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Excavations at Portclew Chapel, Freshwater East, Pembrokeshire 2008–9

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During 2008 and 2009, Dyfed Archaeological Trust undertook excavations around the ruins of a small medieval chapel at Portclew, Freshwater East, Pembrokeshire. An extensive burial ground with its origin in the early medieval period was revealed, along with a series of early medieval enclosures, and three later medieval domestic buildings. Ceramic and environmental evidence recovered during the excavations suggests an origin for the site as a multifunctional cemetery, where non-funerary activity took place in addition to burial, which became the location for a later medieval chapel and adjacent settlement.

INTRODUCTION

The former Portclew Chapel and cemetery are located at Freshwater East in the parish and civil community of Lamphey, Pembrokeshire (NGR SS 0208 9861, Fig. 1). In 1963, human remains were disturbed during the construction of a house near the chapel and in 2000, sixteen burials, including four in slab-lined graves and one in a lintel grave, were recorded during the laying of electricity cables a little to the south (Fig. 2).[11] Examination of aerial photographs at that time suggested the possibility of a number of other below-ground features in the area.[12] The site was thus among those selected for research excavation as part of the *Pembrokeshire Cemeteries Project*, an offshoot of the Cadw-funded *Early Medieval Ecclesiastical Sites Project*.[13] The excavations took place in 2008 and 2009, and were intended to characterise the nature, condition and extent of the site in order to inform its future management (Schlee 2009, 2).

The underlying geology is an outcrop of Old Red Sandstone on the northern arm of the Freshwater East Anticline (British Geological Survey 1983). Above the bedrock and 'rab' (the local term for widespread deposits of shattered shale) lies an accumulation of wind-blown sand, representing significant sand encroachments that are observed along much of the coast of south Wales (Griffiths 2015). The excavation has revealed that at Portclew this sand began to accumulate at some point between the early/mid-Iron Age and the early medieval period.

The standing remains of the medieval chapel are located in a field just north-east of the modern hamlet of Portclew and are the only upstanding archaeological features present. However, approximately one hundred metres to the north-east is a possible holy well.[14] This has a small well-head structure enclosing the spring and is situated close to a hollow-way of presumed medieval origin. The site of the chapel is eighty metres above sea level, just off the brow on the eastern side of a hill, with extensive views to the north, east and south. Hedges and buildings obscure the view to the west. Approximately five hundred metres to the south the wide, sandy beach of Freshwater East is sheltered to the west by Trewent Point. On a clear day, Lundy is visible.

Site history

The place name Portclew is understood to derive from *Porth*, meaning inlet or bay, and *lliw*, meaning clear, or fresh, water, Lliw being the name of the stream that flows into the sea at Freshwater East (Charles 1992). The earliest known documentary reference to 'Porthllu' is an entry of 1326 in the *Black Book of the*

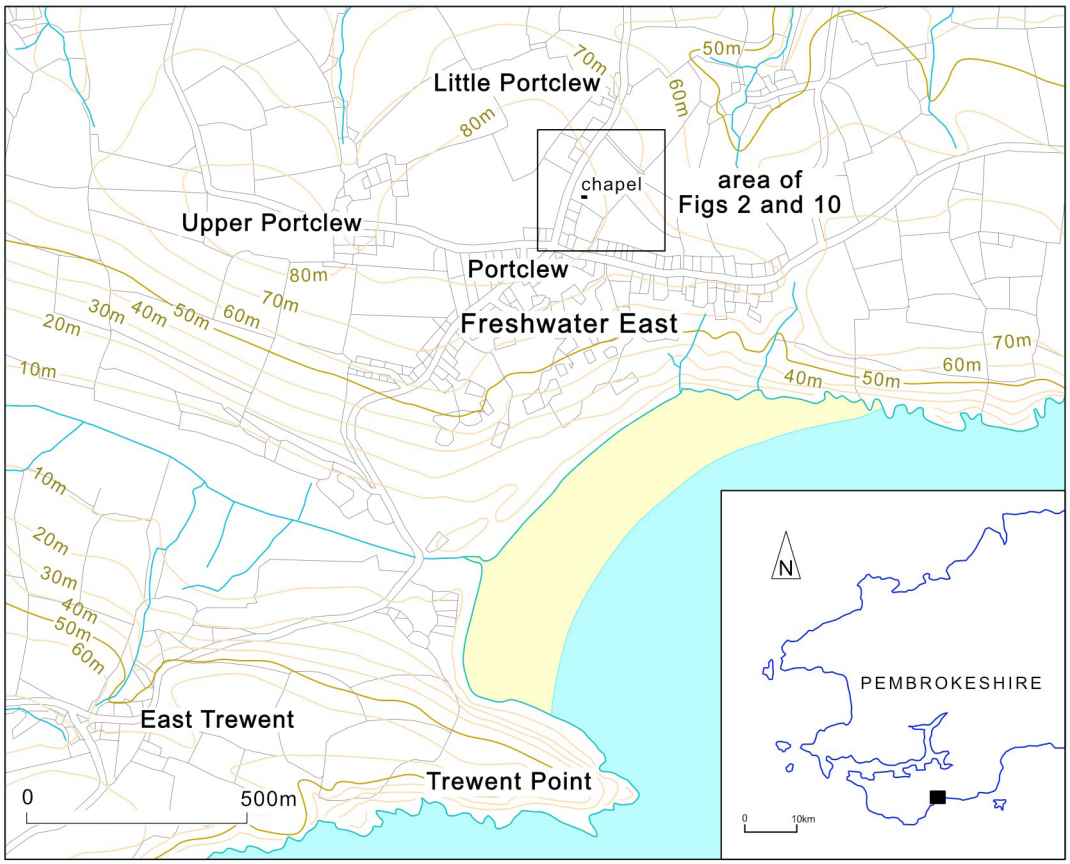

Fig. 1. Location map.

Bishops of St David's (BBSD) (Willis-Bund 1902, 170–73). Rents from Porthllu form a large proportion of the total returns from Lamphey parish, suggesting a sizeable settlement. The BBSD indicates three and a half carucates (ploughlands) and nine acres of arable land at Portclew, which were divided into the individual holdings of seventeen '*coloni'* whose names suggest Welsh, English, French and perhaps Flemish origins. The *coloni* were villein-type tenants. Their semi-servile status is indicated by the extensive services—ploughing, harvesting, carriage and building—that most of them (fourteen of the seventeen) had to perform on the Bishop's demesne lands at Lamphey (recorded in BBSD as 'Llantefey').

The carucates would have been farmed as open fields of intermingled holdings, adjacent to a village where the *coloni* lived. Judging by the Lamphey demesne list of crops (winter and spring wheat, beans, peas, clover, barley and oats), these were probably cultivated using a midlands-type rotation, rather than an infield-outfield system. The 'acres' probably indicate additional intakes from pasture or woodland. Portclew was also a significant area for sheep rearing—the BBSD notes that it has pasture for 300 sheep—and, in addition to their annual cash rent and services, the *coloni* had to pay a *collectio* (food rent) of sheep every three years (pers. comm. Rhiannon Comeau 2024).

Other than the sea, the principal communication route in this part of Pembrokeshire during the medieval period would have been the Ridgeway, a route of ancient origin, later developed into a turnpike road and

now the A4139. To the south of the Ridgeway lie dispersed nucleated settlements linked by roads and tracks, such as the modern footpath between Portclew and Lamphey (James 1999, 2). No trace of a medieval hamlet now survives above ground at Portclew; with the exception of the chapel, the present buildings are all of post-medieval date (ibid., 2).

The history of the chapel is not known. There is no mention of it in medieval documents and it does not appear in either the 1284 *Valuation of Norwich,* the 1291 *Taxatio* or the 1535 *Valor Ecclesiasicus* (Anon 1802; Caley and Hunter 1810; Lunt 1926). It appears as 'Chapel (in ruins)' on the first edition Ordnance Survey map of 1869;[15] the ruins are described by Laws and Owen (1908). Neither the dedication of the chapel, nor that of the nearby well, are known.

Methodology

A magnetometer survey of the site and surrounding area was undertaken in order to determine the possible extent and complexity of archaeological deposits. This revealed a number of features, including a pair of curvilinear ditches enclosing the chapel, additional rectilinear ditches and a number of possible structural features (Figs 2 and 10; Schlee 2009; 2010). Subsequent evaluation trenches targeted these and other features. All trenches were opened by mechanical excavator followed by hand excavation. Excavation of human remains was kept to a minimum, but six burials were lifted to enable radiocarbon dating and osteological analysis.

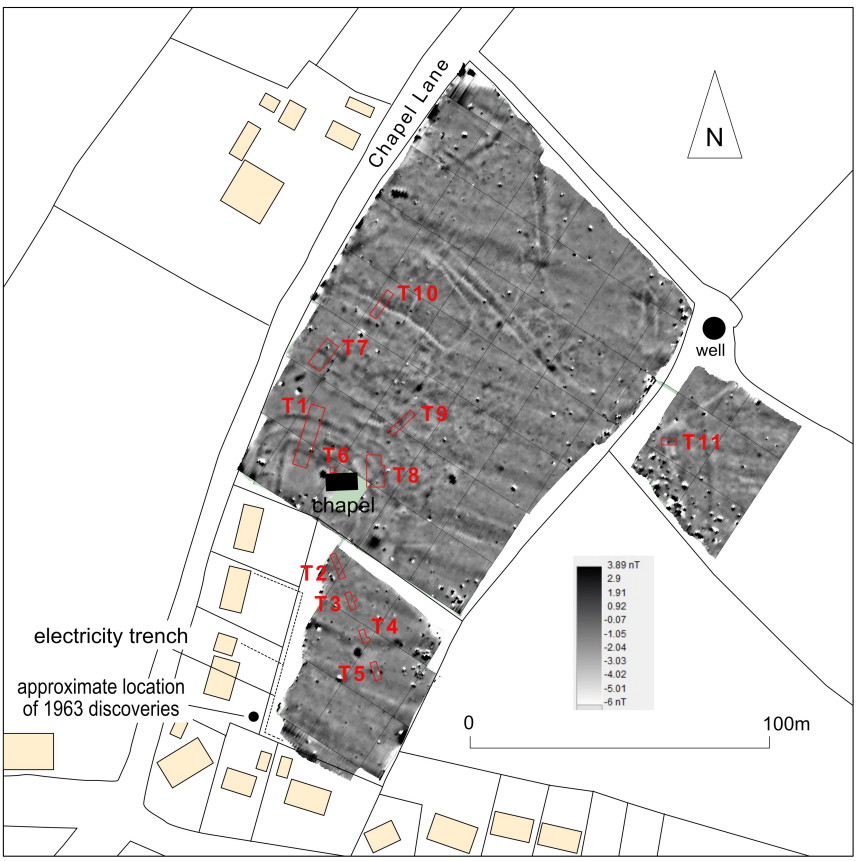

Fig. 2. Trench locations superimposed on magnetometer survey results.

RESULTS

A sequence of activity spanning the ninth century BC to the fourteenth century AD was revealed by the excavations. This activity comprises five principal phases which are described below. Radiocarbon dates are calibrated at 2 sigma (95% probability).

Phase 1: buried soil

The earliest feature revealed during the excavations was a probable buried plough soil (406). This was a compact, mid-red-brown, sandy clay with occasional charcoal flecks and small shale fragments, encountered in Trench 4. Oak charcoal present within this layer returned an early to mid-Iron Age radiocarbon date of 815–570 cal BC (SUERC-32868).

Phase 2: rectilinear enclosure ditch and pits

An enclosure ditch (118/139) and a group of four intercutting pits (140–3) approximately two and a half metres to the south represent the earliest cut features on the site that are not burials (Figs 3 and 4). The geophysical survey suggests that ditch 118/139 was sub-rectangular in plan. Where its northern line was exposed in Trench 1, ditch 118 had a V-shaped profile with a flat base and was relatively wide in relation to its depth (*c*. 1.6m×0.4m). The lower fill (145) of the ditch contained fragments of the teeth, and fore and hind limbs of cattle (Higbee, this article). Charcoal present within the upper ditch fill (138) returned a radiocarbon date of cal AD 570–665 (BETA-254897). Charred cereal grains recovered from fill 138 included a substantial amount of barley as well as oats and bread wheat (Caseldine and Griffiths, this article). The southern edge of ditch 118 had been cut by a shallow, broad, flat-bottomed ditch (139) on the same alignment. Charcoal present within the basal fill (137) of ditch 139 produced a radiocarbon date of cal AD 770–1025 (BETA-254896). The assemblage of charred cereal grains from fill 137 was smaller than that from fill 138 in ditch 118, but again barley was the primary crop represented, with smaller amounts of oat and wheat, and a few hazelnut fragments (ibid.). A single horse molar was the only animal bone recovered (Higbee, this article).

Fig. 3. Trench 1 showing rectilinear ditch 118 and intercutting pit group 140–143, towards the top of the image. View south, scales 0.1m and 0.5m intervals.

Examination of the geophysical survey results suggests that if ditch 118/139 does represent a rectangular enclosure, then it bounded an area measuring approximately 20m N-S × 15m E-W. Since the ditch was not

found in any of the other trenches this could not be confirmed archaeologically. There was no surviving internal or external evidence for an associated bank.

The southern edge of ditch 139 had been truncated by intercutting pit group 140–3. Pits 140 and 143 were the largest within this group. Pit 140 was not fully excavated, but measured at least 1.4m E-W, with a maximum width of 1m N-S. Its edges were irregular, with a sharp break of slope to the north and more gently sloping sides to the south, and it was 0.10m deep. Oak charcoal within the fill (148) of pit 140 produced a radiocarbon date of cal AD 560–660 (BETA-254895), overlapping with the date obtained for the upper fill of ditch 118. Pit 143 was not fully excavated, but measured at least 0.9m E-W with a maximum N-S width of 0.6m. It was steep-sided, and 0.9m deep.

Pits 141 and 142 were smaller features. Pit 141 was elliptical in plan and measured 0.8m E-W by a maximum of 0.5m N-S. It was steep-sided and 0.61m deep. Pit 142 was on a slightly different alignment than pits 140 and 143. It was not fully excavated, but measured at least 0.7m NW-SE by 0.5m NE-SW, and was 0.68m deep.

Pit 142 had been cut into both pit 141 and pit 143, while pit 141 was cut into pit 140. A stratigraphic relationship between pits 140 and 143 could not be determined. The charcoal in pit 140 was the only dateable material recovered from this group of features.

The absence of packing stones within intercutting pits 140–3 suggested that they were not postholes. Other cut features in this area of the site were more ephemeral; on excavation they were unconvincing as postholes or stake holes, and probably represent root action or animal burrows.

Phase 3: inhumation cemetery

Thirty-three burials, or probable burials, along with a quantity of disarticulated human bone, were revealed during the excavations. All burials were cut into wind-blown sand. Twelve graves were excavated, but human remains for analysis were only lifted from six of those: five in 2008 and one in 2009.

The six excavated burials were found to comprise the remains of eight individuals: four adults and four non-adults. Osteological and isotopic analysis of these individuals was undertaken by Katie Hemer, then at the University of Sheffield (see below). The following presents a summary of the results:

Sk001 was recovered from Trench 4 in 2008. The grave cut (403) for this burial was disturbed during machining, meaning that its original dimensions are not known. The grave was aligned WSW-ENE, with the head to the west. It is possible that the grave cut was originally stone lined, but only a foot stone remained. The burial was that of an adult male aged thirty-five to fifty years at death, buried in an extended supine position. Bone from Sk001 returned a radiocarbon date of cal AD 595–665 (SUERC-28943).

Sk002 was recovered from Trench 3 in 2008. The cut (302) for this dug grave was aligned WSW-ENE and had truncated that of Burial Sk004 (Fig. 5). Sk002 was a probable adult male aged between twenty-five and thirty-five years at death, buried in an extended supine position with the head to the west. A sample of bone returned a radiocarbon date of cal AD 680–945 (SUERC-28087). During post-excavation analysis the bones of a non-adult aged between one and six years at death were found among those of Sk002.

Sk003 was recovered from NW-SE aligned grave (210) in Trench 2 during 2008. Below the one surviving lintel stone was a well-constructed slab-lined cist (203) with no base slabs. The cist measured *c*. 1.9m × 0.5m internally, and contained the burial of a non-adult aged between five and eight years at death. Occasional small rab fragments present within the top of the fill (202) of this

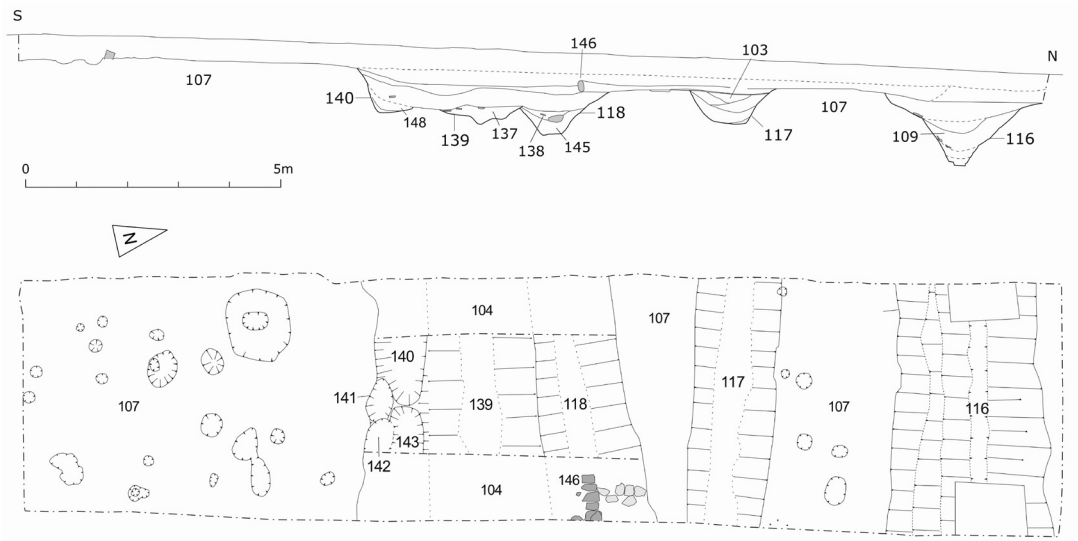

Fig. 4. Plan and section of features in Trench 1.

grave suggested the former presence of additional lintel stones. Sk003 was buried in an extended supine position with the head to the north-west. A sample of bone from this individual returned a radiocarbon date of cal AD 655–820 (SUERC-28082).

Sk004 was recovered from Trench 3 in 2008 (Fig. 5). The grave cut (306) was oriented and contained a slab-lined cist (305) measuring *c*. 1.9m × 0.5m internally. No base slabs were present and there was no evidence for lintel stones. The north side of the cist had been removed when the later grave of adult Sk002 was dug. Sk004 was a non-adult aged sixteen to eighteen years at death, buried in an extended supine position. Bone from this individual has returned a radiocarbon date of cal AD 555–655 (SUERC-28088).

Sk005 was recovered from Trench 6 in 2008. No grave cut was discernible, but the burial was within a NW-SE aligned, well-constructed, slab-lined grave (613). Sk005 was a female adult aged forty to fifty years at death, buried in an extended supine position with the head to the north-west. Bone from this individual has returned a radiocarbon date of cal AD 440–650 (SUERC-28086).

Sk006 was recovered from Trench 8 in 2009 (in the second interim report—Schlee 2010—this was Sk5). The original dimensions of this oriented, dug grave are not known, as it had been severely truncated by a later grave and by structural elements of Building C (see below), with the result that most of the leg bones and all the foot bones were absent. However, since it appeared to be the stratigraphically earliest burial in Trench 8, Sk006 was lifted. The burial was that of an adult male aged twenty-five to thirty-five years at death buried in an extended supine position. Bone from Sk006 returned a radiocarbon date of cal AD 435–640 (SUERC-28089). Also present in the grave of Sk006 were the disarticulated remains of an infant aged between two and twelve months at death.

Fourteen burials excavated in 2008, and nine burials excavated in 2009 were not lifted. Not all the attributes of these burials could be discerned, but it was observed that eleven graves were oriented and

twelve were aligned SW-NE. Sixteen of the burials appeared to be in dug graves whilst four were in probable lintel graves and three were in slab-lined graves with no evidence for lintel stones. The age and sex of the individuals in these unexcavated graves is obviously not known, but a well-constructed cist revealed in 2009 measured 0.5m × 0.3m internally, and probably represents the burial of a neonate or very young infant. A further probable infant burial, identified by an assemblage of teeth recovered from a possible grave cut in Trench 1, represented the only evidence for burial within the rectilinear enclosure.

