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GRAEME KIRKHAM AND PETER ROSE

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Contents

Contributors

(Corresponding authors only)

Zoe Arkley	Email: zoe.arkley@cotswoldarchaeology.co.uk
Mark Bowden	Historic Places Investigation Team West, Historic England, The Engine House, Fire Fly Avenue, Swindon SN2 2EH. Email: mark.bowden@historicengland.org.uk
James Gossip	Cornwall Archaeological Unit, Fal Building, New County Hall, Treyew Road, Truro TR1 3AY. Email: jgossip@cau.org.uk
David Gould	Email: D.R.Gould@exeter.ac.uk
Steve Hartgroves	Email: steve.hartgroves@btinternet.com
Andy M Jones	Cornwall Archaeological Unit, Fal Building, New County Hall, Treyew Road, Truro TR1 3AY. Email: andjones@cau.org.uk
Matthew Knight	Department of Scottish History and Archaeology, National Museums Scotland, Chambers Street, Edinburgh, EH1 1JF. Email: M.Knight@nms.ac.uk
Ann Preston-Jones	34 Dobbs Lane, Truro TR1 3NB
Paul Rainbird	AC archaeology, Unit 4, Halthaies Workshops, Bradninch, Exeter EX5 4LQ. Email: prainbird@acarchaeology.co.uk
David Shepherd	Email: avidshepher@gmail.com

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Later Neolithic pits and an Iron Age and Romano-British settlement at Penryn College

JAMES GOSSIP AND ANDY M JONES

with contributions from WENDY CARRUTHERS, NINA CRUMMY, ROWENA GALE, GRAEME KIRKHAM, ANNA LAWSON-JONES, HENRIETTA QUINNELL, ROGER TAYLOR, CARL THORPE AND SUSAN WATTS

Archaeological monitoring during the redevelopment of playing fields at Penryn College, Cornwall, revealed activity dating to the Late Neolithic and to the Iron Age – Romano-British period. The Neolithic evidence took the form of pits containing Grooved Ware, the eighth occurrence of this pottery type to be found in Cornwall. Three radiocarbon dates were obtained, indicating activity in the period 2900–2400 cal BC. The investigations also revealed a Middle to Late Iron Age ditched rectilinear field system, over which a settlement of two curvilinear enclosures and several post-built structures developed between the Late Iron Age and the second century AD. A Romano-British toilet set, the only example found to date in Cornwall, appears to have been deposited in one of the structures as a votive object.

NB. This paper was completed prior to analysis of the major Later Neolithic Grooved Ware assemblage excavated at the Truro Eastern District Centre (TEDC) site (Taylor 2015). The content has not been updated to reflect the findings from this discovery.

During June and July 2007 Cornwall Council Historic Environment Projects (now Cornwall Archaeological Unit) carried out a programme of archaeological recording in advance of the redevelopment of playing fields at Penryn College, Penryn. Initially, an archaeological watching brief was undertaken during soil stripping. In the light of significant findings this work was expanded to a larger-scale excavation.

Location and context

The site lies on an east-facing slope on the western outskirts of Penryn, centred on SW 77535 34336 (Fig 1). It is located within an area which was formerly farmland, modified as playing fields for Penryn College during the second half of the twentieth century. Formation of the playing fields required both terracing into the hillslope and the removal of field boundaries. The site has subsequently been developed. Directly to the west is the site of the former historic farm settlement of Parkengew, shown on the second edition Ordnance Survey 25in: 1-mile map of *c* 1908 but no longer extant. The place-name incorporates the Cornish element *kew*, a hollow or enclosure (Padel 1985, 57).

Geologically, the site is located close to the junction between the igneous granite of

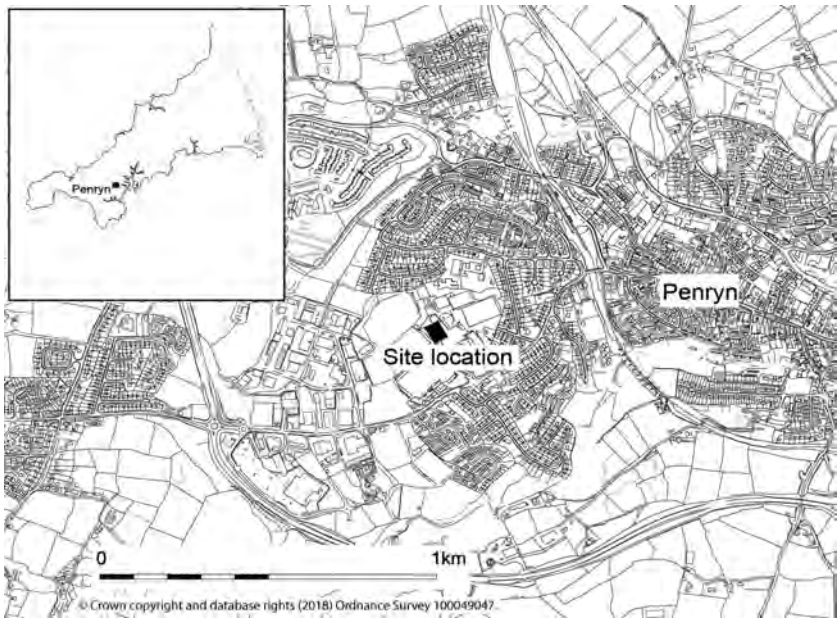

Fig 1 Penryn College: location.

Carnmenellis and the Devonian Mylor Beds. This has resulted in the exposed bedrock being categorised as metamorphic, with visible quartz veining and frequently contorted killas (Geological Survey of Great Britain 1974) and granites and other igneous rocks occurring. Soils in the area are Moretonhampstead series loam over granite.

The site is situated roughly 700m south east of the universities of Falmouth and Exeter campus at Tremough, Penryn, which has produced extensive evidence for prehistoric activity ranging from the Neolithic to Romano-British periods. This has included Late Neolithic 'ritual' pits dated to *c* 2900–2300 cal BC, a Middle Bronze Age settlement and ceremonial landscape (*c* 1500–1200 cal BC), an Iron Age field system and Roman-period enclosures (Gossip and Jones 2007; 2009–10; Jones *et al* 2015) and, most recently, medieval activity in the form of a structure, probably agricultural (Gossip, in preparation a).

The excavations

James Gossip

Initial evidence from evaluation trenching suggested that settlement of Iron Age or Romano-British date lay within the development area. These results led to the controlled topsoil stripping and archaeological recording of an area of approximately 0.25 ha. The topsoil comprised clayish silt loam, mostly about 0.3m deep, containing occasional angular stone. Along the western edge of the site the topsoil depths were considerably greater, up to 1.45m, having been built up through levelling of the playing field. In other places the levelling of the area had evidently resulted in the truncation of many features, which were in places very poorly preserved.

Within the stripped area archaeological features were dense, and it was evident that more than one phase of activity was represented. Analysis of stratigraphy, the finds and scientific dating together indicate four main phases of activity with areas of overlap (Fig 2). Many of the deposits produced no artefacts and chronology has been inferred from stratigraphic and spatial relationships.

In this report structures are denoted by numbers without brackets; for example, wall 25. Context numbers for cuts – ditches, pits, postholes and similar features – are shown in square brackets [34] and fills, layers and other deposits are shown with round brackets: (20).

Fig 2 Phase plan: Late Neolithic – Romano-British features.

Phase 1: Late Neolithic (*c* 2900 to 2500 cal BC)

Grooved Ware pits

A group of pits (Fig 3) was revealed close to the southern extent of the stripped area, falling within an Iron Age – Romano-British enclosure (below). These included a shallow, bowl-shaped pit [312], 0.9m in diameter and 0.25m deep. Sherds of decorated Grooved Ware pottery came from the fill (12) and a large flat stone appeared to have been deliberately laid against the western edge of the feature. Two further pits were recorded just to the north. One of these, [97], was vertical-sided, 0.95m deep and 2m in diameter with a flat base. It contained a number of silty clay deposits from which Grooved Ware pottery sherds and flint were recovered (Quinnell, below; Lawson-Jones, below). These deposits were distinguished by varying shades of brown indicating different episodes of erosion and deliberate backfilling over a period of time, with some deposits the result of natural erosion and others representing deliberate discard into the pit.

The basal fill (98) of pit [97] contained hazel charcoal (Gale, below) which gave a radiocarbon determination of 4005 ±30 BP, 2580–2468 cal BC (SUERC-19979). A sherd from pit [312] had residue from which a determination was obtained of 4000 ±30 BP, 2577–2468 cal BC (SUERC-19980). Hazel charcoal from the same context yielded a determination of 4080 ±30 BP, 2857–2496 cal BC (SUERC-19984).

