be preparation on one edge and a thin bladelet removal from this edge.	? Later Mesolithic or Prehistoric
965	160 E	Flint	Natural piece of flint.	Natural
991	160 A	Flint	Possibly a piece of knapping debitage with cortex on two edges. The piece could be natural.	Prehistoric
992	160 A	Quartz	Two natural pieces of quartz.	Natural
1101	160 D	Flint	A piece of possible knapping debitage. The piece has little to distinguish it.	Prehistoric
1101	160 D	Flint	This has thermal fractures and no conchoidal fracturing to indicate it has been knapped.	Natural
1110	160 J	Flint	An anvil struck core with scalar fracturing at both ends.	Mesolithic or Neolithic
1121	146	Flint	A small flint flake or spall.	Prehistoric
1124	632	Flint	A flint flake.	Prehistoric
1124	632	Flint	A flake with possible retouch along one length. The retouch is very marginal, and the piece is undiagnostic.	Prehistoric

Hammerstone 469 NMW Photo reference 108013-14.

Flint knife 446 NMW Photo reference 108253-54.

ROMAN POTTERY

By Peter V. Webster

General Comment

This small collection is presumably derived from agricultural activity during the Roman period and, therefore, from a midden attached to a nearby farm. It is unwise to draw too many conclusions from what must be a random sample presumably of material spread over a much wider area. However, the number of samian sherds (five of the total seven) may be noted, a high proportion particularly for a rural site, and just possibly indicative of derivation from an occupation site well above the subsistence level. The material could span the second to the fourth century, but it seems more likely that the date range is narrower than this and certainly all the sherds could have been in use between the mid-second and mid-third centuries.

Catalogue

SF 442. Small sherd, possibly from a bowl

Provenance: sandy context 103 (Period III Phase 5).

Description: very abraded fragment of possible decorative external cordon from a vessel (?bowl) in fine orange oxidised fabric. Probably Roman.

Date: Roman.

SF 906. Mortarium

Provenance: context 517 (Period IV – in make-up of wall of stone-built chapel).

Description: mortarium base. Probably white Oxfordshire.

Date: mid-third to fourth century

SF 920. Samian

Provenance: US (2021).

Description: very abraded fragment of vessel (? probably Dragendorff 33). Central Gaulish.

Date: AD 120-200; the form is most popular in the mid- to late second century

SF 939. Samian

Provenance: context 146 (Period III Phase 5).
Description: abraded dish fragment is traces of barbotine decoration. A large example of Drag. 36.

Date: AD 120-200. Large examples like this tend to belong to the later part of the century

SF 949. Samian

Provenance: within black occupation later context 160(K) (Period II Phase 3).
Description: small fragment of vessel (? probably a bowl). Probably Central Gaulish.
Date: second century.

SF 957. Samian

Provenance: context 182 (Period II Phase IV).
Description: very small fragment of vessel (? probably a bowl). Burnt. Central Gaulish.
Date: second century.

SF 1141. Samian

Provenance: context 146 (Period III Phase 5).

Description: very abraded fragment of orangeware.

Date: Roman.

OTHER ROMAN FINDS

by Mark Redknap

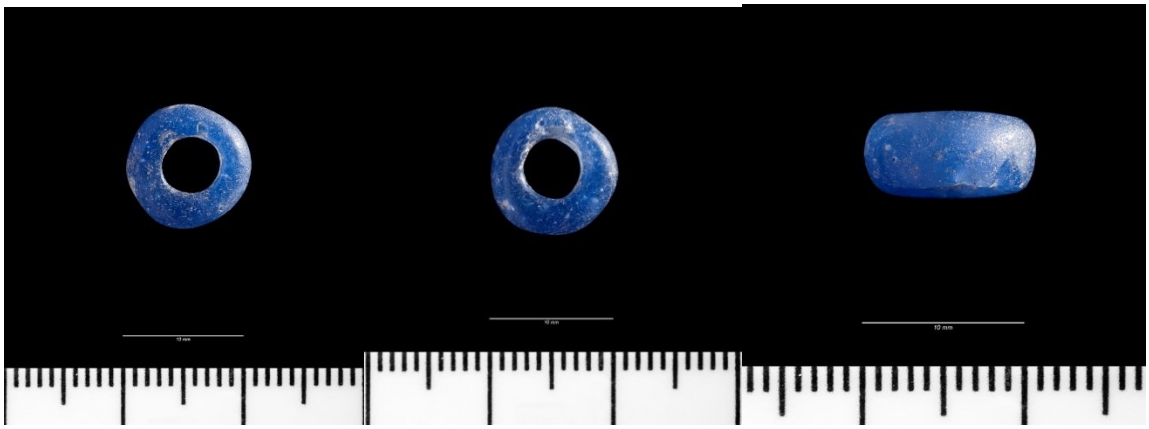
Roman Beads

SF 404. Light blue glass bead

Provenance: from beach immediately below T1, found by V. Lambourne (2014).

Description: annular light blue glass bead from a necklace. Similar examples are known from Whitton (Jarrett and Wrathmell 1981, plate 18) and Porth-y-Rhaw (Sablerolles and Henderson 2010, fig. 16.1).

Dimensions: external diameter 10 x 10.02 mm; internal diameter 4.6mm; max T 4.5 mm.



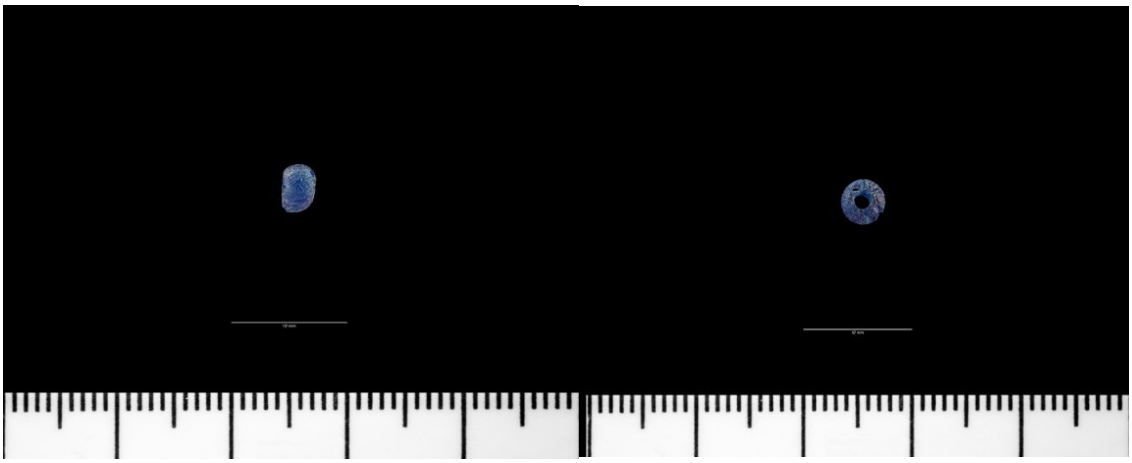
NMW Photo reference 108250-52.

SF 457. Blue glass bead

Provenance: skeleton 289 (Period III Phase 5).

Description: very small annular glass bead from a necklace. Roman?

Dimensions: L 2.6mm; external diameter 3.8 mm; internal diameter about 1.3mm; max T 2.6mm.



NMW Photo reference 158579-80.

Bone

SF 91. Cosmetic pick

Provenance: context 97 (Period IV).

Description: burnished point and chamfered end, polished through use.

Dimensions: overall L 52.2mm; max shaft W 4.3mm; max shaft T 3.4mm.

Date: uncertain, but possibly Roman.

Iron

SF 465. Nail shaft

Provenance: context 41 (Period I Phase 1).

Description: section of shaft.

Dimensions: unconserved length 37.8mm; max W 16.8mm.

EARLY MEDIEVAL FINDS

By Mark Redknap

Pre-excavation finds from Whitesands Bay

Of significance to the interpretation of the excavation sequence and the wider context of the material culture from the site are a number of objects found by metal detector on Whitesands beach.

1. Projecting ring-headed pin

A projecting ring-headed pin was discovered in 1988 with the aid of a metal detector by Mr Colin Scale within intertidal peat at Whitesands beach and recorded by the author at National Museum Cardiff in 1993. Its reported findspot lay about 100m WSW of St Patrick's Chapel, about midway between low and high water of medium tides (NGR SM 7325 2719).

Description; the straight shaft ends with a right-angled projection to a large ring-head of oval cross-section decorated with cast transverse ribbing on the front between four oval settings, now empty but possibly for enamel or other material.

The pin was submitted to Dr Peter Northover for analysis (NMW 556). A sample taken at the top of the shaft was drilled and hot-mounted in a copper-filled acrylic resin, ground and polished. Analysis was by electron probe microanalysis with wavelength dispersive spectrometry using the CAMEBAX automated instrument in the Department of Materials, University of Oxford. This analysis gave the following results: Cu 88.22%, Sn 10.13%, Pb 0.92%, Zn 0.32%, S 0.11%, Sb 0.09%, Au o.04%, Ni 0.03%, Ag 0.03%. XRF 1906 (LM): Cu, trace of Sn.

Dimensions: overall H 131.9mm; maximum external ring D 39.5mm; ring T 2 x 2.5mm; maximum shaft D 2.9mm; internal D of oval settings 2.2 x 2.3mm – 3 x 3.6mm.

Discussion: this pin is typologically related to Iron-age and Romano-British ring-headed pins, which are long-lived and notoriously difficult to date. An Iron Age example from Bellymena, Co. Antrim with large ring and oval inset for enamel, differs in having a ring in the same plane as the crook in the shaft (Dunning 1934, 285; Raftery 1983, Typ3 1G, fig. 134 no. 403). Late Roman ring-headed and ibex-headed pins (those with larger beaded lower part to corrugated upper part, often with concave settings) are generally dated to the third and fourth centuries AD. A projecting ring-headed pin from Phase Z dump in the North Aisle of Wroxeter baths basilica has a small ring (D 21.5mm) with incised zig-zag decoration on the lower edge of the head-plate (Barker et al 1997, fig. 311). If this Wroxeter dump is fifth century, post-dating the archaeomagnetic date of 500-550 for the Phase X oven D371, it could contain residual material (Barker et al 1997, 168). Ring-headed examples are known from the Temple of Nodens at Lydney (associated with late third- to fourth-century activity; Wheeler and Wheeler 1932, fig. 18, no. 64), as well as in Scotland (eg Bowermadden broch; Stevenson 1955, fig. B, 12). Plain examples are known from Anglesey (ring diameter about 16mm; British Museum 1925, fig. 109) and Dorchester (ring diameter about 23mm; Cool 1990, fig. 10, no. 9).

The diameter of the ring and straight pin with right angle projection pin are a chronological indicator, bearing in mind similar trends to larger diameters in early post-Roman penannular brooches, which sometimes have enamel inlay on small terminals. The regular cast ribbing resembles that on an early zoomorphic penannular brooch from Segontium, Gwynedd (fourth- to fifth century) and a larger zoomorphic penannular brooch from Port Dafarch, Anglesey (fifth- to sixth century; Youngs 1989, cat. No. 15; Redknap 1991, 30, bottom right and bottom left respectively). Therefore, the features of the Whitesands pin are consistent with a late fourth- to fifth-century date range, and its characteristics arguably favour a fifth-century date, although this cannot be independently confirmed. Projecting ring-headed pins are considered ancestral to the hand-pin of the sixth century.

2. Silver penny of Eadred

A tenth-century silver penny of Eadred (946-55. Two-line, HR1, N 707, moneyer Sigar; Blackburn and Bonser 1985, no. 55; Besly 2006) was found was found in September 1985 by Ms A. Lewis and A. W. Bartlett at the edge of the beach about 90m north-west of St Patrick's Chapel (NGR SM 7328 2725). The coin is now in Scolton Manor Museum, and an electrotype in the Amgueddfa Cymru collection (E 369).

Discussion: this is significant in view of the silver penny of Edmund (939-46) found during the excavation (see below). The Eadred and Edmund coins supplement the scatter of Anglo-Saxon coins now identified from coastal contexts in Wales (Besly 2006, 702). They have been long viewed as the product of Scandinavian contact along the two trade routes from Dublin to south-west and north-west England (Loyn 1976), and Blackburn and Bonser considered the coin of Eadred to fit that pattern. That it should be a coin from north-west England added support to the argument that it is likely to have been carried there by the 'Vikings', and they considered that it may even have seen some years of circulation in Dublin, before being brought to Wales (Blackburn and Bonser 1985, 68).

Some 35 years on, interpretation is more nuanced, and the St Patrick's Chapel coins suggest that other agencies also contributed to this coastal distribution.

Coin

SF 901. Silver penny

Provenance: context 505 (Period V)

Context: discovered during the excavation within post-medieval rubble context 505 (Rose Hedley, note in excavation archive; detailed assessment by Alastair Willis, Amgueddfa Cymru).

Description: silver penny of Edmund (939-46), moneyer THEODULF, no mint name, probably Chester (Two-line, HM var a (HQ 1), N 692.3.

Early medieval glass?

SF 445. Glass fragment

Provenance: context 144 (Period III Phase 5).

Description: small unevenly curved wallsherd of glass with a pale green colour slightly tinged with turquoise (colour chart for Anglo-Saxon window glass from Wearmouth and Jarrow; Cramp 2006, fig. 27.1.11). The surfaces inside and out show uneven striated waves, and there are areas of fine bubbling and imperfections. The fresh fracture reveals occasional very fine bubbles. A calcareous partially covers surfaces and old fractures.

Dimensions: 11.5x 14mm.

Discussion: the date is provided by the early medieval for the context. If not intrusive, the surfaces of this sherd, which appear to result of high temperature modification, suggest that it may have been part of a store of manufactured material being recycled by makers.

Beads

A total of ten early medieval beads were discovered during the excavation, one of bone, one of amber and eight of glass. They were found in a variety of contexts: the amber bead below skeleton 230, Burial 29 (Period III Phase 6), the decorated beads SF **973**, **976** within occupation layer 160 (Period II Phase 3), and the others from contexts 160 (c. AD 750-800) and context 516 (Period III Phase 6).

SF 918. Small biconical bone bead

Provenance: context 97 (Period IV) (2021).

Description: small lathe-turned circular bead with a biconical profile and polished surface.

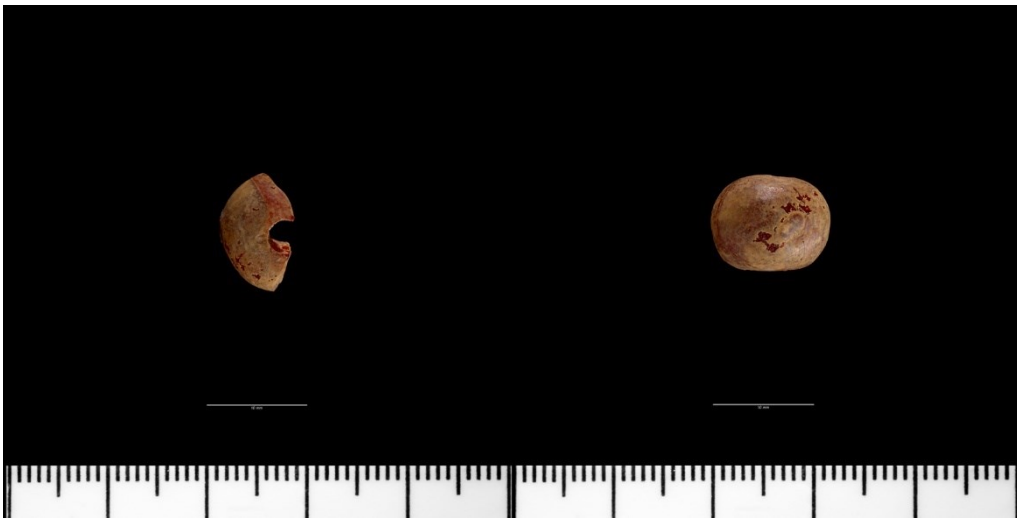
Dimensions: L 3mm; external diameter 10mm; internal diameter about 2.8mm.

Polish is the result of wear.

NMW Photo reference 158583-85.

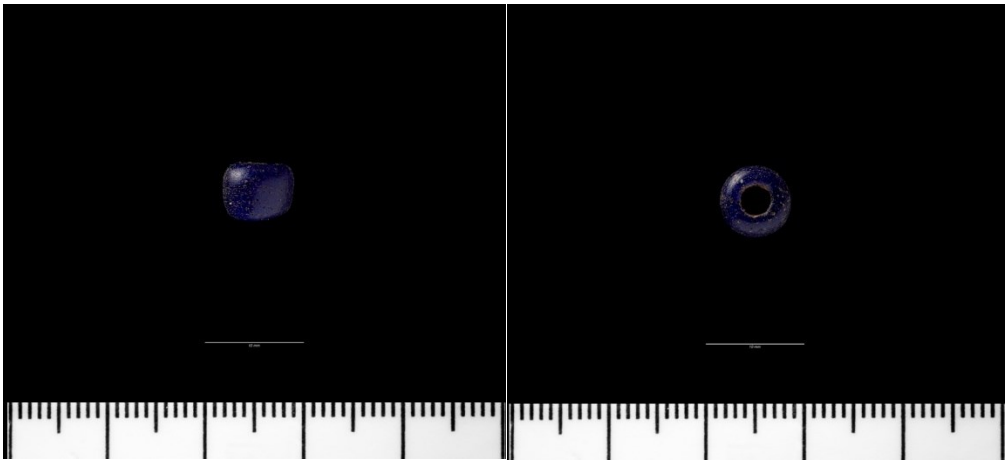
SF 415. Fragment of amber bead

Provenance: Trench 1, from below femur/between femora of skeleton 230, Burial 29 (Period III Phase 6).
Description: half a spherical bead with parallel-sided perforation.
Dimensions: external diameter 11.8mm; L 9.5mm; internal bore diameter 3.3mm; weight 0.4g.
Analysis: amber confirmed by FTIR spectrometry (see below)



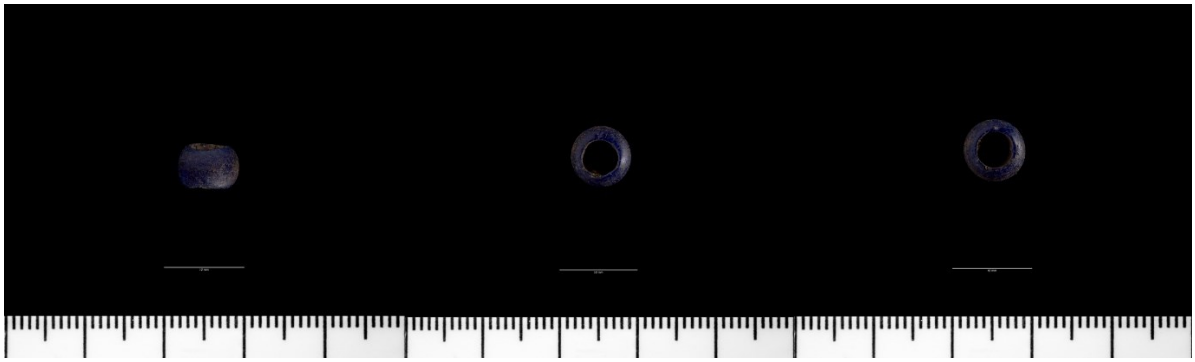
NMW Photo reference 158574-75.

SF 908. Blue glass bead
Provenance: context 516 grave fill, Burial 96 (Period III Phase 6).
Description: small dark blue annular glass bead from a necklace.
Dimensions: L 5.7mm; external diameter 7.1 mm; internal diameter about 3.5mm; max. T 2.6mm.



NMW Photo reference 158581-82.

SF 971. Blue glass bead
Provenance: context 160G (Period III Phase 3).
Description: small dark blue annular glass bead from a necklace.
Dimensions: L 5.1mm; external diameter 7.5 mm; internal diameter about 4.5mm; max T 2.7mm.



NMW Photo reference 158558-60.

SF 979. Greyish-white glass bead

Provenance: context 160 (Period III Phase 3).

Description: small opaque greyish white annular glass bead with D-shaped cross-section.

Dimensions: L 4.5mm; external diameter 8.5 mm; internal diameter about 6mm; max 1.9mm.

NMW Photo reference 158567-69.

Segmented glass beads

SF 153 (a) Segmented glass bead fragment

Provenance: context 160 (Period III Phase 3).

Description: fragment of a segmented dark blue bead of tubular form and three larger and one smaller segment.

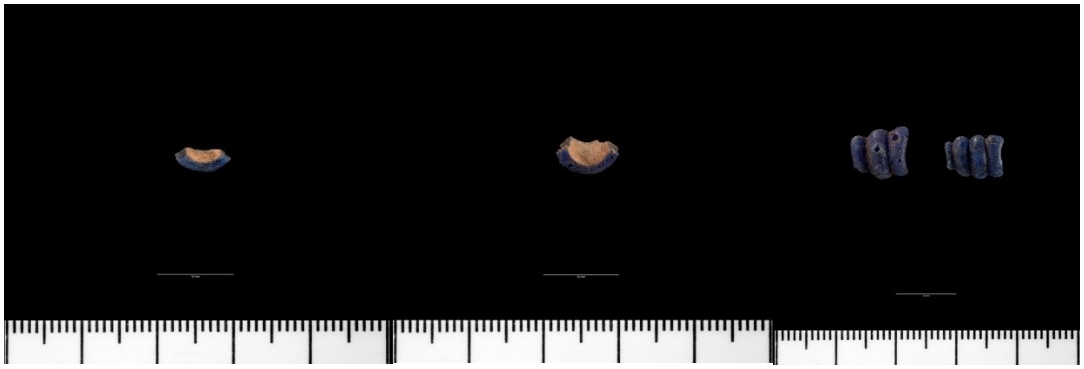
Dimensions: internal diameter about 6mm; L 9.8mm; max. T 2.1mm.

SF 153 (b) Segmented glass bead fragment

Provenance: context 160 (Period II Phase 3)

Description: fragment of a segmented dark blue bead of tubular form, with three segments. Some fine air bubbles have pitted the surface.

Dimensions: L 9.8mm.



NMW Photo reference 158576-78.

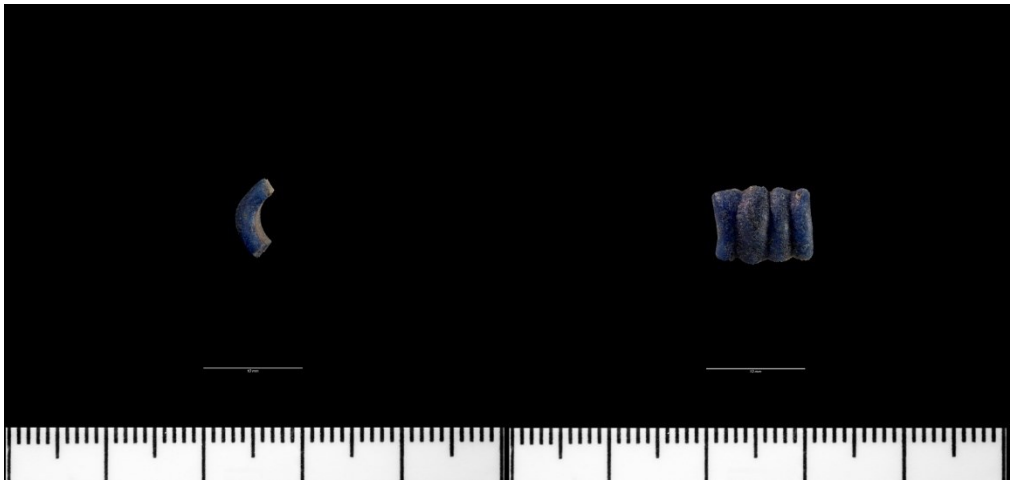
SF 980. Segmented blue glass bead fragment

Provenance: context 160 (Period II Phase 3).

Description: fragment of a segmented dark blue bead of tubular form.

Dimensions: external diameter 10mm; internal diameter about 5.8mm; L 10mm; max. T 2.6mm.

Discussion: SF 153a, 153b and 980 are all fragments of the same bead. for a related blue bead, also with four segments from Ireland see Mannion 2015, 22, fig. 14: 'a typical Class 1 bead'.



NMW Photo reference 158570-71.