In addition to non-adult remains redeposited within the fill of cist 203, seventy-six fragments of human bone were identified during post-excavation. These represent the partial skeleton of an adolescent or young adult (15–24 years) from the fill of ditch 207, several adults (*c.* 35–45 years) from wall collapse 8005 and the fill of pit 8036, and neonate bones (representing two individuals) from the fill of ditch 8020 and layer 8015. Redeposited fragments of adult pelvis and sacrum were also recovered from the fill (1112) of a probable ditch in Trench 11 (pers. comm. L. Higbee).

Phase 4: curvilinear ditches

Two concentric, curvilinear ditches (116 and 117), both with evidence for recutting, represent a further phase of activity on the site which was occurring while burial continued. These ditches were visible on the geophysical survey (Figs 2 and 10) and were revealed in Trenches 1, 2 and 8. The geophysical survey suggests that the two ditches may in fact be one continuous feature, enclosing a D-shaped area of *c*. 1,400 square metres, with an entrance on the eastern side.

The inner ditch (117) was present across the full 4.8m width of Trench 1 on an E-W alignment (Fig. 4). It had a maximum width of 1.6m and was V-shaped in profile, but with a wider flat base than that of ditch 116. Both the northern and southern edges of ditch 117 had a sharp break of slope down to a maximum depth of 1.03m. The fills of both ditches (116 and 117) were similar. Oak charcoal present in the uppermost fill (103) of ditch 117 returned a radiocarbon date of cal AD 655–875 (BETA-254894).

Fig. 5. Intercutting burials of Sk002 and Sk004 in Trench 3. Scales: 0.1m intervals.

A 1.6m wide section of inner ditch 117 was also revealed on an E-W alignment in Trench 2 (207). Fragments of sheep/goat vertebrae and of a cattle scapula were present within its fill (206); a bulk sample of charred material returned a radiocarbon date of cal AD 585–775 (BETA-254898). The lower two courses of a drystone wall constructed along the top of ditch cut 207 were also revealed in Trench 2. Wall 204 was primarily constructed using fairly small stones although at the eastern edge of the trench, a single vertical slab had been used; possibly part of a former slab-lined grave truncated by ditch 207.

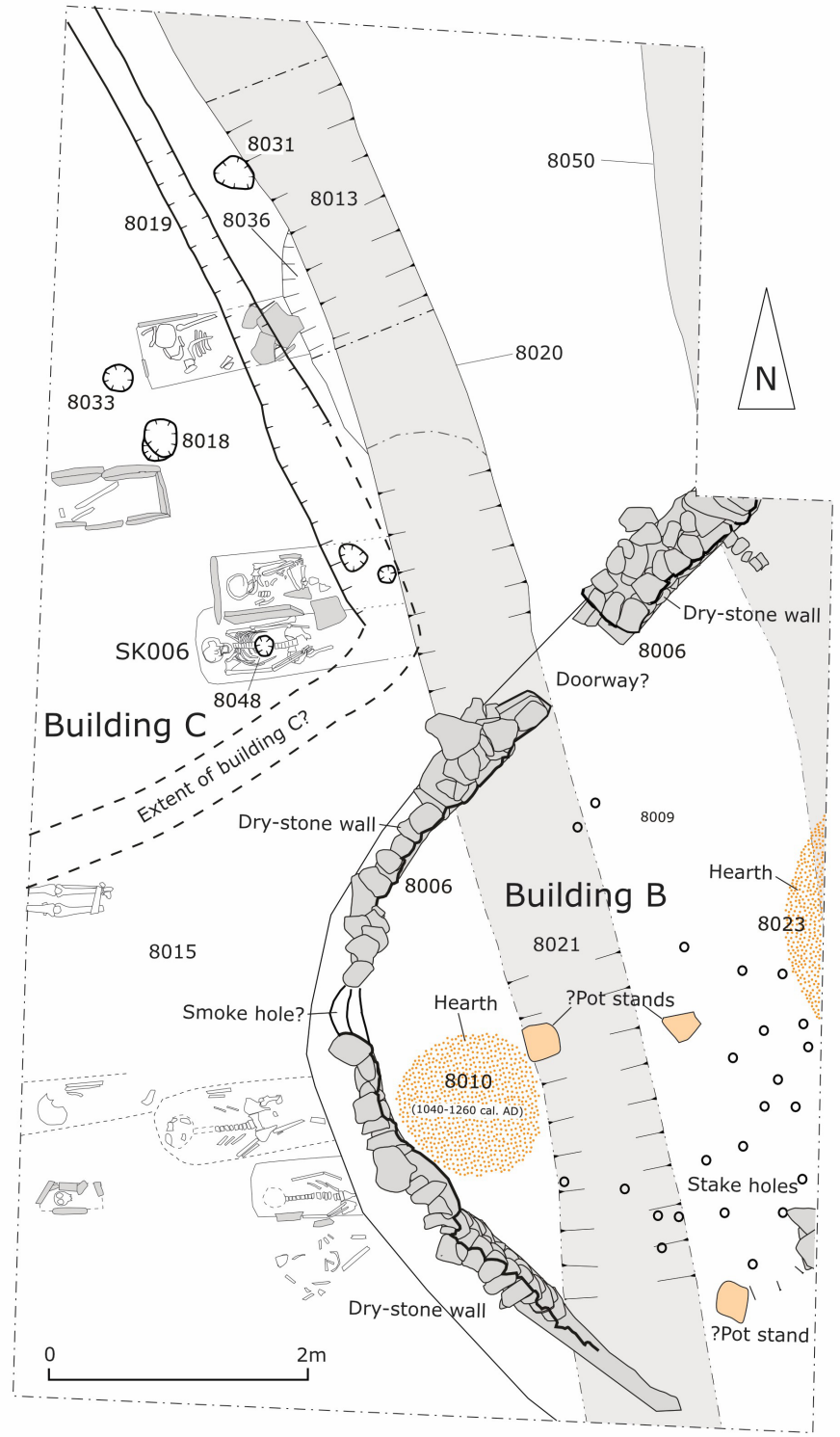

Fig. 6. Plan of all features in Trench 8.

The surviving section of wall 204 measured 1.5m long × *c*. 0.35m high. Whether this wall relates to the cemetery or to the later settlement (see below) is not known.

An eleven-metre-long section of the inner ditch (8020) was also revealed on a NW-SE alignment in Trench 8 (Figs 6 and 9). Here, the ditch had a maximum width of 0.85m and was more U-shaped in profile than in Trench 1, with sides that sloped moderately for 0.38m to an almost flat base. The fill (8021) was a firm, dark reddish-brown silty-sand with occasional stones, charcoal fragments and fragments of human bone. A fragment of oak charcoal from within this fill returned a radiocarbon date of cal AD 665–875 (SUERC-32871), overlapping with the date of cal AD 655–875 (BETA-254894) obtained from fill 103 of this ditch in Trench 1. Within Trench 8, ditch 117/8020 truncated burials, including Sk006 dated to cal AD 435–640 (SUERC-28089). It also truncated a pit (8036), the fill of which (8022) contained a basal sherd of a carinated E ware beaker (see Campbell, this article). Also present within the fill of pit 8036 was a small number of white quartz pebbles along with fragments of sheep/goat, horse, pig and cattle bone, and several fragments of human bone (Higbee, this article). The relationship between pit 8036 and an unexcavated grave was not established.

The outer ditch (116) was present on an E-W alignment across the full 4.8m width of Trench 1 (Fig. 4). It had a maximum width of 3.2m and was V-shaped in profile with a flat base. It had a sharp break of slope on the northern edge but a more gently sloping southern edge, and a maximum depth of 1.5m. Three fills were identified, mostly comprising sandy-silts or red and green shaley clay. However, the middle fill (109) contained fragments of charcoal and burnt earth, from which a sample of roundwood returned a radiocarbon date of cal AD 770–1020 (BETA-254893).

The outer ditch (8050) was revealed, but not excavated, on a NW-SE alignment in the north-east corner of Trench 8 (Fig. 6). The full width of the ditch in this location is not known, as it continued beyond the edge of the trench, but a maximum width of 0.5m was visible in plan.

There was no surviving in-situ evidence for a bank associated with either curvilinear ditch, nor for any palisade or revetment posts. Several circular features were observed cut into the natural between the ditches, where banks are likely to have been (Fig. 4), but it was not possible to determine whether these pre-dated, post-dated or were contemporary with the ditches. However, pieces of shale with pick marks on them, present within the ditch fills may be derived from former bank material, which might indicate that the circular cuts were the earlier features. While this might be supported by a Mesolithic radiocarbon date obtained from oak charcoal present in the fill (122) of posthole 123 (7080–6820 cal BC; SUERC-32870), it is also quite possible that the charcoal was residual.

Phase 5: chapel and settlement

The standing ruins of the stone-built chapel at Portclew measure *c.* 8.5m E-W × *c*. 4.2m N-S. The western gable wall no longer survives and very little of the north wall remains, but the south wall survives to a little over three metres while the eastern gable wall is almost intact, standing to *c.* 5m (Fig. 7). The structure has been given a *terminus ante quem* of the early thirteenth century, based on the character of a window in this gable (Potter 2011, 49). It is very likely that the earthworks of the curvilinear enclosure were still visible when the chapel was constructed, as the geophysical survey suggests that the building sits entirely within the enclosed area.

A small trench opened on either side of the north wall of the chapel (Fig. 2, T6) revealed that construction/collapse material had sealed the burial of Sk005 (cal AD 430–650). A foundation cut was also present adjacent to the wall. However, no dateable material was present in the fill of that cut, nor within the fill of a posthole revealed just inside the chapel, below the robbed-out floor.

Evidence for a settlement comprising at least sixteen buildings was revealed by the geophysical survey. Three of those buildings were excavated and it is likely that short sections of drystone walling (146 and

Fig. 7. The standing remains of the chapel, viewed from the north.

204), revealed in Trenches 1 and 2, also relate to this phase of activity. The results of environmental, zooarchaeological and pottery analysis of material associated with the excavated buildings are summarised here, with full details subsequently provided in the specialist reports.

Building A.

Building A was excavated in Trench 7 and was represented by a group of cut features and by layers containing occupation debris (Fig. 8). From south to north across the trench the cut features were a probable drip gully (7004), a sunken floor (7029, 7033, 7034), a probable beam slot (7025/7017), a linear ditch (7035) and a pit (7032). To the east, a further cut feature (7005) appeared to be a boundary or enclosure ditch. A short curvilinear feature (7018) and several postholes and possible stake holes were also present, while deposit (7014) probably represents a yard area.

Probable drip gully 7004 was revealed on an east-west alignment across the full extent of the five-metre-wide trench, although a small section of its eastern end was truncated by a short curvilinear feature (7018). Gully 7004 had a maximum width of 0.3m and a maximum depth of 0.05m. It was filled by a loose, brownish-yellow sandy silt containing occasional charcoal, shells, flecks of animal bone and one sherd of a late twelfth to thirteenth-century Dyfed Gravel Tempered ware cooking pot. A line of postholes to the south of gully 7004 suggested a possible fence line.

The floor of Building A was represented by three cut edges. Edge 7029 was a linear, E-W aligned feature with a single, north-facing, gradual slope. It was 1.8m long with a maximum depth of 0.10m. Edge 7033 was a linear, E-W aligned feature with a gradual, north-facing slope. It was 2.2m long with a maximum depth of 0.10m. Its slope extended for between 0.5m and 0.75m from the break of slope before being truncated by edge 7029. Edge 7034 was a linear, N-S aligned feature with a gradual, west-facing slope that was steeper to the north. It was 2.5m long and a maximum of 0.19m deep, and was truncated by linear ditch 7035.

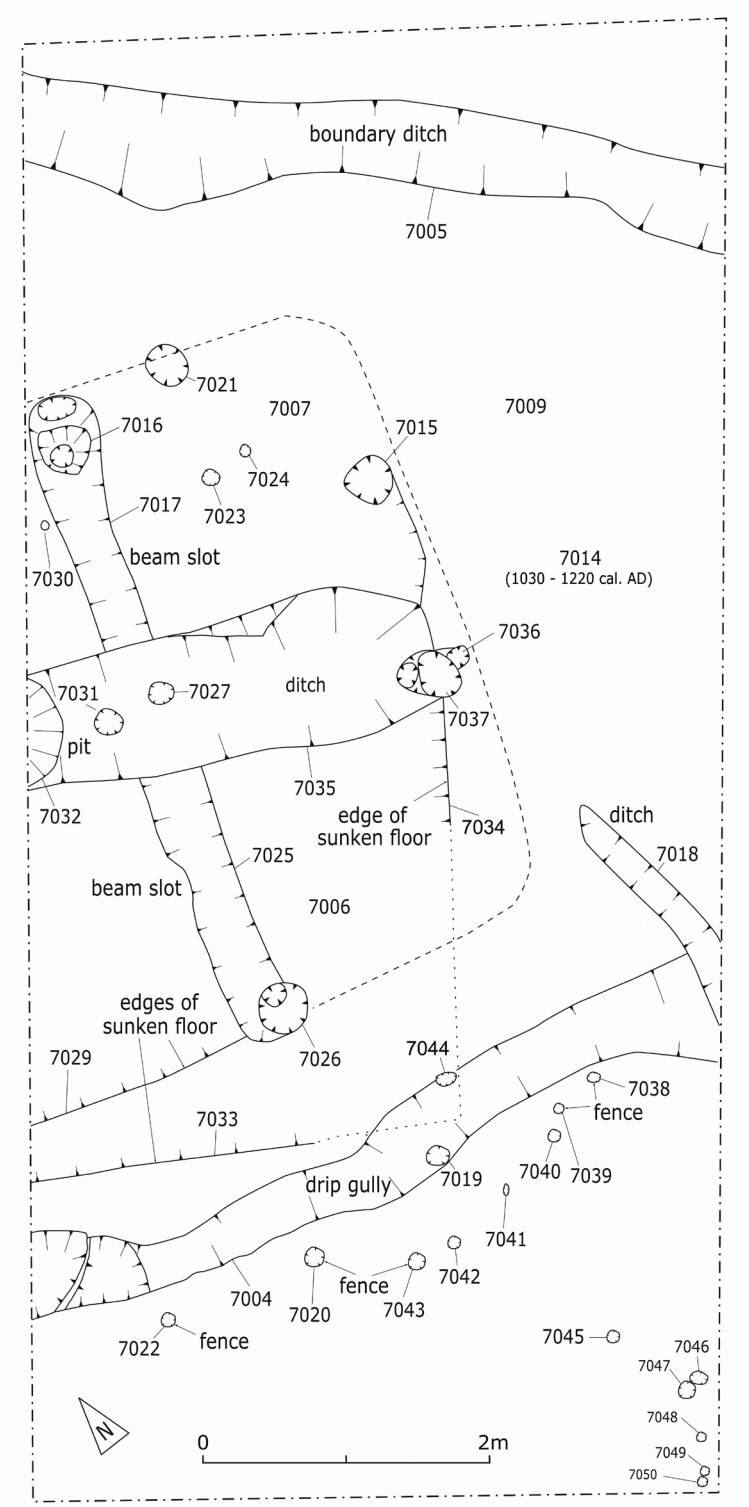

Fig. 8. Trench 7 plan of Building A and associated features.

Probable beam slot 7025/7017 was a N-S aligned curvilinear feature measuring approximately four metres in length and with a maximum width of 0.54m. Its profile varied from vertically sided in some areas to a flattened U-shape in others, with a flat base. This feature was filled by wind-blown sand and was cut by postholes 7016, 7026 and 7027, and by linear ditch 7035.

Ditch 7035 was an E-W aligned linear feature, *c*. 2.9m long × 0.87m wide and 0.13m deep that was filled by wind-blown sand. It was u-shaped in profile, with a steeper break of slope on the south side. At its eastern end it was cut by posthole 7037.

Pit 7032 was a section of a circular pit, possibly 0.84m in diameter but which was truncated by the trench edge. The feature was bowl-shaped in profile with a maximum depth of 0.2m. Its location suggested a relationship with ditch 7035. No dateable material was present within its fill.

Pit 7011 was a shallow (max. *c.* 0.07m deep) circular feature measuring 0.8m in diameter. One sherd of a late twelfth to thirteenth-century Dyfed Gravel Tempered ware cooking pot was recovered from the fill of this feature.

To the north-east of these features was possible boundary ditch 7005. This was a slightly curvilinear cut feature that extended for five metres in a NE-SW direction across the full width of the trench. It was 0.45m wide at its mid-point and a maximum of 0.15m deep, with a U-shaped profile. Its homogenous fill was a moderately compact, mid-reddish brown sandy silt containing shale fragments. Five sherds of late twelfth to thirteenth-century Ham Green and Dyfed Gravel Tempered ware cooking pots were recovered from this fill along with fragments of abraded sheep/goat femur.

Truncating gully 7004 in the south-eastern corner of the trench was a two-metre-long section of curvilinear ditch (7018) with a maximum width of 0.54m and a maximum depth of 0.15m. Since it continued under the edge of the excavation the full length of this feature is not known, but it might have been associated with a group of possible stake holes in the same area of the trench. It was filled by a moderately compact, mid-reddish brown sandy silt (7013) containing frequent shale fragments, a sheep/goat molar and two sherds of late twelfth to thirteenth-century Dyfed Gravel Tempered ware cooking pot.

To the east of beam slot 7017/7025 was a former floor layer (7006/7007) comprising moderately compact, mid-reddish brown sandy silt containing occasional shale fragments and charcoal flecks. This layer produced eighteen sherds of late twelfth to thirteenth-century Dyfed Gravel Tempered ware cooking pot, three sherds of late twelfth to thirteenth-century Ham Green ware cooking pot, one sherd of North Devon Gravel Tempered ware cooking pot, two sherds of Ham Green ware jug, twelve sherds of twelfth to early thirteenth-century Bristol Pottery Type 114 cooking pot and one sherd of a thirteenth to early fifteenth-century Fine Micaceous ware green-glazed jug. Also present within this layer were fragments of burnt daub and faunal remains comprising teeth or fragments of sheep/goat, cattle, pig and horse.

Between the plough soil and the upper geological horizon in the area between gully 7004 and ditch 7005, to the east of Building A, was a 0.05m deep layer (7014) of mid red-brown sandy silt that was darker, less compact and with less shale inclusions than the natural. Grains of charred bread wheat (*Triticum aestivum*) recovered from a sample of this layer have returned a radiocarbon date of cal AD 1040–1220 (SUERC-32869).

Between gully 7004 and ditch 7005 was an area of wind-blown sand (7009) and shale-derived rubble (7012) which appeared to fill or overlie cut features. Wind-blown sand 7009 produced two sherds of late twelfth to thirteenth-century Dyfed Gravel Tempered ware cooking pot. Rubble 7012 produced five sherds of that same fabric and one sherd of a late twelfth to late thirteenth-century glazed Ham Green jug, along with fragments of burnt daub.

Building B

Building B was excavated in Trench 8, *c*. 50m south-east of Building A, and was represented by the remains of a drystone wall (8006) with rounded interior corners, two hearths (8010) and (8023), and several stake holes (Figs. 6 and 9). All features and deposits within the building were below a deposit of wind-blown sand (8005).

Fig. 9. Building B with the tops of the underlying ditches visible. Scales 0.1m and 0.5m intervals.

Wall 8006 was a curvilinear, drystone wall constructed using randomly coursed rough sandstone blocks. It measured a total of 8.6m in length and a maximum of 0.6m in width and, in places, survived to seven courses (*c*. 0.6m) high. There was no evidence for bonding. The full extent of the wall could not be determined, as it continued beyond both the southern and the north-eastern edges of the trench. However, the slight indication of a rounded internal corner to wall 8006 at the southern trench edge suggested that the full *c*. 3.8m extent of the south-west wall of the building had been revealed.

There was considerable variation in the character of the stonework of the north-west and south-west walls of the building, with a 0.4m wide gap between the two that appeared to be intentionally constructed. To the south of this gap, a large flat stone was set within the south-west wall and in front of that was hearth 8010—a 1.1m diameter × 0.03m deep deposit of friable, dark black-brown sandy silt with frequent charcoal flecks. Grains of charred bread wheat (*Triticum aestivum*) retrieved from a sample of this deposit returned a radiocarbon date of cal AD 1045–1265 (SUERC-28944). In the north-west wall, a change in the character of the stonework suggested a *c*. 0.7m wide blocked door or window, although removal of the blocking stones did not reveal a formal threshold.