To the north of [97] were four intercutting pits, [160], [161], [162] and [163], all between 0.3m and 0.6m deep with steep-sided concave profiles. These also produced Grooved Ware sherds and [161] and [162] contained flint. Adjacent bowl-shaped pit [83], 0.9m in diameter and 0.3m deep, also contained Grooved Ware in the upper fill (82) and a shattered cobble in primary fill (94).

The radocarbon dates suggest that use of the site occurred at about the same time as the earliest Grooved Ware activity at nearby Tremough, for which a date of 2861–2489 cal BC (Wk-14999) was obtained (Gossip and Jones 2007, 113).

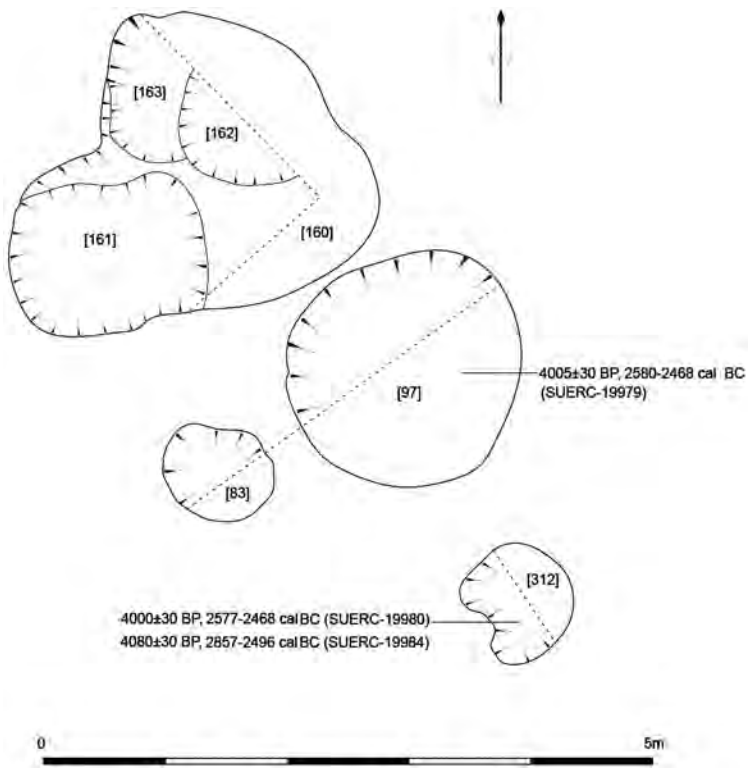

Fig 3 Late Neolithic Grooved Ware pits.

Phase 2: Middle to Late Iron Age and beyond (third century BC to first century AD)

Rectilinear field system

A series of linear ditches formed a field system of Middle to Late Iron Age date, probably maintained into the first century AD, when a small settlement was superimposed on part of it (Fig 4). Ditch [264] was aligned north west – south east with a return towards the south west. Concave in profile, 1.15m wide and 0.12m deep, it extended at least 35m to the north towards the outer limit of the excavation where it was recorded as ditch [5]. Here it was far more deeply buried as a result of redeposited topsoil and was located at a depth of 1.45m below the surface of the field. The fill (10) was a dark, greyish-brown clayey silt with a plastic texture.

Ditch [289] lay to the south of and parallel to the south-west return of [264]. This extended beyond, and was cut by, the northern terminal of ditch [259], which formed part of the later enclosure 2 (Fig 6). A later phase of ditch [289] was indicated by a recut, [174], a truncated section of gully (0.06m deep), suggesting maintenance of the ditch over a period of time (possibly during continued use of the site in the Roman period). South Western Decorated Ware was recovered from (10), the basal fill of ditch [5], as well as from recut [174] (Quinnell, below).

Ditch [58] may be part of the same field system, as it lies parallel with ditch [5] and perpendicular to [289] (Figs 4, 6 and 7). Abraded South Western Decorated Ware was recovered from ditch [91], a spur at the southern end of ditch [58]. Adjacent to the south was ditch [66] (Fig 6), which continued the boundary alignment to the south east. Despite

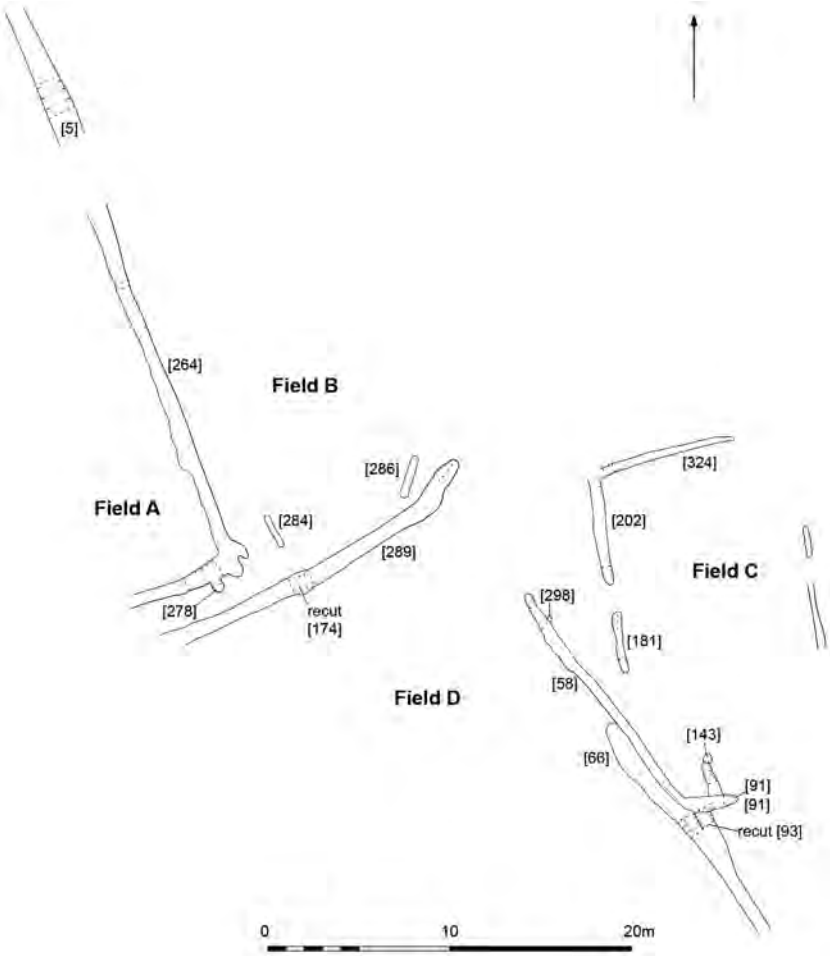

Fig 4 The Late Iron Age field system.

Late Iron Age pottery from [91] and Cordoned Ware from ditch [66] (suggesting activity in the late first century cal BC and first century AD, but possibly residual), the relationship between these two ditches is uncertain as they appeared to run alongside each other. It is possible that [66] is the earlier ditch, and part of the field system; while [58] is later and formed part of enclosure 2, superimposed on the field system. Two long bones from a sheep-sized animal were recovered from ditch [66] (Randall, below). Some maintenance of ditch [66] is suggested by recut [93].

To the east, on a slightly different alignment, was an L-shaped ditch made up of features [202] and [181], aligned broadly north – south, and east – west ditch [324] to the east. The fill (325) of ditch [324] was cut by a later curvilinear ditch [200] forming enclosure 1 (Fig 5). Lengths of truncated ditch parallel to ditches [202] and [181] were recorded to the east but were not excavated or numerated (Fig 4). The truncated ditch sections appear to form an enclosure or plot at least 10m wide and more than 15m long, with a 1.5m wide entrance on the western side between the terminals of ditches [202] and [181]. Although it is possible that they represented part of a reorganised field system, there is also the possibility that they form part of the eastern side of enclosure 2. However, as there are no direct relationships it is not possible to confirm this.

A small amount of pottery from layer (296), a dark greyish-brown deposit (within the eastern part of the field system) and later enclosure 1 ditch [25] dates to the Early Iron Age period (*c* 600–300 cal BC). While the material in [25] is residual the presence of these sherds does suggest earlier activity on the site.

Phase 3: late first century BC to first century AD

Curvilinear enclosures and buildings

Two elongated curvilinear enclosures (Figs 2, 5 and 7), both open on their eastern sides, extended across the excavated area. These enclosures and the associated structures are likely to represent settlement activity, probably with continued use of the surrounding fields.