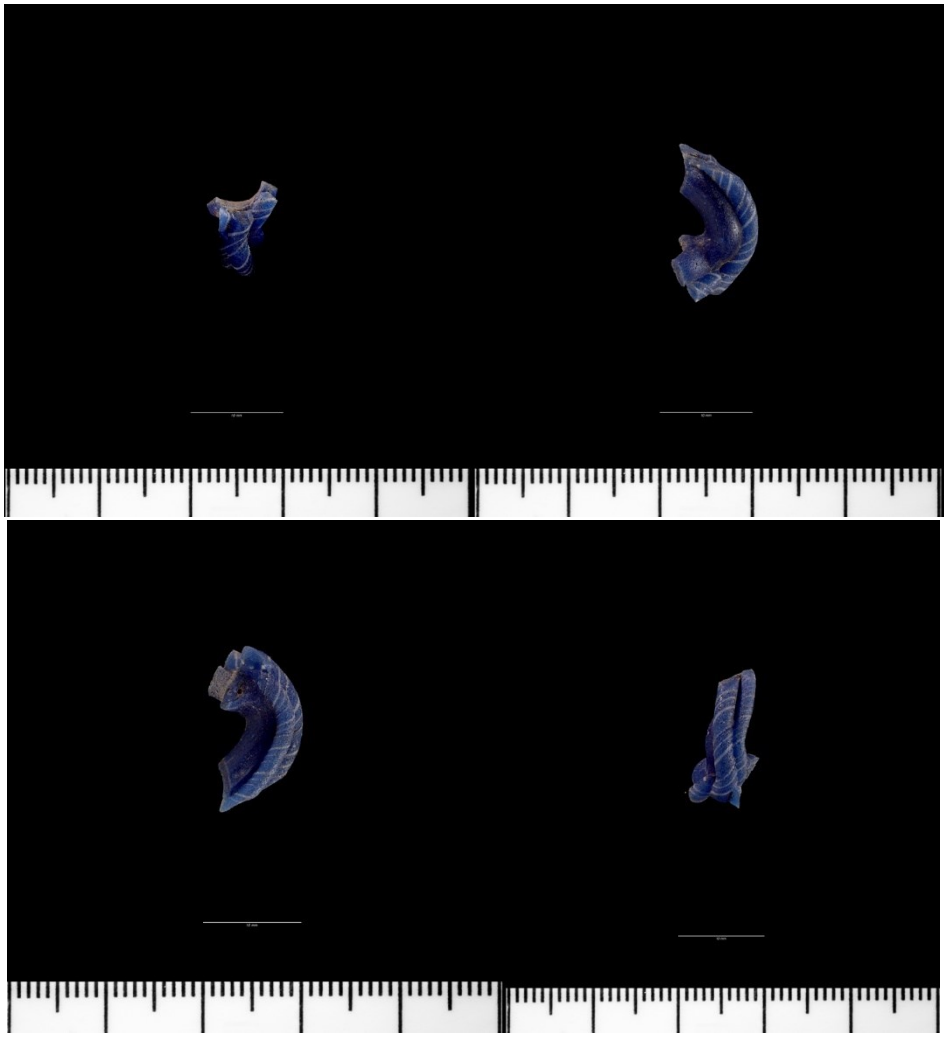
Decorated glass beads

SF 973. 'String' or 'cable' bead

Provenance: context 160 (Period II Phase 3).

Description: fragment 'string' or 'cable' bead comprising a blue segment bead (two segments extant), to which an arcing section of blue rod which is externally decorated with two reticella rods with fine white spirals twists has been attached.

Dimensions: L of segmented bead 5.1mm; L of decorated rod 15.2mm; D of blue rod 4.8mm.



NMW Photo reference 158561-64.

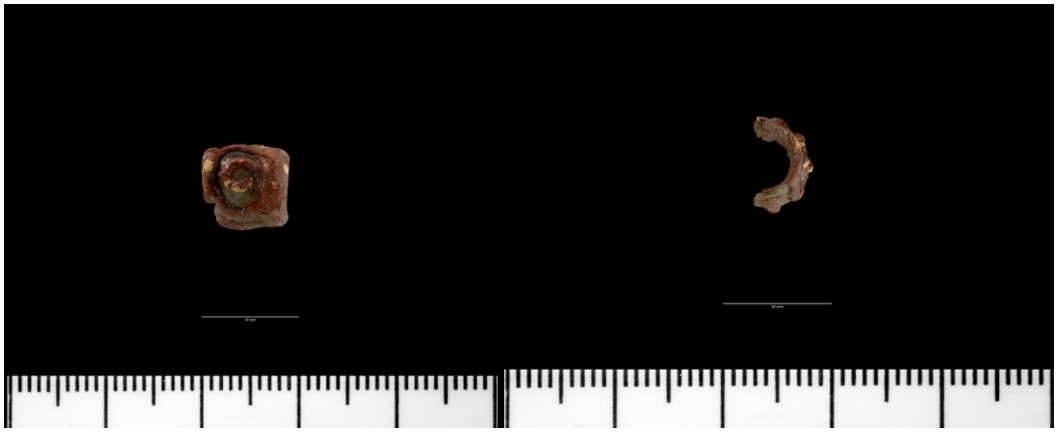
Glass bead from Dungiven, Co. Londonderry (BM Museum number 1890,0215.9; © The British Museum)

SF 976. Trail decorated glass bead

Provenance: context 160 (Period II Phase 3).

Description: fragment of a translucent very pale green barrel-shaped bead whose surface has been decorated with opaque yellow unmarvered trailed meander/spiral decoration between continuations of the strand to form plain yellow border 'collars' at either end.

Dimensions: external diameter 9.7mm; internal diameter about 4.9mm; L 9.2mm; max. T 2.2mm.



NMW Photo reference 158565-66.

Discussion

The bone, amber and glass beads from the excavation form a significant collection, the latter displaying stylistic affinities with parallels in Ireland.

Amber bead fragments have also been excavated in contexts belonging to the later phases of the Raised Rath period of Deer Parks Farm, Co. Antrim (phases 11-13; Lynn and McDowell 2011, 332).

Small annular beads of spheroid form (Guido Group 7) can be difficult to date, as green or opaque blue examples ranging in diameter from 2.5-9 mm occur in Roman contexts such as those from the drain group 4 in the legionary fortress of Caerleon (Brewer 1986, 147), and examples in blue glass from Caerwent and Usk (Guido 1978). However, they are also well known from early medieval contexts in Ireland (Mannion 2015, class 15, figs 44-46), and the dimensions of the St Patrick's Chapel examples fit in with the average size of such Irish examples (7mm), which occur in contexts dated between the late fifth/early sixth to late ninth centuries (Mannion 2015, 28-29).

'String' or 'cable' beads with applied cable twisted reticella rods similar to SF **973** are usually described as 'Irish', parallels occurring in Ireland and within the assemblage of 64 beads from the Knowe of Moan burial, Harray, Orkney (Hunterian Museum, Glasgow B.1914.524; http://www.huntsearch.gla.ac.uk/). A close parallel is the string bead from Dungiven, Co. Londonderry (British Museum acc. nos 1890,0215.9, 1862,0701.1; Marzinzik 2013, no. 138, 294-95). These are generally loosely dated to the sixth to ninth century, and so the eighth-century date for the context of the St Patrick's Chapel example provides closer dating for the circulation of this bead type.

Trailed decorated bead SF **976** is related to one with yellow trailed decoration from Ireland (Mannion 2015, 23, fig. 32). The size and form of **976** is consistent with Mannion's Class 9 unmarvered decorated beads. An example from Clonmacnoise came from a context thought to date to the ninth or tenth century (Mannion 2015, cat. No. 9.1); one from Deer Park Farms came from a context with a C14 date of AD 650-780 (Lynn and McDowell 2011, 195). These parallels suggest a seventh to ninth-century date range, and the radiocarbon date for context 160 places this bead type securely in the eighth century.

Copper alloy objects

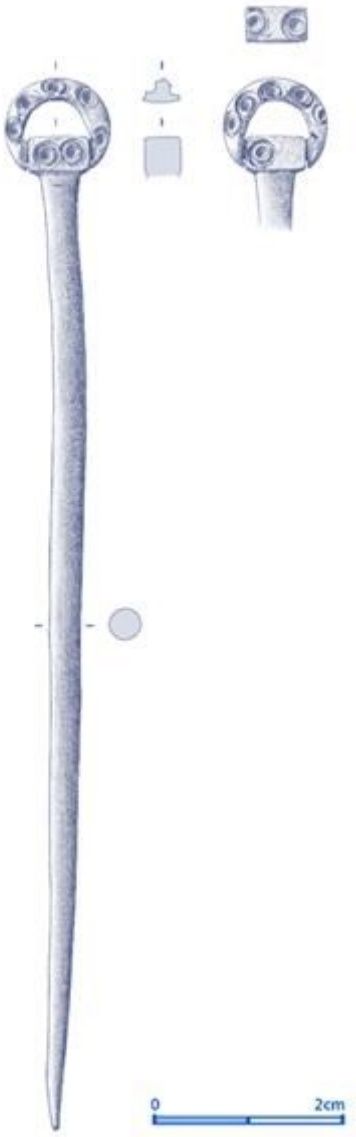
SF 412. Ringed-pin *(Drawn by T Daly, NMW)*

Provenance: context 88, rubble (Period IV) associated with cist graves around the chapel.

Description: crutch-headed ringed pin with stirrup shaped ring, both decorated with ringed and dot ornament, deeply punched but slightly irregularly placed. Ring secured in sockets by small tenons. Shaft complete and plain, of circular cross-section.

Dimensions: L (head and shaft) 104mm; head W 6mm; head T 3.4mm; max. ring D 10.5mm; ring T 4mm; max. shaft D 3mm.

Discussion: numerous parallels from Dublin have been found in late eleventh or twelfth century contexts. One with very similar off-centre decoration ring from Christchurch Place, Dublin, came from a late eleventh-century context (Fanning 1994, DRP188, Fig. 68). An example with a much shorter shaft and thinner ring came from a late tenth/early eleventh century 'fosse' in Fishamble Street (ibid, DRP203, fig. 71). A closer parallel is one from a context dated to the twelfth century in the High Street, Dublin (ibid, fig. 80: DRP232 (E71:10944). However, the published dates for many High Street ringed pins are now considered to be about 50 years too late (Ó Floinn, *in litt*.).



SF 453. Fragments of cast copper alloy

Provenance: context 149 (Period III Phase 3/4).

Description: three small fragments of copper alloy, one from a small D-shaped buckle loop or similar (photographed).

Dimensions: max. W 3mm.

Discussion: one fragment appears misshapen and may point to metalwork recycling.

NMW Photo reference 108266-67.

SF 962. Small domed stud

Provenance: context 160 (Period II Phase 3).

Description: small domed headed stud or rivet/nail, thin shaft of square cross-section (incomplete). The domed head is covered in sheet copper-alloy.

Dimensions: max. surviving head D 9.3mmk surviving L overall 8.7mm; shaft W 3.4 x 3.4mm.

Discussion: this small stud may have decorated a leather belt, strap, saddle, box or trunk.

Table 4. p-XRF analysis by Amgueddfa Cymru of artefacts from St Patrick's Chapel.

SF no.	p-XRF no.	Object type	p-XRF results
931	1865	Bleb	Cu with trace Sn, Pb
932	1866	Wire hook	Cu, some Zn, trace Pb
940	1858	Wire	Cu, trace Pb, Fe, Sn
940	1862	Wire	Cu, some Sn, trace Pb
945	1907	Bleb of copper (2021)	Cu, minute amount of Sn
956	1864	Strip	Cu. Some Sn, trace Pb
974	1867	Waste	Cu, some Sn (small)
975	1863	Ingot	Cu, some Pb, trace Sn
975	1906	Ingot	Cu, trace of Pb and Sn.
977	1868	Bramble-headed pin	Cu (calcareous/sandy copper-stained coating), some Fe, trace Pb
978	1859	Scrap/waste	Cu, some Fe, Sn, trace Pb, Zn
978	1869	Scrap/waste	Cu, slight trace Pb
NMW Scale collection	1908, 1909	Ring-headed pin (from shaft)	Cu, minute trace of Sn.

Shale objects

SF 430. Shale, lignite or jet bracelet fragment

Provenance: unstratified, found by Andrew David in the 1970s, in eroding sand above a cist grave.

Description: fragment of bracelet, originally of lenticular cross-section (one side now missing, leaving a flat fractured face); lathe-turned from a black, organic-rich stone. Interior surface slightly convex, with angular turn to inner and outer convex sides, and incomplete were broken along a natural lamination. Fine scratch marks on outer and inner curved surfaces, which are polished to a high sheen. Raw material finely laminar, with a 'stony' appearance: compact, warn to touch.

Dimensions: surviving L 51.2mm; estimated external diameter 43mm; weight 8.1g.

NMW Photo reference 108255-57, 108274-75

SF 936. Shale or jet bracelet fragment

Provenance: found loose in sand layer 146 (Period III Phase 5).

Description: part of a bracelet (sometimes called a bangle), now in six fragments. Originally of lenticular cross-section (one side now missing), lathe-turned from a matt charcoal grey, organic-rich stone. Interior surface slightly convex, with angular turn to inner and outer convex sides; incomplete were broken along a natural lamination. Raw material finely laminar, with a 'stony' appearance: compact, warn to touch.

Dimensions: surviving maximum L 38.4mm; estimated external diameter 70mm; weight 1.6g.

Discussion

Bracelets (sometimes called 'bangles' or 'armlets') made of polished black stone (jet, lignite, cannel coal or shale) have a broad Bronze Age to early medieval date across Ireland, Scotland, England and Wales, and as they show little typological variation, they can be difficult to date.

The 'flattened-oval' cross-section of SF **430** is similar to a Roman example from a grave group in York (Allason-Jones 1996, no. 84), while examples with slightly different profiles have been published from *Segontium* (two from periods 8-9, late third to fourth century; Allason-Jones 1993, fig. 10.22, nos 491-493). Of the jet and shale bracelet fragments found in Anglo-Scandinavian deposits at the Coppergate excavations, some were thought to be Roman, and only those with D-shaped cross-sections found in Anglo-Scandinavian deposits were catalogued as early medieval (Mainman and Rogers 2000, 2599).

Early medieval examples occur at the Viking-age settlement at Woodstown, Co. Waterford (Hunter and Sheridan 2014, 320-23), Fishamble Street, Dublin; Ballymacash rath, Co. Antrim (Jope and Ivens 1998, 119-20, fig. 9); Ballinderry I crannog, Co.

Westmeath (Hencken 1936); Carraig Aille, Co. Limerick (O Riordain 1949, 88, fig. 17 and Garryduff, Co. Cork (O'Kelly 1963, 88). The cross-section of SF **430** is closely paralleled by lignite examples from insecure contexts at the multi-period complex at Lowpark, Co. Mayo (Gillespie 2010, fig. 4.63, pl. 4.89), and one from Deer Park Farms. Co. Antrim (from layer phase 1, Raised Rath Period (McDowell 2011, fig. 14.3, no. 1263). Examples of similar form can also be found in the collection of Irish antiquities in the National Museum of Denmark (Eogan 1991, fig. 15, no. 105).

SF **936** is similar to one of the bracelets from Anglo-Scandinavian contexts at York (Mainmain and Rogers 2000, fig. 1293, no. 9860), where evidence for jet and shale working has been found (ibid, 2498-2500). It closely resembles a fractured, well finished examples from Whithorn, possibly made of canneloid shale (Hunter and Nicholson 1997, fig. 10.109, no. 1.2), Monkwearmouth and from Viking-age sites and burials in Scotland such as a lignite bracelet from Lamba Ness, Sanday, Orkney and one from Castletown, Caithness (?lignite: Hunter 2008, fig. 2a, b; Graham-Campbell 1980, cat. no. 242).

Examples from Wales include a cannel coal parallel to SF **430** from Borras Quarry, Wrexham (external diameter about 70mm; Ian Grant, *in litt*.), and a narrow shale arm ring from the interface of two fills within a stone-lined pit at Llanbedrgoch, the lower of which has been radiocarbon dated to 609-621 AD (0.8%), 638-892 AD (94.6%; Beta-123209, 1290 +/- 70; Redknap, in preparation).

Iron objects

SF 463. Fragments of small staple

Provenance: context 160 (Period II Phase 3).

Description: two sections of shaft and disconnected curved head once forming a staple.

Dimensions: unconserved shaft length 21mm; max. W 4.8mm.

SF 474. Possible belt slide

Provenance: context 160 (Period II Phase 3).

Description: rectangular band of flat rectangular cross-section, resembling a belt slide

Dimensions: internal L 25mm x W 3mm (from X-ray); unconserved T 5.5mm.

SF 461. Fragment of? nail

Provenance: context 187 (Period II Phase 5). From sand below wall 42.

Description: section of shaft.

Dimensions: unconserved length 27.3mm; max W 7.5mm;

Craft production

Metalworking debris

Three of the crucibles and many of the mould fragments recovered during the excavation derived from context 129, the upper fill of B48 (Period III Phase 4) and from layer 160 (Period II Phase 3).

As has been pointed out by Tim Young (below) the composition of corroded casting spills is unlikely to be completely representative of the original bulk metal being cast, but the metal cast is likely to have been bronze. Burial 51 (child triple burial, Period III Phase 5) was physically related burial B48 and contained a significant quantity of copper-alloy waste and crucibles.

Waste

SF 435. Copper-alloy waste

Provenance: grave fill 129 (upper fill burial no. B48, Period III Phase 4).

Description: fragments of copper alloy, forming a globule of waste (bleb).

Dimensions: largest 6 x 4.5mm; total weight 0.6g.

Analysis: p-XRF by T. Young.

Discussion: indicative of metalworking in the area.

SF 450. Copper-alloy waste

Provenance: Context 112 (Period 3 Phase 5).

Description: two small conjoining fragments of copper alloy, forming a globule of waste.

Dimensions: largest L11.2mm; max W 7.3mm; max T 4.8mm; total weight 2g.

Analysis: see below.

Discussion: indicative of metalworking in the area.

SF 935. Copper-alloy waste

Provenance: context 41. Although assigned to context 41 this find was probably within or associated with layer 160 (Period II Phase 3).

Description: small twist of unevenly cast sheet; uneven surface; probably casting waste.

Composition: copper-alloy.

Dimensions: maximum L 13.8mm; maximum W 2.2mm; sheet T about 0.5mm.

SF 945. Copper-alloy waste

Provenance: context above skeleton 1016, Burial 201 (Period III Phase 2).

Description: fragment of copper alloy, forming a globule of waste (bleb).

Dimensions: 5 x 3.2mm; total weight 0.6g.

Analysis: p-XRF by T. Young (see report). XRF 1907: Cu, minute amount of Sn.

Discussion: indicative of metalworking in the area.

SF 975. Copper-alloy ingot (pencil drawing done; photograph required)

Provenance: context 160 (Period II Phase 3).

Description: small finger-shaped ingot with flat, rough underside, rounded sides and longitudinal depression on upper surface.

Composition: p-XRF 1863, 1906: Cu, trace of Pb and Sn.

Dimensions: maximum L 39.8mm; maximum W 9.5mm; maximum T 5.1mm.

Fired clay

SF 922. Fired clay

Provenance: context 112 (Period 3 Phase 5).

Description: three fragments of fired clay- daub or hearth lining.

Dimensions: wt 6.6g.

Clay casting moulds

A large number of clay mould fragments have been identified, but all are only partially preserved, the high degree of fragmentation limiting the identification of products cast from them. Nevertheless, vestigial clues suggest certain objects types. All the diagnostic fragments appear to be from two-piece bivalve moulds. The generally fine fabric shows mostly reduction on the casting interior of the mould, though some inner faces are oxidised. It has been possible to identify some conjoining fragments of impression, and the better-preserved impressions have been classified as follows:

SF 470, 437, 434 NMW Photo reference 108272.

A. Plain circular impressions

Some moulds provide evidence for the casting of flat circular shapes, though only plain faces have been observed. The inner radius for the multiple mount casts appears to be of about 40mm. In view of the incomplete nature of the impressions, it is unclear whether any represent the plain backs of decorative metalwork cast as multiple discs (later separated and finished, as at Killucan, Co. Westmeath (O'Connor 2005, fig. 1b), brooches or mounts. Similar products may be represented by **SF 472** from contexts 129/156. The lack of decoration on many impressions suggests that these are plain backs without fastening lugs; any externally decorated surfaces may have been thoroughly broken up post-casting.

B. Possible brooch impressions

Some impressions appear to represent the plain undersides of disc-shaped terminals of pseudo-penannular brooches (eg B1, SF **434**; context 129/wall 42;). Parallels include the smaller disc-shaped terminals of a pseudo-penannular brooch from the Shanmullagh hoard from the River Blackwater, Co. Armagh and Co. Tyrone, Ireland (attributed to the ninth century: Bourke 2010, fig. 6 no. 48). While clear impressions for the brooch hoops are absent, the eighth-century date does not rule this out. One possible trapezoidal terminal is represented by SF **470** from context 139, through this is not conclusive.

Two impressions appear to show curved shafts with transverse terminals of wider circular cross-section. Although small, the curved shafts rule out ringed pin heads, and simple penannular objects may be represented.

C. Impressions with curved or straight edges and projecting lugs

SF 434 from context 129 (C1) and **SF 437** (C2) appears to indicate an object with projecting lugs, recalling those on the door handle plate from Donore, Co. Meath (Kelly; Youngs 1989, cat. No. 64). However, the projections on the St Patrick's Chapel moulds are small and project from straight edges which show slight curvature towards on end of the surviving fragments. Both are very fragmentary, but the keying indent is partially preserved on **SF 437** (context 131), in the manner of central indents on bivalve moulds from Dooey, Co. Donegal and Dunadd (for brooches; Youngs 1989, nos 180, 181). There is a suggestion that the impression may have continued into a hoop, suggesting that this fragment could represent the inner edges of a penannular brooch terminal. The late ninth – early tenth-century brooch from Ballyspan, Co. Kilkenny, has similar small projections (Youngs 1989, cat. No. 89, 104, lower left), while the Breadalbane brooch as slightly larger projections (Brunning 2020, fig. 10.1).

D. Circular impressions with low relief moulding (SF 486, another from context 129) Some appear to show discs with low relief moulding, in the form of radiating raised 'arms', sometimes from a central 'boss'. One impression appears to show a central raised 'head and snout' shape within a small circular frame (context 129). None resemble known basal bowl escutcheons (cf Garton Slack; Youngs 1989, no. 32). Smaller disc moulds were recorded from Dunadd (Lane and Campbell 2000, 130). The diameters appear to match those for the undersides of circular brooch terminals, suggesting that some may have formed obverse and reverse moulds. [Reconstruction needs to be drawn]

One impression comprises a straight arm terminating in a boss, reminiscent of the bossed cross arms from a female grave 511 dating to the first half of the tenth century, Birka, Sweden (Wamers 1985, cat. no. 146, Taf. 18, no. 2).

These high fragmented remains are challenging to interpret, though it is possible that there may be a distant connection to the discs with radiating arms on some disc-headed pins from Ireland, or the rings with openwork radii on some brooch-pins (Armstrong 1922, pl xiii, fig 3; plate XIV, fig. 1).

E. Uncertain forms. E.1. Straight edges

A number of impressions display straight edges, though artefact types uncertain (SF **437**,).

Raised rim openwork occurs on cross mounts (eg Bourke 2010, fig. 30, no. 268) while straight rims with raised edges can be found on some strainers (Bourke 2010, fig. 42, no. 334) but these are raised from sheet metal.

Some of the castings may be for elements on composite objects. The profiles of some impressions resemble those for small dishes (cf Tweddle 1986, fig. 94 no. 689).

F. Bosses

A significant number of domed bosses of similar size, and less frequently the negatives of the same shapes, have been noted (eg SF **441**,; SF **437**). These appear to be keying bosses for the bivalve moulds, though they lack the asymmetry found on early medieval moulds elsewhere. The alternative interpretation is that they represent the casting of central hollow bosses on larger castings.

General comments

The mould fragments are most numerous in context 129, the upper fill of a ninth-century grave; this is presumably a secondary context, the source (perhaps dark context 160) being disturbed by the act of burial. Some fragments of mould are still covered in blackish sand, implying that they lay within a charcoal rich context.

The moulds are notable for being thin-walled (generally 7-11mm). Early medieval moulds from other sites include those from the foundations of an Early Christian period hut site at Kilpatrick, Corbetstown, Co. Westmeath (O'Connor 2005, Fig. 1). They occur on a wide range of sites in Ireland, from ringforts, royal sites, crannogs, monastic sites and sandhills settlements. Many date to between the sixth and eighth century (ibid, 241). The more diagnostic moulds found on these sites were for penannular brooches, ring-brooches, pins and pinheads, mounts and studs, and rings.