A second hearth (8023) was found in what was presumably the centre of the building. This comprised a 0.05m deep deposit of friable, dark grey-brown sand with frequent charcoal flecks. This deposit continued beyond the trench edge therefore its full extent is not known, but it may have been in the region of *c*. 1.4m diameter. Close to each hearth was a flat stone *c*. 0.2m square/sub-square, while a third example of similar size was located close to the probable south-east internal corner of the building. These stones may have functioned as pot-stands but equally could represent post-pads that formerly supported structural elements within the building.

Below the base of wall 8006, a floor level had been cut into the bedrock and the building effectively sat upon this. A 0.05m deep deposit of dark grey sand (8009) directly overlay the floor level within the building. The colour suggested a high organic content, potentially indicating either a former occupation layer, decomposed thatched roof collapse, or post-abandonment turf layer. Analysis of a pollen column taken from within the building supports all three of these scenarios (Caseldine, this article) which are therefore not mutually exclusive. Numerous stake holes were present within the building, one of which contained a pierced slate disc, probably either a loom weight or a thatch weight.

The excavation of Building B recovered ceramic fragments of twelfth to thirteenth-century date, but fewer than were present within Building A. As with Building A, the ceramic assemblage represented either Dyfed Gravel Tempered ware or Ham Green ware cooking pots and jugs, but also present were one sherd of an internally glazed North Devon Gravel Tempered ware vessel and three fragments of ridge tile, one of which was glazed. During cleaning of the wall/wall collapse, teeth or fragments of sheep/goat, cattle and horse bone were recovered. Small quantities of sheep/goat, cattle and a single domestic fowl bone were also recovered from other cut features/deposits in the trench. These were mostly features associated with Building B, with a few from earlier curvilinear ditch 117/8020. Analysis of the faunal remains found cattle and sheep/goat present in near equal proportions, but perhaps with slightly more emphasis on the latter. Pig was of minor importance, perhaps because the landscape was largely opened up to grazing for the cattle and sheep/goat (Higbee, this article).

Building B was the stratigraphically latest feature in Trench 8, and had truncated many earlier features and deposits, including burials and curvilinear ditches 8020 and 8050.

Building C

Archaeological evidence for Building C, the presence of which was suggested by the geophysical survey, comprised a possible beam slot (8019) that was filled with wind-blown sand. These features were in Trench 8, to the north-west of Building B (Fig. 6).

Possible beam slot 8019 was a NW-SE aligned linear cut feature measuring *c*. 4.4m in length × 0.5m in width. It was U-shaped in profile, with moderately sloping sides down to a flat base and had a maximum depth of 0.2m. The feature continued under the north-west edge of the trench.

Three postholes (8018, 8033 and 8048) were within the footprint of Building C. All were U-shaped in profile and measured between 0.3m and 0.4m in diameter. Posthole 8018 had an off-centre post-pipe and contained packing stones.

Unlike Building B, Building C was not cut into the bedrock. Although no formal floor was apparent, a deposit of dark humic sand, similar to deposit 8009 observed in Building A, suggested its extent. No dateable material was recovered from any of the component features of Building C. However, all were stratigraphically later than curvilinear ditches 8020 and 8050, excavated burial Sk006 (cal AD 430–610), and unexcavated burials, which the building had truncated.

RADIOCARBON DATING

The following AMS dates from charred material or human bone were either obtained from the Scottish Universities Environmental research Centre (SUERC) or from Beta Analytic Inc. They have been calibrated with the internationally agreed IntCal20 curve (Reimer *et al*. 2020) using OxCal 4.4 (Bronk Ramsey 1995; 2001). The date ranges were calculated using the maximum intercept method and are quoted with the endpoints rounded out to five years.

BETA-254893
Context: (109) middle fill of curvilinear ditch 116, Phase 4
Sample: Charcoal (oak, roundwood)
Conventional radiocarbon age: 1120± 40
Calibrated result at 95% probability: cal AD 770–1020

BETA-254894
Context: (103) upper fill of ditch curvilinear ditch 117, Phase 4
Sample: Charcoal (oak, large fragment)
Conventional radiocarbon age: 1280± 40
Calibrated result at 95% probability: cal AD 655–875

BETA-254895
Context: (148) fill of pit 140, Phase 2
Sample: Charcoal (oak, roundwood)
Conventional radiocarbon age: 1440± 40
Calibrated result at 95% probability: cal AD 560–660

BETA-254896
Context: (137) basal fill of rectilinear ditch 139, Phase 2
Sample: Charcoal (mixed sample)
Conventional radiocarbon age: 1100± 40
Calibrated result at 95% probability: cal AD 770–1025

BETA-254897
Context: (138) upper fill of rectilinear ditch 118/139, Phase 2
Sample: Charcoal (hazel, roundwood)
Conventional radiocarbon age: 1420± 40 BP
Calibrated result at 95% probability: cal AD 570–665

BETA-254898
Context: (206) fill of curvilinear ditch 207, Phase 4
Sample: Charcoal (wild cherry, large fragment)
Conventional radiocarbon age: 1390± 40
Calibrated result at 95% probability: cal AD 585–775

SUERC-28082 (GU-20983)
Context: Sk003
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1295± 35
Calibrated result at 95% probability: cal AD 655–820

SUERC-28086 (GU-20984)
Context: Sk005
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1495± 35
Calibrated result at 95% probability: cal AD 440–650

SUERC-28087 (GU-20985)
Context: Sk002
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1210± 35
Calibrated result at 95% probability: cal AD 680–945

SUERC-28088 (GU-20986)
Context: Sk004
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1460± 35
Calibrated result at 95% probability: cal AD 555–655

SUERC-28089 (GU-20987)
Context: Sk006
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1520± 30
Calibrated result at 95% probability: cal AD 435–640

SUERC-28943 (GU-21298)
Context: Sk001
Sample: Human bone, Phase 3
Conventional radiocarbon age: 1410± 30
Calibrated result at 95% probability: cal AD 595–665

SUERC-28944 (GU-21299)
Context: (8010) hearth in Building B, Phase 5
Sample: Charred wheat grain (*Triticum aestivum)*
Conventional radiocarbon age: 870± 30
Calibrated result at 95% probability: 1045–1265 cal AD

SUERC-32868 (GU-23074)
Context: (406) buried plough soil, prehistoric, Phase 1
Sample: Charcoal (oak)
Conventional radiocarbon age: 2850± 30 BP
Calibrated result at 95% probability: 815–570 cal BC

SUERC-32869 (GU-23075)
Context: (7014) occupation surface, Building A, Phase 5
Sample: Charred wheat grain (*Triticum aestivum)*
Conventional radiocarbon age: 895± 30
Calibrated result at 95% probability: 1040–1220 cal AD

SUERC-32870 (GU-23076)
Context: (122) fill of posthole 123, Phase 4
Sample: Charcoal (oak)
Conventional radiocarbon age: 8045± 35
Calibrated result at 95% probability: 7080–6820 cal BC

SUERC-32871 (GU-23077)
Context: (8021) fill of ditch 8020, Phase 3
Sample: Charcoal (Alder)
Conventional radiocarbon age: 1260± 30
Calibrated result at 95% probability: cal AD 665–875

E WARE FROM PORTCLEW CHAPEL

By Ewan Campbell

Basal sherd of small E2 beaker. String cut-off on base exterior, strong internal finger-spiral. Cream coloured fabric with dark grey firing patch on exterior. Fabric hard, laminated, with abundant rounded to well-rounded white and colourless quartz 1mm diameter, occasional large sub-angular quartz to 3mm, no iron ore. Unabraded. Basal diameter 40mm, sherd size 60 × 50mm, thickness 5mm. From pit 8036 in Trench 8.

This is a typical sherd of a small E ware beaker of E2 form. These small carinated beakers are the second most common form of E ware found in insular contexts, with more than thirty examples known (Campbell 2007, 39), though the only other example from Wales is from Dinas Powys (Alcock 1963, fig. 29.5). The vessel can be dated to the later sixth or seventh century, and the form is common throughout Merovingian cemeteries in France in other fabrics. The exact production centre of E ware has not been identified, but lies somewhere in south-west France between the Loire and Gironde. The Portclew

example is typical except that the fabric is Campbell's variant E2, a rare variety with well-rounded rather than sub-angular quartz grains.

E ware was imported to Atlantic Britain and Ireland as part of a package which often included glass drinking vessels, and probably formed a minor part of a major cargo of perishable goods such as salt or wine, alongside luxuries such as nuts, spices and purple dyestuffs. There is indication of royal investment in this trade, and insular centres of importation (which have quantities of E ware) are often known royal sites. However, individual vessels of E ware were more widely distributed, probably as gifts from these royal centres, and are found on a variety of types of site of lower status including occasional religious sites. The nearest centre of importation to Portclew was at Longbury Bank, Penally, about ten kilometres to the east (Campbell and Lane 1993), and other E ware sites in the area include Caldey Island, Carew Castle and Linney Burrows.

Although the larger E ware vessels were used as containers to import luxury goods, the function of the small E ware beakers is unknown. They could have been used for drinking imported wine, or carrying spices or nuts. Whatever the case, they reflect contacts with the wider European world, and access to a range of exotic goods.

MEDIEVAL AND LATER POTTERY

By the late Paul Courtney

The excavations produced 242 sherds of medieval pottery and ridge-tile weighing 3,881kg, while a further eleven sherds of post-medieval pottery weighed 223g. The earliest sherd was an imported E ware beaker (Campbell, above). The rest of the medieval pottery dates to the twelfth to thirteenth centuries and presumably derives from the excavated buildings. Of the medieval pot and ridge tile, 88 sherds derive from Trench 6, 66 sherds from Trench 7 and 17 from Trench 8. The assemblage includes a mixture of Dyfed-produced, gravel tempered (?siltstone) wares (DGT) from the immediate region. In addition, North Devon cooking pots occur, and various wares (glazed and unglazed) shipped down the Severn from the Monmouthshire/Gloucestershire/Wiltshire region. The ratio of unglazed to glazed DGT sherds is nearly 14:1, perhaps reflecting that the site was rural and its inhabitants of moderate social status in this period.

This post-Conquest phase of pottery use could follow on from an aceramic phase. It is also difficult to be sure if there is twelfth-century activity from the ceramic assemblage though it is quite possible. The terminal date of occupation is also imprecise given the small size of the assemblage. The local wares could have continued in use into the fourteenth century. However, there is a lack of diagnostic fourteenth to sixteenth-century wares, for example Bristol Redcliffe, Newport-type jugs, Malvern or Iberian red micacaeous (Merida) ware. Certainly, occupation is likely to have ceased by the mid-fourteenth century, but abandonment could feasibly have been half a century earlier. In addition to the jugs, pitchers and cooking pots/storage vessels there were also sherds of glazed of late thirteenth-century or later ridge tiles (DGRT), all from a common source. These can probably be linked to the chapel building on the site. There is also a small amount of post-medieval pot probably of late sixteenth to mid-eighteenth-century date.

HUMAN REMAINS

By Katie A. Hemer

Introduction

Six articulated skeletons were excavated at Portclew in 2008–9. All six skeletons underwent an osteological assessment by the author and, as part of a wider bioarchaeological study of early medieval populations from Wales, the remains were also subjected to stable isotope analysis in order to reconstruct the dietary profiles and childhood origins of those individuals. The following report presents the results of the bioarchaeological analyses.

Osteological analysis

The osteological analysis of the remains from Portclew aimed to record as much information about each skeleton as possible following the guidelines of CiFA/ British Association for Biological Anthropology and Osteoarchaeology (Brickley and McKinley 2004; Mitchell and Brickley 2017). All the individuals were recorded using a variety of standardised osteological methods including, but not limited to, Brickley and McKinley (2004) and Buikstra and Ubelaker (1994). An inventory of each skeleton was undertaken; bone surface preservation, the degree of fragmentation, and overall completeness were recorded according to Brickley and McKinley (2004). The bones of the cranium, torso, and appendicular skeleton were recorded as present or absent, and a detailed written inventory of the estimated age at death, sex, stature, pathology and dentition was collated.

For each adult skeleton (> 18 years at death), biological sex was estimated based on the sexually dimorphic features of the pelvis and cranium (Buikstra and Ubelaker 1994, 20), and each adult individual was classified as either 'possible male', 'male', 'possible female', 'female', 'indeterminate', or 'undetermined'. Where the cranium and pelvis were absent or significantly damaged thus obscuring sexually dimorphic features, the skeleton was classes as 'undetermined'. 'Undetermined' also includes those individuals below the age of 18 years at death since the absence of sexual dimorphism in the developing juvenile skeletons means that sex estimation is unreliable without the use of biomolecular methods such as ancient DNA analysis which was beyond the scope of the original study (Buikstra and Ubelaker 1994, 21; Scheuer and Black 2004, 14). Adult age-at-death estimation is based on the observation of degenerative changes to the pubic symphysis (Brooks and Suchey, 1990), the auricular surfaces of the ilium (Lovejoy *et al*., 1985), and the sternal rib ends (Iscan *et al*. 1984; 1985). Adult skeletons were assigned to one of the following age groups: Young Adult (20–35 years), Middle Adult (35–50 years), or Old Adult (50+ years) (Buikstra and Ubelaker 1994, 9). Where it was not possible to provide a more accurate age estimation, for example due to damage or the absence of the required elements, biologically mature individuals were simply classed as 'Adult'. Juvenile age-at-death estimation relied on the stage of dental development including mineralisation and eruption of the deciduous and permanent dentition according to AlQahtani, Liversidge and Hector (2010), and the appearance and fusion of the epiphyses (Scheuer and Black 2004). The following age groups are frequently assigned to juvenile individuals: Foetus (>40 weeks); Neonate: Birth to 1 month; Infant: 2–11 months; Early child: 1–6 years; Late child: 7–12 years; Adolescent: 13–20 years (Buikstra and Ubelaker 1994, 9; Scheuer and Black 2004).

Adult stature was estimated using the stature estimation formulae of Trotter and Gleser (1952). Where possible, priority was given to the measurement of the femorae, however, when absent, stature was estimated from the tibiae (excluding the medial malleolus as per Mays (2016)). No attempt was made to estimate stature in those skeletons where the required long bones were damaged and/or incomplete. No

attempt made to estimate the stature of the juveniles since there are a number of intrinsic and extrinsic factors affecting long bone growth which cannot be accounted for (e.g. biological sex, socio-economic status) (Brothwell 1981, 102).

Any evidence of pathology or trauma affecting the skeleton or dentition was identified and recorded using detailed descriptions in accordance with published guidelines and diagnostic criteria (e.g. Brothwell 1981; Hillson 2023; Aufderheide and Rodrigues-Martin 1998; Ortner 2003; Buikstra 2019).

Results

Overall, skeletal preservation of the six individuals included in this study was very good; four skeletons were over 75% complete, whilst two skeletons were between 50-75% complete. The degree of bone surface erosion was generally good (Grade 2-3, see Brickley and McKinley 2004). As such, it was possible to observe and record pathological changes affecting the skeleton.

Estimation of Age-at-Death and Biological Sex

Of the six articulated skeletons analysed, four were identified as biological adults, one was a juvenile, and another was an adolescent. Two adult individuals were classed as Young Adults (20–35 years of age at death), whilst two were classed as Middle Adults (35–50 years of age at death) (Table 1). The juvenile (SK003) was aged between 5.5 and 8.5 years of age at death based on their dental development, whilst one individual (SK004) was an adolescent between 16 and 18 years of age at death. It was possible to estimate the biological sex of the four adult skeletons as follows: two were identified as 'male' (SK001, SK006), one as a 'possible male' (SK002), and one as 'female' (SK005) (Table 1). No attempt was made to estimate the sex of SK003 or SK004. Whilst it has been possible to estimate each individuals' age at death, and the biological sex of the adult individuals, it is worth noting that the small sample size and the demographic data presented here do not provide an accurate reflection of the entire Portclew population buried at the cemetery.

Table 1. Summary of the completeness, preservation, and estimated age and sex of the articulated skeletons excavated at Portclew. *See Brickley and McKinley (2004) for surface preservation grading.

Skeleton	Completeness	Surface Preservation*	Age-at-death	Sex
SK001	75–100%	Grade 3	35–50	Male
SK002	75–100%	Grade 3	25–35	Possible Male
SK003	75–100%	Grade 2	5.5–8.5	Undetermined
SK004	75–100%	Grade 3	16–18	Undetermined
SK005	50–75%	Grade 3	40–50	Female
SK006	50–75%	Grade 2	25–35	Male

Stature

Stature estimation requires undamaged long bones and unfortunately only two adult individuals had complete long bones suitable for metric analysis. Stature for SK001 was estimated as 171.8 cm, whilst the stature of SK002 was estimated as 159.7cm; the mean stature for both males was 165.7cm (Table 2). Comparison with other early medieval populations shows similarities between the mean statures for these populations, with Portclew most similar to Atlantic Trading Estate. It is important to remember, however, that Portclew is only represented by the estimated stature of two individuals, and it is therefore unlikely that the data are representative of the stature of all adult males buried at the cemetery.

Table 2. Mean stature estimates for early medieval cemetery populations from Wales. Data for Portclew (this study); Llandough and Atlantic Trading Estate (Loe 2003, 278); Brownslade Barrow (Groom *et al*. 2011, 151).

	Portclew (n=2)	**Brownslade Barrow (n=10)**	**Llandough (n=80)**	**Atlantic Trading Estate (n=19)**
Male /?Male	165.7cm	168.9cm	169.5cm	165.1cm

Pathology

During the osteological analysis, evidence for pathology in the skeleton and dentition were observed and recorded; the following section outlines the results of that analysis. The body's immune system responds to stimuli, such as invading pathogens, through an inflammatory response which, if left unchecked, will manifest as the destruction of existing bone, the formation of periosteal new bone, and/or the co-occurrence of these two processes (Waldron 2020, 35–44; Buikstra 2019, 73–81). It is not always possible to determine what the causative agents was, and therefore changes observed in the skeleton may be described as a non-specific inflammatory response. An example of a non-specific inflammatory response during childhood caused, for example, by malnutrition or chronic disease, can present in the skeleton as porosity in the roof of one or both orbits; this is commonly known as cribra orbitalia (Cole and Waldron 2019; Schats 2021). Cribra orbitalia was recorded as present when one or both orbital roofs exhibited changes consistent with the descriptions outlined in Stuart-Macadam (1985). The lesions were not, however, assigned a degree of severity due to uncertainty around the causative factors, in vivo conditions, and the skeletal response (see Grauer 2019, 514–517). At Portclew, two skeletons—SK003 and SK004—who were both below the age of 20 years at death presented evidence of cribra orbitalia in one or both orbits. There were no other instances of non-specific periosteal new bone formation such as tibial periostitis or maxillary sinusitis in any of the skeletons.

Joint Disease

Osteoarthritis (OA) is the most common form of joint disease; it affects the synovial joints and involves the loss of cartilage which results in bony changes as the joint attempts to repair and stabilise itself (Waldron 2020, 721). The bone changes associated with OA include marginal and surface osteophytes, thickening of the joint capsule, alteration of the joint contour, subchondral cysts, joint surface porosity, and eburnation (Waldron 2020, 725). Whilst eburnation on its own is pathognomonic of OA, in its absence, a diagnosis of OA requires the presence of at least two or more of the other changes noted above (ibid., 725); it was this operational definition that was employed when diagnosing joint disease.

In total, all 6 individuals had one or more non-spinal joints available for observation, and of those, only SK006 displayed evidence of primary OA at the acromial end of the right clavicle. OA arises following the degeneration of the fibrocartilaginous disk that forms the acromio-clavicular joint (ACJ) of the shoulder. The ACJ of SK006 presented evidence of porosity and eburnation which affected two thirds of the joint surface and was thus diagnostic of OA. There were no associated bone changes to the articulating surface of the acromion nor to the humeral head. Moreover, the changes were unilateral, and there were no signs of trauma to the proximal humerus or the shoulder girdle to suggest that the ACJ OA was secondary to an injury in that joint.

In the spine, OA can arise following the degeneration of the cartilage at the apophyseal joints i.e. between the superior and inferior articular processes of the vertebrae (ibid., 725). In addition to OA, intervertebral disc disease (IVD) can occur following the degeneration of the intervertebral discs which

cushion the articulating vertebral bodies (ibid., 126). This degeneration results in contact between the surfaces of the vertebral bodies and stimulates pitting on body surfaces and the formation of new bone, known as marginal osteophytes, around the margin of the vertebral bodies (ibid., 126). IVD is commonly associated with ageing, and occurs more frequently in individuals over the age of forty (ibid.,126). Another condition affecting the spine is Schmorl's nodes; these form when an intervertebral disc herniates into the cartilaginous endplate of the vertebral body; they present as a cavity in the surface of the vertebral body (ibid., 128). They are most common in the thoracic and lumbar vertebrae, and particularly in individuals who place considerable stress on their lower spine (ibid., 128).