Enclosure 1

Enclosure 1, the more northerly of the two, was formed by ditches [25], [200], [204], [293] and [308] (Figs 2 and 5). These had shallow, concave profiles, no deeper than 0.25m. The ditches were particularly shallow at the north-eastern end of the enclosure where they had been truncated. The ditches contained a single fill comprising a dark greyish-brown silty clay with stones and charcoal. A possible entrance was identified on the south-western arc of the enclosure, possibly closed at an indeterminate point by cut [280]. The enclosure was approximately 22m long on its north east – south west axis and 15m wide. Artefacts from the ditch included sherds of South Western Decorated and Cordoned Wares, and another sherd likely to date to the mid-second century AD onwards came from the excavated section in ditch [25] (Quinnell, below). Ditch [204] contained fragments of South Western Decorated and Cordoned Ware pottery and a sheep molar was also recovered from it (Randall, below). This suggests that initial use of the enclosure occurred in the Late Iron Age and may have continued well into the Roman period (Phase 3). An alternative interpretation, however, could be that the enclosure dated to the Roman period and that the Late Iron Age pottery had been redeposited and was residual.

Structure 1

Structure 1 was made up of a group of features centrally placed within enclosure 1 (Fig 5). It included steep-sided postholes, shallow pits and two clay-lined hearths, [243] and [47], together covering an area 5m by 3.7m lying north east – south west. A cluster of steep-sided features, which are likely to be postholes, lay on the eastern side of the structure: [140], [238], [236], [234] and [232]. The deepest of these at 0.25m was [238], which also contained a post-pipe. To the west was oval posthole or post pit [317], 0.9m long and 0.7m wide with steep sides 0.2m deep. The postholes may have supported a structure, possibly roofed, around the hearths, although a clear plan is difficult to establish. Concave pits [71], [228] and [226], none of which were more than 0.25m deep, were recorded to the north and south of the two hearth pits. It is possible that [228] and [226] formed part of the linear arrangement made up by [140], [238], [236], [234] and [232].

Hearth-pit [243] was 0.9m in diameter with a 0.3m deep fill (242), comprising lenses of oxidised clay and ash, the surface of which was numbered [37]. Hearth [47] was more complex and consisted of a bowl-shaped pit 0.7m in diameter and 0.35m

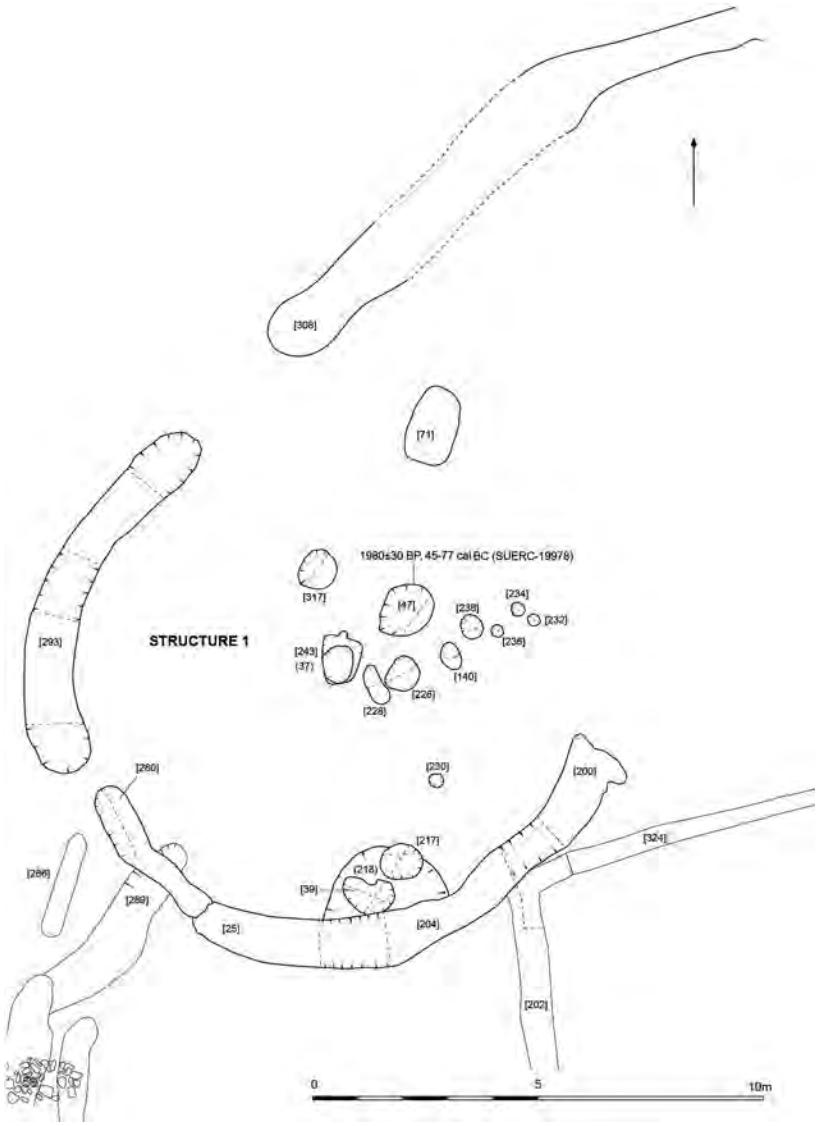

Fig 5 Enclosure 1 and structure 1.

deep filled with a series of deposits. These were primary fill (55), a 0.04m thick band of burnt clay, presumably the base of the hearth, above which was (48), a lens of white clay only 0.01m thick. This was sealed by (52), a 0.01m deep layer of charcoal, and above this (11), a deposit of mixed charcoal and burnt clay 0.06m thick. The final deposit was (49), a layer of mid brown silty clay with frequent burnt clay inclusions, possibly truncated and partially mixed with topsoil. These deposits contained the largest quantities of both fuel debris and charred plant remains recovered from the site (Gale, below; Carruthers, below). The latter largely comprised cultivated grains (spelt wheat and possibly barley) and weed seeds.

Both hearth pits had charcoal-rich basal fills and scorched edges where cut into the natural subsoil. Hearth pit [243] produced a shoulder from a South Western Decorated Ware vessel within oxidised clay deposit (37). A radiocarbon determination from fill (11) of hearth [47] of 1980 ±30 BP calibrated to 45 cal BC – 77 cal AD (SUERC-19978). Use of structure 1 and its surrounding enclosure may therefore have begun around 100 cal BC and continued for some time.

Pits [39] and [217] to the south of structure 1, close to the enclosure ditch, were both recorded as cutting an older possible buried soil (218), which pre-dated the structure, but the function of these is unclear. As neither postholes, hearths or pits make a coherent plan it is possible that some features have been destroyed by truncation, probably during terracing of the hillslope to form playing fields.

Enclosure 2

To the south, enclosure 2 (Figs 2 and 7) was formed by a curvilinear ditch [214] which was far more substantial than that of enclosure 1. The ditch appeared to enclose structures 2, 3, 4 and 5 (below). It was 1.1m wide and 0.8m deep with steep sides and a narrow concave base, running south from outside the southern entrance of enclosure 1 and then curving south east and east. A series of silty clay layers (up to 0.31m deep) and lenses (up to 0.06m thick) formed the ditch fills, generally yellowish brown in colour and with varying amounts of stone present (never abundant). Most of these deposits have the same basic character as the natural subsoil, and it is likely that they are derived from the erosion of a bank formed from the upcast derived from excavation of the ditch; this is most likely to have been sited along the outside of the ditch because features within the enclosure come very close to the ditch and there would not have been adequate space for a bank. A greyish-brown silty clay (248) in the base of the ditch indicates gradual infill through erosion when the ditch was first open. A later recut [73] was recorded around part of the western curve of ditch [241], the fill of which (72), a mid-brown silty clay, was cut by phase 3 rectilinear gully [75] (below).

If not open on its eastern side, enclosure 2 may have been bounded here by ditch [58] (if not associated with the earlier phase field system). Alternatively, field system ditches [181] may have been reused to define the enclosure on its eastern side. If this was the case, an entrance into the enclosure 10m wide would have been created on the eastern side between the eastern terminal of ditch [214] / [73] and the southern terminal of ditch [181]. A short gully [286] located to the north of ditch [214] was filled with a silty clay ashy deposit (285); this may have extended the length of ditch [214] but could not be assigned to a phase.

Several features within the enclosure are not obviously associated with structures. These include pit [81], a circular concave pit 1m in diameter and 0.25m deep, and adjacent posthole [265]; this was 0.4m in diameter and 0.2m deep with steep sides and a rounded base. Both of these features are close to enclosure ditch [214] on the western side of the enclosure. To the east of them was a steep-sided elongated feature [282], approximately 1.6m long, 0.35m wide and 0.15m deep, of uncertain function.