Table 5. Summary of casting debris by number.

Context	41	42	47	100	112	129	131	136	139	154	156	160	165	Ass 122	644	Sk 1016
Period/Phase	**II/1**	**III/1**	**III/6**	**III/6**	**III/5**	**III/4**	**III/6**	**III/4**	**III/6**	**III/6**	**III/4**	**II/3**	**III/4**	**III/6**	**II/3**	**III/2**
Hearth lining		14														
Mould type A							1						1			
Mould type B						1					1					
Mould type C						1	1		1							
Mould type D						6							1			
Mould type E						2	1			1						
Mould type F (keying)						4	1	1								
Undiagnostic mould fragment		3	1			21	8	1			1	1	1			
Crucible				1		2								1	1	
Total	0	17	1	1	0	35	12	2	1	1	2	1	3	1	1	0
Copper-alloy bleb	1				1	2						1		1		1

Catalogue of illustrated moulds fragments

A. Plain circular impressions

A1. SF 486. Mould fragment

Provenance: context 165 grave fill, burial B73 (Period III Phase 4).

Description: two fragments of mould (undiagnostic); light orange-brown core and soot blackened external surface; partially reduced light grey? internal surface on one fragment. Analysed by Tim Young.

Weight: 3.6g

NMW Photo reference 108249.

A2. SF 437. Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of mould with slight impression of shallow circular moulding with a minimum radius of 2.75cm; dark grey fabric, core and margins, orange / light brown external surface. No XRF.

Weight: 3.8g.

B. Pseudo-penannular brooches

B1. (SF 434). Mould fragment

Provenance: one fragment from context 129 burial no. B48 (Period III Phase 4) and a conjoining fragment from wall 42 (=boulder wall that surrounded the early phases of the cemetery). (2016).

Description: fragments of mould forming a double disc casting. XRF by Tim Young.

Weight: Radius about 30mm; 46 x 35.4 x T. 9mm; 11.9g.

B2. (SF 472). Mould fragment

Provenance: context 156 (with impression) and conjoining outer fragment context 129 burial no. B48 (Period III Phase 4).

Description: two conjoined fragments of mould forming a disc shaped casting. Very similar to SF 434 above, but for larger disc.

Weight: estimated diameter of disc 60mm; 25.3 x 22.6 x 9.6mm; 4.4g.

Possible ring or mounts of oval cross-section with transverse moulding NMW Photo reference 108248.

C. Impressions with curved or straight edges and projecting lugs

C1 (SF 434). Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, reduced core and surface one side, and pale grey surface exterior. Dark grey inner surface of mould has the partial impression of a curving edge with a small square projection at one point. Curvature increases towards one end, suggesting strap end of buckle frame. No XRF.

Weight: 26.8 x 16.5 x maximum T 12mm; 4.5g.

C2. (SF 437). Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: one fragment, grey internal surface. Incomplete impression of a flat plate with steps, and a single negative keying consisting of a finger indent. The impression resembles the inner edge of a brooch terminal back, with a keying indent central to the bivalve mould half, and the suggestion of curvature relate to a hoop, whose

diameter can be estimated at about 80mm. There is a change in the direction of the impressed edge towards one end.

Dimensions: 36.9 x 30.06 x T. 11.5mm; weight: 10.1g.

NMW Photo reference 108268.

C3. SF 470. Mould fragment

Provenance: context 139 cist grave, B53 (Period III Phase 6).

Description: Grey, reduced surface. Impression resembles the plain underside of a quadrangular brooch terminal, but insufficient survives to be certain.

Dimensions: 23.3 x 13.6 x T. 8.6 mm; Weight: 2.5g

D. Circular impressions with low relief moulding

D1. (SF 434). Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: one fragment with a reduced core and surface one side, and orange-brown surface exterior. Dark grey surface has appearance of a mould, with impression of a circular moulding in the manner of a lid or small dish. No pXRF.

Weight: Radius in inner circle 40mm; 3.1g.

NMW Photo reference 108247.

D2. (No SF no.) Fragment of mould

Provenance: context 129 burial no. B48 (Period III Phase 4) (2016).

Description: mould fragment with partial impression of a circular? mount with raised plain border, central boss and traces of two raised ridges extending towards but stopping short of the external border. Identification of the type of object being cast is difficult, but the impression appears to be a mount, sharing characteristics with D3 (SF **486**), which may have been part of the same mould. Two short impressions within the central indent resemble hair locks, framed within a slightly raised plain border; the indent may originally have been oval, prompting the suggestion that a head was represented. While the overall design is far from clear, the radiating arms are reminiscent of the cruciform halo around the seated scribe Matthew in the gospel manuscript St Gallen, Stiftsbibliothek, Cod. Sang. 1395, p. 418 (Farr 2017, plate 6).

Dimensions: diameter about 32mm; weight 2.2g.

D3 (SF 486). Fragment of mould

Provenance: context 165 grave fill, burial B73 (Period III Phase 4)).

Description: mould fragment with partial impression of a circular? mount with raised plain border, and traces of central boss and one deep ridge extending towards but stopping short of the external border (resembling a cell divide). Identification of the type of object being cast is difficult, but the impression appears to be a mount, probably originally part of D3 from context 129 above.

Dimensions: diameter about 40mm; arm length about 8.5mm; diameter about 34mm; weight 1.6g.

NMW Photo reference 108249.

D4. (SF 434). Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment with impression of straight 'arm with quadrant-shaped cross-section and central 'boss'. Light grey reduced core and surface one side, and orange brown surface exterior. Some original outer edge. No XRF

Weight: 7.6g

Dimensions: 31 x 25.8mm x T 12.7mm.

D5. (SFxx). Mould fragment

Provenance: context 129, burial B48 (Period III Phase 4).

Description: oxidised orange/brown core and external surface, medium grey inner surface with thin light grey margin. Impression a circular mount with narrow raised border (rounded profile, estimated external diameter about 40mm). Within low border, impression of what may be a D-shaped head, snout and single ear (no eyes visible).

Dimensions: T 7mm; weight 1.0g./1.9g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, reduced dark grey core and surface one side, and light brown surface exterior. Dark grey surface has appearance of a mould, with **impression of a circular moulding** in the manner of a lid or small dish with wide rim. No XRF. Also, two undiagnostic oxidised sherds.

Dimensions: weight: 3.9g (reduced fragment);1.6g (oxidised fragments)

No SF no. Fragment of mould

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: mould fragment, oxidised orange/brown core and external surface, medium grey inner surface with thin light grey margin. Impression a circular mount with narrow raised border (rounded profile, estimated external diameter about 40mm). Within low border, impression of what may be a D shaped head, snout and single ear (no eyes visible).

Dimensions: T 7mm; weight 1.0g.

E. Uncertain forms

E.1. Impressions of spatulate form

No SF no. Fragment of mould

Provenance: context 129, burial B48 (Period III Phase 4) (2016).

Description: mould fragment with partial impression of an object with a transverse moulding of circular cross-section at the end of a plate or runnel of flattened D cross-section, with suggestion of a slight expansion. Identification of the type of object being cast is difficult, but the impression shares characteristics with another fragment from context 154 (Grave fill, burial B66 (Period III Phase 4) SF 455).

Dimensions: end moulding W 6.6mm; diameter about 3.8mm; length of plate (incomplete) 12.3mm; weight 1.3g.

SF 455. Fragment of mould

Provenance: context 154 (grave fill) burial B66 (Period III Phase 6) (2016).

Description: mould fragment with reduced core and mould surface, and light orange brown surface exterior, bearing the partial impression of an object with a transverse moulding of circular cross-section at the end of curved plate, with suggestion of a slight expansion. Identification of the type of object being cast is difficult, but the impression shares characteristics with another fragment from context 129 (no SF no.). The impression is incomplete but may be for a pin head (head too small for a brooch pin of Clogher type: Youngs 1989, no. 188). Possible for a ringed pin with plain rounded head?

Dimensions: end moulding W 5.5mm; diameter about 3.5mm; length of plate (incomplete) 8.3mm; weight 1.3g.

NMW Photo reference 108246.

E.2. Impressions with straight edges

SF 437. Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of mould with impression of a straight edge and flat plain base; dark grey core and inner margin/surface, orange / light brown external surface. No XRF.

Weight: minimum T 9.9mm; maximum T 14.2mm; weight 7.2g.

(SF 434}. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, reduced core and surface one side, and orange brown surface exterior. Dark grey surface of the mould has the impression of a straight moulding, and possible small boss at one end. Also, one undiagnostic sherd.

Weight: weight 3.1g; 21.9 x 21.5 x T 7.2g. (oxidised sherd 2g)

F. Keying bosses (DAL 108273)

SF 434. Mould keying boss

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, pale pinkish brown core and mould, with boss – possibly key for bivalve mould. No XRF.

Weight: boss T 13.6; minimum T 8.8mm; weight 5.8g.

SF 441. Mould keying boss Needs illustrating

Provenance: context 136 (lower grave fill) burial no. B48 (Period III Phase 4).

Description: oxidised mould boss (keying in), orange fine fabric. No XRF.

Dimensions: 26.5 x 21.5 x boss T. 12.5mm; minimum T 6.3mm; weight: 4.6g

SF 437. Mould keying boss

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: keying boss; pale / light grey core and inner mould surface; oxidised pale creamish-grey outer surface.

Weight: 3.4g

SF 434. Mould keying boss

Provenance: context 129 burial B48 (Period III Phase 4)

Description: 1 boss – possibly key for bivalve mould. No XRF.

Weight: 3.1g

SF 434. Mould keying boss

Provenance: context 129 burial no. B48 (Period III Phase 4) (2016).

Description: 1 fragment of mould (negative impression of a boss) with dark grey surface and light grey margin, with pale orange external margin and surface. One surface smoother than the other, and flat.

Weight: 2.9g

SF 434. Mould fragment (sketch done)

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 mould fragment (rounded boss), patchy dark grey inner surface and margin; pale grey external margin and surface.

Weight: 3.1g

Catalogue of unillustrated mould fragments

SF Pottery. Fired furnace/hearth lining

Provenance: context 42 (within boulder wall Period III Phase 1).

Description: 13 fragments, some with reduced surface once side.

Weight: 23.3

SF Pottery. Mould fragment

Provenance: context 42 (within boulder wall Period III Phase 1).

Description: 1 fragment, reduced core and surface one side, and light brown surface once side. Mid grey surface has appearance of a mould, but not enough survives to establish what was being made.

Weight: 2.3g

SF Pottery. Mould fragments

Provenance: context 42 within boulder wall Period III Phase 1).

Description: 14 fragments of fired clay, oxidised. One rough side suggests associated with hearth lining.

Weight: 23.1g

SF 409. Mould fragment?

Provenance: context 47, from 'foot' end of cist grave 47 burial B13 (Period III Phase 6).

Description: 1 fragment, oxidised orange, and undiagnostic.

Weight: 1.5g; 14.6 x 10.07mm.

No SF no. Fragment of mould

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: mould fragment with partial flat impression. Reduced dark grey inner surface, grey inner margin and core, oxidised orange external margin and surface.

Dimensions: 12.9 x 11.5 x 7mm; weight 0.8g.

No SF no. Fragment of mould

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: nine small undiagnostic mould fragments, oxidised orange.

Dimensions: <13mm; total weight 3.9g.

No SF no. Fragment of mould

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: small undiagnostic mould fragments, 4 oxidised orange, 2 partially reduced.

Dimensions: total weight 4.1g.

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, reduced core and surface one side, and pale light brown surface exterior. Dark grey surface has appearance of a mould, with impression of a flat surface indent at one point. No XRF.

Weight: 19 x 19 x T. 9.7mm; 3.2g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, reduced core and surface one side, and orange brown surface exterior. Dark grey surface has appearance of a mould, for object with slight curvature (or same as above). No XRF.

Weight: weight 3.8g; 26.2 x 17 x T 9.5mm

No SF no. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, pale grey mould, with dark grey casting surface.

Weight: 3.4g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, pale pinkish orange core. One surface smoother than the other, and flat.

Weight: 2.8g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 mould fragment (undiagnostic flat, plain), light grey inner surface and margin; pale orange external margin and surface.

Weight: 3.7g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 mould fragment (plain, flat), dark grey inner surface and margin; pale grey external margin and surface. Possibly same mould as tray 6.1 above.

Weight: 3.2g

SF 434. Mould fragments

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: two mould fragments, one with straight edge and three feint parallel lines on rise; the other two conjoined fragments and slightly curved edge, suggesting a plain disc (uncertain). Medium grey inner surface, margin and core; pale light brown thin external margin and surface.

Weight: 7.3g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: mould fragment with straight edge. Medium grey inner surface, margin and core; pale light brown thin external margin and surface. Similar to sherd above (tray 6.4).

Weight: 3.7g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 8 small undiagnostic mould fragments, mostly reduced

Weight: 5.1g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: fragment of mould edge, oxidised.

Weight: 3.5g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: fragment of mould with partial impression of slightly curved edge. No XRF.

Weight: 27 x 23.3mm x maximum T 10.05mm; weight 4.7g

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 16 small fragments of mould, mostly oxidised, and two fragments of impressed mould (junction of plate with rim of raised flattened quadrant profile).

Weight: 16 sherds 14g; impressed mould fragments 2.4g.

SF 434. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: four oxidised fragments of mould, one boss shaped, and 5 reduced fragments of mould.

Weight: 4 oxidised sherds 13.9g; 5 reduced mould fragments 19.8g.

No ***SF no. Mould fragment***

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 mould fragment (undiagnostic); dark grey inner surface, margin and core; pale grey external margin, brownish orange external surface.

Weight: 3.7g

No ***SF no. Mould fragment***

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 mould fragment with straight edge; dark grey inner surface, margin and core; pale brown external surface.

Weight: 6.6g

No SF no. Mould fragment

Provenance: context 129, burial no. B48 (Period III Phase 4).

Description: 1 mould fragment with rim edge to open channel (possible gate), light grey inner surface and margin; pale brown external surface with area of reduction (dark grey).

Weight: 2.9g

No SF no. Mould fragments

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 5 reduced mould fragments and 10 oxidised mould fragments, undiagnostic apart from one with partial runnel impression.

Weight: reduced 5.7g; oxidised 14.7g

No SF no. Mould fragment

Provenance: context 129 burial no. B48 (Period III Phase 4).

Description: 1 fragment, pale pinkish orange core. Inner surface smoother and impressed with a straight edged object (partial).

Weight: 2.3g

SF 437. Mould fragments

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: 31 very smalls fragments, of mould (indiagnostic)

Weight: 7.9g

SF 437. Mould fragments

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of small circular moulding (indiagnostic); grey core and inner mould surface; oxidised orange outer surface and narrow margin.

Weight: 1.3g

SF 437. Mould fragments

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of mould (indiagnostic); pale grey core and inner mould surface; oxidised light brown outer surface.

Weight: 2.8g

SF 437. Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of mould (indiagnostic); pale / light grey core and inner mould surface; oxidised light brown outer surface.

Weight: 1.9g

SF 437. Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: fragment of mould (possibly with disc-shaped element); pale yellowing orange core and external mould surface; light grey inner surface. No XRF

Weight: 3.2g

SF 437. Mould fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: thin fragment of mould (undiagnostic); light grey core and rough grey? inner mould surface; light brown? external surface.

Weight: 2.0g

SF 437. Mould? luting fragment

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: thin fragment of mould (undiagnostic, but probably luting on a bivalve mould); light orange fabric.

Weight: 2.1g

SF 437. Mould fragments

Provenance: context 131 infant's grave, burial B65 (Period III Phase 6).

Description: two fragments of mould (one with negative impression of a boss); dark grey fabric, core and margins, orange / light brown external surface. Analysed by Tim Young.

Weight: 5.4g

SF 441. Fragment of mould

Provenance: context 136 (lower grave fill burial no. B48 (Period III Phase 4) (2016).

Description: two conjoined mould fragments, with reduced dark grey inner surface, grey inner margin and core, lighter pale grey external margin and surface. One partially reduced mould fragment; three oxidised mould fragments.

Dimensions: total weight 10.2g (5 fragments)

SF 455. Fragment of mould

Provenance: context 154 (grave fill) burial B66 (Period III Phase 6) (2016).

Description:

SF 456. Fragment

Provenance: context 165 grave fill, burial B73 (Period III Phase 4).

SF 468. Fragment

Provenance: context 160, black sandy soil underlying cemetery (Period II Phase 3).

SF 472. Fragments of mould

Provenance: context 156 (grave fill) burial B67 (Period III Phase 4).

Description: two fragments of oxidised mould, no diagnostic features. One pale orange brown, the other light greyish brown and uneven. Tim Young analysis.

Weight: 2.8g.

[SF 439 slag not included in this catalogue: p XRF T Young]

Crucibles

Four fragments of crucibles have been identified. The surviving fragments suggest that they were originally of sub-triangular form, similar to examples found on other early medieval sites such as Dunadd (Type 'E', hemispherical bowls; Lane and Campbell 2000, 141), and the triangular crucibles from the monastic site of Nendrum, Co. Down (H. 49mm, eighth- to tenth century; Youngs 1989, no. 175) and Clogher, Co. Tyrone (H. 41mm, late

sixth century; idem, no. 173). The wall rises above rim height on one sherd (SF 421), pointing to the possibility of a partial lid. All are highly vitrified externally and over the upper part of the inner rim surfaces. Three are derived from context 129, the upper fill of B48 (Period III Phase 4), over black soil 160 (assigned a date range AD 750-800, early within its calibrated radiocarbon date range).

No SF no. Crucible fragment

Provenance: context 129 upper fill burial no. B48 (Period III Phase 4).

Description: rim of a crucible with small pouring lip. Surfaces sintered to purplish grey colour.

Dimensions: max. height 27.3mm; W 25.4mm; estimated diameter 50mm; weight 5.9g.

SF 421. Crucible fragment

Provenance: Grave fill 100, burial 41 (Period III Phase 6).

Description: rim fragment with external iridescent vitrification; rim shape suggests a triangular crucible form.

Dimensions: height 41.7mm; estimated diameter about 44mm; maximum wall thickness (towards base) 7.9mm; weight 11.8g.

SF 436. Crucible fragment

Provenance: context 129, upper fill burial no. B48 (Period III Phase 4).

Description: one rim and wall fragment (with about a third of the rounded base profile), with slight pouring lip. Hemispherical bowl. External surfaces sintered to purplish grey colour. Rim shape suggests a triangular crucible form.

Dimensions: estimated height about 50mm; maximum wall thickness (towards base) 7.5mm; weight 14g.

Crucible fragments no Sf number, SF 421 and SF 436 NMW Photo reference 108264-65.

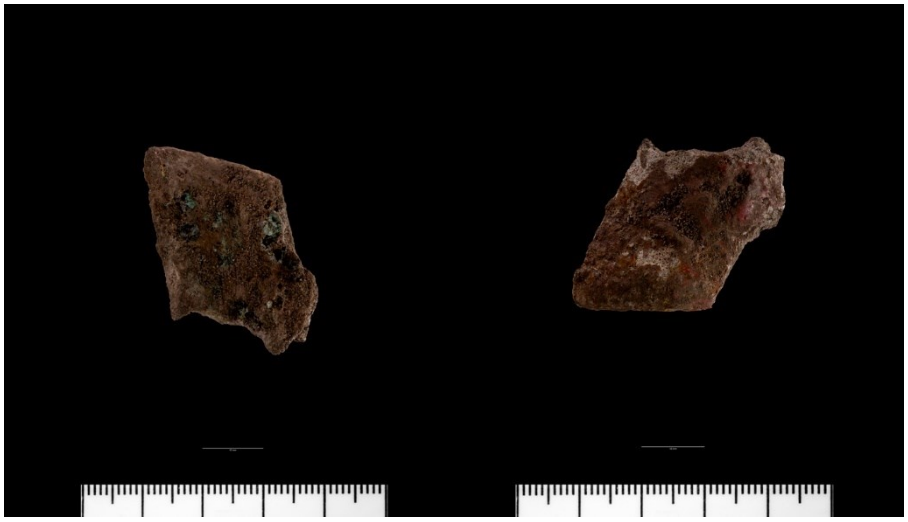
[Also in collection two samples of lumps from black layer 160 (no SF numbers) with 'copper-alloy and other metal from charcoal']

SF 982. Crucible fragment

Provenance: context 644 (Period II Phase 3).

Description: rim from a vertical walled crucible with bronze casting residues adhering to inner surface near the spout; patchy sintered purplish grey external surface.

Dimensions: surviving height 27.3mm; maximum wall thickness 6mm; weight 5.2g.



NMW Photo reference 158572-73.

Amber

Amber was used for cold inlays on decorated metalwork from the late seventh century, as well as for beads, pendants and amulets, and occasionally rings and gaming pieces. It was imported from the southern Baltic (notably the coastal areas of the SE Baltic, in particular the Kaliningrad coast (known as the Amber Coast, a region containing about 90% of the world's amber serves today, where it is eroded out from submarine strata and mined) as well as the coast of north Germany and the Netherlands. Analysis of amber found at Kaupang, Dorestad (Netherlands), Hedeby and Groß Stromkendorf has established that it is Baltic amber, and much of the 6 kilos of amber recovered from the marketplace at Ribe is thought to have been collected from nearby beaches (Feveille 2013, 45).

A large quantity of amber waste was recovered, and two fragments of amber were verified by XRF. The very fine nature of many of the fragments that this is waste from the working of amber, rather than raw amber for future use, indicating the manufacture of amber items alongside the metalworking, most of it occurring with the metalworking evidence within context 160. The amber debris found at Scotch Street Armagh was debris from a workshop under church patronage, and similar activity appears to have taken place at Whitesands.

Amber was used as a cold inlay in a variety of metal objects, as well as bead making (see SF **415**). The material must have been imported as nodules from the Baltic area, unless it was being recycled form earlier artefacts. It appears on post-Roman metalwork from the seventh century and is an important inlay in the ninth century (cf fragments of amber from Scotch Street, Armagh, dated to the eighth or ninth century: Youngs 1989, no. 216). Amber pendants have been published from Dublin and Woodstown, as have annular beads (Harvey 2014, 285).

Table 6. Quantity of amber waste by context.

Context	41	149	160	160A	160B	160C	160D	160E	160F	160G	160H	160J	160L	230	506	529
Amber wt (g)	0.3	0.1, 0.2	0.5	0.1 0.3	0.7	0.1	1.4 0.1	0.9 0.04	2.9	0.2 0.1	0.2	0.05	1.1, 0.5	0.6	0.1	0.1
Totals (g)	0.3	0.3	0.5	0.4	0.7	0.1	1.5	0.94	2.9	0.3	0.2	0.05	1.6	0.6	0.1	0.1
Totals by context	0.3	0.3	0.5	8.69										0.6	0.1	0.1
Overall weight (g)	10.59															

Catalogue

SF 418. Amber fragment

Provenance: Trench 1, from sand below skeleton 230, Burial 29 (Period III Phase 6) (possibly associated with skeleton) (2016).

Description: irregular piece of amber with one smooth surface.

Dimensions: L 14.5 x 9 x 6.5mm; weight 0.6g.

Analysis: amber confirmed by FTIR spectrometry (see below).

SF 450. Amber fragment

Provenance: context 149 (Period III Phase 3/4) (2016).

Description: small unworked fragment of amber.

Dimensions: L14.2mm; max W 6.4mm; max T 3.6mm; weight 0.1g.

Analysis: amber confirmed by FTIR spectrometry (see below)

SF 451. Amber fragment

Provenance: context 149 (Period III Phase 3/4) (2016).

Description: seven small unworked fragments of amber.

Dimensions: largest L7.6mm; max W 6mm; max T 2.6mm; weight 0.2g.

Analysis: amber confirmed by FTIR spectrometry (see below)

SF 458. Amber fragments (not analysed)

Provenance: context 160, black sandy soil underlying cemetery (Period II Phase 3).

Description: five small unworked fragments of amber. One has the appearance of a flake.

Dimensions: largest L 13.8mm; max W 9mm; max T 3.8mm; weight 0.5g.

Analysis: see below.

SF 905. Amber fragments

Provenance: context 529 grave fill of burial B100 (Period 3 Phase 6).

Description: one large fragment and a small flake 3.4mm.

Dimensions: larger 8.5 x 10.4mm x T 3.4; small L 4.5mm; weight 0.1g.