During the analysis of the Portclew assemblage, an assessment of the inferior and superior vertebral body surfaces, the articular facets of the transverse processes and the costo-vertebral (rib) facets of the thoracic vertebra was undertaken to identify OA, IVD and Schmorl's nodes. Of the 6 individuals from Portclew, all had preserved vertebral columns—whether complete or partial columns—which were suitable for observation. SK002 had Schmorl's nodes in the thoracic spine (T6–7, T10), but no evidence of OA or IVD. SK005 and SK006, however, did present evidence of spinal pathology. SK005 presented evidence of OA, including porosity and eburnation in the left superior articulating facet of the 4th cervical vertebra, as well as IVD (porosity and marginal osteophytes) in the 4th and 5th lumbar vertebrae, and marginal osteophytes on the anterior margin of the 1st sacral vertebra. They also had Schmorl's nodes in six thoracic vertebral bodies. The IVD and OA are consistent with the age of the individual, who was estimated to be an older adult. SK006 presented porosity in the bodies of the cervical vertebrae (C6–C7), and IVD in the thoracic (T2-–T8) and lumbar (L2–L5) vertebrae.

SK001 had six rather than five lumbar (L5) vertebrae; lumbarisation, occurs when the first sacral vertebra fails to fuse with the second sacral vertebra and instead takes on a role as a sixth lumbar (L6) vertebra (Lewis 2019, 597). Further changes to the spine of SK001 affected the L5/L6 vertebrae as follows. The antero-inferior surface of the L5 vertebral body presented changes to its shape, and a loss of definition to the inferior body margin. Corresponding to this were changes to the superior articulating surface of the L6 body. The superior surface of the L6 body has a concave appearance consisting of a series of pits near the anterior margin. When in articulation with the L5, it becomes apparent that the L5 body sits into the concave, superior surface of the L6 body, and in doing so, the L5 is slightly displaced posteriorly. The presence of spicules of new bone projecting from the anterior surface of the mid portion of the L5 body may represent a response to the biomechanical instability of those vertebrae, and an attempt by the body to stabilise the L5/S6 junction. No changes were observed to the L4 or S2 vertebrae, suggesting that the process was localised to the L5/L6. It is possible that the bony changes arose from a ruptured intervertebral disc between the two vertebrae. Differential diagnoses include infection from a pathogen, although vertebral osteomyelitis is very rare (Aufderheide and Rodriguez Martin 1998, 177), whilst Tuberculosis (TB) most commonly affects the thoracic vertebrae rather than the lumbar vertebrae as presented in this skeleton (Aufderheide and Rodriguez-Martin 1998, 134–6). Moreover, no other changes elsewhere on the skeleton were consistent with TB. Elsewhere on SK001, the distal portion of the left radius diaphysis is hypertrophic both antero-posteriorly and medio-laterally in comparison to the right radius. Pronounced muscles attachment sites are observed on the posterior aspect of the distal diaphysis, specifically for the extensor policis brevis and extensor policis longus. There is not, however, any evidence of periosteal new bone formation, osteomyelitis, or any sign of a healed fracture to account for the difference in size between the right and left radii. Without radiographs, it was not possible to observe the cortical bone and medullary cavity to identify evidence of osteitis. There was no evidence in the left ulna or humerus to suggest the asymmetry related to the preferential use of the left arm. Finally, there was no evidence on the skeleton to suggest that the changes observed in the radius were related to the aforementioned changes observed in the L5/L6 vertebrae.

Dentition and Dental Pathology

In comparison to bone, teeth maintain their integrity in archaeological contexts because of their tough enamel surface. Teeth come into contact with the food a person ingests, and the consistency and composition of that food can influence which microorganisms flourish in the mouth and the types of biomechanical forces acting on the teeth (Hillson 1979, 147; Lukacs 1989, 261). The mouth is an ideal environment to sustain a plethora of micro-organic colonies including bacteria, fungi, yeasts, viruses, and protozoa (Hillson 1996, 254). The presence of these microbes can determine the types of dental diseases an individual might develop throughout life. At Portclew, all six individuals had some dentition available for observation. In total, 120 teeth and four tooth roots were recorded, with some individuals having lost their teeth either ante-mortem or, in most cases, post-mortem.

Dental Caries

Dental caries, otherwise known as tooth decay, form when an area of tooth enamel, dentine, or cement underlying a deposit of supragingival plaque, begins to demineralise (Hillson 2023, 377). This progressive demineralisation eventually produces a visible cavity on the crown or root surface (ibid., 377). As part of this study, the size and location of the dental caries were recorded following the criteria of Lukacs (1989, 267). Three adult individuals presented dental caries; two males (SK001 and SK006) and one female (SK005), and each individual had only one carious lesion. All carious lesions affected the molar teeth; two caries were located on the maxillary molars (SK001—Left M3, SK006—Left M1) whilst one was located on a mandibular molar (SK005—Right M2). All lesions were located at the cemento-enamel junction. SK001 had the largest caries, spanning the height of the tooth crown from the occlusal surface, beyond the cemento-enamel junction into the root. In doing so, half of the tooth's crown was obliterated, and the tooth's pulp cavity was exposed.

Calculus

Calculus is one of the most common dental diseases affecting past populations (Hillson 1996, 254). Without adequate oral hygiene, plaque forms on the surface of the teeth, and contains an accumulation of bacteria, food micro-remains, and environmental particles (Hillson 2023, 376). When this plaque mineralises, it adheres to the tooth's surface forming a hard, mineral deposit known as calculus (ibid., 373). The presence, amount, and location of calculus was recorded for each individuals' dentition. All four adults and the adolescent (SK004) had some degree of calculus, with 48 teeth affected in total (TPR 40%). The majority of teeth had either a slight amount of calculus (TPR 52%), or a moderate amount of calculus (TPR 43%). Only three teeth (TPR 6%) presented a significant amount of calculus, and these all belonged to SK006. In all cases, calculus was deposited on one or more sides of the tooth crown, but not on the occlusal surface. The greatest build-up of calculus occurred on the lingual surface of the posterior teeth, notably the molars, whilst SK001 had a moderate amount of calculus deposited on the buccal surface of the anterior teeth.

Dental Abscessing

Oral microorganisms and their associated toxins can enter into the pulp cavity of a tooth through a dental caries, occlusal tooth wear, or trauma (Hillson 2023, 404). As they pass through the root canal and emerge from the apical foramen, they trigger an inflammatory response which results in the formation of inflammatory exudates (ibid., 404). If left untreated, eventually an abscess will form at the base of the root, known as an apical abscess. At Portclew, only SK006 had an abscess; this was a small, apical abscess at the base of the right maxillary first premolar on the buccal surface. It is worth noting that this premolar tooth also exhibited heavy occlusal wear and therefore it is possible that the bacteria responsible for the

abscess entered the pulp cavity via the exposed dentine. The individual also had a significant amount of calculus and therefore poor oral hygiene may have been an exacerbating factor.

Periodontal Disease and Ante-mortem tooth loss

Periodontal disease is the inflammation of the gingivae, which eventually progresses to affect all the tooth-supporting tissues (periodontium) causing an irreversible inflammatory condition known as periodontitis (Hillson 2023, 396). Periodontal disease occurs as part of an immune response to deposits of calculus being in contact with the gingivae over an extended period of time (ibid*.,* 396). In its advanced stage, the tissues anchoring the tooth root in its socket are lost, which eventually leads to ante-mortem tooth loss and the resorption / remodelling of the alveolar bone (ibid*.,* 400). As part of this study, only one individual (SK005) displayed changes consistent with periodontitis and antemortem tooth loss affecting both the maxilla and mandible. In the maxilla, the alveolar bone of the first and second incisors and the canine had remodelled, and the three corresponding teeth had been lost ante-mortem. In the mandible, remodelling of the alveolar bone of the right third molar, and the left first and second molar sockets had occurred, and those teeth were lost ante-mortem. SK005 also displayed severe tooth wear; for example, four maxillary teeth (R. PM2, R. M1, L.PM1, L.PM2) were represented by only the roots and the crowns had been worn away over time.

Dental Enamel Hypoplasia (DEH)

Tooth enamel is formed in layers by ameloblasts cells that have the function of secreting the enamel matrix. If the process of enamel formation is disrupted, then a linear groove or pit will appear on the surface of the tooth crown (Ritzman *et al*. 2008, 349; Hillson 2023, 230). Tooth enamel forms during childhood and since enamel cannot remodel, any defect formed at the time of tooth formation will be retained into adulthood. Disruption to enamel formation can be caused by a variety of factors including disease, nutritional deficiencies, or other environmental factors (Hillson 2023, 230). It is not possible, however, to pin-point a precise cause to DEH since the lesions are not pathognomonic of any specific condition (ibid*.,* 246). As part of this study, the presence, location and severity of DEH was recorded per tooth according to the criteria of Brickley and McKinley (2004). DEH was found in three individuals (SK001; SK003; SK004). All hypoplastic defects affected the anterior teeth and were of the linear form, located on the middle of the crown. Two individuals (SK001 and SK003) had mild hypoplastic lesions, whilst SK004 showed signs of moderate-severe hypoplastic lesions. Two individuals with DEH (SK003 and SK004) also presented evidence of cortical bone expansion in the orbits suggesting they both experienced a physiological response to a pathological condition during childhood. It is not possible to say, however, whether the changes represent multiple, unrelated pathological episodes or a single episode that was responsible for both the dental hypoplasia and cribra orbitalia.

Dental Anomalies

SK001 displays a dental anomaly known as an external enamel pearl, which is a small nodule of enamel that forms below the cemento-enamel junction at the furcation between two roots (Hillson 2023, 132). Enamel pearls are said to form when areas of Hertwig's epithelial root sheath remain after root development and differentiate into enamel-forming ameloblast cells which proceed to produce enamel pearls on the surface of the root (Moskow and Canut 1990, 277). At Portclew, SK001 had a small type 1 'true' pearl located at the root furcation of the left, maxillary third molar; this was the only individual to display a dental anomaly.

Stable Isotope Analysis

The analysis of the human remains from Portclew formed part of a larger project reconstructing the life histories of individuals from early medieval Wales and the Isle of Man. Carbon, Nitrogen and Sulphur isotope analysis was undertaken to explore the dietary profiles of early medieval populations in Wales, whilst Strontium and Oxygen isotope analysis was employed to investigate patterns of past population mobility. The results of these analyses were published in Hemer *et al*. (2013; 2016). The dietary isotope profile of individuals from Portclew was consistent with other early medieval populations from southwest Wales, namely demonstrating a reliance on terrestrial resources with little or no input from marine species despite the proximity of the site to the coast (Hemer *et al*. 2016). Based on the isotopic analysis, most of those buried at Portclew were considered local to southwest Wales. In the original study, one individual, SK003, was identified as an outlier and the authors proposed this individual might have originated from a warmer climate (Hemer *et al*. 2013). The young age of this individual raised questions around population movement at this time, and the often-overlooked role played by children in migration in the past (Hemer 2014).

Summary

The excavation of Portclew chapel revealed the remains of six individuals who were articulated, well preserved, and over 50% complete. Fragmentation was minimal and surface preservation was good enabling the observation of pathological changes. In total, there were four were adults (three males, 1 female) all aged between 25–50 years of age, one juvenile, and an adolescent below 20 years of age at death. It is important to remember that the demographic profile of those reported here does not provide a true representation of the entire population who were buried at the cemetery during its use. Likewise, the observed pathologies are unlikely to be a true reflection of the population's disease burden at that time. Indeed, evidence of pathology was limited to dental disease, non-specific inflammatory conditions, and joint disease. Congenital anomalies including an enamel pearl and the lumbarisation of the first sacral vertebra were both identified in the same individual (SK001). On-going histological analysis of the dentition of these individuals forms part of a larger project exploring evidence of vitamin D deficiency in early medieval populations from Britain. The isotopic analyses undertaken on the Portclew population contributed to our understanding of resource exploitation and the mobility of people at this time. Despite the fact that it was only possible to excavate a small proportion of the Portclew cemetery, the site as a whole makes a valuable contribution to an ever-growing corpus of archaeological and osteological data for early medieval cemeteries in Wales.

POLLEN ANALYSIS FROM PORTCLEW

By Astrid E. Caseldine.

During the excavations at Portclew pollen columns were taken from Trenches 4 and 8 to see if any palaeoenvironmental or palaeoeconomic data could be obtained and to complement plant macrofossil studies.

Methods

Samples were prepared following standard procedures, including acetolysis to remove cellulose and hydrofluoric treatment and micro-sieving to remove minerogenic material (Moore *et al*. 1991). Tablets containing a known concentration of *Lycopodium* spores were added to each sample to act as a marker

and to assess the concentration of pollen in the samples. Pollen concentrations were low, and the count was based on 300 *Lycopodium* spores. The results are given in Table 3. Nomenclature is modified from Moore *et al*. (1991), based on Bennett (1994; Bennett *et al*. 1994).

Results and discussion

The only column to produce sufficient pollen to undertake a count was a column from Trench 8 which included the overlying sand, the dark organic sand and hearth 8010, a roughly circular spread of sand containing a high proportion of charcoal, within Building B. It would appear that the presence of the hearth led to more favourable conditions for the preservation of pollen. However, there may have been some differential preservation as, for example, Lactuceae pollen, which is a particularly resistant type of pollen, was relatively abundant.

Pollen from the overlying sand was very scarce but more plentiful in the organic soil and the hearth. The whole assemblage was dominated by herbaceous pollen. Pollen was relatively frequent in the level (6cm) from the top of the dark sand then declined until a marked increase in the level (14cm) at the base of the sand of the hearth, immediately above a thin lens of yellowish-red silt. Pollen values then declined sharply, with only a trace of pollen in the levels below. Cereal type pollen, mainly Hordeum (barley and certain wild grasses) type pollen but including *Triticum-Avena* (wheat-oats) type as well, was also most frequent in pollen levels 6cm and 14cm but was present in the intervening levels. Cereal pollen is generally under-represented in pollen diagrams because of its pollination mechanism (most cereals are self-pollinating) and dispersal characteristics and therefore large amounts indicate its local presence. The presence of cereal at the site is confirmed by substantial amounts of charred cereal macrofossils recovered from the dark layer of organic sand (8009) and the hearth (8010).

Several other pollen taxa are similarly represented in the plant macrofossil record, but a number are not, and therefore extend the botanical record for the site. Poaceae (grass), Cyperaceae (sedges), *Anthemis* (e.g. chamomiles, yarrows, corn marigold) type, Chenopodiaceae (e.g. orache, fat-hen) and Brassicaceae (e.g. cabbages, charlock, shepherd's purses, radishes) pollen and *Pteridium aquilinum* (bracken) spores are represented by grass, sedges, stinking chamomile, corn marigold and orache seeds, wild radish capsules and bracken leaf fragments. Additional pollen taxa include Lactuceae (e.g. dandelion, sow-thistles), *Aster* (e.g. daisy, goldenrod) type, Lamiaceae (e.g. deadnettles), *Plantago lanceolata* (ribwort plantain), *Hypericum perforatum* (e.g. perforate St John's-wort) type, *Cirsium* (thistles) and *Centaurea nigra* (common knapweed). The weed taxa indicate cultivation, grassland and rough ground. Much of the pollen is likely to be derived from plant remains brought into the building, in particular from crop processing waste, or from weeds growing in the immediate area of the building, or perhaps from flooring or thatch, especially the latter when it was abandoned, or possibly from plants growing at the site when it fell out of use. The latter suggestions may account for the higher pollen counts at the top of the dark sand (6cm).

There is very little arboreal pollen in the pollen record, namely *Alnus* (alder), *Corylus avellana* (hazel) type and *Pinus* (pine) pollen, and no *Quercus* (oak) pollen whereas the charcoal record from hearth 8010, and hearth 8023, consisted entirely of oak (see charcoal report). Oak also dominated in the charcoal asssemblage from the dark sand layer (8009) but hazel was present as well as ash (*Fraxinus excelsior*). The absence of *Quercus* pollen may reflect differential preservation. However, the presence of *Pinus* (pine) pollen is almost certainly derived from the general atmosphere as pine pollen is particularly well-designed for long-distance transport.

Overall, the pollen evidence is consistent with the plant macrofossil and animal bone evidence which suggests an open landscape with mixed farming taking place and limited woodland in the area during the medieval period.

Table 3. Pollen evidence from Portclew.

Sample Depth	5cm	6cm	8cm	10cm	12cm	14cm	16cm	18cm
Taxa	**Pollen Count**	**Pollen Count**	**Pollen Count**	**Pollen Count**	**Pollen Count**	**Pollen Count**	**Pollen Count**	**Pollen Count**
Trees								
Pinus	-	1	-	1	-	-	-	-
Alnus	-	1	-	-	-	-	-	
Total Trees	**-**	**2**	**-**	**1**	**-**	**-**	**-**	**-**
Shrubs								
Corylus avellana type	-	-	-	1	-	-	-	-
Total Shrubs	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**
Herbs								
Poaceae	2	43	21	3	8	68	3	3
Hordeum type	-	20	1	2	1	20	7	-
Triticum-Avena type	-	2	-	1	-	6	1	-
Cyperaceae	-	1	1	-	-	-	-	-
Aster type	-	3	2	2	1	32	-	-
Anthemis type	-	1	1	1	-	8	-	-
Centaurea nigra	-	-	-	-	-	1	-	-
Cirsium	2	-	-	-	-	-	-	-
Lactuceae	7	17	29	21	5	14	-	-
Chenopodiaceae	-	-	1	-	-	-	-	-
Brassicaceae	-	-	1	-	1	-	-	-
Lamiaceae	-	-	1	-	-	-	-	-
Hypericum	-	-	-	1	-	-	-	-
Plantago lanceolata	-	-	1	1	-	1	-	-
Total Herbs	**11**	**87**	**59**	**32**	**16**	**150**	**11**	**3**
Indeterminate	1	11	6	3	3	16	3	2
Spores								
Osmunda	-	-	-	-	-	2	-	-
Polypodium	-	1	1	1	-	1	-	-
Pteridium aquilinum	-	-	1	2	-	1	-	-
Pteropsida (monolete indeterminate)	-	7	-	-	-	-	-	2
Total Spores	**-**	**8**	**2**	**3**	**-**	**4**	**-**	**2**
Total Pollen, Spores, Indet.	**12**	**108**	**67**	**39**	**19**	**171**	**14**	**7**

CHARRED PLANT REMAINS

By Astrid E. Caseldine and Catherine J. Griffiths

A sampling programme was undertaken during the excavations at Portclew with the aim of recovering charred plant remains which would provide information about the agricultural economy of the area and activities taking place at the site. In addition the plant remains would add to the increasing body of archaeobotanical evidence for agricultural activity during the early medieval and medieval periods in south-west Wales (e.g. Caseldine 1994, Carruthers 2010, Caseldine and Griffiths 2011).

Methods

The samples were processed using a flotation machine. The finest mesh used to recover the flots was 250 microns and 500 microns to recover the residues. The samples were sorted using a Wild M5 stereomicroscope. Identification was by comparison with modern reference material and by reference to identification manuals and atlases (e.g. Berggren 1969, 1981, Schoch et al 1988, Anderberg 1994, Cappers *et al*. 2006, Jacomet 2006). The results are presented in Table 4.

Cereal identifications

Large amounts of barley (*Hordeum*) were present and the angular shape of the grains and evidence of the hull on a number of grains indicated hulled barley. Although the possibility of two row barley cannot be ruled out, the presence of twisted as well as straight grains suggested six-rowed barley (*H. vulgare*). Most of the identifiable wheat (*Triticum*) resembled a free-threshing wheat, namely bread wheat (*T. aestivum*). The latter was confirmed by the presence of bread wheat rachis but much of the rachis was poorly preserved and was assigned to a 'free-threshing' category which could include rivet wheat (*T. turgidum*) as well as bread wheat. One rachis internode fragment suggested the presence of a tetraploid wheat (tetraploid wheats include emmer (*T. dicoccum*) and rivet wheat). One or two flatter grains more closely resembled spelt wheat (*T. spelta*), while others could only be allocated to a broader wheat (*Triticum* sp.) group. One grain had the typical bullet-shaped appearance of rye (*Secale cereale*). Oat (*Avena* sp.) was also present, and a few floret bases indicated cultivated oat (*Avena sativa*). Much of the grain was too poorly preserved to be allotted to even a genus and was allocated to a cereal indeterminate group. As well as cereals, pea (*Pisum sativum*) and broad bean (*Vicia faba*) were present.