Structure 2

Structure 2, at the northern end of enclosure 2 (Fig 7), was a complex, confused group of features which included curvilinear gullies, postholes, pits and shallow hollows, extending over an area approximately 6m north – south and 4m east – west. Interpreting the stratigraphy is to some extent problematic. Curvilinear gully [23] to the north was 3.5m long, 0.5m wide and 0.14m deep. It was filled with a mid-brown silty clay (22). It appeared to form the northern boundary of a natural depression approximately 3m by 2m, which was filled by a mid yellowish-brown silty clay (175). Cut into the fill (175) of the hollow were steep-sided postholes [27], 0.75m in diameter and 0.3m deep, and [165], 0.7m in diameter and 0.25m deep, both of which had collapsed packing stones in their respective fills, (26) and (166). Both (166) and (164), the fills of posthole [165], produced burnt clay and charcoal indicative of domestic activity (Gale, below). Several shallower concave features, [209], [197] and [207]), none of which exceeded 0.15m in depth, had similar reddish-brown silty clay fills containing varying amounts of charcoal. These were either pits – internal features within the structure – or additional truncated and eroded or otherwise damaged postholes. Pit [207] was cut by gully [64], which also cut pits [165] and [64] so presumably the features were not contemporary.

Pit or posthole [205], 0.4m in diameter and 0.17m deep, was filled by (206), a greyish-brown silty clay containing large quantities of waste from cereal processing (spelt and emmer wheat) (Carruthers, below). Posthole [185], immediately to its south west, also contained spelt wheat fragments.

Feature [62], 1m in diameter and 0.1m deep, contained a primary fill (61) of red oxidised clay 0.03m thick resulting from direct heat. This may have been a hearth which had a secondary use, as deposit (60) / (20) contained a stone post-setting.

Fig 6 Parallel ditches [58] (left) and [66] viewed from the north. (Photograph: © Cornwall Archaeological Unit, Cornwall Council.)

Posthole [19] (0.45m deep and 0.85m in diameter) was recorded on the western edge of structure 2 and four further postholes, [189] (0.33m deep and 0.45m diameter), [185] (0.38m deep and 0.4m diameter), [191] (0.05m deep and 0.3m diameter; probably truncated), and [195] (0.22m deep and 0.55m diameter), mark the southern extent of the group, approximately 5m south of gully [23]. It is possible that postholes [27], [19], [189], [185], [195] and [191] represent part of the outer southern and western arc of supports for a roofed or partially-roofed structure. Posthole [19] contained a fragment of the skull from a sheep-sized mammal (Randall, below). The deposit represents an unusual survival of animal bone in Cornwall and might represent a votive deposit. Alternatively, or additionally, features [191] and [298] may have been associated with ditch [58] as they all lie alongside its eastern edge.

Gully [23] may be part of a trench to hold wall footings on the north side of the building. Posthole [27] contained stone packing in fill (26) and the complete upper part of a rotary quern (Fig 8), perhaps serving a secondary use as a post support (Watts, below). The quern deposition may indicate reuse or maintenance of the structure in the later second century AD phase 4, below). A ritual interpretation for the deposit is also possible, however, because the stone, although worn and repaired, would still have been functional.

A truncated east–west gully [64], 0.9m wide and 0.1m deep, with a concave profile, filled by (63), a mottled brown silty clay was cut through deposit (175). The gully contained a Romano-British toilet set, unique in Cornwall, which dates to the later first century AD at the latest (Crummy, below). Its context is highly unusual, and it may have been a ritual or votive deposit. The gully was very late in the sequence and it might have been cut across the site when it was decommissioned. Taken together, the animal skull in posthole [19], the quern in posthole [27] and the toilet set in gully [64], might imply that the building was subject to a formal abandonment process. Deposit (224) at the eastern end of gully [23] was a sub-circular deposit of very shallow, charcoal flecked clay, possibly representing a buried soil or surface associated with the structure. Adjacent to (224) were sub-circular concave pits [220] and [222], possibly associated with structure 2 but of unknown function.

Structure 3

Curvilinear gully [249], to the west of and concentric with structure 2, may have formed part of a smaller enclosure adjacent to it or alternatively may represent a separate structure

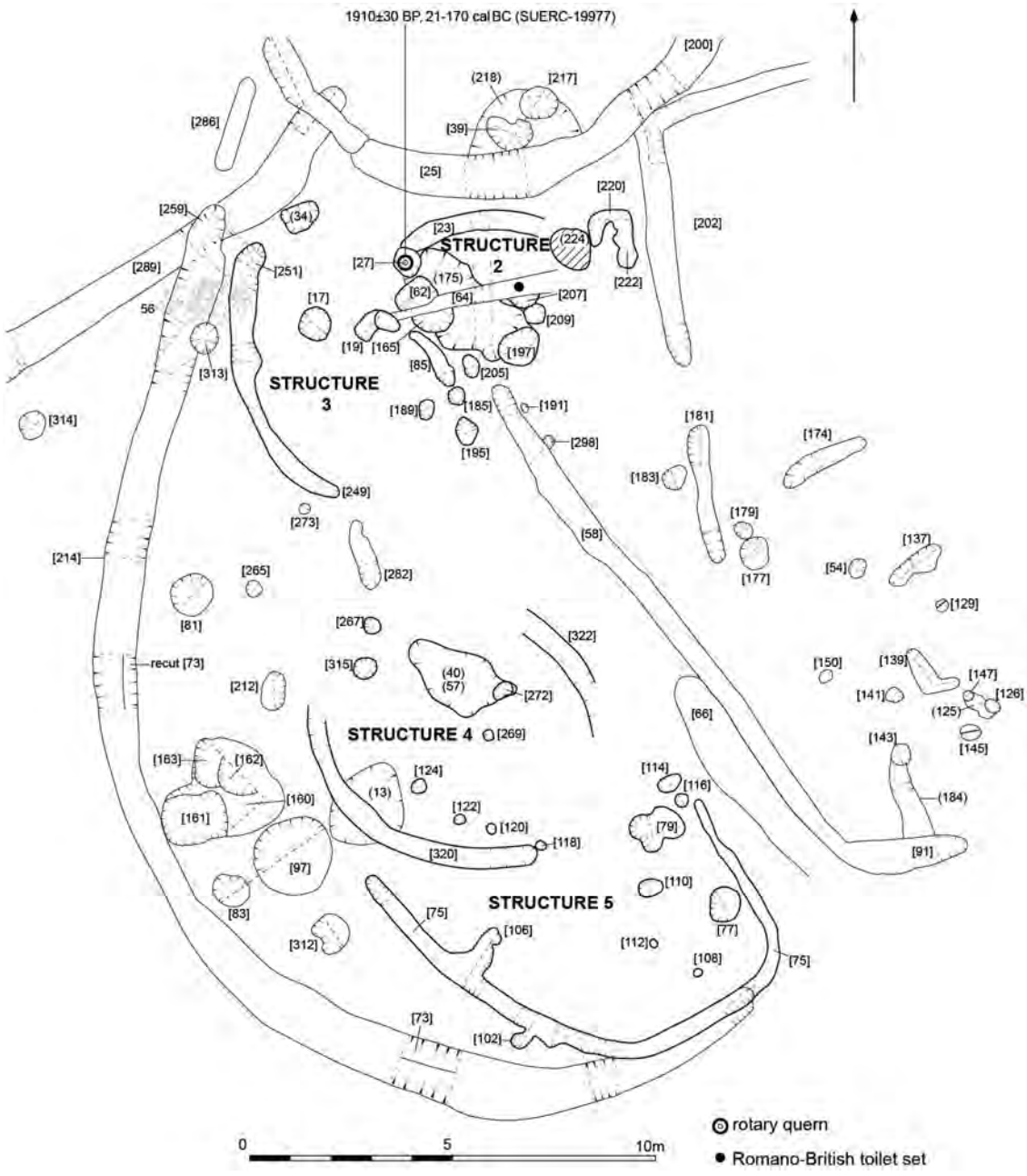

Fig 7 Enclosure 2 and structures 2–5.

approximately 6.5m north–south and 5m wide (Fig 7). If this was a separate roofed structure it is clear that it overlaps with structure 2; unfortunately, however, stratigraphic evidence was insufficient to distinguish clearly between the two structures and their relationship remains unclear. The relationship with enclosure ditch [214] is also uncertain. Gully [249] was almost certainly truncated and very

Fig 8 Upper stone of rotary quern in top of posthole [27]. (Photograph: © Cornwall Archaeological Unit, Cornwall Council.)

shallow at 0.1m deep; it may originally have extended further to the east. Its northern terminal [251] survived to a greater depth of 0.65m and may have been a separate posthole cut at the end of the gully. Fills comprised (33), (252) and basal deposit (261), containing large angular granite stones, possibly collapsed post-packing. Deposit (252) contained residual sherds of Grooved Ware. A 2m long section of curvilinear gully [85] 0.15m deep and 0.5m wide, 4.5m to the east of [249] could represent the eastern side of the structure, although the relationship between [85] and structure 2 features was uncertain.