SF 910. Amber fragments

Provenance: context 506 cist grave burial B90 (Period IV)

Description: three small fragments of amber

Dimensions: all <5.5mm; weight under 0.1g

SF 941. Amber fragments

Provenance: 146 sandy layer (Period III Phase 5).

Description: one wedge shaped fragment of bead with drilled hole (probably a large cylindrical bead); one small fragment.

Dimensions: large fragment W from perforation to edge 5.6mm; L 12.3mm; weight of both 0.3g

SF 958. Amber fragment (Photograph)

Provenance: context 160L (Period II Phase 3).

Description: angular fragment with some evidence of knapping.

Dimensions: max L 15.3mm; W 10.3mm; T 7.1mm; weight 1.1g.

SF 959. Amber fragments (not illustrated)

Provenance: 160E (Period II Phase 3).

Description: amber working waste: one medium lump,

Dimensions: medium fragment L 11mm, W 9.3mm, T 7mm, eleven small fragments (6.6-4.0mm) and numerous fine to very fine fragments (3.5-0.1mm); weight 0.5g.

SF 967. Amber fragments (not illustrated)

Provenance: 160E (Period II Phase 3).

Description: waste fragments (seven medium, and numerous small to very fine).

Dimensions: medium 7.2-11.2mm; rest <4mm); weight 0.9g.

SF 990. Amber fragments (not illustrated)

Provenance: 160A (Period II Phase 3).

Description: one medium fragment and numerous fine to very fine fragments.

Dimensions: medium 8 x 7.2 x 5mm; rest smaller; weight 0.1g.

SF 993. Amber fragments (not illustrated)

Provenance: 160A (Period II Phase 3).

Description: one medium and numerous fine to very fine fragments

Dimensions: medium 7.4 x 5.5 x 2.5mm; weight 0.3g.

Also ochre, snail, stone fragments

SF 995. Amber fragments (not illustrated)

Provenance: 160B (Period II Phase 3).

Description: 13 medium and numerous fine to very fine fragments

Dimensions: medium 3.5-6mm; rest smaller; weight 0.7g.

SF 997. Amber fragments (not illustrated)

Provenance: 160C (Period II Phase 3).

Description: 1 large 3 medium a 5 small fragments

Dimensions: large 12.2 x 5 x 3mm; medium 4-5mm; rest smaller; weight 0.1g

SF 1000. Amber fragments (not illustrated)

Provenance: 160D (Period II Phase 3).

Description: 8 medium and abundant small to very fine, two small fragments with tubular shape, one with straight end (waste from beads?).

Dimensions: medium (>5mm); rest small to very fine; weight 1.4g.

SF 1105. Amber fragments (not illustrated)

Provenance: 160E (Period II Phase 3).

Description: I small fragment (flake)

Dimensions: 8 x 3.8 x 1.5mm; weight 0.04g.

SF 1106. Amber fragments (not illustrated)

Provenance: 160H (Period II Phase 3).
Description: 13 medium and 3 small fragments.
Dimensions: medium 3-6.7mm; rest smaller; weight 0.2g.

SF 1108. Amber fragments (not illustrated)
Provenance: 160J (Period II Phase 3).
Description: 1 medium fragment
Dimensions: L 4.9mm; weight 0.05g

SF 1111. Amber fragments (not illustrated)
Provenance: 160G (Period II Phase 3).
Description: 1 medium and 2 small to fine fragments.
Dimensions: medium 175mm; rest smaller; weight 0.2g.

SF 1112. Amber fragments (not illustrated)
Provenance: 160D (Period II Phase 3).
Description: 1 large, 1 medium and on small fragment.
Dimensions: large 12mm; medium 8mm; small < 3.2; weight 0.1g.

SF 1114. Amber fragments (not illustrated)
Provenance: 160G (Period II Phase 3).
Description: 7 medium (1 flake) and 18 small to fine fragments.
Dimensions: medium 307mm; rest smaller; weight 0.1g.

SF 1116. Amber fragments (not illustrated)
Provenance: 160F (Period II Phase 3).
Description: 19 medium, rest small to fine
Dimensions: large 11.5 – 7.0mm; medium 7.0-5.0mm; abundant small to very fine fragments < 5.0mm; weight 2.9g.
NB fragment of copper alloy casting waste in same bag.

SF 1135. Amber fragment (not illustrated)
Provenance: context 41 Although assigned to context 41 this find was probably within or associated with layer 160 (Period II Phase 3).
Description: one large fragment of amber.
Dimensions: 13 x 10.3 x 7.3mm; 0.3g.

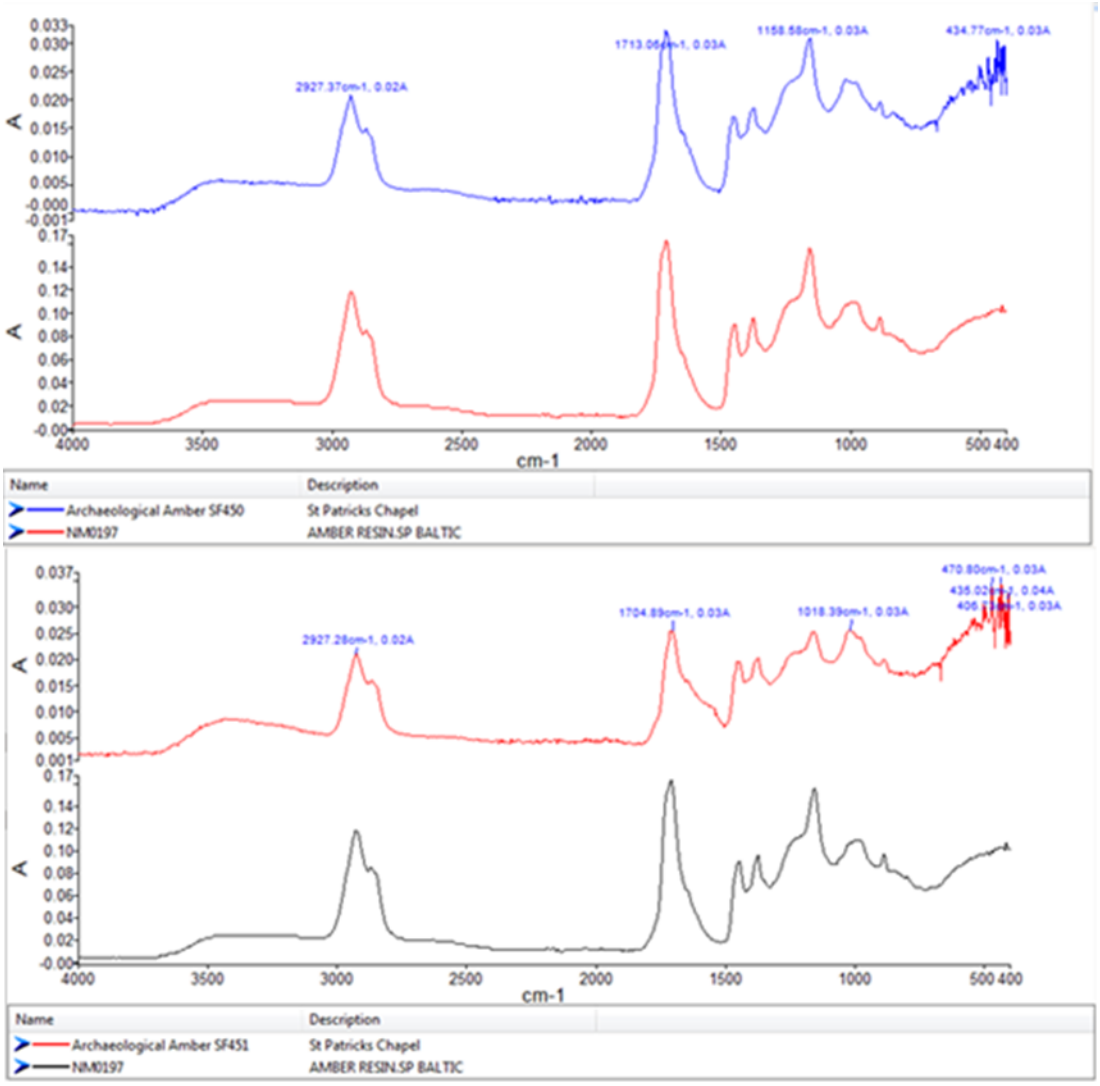
ANALYSIS OF POSSIBLE AMBER SAMPLES

By Owen Lazzari

Two small samples were taken from the possible amber finds. The two pieces were analysed using a Perkin Elmer Spectrum One Fourier-transform infrared (FTIR) spectrometer using an Attenuated Total Reflection (ATR) sampling accessory. The two datasets above show that the spectra of both of the finds which were analysed from St Patrick's Chapel correspond to an amber resin.

Although it is possible to suggest that the strongest likelihood of the source of the material is from the Baltic region due to its abundance of amber, this is not 100%.*

*The database above has been manually recorded, the capitalised spectra suggesting the Baltic location is not 100% accurate, but is a strong possibility.



THE MEDIEVAL FINDS

By Mark Redknap

Stone objects

SF 448. Perforated stone Not illustrated

Provenance: context 130 loose sand (Period III Phase 3/4).

Description: top corner fragment of stone tile with hole for peg or nail with hourglass profile. Foliated quartz felspathic rock (identification: J Horák).

Dimensions: max H. 90.03mm; max W 100mm; hole 14 x 15.5mm; maximum T 27.9mm.

Discussion: this resembles a fragment of stone roof tile, but as it is from an early medieval context, it may be a weight.

Bone objects

SF 413. BonE/Working offcut

Provenance: context 87 sandy clay layer (Period IV).

Description: offcut of flat animal bone with 5 circular cuts for flat beads.

Dimensions: L 62.8mm at modern break; minimum diameter of cut-outs 9mm.

Discussion: this is a trimmed flat panel of bone from which discs have been cut, probably for turning into beads (cf MacGregor 1985, fig. 58). They are found widely in late medieval and later contexts (MacGregor 1985, 101-102; Egan and Pritchard 2002, 311). Similarly sized offcuts from panels from late thirteenth and fourteenth-century deposits in London were for bead making (ibid, 311, fig. 207), and beads made at St Patrick's chapel could have been for necklaces or rosaries.

NMW Photo reference 108261-63.

SF 934. Bone pin

Provenance: close to skeleton 735, burial B125 (Period III Phase 4).

Description: polished pinpoint, covered in copper-corrosion-coloured sand. Top of shaft missing. Overall L 40.3mm; max T 2.4mm.

Discussion: this pin may have been fastening clothing or a shroud, although its broken condition leaves open the possibility that it is residual.

NMW Photo reference 158556-57.

Antler objects

SF 466. Antler offcut

Provenance: context 103 (Period III Phase 5).

Description: incomplete object made from a hollowed antler tine, characteristic external surface partially intact (incompletely filed and polished). Appears to be an offcut.

Dimensions: L 17.1mm; max W 9.2mm; max T of wall 6.4mm.

Discussion: it does not appear to be a finished bead but may represent an offcut from the making of rings or annular beads. Similar fragments have been reported from mid-tenth century and later deposits at Coppergate, York (MacGregor, Mainman and Rogers 1999, 199).

NMW Photo reference 108269-71.

SF 466. Antler object

Provenance: context 130 loose sand (Period III Phase 3/4)

Description: incomplete object made from a hollowed antler tine; characteristic external surface removed. The open end has a traverse saw cut, bisected on one side by a tentative saw cut. At the fractured point end there is evidence for a transverse drilled perforation.

Dimensions: overall L 30.5mm; max D 17.8mm. Diameter of perforation

Discussion: possible toggle.

NMW Photo reference 158553-54

Ceramics

Tableware

SF 410. Jug handle

Provenance: topsoil T1 (2014).

Description: small pulled jug handle, in a brown, partially reduced hard fabric (probably Dyfed Gravel-tempered ware). Late medieval.

SF 1151. Fragments of glazed jug

Provenance: context 510 – possible floor deposit of chapel, but more likely backfill from 1924 excavation (Period IV/V).

Description: five wall sherds from a jug in oxidised light brown fine limestone-tempered fabric with thin pale green external glaze. Llanstephan-type ware, similar to examples from Linney Burrow, Pembrokeshire (NMW acc. No. 12.15, M261).

Date: thirteenth-/fourteenth century.

SF 1138. Glazed jug

Provenance: SF 1138 (1x: topsoil) and sherds from contexts 503, possible floor deposit of medieval chapel, 507 backfill of 1924 excavation (1), 1103 uncertain context (1).

Description: five wall sherds of thin-walled jug in oxidised light brown fine(<1mm) ill-sorted white an opaque (occasionally reddish-brown) angular inclusions, occasional fine rounded gravel (<1mm), moderate fine mica on surface, tempered fabric with browN/Speckled light green external glaze and narrow horizontal grooves decorating shoulder.

Date: thirteenth-/fourteenth-century.

Coarsewares

SF 405. Cooking pot rim

Provenance: From the void of cist grave 21, Burial B6 (Period III Phase 7) (2014). Cist grave 21 lay directly beneath disturbed 20th century deposits.

Description: narrow upright cooking rim, in oxidised light brown Dyfed Gravel-tempered ware fabric. This sherd is thought to have fallen into cist from later horizon above. Thirteenth-/fourteenth century.

Dimensions: external diameter about 280mm.

SF 406. Cooking pot rim

Provenance: context 13, T2 (Period IV or V).

Description: four cooking pot sherds in Dyfed Gravel-tempered ware, partially sooted (thirteenth-/fourteenth century); one sherd of post-medieval glazed redware (eighteenth- or nineteenth century).

Discussion: the context is interpreted as twelfth- to thirteenth century, and the later sherd may be intrusive.

SF 429. Vessel rim

Provenance: context 45 (Period V).

Description: vessel rim with flat, thickened top and gentle central bulge, in oxidised orange Dyfed Gravel-tempered ware fabric. Thirteenth-/fourteenth century.

Dimensions: external diameter 280mm.

SF 428. Cooking pot rim Not illustrated

Provenance: context 45 (Period V).

Description: large cooking rim with slight thickening at rim edge, and small wall sherd in oxidised orange Dyfed Gravel-tempered ware fabric. Thirteenth-/fourteenth century.

Dimensions: external diameter 300mm.

SF1152. Cooking pot

Provenance: contexts 505, 510, SF 406 from context 13 (with post medieval blackware sherd).

Description: sooted sherds of light orange-brown cooking pot with plain everted rim, in a similar fabric to speckled glazed jug SF **1138** etc.

Date: thirteenth-/fourteenth century.

SF 407. Tudor green beaker rim

Provenance: context 007, Trench 3 (post medieval sand (Period V).

Description: rim of a drinking vessel, probably a waisted beaker. It has a thickened rim with rounded profile and thin walled slightly flared neck with cordon in off-white fabric, and a thin external green glaze below the rim.

Dimensions: external diameter 100mm.

Discussion: similar profiles occur on slightly larger drinking vessels with pedestal bases (Border Ware derived from late medieval Surrey Whiteware industry ('Tudor Green') (Pearce 1992, fig. 31, nos 198, 201; Pearce 2007, fig. 72, nos 540Y, 542G). In London, they occur in sixteenth-century contexts.

NMW Photo reference 158545-47.

POST-MEDIEVAL OBJECTS

By Mark Redknap

Copper-alloy objects

SF 431. Copper-alloy handle or guide

Provenance: US.

Description: copper alloy oval loop, with 'flame' decoration (probably once gilt).

Dimensions: L43.9mm; max external W 23.5mm; max loop T 3.7mm.

Analysis: see below.

Discussion: Victorian. It has lost its method of attachment – probably a bolt or screw.

SF 426. Pin

Provenance: from top of wall 9 (modern context).

Description: copper alloy pin with wound-wire head and slightly bent shaft.

Dimensions: L. 26.2mm; max external D head 2.1mm.

Discussion: post-medieval.

Iron objects

SF 413. Nail shaft fragments

Provenance: context 49 layer of limpet shells (Period IV/V).

Description: one point and two other shaft fragments.

Dimensions: unconserved.

SF 420. Nail

Provenance: context 96 grave fill, Burial 5 (Period III Phase 6).

Description: oval nail head with short shaft.

Dimensions: unconserved head diameter 20mm; shaft length 27mm.

SF 447. Nail shaft fragment

Provenance: context 130 loose sand (Period III Phase 3/4).

Description: section of shaft (bent)

Dimensions: unconserved length 26.3mm; max W 6.3 x 5mm.

SF 447. Nail shaft fragment

Provenance: context 130 loose sand (Period III Phase 3/4).

Description: section of shaft (bent)

Dimensions: unconserved length 26.3mm; max W 6.3 x 5mm.

SF 960 Ring

Provenance: context 623 fill of rectangular structure 618 (Period II Phase 2).

Description: section of shaft (bent)

Dimensions: unconserved external D 13.14mm; W 6.8mm; T 2.5mm.

Lead

SF 916. Lead disc weight

Provenance: unstratified

Description: plan dis weight with slightly bevelled edge. D 38.6mm; T 7mm; wt 79.1g.

NMW Photo reference 158548 and 49.

Glass

SF 425. Glass bottle

Provenance: Trench 1, context 54 (backfill of 1924 excavation trench).

Description: moulded bottle in dark glass, marked W. H. George & Son, Haverfordwest.

Dimensions: H 208 mm; basal d 65.7 mm.

Discussion: The George family had a wines and spirits business, W.H. George & Son, listed in 1926 directory.

Stone

SF 154 / 454. Pebble with s'graffito letters and marks

Provenance: unstratified.

Description: discoid pebble, incised on one face with a variety of letters, lines and marks on both sides. One side bears the initials BVM incised in straight line Roman capitals, and below with two conjoined compass-inscribed circles (one faint), and the initials ZA[N.], both sets of initials underlined. At 90 degrees, a ?delta and line. On the other face, a compass inscribed circle (same size as those on the other side), and a triangle/'V' or delta and line.

Geology (Jana Horak): natural water worn pebble: cleaved silicious mudstone. Slatey deposits exist in the vicinity with considerable volcanic material included.

Dimensions: diameter 63.6 x 68.1mm; T 15 mm.

Context: post-medieval

Discussion: attributed to the twentieth century by the excavators, the BVM initials could refer to the Blessed Virgin Mary, suggesting a votive deposition late in the site's history. However, the pebble may be a palimpsest of accumulated graffiti, and in the absence of the further information it is difficult to confirm the motivation and meaning behind each mark.

NMW Photo reference 108011-12.

SF 423. Stone shot line or roof weight

Provenance: context 45 (Period V).

Description: fragment of coarse discoid stone with irregular central perforation.

Geology (Jana Horak): ferricrete (similar to Quaternary stone used in the fabric of St Dogmaels Abbey).

Dimensions: external diameter 160mm; maximum T 46mm; perforation diameter 39.2mm.

Clay pipe

No SF no. clay pipe stem

Provenance: base of 507, backfill from 1924 excavation (Period V).

Description: stem of a clay pipe with spur scar.

Dimensions: L 33.3mm; max D 11.5mm; bore D 2.8-3mm.

Date: nineteenth century

ARCHAEOMETALLURGICAL RESIDUES

By T P Young

Summary

Semi-quantitative elemental analyses were made by handheld portable-XRF (pXRF) on a selection of probable archaeometallurgical residues recovered during excavations at St Patrick's Chapel, Whitesands Bay, Pembrokeshire. The material included one fragment of slag, two small, corroded blebs of metal, three sherds of crucible, four assorted non-metallurgical materials and twenty-one fragments of ceramic mould.

The metallurgical assemblage was compatible with having been generated during a short episode of casting copper alloy (probably a very lightly leaded bronze) to produce small artefacts in two-piece moulds. The materials are probably of early medieval age.

Although very variable in composition, the residues were all compatible with generation from broadly the same alloy composition. Most of the mould fragments showed evidence for enrichment in copper, tin, lead and zinc. Lead, copper and tin were typically concentrated in the inner parts of the mould close to the matrix, whereas zinc had permeated through the mould as vapour and was preferentially enriched towards the outside of the cermaic. Modelling of the metal composition tentatively suggests a tin bronze, with less than 1% of zinc and a few percent of lead. Such a metal would be classifiable as a bronze, or a leaded bronze, depending on the scheme used.

Methods

The material described here derives from excavations at St Patrick's Chapel, Whitesands Bay, St Davids, Pemborkeshire, by Dyfed Archaeology.

This report details analytical investigations undertaken with a handheld portable X-Ray Fluorescence instrument; morphological and typological reporting on these residues is to be undertaken by Dr Mark Redknap, National Museum Wales. Analysis employed a Bruker Tracer III-SD portable X-Ray fluorescence spectrometer (instrument belonging to the Department of Archaeology, Cardiff University, and the National Museum Wales). The instrument was operated with the Bruker 'yellow' filter (300µm Al + 25µm Ti), at 40kV and 9.60 µA, with a filament current of 189 µA, for 100s. The instrument was controlled by a PC running Bruker's S1PXRF software. Data were exported as text files for further imaging and processing in Bruker's Artax software. Data are presented here as the net peak area for the principal peaks as reported by Artax (Table 7).

A very crude semi-quantitative calibration of the data acquired from two highly corroded metal blebs was performed using a technique (Young 2015) employing a simple linear regression of data presented by Nicholas & Manti (2014) who analysed copper alloy standards using the same instrument and with the same operating conditions as for the present work. This calibration would not be expected to be fully valid for analysis of an irregular surface of weathering products, rather than smooth metal, hence it is not a fully quantitative approach. The calibration process uses the linear regression factor as a multiplier for the net peak area as report by Bruker's Artax software for the spectra exported from S1PXRF (Table 8).

Results

Description of the residues

The assemblage comprises a large collection of highly fragmented ceramic moulds, together with a small number of crucible sherds corroded blebs of metal and fragments of slag. A selection of materials was subjected to analysis by pXRF. Full description of the ceramic materials will be the subject of a separate report to be provided by Dr M. Redknap; accordingly, only a summary note on the residues is included here.

Slag: a single fragment of slag was analysed (context (129), find #439). The slag was glassy, dominantly greenish, but with some reddish areas, with indications of flow down a steep surface. The rear of the slag piece was sandy, possibly indicative of the nature of the hearth wall.

Metallic blebs: context (129) also yielded (as find #435), two small highly corroded blebs of metal. The blebs were bright green in colour with coarse crystals of secondary copper minerals protruding from their surface.

Crucibles: three sherds of crucibles were analysed, two from find #436, one from find #421, all from context (129). The fragments were from medium-sized triangular crucibles. The outer surfaces were coated in a thick glaze, locally with of a transparent green, but more generally of an opaque strong red. The inner surfaces were matt and dark grey. The fabric was fine-grained.

Moulds: the mould fragments were mostly fine grained and showed a variety of patterns of oxidation. Wherever identifiable, they are all fragments of piece moulds (bivalved moulds created around a former, which is removed, and the inlet gate sculpted), rather than being investment moulds (from the lost-wax process).

The most common form was strongly reduced, with just a very thin (1mm or less) oxidised-fired (buff/orange) external zone. Other materials showed more oxidation, with a significant number showing dark grey oxidised fabrics throughout. Some of the pieces were identified as large (c. 20mm diameter) location bosses (keys), together with a few examples showing the corresponding recess from the opposite valve. All of these key fragments were entirely oxidised. Only a very few fragments showed evidence for the original matrix. A very few fragments showed visible carbonaceous or altered metallic residues adhering to the face of the mould. The moulds were characterised by mostly being very thin (typically less than 12mm).

Analysis of the residues

The net peak areas for selected peaks are presented in Table 7. Figure 104 illustrates the variation in the net peak areas of the principal components of the alloys being cast: copper, lead, tin and zinc.

Some non-metallurgical materials were analysed in order to determine the background levels of the various metals within objects from same contexts. These included a bone fragment (context (165), find #468), a mollusc shell, probably a winkle (context (160), find #471), and a piece of iron-rich siltstone (context (160), find #471). In addition, a small fragment of tempered fired clay (oxidised fired, with both coarse quartz and hair

temper) that may also possibly be non-metallurgical, was also analysed (context (165), find #468). These all proved to have low levels of copper, zinc, tin and lead.