Results and Interpretation

Trench 1

The samples from Trench 1 were largely from ditches and postholes and in general produced only small quantities of remains, the one exception being the sample from fill 138 of rectangular ditch 118 which produced large amounts of grain. Fill 138 was from a layer overlying the basal layer of the rectangular ditch and yielded a substantial amount of barley as well as oats and bread wheat. Preservation varied considerably from very well-preserved grain to very poorly preserved grain, the latter resulting in a large quantity of indeterminate cereal grain. Broad bean (*Vicia faba*) was also present, indicating that legumes as well as cereal formed part of the diet. Other remains included elderberry (*Sambucus nigra*) seeds, hazelnut (*Corylus avellana*) shell fragments, a wild radish (*Raphanus raphanistrum*) capsule and a redshank (*Persicaria maculosa*) seed. This ditch was on a slightly different alignment to that of the concentric outer ditches and hazel (*Corylus avellana*) charcoal from this context gave an early medieval date of cal AD 570–665.

The dominance of grain and almost complete absence of weed and chaff remains suggests that this assemblage primarily represents the remains of processed grain that was accidently or deliberately charred. However, the absence of chaff may reflect differential preservation, especially as much of the grain was poorly preserved. Similarly, straw nodes and fragments may be underrepresented. Essentially the grain appears to be the remains of a barley crop with the oat and wheat possibly contamination, perhaps reflecting slightly lax husbandry practices, or the mix could indicate mixed cropping. The latter was a practice aimed at recovering at least some cereal if one crop failed. Alternatively the three crops may have become mixed together when they became burnt either deliberately as waste or as a result of an accidental fire. The weed seeds may have been collected incidentally with the cereal, but the elderberry seeds and hazelnut fragments could indicate deliberate collection of wild foodstuffs. Alternatively, they might have been collected along with wood for fuel. Elder is especially found on disturbed soils which have been enriched by manure. The presence of bone, including charred fragments, suggests general waste was being dumped in the ditch.

Although no plant remains were recovered from pit group 140–143, oak (*Quercus* sp.) roundwood charcoal from fill 148 of post pit 140 gave a date of cal AD 560–660, suggesting the pits were contemporary with the rectangular ditch. Slightly later in date is the evidence from the inner concentric ditch 117 where a date of cal AD 655–875 was obtained on wild cherry/blackthorn (*Prunus* sp.) charcoal from the upper fill (103) of the ditch. Charred plant remains were very scarce from the basal fill (136) of the ditch with only a possible barley grain and a few weed seeds, namely stitchwort (*Stellaria* sp.) and dock (*Rumex* sp.) and vetch/pea (*Vicia/Lathyrus*), recorded. The remains probably represent general background waste.

A similar interpretation applies to the remains from outer concentric ditch 116, postholes 113 and 121 lying between the two concentric ditches, and shallow ditch feature 139. A small assemblage of barley and wheat grains and oat/grass caryopses was obtained from the middle fill (109) of the outer ditch, while oak roundwood from this fill gave an early medieval date of cal AD 770–1020, suggesting a later phase of activity. Other remains recovered from this sample included teeth and bone fragments.

Samples from post pipe fill 112 in posthole 113 and fill 120 of posthole 121 yielded very little, only occasional grains of barley and oat. A sample from fill 122 of posthole 123, a posthole close to posthole 121, produced no charred seeds, but oak charcoal gave a Mesolithic date of 7130–6820 cal BC. It is possible that the charcoal is residual but the absence of charred cereal grain in the posthole supports an early date.

The assemblage from the basal fill (137) of the shallow ditch 139, which cut the southern edge of rectangular ditch 118 and pit group 140–143, was again small. Barley was the main cereal represented but oat and wheat were present as well. The only weed seeds were dock and sheep's sorrel (*Rumex acetosella*). In addition a few hazelnut fragments were recovered. Wild cherry/blackthorn charcoal from this context gave a date of cal AD 770–1025, suggesting that this feature was contemporary with the outer concentric ditch 116.

Trench 2

Only a few charred plant remains were identified from ditch 207 in Trench 2. The assemblage was from the primary fill (211) of the ditch and comprised a small number of barley grains and a wheat rachis. A number of bone fragments were also present, indicating general domestic waste. A date of cal AD 585–775 was obtained on wild cherry/blackthorn charcoal from the overlying deposit (206). This date is similar to that from the rectangular ditch 118 but the date is also consistent with that from inner concentric ditch 117 and the profile resembles that of the inner ditch as well. In addition charred plant remains are scarce in both ditch 207 and ditch 117 and the assemblages are similar, lending support to the view that the ditch could be a continuation of one of the concentric enclosure ditches. The date of the outer ditch is later, and the plant remains scarcer, at least in the context examined.

Trench 4

Charred plant remains were recovered from the buried soil (406) in Trench 4. A date of 815–570 cal BC on oak charcoal from the soil dates the assemblage to the Late Bronze Age/ Early to mid-Iron Age, rather earlier in date than that from the ditches and buildings. Plant remains were scarce and included a vetch/ pea seed and a barley grain, the latter suggesting cultivation was already taking place in the area by the Late Bronze Age/Early Iron Age.

Trench 7

Two samples were from a trampled 'yard' area outside of Building A in Trench 7, while the third was from the fill (7026) of a posthole (7028) marking the corner of a beam slot forming the eastern end of timber-framed building A. The only remains from the latter consisted of a grain of bread wheat, a gorse spine and charcoal fragments. The gorse might represent material deliberately collected as fuel or the remains of plant material originally collected as animal feed, the remnants of which were then thrown onto a fire.

The assemblage from a trampled deposit (7013) filling a shallow feature (7018), possibly a drip gully, in the 'yard' area mainly comprised bread wheat and barley along with a small amount of oat and a rye grain. Indeterminate cereal was frequent, and the assemblage probably represents general waste, although of processed grain rather than the by-products. A hazelnut fragment was the only other charred plant remain, apart from charcoal, although charred bone was also present. This assemblage was from below a trampled layer (7014) which filled shallow depressions in the 'yard'. The assemblage from this layer produced a slightly larger amount of grain, mainly bread wheat but with reasonable amounts of barley and oat as well. Spelt wheat was also possibly present, probably a weed contaminant. In contrast to the previous assemblage from the possible gully (7018), a few weed seeds were present and included sheep's sorrel, corn spurrey (*Spergula arvensis*), redshank and wild radish. The occurrence of corn spurrey and sheep's sorrel suggests cultivation on sandy and light loam soils in the area. The weed seeds are likely to be a by-product of crop processing and the assemblage probably represents the remnants of fuel waste from fires. A date of cal AD 1040–1220 on bread wheat from this deposit indicates this activity and occupation of the building dates to the medieval period.

Trench 8

The charred plant assemblages from this trench were from a dark layer (8009) of organic sand above the floor surface of Building B, two hearths (8010 and 8023) and two samples taken from the fill of ditch 8020, one from the fill (8013) of the ditch between Buildings B and C and the other from the fill (8021) of the ditch below the floor in Building B. The assemblage from fill 8013 comprised a small amount of barley, bread wheat, including rachis, oat and indeterminate cereal, while only a barley grain was recovered from fill 8021. Both fills produced bone fragments, mainly 8013. Alder (*Alnus glutinosa*) charcoal from fill 8021 gave a date of cal AD 665–875 which supports the view that this ditch was a continuation of ditch 117 found in Trench 1. Charred plant remains were much more frequent in the fill of ditch 8013 from between Buildings B and C than in ditch 8020 from below the floor of Building B or from ditch 117 and it is possible that some of these remains might be intrusive from later activity associated with the buildings, although the absence of weed seeds compared with assemblages from Building B might suggest that this is not the case.

The sample from hearth 8010, the hearth next to the wall in Building B, produced a large assemblage but much of the grain was too poorly preserved to identify. Wheat and oat dominated the grain assemblage with smaller amounts of barley. The sample also included a relatively large quantity of wheat rachis, much of it bread wheat. In addition straw nodes and fragments and weed seeds typical of cornfields were present. The latter included a relatively large number of stinking chamomile (*Anthemis cotula*) seeds

as well as seeds of red bartsia (*Odontites vernus*), corn cockle (*Agrostemma githago*), corn marigold (*Chrysanthemum segetum*), cleavers (*Galium aparine*), brome (*Bromus* sp.), wild radish, sheep's sorrel and dock.

Wheat prefers a heavier soil with a high clay content and the presence of stinking chamomile seeds suggests that cultivation was taking place on heavier, clay and clay-loam soils as well as lighter soils in the area. Some of the grain may reflect accidental burning during food preparation but the weeds seeds, chaff and straw indicate the deliberate use of crop processing waste as fuel. Other plant remains included a fragment of bracken (*Pteridium aquilinum*) leaf, which may reflect the use of bracken as animal bedding prior to waste being thrown onto the fire, and crab apple pips and bramble fruit stones, both of which suggest the use of wild plant foodstuffs. Other waste includes bone and oyster (*Ostrea edulis*) shell fragments. A date on wheat grains from the hearth gave a date of cal AD 1045–1265, suggesting that this building was slightly later or possibly contemporary with Building A in Trench 7.

The assemblage from fill 8042 of a circular hearth (8023) towards the centre of Building B is smaller than that from hearth 8010 but again is dominated by indeterminate cereal grain with bread wheat the most frequent cereal identified, followed by oat and then barley. In general the weed assemblage shows some similarities with that from the other hearth, including frequent seeds of stinking chamomile and the presence of sheep'sorrel, red bartsia, wild radish, brome and grass (*Poaceae*) seeds. Other weed seeds include smooth tare (*Vicia tetrasperma*) and orache (*Atriplex* spp.). Orache, like wild radish, is typical of cultivated and waste ground while smooth tare occurs in grassland. Fragments of bracken leaves are again present and there is a hazelnut fragment as well as a possible whitebeam/rowan (*Sorbus* sp.) seed.

The sample from the organic sand layer (8009) above the floor surface of Building B produced a large amount of bread wheat and indeterminate grain, quite a lot of barley and oat, a pea (*Pisum sativum*), a few chaff fragments and a range of weed seeds, although not in large quantities. The occurrence of pea in this sample provides further evidence that legumes formed part of the diet in addition to cereal. As well as wheat and barley rachis, a straw node was present and a few oat floret bases. The latter confirmed the presence of cultivated oat (*Avena sativa*) although wild oat may also have been present. The weed seeds included species found in cultivated or disturbed ground or grassland, and included oraches, sheep's sorrel, hairy tare (*Vicia hirsuta*), nettle (*Urtica dioica*) vetches/peas, stinking chamomile, corn marigold and wild radish. A sedge (*Carex* sp.) seed may indicate cultivation of, or near to, damp ground. Other remains included hazelnut shell fragments and thorns as well as charred bone, fish bone and marine mollusc fragments. Since this sample was from between the two hearths 8010 and 8023 it seems likely that the assemblage derives from plant remains burnt on the hearths which became scattered on the floor surface and later incorporated in the overlying sand as a soil formed.

Discussion

Prehistoric evidence

The earliest evidence from the site is that from a posthole which produced only wood charcoal which included oak. Hence all that can be said is that oak woodland was present in the area in the Mesolithic period, *c*. 7080–6820 cal BC. A Late Bronze Age/early to mid-Iron Age date of 815–570 cal BC on oak charcoal from the buried soil again attests to the presence of oak woodland in the area. Nevertheless, by this time the occurrence of a grain of hulled barley suggests cereal cultivation was also taking place in the area. Indeed there is evidence from a later Bronze Age house at Newton, Llandstadwell, Pembrokeshire for the cultivation of hulled barley, although there, wheat and oat were also represented (Caseldine and Griffiths 2004a). However, generally there is comparatively little plant macrofossil evidence from south-west Wales for cereal cultivation dating to the late Bronze Age/early Iron Age transition. Barley, emmer wheat and possibly spelt wheat were recovered from a posthole at Great Castle Head, Dale, dated to this

period (Caseldine 1999) and a possible emmer/spelt grain and barley grain were recorded from a gully at Brownslade (Carruthers 2011).

Although no pollen or molluscs survived in the buried soil, molluscs from the overlying windblown sands suggest an open environment (Walker, this article). A similar deposit, though with a more varied mollusc assemblage, occurred at Brownslade (Bell and Brown 2011), where the sand incursion began no earlier than the middle of the fourth to the first centuries BC.

Early medieval evidence

The main environmental evidence from the site dates to the early medieval and medieval periods beginning with that from rectilinear enclosure ditch 118 and the intercutting pit group 140–143 dated to the mid-sixth to mid-seventh centuries. The assemblage from the ditch suggests that barley was the main cereal crop, but that bread wheat and oat were also grown as well as broad beans. Although these crops may have been sown separately it is possible that two or more crops may have been grown together in the same field. Mixed cropping was undertaken to reduce the risk of a complete harvest failure. Most commonly used mixtures in the medieval period were barley and oats (drage, dredge), wheat and rye (maslin, mancorn), wheat and oats and a cereal, commonly oats, with a legume (bullimong) (Pretty 1990; Hammond 1995).

Evidence from the inner curvilinear ditch (117/8020), dated to the mid-seventh to the late ninth centuries, is generally scarce but suggests barley continued to be grown. This view is supported by the evidence from the inner ditch outside of Buildings B and C where barley is slightly more plentiful. Bread wheat and oat are also recorded in the sample from the inner ditch in this area, suggesting all three cereals were cultivated at this time. However, it is possible that the slightly richer assemblage is a result of intrusive material from later activity associated with the buildings. During the late ninth to tenth centuries, barley continues to be the main crop represented, although there is evidence for oat and the presence of wheat.

The results from Portclew are in keeping with those for early medieval crop husbandry from other sites in south-west Wales including West Angle (Caseldine and Griffiths 2011), Newton, Llandstadwell (Caseldine and Griffiths 2004b), South Hook (Carruthers 2010), Maenclochog Castle (Carruthers 2008), Bayvil (Simmons 2017) and sites associated with the South Wales Gas Pipeline, notably Creamston Road, Uzmaston (Site 251.2) (Giorgi 2013), Conkland Hill, Wiston (Carruthers 2014) and Steynton (Site 512), Milford Haven (Giorgi 2015). Representation of individual crops varies, for example at Creamston, oat dominates with a small amount of barley, and wheat is absent but barley, bread wheat and oats appear to have been the main cereals grown in the region (Giorgi 2013). In addition there is some evidence from Maenclochog and Conkland Hill for rye being grown (Carruthers 2008; Carruthers 2014). Overall, the results are consistent with those in general from Wales that suggest that oat becomes a significant crop during this period and together with barley and free-threshing wheat, which takes over from the glume wheats (spelt and emmer), are the main crops (Caseldine 2015, Comeau and Burrow 2021).

Medieval evidence

Radiocarbon dating and pottery evidence suggest the buildings date to the twelfth to thirteenth centuries. The evidence from the yard area of Building A may indicate a change in crop husbandry at the site during the twelfth century with bread wheat possibly becoming of greater significance, perhaps more important than barley, although this difference might simply be due to the difference in contexts examined. Rye is also present. A mid-twelfth to mid-thirteenth-century date from Building B possibly suggests this building is slightly later than Building A and, if this is the case, the plant remains may indicate a further increase in the importance of bread wheat, although barley and oat appear to remain significant crops. The increase

Table 4. Charred plant remains from Portclew.

Trench	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**4**	**Habitat Preference**
Feature	**D**	**PH**	**PH**	**PH**	**D**	**D**	**D**	**D**	**BS**	
Context	**116**	**113**	**121**	**123**	**117**	**139**	**118**	**207**	**406**	
Sample size (l)	**109**	**112**	**120**	**122**	**136**	**137**	**138**	**211**	**406**	
	10	**7**	**7**	**4**	**17**	**10**	**19**	**10**	**16**	
Cereals										
Hordeum sp. – straight grain (Hulled Barley)	5	1	-	-	-	1	432	1	-	A
Hordeum sp. - twisted grain	1	-	-	-	-	4	304	2	1	A
Hordeum sp. - indet. grain	2	3	-	-	-	1	198	4	-	A
Hordeum sp. – rachis	-	-	-	-	-	-	1	-	-	A
cf. *Hordeum* sp. – grain	-	-	1	-	1	-	-	-	-	A
Avena sativa L. – floret bases(Oat)	-	-	-	-	-	-	-	-	-	A
Avena spp. – grain	-	1	-	-	-	3	99	-	-	A, D
Avena spp. – floret frags.	-	-	-	-	-	-	-	-	-	A
Avena/Poaceae – caryopsis(Oat/grass)	2	-	-	-	-	-	-	-	-	A, D
Secale cereale L. – grain (Rye)	-	-	-	-	-	-	-	-	-	A
Triticum cf. *spelta* L. - grain(Spelt wheat)	-	-	-	-	-	-	-	-	-	A
Triticum aestivum L. – grain(Bread wheat)	-	-	-	-	-	-	57	-	-	A
Triticum aestivum L. - rachis	-	-	-	-	-	-	-	-	-	A
Triticum sp. (free threshing)(Bread wheat, rivet wheat) – rachis	-	-	-	-	-	-	-	1	-	A
Triticum sp. – grain(Wheat)	2	-	-	-	-	1	33	-	-	A
Triticum sp. grain + sprouted embryo	-	-	-	-	-	-	-	-	-	A
Triticum sp. – hexaploid rachis(Spelt wheat, bread wheat)	-	-	-	-	-	-	-	-	-	A
Triticum sp. – tetraploid rachis(Emmer wheat, rivet wheat)	-	-	-	-	-	-	-	-	-	A
cf. *Triticum* sp. – grain	-	-	-	-	-	-		-	-	A
Cerealia indet.	5	-	1	-	-	4	450	9		A
Cerealia indet. – small frags.(weight - mg.)	1	-	-	-	-	-	347	-	-	A
Straw nodes	-	-	-	-	-	-	1	-	-	A
Straw frags.	-	-	-	-	-	-	3	-	-	A
Other plants										
Corylus avellana L.(Hazel) – shell frags.	-	-	-	-	-	3	17	-	-	W
Urtica dioica L.(Common nettle)	-	-	-	-	-	-	-	-	-	A, D, M, W, n
Atriplex spp.(Oraches)	-	-	-	-	-	-	-	-	-	A, C, D, s
Stellaria sp(Stitchworts)	-	-	-	-	1	-	-	-	-	A, B, C, G, M, W, d ,s, w
Spergula arvensis L.(Corn spurrey)	-	-	-	-	-	-	-	-	-	A, C, R, a, o, s
Agrostemma githago L.(Corncockle)	-	-	-	-	-	-	-	-	-	A, D
Persicaria maculosa Gray (Redshank)	-	-	-	-	-	-	1	-	-	A, D, o
Rumex acetosella L.(Sheep's sorrel)	-	-	-	-	-	1	-	-	-	A, G, H, a, o, s
Rumex spp(Docks)	-	-	-	-	1	1	-	-	-	A, B, C, G, W, w
Raphanus raphanistrum L. (Wild radish) – capsule, whole	-	-	-	-	-	-	1	-	-	A, D
Raphanus raphanistrum L.– capsule, frags.	-	-	-	-	-	-	-	-	-	A, D
Rubus fruticosus L. agg.(Brambles)	-	-	-	-	-	-	-	-	-	D, G, W, o

Malus sylvestris (L.) Miller (Crab apple)	-	-	-	-	-	-	-	-	-	W
cf. *Sorbus* sp. (Whitebeams)	-	-	-	-	-	-	-	-	-	W
Rosaceae type thorns	-	-	-	-	-	-	-	-	-	W
Vicia hirsuta (L.) *Gray* (Hairy tare)	-	-	-	-	-	-	-	-	-	DG
Vicia tetrasperma (L.) Schreber (Smooth tare)	-	-	-	-	-	-	-	-	-	G
Vicia faba L. (Broad bean)	-	-	-	-	-	-	1	-	-	A
Vicia faba L. (Broad bean) – frags.	-	-	-	-	-	-	2	-	-	A
Vicia/Lathyrus (Vetches/Peas)	-	-	-	-	1	-	-	-	-	ACDG
Pisum sativum L. (Pea)	-	-	-	-	-	-	-	-	-	AD
Ulex spp. (Gorse) – spines	-	-	-	-	-	-	-	-	-	GHWops
Odontites vernus (Bellardi) Dumort. (Red bartsia)	-	-	-	-	-	-	-	-	-	ACDGR
Galium aparine L. (Cleavers)	-	-	-	-	-	-	-	-	-	ADo
Sambucus nigra L. (Elder)	-	-	-	-	-	-	4	-	-	DWn
Anthemis cotula L. (Stinking chamomile)	-	-	-	-	-	-	-	-	-	AD
Chrysanthemum segetum L. (Corn marigold)	-	-	-	-	-	-	-	-	-	ADRs
Carex sp. (Sedges)	-	-	-	-	-	-	-	-	-	BCDG MW(w) as
Bromus spp. (Bromes)	-	-	-	-	-	-	-	-	-	ACDG(w)
Poaceae (Grasses)	-	-	-	-	-	-	-	-	-	CDGHM RWdow
cf. Poaceae – stem node	-	-	-	-	-	-	-	-	1	
Pteridium aquilinum (L.) Kuhn (Bracken) – leaf frags.	-	-	-	-	-	-	-	-	-	GHMWad
Unidentified	-	-	-	-	-	-	1	-	-	
Charcoal	+	+	+	+	+	+	+	+	+	
Animal bone										
Bone frags.	3	-	-	-	-	-	28	48	-	
Charred bone frags.	-	-	-	-	-	-	25	-	-	
Teeth – mammal/human	4	-	-	-	-	-	-	-	-	
Small mammal bone – rodent	-	-	-	-	-	-	-	-	-	
Teeth – small mammal/fish	-	-	-	-	-	-	-	-	-	
Fish bone	-	-	-	-	-	-	-	-	-	
Fish scale	-	-	-	-	-	-	-	-	-	
cf. Bird bone	-	-	-	-	-	-	-	-	-	
Molluscs										
Patella vulgata (Limpets) - shells	-	-	-	-	-	-	-	-	-	
Littorina littorea (Winkle) - shells	-	-	-	-	-	-	-	-	-	
Nucella lapillus (Dog whelk) - shells	-	-	-	-	-	-	-	-	-	
Ostrea edulis (Oyster) - shell frags.	1	-	-	-	-	-	-	-	-	
Land molluscs	+	-	+	+	-	+	+	-	-	

Features: D = ditch; PH = post hole; BS = buried soil; G = gully; L = layer; H = hearth, P = pit.
Habitat preferences: A = arable & cultivated; Aq = aquatic; B = bank side, pond margins; C = coastal, salt marshes; D = disturbed ground, wasteland, rough ground; G = grassland; H = heaths, moorland; M = marshes, fens, bogs; R = road sides; W = woods, hedgerows, scrub;. a = acid soils; d = dry; n = nitrogen enriched; o = open ground, clearings; s = sandy soils; w = wet.
+ = present

in bread wheat may mark an expansion in cereal growing in the area. Bread wheat prefers heavier soils and the appearance of stinking chamomile in the plant assemblage suggests an expansion of cultivation onto clays soils in the local area which would be more suitable for bread wheat and oat rather than barley. Other crops at this time included peas.