Gully [249] was overlain by 56, a compact linear spread of stone extending 2m east–west, 1m wide and 0.3m high in a reddish-brown silty clay matrix, perhaps part of a bank built across the structure and adjacent enclosure 2 ditch [214] following their disuse and which subsequently collapsed. Pit or posthole [17] was located between gullies [249] and [85] and was a circular bowl-shaped cut 0.7m in diameter and 0.3m deep with a compact mid-brown silty clay fill containing fragments of granite and charcoal. A shallow scoop (34) was situated to the north of [251], the northern terminal posthole of [249]. This feature was 0.04m deep with a fill of oxidised red clay and burnt granite and was probably the site of a hearth outside the structure.

Structure 4

Centrally placed within enclosure 2 was structure 4, made up of a group of features extending across an area approximately 7m along its longer north west – south east axis and 6m wide (Fig 7). Two shallow truncated curvilinear gullies [320] and [322] delineated two sides of an oval space measuring approximately 7m by 5.5m. The possible terminal of gully [320] suggests an entrance facing south east. These gullies were both 0.5m wide and only 0.03m deep and had greyish-brown silty clay fills. North of gully [320] was a roughly curvilinear arrangement of postholes, [118], [120], [122] and [124], all of which were shallow – between 0.06m and 0.12m – and had probably been truncated. They were filled with homogeneous mid greyish-brown silty clays. The diameters were reasonably consistent, in the range 0.2–0.27m, and all the profiles were steep-sided, tapering to a rounded base. Two more steep-sided postholes – [267], with collapsed stone packing in its fill (268), and [315] – were located on the north-western arc of structure 4 where no gully survived.

Slightly east of centre within structure 4 was posthole [269], straight-sided but very shallow. To the north of this was a concave-sided eroded pit or hollow [272], 0.35m deep and 0.6m in diameter, which contained patches of burnt clay in its fill (271). The latter was beneath deposit (40), a silty clay layer within an irregular sunken area measuring 0.35m deep, below which was (57) a

burnt red clay layer in a matrix of brown silty clay, possibly the remains of a central hearth.

The internal features may belong to a later phase of the structure (below). An area of shallow buried soil (13) comprising reddish-brown silty clay contained a South Western Decorated Ware rim and was cut by southern gully [320], suggesting that there was Iron Age activity prior to the construction of the building.

Phase 4: second century AD

Occupation during the Roman period

Stratigraphic relationships and artefacts indicate further development of the settlement into and beyond the second century AD. Structure 4 had evidence of continued use during this phase. Deposit (40) overlying hearth deposit (57) produced parts of a bowl dating to the late first or early second centuries AD.

Structure 2 posthole [27] (Fig 7), measuring 0.3m deep and 0.75m in diameter contained the complete upper part of a rotary quern in the top of its fill. The stone had possibly been reused as a post-pad, with further collapsed packing stones in the base of the feature. Fill (26), a dark greyish-brown silty clay, provided a radiocarbon determination from *corylus* of 1910 ±30 BP, 21–170 cal AD (93.6 per cent) (SUERC-19977), suggesting either the maintenance of the structure into the second century AD (phase 4) or, given similar depositions of worked stones in postholes elsewhere when structures were abandoned and formally closed down, it could date the end of use of the structure.

An isolated feature [313], possibly a posthole, to the west of structure 3, cut ditch [214], suggesting that [313] also belongs to this further phase of activity.

Structure 5

At the southern end of enclosure 2, was rectilinear gully [75]. It was a concave-profiled feature 0.2m deep and 0.3–0.4m wide. It cut deposit (72), the fill of [73], itself a recut of enclosure ditch [287]. The stratigraphic evidence therefore suggests that enclosure 2 was effectively either already out of use or was put out of use at the point when the enclosure formed by [75] was constructed.

Fill (74) in gully [75] contained a sherd of a Type 4 jar with a date not before the mid second century AD. The gully encloses features which may have related to structure 5 and formed an enclosure approximately 7m by 6.5m with an open side facing north west towards the possible entrance to structure 4. The gully may have been the foundation trench for hurdle fencing or a palisade enclosing this area.

A possible structure located immediately south east of structure 4 may be seen in a cluster of concave pits and two small postholes (Fig 7). The pits, [114], [116], [79], [110] and [77], ranged between 0.1m and 0.4m in depth and were up to 1m in diameter; they extended over an area 5m long and 2.5m wide towards the north-eastern corner of the enclosure defined by gully [75]. Two small postholes [112] and [108] to the south were very shallow (0.05m and 0.08m) and both 0.2m in diameter. All of these features had homogeneous mid or dark greyish-brown silty clay fills.

The function of this group of features is unknown, although they may possibly have formed a structure which had either been dismantled or suffered subsequent truncation. In the absence of finds chronology is problematic. However, the features are contained by enclosure gully [75], which may have been dug because enclosure 2 was no longer functioning, and they may therefore belong to phase 4.

Unphased features: post-second century AD?

Stony spread 56

The stones comprising stony spread 56, adjacent to the northern end of ditch [214] were to some extent within its upper fill and may represent part of a collapsed east–west stony bank constructed across the ditch and adjacent structure 3 after they had gone out of use.

Possible fenced structure

Another group of features was excavated and recorded to the east of field or enclosure ditch [58] (Fig 7). These were arranged on a north west – south east axis and spread over an area approximately 8m by 4.5m. They included a rough alignment of pits and postholes: [179] (0.2m deep), [177] (0.15m deep), [150] (0.3m deep with collapsed stone packing), [141] (0.1m deep), [145] (0.25m deep), [126] (0.15m deep) and [129] (0.14m deep). These features ranged in diameter from 0.25m to 0.35m,

with the exception of [177] which was 0.75m in diameter. Within this grouping were two steep-sided, flat-based gullies, possibly structural slots or perhaps for fencing, [139] (0.13m deep) and [137] (0.25m deep), and pit [54] (0.13m deep). To the south was posthole [143] just to the south of the possible structure (Fig 7), which was connected to ditch terminal [91] by a short stretch of ditch (184) (no cut number allocated). This ditch section had an uncertain relationship with ditch [91] to the south.

Pottery

Henrietta Quinnell, with petrographic comment by Roger Taylor

Late Neolithic Grooved Ware

The assemblage is the eighth Grooved Ware group to be identified in Cornwall and currently the second largest, after that from nearby Tremough (Gossip and Jones 2007; 2009-10). The published reports on Tremough (Quinnell 2007a; 2009–10) provide references for the other sites; those references are not updated here since no group described there as unpublished has subsequently reached print. Overall, the Penryn College assemblage has considerable similarities with that from Tremough, both in form and fabric, and both belong to the Durrington Walls Grooved Ware sub-group.

Fabrics

PETROLOGY

A selection of sherds was examined microscopically by Roger Taylor and three fabrics were found to be present. Full details are deposited with the archive.

Gabbroic

P1–7 and **P10** were examined: Dr Taylor's descriptions for **P1** and **P6** are given below. This fabric had a fine matrix with sparse inclusions and was generally oxidised.

P1 *Feldspar* – soft white altered angular to sub-angular grains, 0.1–1.5mm, rarely 3mm. *Amphibole* – rare grey fibrous sub-angular grains, 0.5–0.8mm. *Magnetite* – rare black glossy grains, 0.6mm. *Quartz* – vein quartz off-white sub-angular grain, 1mm; sub-rounded translucent grain, 0.2mm. *Limonite* – soft rounded black to brown grains, 0.5–1.5mm. *Matrix* – smooth slightly silty clay. *Comment*: a gabbroic fabric with predominant feldspar and other gabbroic components rare.

P6 *Feldspar* – soft white altered, angular to sub-angular grains, 0.5–0.8mm, rarely 4–6mm. *Amphibole* – sparse translucent off-white cleaved grains, 0.2–1.1mm. *Magnetite* – sparse black glossy grains, 0.2–0.5mm. *Quartz* – rare translucent colourless sub-angular grains, 0.2–0.4mm. *Matrix* – slightly silty with some fine muscovite flakes. *Comment*: a sparse gabbroic fabric, mainly feldspar.