Some indication of the original metal composition is provided by the analyses of the slag, crucibles and most particularly the corroded metal blebs. Of these, only the corroded blebs might be able to provide an analysis that approximates to that of the original metal. Because of the irregular nature of these corroded blebs, and their weathered state, only a very approximate analysis can be obtained by pXRF. Furthermore, the calibration applied to the analysis here is only capable of a crude approximation to the actual composition, because it is derived from work on large polished planar metal surfaces. In addition to the poor quality of the analysis, there is uncertainty as to whether there has been any change to the elemental composition of the spill during weathering (by preferential leaching, for instance). The composition of corroded casting spills is also unlikely to be completely representative of the original bulk metal being cast. Thus, at several levels, the analysis presented here is likely to be poor approximation to the original metal composition. Nonetheless, Table 8 presents some modelling of the composition of the blebs.

The corroded nature of the blebs is reflected in their low total of metals in the raw calibrated data. Normalising the metal data to 100% shows a large difference between the two blebs, but comparison of the data excluding copper (right hand columns of Table 8) reveal the variation to be different contents of copper, with the other elements (zinc, tin and lead) in a similar ratio to each other in the two blebs.

Classifying the metal on the basis of such low-quality analyses is fraught, but the general impression is that zinc is low (probably around 1% or less), tin is high (eight to nine times the concentration of zinc; perhaps in the range indicated by the estimates of 4 and 10%), and that lead is moderately high (four to five times the concentration of zinc; perhaps in the range indicated by the estimates of 2 and 6%). The metal may probably therefore be classifiable as a bronze, although the term 'leaded bronze', usually employed for bronzes of greater than 8% lead (Bayley & Butcher 2004, 14), but sometimes for bronzes with as little as 1% lead (Pollard et al 2015, 700), might be applicable. If the zinc were to have been as high as 1%, then the material could be considered as close to a composition transitional between a bronze and a gunmetal.

Alloys of this quaternary composition are usually considered as indicators of recycling. The low zinc content is typical of metal in circulation in the early medieval period (post-'early Saxon'; Blades 1995), in which the higher zinc metals of earlier periods have become diluted and have undergone zinc loss during recycling. The work of Blades (1995) demonstrates, however, how a wide range of alloy compositions can be found in all periods.

The pattern of metal distribution within the twenty-one examples analysed of the material identified as mould fragments, proved to be distinct, and confirmed the debris as moulds. Both copper and lead show preferential concentration on the face of the fragments identified as the inner (matrix) face (typically reduced-fired). Copper is probably a simple contaminant in these materials (and occurs at much lower concentrations than in the slags, crucible and metallic blebs), but lead typically shows a strong reaction with silicate materials. The lead peaks in the pXRF spectra of the inner faces of the moulds were commonly larger than those of the crucibles, slags and even the metallic blebs. Zinc, in contrast, is typically transferred from the hot metal in the vapour phase (Kearns et al. 2010), and this shows greatest enrichment in the outer parts of the moulds.

Discussion

The composition of the original metal cannot be determined with any certainty, but was probably a bronze, bearing some zinc and lead and therefore close to being gunmetal. Such a metal would be considered a typical general-purpose material for small castings.

None of the ceramics in the assemblage gave any evidence for being involved in the handling of precious metals, and the assemblage is unusual in containing no residues from ferrous metalworking.

The technologically restricted range of the assemblage is paralleled by its stratigraphic restriction. This is very likely to suggest that the metalworking debris is the product of a single short period of activity, rather than a more typical long-lived craft.

The form of the crucibles, the mould technology and the metal composition are all compatible with an early medieval age.

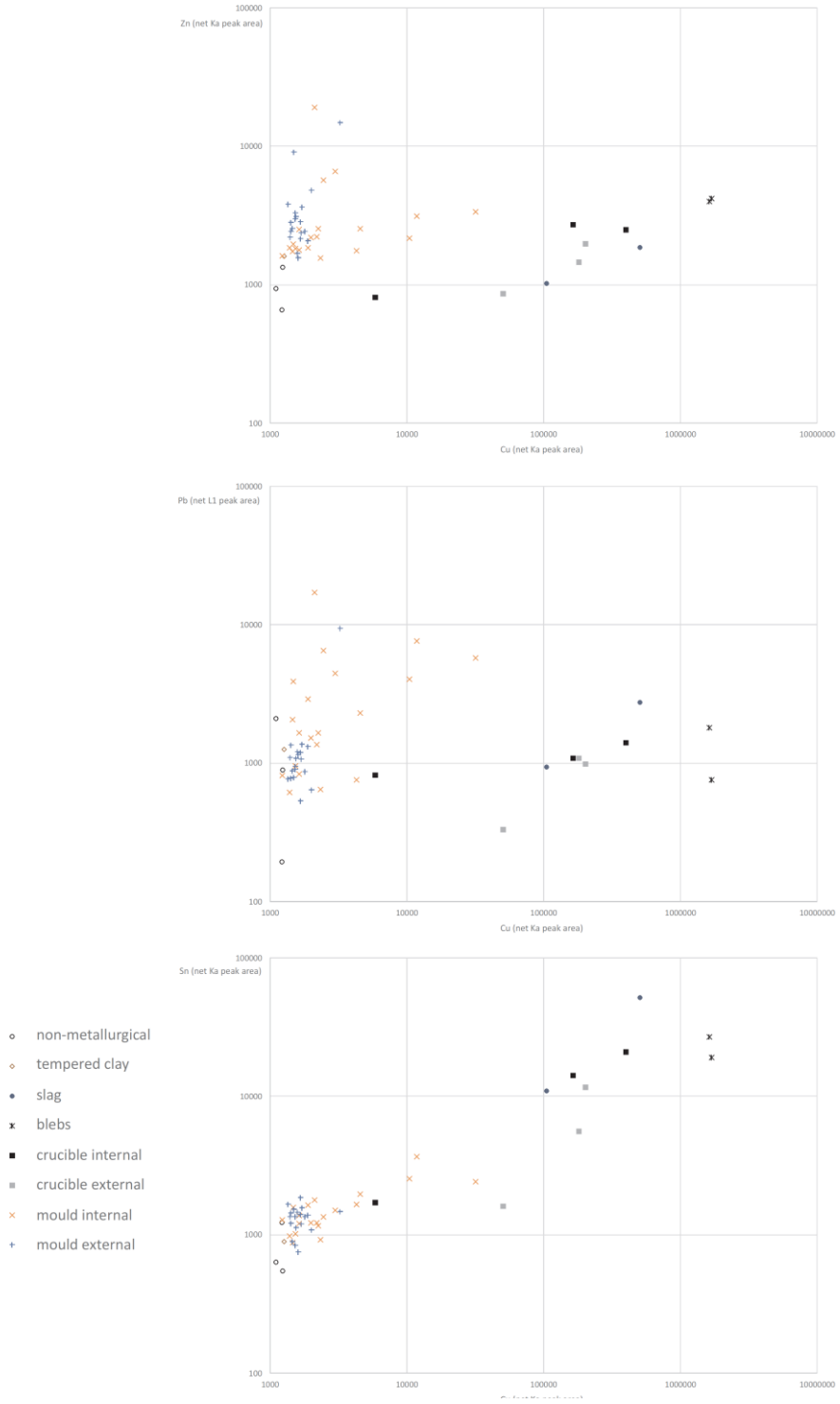


Figure 104. binary plots of the net peak area for zinc (upper), lead (middle) and tin (lower), plotted against copper for pXRF analyses. Symbols indicate the various residue types.

Table 7. net peak area for selected peaks, as calculated by Artax.

sample	**context**	**piece**	**Element**	Ca	Ti	Mn	Fe	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Rh	Sn	Pb
			Line	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	L1
			Energy/keV	3.692	4.512	5.9	6.405	6.931	7.48	8.046	8.637	13.396	14.165	14.958	15.775	20.216	25.271	10.551
421	129	1	crucible #1	18663	3197	8405	233125	1487	21	182104	1452	3134	23021	2742	17231	29200	5578	1092
421	129	1	crucible #2	23045	2410	14976	161127	939	57	203211	1982	2485	27054	2492	15236	25565	11698	983
421	129	1	crucible #3	6292	815	2972	62065	816	238	403256	2482	1344	3032	950	8463	15392	21064	1406
434	129	1 (left)	ceramic 1 buff #1	13151	2771	3197	173746	877	69	1523	2994	4478	6234	3095	19076	27046	836	899
434	129	1 (left)	ceramic 1 grey fracture #1	4435	1921	3044	121107	659	68	1279	1848	2934	4151	2577	14858	22940	1509	2912
434	129	2	ceramic 2 grey matrix #1	3723	2731	1963	129447	1036	90	1476	1986	3714	24995	2861	19384	28244	1596	3929
434	129	3	ceramic 3 darkest grey side matrix #1	5223	2425	3677	150569	994	1	1532	1829	3525	4709	2843	18724	26794	1022	959
434	129	3	ceramic 3 pale grey side #1	4011	2657	2899	166138	1218	40	1525	3321	3625	6014	3155	19144	26248	1354	953
434	129	4	ceramic 4 darker grey side convex #1	11328	4370	6594	253688	2046	334	1629	2514	7789	23393	2822	23512	26664	1390	1667
434	129	4	ceramic 4 paler flat side #1	5472	4649	5545	260382	1737	326	1421	2429	7317	17460	2702	22541	25253	1211	1360
434	129	5	ceramic 5 darker convex side #1	4462	3046	4142	201126	1237	91	1545	3123	4435	4480	3114	20009	29060	1121	1093
434	129	5	ceramic 5 paler convex side #1	2750	2497	3513	155519	1229	80	1212	1635	3874	4681	2840	19478	25929	1282	821
434	129	6	ceramic 6 broken oxidised outer face #1	12230	2882	3707	181464	957	95	1399	2215	4223	5018	3422	23453	27832	1348	1099
434	129	6	ceramic 6 darker planar side poss matrix #1	4424	2441	2679	148332	974	77	1454	1759	3441	4998	2614	17504	24628	888	2080
434	129	7	ceramic 7 buff #1	3854	2686	3118	175321	1105	122	1349	3834	4120	5537	2913	18665	25842	1676	772
434	129	7	ceramic 7 orange #1	3868	3011	3006	172203	932	14	1627	1791	5342	5849	2974	21673	28786	1215	838
434	129	8	ceramic 8 orange boss to front #1	4998	3074	4111	192756	1522	63	1888	1865	4305	5357	3276	19666	29832	1644	2925
434	129	8	ceramic 8 orange broken rear #1	3015	2694	2719	184706	1177	115	1584	1693	4485	5517	2887	20041	27214	1463	1217
434	129	9	ceramic 9 orange boss hole to front #1	3395	2881	2840	180919	953	56	1371	1852	4298	5470	2910	18983	28210	990	620
434	129	9	ceramic 9 orange planar rear #1	2816	2775	3196	184808	1021	80	1482	9156	4778	5494	3588	19639	27803	1522	788
434	129	10	ceramic 10 buff darkened possible matrix #1	7385	2267	2899	162872	1180	91	10351	2180	4206	4037	2706	18048	26689	2543	4060
434	129	10	ceramic 10 buff planar but rough rear #1	6610	3070	2905	175948	1224	126	1422	2824	4409	4698	2813	21564	26350	1435	780
434	129	11	ceramic 11 inner smooth grey	4297	2724	3089	231392	1456	117	11683	3133	3793	4197	3231	19263	25597	3670	7712

434	129	11	ceramic 11 outer rough thin orange	10806	2550	3059	191448	1199	50	1668	2150	5731	6676	2730	20169	26953	1411	536
435	129	1	bleb #1	3532	441	566	26591	529	527	1679930	4204	338	1429	340	581	8000	19234	766
435	129	2	bleb #2	2047	264	286	11264	408	1191	1618387	4020	341	748	222	263	6708	27025	1810
436	129	1	inner lip crucible #1	6670	1093	3285	80193	551	80	163462	2729	1392	5096	1219	7446	11111	14250	1092
436	129	1	red glaze mid body crucible #1	21550	1717	14698	157341	947	68	50888	860	3203	39625	2186	14593	26842	1605	332
436	129	2	inner small fragment crucible #1	2987	1343	2106	100802	668	97	5853	808	3056	2613	1808	11905	19167	1713	816
439	129	1	slag exterior vitrified surface #1	6831	1431	9835	59900	510	39	104705	1028	3345	21909	1288	13205	16265	10897	941
439	129	2	slag sandy rear surface #1	10945	1482	2972	71153	840	593	509549	1868	1794	13922	440	3457	19154	52041	2762
437	131	1	ceramic 1 dark face #1	3654	5405	5426	261647	1712	337	2238	2545	8229	22052	2877	24542	26343	1169	1677
437	131	1	ceramic 1 orange face #1	6416	5010	5591	296425	2231	454	1665	2848	8146	18975	3110	26370	26632	1868	1193
437	131	2	ceramic 2 dark face with boss hole #1	4133	5892	8271	284271	1801	374	1963	2216	8344	18189	2940	25209	27415	1234	1525
sample	**context**	**piece**	**Element**	Ca	Ti	Mn	Fe	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Rh	Sn	Pb
			Line	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	K12	L1
			Energy/keV	3.692	4.512	5.9	6.405	6.931	7.48	8.046	8.637	13.396	14.165	14.958	15.775	20.216	25.271	10.551
437	131	2	ceramic 2 orange outer face fracture #1	32377	2970	6512	187778	1396	262	1595	1562	7023	17344	2347	20021	21331	754	1149
437	131	3	ceramic 3 inner	5755	5412	5074	272547	1660	366	2438	5697	7861	23255	3131	22512	25708	1354	6577
437	131	3	ceramic 3 outer	3381	4898	5289	289178	1800	340	1674	2378	8138	18556	2967	24337	25459	1202	1079
470	139	1	ceramic inner face	4448	4868	5193	284254	2022	329	2193	2241	7358	20847	2699	24008	25966	1231	1367
470	139	1	ceramic outer face	3201	4699	5089	255371	1647	297	1796	2427	7430	15788	2434	23135	24659	1354	876
455	154	1	ceramic 1 pale buff rear #1	2550	2530	2182	172303	1115	110	1456	2558	3916	3665	2928	17892	26897	889	884
455	154	1	ceramic 1 pale buff with green adhesion	3791	2586	2661	183663	1175	117	31825	3387	3530	4152	2781	16885	26103	2430	5833
472	156	1	ceramic 1 buff #1	2231	2493	2123	166147	1212	71	2325	1570	4070	4203	2426	16629	23863	928	649
472	156	1	ceramic 1 orange #1	3503	2669	3215	198038	1342	84	2001	4838	4826	4659	3276	22949	27302	1080	643
472	156	2	ceramic 2 pale buff tiny #1	6601	2794	3159	191666	1391	111	1884	2090	4441	9015	3124	20924	29659	1388	1319
472	156	2	ceramic 2 pale buff tiny #2	7079	2570	3338	165622	735	73	4240	1768	3657	6825	2328	17010	24565	1677	761
471	160	1	possible shell outer #1	199354	618	2986	43515	209	71	1217	660	238	85262	217	1702	27271	1228	193
471	160	2	red siltstone piece	8075	1710	97235	1216914	7642	282	1102	943	592	11717	1845	2015	21041	632	2098
468	165	5	bone	95625	711	23988	14030	-1	109	1226	1342	571	29534	165	1500	22242	547	896

468	165	4	tempered oxidised clay broken face #1	2929	2824	2034	183220	1062	48	1264	1601	4345	7410	2300	17959	25679	891	1265
468	165	3	small sherd grey side #1	8412	3879	4250	244072	1730	215	2105	19254	4841	14202	2413	16623	21766	1803	17243
468	165	3	large sherd orange side #1	5407	5171	6982	296328	2311	410	1710	3627	6899	13611	2562	23491	26987	1565	1369
468	165	2	thick sherd flat side #2	6981	5212	5955	278514	2090	268	3247	14949	5745	14907	2790	21078	24721	1484	9520
468	165	2	large sherd grey side #1	8129	5090	6904	282245	1805	342	2981	6677	6124	16443	2859	22512	27086	1514	4486
468	165	1	thick sherd broken edge #4	2395	2335	1638	146109	1014	115	2286	1280	3045	3156	2177	16661	23401	1384	856
468	165	1	thick sherd broken edge #3	26856	1960	8790	97961	506	104	4527	2567	3549	20868	1536	9724	27517	1972	2313
468	165	1	thick sherd broken edge #2	2111	2727	1753	177508	1047	126	2341	1564	3528	3612	2854	18277	25466	1368	994

Table 8. semi-quantitative calibration of pXRF analyses of two corroded metal blebs from context (129) find #435.

Element	Line	Net Area		Factor	Raw wt%		Wt% norm to 100%		non-Cu	
		Bleb 1	Bleb 2		Bleb 1	Bleb 2	Bleb 1	Bleb 2	Bleb 1	Bleb 2
Ca	K12	3532	2047							
Ti	K12	441	264							
Mn	K12	566	286							
Fe	K12	26591	11264	0.00001773	0.5	0.2				
Ni	K12	527	1191	0.00001789	0.0	0.0				
Cu	K12	1679930	1618387	0.00001759	29.5	28.5	93.2	82.0		
Zn	K12	4204	4020	0.00001231	0.1	0.0	0.5	1.2	7%	7%
Sr	K12	1429	748							
Zr	K12	581	263							
Rh	K12	8000	6708							
Sn	K12	19234	27025	0.00006914	1.3	1.9	4.2	10.2	63%	57%
Pb	L1	766	1810	0.00004250	0.0	0.1	2.0	6.4	30%	36%

CHARRED PLANT REMAINS AND CHARCOAL

By C J Griffiths

Three bulk samples and two small charcoal samples from context 160 a layer of and a 50cm column sample through buried soil 41 on which context 160 rests were analysed. The samples were sieved and analysed at the Archaeobotanical Laboratory, Trinity Saint David's, University of Wales, Lampeter. The plant remains, charcoal and other eco facts were identified and quantified in an attempt to interpret the origins of context 160.

Method

The three bulk samples were processed at University of Wales, Trinity Saint Davids using a simple wash over technique, the finest sieve used to collect both the flot and residue was 250µm. The smaller charcoal samples were washed on a 250µm sieve to remove sediment and air dried. One round wood fragment of charcoal from was selected to provide a radiocarbon date.

The samples were sorted and identified using a Wild M5 microscope. Identification was by reference to standard texts and a modern seed collection. Nomenclature and habitat information is based on Stace (1995).

Results

The plant remains are summarised in Table 9.

The bulk and charcoal samples analysed all originated from context 160. The bulk samples provided evidence of cereal remains, other plant remains, charred and non-charred mammal bones, fish bones and scales and marine mollusca. Fragments of amber were present in all fractions of the bulk samples, including the flots.

Cereal Remains

Sample 308 provided the greatest quantity of cereal remains, *Avena* sp. (oats) were the most frequent cereal grain in this sample, however the lack of floret bases made it impossible to identify whether they are a domesticated species grown as part of an arable crop or wild oats.

Wheat grains were also present and had the characteristics of *Triticum aestivum* (bread wheat) type grains. Although morphologically wheat grains do overlap and can be difficult to identify to species, a *Triticum aestivum* rachis fragment from sample 308 provided evidence of the presence of bread wheat at the site.

The barley grains present display the characteristics of hulled barley (*Hordeum* sp.), however the grains were too badly preserved to distinguish whether the grains were straight or assymetrical, so it was not possible to determine whether the grains were derived from two row or six row barley.

The cereal remains from samples 309 and 310 were minimal, sample 309 contained barley and bread wheat type grains, sample 310 contained a barley grain and oat or large grass grains. Again, the barley displayed characteristics of hulled barley, but were too badly preserved to determine whether they were derived from 2 row or 6 row barley.

Other cereal remains were too badly preserved to identify to species and were assigned to the cerealia indeterminate category.

Other Plant Remains

The non-cereal plant remains from the samples were broadly similar, with species associated with arable cultivation or grassland, *Rumex acetosella* L. (sheep's sorrel), *Rumex* sp. (docks) and *Plantago lanceolata* L. (ribwort plantain) present in all three samples. Sample 308 and 310 produced whole and fragmented wild radish or sea radish capsules (*Raphanus raphanistrum* L./*Raphanus raphanistrum* ssp. *maritimus* L.). Wild radish is associated with arable or disturbed ground, sea radish, a coastal plant, however the presence of the capsules may represent a weed of cultivation or a casual growing locally.

Plant remains indicative of dry scrub conditions were represented by *Ulex europaeus* L. (gorse) seeds and spines, *Rosa* spp. (rose), *Prunus spinosa* L. (blackthorn) stone and thorns, *Rubus fruticosus* L. Agg (bramble), *Calluna vulgaris* L. (heather) seeds and flower heads and *Pteridium aquilinum* (L.) Kuhn (Bracken). However damp conditions are also represented by the presence of *Carex* sp. (sedge) nutlets in all the samples

Wild plants possibly collected as a food source were represented by *Corylus avellana* L. (hazel) nut-shell fragments (present in samples 309 and 310) and *Malus* cf. *Sylvestris* (L.) Miller (crab apple) pips (sample 310).

Column Sample 304

The column sample was examined and recorded. The top 6cm representing context 160 contained a black sandy sediment with a large fragment of slate, below this was a mixture of the dark sediment and sand to 14cm, some charcoal flecks were also visible, ephemeral marks through this sediment may indicate cultivation marks at the interface with context 160 and context 41.

From 14cm to 40cm the sediment is composed of a firm sandy sediment with shell fragments and charcoal flecks visible around 20cm. There was a band of lighter sand between 27cm and 29cm. A charcoal fleck was noted at 35cm. Below 40cm the sand becomes more friable.

Charcoal Identification

Charcoal from the three bulk samples and two bags of charcoal relating to context 160 was examined. The charcoal was fractured to produce clean transverse, transverse longitudinal and radial longitudinal sections. A Leica DMR microscope with an incident light source was used to identify the charcoal. Identification was achieved using identification souces (Schweingruber 1978 and Schluch et al 2004) and modern reference material. Nomenclature follows Stace (1995). The results are given in Table 10.

The bulk samples 308, 309 and 310 provided 65 fragments of charcoal, the smaller charcoal samples 9 fragments, including the Ulex eurapaeus used for carbon dating the context. The results show that *Prunus spinosa* L. (blackthorn) and *Ulex europaeus* L. (gorse) were the dominant species, with a small quantity of *Rosa* sp. (rose) and *Fraxinus excelsior* L. (ash) present.

Overall, the species present may indicate that the only woodland available for fuel was of a scrubby nature.

Discussion

Overall context 160 appears to be composed of domestic waste, the presence of cereal grains and weed seeds as well a bone fragments including small mammal bones may indicate that the context was either an occupation layer or the deposition of domestic

waste as a fertilizer to improve the buried soil (context 41) recorded in column sample 304.

The three bulk samples do appear to have spatial variations, which may indicate occupation. Sample 308 contained the greatest quantity of cereal remains, with oats being the most predominant, this sample also produced the only bread wheat rachis fragment, sample 309 had few cereal grains, however the sample produced a quantity of heather seeds and flower heads. Sample 310 also had few cereal grains present but did produce the largest quantity of bone material and amber fragments.

The cereal remains from St Patrick's Chapel are comparable with other early medieval sites, thus indicating that the site had access to arable agriculture. West Angle early medieval cemetery (Caseldine and Griffiths 2008) produced a broadly similar assemblage of cereal remains, though glume wheats were present in greater quantity than bread wheat. Oats were again the dominant cereal. The early medieval site at Newton, Pembrokeshire (Caseldine and Griffiths2004) however did produce an assemblage of bread wheat, oats and barley.

The non-cereal assemblage produced evidence of a mixture of arable and grassland species, with dry grassland species dominant. Wild plant remains possibly collected as a food source to supplement diet were represented by hazel nut-shell fragments and apple pips. The presence of grass seeds, heather flowers and seeds, bracken bracts a dock seeds suggest the inclusion of small weed seeds either from arable cultivation or pastoral activity, such as bedding for animals.

The evidence from context 160 however does appear to have similarities with a sample from the excavation at Brownslade, 'Plough marks (277) - sample 616' which also produced cereal remains and bone material and was interpreted as 'being indicative of burnt domestic waste that was probably being used to manure the fields.' (Carruthers 2011). As context 160 at St Patrick's Chapel is above a buried soil horizon and also has associated cultivation marks, it would appear that the deposit was due to the use of domestic waste as a form of manure. The presence of the amber fragments which were present in the three bulk samples may also confirm the deliberate spreading of waste as over context 41, the fragments are small and could represent detritus from the working of the material.

Conclusion

Context 160 produced an assemblage of plant remains and bone which are indicative of domestic waste, the context contains evidence of occupation with the presence of cereal remains at the site but given the non-plant-based evidence the most likely interpretation is that it was domestic waste which was used as a fertilizer.