The presence of chaff and weed seeds indicates that crop processing was taking place at the site and the deliberate burning of cereal waste, but charred processed grain suggests accidental burning. Although wheat is likely to have been favoured to make bread, barley, oats and rye could have been used. Cereal would also have been used to make ale. Some of the cereal grain, namely oat and barley, along with chaff and straw may represent the remains of animal feed, while gorse and bracken could indicate the exploitation of wild resources for use as fodder or bedding, as well as fuel. Animal bone evidence (Higbee, this article) indicates the presence of cattle, sheep/goat, pig, horse and domestic fowl. Wild plant resources such as hazelnuts, brambles and crab apples as well as marine molluscs and fish may have supplemented the diet of cereals, legumes and meat and dairy products.

Evidence for cereal cultivation during the twelfth and thirteenth centuries elsewhere in the local region includes that from Newport, Pembrokeshire (Caseldine 1994), Wiston (Caseldine 1995) and Laugharne Castle (Caseldine and Griffiths 2005). The main crops occurring at these sites are bread wheat, barley, oats, both common and black/bristle oat, and rye. At Laugharne there is also evidence for the cultivation of peas and beans.

Although the evidence is slightly later, there is some documentary evidence dating to 1326 which relates to Lamphey, two kilometres to the north of Portclew. It was one of the five St Davids' properties, and the Black Book of St Davids provides documentary evidence for the crops sown and their yields (Jack 1988). Although later in date than the archaeobotanical evidence from Portclew, it does provide some useful comparative information. The documentary evidence suggests that wheat, barley and oats continued to be grown in the area and gives some idea of the crop yield. Three bushels per acre of bald wheat sown gave a four-fold yield while two and a half bushels of bearded wheat gave a three-fold yield. Seven bushels of oat sown gave a three-fold yield and six bushels of barley gave a four-fold yield. There is no reference to rye being grown at Lamphey, but it was grown at other properties. Significantly, Lamphey was the only property to grow both wheat and oats. The others grew either barley and oats, wheat and rye or wheat alone. In addition to cereals, there is evidence for the continued cultivation of legumes. Four bushels of great peas, two and a half bushels of small peas and six bushels of beans were sown per acre at Lamphey. The archaeobotanical evidence from Portclew therefore extends back the record for crop husbandry in the Lamphey area and suggests that the growing of wheat, barley and oats as main crops was already established in the area by the twelfth century, at the latest.

CHARCOAL IDENTIFICATIONS FROM PORTCLEW

By Astrid E. Caseldine and Catherine J. Griffiths

A small amount of charcoal was identified from a number of samples from the site, principally as potential samples for AMS dating. Larger samples were also identified from several samples, including hearth samples. Apart from obtaining samples for AMS dating, the aim of the charcoal analysis was to gain some information about the wood that was being used at the site and the woodland that was available for exploitation.

Methods

The charcoal was fractured to produce clean sections (transverse, transverse longitudinal and radial longitudinal) for examination. It was identified using a Leica DLR microscope with incident light source. Key characteristic features of the wood anatomy were used to identify the charcoal using standard texts (e.g., Schweingruber 1978; Schoch *et al*. 2004). Nomenclature follows Stace (1995). The results are presented in Table 5.

Results

Only a very small amount of charcoal, largely for AMS dating, was identified from ditch fills and postholes in Trench 1. Hazel (Corylus avellana) charcoal from fill 138 of the rectangular ditch (118) gave a date of cal AD 570–665, whilst a date of cal AD 560–660 was obtained on oak (Quercus sp.) roundwood charcoal from fill 148 of posthole 140. Oak and wild cherry/blackthorn (Prunus sp.) were identified from the upper fill (103) of the inner concentric ditch and charcoal of the latter taxon gave a date of cal AD 655–875. A date of cal AD 770–1020 was provided by oak roundwood charcoal from the middle fill (109) of outer concentric ditch 116. A fragment of gorse (Ulex sp.) was identified from the post pipe fill (112) of posthole 113 while an early date of 7080–6820 cal BC was obtained from oak charcoal from the fill (122) of posthole 123. A fragment of wild cherry/blackthorn charcoal gave a date of cal AD 770–1025 from the basal fill (137) of shallow ditch 139 which cut rectangular ditch 118. Oak was also identified from this fill.

Wild cherry/blackthorn was identified from fill 206 of ditch 207 in Trench 2 and produced a date of cal AD 585–775. A somewhat earlier date of 815–570 cal BC was obtained on oak charcoal from the buried soil (406) in Trench 4. Wild cherry/blackthorn was also present.

Charcoal from the trampled deposit (7013) from a possible gully and from the trampled deposit (7014) filling shallow depressions in the 'yard' area outside of Building A in Trench 7 was entirely oak. Similarly, oak dominated the assemblages from a dark organic sand layer (8009) above the floor surface of Building B in Trench 8 and from two hearths, (8010 and 8023), within the building. Hazel and ash (Fraxinus excelsior) were also recorded from the organic sand layer. Alder (Alnus glutinosa) charcoal from the fill (8021) of ditch 8020 below the floor in Building B, thought to be a continuation of ditch 117 in Trench 1, gave a date of cal AD 665–875. Dates from charred wheat grains suggest the buildings date to between the twelfth and the first half of the thirteenth century, which agrees with the pottery evidence.

Discussion

Much of the charcoal evidence is very limited but the dated oak charcoal from a posthole in Trench 1 confirms the presence of oak woodland in the area during the Mesolithic. Similarly, the date on oak charcoal from the buried soil in Trench 4 indicates the continued presence of oak in the area during the late Bronze Age/early Iron Age, although the occurrence of cherry/blackthorn, assuming the charcoal was not intrusive, could reflect secondary scrub woodland following clearance activity. Elsewhere in Pembrokeshire, for example at Castell Mawr hillfort, an increased diversity of taxa, including cherry/blackthorn, also indicates scrub and opening up of the woodland in the Early to Middle Iron Age (Simmons 2017).

The dates from the rest of the charcoal indicate that woodland and scrub comprising oak, alder, hazel, wild cherry/blackthorn and gorse was present in the area during the early medieval period. The evidence is similar to that from the early medieval cemetery at West Angle, Pembrokeshire, where the range of species suggested oak and scrub woodland, or possibly hedges (Caseldine and Griffiths 2011), and the early medieval cemetery sites at the Druid's Square Barrow cemetery at Corwen in south-west Denbighshire (Caseldine and Griffiths 2013) and Meusydd cemetery near Llanrhaeadr-ym-Mochnant

in northern Powys (ibid.). At other sites in the Pembrokeshire area, for example the early medieval settlement with associated iron smelting site and crop processing complex at South Hook, Herbranston, the charcoal assemblages indicate similar woodland and scrub were exploited for fuel with broom or gorse, in particular, used in the metal-working furnaces, whilst oak tended to dominate in the corn dryers (Challinor 2010). Similarly, charcoal identified from sites such as Steynton (Site 512), Milford Haven (Challinor 2014a) and Conkland Hill (Site 508), Wiston (Challinor 2014b) associated with the South Wales Gas Pipeline also indicate woodland including hazel, oak, cherry type and broom/gorse.

The charcoal from the hearths and occupation layers associated with the buildings indicates that oak woodland with ash and hazel was present in the area during the twelfth and thirteenth centuries, and that these species were being collected for fuel and for building purposes. Although the assemblages from the hearths are quite small, which might account for the limited range of species, it is interesting that only oak was recorded and scrubby species such as blackthorn were not. This may indicate a preference for oak, perhaps for smoking meat or fish, or reflect the availability of different tree and shrub species for use as fuel. Cereal waste was also recovered from the hearths. Similarly, charcoal from the occupation layers may represent fuel waste or possibly from the burning of waste wood used in the construction of the buildings themselves.

Table 5. Charcoal identifications from Porth Clew.

Trench	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**4**	**7**	**7**	**8**	**8**	**8**	**8**	**Total**
Feature	**D**	**D**	**PH**	**PH**	**D**	**D**	**PH**	**D**	**BS**	**G**	**L**	**L**	**H**	**D**	**H**	
Context	**117**	**116**	**113**	**123**	**139**	**118**	**140**	**207**	**406**	**7018**	**7014**	**8009**	**8010**	**8020**	**8023**	
	103	**109**	**112**	**122**	**137**	**138**	**148**	**206**	**406**	**7013**	**7014**	**8009**	**8010**	**8021**	**8042**	
Quercus spp. (Oak)	2	1*	-	2*	1	-	1*	-	3*	20	20	18	20	-	20	**108**
Alnus glutinosa (L.) Gaertner (Alder)	-	-	-	-	-	-	-	-	-	-	-	-	-	1*	-	**1**
Corylus avellana L. (Hazel)	-	-	-	-	-	1*	-	-	-	-	-	1	-	-	-	**2**
Prunus sp. (Wild cherry/ blackthorn)	1*	-	-	-	1*	-	-	1*	1	-	-	-	-	-	-	**4**
Ulex spp. (Gorse)	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**
Fraxinus excelsior L. (Ash)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	**1**
Total	**3**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**4**	**20**	**20**	**20**	**20**	**1**	**20**	**117**

* Includes charcoal used for AMS date.
Feature: D = ditch; PH = post hole; BS = buried soil; G = gully; L = layer; H = hearth.

ANIMAL AND DISARTICULATE HUMAN BONE

By Lorrain Higbee

A total of 560 fragments of animal bone came from trenches 1–2, 6–9 and 11, these were recovered during the normal course of hand-excavation, no sieved material was retrieved. Most (89%) came from secure contexts of early and later medieval date; the rest are un-stratified finds from plough soil or came from initial cleaning over archaeological deposits.

Methods

The assemblage was analysed following established methods (Baker and Worley 2019), a detailed methods statement forms part of the archive.

Results

Preservation condition and taphonomy

Bone preservation is generally good to fair. Most post-cranial bones have intact cortical surfaces with little or no signs of weathering. A small number (1%) of poorly preserved fragments are present in some contexts and these are likely to be residual having been re-deposited from surface accumulations or reworked from earlier deposits. This interpretation of the animal bone is supported by the presence of human remains from disturbed graves.

The proportion of gnawed bones is relatively low less than 3%, which suggests that bone waste was largely inaccessible to scavenging carnivores and was probably deposited into open features fairly soon after being discarded.

Species represented

The small number (27%) of identified fragments is dominated by the bones from livestock species, particular cattle and sheep, which together with pig account for *c.* 94% of the total (Table 6). Less common species include horse, dog, red deer, domestic fowl and an indeterminate species of passerine.

Table 6. Number and percentage of identified specimens present (NISP).

Species		**Early medieval**	**Later medieval**	**Unstratified**	**Total**	*% Total*
Bos f. domestic	cattle	38	17	8	63	*41.9*
Caprovid	sheep/goat	31	29	14	74	*49*
Sus f. domestic	pig	2	3	-	5	*3.3*
Equus f. domestic	horse	1	2	-	3	*2*
Canis f. domestic	dog	-	-	2	2	*1.3*
Cervus elaphus	red deer	-	-	1	1	*0.6*
Gallus f. domestic	domestic fowl	-	1	-	1	*0.6*
Passerine	?sparrow	-	2	-	2	*1.3*
Total identified		**71**	**55**	**25**	**151**	*100*
% identified		**47**	**36**	**17**	**100**	

Relative importance of livestock

Unfortunately, the early and later components of the assemblage are both too small to provide an accurate indication of the local livestock economy and facilitated comparison with contemporary assemblages

from other local sites (Hambleton 1999, 39–40). The available data indicates that cattle and sheep/goat are present in near equal proportions, with slightly more emphasis on the latter. However, by virtue of their larger size, cattle would have provided the bulk of the animal-based protein consumed at the site. Pig was of minor importance, perhaps because the landscape had largely been opened up to grazing for the cattle and sheep/goat at this time.

Body parts
All parts of the beef and mutton carcass are represented in the assemblage and any absences or under-representations are likely to be the product of small sample size. The body part data suggests local slaughter and consumption, and the over-representation of loose teeth provides a general indication that the assemblage is highly fragmented.

Age, size and butchery
Age information is extremely scarce; only two mandibles were recovered from early medieval contexts and the number of bones from which fusion data can be assessed is relatively low (Table 7). No accurate assessment of slaughter patterns can be made from the available dataset. The quantity of biometric and butchery data is also small and uninformative.

Table 7. Quantity of detailed information available.

Type of data	Early and later medieval	Unstratified	Total
Age (based on mandibles 2+ teeth)	2	2	4
Age (based on epiphysial fusion)	39	5	44
Biometric	7	2	9
Butchery	3	1	4

Unstratified material
Most (56%) of the small number of identified elements from plough soil and cleaning layers are sheep/goat bones. A few cattle bones, two dog bones and a piece of red deer antler were also recovered.

Conclusions
A small, well-preserved but highly fragmented assemblage of animal bone was recovered from the site. Most of the identified bones belong to domestic species, in particular sheep/goat and cattle. The limited dataset provides few further details or opportunities for wider comparison.

Human bone
Disarticulated human remains were recovered from several early and later medieval contexts in trenches 2, 6, 8 and 11. A complete catalogue of this material is provided in the archive. In total 76 human bone fragments were recovered from 14 separate contexts. All are re-deposited bones from disturbed graves; they include the partial skeleton of a young adult (15–24 years) from ditch 207, several adult (*c.* 35–45 years) bones from wall collapse 8005 and pit 8036, and neonatal infant bones from ditch 8020 and layer 8015.

NON-MARINE MOLLUSCS

By Tom Walker

Methods

Twelve bulk samples were available for analysis from 6 contexts in Trench 4 (Table 8). These all consisted of reddish sand. The samples were air dried and 1kg. of each wet sieved through a nest of 2 mm., 1 mm. and 0.5 mm. sieves. All the molluscs retained in the sieves were extracted and identified to species, using the method described in Evans (1972). Particle size analysis by laser granulometry was performed using a Coulter LS 230 granulometer (Pye and Blott 2004). Soil organic matter and carbonate content determined using percentage loss on ignition at 500ºC and 950ºC respectively.

Results

Table 8 shows the molluscs found in each sample. There was a total of 478 shells restricted to the upper three contexts (401, 404, 405, samples 1–8). No shells were present in the lower three contexts (406, 407, 408, samples 9–12). The results of particle size and loss on ignition analysis are presented in Table 9.[16]

Discussion

There is a very restricted mollusc population which is limited to the upper three contexts, shells being totally absent from the lowest three contexts. The great majority (90%) are open country species living in dry habitats, with the remainder being catholic species which can live in a wide variety of habitats (Evans 1972; Davies 2008). There are no species in any sample which require shade. *Helicella itala* and *Cochicella acuta*, the two most abundant species, are both xerophile shells living in open dry grassland providing minimal shade. *Vallonia excentrica* is a species characteristic of open grassland and is typical of grazed land. Also present in small numbers is *Pupilla muscorum*, a shell able to tolerate rather more unstable conditions than *V. excentrica*. *Cernuella virgata* is another xerophilic species typical of dunes and grassland, but slightly less tolerant of very dry conditions; this species is probably a post-Roman introduction to Britain (Kerney 1999, 181).

There are no specific features concerning the small number of catholic species; *Cochlicopa lubrica* and *Vitrea crystallina* both tend to avoid very dry areas and are relatively uncommon on dunes, suggesting that some dampness can be held in the short vegetation that is present. *Cecilioides acicula* is a burrowing species which can live up to two metres. below the ground surface and is therefore not of value in environmental analysis.

Particle size analysis showed that all the mollusc-bearing samples consisted almost entirely of medium and fine sand, with only a little silt; these layers were all consistent with windblown sand with remarkably consistent grain size throughout suggesting a single source of the sand. This source is likely to be the local beach although it is of interest that there was virtually no marine shell debris. It is probable that this sand built up fairly slowly in that once deposition occurred there is a relatively stable number of molluscs, both in absolute numbers and in number of species. In the absence of a wider variety of species and greater variation in shell numbers it is unlikely that there was time for true soils to accumulate during periods of stabilization.

The lower contexts are totally devoid of shells, this change occurring in the middle of context 405. Particle size analysis showed a much wider spread of grain size with considerably more silt and clay. While organic matter in these lower layers was higher than in the upper layers, calcium (represented by the carbonate content) was generally low, but not low enough to suggest complete decalcification. It is probable these sediments are not of windblown origin, being more likely to have derived from the

underlying Old Red Sandstone geology (British Geological Survey 1983). It is interesting that there are considerable numbers of charcoal fragments in sample 9 (context 406), providing a radiocarbon date of 815–570 cal BC. If the burning is anthropogenic in origin, then there is no molluscan evidence in the environment at the time.

A similar deposit has been investigated at Brownslade Warren, about twelve kilometres to the west of Freshwater East (Bell and Brown 2011). As at Portclew, the basal sediments did not contain any molluscs. This was overlain with a more varied mollusc assemblage than at Portclew, but again showing a mobile dune system with some vegetation. The greater number of both shells and species at Brownslade, however, does suggest more stability than at Portclew.

Molluscs from other trenches

Other molluscs provided for assessment were from multiple trenches at Portclew excavated in 2008 and 2009 (Table 10); the lack of small shells implies that these have been hand-picked during excavation. Gastropods were only counted when apices were present; the bivalve numbers are for individual valves, counted when the umbo is present. The great majority are marine shells, although a small number of non-marine shells are present in contexts 102, 8008 and 1002; the number of the non-marine shells is too small to make any environmental comment, but is consistent with those Mollusca found in Trench 4. *Cornu aspersum* is a catholic shell able to live in a great variety of habitats but is of interest that it was almost certainly introduced to Britain during the Roman period.