Granitic derived

P11 was examined.

P11 *Quartz* – sparse angular to sub-rounded translucent colourless grains, 0.2–1mm: vein quartz – sparse translucent colourless to pale orange sub-angular grains, 1–3.5mm. *Composite* – quartz / biotite, one fragment seen, 2mm. *Feldspar* – a translucent colourless cleaved grain, 0.6mm. *Rock fragments* – silty micaceous slate tabular fragments, 1 and 4mm. *Mica* – muscovite, rare cleavage flakes, 1 and 2mm. *Limonite* – sparse soft dark brown rounded and sub-rounded grains, 2–3mm. *Matrix* – smooth finely micaceous clay with many cavities, some tabular, some elongated or irregular in shape; these cavities are mainly empty, although some contain carbonised plant material or have impressions of an original plant infill. Size range 1–5mm. *Comment*: a very sparse granite derived fabric with a very low hard mineral content. Possibly from an estuarine / river clay source with a natural organic content, or possibly the addition of organic material in lieu of mineral temper. The source is probably the Penryn estuary within a few kilometres of the site.

Lizard

P9 was examined.

P9 *Amphibole* – sparse dark brown to black cleaved grains, 2–3mm: pale grey fibrous and cleaved grains, 0.8–2m. soft light brown foliated fibrous fragments, probably altered amphibole, 1–5mm. *Limonite* – dark brown sub-rounded grains, 0.2–0.7mm, rarely sub-angular 7mm. *Rock fragments* – black smooth glossy soft fragments powdering to light grey, 0.5–1.1mm, composition uncertain. *Feldspar* – rare angular to sub-angular soft white to pale brownish altered, 0.4–3mm. *Magnetite* – rare black glossy angular magnetic grains, 0.4mm. *Matrix* – smooth clay. *Comment*:

Table 1 Fabrics by context (s = no of sherds; g = weight in grams)

Context		*Gabbroic*	*Granitic- derived*	*Lizard*	*Minimum vessels*	*Totals*
(12)	Pit [312]	69s/703g P1-7	12s/115g **P8**		8+	81s/818g
(94)	Pit [83] lower fill	4s/24g				4s/24g
(82)	Pit [83] upper fill	2s/26g			1+	2s/26g
(98)	Pit [97] lowest fill	16s/51g		1s/25g **P9**	3+	17s/76g
(131)	Pit [97] middle fill	1s/3g				1s/3g
(130)	Pit [97] middle fill	1s/3g				1s/3g
(96)	Pit [97] middle fill	34s/159g **P10**	7s/ 35g **P11**			41s/194g
(95)	Pit [97] upper fill	3s/35g				3s/35g
(159)	Pit [161] lower fill	1s/11g			1+	1s/11g
(158)	Pit [161] upper fill	8s/141g			1+	8s/141g
(127)	Pit [162]	2s/4g				2s/4g
	Redeposited in later contexts	20s/85g				20s/85g
		161s/1245g	19s/150g	1s/25g	14+	181s/1420g

this sherd has an unusual fabric. The clay and contents are evidently derived from the Lizard area but not from the traditional gabbroic clay source areas. No close comparanda are known.

Comment on the fabrics

The data on fabrics for the seven other Grooved Ware sites previously known in Cornwall are presented by Jones and Quinnell (2011, panel 2). The material from Davidstow Moor, Trevorva Cott (Probus) and Carrick Crane Crags (St Keverne) is all gabbroic while the few sherds from Zennor Quoit are granite derived and the fabrics of the two separate small assemblages from Trevone (Padstow) are not yet known. The largest assemblage, that from the site closest to Penryn College at Tremough, consisted of 175 sherds weighing 1933g. Of this, 76 per cent by sherd numbers, 70 per cent by weight, was gabbroic. At Penryn College 89 per cent was gabbroic by sherd numbers and 87.7 per cent by weight. The gabbroic fabric at Tremough was generally rather coarser than that at Penryn College.

At Tremough a further 17 per cent on sherds and 25 per cent on weight consisted of a fabric which combined gabbroic with granitic clays, indicating that there some gabbroic clay had been moved close to the location at which it was found and potted on site (Quinnell 2009–10, 39). Nothing similar was retrieved from Penryn College. A final 7 per cent by sherds and 5 per cent by weight at Tremough was made up of a vein quartz fabric, in which crushed vein quartz was added to clays local to the site; again, nothing similar was found at Penryn College. The granite derived fabric at Penryn College, 10.5 per cent on both sherds and weight, and the unusual Lizard fabric, 0.5 per cent by sherds and 1.8 per cent by weight, were not represented at Tremough.

Comparison between the two sites indicates that gabbroic fabrics formed the majority of the assemblage at both with other fabrics generally local to the sites making up the remainder. The predominance of gabbroic fabrics in known Grooved Ware assemblages continues a tradition which started in the Early Neolithic and continued in the area through the remainder of the prehistoric period.

Description of Grooved Ware by context

(12) in pit [312] (Figs 9 and 10)
Material appears to be fresh. **P1–7** Grooved Ware gabbroic.

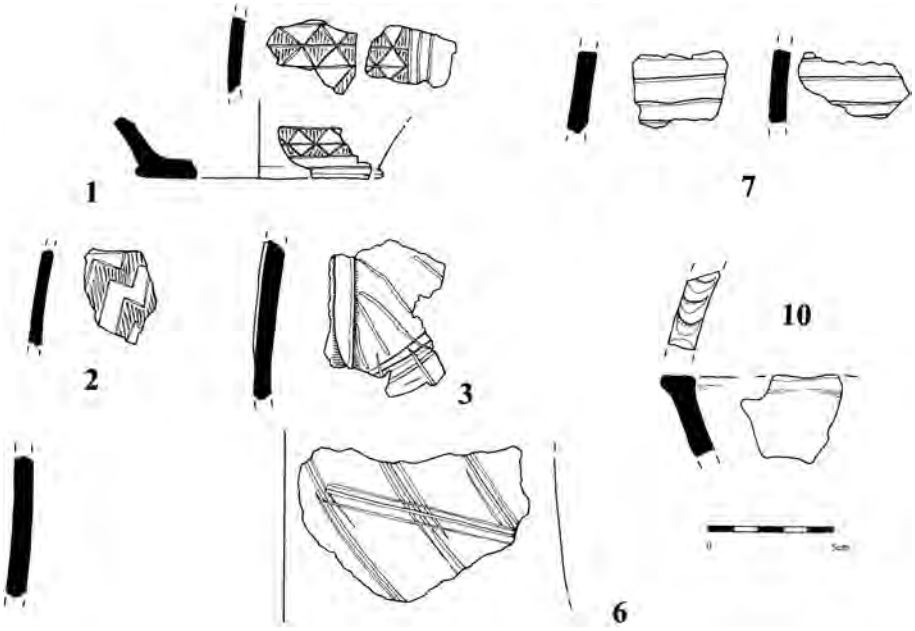

*Fig 9 Late Neolithic Grooved Ware pottery: **P1–3** and **P6–7** from fill (12) of pit [312]; **P10** from middle fill (96) of pit [97]. (Drawing: Carl Thorpe.)*

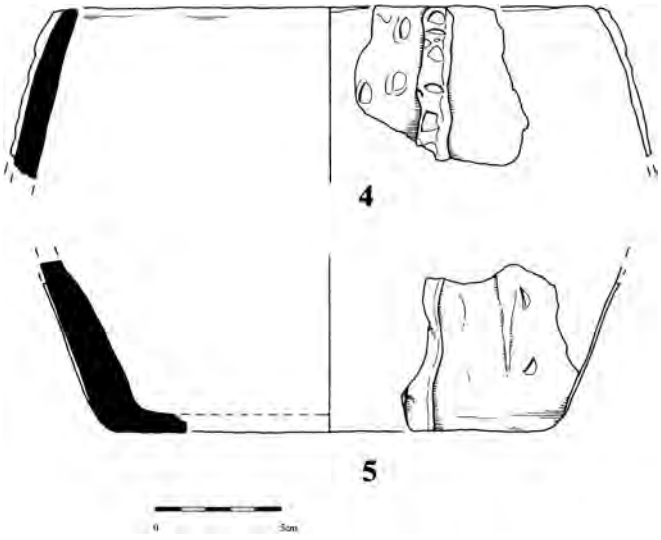

*Fig 10 Late Neolithic Grooved Ware pottery: **P4–5** from fill (12) of pit [312]. (Drawing: Carl Thorpe.)*

P1 Base of thin-walled vessel with protruding foot, internal diameter approximately 80mm: this is Longworth's (1971, 58) Type C Grooved Ware base angle form. Only a small part of the vessel wall present. Incised decoration. The design appears to have consisted of alternate plain and decorated panels, the latter with alternate infilled and open diamonds / triangles. The incisions are very fine for Grooved Ware and the fabric is also fine with sparse inclusions.