Table 9. The plant remains from St Patrick's Chapel

Sample no.	**308**	**309**	**310**	**Habitat preference**
Context	**160**	**160**	**160**	
Sample size - litres	**6**	**4.5**	**9.5**	
Taxa				
Hordeum sp. (Hulled) - indet. grain	5	2	1	A
Avena spp. - grain	20	-	-	A
Avena sp. - awn	1	-	-	
Avena/Poaceae - grain	13	-	5	A

Triticum aestivum L - rachis (Bread wheat)	1	-	-	A
Triticum aestivum L. type - grain	3	3	-	A
T. cf. *aestivum* - grain	3	-	-	A
Cerealia indet. - grain	22	3	20	A
Other plants				
Ranunculus repens type (Creeping buttercup)	1	-	1	Gw, B, M, C
Corylus avellana L. (Hazel) nut frags.	-	3	1	W
Chenopodium album L. (Fat hen)	-	2	-	A, D
Atriplex spp. (Oraches)	3	-	16	A, D, C, B
Stellaria spp. (Stitchworts)	-	6	6	W, B, A, M, G
Persicsaria spp. (Knotweeds)	4	-	-	G, B, D, A, w,
Rumex acetosella L. (Sheep's sorrel)	8	5	13	A, G, H
Rumex spp. (Docks)	21	12	55	G, A, B, W, w
Viola spp. (Violets)	-	-	3	W, G, H, M
Raphanus raphanistrum L. (Wild radish) /*Raphanus raphanistrum* cf. *maritimus* L. (Sea radish) whole capsules	4	-	2	D, C
Raphanus raphanistrum L. (Wild radish)/*Raphanus raphanistrum* cf. *maritimus* L. capsule frags.	11	-	9	A, D
Calluna vulgaris (L.) Hull - seeds (Heather)	-	22	-	H, M ,W
Calluna vulgaris (L.) Hull - flower heads	12	58	2	H, M ,W
Rubus fruticosus L. agg. (Brambles)	2	-	-	W, G
Rosa spp. (Rose)	3	-	2	W
Prunus spinosa L. – stone (Blackthorn)	-	-	1	W
Prunus spinosa type - thorn	3	2	1	W
Malus cf. *Sylvestris* (L.) Miller (Crab apple)	-	-	8	W
Vicia/Lathyrus (Vetches/Peas)	-	1	5	G,W, D, H, A, M
Ulex europaeus L. – seeds (Gorse)	8	2	5	G,H,W
Ulex europaeus L. - spine (Gorse)	-	2	-	G,H,W
Cf. .*Linum usitatissium* L. (Flax)	-	-	1	A
Plantago lanceolata L. (Ribwort plantain)	3	2	22	G
Galium aparine L. (Cleavers)	2	-	2	A, D

Carduus spp. (Thistle)	-	-	4	G, A, D
Lapsana communis L. (Nippleworts)	1	-	-	W, D
Carex spp. - trigonous *(Sedge)*	5	1	-	B, M, W, Gw
Carex spp. – biconvex (Sedge)	-	2	2	B, M, W, Gw
Poaceae (grasses)	14	-	7	G, H, M, W, w, R
Poaceae - small	-	4	61	G, H, M, W, w, R
Leaf buds	-	1	-	W
Pteridium aquilinum (L.) Kuhn (Bracken) – leaf frags.	1	-	-	W, H, M
Rhizome	-	-	1	
Leaf bud	-	1	-	
Thorn	3	-	-	
Flower head indet	1	3	1	
Charred organic material	10	17	8	
Small mammal bones	29	1	50	
Small mammal teeth	-	-	4	
Mammal teeth	4	-	2	
Bone frags	21	47	61	
Charred bone frags	17	46	14	
Fish bones	-	-	17	
Fish scales	2	-	2	
Limpet shells	11	4	12	
Limpet shell frags	-	-	8	
Other marine mollusca shells	-	9	-	
Cf. Amber fragments	70	11	126	
Metal object	-	1	-	

Table 10 The Charcoal Identifications from St Patrick's Chapel

Sample	**308**	**309**	**310**		**Total**
Contect	**160**	**160**	**160**	**160**	
Species					
Fraxinus excelsior L. (Ash)	5	-	-		5
Prunus spinosa L. (Blackthorn)	17	1	18		36
Rosa spp. (Rose)	3	-	-	5	8
Ulex europaeus L. (Gorse)	-	19	7	34	30
Total	25	20	25	9	79

ADDITIONAL CHARRED PLANT REMAINS, CHARCOAL AND OTHER ANALYSES

By J Robertson

Introduction

A total of four bulk samples were submitted for environmental assessment from the archaeological works undertaken at St Patrick's church, Wales. The samples were collected from a series of early medieval pits and hearths believed to date to the 8th century. More detailed site information was not available at time of writing this report. A small number of ecofacts and artefacts composed of carbonised macroplants, charcoal, animal bone, fish bone, marine shell, terrestrial shell and industrial waste were recovered. The aim of this report was to assess the potential of these finds for further study and their suitability for radiocarbon dating.

Methodology

The bulk samples were processed in their entirety in laboratory conditions using a floatation method designed to retrieve both ecofacts and artefacts (cf. Kenward *et al*. 1980). The sediment was composed of a loose sand and did not require any pre-treatment prior to processing. The wash overs were scanned using a high-powered microscope at x10-x40 magnification. The residues were separated using a stack system of 4mm, 2mm and 1mm sieves and each fraction was scanned by eye and with a magnet.

All plant macrofossils were subsequently examined at magnifications of x10 and up to x450. Macroplant identifications were confirmed using modern reference material and seed atlases (Cappers *et al.* 2006; Jacomet 2006). Taxonomy and nomenclature for plants follows Stace (2010).

A maximum of ten charcoal fragments larger than 4mm were selected from each sample for further analysis. Species identifications were confirmed by analysing the transverse, tangential and radial sections at x70-x450 magnification and using keys and texts (Hather 2000; Schweingruber 1990).

Recoveries of animal bone, fish bone, shell and industrial waste were subjected to a rapid scan and quantified by weight.

The assemblage

The results are recorded in full in Table 11 the carbonised macroplant, Table 12 the charcoal species, Table 13 bone, and Table 14 other finds.

The macroplant

A small assemblage of four carbonised macroplant were scattered among three contexts (627), (632) and (651). The species identified were two bread/club wheat caryopses (*Triticum aestivum* L), one heather fruit (*Calluna vulgaris* L) and one blackthorn endocarp (*Prunus* spinosa L). Preservation of these finds was generally poor. The macroplants were scattered throughout the site with no evidence of selective or deliberate disposal. The only other finds were small fragments of peat recorded in all four samples. The cereal is likely re-deposited domestic food waste. The blackthorn could have been collected from the wild as a food resource or was an accidental inclusion of the charcoal assemblage. The heather

was probably a component of the peat that may have been used as a fuel source or building material.

The charcoal

A total of 30 fragments of charcoal (82.5g) were identified to species from three contexts (632), (644) and (651). Charcoal was noted in context (627), but the fragments were smaller than 4mm and not suitable for further analysis. The species identified were alder (*Alnus glutinosa* L), heather (*Calluna vulgaris* L), blackthorn (*Prunus* spinosa L) and oak (*Quercus* sp). The dominant species was blackthorn (53%) followed by oak (33%) with smaller quantities of alder (7%) and heather (7%). There was roundwood composed of blackthorn (47%) and heather (7%). Preservation of the charcoal varied from poor to adequate. The presence of mixed wood species and roundwood likely represents the disposal of fuel debris.

The bone

Animal bone fragments (35.1g) were scattered among all four contexts. A rapid scan of this material revealed the presence of large mammal, rodent and burnt bone. Preservation of the large mammal bone fragments was generally poor. The rodent bones were noticeably better preserved and likely belong to semi-articulated animals. Fish bone was noted in context (627) and alongside possible scales in (627) and (651). The animal and fish bone are likely food residue whereas the rodents are accidental inclusions from animals that burrowed into the deposits later.

The shell

Marine shell was present in all four samples and the species were common periwinkle (*Littorina littorea* L), common mussel (*Mytilus edulis* L) and common limpet (*Patella vulgata* L). These species are edible and easily harvested from the seashores surrounding Britain (Hayward 1996). Without more detailed contextual information about the deposits, it is not possible to establish if these finds are food waste or if they are natural inclusions within the sandy sediments. Terrestrial snail shells were recognised in all four contexts but only the larger shells from (815) were collected. These finds are likely invasive.

The industrial waste

A single fragment of vitrified industrial waste was noted in deposit (821).

Discussion and statement of significance

The ecofact assemblage from St Patrick's Church has derived from the disposal and rE/Working of both food and fuel debris. Bread/club wheat was commonly cultivated in Wales throughout the medieval period and has been found on many similar sites (Moffett 2009, 47). There is also evidence that turfs were used as a fuel source. It is also possible wild food resources such as blackthorn were gathered when seasonably available but equally this fruit could have been an accidental component of the wood species selected for fuel.

The wood species are all native and would have grown in the surrounding landscape. Alder tends to favour damp habitats, blackthorn grows in a range of landscapes such as hedgerows, scrub or more open woods, heather prefers more acidic landscapes whereas oak is adaptable to a variety of growing conditions (Stace 2010, Linford 2009). The wood species noted at this site indicate that the variety of tree species were selected for fuel.

Recommended further work

Both the macroplant and charcoal assemblage have been fully assessed and no further species identifications are required. The small size of both the macroplant and charcoal assemblage limits its potential for further study and further analysis of these finds are not recommended.

Table 11. Carbonised Macroplant

Sample Number			815	819	821	822
Feature			Pit/alter	Deposit	Deposit	Pit/hearth
Context			627	632	644	651
Sample vol(l)			30	30	30	40
% Analysed			100	100	100	100
Species	**Name**	**Part**				
Triticum aestivum/compactum L.	Bread/club wheat	Caryopsis	1	1		
Calluna vulgaris L.	Heather	Fruit		1		
Prunus spinosa L.	Blackthorn	Endocarp		1		
Unknown	Indet	Seed				1
Peat		Frag(s)	<4mm	<4mm	<4mm	<4mm

Table 12. Charcoal Species

Sample	**Feature**	**Context**	**Species**	**Name**	**Frag**	**RW**	**Weight**
815	Pit/alter	627					<4mm
819	Deposit	632	*Alnus glutinosa* L.	Alder	1		
819	Deposit	632	*Prunus* spinosa L.	Blackthorn	1	5	
819	Deposit	632	*Quercus* sp.	Oak	3		17
821	Deposit	644	*Calluna vulgaris* L.	Heather		2	
821	Deposit	644	*Prunus* spinosa L.	Blackthorn		3	
821	Deposit	644	*Quercus* sp.	Oak	5		33.1
822	Pit/hearth	651	*Alnus glutinosa* L.	Alder	1		
822	Pit/hearth	651	*Prunus* spinosa L.	Blackthorn	1	6	
822	Pit/hearth	651	*Quercus* sp.	Oak	2		32.4

Table 13. Bone

Sample	Feature	Context	Animal	Fish	Scales
815	Pit/alter	627	**(6.5)	*(0.1)	*(N/A)
819	Deposit	632	**(3.5)		
821	Deposit	644	***(11.8)		
822	Pit/hearth	651	**(13.3)		*(N/A)

Key: *=<10, **=10-29, ***=30-99, ****=>100, weight given in grams in brackets

Table 14. Other finds

Sample	Feature	Context	IN(g)	Shell(g)	Snail(g)
815	Pit/alter	627		*(2.4)	*(28.7)
819	Deposit	632		**(11.1)	P
821	Deposit	644	*(4.5)	*(25.7)	P
822	Pit/hearth	651		*(15.1)	P

Key: *=<10, **=10-29, ***=30-99, ****=>100, P=present, weight given in grams in brackets

ANIMAL BONES: MAMMALS AND BIRDS

By A. Hadjikoumis

Introduction

The excavations carried out at St Patrick's Chapel in 2014-2016 and 2019/2021 yielded a sizeable faunal assemblage consisting of macromammal, micromammal and bird specimens (as well as fish, see Maccarinelli). The assemblage was generated, primarily, through human activity at the site from the 8th century to the modern period. The overwhelming majority of the material, however, derives from early medieval contexts chronologically attributed to the 8th century AD, either directly or recovered from 9th-10th century contexts (mainly human burials) as residual material.

Faunal assemblages of early medieval period in Wales are very rare (Edwards et al. 2017). The situation is better in England (e.g., Hammon 2011) and Ireland (McClatchie et al. 2019) but sites dating specifically to the 8th century AD are still scarce. This current state of affairs limits the scope for useful comparisons between other sites and St Patrick's Chapel. Therefore, however, the newly collected zooarchaeological data at the site are valuable in filling the well-defined gap of our knowledge of early medieval animal husbandry in Wales (Edwards et al. 2017). More such datasets will eventually lead to a better understanding of economic and social activities, as well as the environmental setting of early medieval southwest Wales. Therefore, the main aims of this report are, to present the taxonomic composition of the faunal remains, discuss the results in their historical and environmental contexts, help elucidate the 'nature' of the site, as well as lay out future plans for further zooarchaeological analyses on the collected dataset.

Materials and methods

In total, 2655 macromammal, 41 micromammal and 142 bird remains have been identified to some taxonomic level and recorded in detail. About 97% of those remains are dated, to varying degrees of certainty, to the 8th century AD. More than half of the 8th century material was recovered as residual in later contexts, usually 9th-10th century sandy layers of the cemetery. Contexts 112, 130, 146, 160, 164 were particularly rich in 8th-century residual faunal remains. Most of the material dated directly to the mid-8th century (i.e., not residual) derived from contexts 632, 644 and 160 A-K.

The assemblage was studied at the zooarchaeology laboratory of the University of Sheffield, and its large comparative faunal collection was used in the identification of specimens. For mammals, the anatomical units systematically recorded for quantification purposes were: horncore base; mandible/loose cheek teeth; atlas; axis; scapula; proximal and distal halves of humerus, radius, femur, tibia, metapodia (only III and IV in pigs); proximal half of ulna; pelvis; astragalus; calcaneum and phalanges 1-3 (excluding lateral phalanges in pigs). No attempt has been made to distinguish phalanges into fore- and hind-limb. For birds, the anatomical units systematically recorded were scapula (articulation); sternum (anterior margin, coracoidal groove and external spine); pelvis (acetabulum); proximal and distal halves of coracoid, humerus, ulna, radius, carpometacarpus, femur, tibiotarsus and tarsometatarsus. These anatomical elements have been selected for their durability, identifiability and potential to yield information that sheds light on the human-animal relationship. All other anatomical elements were identified only to size. Besides mammals and birds, identifiable remains of all other classes of animals (except fish, see Maccarinelli) were also recorded. The distinction between sheep and goat was attempted on postcranial remains based on Boessneck et al. (1964)

and mandibular cheek teeth based on Halstead et al. (2002) and Payne (1985) but goat remains have not been reliably identified. In general, when a specimen could not be identified to the species level, identification was attempted albeit on a more general taxonomic level. The most generic level of identification used was a four-size scheme for mammals: large (e.g., cattle, equids, red deer), medium (e.g., sheep/goat, pig), small (e.g. cat, lagomorph) and micromammal (e.g. rodents, shrews, voles).

Besides anatomical element and taxon, age-at-death was also recorded based on dental eruption/wear and the epiphyseal fusion state of postcranial elements. Eruption/wear of mandibular dental remains were recorded following Payne (1973; 1987) for sheep, Grigson (1982) and Halstead's (1985) adaptation of Payne for cattle, and Grant (1982) and Bull & Payne (1982) for pig. Epiphyseal fusion follows Silver (1969) for sheep, cattle and pig. Sheep and cattle pelves were attributed to male or female based on their morphology whenever possible (Grigson 1982; Boessneck et al. 1964). Permanent pig canines were also attributed to male or female based on their sexually dimorphic morphology (Mayer & Brisbin 1988). Fragmentation, taphonomic conditions (e.g., gnawing, burning) and butchery were recorded as described in Halstead (2011). Biometric measurements were taken following von den Driesch (1976), unless otherwise stated.

In terms of quantification, all identified mammal and bird specimens are calculated with three different methods (NISP, MinAU, MaxAU). Beyond the more widely used NISP, the Minimum Anatomical Units (MinAU) and Maximum Anatomical Units (MaxAU) (Halstead 2011) were also calculated as they constitute more reliable units for several analyses, as well as acting as a check on NISP, in cases of heavy fragmentation.

Results

Macromammals

The quantified taxonomic data for all macromammal remains from St Patrick's Chapel are presented in Table 15 in NISP, MinAU and MaxAU. In addition, three remains (1 sheep, 1 cattle and 1 large mammal) dating generally to the Medieval/post-Medieval periods were recorded but not reported in further detail. It is apparent from the chronological spread of the material that activities that generated the assemblage took place primarily in the 8th century AD. As for the general characteristics of the fauna, it is diachronically dominated by sheep (no goat remains have been identified), and to a lesser degree by cattle. The pig is present but scarce. Beyond these common domestic mammals, a few other macromammal species are nominally present such as roe deer (and possibly fallow or red deer from a modern context), dog, otter, cat and a lagomorph (rabbit/hare).

Table 15. NISP, MinAU and MaxAU of all macromammal taxa identified at St Patrick's Chapel, presented in relative chronological order.

NISP

Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Equid	1		4			1	6
Cattle	7	66	171	11	12	35	302
Pig	1	10	20	1	5	4	41
Sheep/Goat	17	244	384	12	12	71	740
Sheep	8	49	126	7	6	25	221
Red/fallow deer						1	1
Roe deer	1	2	1				4
Dog						1	1
Otter			1				1

Lagomorph			1				1
Cat						1	1
Total	35	371	708	31	35	139	1319

MinAU

Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Equid	1		3			1	5
Cattle	6	52	126	8	8	28	228
Pig	1	12	21	1	6	4	45
Sheep/Goat	14	182	286	10	9	57	558
Sheep	8	46	118	6	5	26	209
Red/fallow deer						1	1
Roe deer	1	2	1				4
Dog						1	1
Otter			1				1
Lagomorph			1				1
Cat						2	2
Total	31	294	557	25	28	120	1055

MaxAU

Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Equid	1		4			1	6
Cattle	7	70	174	12	14	36	313
Pig	1	12	23	1	6	4	47
Sheep/Goat	18	273	430	14	14	79	828
Sheep	8	52	136	7	6	29	238
Red/fallow deer						1	1
Roe deer	1	2	1				4
Dog						1	1
Otter			1				1
Lagomorph			1				1
Cat						2	2
Total	36	409	770	34	40	153	1442

Micromammals

Micromammals have also been identified and their quantified taxonomic data are presented in Table 16. The vast majority derives from flotation with the smallest sieve size of 2mm and all micromammal material is dated loosely to the 8th century AD. Micromammal remains belonged mouse- and rat-sized rodents, voles and shrews. The short-tailed field vole (*Microtus agrestis*) and Eurasian pygmy shrew (*Sorex minutus*) have been positively identified.

Table 16. NISP, MinAU and MaxAU of all micromammal taxa identified at St Patrick's Chapel, presented in relative chronological order.

NISP

Taxon	8th/earlier	Mid/late 8th	8th residual	Total
Rodent	1		2	3
Rodent (rat-sized)		1		1
Rodent (mouse-sized)	5	3	2	10
Rodent/vole		5		5
Vole		4		4
Microtus agrestis			4	4
Vole/shrew			1	1
Shrew	2			2
Sorex minutus		1		1
Total	8	14	9	31

MinAU

Taxon	8th/earlier	Mid/late 8th	8th residual	Total
Rodent	2		4	6
Rodent (rat-sized)		2		2
Rodent (mouse-sized)	6	5	3	14
Rodent/vole		6		6
Vole		4		4
Microtus agrestis			6	6
Vole/shrew			1	1
Shrew	2			2
Sorex minutus		2		2
Total	10	19	14	43

MaxAU

Taxon	8th/earlier	Mid/late 8th	8th residual	Total
Rodent	2		4	6
Rodent (rat-sized)		2		2
Rodent (mouse-sized)	6	5	4	15
Rodent/vole		6		6
Vole		4		4
Microtus agrestis			6	6
Vole/shrew			1	1
Shrew	2			2
Sorex minutus		2		2
Total	10	19	15	44

Moreover, a large number of macromammal and a small number of micromammal specimens were identified only to size group. These data are presented only in terms of NISP in Table 17. The results corroborate those presented in Tables 15 and 16, mainly reflecting the sheep and cattle dominance in the assemblage. Moreover, it is important to mention that most of this material contains body parts that are difficult to identify to species level (e.g., ribs, vertebrae and small fragments of cranial and postcranial bones)

but nevertheless attests to the fact that entire animals were consumed and deposited at St Patrick's Chapel, at least in the eighth century AD.

Table 17. NISP of all macromammal and micromammal remains that were identifiable only to size, presented in relative chronological order.

	NISP						
Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Large mammal	2	90	205	12	12	36	357
Medium mammal	30	448	388	18	26	63	973
Small mammal	1	1	1				3
Micromammal		9				1	10
Total	33	548	594	30	38	100	1343

Birds

Besides mammals, a significant number of bird remains were recorded and quantified (Table 18). In addition, two *Alca*/*Uria* specimens dating generally to the Medieval/post-Medieval periods were recorded but not reported in further detail. As it is the case for mammals, bird remains also show that most were deposited at the site in the 8th century AD. The taxonomic composition is diverse and raises interesting questions concerning the relationship between people and birds at the site as the majority of remains belong to wild species. The most frequent taxon is the starlings/thrushes (*Sturnus*/*Turdus*), which likely includes starling, redwing and fieldfare but the presence of other *Turdus* sp. is also probably. This taxon is followed in frequency by *Alca*/*Uria* (razorbill/guillemot and possibly other species), Scolopacidae (predominantly woodcock but also other species such as godwit and dunlin) and, to a lesser degree, Galliformes (mainly domestic chicken). Beyond the taxonomic diversity included in these taxa, more wild taxa were identified even if in small numbers (e.g. puffin, gull species, coot, gannet, etc.).

Table 18. NISP, MinAU and MaxAU of all bird taxa identified at St Patrick's Chapel, presented in relative chronological order.

	NISP						
Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Alcidae (*Alca*/*Uria*)	3	11	4		6	3	27
Fratercula arctica		2					2
Larus sp.		1	3				4
Charadriiformes	1		4				5
Procellariidae		1					1
Podicipediformes (small)	1						1
Morus bassanus			1				1
cf. Fulica atra			1				1
Anatidae	1	1	3				5
Galliform (*cf. Gallus*)	1	3	5	1		1	11
Scolopax rusticola		6	9	2			17
Other Scolopacidae			3	3		1	7
Sturnus/*Turdus*	1	22	15		1	2	41
Passeriformes (small)		3	2				5
Total	8	50	50	6	7	7	128

MinAU							
Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Alcidae (*Alca*/*Uria*)	4	16	7		9	5	41
Fratercula arctica		3					3
Larus sp.		1	5				6
Charadriiformes	2		6				8
Procellariidae		1					1
Podicipediformes (small)	2						2
Morus bassanus			2				2
cf. Fulica atra			2				2
Anatidae	2	1	4				7
Galliform (*cf. Gallus*)	2	3	5	2		2	14
Scolopax rusticola		8	14	3			25
Other Scolopacidae			6	6		2	14
Sturnus/*Turdus*	2	35	29		2	3	71
Passeriformes (small)		6	4				10
Total	14	74	84	11	11	12	206

MaxAU							
Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Alcidae (*Alca*/*Uria*)	4	16	7		10	5	42
Fratercula arctica		3					3
Larus sp.		1	5				6
Charadriiformes	2		6				8
Procellariidae		1					1
Podicipediformes (small)	2						2
Morus bassanus			2				2
cf. Fulica atra			2				2
Anatidae	2	1	4				7
Galliform (*cf. Gallus*)	2	3	5	2		2	14
Scolopax rusticola		8	14	3			25
Other Scolopacidae			6	6		2	14
Sturnus/*Turdus*	4	35	29		2	3	73
Passeriformes (small)		6	4				10
Total	16	74	84	11	12	12	209

Other remains

Besides mammals and birds, 54 remains of amphibians were also recovered. Moreover, few remains of cuttlefish, marine molluscs, crab and bird eggshells (probably of medium-sized birds) were identified (Table 19).

Table 19. NISP of all other animal remains identified at St Patrick's Chapel that did not belong to mammal, bird or fish, presented in relative chronological order.