Of the marine shells nearly 80% are limpets, almost certainly all *Patella vulgata*. The average length of all the shells where measurements can be taken (254 shells) is 30 mm. and only 10 shells measured 40 mm. or more. Limpets live attached to rocks mainly in the intertidal zone. While they may have been collected as food their flesh is tough and their generally small size makes it possible that they were used as fish bait.

There are moderate numbers of other shells which live on rocky shores. The winkle, *Littorina littorea*, may have been eaten, but the dog whelk, *Nucella lapillus*, is an unlikely food as it is very difficult to extract from the shell. The flesh of the dog whelk is a source of purple dye used to dye cloth, but the small numbers would seem to preclude its collection for this use. The mussel, *Mytilus edulis*, is a common source of food but these few specimens are all very small and would not have provided much in the way of nutrition. An alternative explanation for the presence of these shells is that seaweed was harvested from the rocky shore as a source of fertilizer and the shells which happened to be living in the seaweed were caught up in the collection process. *Helcion pellucidum* lives in the holdfasts of seaweed and is very unlikely to have been deliberately collected.

The oyster, *Ostrea edulis*, was a common food during the medieval period and those present at Portclew may well have been used for food; they are unlikely to have been harvested with seaweed as they are attached more firmly to the substrate than the other shells.

Conclusions

No comments can be made from the molluscan evidence concerning the early environment around the area of Trench 4, as no molluscs survive in the deposits. During the periods when molluscs are preserved, the land has always been open, with no evidence of woodland or of vegetation providing significant shade. The presence of greater numbers of *Vallonia excentrica* than *Pupilla muscorum* is consistent with grazed grassland, similar to the current land use. The lack of stabilization layers suggests continuous relatively unstable conditions, probably over many centuries, perhaps with multiple episodes of accumulation and deflation of windblown sand.

Table 8. Mollusc analysis for Trench 4.

Context no.	**401**			**404**			**405**		**406**		**407**	**408**
Depth (cms)	10-37			37-79			79-89		89-124		124-140	140-150
Sample no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
MOLLUSCS												
Burrowing species												
Cecilioides acicula		2										
Catholic species												
Cochlicopa lubrica	1	3	5	7	2		1	1				
Punctum pygmaeum			1									
Vitrea crystallina	1		2									
Milacidae		1										
Limacidae		1										
Trochulus hispidus		3	6	4	9							
Open country species												
Vallonia excentrica	6	23	24	12	8	3	4					
Pupilla muscorum	2	5	6	2	1							
Cernuella virgata	15	4										
Helicella itala	20	69	52	45	28	8	7					
Cochicella acuta	20	23	15	19	6	1	1					
Total shells	65	134	111	89	54	12	12	1	0	0	0	0
Total taxa	7	10	8	6	6	3	4	1				

Table 9. Particle size and loss on ignition analysis for Trench 4.

Context	**Sample no.**	**Texture**	**Particle size analysis**			**Loss on ignition**	
			Clay % (<2 µm)	**Silt % (2-63 µm)**	**Sand % (63-1000 µm)**	**Organic matter %**	**Carbonate %**
401	1	muddy sand	3.6	30.2	66.2	2.11	4.15
401	2	muddy sand	2.4	15.2	83.4	0.86	7.80
404	3	muddy sand	2.3	11.1	86.6	0.53	8.39
404	4	sand	1.8	6.7	91.5	0.50	10.20
404	5	sand	1.7	5.9	92.4	0.45	10.98
404	6	sand	2.8	7.1	90.9	0.38	11.18
405	7	muddy sand	5.8	27.5	66.7	1.06	6.54
405	8	sandy mud	9.2	63.7	27.1	2.31	1.23
406	9	sandy mud	13.5	65.2	21.2	2.67	5.56
406	10	sandy mud	8.4	65.3	26.3	2.73	5.68
407	11	sandy mud	6.5	45.2	48.4	2.56	2.16
408	12	sandy mud	7.9	51.7	40.4	2.89	1.93

Table 10. Mollusc analysis of samples from trenches 1, 2, 5, 6, 7, 8, 10 and 11.

		Non-marine			Marine					
Trench no.	**Sample no.**	*Cochicella acuta*	*Helicella itala*	*Cornu aspersum*	*Patella* sp.	*Helcion pellucidum*	*Littorina littorea*	*Nucella lapilus*	*Mytilus edulis*	*Ostrea edulis*
1	100				2					5
1	102			1	1		1		frag	
1	105 south				1					6
1	105				1					8
2	202								frag	
2	206									1
5	501	1			4		1			1
6	601									1
6	602									1
6	604									1
6	606				1					
6	607				1			1		
7	7001				1					2
7	7002							1		
7	7006				149		23			
7	7007				40		3			
7	7012				2					
8	8005									4
8	8008		2	1	3			15	6	
8	8009				6				frag	
8	8022				1					
9	9004							1		
10	1001				1					1
10	1002	1		frag	74		1			
11	1101				3		1			
11	1105/4				9		3	1		
11	1105/4				1					1
11	1106				27	1	2			
11	1107				64		1			
Total		2	2	3	392	1	36	20	9	32

DISCUSSION

By Marion Shiner

Despite the limited scale of the excavations, a considerable quantity of evidence for the character and extent of the site was recovered during the investigation and subsequent analysis of archaeological features at Portclew Chapel. The excavations have provided a unique opportunity to investigate a complex site that has the potential to have been in continuous use between the fifth and the fourteenth centuries AD. This discussion will begin by considering the evidence for each period, before contextualising the site more broadly.

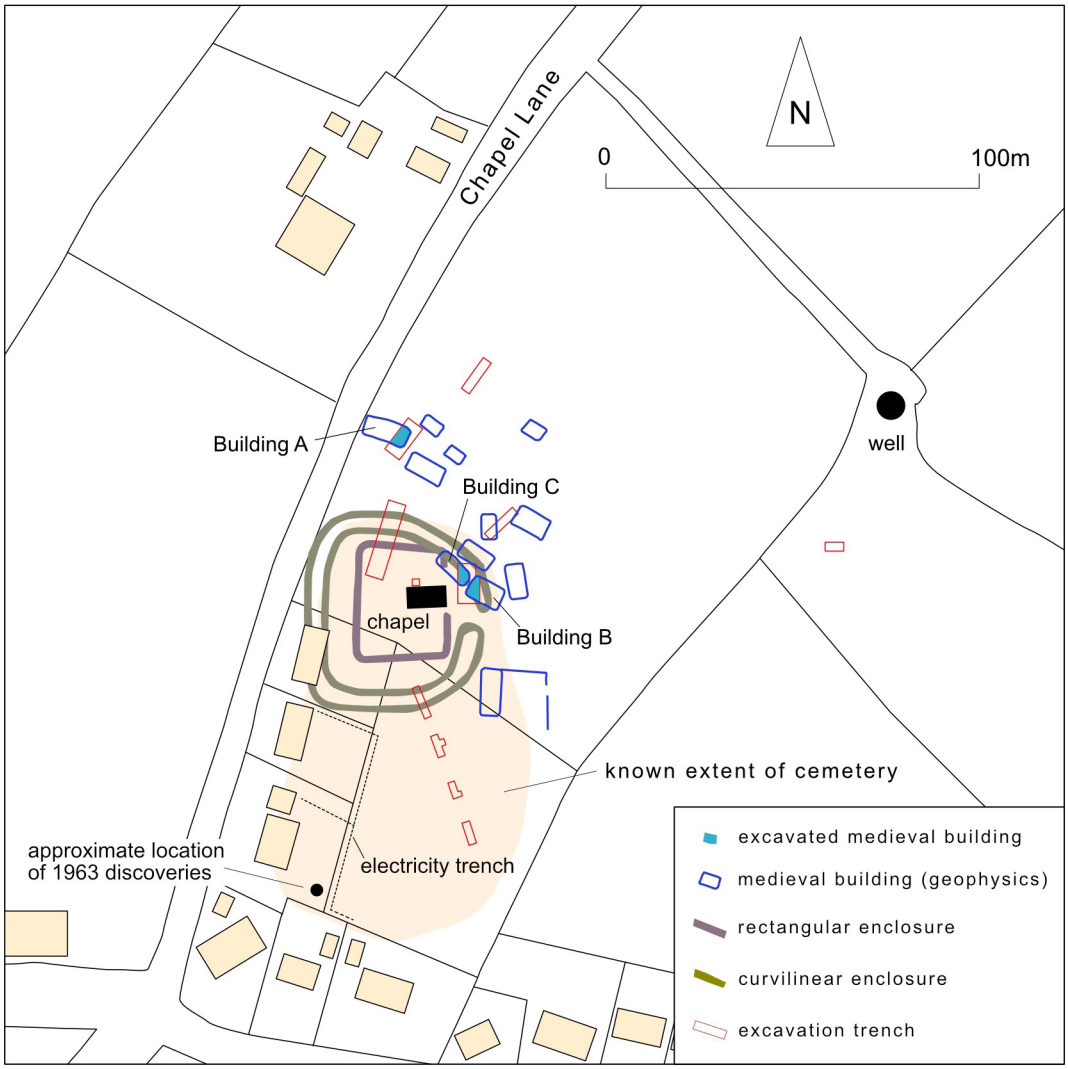

Fig. 10. Plan of all features.

The prehistoric buried soil

With the caveat that the radiocarbon date obtained came from a large fragment of oak charcoal rather than a short-life sample, the early to mid-Iron Age buried soil in Trench 4 suggests human activity in the vicinity of the site during late prehistory. This is supported by a single grain of hulled barley within the soil sample, indicative of nearby cereal cultivation (Caseldine, this article). It is worth noting that Freshwater East Camp, a bivallate coastal promontory fort, is located approximately 500m south-east of the site at Portclew. While no secure dating evidence exists for that site, an association between it and the buried plough soil at Portclew should not be ruled out, given occupation dates obtained from other promontory forts in Pembrokeshire (Murphy 2016; Driver 2023).

The absence of molluscs from the buried soil at Portclew is interesting but is not without parallel. No molluscs were present within a sample from a buried soil below early medieval burials in windblown

sand at Brownslade Barrow, *c*. 12 km. to the west of Portclew (Bell and Brown 2011). The reason for this absence remains unclear (Walker, this article).

The early medieval activity

Radiocarbon dates obtained from burials, pits and ditches at Portclew span the fifth to the tenth centuries AD. Most dates are from single-entity, short-life samples or are from contexts that are bracketed stratigraphically by more securely-dated contexts. However, for fill 137 in ditch 139, and upper fill 103 in ditch 117, the potential for the old wood effect and/or residuality to have affected the dating needs to be considered. Notwithstanding this issue and while there is obviously some overlap, it is possible to identify a broad chronology for the early medieval activity.

Rectilinear ditch and pits

Radiocarbon dates obtained from the basal fill of the ditch, and from one of the pit fills, span the fifth to the seventh centuries AD and thus these represent the earliest cut features that were not graves—some of which may be contemporaneous features. The presence of cattle bone, charred cereal grains and broad beans in the ditch, along with the sherd of E ware (probably in a residual context), suggest settlement in the vicinity during this period and a plausible suggestion is that the rectilinear ditch enclosed a domestic space. Equally however, the E ware and faunal/plant remains might represent the remains of funerary feasting, a tradition that was condemned in the sixth century, but which documentary evidence suggests was still being practised in the seventh (O'Brien 2020, 122–3).

Although neither corn-drying kilns nor quern stones were revealed within the excavated areas, the presence of substantial quantities of charred cereal grains within the fill of the rectilinear ditch suggests crop processing in the immediate area. The cereals, and the quantity of each, that are represented are typical of this period, when barley was the primary crop, but oats were increasingly grown, and free-threshing wheat was replacing glume wheats such as emmer and spelt, neither of which was present at Portclew (Caseldine and Griffiths 2011, 181). The presence of broad beans among the environmental evidence from the ditch is of interest as these have only been recovered from one other early medieval Welsh site—the ninth to tenth-century royal crannog at Llangorse, Monmouthshire (pers. comm. Tudur Davies 2023; see Lane and Redknap 2020).

The presence of the E ware beaker fragment is highly significant because it suggests that this was a site of some importance; the only other sherd of this type from Wales comes from the high-status hilltop site at Dinas Powys. Imported Continental pottery and glass dating from the fifth to the seventh centuries AD is known from an increasing number of early medieval Welsh sites and is understood to be indicative of high-status activity, although it should be noted that the beaker form in other fabrics is common within Merovingian cemeteries (Campbell 2007, James 2016, 478–487; Seaman 2016; see below). Almost half of the Welsh sites that have produced imported material (44%, N=16) are defended hilltop settlements such as Dinas Powys (Vale of Glamorgan), New Pieces (Powys) and Hen Gastell (Neath Port Talbot). The remainder, such as Kenfig Burrows (Bridgend), Longbury Bank and Linney Burrows (both Pembrokeshire) are mostly undefended lowland settlements (Seaman 2016, 43). These generally produce a smaller quantity of evidence for import wares and thus are considered to have been of slightly lower status than the hilltop sites (ibid., 43). A relationship between defended and undefended sites involving redistribution through networks of patronage, clientship, tribute and render has been postulated to explain the nature of the distribution (Cuttler *et al*. 2012; Seaman 2016, 43).

Although the site at Portclew occupies a hilltop location it does not have the attributes of a fifth to seventh-century, high status, defended settlement. The shallow, non-defensive nature of the rectilinear ditch, the absence of any evidence for an associated bank, and the single sherd of E ware indicate an

undefended site of more modest significance. While the potential for further imported material to be present clearly exists, as the site is not fully excavated, the lack of substantial earthworks excludes any alternative interpretation. Moreover, should the creation of a defended site have been desirable then a number of nearby locations, such as Freshwater East Camp, Trewent Point or Greenala Camp—an Iron Age multivallate promontory fort—would be eminently more suitable. Instead, the location of the site at Portclew suggests a role in trading, perhaps involving a market on the wide, sandy beach below, as has been suggested for other undefended coastal sites that have produced import wares, such as Kenfig Burrows (Campbell and Lane 1993, 66; James 2016, 485).

The function of the early medieval intercutting pit group is difficult to determine. There was no evidence for post pipes, and during the excavation, these features were thought to represent a group of former rubbish pits sited along the northern edge of the area enclosed by the rectilinear ditch. However, neither animal bone, charred cereal grains, nor any other plant remains were present within the pit fills, which casts doubt on the validity of that interpretation.

Burials and curvilinear ditches

Since the 1960s, burials have been recorded in several locations around the chapel at Portclew indicating a cemetery of considerable size (Fig.10). Dates of cal AD 430–610 and cal AD 430–650, obtained from Sk006 and Sk005 respectively, indicate that burial could have begun by the mid-fifth century. Assuming a post-Roman origin for the site, this means that the earliest burials either slightly pre-date or are contemporary with the rectilinear ditch and associated intercutting pit group. However, except for a possible neonate burial represented by an assemblage of teeth in Trench 1, and a second neonate found during post-excavation within the fill of the ditch, they do not appear to have been enclosed by it: all the undisturbed burials yet recorded lie south or east of that feature. The presence of neonate bone within the ditch and the area that it enclosed is therefore of interest, as it hints at the possibility of a separate burial location for the very youngest individuals in the community; a practice that has been identified in Wales during the Late Iron Age, Roman and early medieval periods (Shiner 2021a; Nelson-Viljoen *et al*. 2021). Similarly, the presence of white quartz pebbles along with the sherd of E ware and fragments of animal and (presumably) redeposited human bone in pit fill 8022 is of interest. Such pebbles are frequently found in association with early medieval burials and recent research suggests they were considered to have amuletic properties (Murphy and Hemer 2022; Shiner and Hemer, in prep.).

Some of the individuals whose graves were recorded were found within dug graves while others were found within a grave cut that was lined with stone slabs, known as a ‘long cist grave’ (Thomas 1971, 49). Among the latter, varying degrees of cist construction were observed; not all cists had lintel stones, although these could have been capped with timber planks that did not survive to be detected (Kenney 2001, 7; Longley 2009, 111; Groom *et al*. 2011; Shiner 2023). Similarly, dug graves may once have had timber linings (Shiner 2023). Thirteen graves were oriented (E-W with the head to the west) but twelve were aligned SW-NE, two were aligned NW-SEand two were WSW-ENE. All individuals whose graves were fully excavated were in an extended, supine position with the head to the western end of the grave and there was no evidence for either grave markers or grave goods.

With the caveat that this is an extensive burial ground that is not fully excavated, the funerary practices observed at Portclew are typical of early medieval Wales, where extended inhumation had replaced cremation as the dominant funerary rite by the fourth century (Pollock 2006, 74). For instance, research has shown that while oriented burial was common, it was by no means the norm (Longley 2001, 318–9; James 2016, 429; Shiner 2024, 229). Similarly, varying degrees of grave elaboration are observed both within and between early medieval Welsh cemeteries (James 2016, 428–448; Shiner 2024, 229). Although the reasons for this are not clear, it has recently been shown that the likelihood of burial in a stone or

slab-lined grave decreased with increasing age-at-death in Wales during this period and was significantly more likely for those who died before they were a year old. The dataset that produced this result included burials from St Patrick's Chapel (Pembrokeshire), where almost forty percent of individuals (at the time the research was undertaken) were aged less than one year at death, but a statistically significant result was obtained both with and without those data, suggesting that the observation was valid (Shiner 2021a, 186–7). Moreover, although lack of skeletal material prevented inclusion of the cemetery at Arfryn (Anglesey) in the above study, it was noted that infants at that site tended to be buried in cists, while older juveniles and adults were 'most often associated with unprotected dug graves' (Hedges *et al*. 2016, 153). Among those individuals from Portclew whose age-at-death is known, all individually buried non-adults were in slab-lined graves, while both dug graves were those of adults, although both also contained the bones of non-adults. The disarticulated bones of an infant, present with Sk006, probably represent redeposit of a disturbed burial, but it is possible that an individual aged one to six years at death, found among the bones of Sk002, represents a double burial. That Sk002 was an adult male does not cast doubt on this suggestion, as double burials of adult males and non-adults are known from other early medieval Welsh cemeteries (Shiner 2021a, 184).

The isotopic analysis of dental enamel from the excavated burials from Portclew suggested considerable geographical mobility among those individuals. This has added to a growing corpus of evidence for mobility and migration during the early medieval period, including that of children, who may either have travelled with their families, or as fosterlings, apprentices or slaves (Hemer *et al*. 2013; Hemer 2014; Hemer and Evans 2018). The teeth of Sk003, for instance, had developed while that individual may have been living in a far warmer climate, perhaps somewhere around the Mediterranean, yet they were buried at Portclew having died aged between five and eight years old.

The analysis of dietary isotopes indicated a reliance on terrestrial rather than marine resources among the individuals whose burials were excavated. Despite the proximity of the site to the coast, this is not unexpected. The results are in keeping with those obtained from individuals buried in other coastal early medieval Welsh cemeteries prior to what has been termed the 'fish event horizon'; an increase in the consumption of marine fish, and in commercial marine fishing, after the late tenth century (Barrett *et al*. 2004, 618; Hemer 2011; Faillace and Madgwick 2019, 15; Edwards 2023, 211–12). At Portclew, this shift in resource exploitation is illustrated by evidence that by the twelfth and thirteenth centuries, the occupants of the site were probably using marine molluscs as fish bait (Walker, this article).

The earliest radiocarbon dates for the curvilinear ditches were obtained from a fill of the inner ditch in Trench 2 and span the late seventh to late ninth centuries AD. This ditch surrounded the area enclosed by the earlier, rectilinear ditch as well as several burials. However, it appears that the burial ground continued to expand as some of the burials present in Trench 2 were outside the area enclosed by the seventh-century ditch. One of these was the burial of Sk003, dated to the mid-seventh to late eighth century. Burials dating from the sixth to seventh and the seventh to ninth centuries were also present in Trench 3, outside the area enclosed by the ditch, and further undated burials were revealed in Trench 4, further to the south-east. This expansion may be what necessitated the creation of the outer curvilinear ditch, the fill of which returned a late eighth to early eleventh-century radiocarbon date. By the time it was created, it seems that the full extent of the cemetery was not known, as the burials located in Trenches 3 and 4 were not encompassed by this ditch. This is also a further indication that graves may not have been marked. It is important to note that neither of the curvilinear ditches could have served as an effective defence, therefore it seems that their function was simply to create a bounded space; a phenomenon that has also been observed at early medieval cemeteries in Ireland (Corlett and Potterton 2014, *passim)*. It is also worth noting that far fewer charred cereal grains were present within these ditch fills than within the

fill of the earlier, rectilinear ditch, suggesting a reduction, or perhaps even cessation, of nearby settlement activity during this phase of use of the cemetery.