P2 Wall sherd with incised decorations of slanting chevrons beneath a horizontal line: alternate chevron bands infilled with vertical incisions. Very similar to **P1** in the fineness of the incised lines and in fabric.

P3 Body sherds with applied vertical rib and criss-cross incisions on the surviving side.

P4 (Fig 10) Thick-walled vessel with irregular pointed rim approximately 180mm in diameter.

Applied vertical cordon with fingertip impressions; further fingertip decoration elsewhere on sherds.

P5 (Fig 10) Base of vessel with applied vertical cordons and occasional fingertip impressions. This could be the base of **P4** but minor variations in fabric suggest that it is not. A further 30 sherds may belong to this vessel or just possibly **P4**.

P6 Body sherds with blocks of lightly incised double lines crossing diagonally.

P7 Body sherds with incised horizontal parallel lines; two specimens have been drawn.

P8 (not illustrated) Sparse granitic derived fabric, very reduced. Part of vessel base with some slight impressions of vegetation.

Pit [83] (not illustrated)
Generally fresh. All Grooved Ware gabbroic fabric. All sherds could come from one vessel.

(94) lower fill
Sherds from vessel(s) with decoration as **P3**.

(82) upper fill
Sherds from representing vessel(s) as **P3**.

Pit [97] (not illustrated)
Sherds fresh unless otherwise stated. All gabbroic except **P9** and **P11** and may represent one vessel.

(98) lowest fill
Sherds representing vessel(s) as **P3**.

P9 (not illustrated) Non-gabbroic Lizard fabric base angle, abraded.

(131) and (130) middle fill
Sherds as **P3**.

(96) middle fill
Sherds as **P3**. All Grooved Ware gabbroic except **P11**. Sherds are of mixed abrasion, some fresh, some considerably abraded.

P10 Rim sherds, expanded flat top with some finger marking. Some body sherds may belong to the rim.

P11 (not illustrated) Granitic-derived, seven body sherds, 35g, fresh in a non-gabbroic fabric; some hints of fingertip decoration. Dr Taylor comments that the arrangement of internal cavities in the matrix has no regular structure or alignment. This suggests that these fragments have not been worked by traditional potting methods such as coil building. The roughness of one surface of most of the sherds and their lack of curvature also point to this conclusion.

(95) upper fill
Sherds as **P3**.

Pit [161]
Generally abraded. Possibly only one vessel represented.

(159) lower fill
Sherd with broad incised lines.

(158) upper fill
Includes two sherds with applied cordons.

(127) in pit [162]
Abraded body sherds representing a single vessel.

Redeposited sherds

The former extent of Grooved Ware on the site is indicated by the 20 sherds weighing 85g in Grooved Ware gabbroic fabric which were found in contexts (24), (30), (37), (38), (40), (125), (213) and (252). The contexts ranged in area from a concentration around structure 1 to the rectilinear enclosures. The mean weight of these sherds is 4.25g as opposed to 8g for sherds recovered from Neolithic features and they have varying degrees of abrasion. The scattered nature of the find-spots and the condition of the material suggests that most became incorporated in Late Iron Age and Early Roman features from a presence in the topsoil: there is no indication of any pit deposits producing redeposited material. The survival of the Grooved Ware sherds for some two and a half millennia may suggest that the topsoil was not much disturbed over this long period.

Discussion of Grooved Ware

Overall, as at Tremough, the general style of the vessels, with curved sides and closed shapes, together with the frequency of cordons combined with other decorative techniques, indicates an affinity with the Durrington Walls sub-style of Grooved Ware (Wainwright and Longworth 1971, 240–2; Garwood 1999, 157–9). This style occurs across southern Britain and lasted for the duration of use of Grooved Ware. It was used in parallel first with the Clacton sub-group and later with the

Woodlands sub-group, in which overall vessel forms are based on open and tub straight-sided vessels (Garwood 1999, 159).

Decorative techiques present include applied cordons, grooved lines, fine incised lines and fingertip and nail impressions. Most of the vessels present had applied cordons with additional fingertip or nail impressions or incised lines. The overall decorative range is more restricted than at Tremough, possibly partly due to the greater number of vessels present there, 21+ as opposed to the 14+ at Penryn College. Techniques present at Tremough and not at Penryn College are cord impressions and closely-spaced incision / grooving of lines forming all-over patterns. Penryn College, however, has fine incised and infilled designs in **P1** and **P2** which are not represented at Tremough and do not appear to have been previously found in Cornwall. The designs on **P1** and **P2** include undecorated areas but, as the portions of vessels present are small, the overall layout of these designs is unknown. The fine incision and use of undecorated areas on these vessels find their best parallels on the inside of bowls, broadly of the Durrington Walls sub-group, from Dorset, notably those from Wyke Farm henge (Cleal 1991, fig 7.19). **P1** is also fairly closely paralleled by P592 with external decoration at Durrington Walls (Longworth 1971, fig 63). However, **P10**, the bowl with a heavy expanded rim with fingertip decoration, is not paralleled at Durrington Walls or among assemblages typically assigned to that sub-group. Good parallels for these techniques and styles are known, for example from the West Kennet palisade enclosures (Hamilton 1997, figs 60 and 68), where they are discussed as regional features among a Durrington Walls assemblage.

In Devon seven Grooved Ware assemblages, all smaller than Penryn, are known to the author, but six of these await full analysis and publication. Four of these have been identified since the analysis of the Tremough assemblage was carried out (Quinnell 2007a). These have come from the Royal Naval Stores Depot, Topsham, and Digby, Exeter (Exeter Archaeology), with two sites on the Langage pipeline north west of Totnes (Cotswold Archaeology). Only the small group from Three Holes Cave, Torbryan, has been published (Rosenfeld 1964), but some details of assemblages from Ash Hole Cave, Torbay, and from Bow in mid-Devon were given in the report on Tremough (Quinnell 2007a; 2009-10), together with the suggestion that the Bow assemblage belonged to the Durrington Walls sub-group. The author has seen all the material and considers that generally it, like Bow, relates to the Durrington Walls sub-group. Hopefully, when the remaining Devon and Cornish material has been published, the characteristics of Grooved Ware in the south-west peninsula will be better understood.

The radiocarbon determination on *corylus* charcoal from context (98), the lowest fill of pit [97], calibrated to 2580–2468 cal BC (SUERC-19979). The date on residue from a pot sherd from (12) in pit [312] calibrated again to 2577–2468 cal BC (SUERC-19980). *Corylus* charcoal from the same context yielded a determination of 4080 ±30 BP, calibrating to a series of dates between 2860 and 2560 cal BC with a probability range for 2857–2496 cal BC (SUERC-19984). These three dates taken together indicate that Grooved Ware use of the site may have been broadly contemporary with the earlier phase of Grooved Ware activity at Tremough, which dated to 2861–2489 cal BC (Wk-14999). The second of the two dates from Tremough with Grooved Ware associations, 2565–2292 cal BC (Wk-15001), suggests that activity at Tremough occurred over a longer time span than at Penryn College.

Iron Age and Roman pottery

The assemblage consists of two probably residual Early Iron Age sherds, and then a group of material representing activity from the end of the Middle Iron Age until the beginning of the Roman period, probably representing a period of continuous activity during the first centuries cal BC and AD. This evidence complements to some extent that from Tremough. There, the excavated area revealed fields in use during the Late Iron Age and early Roman periods, with settlement starting only in the second century AD. The east end of the field system at Tremough incorporated an enclosure, the 'fort', which was only investigated by limited trenches (Gossip and Jones 2009–10). Consequently, there were few ceramics from Tremough of the same date as these from Penryn College (Quinnell 2007a; 2009–10).

Residual Early Iron Age

A rim sherd, residual in [25], the enclosure 1 ditch, was in gabbroic fabric containing much quartz; its

form is similar to R2 from Trevelgue (Quinnell 2011, 7.8.1) and to a rim from Carn Euny (Elsdon 1978, no 18, fig 53). A larger and thicker example of a similar rim was found in deposit (296) within the rectilinear enclosure system. This was of loessic gabbroic. Both of these forms probably belong to the Early Iron Age Plain Jar Group (Quinnell 2011, 7.8) of between 600 and 300 cal BC, and represent earlier use of the area.