	NISP						
Taxon	8th/earlier	Mid/late 8th	8th residual	8th/9th	11th/12th	Unstrat/Modern	Total
Amphibian	4	24	20	5		1	54
Eggshell (bird)	2		2				4
Crab					1		1
Cuttlefish			2				2
Marine shell		4	2				6
Total	6	28	26	5	1	1	67

As it is evident from the sample sizes of each chronological sub-sample (Tables 15-18), only material dating to the 8th century AD is amenable to further analysis. Its bulk derives from the combination of the 'Mid/late 8th' and '8th residual' material. The material dating to '8th/earlier' was also added as it also belongs primarily to the 8th century AD, with a low probability of some deriving from slightly earlier contexts.

The results in all three quantification methods used are consistent, which is evidence that fragmentation has been similar for the common macromammal taxa represented (Table 20). Since goat remains have not been identified, all 'sheep/goat' specimens have been combined with those positively identified to sheep. The resulting frequency of around 75% clearly demonstrates the importance of sheep. Cattle frequency is around 21% and, combined with the fact that cattle are much larger than sheep, suggests that cattle were of pivotal importance as well. Overall, the fact that sheep and cattle combined account for more than 95% of the assemblage is revealing of their paramount importance. Beyond these, the pig is present in very low frequency (3-4%) and thus must have been of secondary importance. The presence of equids is rather expected but their frequency of their remains is quite low. In terms of size and morphology, most equid remains are more likely to have belonged to horses. The presence of few remains of roe deer, otter and a lagomorph (possibly a wild species but could also be domesticated rabbit) attest to infrequent or circumstantial hunting or trapping activities.

Table 20. Frequencies of all macromammal taxa identified at St Patrick's Chapel in 8th century AD contexts, quantified in NISP, MinAU and MaxAU.

	8th century AD					
Taxon	NISP	%NISP	MinAU	%MinAU	MaxAU	%MaxAU
Equid (*Equus* sp.)	5	0.4%	4	0.5%	5	0.4%
Cattle (*Bos taurus*)	244	21.9%	184	20.9%	251	20.7%
Pig (*Sus domesticus*)	31	2.8%	34	3.9%	36	3.0%
Sheep (*Ovis aries*)	828	74.3%	654	74.1%	917	75.5%
Roe deer (*C. capreolus*)	4	0.4%	4	0.5%	4	0.3%
Otter (*L. lutra*)	1	0.1%	1	0.1%	1	0.1%
Lagomorph	1	0.1%	1	0.1%	1	0.1%
Total	1114	100.0%	882	100.0%	1215	100.0%

Micromammal remains dating to the 8th century AD (Table 21) show a relatively high frequency of mouse-sized rodents, which possibly belong to either the house mouse or the

wood mouse. Beyond these, a rat-sized rodent, vole and shrew were also present at the site. In general, the remains of micromammals are likely underestimated as most derived from soil samples processed through flotation (2mm). The range of micromammals identified is interesting as it represents different habitats, from commensal to grassland/moorland and woodland.

Table 21. Frequencies of all micromammal taxa identified at St Patrick's Chapel in 8th century AD contexts, quantified in NISP, MinAU and MaxAU.

	8th century AD					
Taxon	NISP	%NISP	MinAU	%MinAU	MaxAU	%MaxAU
Rodent	3	9.7%	6	14.0%	6	13.6%
Rodent (*Rattus*-sized)	1	3.2%	2	4.7%	2	4.5%
Rodent (*Mus*-sized)	10	32.3%	14	32.6%	15	34.1%
Rodent/vole	5	16.1%	6	14.0%	6	13.6%
Vole	4	12.9%	4	9.3%	4	9.1%
Field vole (*Microtus agrestis*)	4	12.9%	6	14.0%	6	13.6%
Vole/shrew	1	3.2%	1	2.3%	1	2.3%
Shrew	2	6.5%	2	4.7%	2	4.5%
Pygmy shrew (*Sorex minutus*)	1	3.2%	2	4.7%	2	4.5%
Total	31	100.0%	43	100.0%	44	100.0%

Bird remains were relatively abundant in 8th century AD deposits at St Patrick's Chapel (Table 22). As mentioned earlier, starlings and thrushes (likely several species including redwing and fieldfare) were quite common. Relatively common were also the remains of razorbills and gillemots, as well as those of the woodcock. In all these cases, the high frequency of remains suggests intentional (i.e., consumption) rather than accidental inclusion in human-generated deposits. In the case of the Alcidae family, there is even direct evidence of consumption in the form of dismembering cutmarks and burning marks on the tip of a distal humerus, likely of a razorbill (Fig. 105). The remains of domestic chicken were also present in small quantities. It is also possible that some of the Anatidae remains belong to the domestic goose. The duck remains were too small to represent a domestic duck and likely belong to a wild species. Beyond these, the remains of gull species and Charadriformes in general, as well as those of small passerine birds such as house sparrow were also present. Both gulls and house sparrows are drawn to human settlements, but their consumption cannot be excluded either. The list also includes other avian species that are related mainly with water and fit the general environment of the area such as puffin, gannet, waders (possibly godwit and dunlin), grebes and fulmar/petrel.

Table 22. Frequencies of all bird taxa identified at St Patrick's Chapel in 8th century AD contexts, quantified in NISP, MinAU and MaxAU.

	8th century AD					
Taxon	NISP	%NISP	MinAU	%MinAU	MaxAU	%MaxAU
Alcidae (*Alca*/*Uria*)	18	16.7%	27	15.7%	27	15.5%
Fratercula arctica	2	1.9%	3	1.7%	3	1.7%
Larus sp.	4	3.7%	6	3.5%	6	3.4%
Charadriiformes	5	4.6%	8	4.7%	8	4.6%
Procellariidae	1	0.9%	1	0.6%	1	0.6%
Podicipediformes (small)	1	0.9%	2	1.2%	2	1.1%
Morus bassanus	1	0.9%	2	1.2%	2	1.1%
cf. Fulica atra	1	0.9%	2	1.2%	2	1.1%
Anatidae	5	4.6%	7	4.1%	7	4.0%
Galliform (Gallus/Phasianus)	9	8.3%	10	5.8%	10	5.7%
Scolopax rusticola	15	13.9%	22	12.8%	22	12.6%
Other Scolopacidae	3	2.8%	6	3.5%	6	3.4%
Sturnus/Turdus	38	35.2%	66	38.4%	68	39.1%
Passeriformes (small)	5	4.6%	10	5.8%	10	5.7%
Total	108	100.0%	172	100.0%	174	100.0%

Figure 105: Alcidae (likely razorbill) humerus exhibiting burning marks on the tip of the distal end and dismembering marks on the distal articulation (indicated by red arrow).

Discussion

The results of the analysis of the 8th-century AD faunal assemblage from St Patrick's Chapel, shed valuable light into the zooarchaeologically little-known early Medieval period in Wales. Before proceeding with this discussion, however, the issue of the 'nature' of the assemblage, and the site more generally, needs to be addressed. Most of the material has been recovered as residual from slightly later (9th-10th century) funerary contexts and the material more directly attributable to the 8th century derives mainly from the oval stone-built enclosure and surrounding spaces. The overall characteristics of the assemblage in terms of taxa, body parts, fragmentation, age-at-death and butchery, render it clear that it was generated primarily through farming activities. This is also in accordance with the results of the archaeobotanical analyses at St Patrick's Chapel, which are suggestive of a landscape that included arable and pastoral land (see reports by Griffiths and by Robertson, this volume). It can be assumed, therefore, that people lived and farmed at or

near St Patrick's Chapel, before, and perhaps in the early stages of the subsequent funerary and religious functions of the site.

The analysed faunal assemblage reflects an animal economy that was based almost entirely on the husbandry of domestic species, primarily sheep and cattle. An overwhelming majority of sheep (75%) suggests that a significant number of people were occupied with activities relating to them such as herding, dairying, butchering, cooking, etc. This interpretation is corroborated by archaeobotanical evidence for the cultivation of cereals (see Griffiths and Robertson, this volume), some which could have been fed to animals. In any case, cereal cultivation is highly compatible with sheep and cattle husbandry in that it provides seasonal (e.g., after cereal harvest and processing) and inter-annual (fallow fields) grazing opportunities (e.g., Hadjikoumis 2021). The presence of grassland and possibly woodland, as well as the coast (e.g., seaweed), provided additional opportunities for sheep and cattle grazing. Pigs played a marginal role in diet and were probably raised occasionally, as it was the case for domestic chicken and possibly geese. Equids, most likely horses, were used for transportation and agricultural tasks but were either scarce or most of their remains deposited elsewhere. The same set of explanations also addresses the question of the absence of dog remains in the 8th century AD material.

The preoccupation of the site's inhabitants with agropastoral tasks is also reflected on the scarcity of wild mammal remains. Roe deer remains are merely present and are probably the result of a circumstantial encounter. The hunting or trapping of wild birds played a small dietary role but may have been seasonally significant, as well as contributing to the cultural identity of those exercising it. Capturing starlings, thrushes, razorbills and guillemots to supplement diet surely involved relevant technological and ecological knowledge, as well as skill. Some of the birds captured, such as the razorbill guillemot, only come to land to nest thus creating seasonal fowling opportunities (Best 2014). Moreover, the few remains of eggshells (Table 19) are compatible with medium-sized bird species, likely domestic chicken. The collection of eggs from nests of wild birds, however, cannot be excluded.

Besides economy and subsistence, the faunal remains also shed light on the environmental setting around St Patrick's Chapel during the 8th century AD. As mentioned earlier, the near-absolute dominance of domestic animals in the assemblage attests to the fact that large parcels of the landscape were devoted to agropastoral production, with cereal and fallow fields near the site. The remains of rat- and mouse-sized rodents are also compatible with such an environment, as are those of house sparrows and other passerine bird species. The degree of reliance on agropastoral production, however, is not necessarily proportionate to the diversity of environments around the site. An obvious environmental component is the coastal one, with alternating rocky and sandy areas as indicated by the presence of cliff-nesting seabirds, as well as waders. Some shrub or woodland vegetation must have also been present within reasonable distance, which would provide suitable environment for roe deer and woodcocks. Moreover, the presence of taxa such as otter, coot, wild duck/goose and other seabirds such as gulls and gannets (as well as fish, see Maccarinelli, this volume) reveal some interaction with the mosaic of riverine, estuarine and coastal environments found even today around St Patrick's Chapel.

The excavation and analysis of this faunal assemblage will contribute towards the emergence of a reliable and synthetic picture of human-animal interactions in early Medieval Wales. Currently, available comparisons are few as '*animal bone assemblages dating to the early medieval period in Wales remain exceptionally rare*' (Edwards et al 2017: 17). A stable isotope analysis of human skeletons recovered at coastal sites in western Britain (including St Patrick's Chapel) corroborate the zooarchaeological analyses

in suggesting self-sufficiency in locally produced and collected foodstuffs, as indicated by the differentiation of the inhabitants of St Patrick's Chapel and other coastal sites from those of inland Southeast Wales (Hemer et al. 2017). These results do not necessarily suggest extensive uptake of marine food directly by humans but rather the consumption of local crops and animals produced in a coastal environment.

Overall, the study of St Patrick's Chapel has contributed a relatively well-dated and large dataset. Unfortunately, the only large 8th century AD assemblage from Wales is that of Dinas Powys with its well-known problems of reliability of faunal data (Seaman 2013). Assuming a tolerable degree of reliability in Dinas Powys results (Alcock 1963), the two sites appear to have been of different character with more cattle and younger animals at Dinas Powys and more sheep and subadult/adult animals at St Patrick's Chapel, although mortality analysis is still pending at the latter site. It is reliable, however, that at St Patrick's Chapel during the 8th century AD the pastoral activities were revolving around managing sheep herds. This characteristic contrasts what has been observed in Ireland throughout the early Medieval period (e.g. McCormick 2014) and England (e.g. Hammon 2011), where animal economies are much more heavily dependent on cattle husbandry. Even in Wales later in the Medieval period (e.g., Gidney and Caple 2007), cattle were more abundant than at early Medieval St Patrick's Chapel. Site type, site status and environmental setting are currently considered as factors in differentiating the faunal composition at each site. Only the addition of data points on the map will eventually enable a more synthetic approach.

Conclusions and future work

The results of the zooarchaeological analysis shed light on key aspects of human activity at early Medieval St Patrick's Chapel. It has been established that the site's animal economy was based on agropastoral activities. Animal husbandry involved mostly sheep herds and, in smaller but significant numbers, cattle. Interaction with wild mammals was circumstantial. The consumption of wild birds such as starlings, thrushes, razorbills, guillemots and woodcocks appear to have been more systematic, even if still of secondary economic importance. It does reveal, however, good knowledge of the local environment, the biology and seasonal cycles of these species, as well as the skills required to capture them. Moreover, the overall faunal composition including macromammals, birds and micromammals, reveals a patchwork of agricultural, coastal, grassland, wetland and woodland landscapes, although the proportions and degree of human interaction cannot be precisely estimated at this point.

Further analyses on the collected zooarchaeological data are still pending. More specifically, age-at-death data for the most common taxa (sheep, cattle and most common bird taxa) will be analysed to explore the desired products of sheep and cattle husbandry, as well as the capturing strategies of wild bird taxa. Male:female ratios for sheep, and cattle if feasible, are expected to shed further light into the husbandry strategies employed. Moreover, analyses on anatomical representation and fragmentation will be pursued in an effort to better understand production and consumption patterns, at least for sheep and cattle. Biometric analyses will also be attempted to understand the size of animals compared to earlier and later periods. Such analyses on bird remains might help towards further refinement of their taxonomic attribution.

FISH BONES

By Angela Maccarinelli

Introduction and material

This report presents the analysis of the fish bones recovered from the site of Saint Patrick's Chapel, Pembrokeshire (Wales). Fish remains were recovered during five years of excavation (2014, 2016, 2017, 2019, 2021), mostly belonging to residual layers from 8th century contexts, or recovered from 9th-10th century contexts (mainly human burials) as residual material. Some of the bones were recovered from unstratified contexts (NISP: 2) and were excluded from the analysis and discussion. One maxilla belonging to hake possibly came from a modern layer, thus was also excluded from the analysis.

A fraction of the remains from context 160 were processed using flotation and sieving techniques (mesh size: 1, 2 mm), while the rest of the material was hand-collected. Hand-collected samples inevitably means a bias against smaller species as sieving must be carried out, and species diversity increases significantly with the use of fine meshes (Wheeler & Jones 2009, 40; Morales-Muñiz 2014;); this need to be considered in the interpretation of the data.

Despite the small sample size, the assemblage is represented by a high taxonomic variability, thus can been informative of past diet of the inhabitants of the region.

Methods

All bags containing animal bones were checked and searched for the presence of fish remains. The resulting material was recorded on electronic sheets using Microsoft Excel. The recording protocol (Maccarinelli 2021) results from the combination of protocols developed by Albarella and Davis (1994) and the York recording system (Barrett 2000), with the integration of suggestions by Wheeler and Jones (2009). The recording protocol relies on a selection of anatomical elements which are highly diagnostic at taxonomic level, recurrent in the skeleton of different species and robust enough to have higher chances of preservation in the archaeological record. The aim of this selective approach is to minimise the biases related to the taphonomic processes, anatomical differences between taxa, and species identifiability. Anatomical element nomenclature follows the guidelines of Wheeler and Jones (2009) and Thieren et al. (2012) for the specific case of eel. Elements excluded from this section (for the specific case of this assemblage: ribs, fins, brachial arches, scales and scutes, skull fragments and unidentified fragments) were recorded at a lower level of detail and excluded from the quantification analysis. Whenever the remains could not be identified at least to order-level, these were classified as 'unidentified'. Scales and scutes were treated separately from other unidentified non-countable fragments and their number was estimated as their presence/absence can be informative of carcass processing practices (e.g., Barrett 1997) and oN/Site cleaning of the fish (e.g., Bond & O'Connor 1999).

Taxonomic identification

Identification of fish skeletal remains relied primarily on comparison with the modern specimens of the zooarchaeology reference collection held at the University of Sheffield (UK). Atlases (e.g., Cannon 1987; Lepiksaar 1994; Watt et al. 1997), manuals (Casteel 1976; Wheeler & Jones 2009) and various digital identification guides were consulted, including the Archaeological Fish Resource (2011).

The identification of Salmonidae is typically challenging, due to morphological similarities of species belonging to this family; however, as bones from the assemblage belong to individuals visibly larger than 20-30 cm of standard length (i.e. beyond the common size range of the brown trout), they were assigned to either of the two anadromous species, i.e. Atlantic salmon (size range 60-150 cm of total length; Maitland & Campbell 1992) and sea trout (size range 40- 100 cm of total length, Russ 2011).

Except for Gadiformes, for most of the taxa represented in the assemblage (e.g., Sparidae, Cypriniformes, Triglidae) vertebrae do not represent an anatomical element useful for species identification. Most of the assemblage is represented by vertebrae therefore taxa identification could not be pushed further beyond the 'family' level in most cases.

Quantification

The frequency of species, namely the relative proportion of the taxa (order), was calculated using the number of identified specimens (NISP), consisting of the raw count of every countable element in the dataset, regardless of the level of completeness. This method comes with a number of limitations, which, together with the small sample size, need to be considered during the interpretation of the data (Rizzetto & Albarella 2014, 764).

NISP counts were also used for the analysis of habitat distribution. Remains belonging to unidentified Gadiformes have been included in the 'marine' group only because the attribution to the freshwater burbot could be excluded. Those remains for which the identification to family/order level implied the potential presence of species with different ecological requirements (e.g., Salmo salar/Salmo trutta trutta) were excluded from the calculation of habitat distribution.

Taphonomy

Taphonomic alteration was consistently recorded only on countable elements and counted by NISP. The degree of surface preservation of each fragment was recorded using the five categories (Excellent/Good/Medium/Bad/Awful) described by Rizzetto (2014). The degree of bone completeness was recorded using the following stages: bone completeness >75%, 75-50%, 50-25%, <25%.

Evidence of burning was recorded using three stages: singed (the bone appears red brown in colour or black in some areas), burnt (the bone appears almost entirely black-carbonised), and calcined (the bone has a white or light grey/blue colouration). Crushing, defined as mechanical damage and/or chemical bone deformation, was also recorded. In the case of smaller species, this type of bone deformation could be the result of damage from human consumption and digestion (Jones 1984; 1986; Wheeler & Jones 2009, 69-76).

Biometry

Measurements were taken according to Morales and Rosenlund (1979); for the specific case of eel, additional and alternative measurements were taken following Thieren et al. (2012a). Measurements were taken using electronic callipers and approximated to the tenth of a millimetre. Unfortunately, the scarcity of the measurements taken per taxon meant that no further analyses was worth performing.

Pathologies

Only one bone tissue alteration was recorded, specifically 'hyperostosis' on haddock bones. This is a condition characterising specific elements and species, manifested by the swelling

and proliferation of the bone tissue; hyperostosis appears not to be injurious to the fish and is associated with sexual maturity and growth (von den Driesch 1994; Wheeler & Jones 2009, 21).

Results

A grand total of 191 bones were counted. Of these only 55 were identified taxonomically (with various degrees of precision) and 48 recorded as countable specimens and belonging to chronologically reliable contexts.

Such a high number of unidentified bones was mostly represented by undiagnostic fin rays, ribs and bone fragments. A small number of scales (at least 8) were recovered but not identified; two scutes were identified as belonging to Atlantic horse mackerel, but not included in the quantification, following the recording protocol.

For the 8th c. material, the completeness of the bones was overall good, with more than 70% of the identified material more than 50% intact; the level of preservation of the bone surface was medium/good (Figs 106–107).

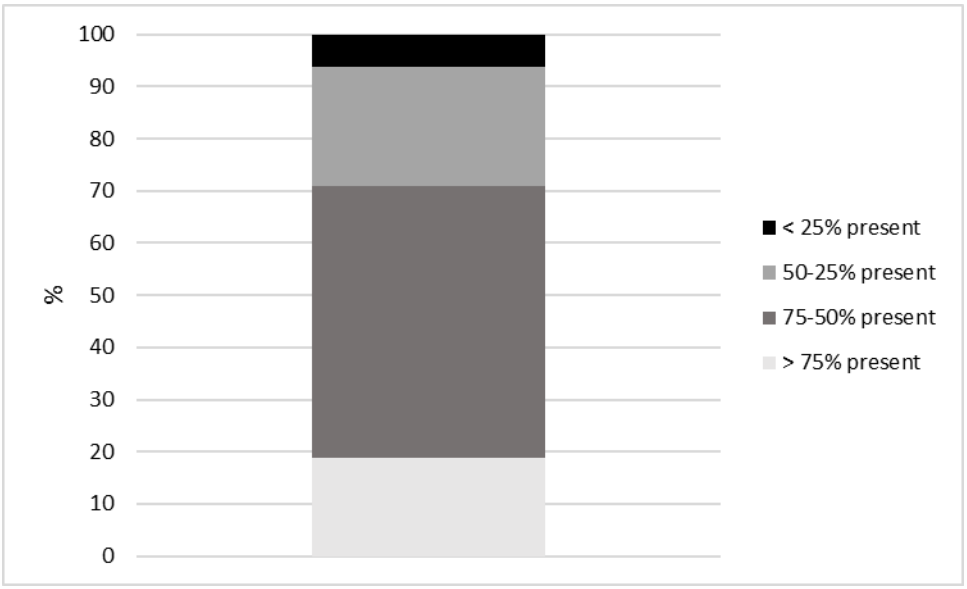


Figure 106**.** Percentage of bone completeness for 8th c. material (NISP: 48), all recovery methods.

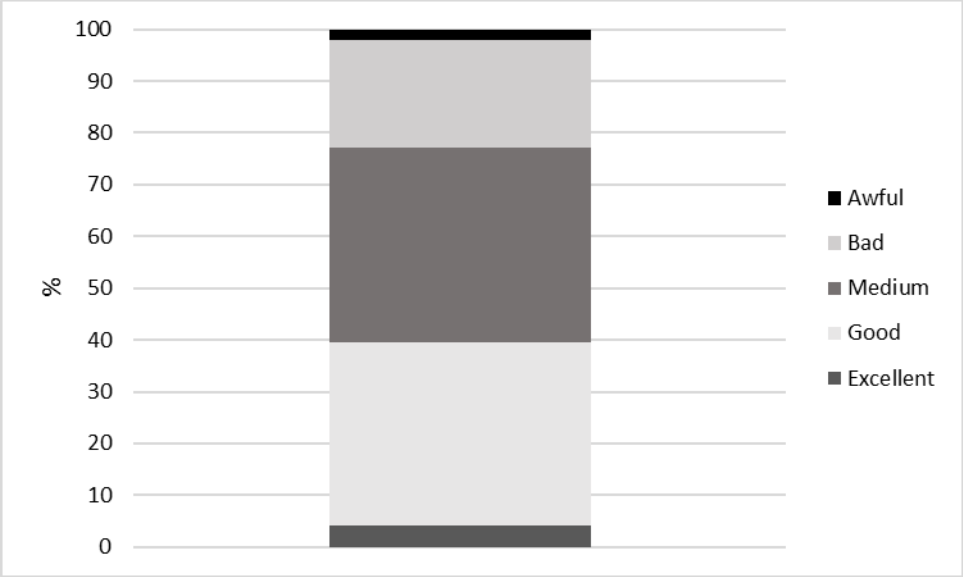


Figure 107**.** Percentage of bone preservation for 8th c. material (NISP: 48), all recovery methods.

Taxonomic frequencies

The NISP for the 8th c. material shows an assemblage dominated by large Gadiformes (29%; Table 23), from which cod, haddock and hack were identified. These are followed by Labriformes (17%), with Ballan wrasse identified, and Carangiformes (17%), completely represented by Atlantic horse mackerel. 13% of the remains were attributed to Spariformes, with Black seabream identified, and 6% respectively to Salmoniformes, entirely represented by Atlantic salmon/Sea trout, and Scorpaeniformes, all belonging to the Triglidae family. Only two remains of Cypriniformes were identified and two belonging to European eel. One was identified as belonging to the Mullidae family and one to Rajidae.

Habitat distribution for the 8th c. material (Fig. 108, Table 23) shows an assemblage almost entirely represented by marine taxa (92%), with a minimal presence of freshwater (4%) and migratory fish (5%).