The latest radiocarbon date obtained from human bone from the site indicates that burial might have continued until the tenth century. However, since the site is not fully excavated, the potential for unexcavated burials contemporary with the twelfth to thirteenth-century chapel and settlement clearly exists.

The later medieval settlement

The discovery of twelfth to thirteenth-century buildings at Portclew was unexpected, as there was no above-ground evidence for a settlement around the chapel. Although only three buildings were excavated the geophysical survey suggests the potential for up to thirteen additional structures to be present, suggesting a nucleated settlement comprising a group of five buildings—including Building A—clustered around the chapel, a slightly smaller cluster—including Building B—a little to the north-west, and two 'outliers' (Fig. 10). While the true nature of the settlement remains unclear the excavated structures are of importance for the evidence they provide regarding the character of the site, and of medieval Welsh settlement more generally.

Buildings A and B were both constructed on a level area terraced into the bedrock while the extent of Building C was indicated by the line of a gully, and by a spread of dark humic sand similar in character to a floor deposit identified within Building A. No evidence for walling or roofing was associated with Buildings A and C, suggesting that both might have been clom-walled, thatched structures. For Building A, the presence of former clom walling is suggested by the space between probable drip gullies and the edges of the sunken floor. In contrast, Building B was bounded by a dry-stone revetment wall and produced three sherds of ridge tile, one of which was glazed. Along with fragments of roofing slate, present in a dump of demolition material elsewhere in the trench, this indicates that Building B—which was adjacent to the chapel—was of higher status than Buildings A and C and it seems plausible to suggest that this might have been a priest's house, although the glazed tile could be from the roof of the chapel.

Internal divisions within Buildings A and C were indicated by beam slots and postholes. While it is possible that flat stones revealed within Building B represent post pads associated with internal divisions their proximity to the two hearths within the building suggests that a function as pot stands is more likely. If this is the case then internal divisions within the building may have been created by light screens, represented by stake holes in the interior. However, if, as seems likely, hearth 8023 was central to Building B then less than half the internal area has been excavated, and evidence for more substantial internal divisions may yet be present.

All three structures produced twelfth to thirteenth-century ceramics representing cooking pots and jugs. However, a far greater quantity of this material was recovered from Building A than from Buildings B and C. Similarly, the majority of faunal remains that could be securely associated with buildings were recovered from Building A, which produced evidence for sheep/goat, cattle and pig along with a fragment of red deer antler (Higbee, this article). Although the assemblage need not represent the remains of more than one complete animal of each species, the contrast with Building B, which could only be securely associated with one horse metatarsal, one sheep/goat molar and one cattle molar, is striking. Together with the ceramic evidence this suggests that different activities may have taken place within each building. Regrettably, the animal bone assemblage from the site was too small to permit the type of analysis that can provide an indication of the local pastoral economy and enable comparison with contemporary local assemblages. However, by virtue of their larger size, it is considered likely that cattle provided the bulk of the animal-based protein consumed, while the body part data suggests local slaughter and consumption (see Higbee, this article).

Cereal remains from samples associated with the buildings demonstrate the cultivation of bread wheat, barley, oat and pea, while the variety of weed seeds present indicates cultivation on heavy clays and damp ground, as well as lighter, loamy soils. A diet supplemented by marine resources and foraged foodstuffs is indicated by the presence of marine molluscs, fish bones and plant remains, such as crab apple, hazel nut and bramble. All plant remains were charred and are likely to represent the remnants of fuel waste from fires (Caseldine and Griffiths, this article). They demonstrate the deliberate burning of crop processing waste and, possibly, animal bedding, evidenced by the presence of chaff, straw and bracken. They also hint at different activities taking place within each building, as fragments of charred bone, fish bone and marine mollusc were only present in the sample taken from the area between the two hearths in Building B (ibid.).

All features associated with the settlement were below a deposit of windblown sand and it is tempting to suggest that sand inundation, which is documented during this period, is what led to its abandonment. For example, in December 1330, eleven cottages and twenty-eight acres of land at Rhosyr (Anglesey) were overwhelmed by sea and sand (Hopewell 2016, 4). Closer to Portclew, sand inundation during either the fifteenth or the sixteenth century probably caused the abandonment of a small medieval settlement at St Ishmael, on the south coast of Carmarthenshire (Murphy and Meek 2022). However, the archaeological evidence indicates a gradual, rather than catastrophic, accumulation of sand at Portclew. While the high soil/sand acidity means that we cannot know whether roofing and other structural timbers might have been removed for re-use elsewhere, pottery was the only artefactual evidence recovered, suggesting the removal of other items prior to abandonment. This is supported by the environmental analysis, which has revealed that the windblown sand present across the site accumulated relatively slowly. Other factors must therefore be considered, and it may be pertinent that the mid-fourteenth-century date for the latest occupation of the site, suggested by the ceramic assemblage (Courtney, this article), coincides with the bubonic plague event of 1347–51, that became known as the Black Death (DeWitte 2010, 3394).

Portclew in context

Close parallels for the early medieval phase at Portclew are known from several other sites in Wales. Llanelen Chapel and Llancadle South II, both Vale of Glamorgan, Capel Maelog, Powys, Wylfa Head, Parc Cybi, both Anglesey, Brownslade Barrow and West Angle Bay, both Pembrokeshire, have all produced evidence for early medieval settlement and contemporary burial. Both Capel Maelog and West Angle Bay also had sequences of non-defensive ditch construction, beginning with rectilinear examples, while Llanelen Chapel and Llancadle South II have also produced fifth to seventh-century import wares (Britnell *et al.* 1990; Schlesinger *et al*. 1996, Groom *et al*. 2011; Hudson et al 2018; Kenney *et al*. 2020; Seaman and Davies 2023; Davies and Seaman 2024). These Welsh sites have recently been characterised as multifunctional cemeteries; sites where non-funerary activity took place in additional to burial (Shiner 2021b). Further investigation of Welsh examples is necessary to fully understand them, but it seems likely that they are associated with a range of site types, including assembly places and domestic settlements. They have parallels on the Continent (Theuws 1999; Zadora-Rio 2003), in Anglo-Saxon England (Kjølbye-Biddle 1992; Murray and McDonald 2006) and in Ireland, where they are known as cemetery-settlements to distinguish them from ecclesiastical burial grounds (O'Sullivan *et al*. 2008; Ó Carragáin 2009; 2010). These Irish sites provide the closest parallels with published Welsh examples, typically having one or more enclosure ditch, evidence for non-funerary activity including metalworking and/or crop-processing in the immediate vicinity, no contemporary ecclesiastical or domestic structures on the site and, crucially, a *terminus post quem* of the fifth century AD or later for the onset of burial (Shiner 2021b, 269–270). For instance, in the northern half of a site occupying a coastal ridge overlooking the sea at Ninch, Laytown, Co. Meath, a succession of concentric ditches associated with a settlement

originating in the sixth century subsequently became the focus of an unenclosed roundhouse settlement and then a seventh to ninth-century burial ground. A quantity of animal bone, and several sherds of E ware were recovered from the phase 2 concentric ditch, which had truncated two intercutting pits that were interpreted as hearths. During the late tenth or early eleventh century, a settlement comprising rectilinear dwellings of a non-indigenous type was established in the southern half of the site (McConway 2014). At Parknahown 5, Co. Laois, a large, fifth to mid-seventh-century circular enclosure ditch was succeeded by a second, larger, double-ditched enclosure between the mid-seventh and the mid-ninth centuries. A burial ground in the northern area of the original enclosure was in use between the fifth and the twelfth to thirteenth centuries and was enclosed by a small, penannular ditch sometime between AD 800 and 1020. Settlement was suggested by a circular structure represented by a slot-trench and associated postholes, along with several other postholes and pits, some of which were below later burials, and by a considerable quantity of evidence for smelting and smithing (O'Neill 2009).

Turning to the later medieval phase at Portclew, medieval structures comparable to Buildings A and C are known of from the town of Newport, Pembrokeshire, where three buildings averaging *c*. 9m by 3m were represented by floor hollows and drainage gullies. Although no evidence for internal divisions was revealed, Building 1 contained two adjacent floor hollows, one of which contained a central hearth. Pottery from the site demonstrated use during the thirteenth century and the structures were interpreted as having been earth walled dwellings with shale tiled roofs (Murphy 1994). Another similar structure, evidenced by a drip gully, floor hollows and postholes indicating multiple rooms has recently been excavated to the west of Llanddewi Velfrey, Pembrokeshire, and has also produced twelfth to thirteenth-century pottery (Luke Jenkins pers. comm.).

Medieval stone dwellings with rounded external corners but squared internal corners have been recorded at several sites in north-west Wales (Longley 2006, 66), but closer parallels for Building B, the twelfth to thirteenth-century sunken floored building with revetted stone walling, come from south-east Wales. At Rhossili, West Glamorgan, a large, stone-built house with clay bonding and rounded corners has produced twelfth to thirteenth-century pottery (GGAT PRN 01862w). Dry-stone dwellings, interpreted as early halls, have also been found in twelfth to thirteenth-century manorial contexts at Penmaen Castle, West Glamorgan, Sully Castle and Llantrithyd Castle, South Glamorgan. The example at Sully was associated with structures interpreted as storehouses or accommodation for retainers (Robinson 1982, 104). A contemporary dry-stone structure was present in an ecclesiastical context at Burry Holms, West Glamorgan, and dry-stone peasant dwellings have been excavated at Cosmeston and Highlight, both South Glamorgan (Robinson 1982, 103–105). Postholes were present within many of the examples above, and all walls had rounded corners, probably with a sloping/hipped thatched roof resting on them, supported centrally on wooden poles. As a group, these examples from Glamorgan have been interpreted as 'one of the earliest traditions of vernacular architecture which must have followed the Norman invasion of the region' (Robinson 1982 104).

However, sunken floors are not a feature of these buildings. Sunken-floored buildings dating from the tenth century have been excavated at Llanbedrgoch, Anglesey, and eighth to tenth-century examples are known from South Hook, Pembrokeshire, but, in both instances, the walling material was timber (Crane and Murphy 2010). Also in Pembrokeshire, a seventh to tenth-century, rectangular, sunken-floored probable building has been excavated at Conkland Hill, but no evidence for either revetment or walling was present (Hart 2014, fig. 8).

The closest parallels for Building B at Portclew are found in south-west England although there, they date from the seventh to the eleventh centuries AD (Wood 2015, 79). For example, at Gwithian, on the north Cornish coast, a complex of fifth to eighth-century seasonal industrial workshops comprised small buildings dug into earlier windblown sand. Turf and soil walls were revetted with stone to hold back

the sand, and stone-lined hearths were centrally located (Nowakowski *et al*. 2007, 42). Buildings with a similar construction method have been excavated at Tean (Isles of Scilly) but remain unpublished (ibid., 44), while sunken floored buildings in shallow hollows, one of which was stone-revetted, have been excavated at Crane Godrevy, Cornwall, and have produced ninth to twelfth-century pottery (Wood 2015, 80).

Of particular interest among Cornish examples of sunken floored buildings are two sites that are located close to medieval churches. Two hundred metres from the church at Llanteglos, a structure measuring *c*. 4m × 2.3m that has produced ninth to eleventh-century pottery was cut into bedrock and revetted with a clay bonded stone wall (ibid., 81). At Gunwalloe, a platform that had been dug through existing occupation and midden deposits accommodated a structure measuring 3m × 6–7m with no evidence for internal divisions. Revetment walls were clay bonded and three were clay-faced internally; the fourth was constructed in such a way as to create a herring-bone pattern and was clearly intended to be seen. Material from the hearth produced a radiocarbon date of cal AD 1030–1210. Pot sherds were the only artefactual evidence present, and it has been suggested that other items were removed prior to abandonment of the building (ibid., 78–9).

The closest Welsh parallel for Portclew is Capel Maelog, Powys, excavated by the Clwyd-Powys Archaeological Trust (Britnell *et al*. 1990) (Fig. 11). There, evidence for settlement pre-dating the first-phase church, in the form of plough-marks, rectilinear and curvilinear ditches, pits and possible roundhouse drip gullies, has produced radiocarbon dates that broadly span the mid-fourth to the early eleventh centuries AD.[17] The earliest burials at the site were located outside the ditches, to the west (ibid., 33–5, 82). A sample of coffin wood from one of these early graves has returned a date of cal AD 770–1150, with an 89% probability that it falls within the range cal AD 821–1027 (CAR–939). Prior to construction of the first phase church (above some of the burials), a north-south aligned ditch was back-filled; material from that fill has been dated to cal AD 1050–1380 (CAR–940), giving a *terminus post quem* of the mid-eleventh century for the building. Bone preservation in most later burials within the church was good, but an absence of skeletal material in graves below them indicated that the area of the earliest burials was exposed to the elements for a considerable period before the construction of the building, and therefore that no earlier church had been present (ibid., 38–9).

Several postholes, some stake holes, a gully and a hearth represented possible evidence for a later medieval building, interpreted as a priest's house, just north-west of the church at Capel Maelog. No dates were obtained, but a concentration of thirteenth to fourteenth-century pottery representing at least six vessels was found in this area. (ibid., 40). No other structural evidence was present within the excavated area, but later settlement was also indicated by faunal remains, including possible antler, found in the fill of a gully west of the church which has been dated to cal AD 1420–1640 (ibid., 41). Finally, within and around the church were sherds of a further 121 vessels of eleventh to fourteenth-century date, the majority of which were cooking pots (72%, n=91). While their presence was noted as unusual in an ecclesiastical context, it was seen as evidence for ecclesiastical activity, or for secular activity focused on the church (ibid., 60–63, 88).

Britnell *et al*. (1990) considered that at Capel Maelog, "*The evidence of earlier activity between the late 4th and 10th centuries, and the proprietorial nature of the foundation of many churches in the 11th and 12th centuries hint that the church owes its origins to the existence of a secular estate of some antiquity*" (ibid., 89). The fifth to eleventh-century evidence for non-funerary activity in the vicinity of the burial ground at Portclew, as we have seen, suggests the existence of a high-status secular estate, and the glazed ridge tile suggests that the subsequent medieval settlement was also of quite high status (pers. comm. Imogen Wood 2023). While we cannot rule out a proprietorial foundation for Portclew Chapel during the eleventh/twelfth century, it may be significant that Portclew lies within the lands of

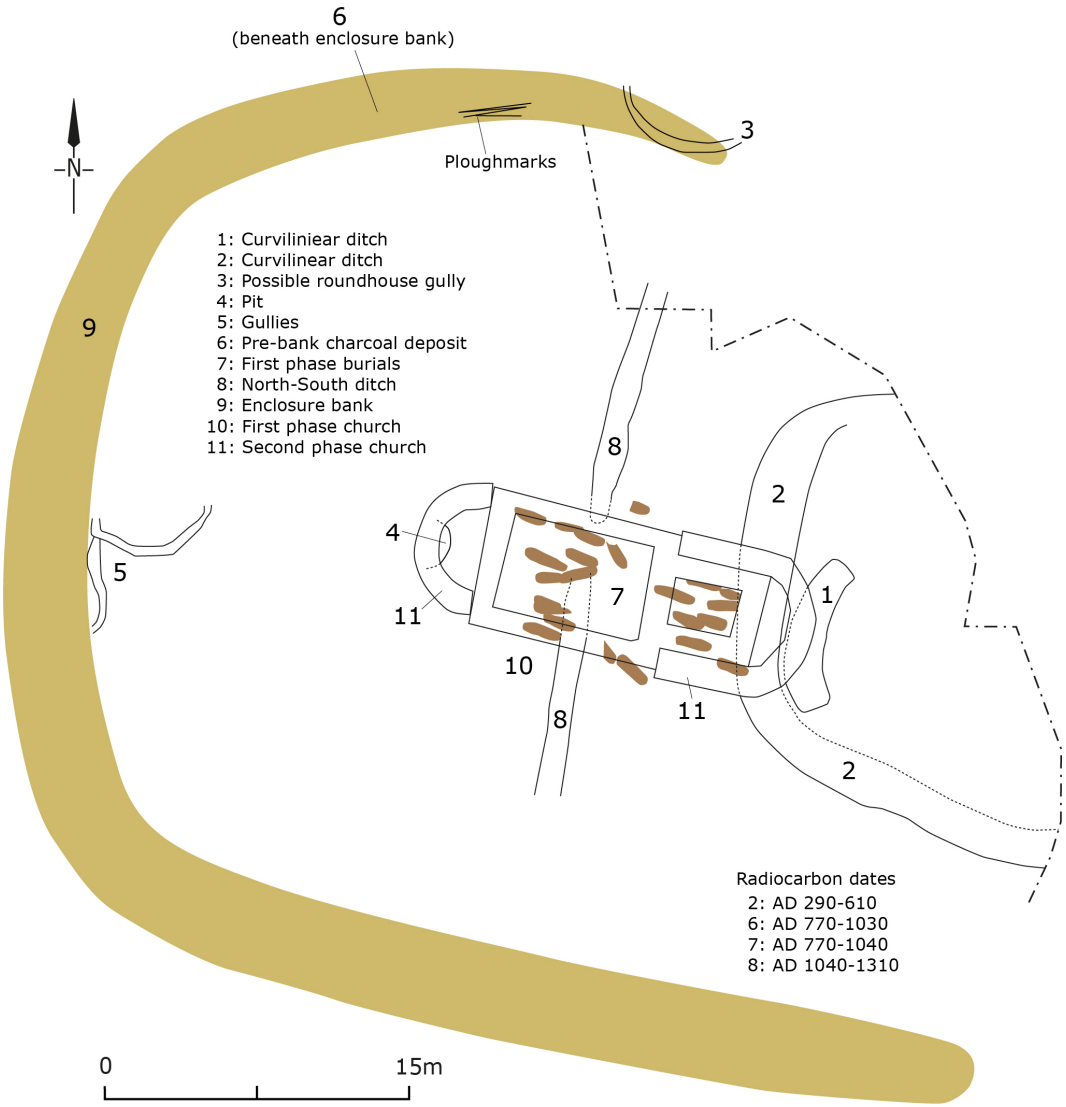

Fig. 11. Plan of features at Capel Maelog (after Britnell *et al*. 1990, fig. 3).

the Bishop of St Davids. The cult of St David (and presumably its estates) was exceedingly active during the late ninth/tenth century, and the land at Portclew could feasibly have been given to St Davids during this period. Burial might have ceased at this point, shifting instead to a church cemetery such as nearby Lamphey; a pattern seen both in Wales and south-west England at this time (Turner 2006, 139; Petts 2009, 126). This could explain why at Portclew, unlike Capel Maelog, there was no evidence for the type of circular embanked churchyard enclosure typical of medieval Welsh churches that have an early medieval origin. The settlement-related activity would have continued, but now on an estate in ecclesiastical rather than secular ownership (with the later addition of a chapel perhaps for financial reasons) which survived for several centuries before a combination of factors resulted in its abandonment.

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NOTES

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5. The late Paul Courtney, d. 2013.
6. Formerly of the University of Wales Trinity St David, College St, Lampeter SA48 7ED.
7. University College London Institute for Archaeology, London.
8. Wessex Archaeology, Portway House, Old Sarum Park, Salisbury, SP4 6EB.
9. Formerly of Dyfed Archaeological Trust, Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AE. Director of the Portclew excavations.
10. Visiting Research Fellow in the Department of Archaeology, University of Reading,
11. A note on the burials found in the electricity trench was compiled by L. and D. Austin and is lodged in the Dyfed Historic Environment Record as PRN 44002.
12. Recorded on the Dyfed Historic Environment Record as PRN 83036.
13. The *Early Medieval Ecclesiastical Sites Project* (EMES) formed part of a pan-Wales, Cadw grant-aided project, intended to redress a notable imbalance in the archaeological record for the period. The *Pembrokeshire Cemeteries Project* was a Cadw grant-aided spin-off, aimed at characterising a number of sites identified by EMES through targeted excavation.
14. The chapel is recorded in the Dyfed Historic Environment Record as PRN 4194 and the well as PRN 102717.
15. Pembrokeshire Sheet XLIII.3. Ordnance Survey 1:2500 first edition map.
16. Graphic representations of the results of particle size and loss on ignition analysis by Tom Walker are available to view in the excavation archive.

17. Radiocarbon dates for Capel Maelog and Conkland Hill have been recalibrated using OxCal v. 4.4 using the IntCal20 atmospheric calibration curve. The date ranges were calculated using the maximum intercept method and, where quoted, are at 2 sigma with the endpoints rounded out to five years.

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