Table 23. NISP of taxa for 8th c. material based on diagnostic elements, all recovery methods. Fish habitats are labelled as follows: MA (marine), FW (freshwater), MI (migratory). Latin and common names follow Kottelat and Freyhof (2007), Camphuysen and Henderson (2017) and Froese and Pauly (2019).

Latin name	**Common name**	**Habitat**	**NISP**
Gadiformes			
Gadus morhua	Atlantic cod	MA	6
Melanogrammus aeglefinus	Haddock	MA	3
Gadidae	-	MA	3
Merluccius merluccius	European hake	MA	2
Labriformes			
Labridae	-	MA	7
Labrus bergylta	Ballan wrasse	MA	1
Carangiformes			
Trachurus trachurus	Atlantic horse mackerel	MA	8

Spariformes			
Spondyliosoma cantharus	Black seabream	MA	4
Sparidae	-	MA	2
Salmoniformes			
Salmo salar/Salmo trutta trutta	Atlantic salmon/Sea trout	MA/MI	3
Scorpaeniformes			
Triglidae	-	MA	3
Cypriniformes			
Cyprinidae	-	FW	1
Nemacheilidae	-	FW	1
Anguilliformes			
Anguilla anguilla	European eel	MI	2
Perciformes			
Mullidae	-	MA	1
Rajiformes			
Rajidae	-	MA	1
TOTAL			48

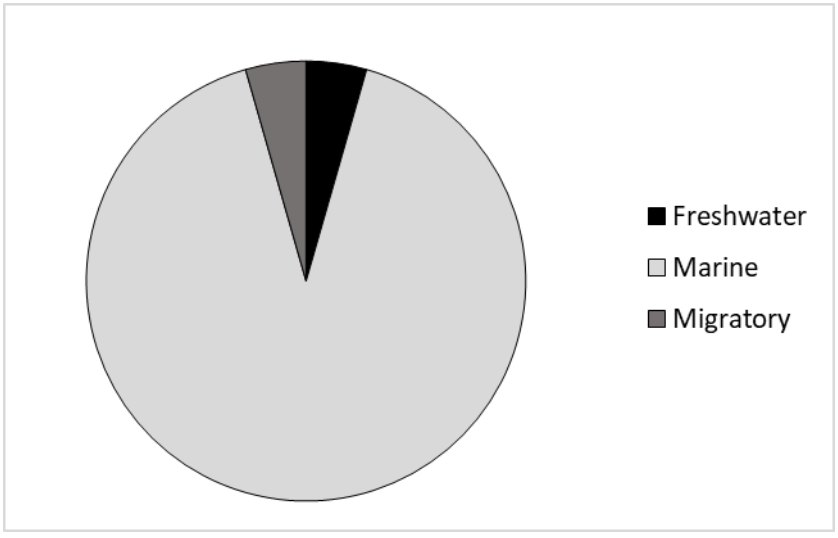


Figure 108. Frequencies of habitat distribution for 8th c. material (NISP: 45), all recovery methods. Salmoniformes excluded.

Anatomical element distribution

Considering the small sample size, no analysis of the anatomical element distribution is worth performing. However, it is worth pointing out that most of the assemblage is represented by vertebrae, which is unsurprising considering the high number of this element in the fish skeleton. Furthermore, cod is entirely represented by vertebrae and bones from the shoulder gridle.

Taphonomic alterations

The taphonomic evidence is scarce, reflecting the small size of the sample and solely represented by a burned vertebra of Labridae and signs of crushing on a small vertebra of cod (both from context 160). No butchery marks were observed on the assemblage.

Biometrical analysis

The limited number of measurements recorded were mostly related to vertebrae and too few to produce any type of reliable analysis.

Discussion

The level of information that is possible to gain from the Saint Patrick's 8th c. fish assemblage is limited because of the small size of the sample and the apparent lack of sieving for some of the contexts. Overall, considering the small-scale assemblage, a relatively large variety of species is present. The assemblage suggests the exploitation of large marine species, namely cod and other Gadiformes, wrasses and mackerel, and seabreams. Other taxa identified include gurnards, mullets, and rays. The wide range of species present, together with the easy accessibility of the coast and availability of the species in the Irish sea, indicates that fish was likely caught locally and consumed fresh. The clear prevalence of cod vertebrae and the cleithrum could suggest that the fish was consumed beheaded in a preserved form (i.e., stockfish), but it is important to point out that long distance trade of this species (from the Baltic and North Sea) has been discounted for the 8th c. by isotopic evidence (Barrett et al. 2011).

There is a minimal exploitation of the estuary/river with only a handful of bones belonging to Cypriniformes and eel and possibly salmon/sea trout. The small size of specimens belonging to both taxa and their scarcity could suggest an accidental catch, possibly targeting other species, such as Atlantic salmon/sea trout. Salmonidae, because of the porous structure of their bones tend to survive less in the archaeological record and are often underrepresented (Hamilton-Dyer 2007, 181). Furthermore, it cannot be excluded that Atlantic salmon/seat trout was a sea catch, as these taxa spend part of their life in marine water before to return to the river of their birth (Rochard & Elie 1994; Heland & Dumas 1994).

The single Labridae burned bone could represent accidental or intentional disposal of kitchen and/or meal waste into a fire, while the evidence of crushing on the cod vertebra could represent either trampling or damage caused by human consumption and digestion (Jones 1984). This evidence together with the presence of a large variety of edible species could suggest the identification of the assemblage as domestic refuse.

Considering the costal location of the site, it is unsurprising that the contribution of freshwater fish to the assemblage is rather minimal. However, an historical contextualisation could add to the understanding of this scarcity. As mentioned in the faunal analysis (see Hadjikoumis), there are very rare comparative faunal assemblages for this period and area. On a broader scale, from the mid-Saxon period, there is visible a trend in England towards a rise in marine fish consumption culminating with what Barrett (et al. 2004) called the 'fish event horizon', consisting of a rapid rise in marine fish occurring at about 1000AD. This trend is accompanied by a decrease in the frequency of freshwater fish, while the contribution of estuarine fish, namely European eel, remains approximatively stable (Albarella 2019). Most common species became herring and eel, which are noticeably absent in our small assemblage, together with cod (e.g., Serjenstson & Woolgar 2006). Once again it is fundamental to emphasize that the lack of consistent

sieving in the assemblage would be reflected in an inescapable underestimation of the smallest species. A regional variation in the distribution of marine species has been identified connected with their increase, following the natural geographical distribution of the taxa, with higher frequencies of hake and conger (also noticeably absent from our assemblage) within the southwest of England (Albarella 2019).

Conclusion

Overall, despite the limitations concerning the small sample size, the variety and type of edible species suggest a reliance on marine fish, related to the coastal location of the site. The limited exploitation of local freshwater resources seems to go hand-in-hand with the scarcity of hunting/wild fowling activity shown by the faunal assemblage (see Hadjikoumis), reflecting a village mainly occupied with agropastoral tasks. On a larger scale, the marine based assemblage seems to represent the general increased exploitation of marine resources, as also seen amongst contemporaneous populations in England.

PUBLIC PARTICIPATION AND OUTREACH

Volunteers from the local community with some from further afield carried out the excavation under the supervision of staff from the Dyfed Archaeological Trust and The University of Sheffield. Over the five seasons of excavation 115 different volunteers participated on the excavation, some for the whole excavation, others giving just a day or two of their time. In total volunteers gave 1371 days of their time to the excavation, broken down as follows:

2014 35 volunteers donated 160 days

2015 28 volunteers donated 184 days

2016 28 volunteers donated 217 days

2019 45 volunteers donated 280 days

2021 54 volunteers donated 530 days

Trust staff (assisted by some of our enthusiastic volunteers at busy times) provided regular tours of the excavation. During the five seasons of excavations approximately 27,800 people — visitors to the area and members of the local community — were directly engaged, broken down as follows:

2014 1500 people

2015 1500 people

2016 3800 people

2019 4000 people

2021 17000 people

Outside the excavation season, Trust staff and The University of Sheffield staff gave talks and lectures to different audiences, ranging from local societies/groups to international academic conferences. Approximately 25 talks/lectures have been given, and more will be presented in the future.

In the first three years of the excavation a bilingual 'dig diary' recording daily discoveries on the excavation was posted on Dyfed Archaeological Trust's website. In 2019 and 2021, bilingual social media posts and blogs replaced the dig diaries.

Volunteer feedback

Below are some comments from volunteers who participated on the excavation:

> Just a brief note to say how much we enjoyed the dig at Whitesands Bay again this year, and how important the opportunity offered by DAT to participate in archaeology is for us retired folk. It's not just that we are interested in the history of the area in which we live, as important as that is, but that actually doing archaeology brings us a load of other benefits. We have learnt new skills [which we hope to be able to develop even further] and have made new friendships with a wide range of people: older and younger, professional archaeologists and volunteers, native-born and incomers. So, the digs have also become a very important social activity for us, but one that, we feel, also gives us the opportunity to put something back into the area in which we live and which we love so much. Intellectual stimulation, physical activity and cheery socialising what more could anyone ask of life! Many thanks, long may it continue.

The opportunity to experience something like this does not come up very often and we feel very privileged to have been allowed to take part. The digs were quite awe inspiring when you think that what we uncovered were only seen by human eyes over a thousand years ago. To be able to put history into context by seeing the way the graves and remains were laid is invaluable. We were also impressed by the way both digs were run in such an inclusive manner, with all abilities and ages being allowed to take part, and in such a hands-on manner. It was an experience not to be missed.

Just to let you know how enjoyable it was helping you out on the dig this year. It has been an unique opportunity to learn about archaeology from true professionals, which left me in a positive state of mind. I hope to be able to help you out again next year!

Thank you for an extremely interesting (and windswept!) 3 days at Whitesands Bay. As a volunteer, and almost total amateur compared to many on site, I really enjoyed the opportunity to gain experience in a new area. The excavation of gravesites and the correct legal and scientific procedures for the discovery and recording of human remains made it a very educational few days. I greatly appreciated the chance to participate in and observe the excavations.

Just a quick email to say how useful and enjoyable I found the weekend spent on the St. Patrick's chapel excavation at Whitesands Bay this year. It was rewarding in its own right as a unique setting to peel back the modern landscape of Pembrokeshire and look down through 1500 years of human occupation, and also as a valuable practical aid to my post graduate studies which only programmes of work like this provide. Hope to be there next year.

I feel very lucky to have been able to help at this year's St Patrick's Chapel excavation. I have been introduced to a site that, for me as an academic researcher, is both fascinating and potentially very important. It also has a much broader appeal, as a hauntingly evocative site with the capacity to tell many stories about the lives of the people buried here, the development of Christianity, and times of both peace and conflict. It evoked keen interest in the many people that I showed around: it is a site that – literally – digs deep into the shared cultural heritage of visitors from both far and near, for the Welsh with its links to St David, and more broadly with its evidence of an early Christian community in the post Roman period. Culturally it is an iconic site, and not just for the development of Christianity, being – effectively – on the front line of the creation and maintenance of Welsh identity both in the post Roman period and during the Viking incursions of the tenth and eleventh centuries. Archaeologically it is wonderfully rewarding, with (unlike many Welsh sites) very good preservation of bone and of artefacts – though further excavation is needed to reap the full benefits of the latter aspect. As someone researching early medieval Wales, it is clear to me that it has the capacity to contribute significantly to some key under-explored questions for Welsh early medieval archaeology. Firstly, it is important for the detailed picture that the analysis of the bones is already revealing. Secondly, for the high likelihood that the early structure around which the burials cluster is either an early medieval (slab) shrine or oratory, site types fundamental to the practice of early Christianity that are well known in Ireland but unknown in Wales, where until now no early medieval churches or shrines have been excavated. Thirdly, for its emerging evidence of early medieval metalworking and crafts, which is desperately rare in early medieval Welsh contexts. Fourthly, for the material evidence of Viking contact provided by the eleventh century Dublin Viking ringed pin find. And fifth and last (but by no means least) for the indications provided by the combined evidence of burials, the probable devotional site, the emerging evidence of manufacturing/ crafts and of long distance contacts, which together suggest that this was a significant early medieval focal site with a long period of occupation, where trade, exchange and key encounters between native and visiting peoples might be expected to have taken place. In brief, it is a site that merits much more investigation and excavation – many visitors to the site couldn't understand why excavation wasn't more extensive – and I, along with these visitors, very much hope that it will be possible to secure funding for further work!

I must thank you for the opportunity of volunteering on the St Patricks Chapel site this month. During my time on site I thoroughly enjoyed the company of like-minded enthusiasts and the important historical input provided by the professionals from Dyfed Archaeology. The site is tremendous with easier digging meaning that even the less fit can achieve a lot. Also, you carefully rotated the activities so that we experienced more of the real archaeological work. I really did find myself lost in the work with the accompaniment of the crashing waves. I am glad to hear that the site has yielded more historical information, I was fascinated by the graves that were uncovered and trust that the remains are now saved. I am naturally very interested in local history and would wish to help in future events hopefully at Whitesands and elsewhere.

I would just like to say thank you to you, Marion, Katie and Hubert for running an excellent excavation at St Patrick's Chapel. It was lovely to feel so involved with the practice of archaeology, and I think that the other volunteers felt the same and the atmosphere (helped by the scenery!) was great. I was really impressed by the respect shown to the human remains, and also by the enormous number of visitors that you gave tours of the site to. Talking to some of them, I got the sense that they were inspired by the dig and the story behind it, and the more local ones seemed really proud of the site being part of their landscape. I'm really looking forward to volunteering at future excavations with you.

I was about to write how very much I enjoyed my first dig when I received your thank you letter for our hard work. Thank you so much for allowing me to attend and the valuable instruction from yourself and all your staff. It was a very humbling moment when I realised that I had dug down to a cist grave. It was exciting to see the different walls uncovered. I am very interested in the history of the area and this dig has opened my mind to even further information. The people that I told to come and visit the dig were very impressed and look forward to further digs at the Chapel.

Thank you for allowing me to volunteer on this year's excavation at St Patrick's Chapel. I have really learned alot from the excavation, especially in relation to archaeological drawing, and how valuable such plans are in detailing the phasing of a site. The excavation, really has broadened my understanding of archaeological recording and excavation techniques. I have also gained a greater understanding of the early Christian period in Wales. The excavation has however, piqued my interest in this period of Welsh archaeology, so much so that I intend to study it further as part of my Masters at Cardiff University. I however would most like to thank you for allowing volunteers on the excavation as it is so rare, nowadays for archaeological excavations to allow this kind of participation by members of the public. Yet I feel by doing so you created a unique sense of commoradorie, where volunteers were able to learn skills from one another and thus develop a better understanding of the site as a whole. It was especially rewarding to see the level of interest and involvement the excavation stimulated in the community.

Volunteering to assist yr Ymddiriodolaeth Archaeolegol Dyfed with the excavations was a most enjoyable and rewarding experience. It was terrific to spend time with friendly local people from the immediate vicinity and further away across south-west Wales with an interest in their heritage and history and who were willing to contribute time to a valuable and fascinating project. We shared the excitement of each new find through the period of the dig and as a novice, I was able to acquire plenty of new skills and knowledge. It was especially pleasing to see that provision was made to allow for the full participation of for people impacted by age and/or infirmity. Even more rewarding, was the opportunity to communicate with some others on team through Welsh. It is valuable for Welsh speakers and learners to be able to use their language more wildly and equally important for non-Welsh speakers to see and appreciate that the language is very much alive.

Quite a number of our members had also visited the site during the previous days of your excavations, and again were delighted to be given a tour of the site, and to view at first hand the care given to excavating this site, where the smallest detail can be of significant interest, let alone the almost unique grave marker that you told us about. We do hope that

we will see you there again to learn more about our ancestors on this 'edge of the world', albeit as you told us, it was much less isolated than we might think. Perhaps next time you could also give a talk to the Society, for the benefit of those Members who were unable to attend your tour. You have certainly made us think, and to view our location and our relationship with Ireland with different eyes. The genetic markers that you told us about were a real surprise. On with the next dig! Paul Edey (Vice-Chair, St Davids and Dewisland Historical Society.

I originally intended to work as a volunteer on the St. Patrick's Chapel excavation for seven days, but found the project so enjoyable and stimulating that I ended up volunteering for a total of ten days. Notwithstanding the shocking weather we had on some days, it was an extremely developmental experience for me as a novice volunteer archaeologist. I was keen to contribute to the project as I had dug at the same location for two days in May 2014, and in fact I was involved in my professional capacity as a Police Officer in dealing with the initial find of human remains at the site back in January 2014.One of the most significant workstreams which happened at this excavation was the education and outreach which took place. There were numerous visitors to the site - both locals and tourists - and they were welcomed by the excavation team and the project was explained to them at an appropriate level of detail. This was done both formally (by Dr Katie Hemer from The University of Sheffield) and informally (other team members actively engaging with visitors when Katie wasn't available). Many of the visitors are known to me (as I live locally), and they have commented very favourably on what a positive experience it was visiting the excavation. There is a high level of interest in this project in the St. Davids area, and special arrangements were made by you and Marion Page to facilitate a site visit by the St Davids Historical Society. This, for me, is one of the key outcomes of this project: stimulating "grass-roots" community interest in local history.Hand in hand with the educational work, visiting the site also inspired a number of these visitors to go on and volunteer to work on the excavation themselves. This was greatly facilitated by the positive attitude of all the professional team members towards we volunteers. I was also particularly impressed by the inclusivity with which this was done. A number of volunteers had medical conditions and disabilities which prevented them from participating in some of the work, but were able to carry out less physically demanding work and contribute fully to the project. I know that in due course there will be further community engagement by the team in presenting some of the findings to the public in St Davids, but I also feel that the innovative use of social media while the excavations were underway did a very great deal to stimulate interest in the project. The timely publication of the dig diary online, and the use of Twitter and Facebook maintained a high level of local awareness. People would stop me on the street to chat about how the dig was progressing, and there was a tangible sense of "community ownership" as the project commenced

Visitor comments

Below are some comments of visitors to the excavation:

Such an interesting site and very impressed by the talk and information – why don't you have a donations box as we all know funding for such digs is in short supply.

It is a shame that the site has not been funded for a longer period as it is so special. We hope further funding is found as it will of course be lost. We would have donated, we live locally and it is our history.

Very interesting, it's surprising what's under your feet. We have sat on this area numerous times, not realising what is here. Fascinating, well done.

20/5/16 – We visited earlier in the week and found it so interesting we have returned today. The guided tour was very informative and I shall be visiting the website when I get home. It was fascinating to see a skeleton that may have lain at this site for 1,500 years.

This site is intriguing, so much so that we have returned twice during our week in St David's. it ties in so well with all that we have learned about S.W. Wales. Dyfed Archaeological Trust are to be commended on their talks & access for the public. Our visits here have been a real highlight.

Archaeoleg diddorol iawn. Gobeithio gewch chi parhau gyda'r "project"

Excellent talk. Very informative and interesting. Having always been interested in history and archaeology it was wonderful to see it in action.

Very interesting and informative talk. Fascinating site, and a great chance to see an excavation first hand. Thank you.

Wonderful and informative. Fingers crossed for more funding to keep revealing the hidden facts of history.

Such a privilege to be allowed onto the site and given such a lot of information. Thank you so much and good luck..

The Pembrokeshire Historical Society are most grateful to have such a comprehensive and interesting explanation of this dig. Thank you for taking so much time and trouble and we look forward to reading the report.

I was here as a volunteer during the first year's dig – it is amazing to see the extent of the site now excavated. It is awesome. Probably the most exciting site I have visited ever.

My first visit – extraordinary! A real privilege to see history in this form.

Visiting today has been very humbling to see the amount of work completed yet so much more that will remain undiscovered.

Really informative visit. What a pity that the excavation cannot be continued to the immediate surrounding area.

Very interesting site being uncovered. Absolutely amazing after having a talk about the site at our local archaeological group in Ammanford – travelled approx. 1½ hr today – very informative talk on tour.

Amazing to be able to see our heritage literally uncovered and to have someone explaining everything so clearly. This is obviously very important as regards Welsh history and I hope the necessary funds are found so the work can continue.

What a fantastic opportunity to look into the past. How fantastic it would be if more money could be found to make this dig an addition to the historical, archaeological and tourist offering of the area like Castell Henllys. PLEASE HELP THIS CONTINUE.

So great to be able to get so close to the excavated past. Fascinating and insightful talk by enthusiastic and knowledgeable guide. This is such an important archaeological site in Wales that it seems a shame only rescue archaeology can he done – let's hope funding can be made available for research work into this magnificent place.

Thank you for taking the time to explain everything to us. Our heritage is so important and knowledge of what exists under our feet. Thanks.

Absolutely fascinating – amazing discovery – thanks. Fascinating dig. Davies, St Davids

Thank you so much for this tour. Absolutely wonderful. We have both enjoyed it. Clear discussion, excellent speaker and tour.

I've been educated, thank you. Learnt a lot.

Such a fascinating process. Thanks for the opportunity to see the past being revealed – and such a helpful explanation.

So pleased that I visited – a fantastic site which is clearly of national importance – superb excavation and excellent presentation to the public. Thank you for the tour.

A most interesting and informative visit and presentation. Well worth the visit. Well described by a knowledgeable person. Highly recommended. Many thanks.

Really interesting talk. Fascinating to see archaeology in action and in real life and not just Indiana Jones! Keep digging. A great and inexhaustible guide too – thank you.

Very, very glad the dig continues – and thank you for welcoming and explaining to visitors too. A very important and exciting site and dig.

Really interesting and important excavation and very informative talk. Feel so fortunate to have been here to see it before it is covered up again.

Really fascinating stuff, and amazing to see it all in real life. I liked seeing the skellington!

Very interesting. So proud to have this in Pembrokeshire. Fascinating and amazing. Diolch.

Fantastic! Archaeology is fascinating.

Thank you so much for this wonderful opportunity. It has been very exciting to hear about our local history

Absolutely fascinating and exciting to see so much uncovered.

Very interesting. Have enjoyed the opportunity to come and see the skeletons and chapel. Thank you for allowing us to share.

What a wonderful tour, and exciting to have the opportunity to see the dig.

A very informative tour and interesting site.

Very interesting and exciting site. Would like if they were allowed to carry on.

Really interesting and when we went we saw one of the skellington.

It's amazing how many skellingtons they've found and how old the skellingtons are!

As the granddaughter of A.B. Badger I'm delighted to hear of the excavation and finds.

Very moving.

Very interesting to realise our local history. It's a wonderful project to gain knowledge of our ancestors. Thank you.

An exciting project, let's hope it can go further again next year.

Fascinating site! Very informative talk. Thank you. Look forward to reading the report when published.

Many thanks for the tour – all so interesting.

The Guide 14.00 hrs, 23/5/16 brought the history of the site alive.

A great talk, thank you and amazing to see the site. It's great to have so many passionate people trying to achieve so much in such little time.

Such a privilege to be able to see the findings of St Patrick's Chapel. A very interesting talk. I had goosebumps seeing those graves!

Really clear explanation of the story that's emerging from the excavation – and the evidence of a mixed trading population completely reversed any idea of 'remote' Pembrokeshire. So glad you've been able to assemble the funding for this. Many thanks for sharing your work!

Very interesting talk and fascinating to see a part of history that will soon be covered up again.

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Finally, the project would not have been possible without the large number of enthusiastic and dedicated volunteers who participated on the excavation. Apologies for any omissions:

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NOTES

1. Dyfed Archaeological Trust, Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AE.
2. Formerly of The University of Sheffield, now with UCL Institute of Archaeology.
3 UCL Institute of Archaeology.
4. Bangor University
5 Formerly of University of Wales Trinity St David, Lampeter.
6 Of, or formerly of, The University of Sheffield.
7 Amgueddfa Cymru National Museum Wales.
8 Aberystwyth University
9 GeoArch, Caerphilly.
10. Hague's excavation archive is in the National Monuments Record housed with the RCAHMW, Aberystwyth.

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Addendum : Carved stone from the 1970 excavation

Provenance: Found during the 1970 excavation, used as a lintel slab on a cist grave.

Dimensions: h. 840mm × w. 470mm × d. 50mm.

Stone type: Locally derived mudstone.

Present condition: Good, but with a little lamination on some edges

Description: A large stone slab crudely shaped into a curve on its top and top right edge. Carving consists of multiple lightly-scored, horizontal, parallel lines and some vertical lines forming a rough cross. The vertical arms are less clear and owe more to natural lamination than carving. Several lightly-scored diagonal lines are present.

Date: Ninth—eleventh century.

Edwards (2007, page 250, P101 and photograph) includes this stone in Appendix A: Monuments of Uncertain Date.