The Middle Iron Age to early Roman period

The pottery is made of gabbroic fabric. The majority of this is 'well-made', well worked with a burnished finish. This version was principally used during the Middle and Late Iron Ages and was probably not produced far into the second century AD (Quinnell 2004, 108). The remainder is 'standard' (*ibid*), less well-made and with a wiped rather than burnished surface. This was once thought to have been introduced at some date early in the Roman period but recent studies, particularly of the assemblage at Trevelgue (Newquay) cliff castle (Quinnell 2011, 7.2.2), demonstrate that it was present in small quantities throughout the Iron Age and became the main gabbroic variant at some date around AD 100.

South Western Decorated Ware belongs broadly to the Middle Iron Age, from the third to the first century cal BC. A feature of the South Western Decorated Ware at Penryn is the frequent use of a roulette to form lines and to infill areas of decoration. It is now recognised (Quinnell 2011, 7.9.5) that rouletting is very much a feature of late South Western Decorated Ware.

Cordoned Ware belongs to the Late Iron Age with some overlap with South Western Decorated Ware in the first century cal BC and occurs until a date within the second century AD. The classification first devised by Threipland (1956) is still used to describe Cordoned Ware vessels. South Western Decorated Ware and Cordoned Ware appear to have a considerable degree of overlap in the first century cal BC, which makes precise dating of features difficult.

The range of ceramics present continues until the introduction of standard gabbroic Roman-period material, probably in the early second century AD. There is no reason to suppose that the Penryn College site was in use for any time after this and all 'later prehistoric' activity, except that indicated by the two residual Early Iron Age sherds, was probably confined to about two centuries. The classification system devised for the Trethurgy assemblage (Quinnell 2004) is used to describe Roman-period gabbroic wares.

Structure 1 and enclosure 1

Features (37), [39], [47] and [238], within structure 1, contained only well-made gabbroic sherds. The only datable sherd was a fresh, decorated shoulder of South Western Decorated Ware in (37). However, hearth [47] produced a radiocarbon determination of 1980 ±30 BP calibrating to 45 cal BC – cal AD 77 (SUERC-19978). Use of this structure may have started around 100 cal BC but continued for some time.

Five contexts in the ditches forming enclosure 1 produced pottery. In four – (86), (199), (203) and

Table 2 Details of Iron Age and Roman fabrics by broad contextual grouping (s = no of sherds; g = weight in grams)

Contextual grouping	*Well-made gabbroic*	*Standard gabbroic*	*Early Iron Age gabbroic*	*Totals*
Structure 1	11s/77g			11s/77g
Enclosure 1 ditches	19s/175g	3s/13g	1s/8g	23s/196g
Enclosure 2 ditches	29s/266g			29s/266g
Gully cutting enclosure 2		1s/4g		1s/4g
Structure 2	18s/236g	1s/19g		19s/255g
Structure 4		8s/143g		8s/143g
Rectilinear field system	3s/34g	15s/298g	1s/47g	19s/379g
Totals	80s/788g	28s/477g	2s/55g	110s/1320g

(309) – this was all well-made but included sherds diagnostic of both South Western Decorated and Cordoned Ware. This would suggest the formation of the enclosure at the same time as structure 1 but long maintenance of its ditches. Context [25], in addition to the residual Early Iron Age sherd referred to above, contained standard gabbroic sherds, including a Type 21 bowl rim (Quinnell 2004, 123) which probably does not date before the mid-second century AD.

Enclosure 2, structure 2 and structure 5

The northern end of ditch [214] / [257], the western side of enclosure 2, produced only abraded South Western Decorated material. Contexts within it, (28), (30), (35), (72) and (90), contained only Cordoned Ware, with parts of three Type H jars (Threipland 1956). This suggests activity within the first centuries cal BC and AD. However, gully [75], which cuts the enclosure 2 ditch, contained part of the neck of a Type 4 jar in standard fabric, which probably does not date before the mid-second century AD, much the same date as the Type 21 bowl in enclosure 1.

In structure 2, posthole [189] produced a South Western Decorated patterned shoulder, while pit [19] contained part of a Cordoned Ware Type H jar. Pottery from contexts (22), (186) and (208) within gully [169] / [23] and (84) in fully [85] had no diagnostic features. Pit [27] with the rotary quern produced a radiocarbon determination of 1910 ±30 BP, calibrating to 21–170 cal AD (93.6 per cent) (SUERC-19977), perhaps a little later than the pottery suggests.

In addition, pit [177] to the east of structure 2, produced sherds without definite features.

In structure 4, deposit (40), part of hearth (57) above hollow or eroded pit [272], produced parts of a Type 19 (Quinnell 2004, 121) bowl in standard fabric, dating to the late first or early second centuries AD. A buried soil (13) cut by features of structure 4 contained a South Western Decorated rim.

The rectilinear field system

Ditch [174] produced decorated pieces from the shoulders of large South Western Decorated jars. This is unusual in that rouletting, as opposed to incised lines, was used to infill curvilinear decoration. Deposit (10), the basal fill of ditch [5], also produced South Western Decorated while ditch [58] produced sherds without definite features. In terms of ceramics these features seem to have had principally Middle Iron Age use.

Stonework

Henrietta Quinnell, with petrographic comment by *Roger Taylor*

Neolithic

Two of the Grooved Ware pits contained pieces of porphyritic elvan with leached-out feldspars which had been sourced as river cobbles. A large cobble, probably shattered by a single impact episode, came from (94) in pit [83]; it had no other signs of use. A small piece came from (159) in pit [161].

The Middle Iron Age to early Roman period

The quern from pit [27] (Watts, below) is the only piece of stonework which does not come from the immediate area of the site. This context also contained a small fragment of local slate with a perforation 4mm across worked from one side.

Eight whole or broken river cobbles were found. Few had obvious signs of use. A broken sandstone cobble from pit [81] in enclosure 2 had slight wear facets, probably from use as a rubbing stone. A broken tabular river cobble of silty sandstone with a broad linear groove worn into one surface, possibly from whetstone use, also came from pit [81]. Two beach pebbles, one of vein quartz, were found in pit or posthole [129] and one of flint from gully [23] in structure 2; neither had obvious wear. The assemblage is comparatively small when considered alongside those of other broadly contemporary domestic sites such as Tremough (Quinnell 2007b).

Rotary quern

Susan Watts, with geological comment by *Roger Taylor*

A complete upper stone of a rotary quern was found set horizontally in the top of posthole [27], dated to the first or second century AD (Fig 11). The quern stone is of a uniformly textured pale yellowish-grey greisen, the coarser elements set in a fine-grained matrix of quartz and muscovite. It is similar in general appearance to the Tregonning

Fig 11 Upper stone of rotary quern from top of posthole [27]. Plan view (top) and side view showing handle holes (bottom). (Photographs: © Cornwall Archaeological Unit, Cornwall Council.)

Hill greisen but lacks accessory minerals such as tourmaline and fluorite. A source, therefore, from the Carnmenellis granite seems more likely.

The stone, now 0.31m in diameter, and weighing 10kg, is neatly made with curving sides, a hopper around the central hole or eye, and a sloping, very slightly convex grinding surface. It has two handle

holes in the side and also a handle slot across the top of the stone, set between the two handle holes. The stone varies in height from 0.087m to 0.115m. The hopper is approximately 0.2m diameter and a maximum of 0.028m deep, and the eye, which is oval in shape with a notch at either end to take the bridge or rynd, is a maximum of 0.074m long and 0.055m wide. The two sub-rectangular, slightly wedge-shaped handle holes are set at 90 degrees to each other on the higher side of the stone. The lower one of the two, to which the grinding surface has worn through, is 0.045m wide and 0.035m high and was, on average, 0.055m deep. The other side handle hole is 0.045m wide, 0.028m high and an average of 0.035m deep. The slot across the top, which is not quite midway between the two handle holes, is 0.28m wide.

The grinding surface is rather worn with glazed high spots and rings of concentric wear. The amount of wear, together with the fact that the grinding surface has worn through to one of the handle holes, suggests that the quern saw long or intensive use prior to its deposition. The stone would, therefore, have originally been both wider and thicker, perhaps approximately 0.33m in diameter and 0.015m high. The positioning of the two handle holes, equidistant along one side of the eye, suggests that they are contemporary with each other and the handle slot may also be original, or could be an adaptation to prolonged use (below). Each one of these handles may have been intended as a replacement for the one below as the stone gradually wore thinner. Alternatively, the stone may have been worked with two handles at a time, perhaps in an oscillatory rather than fully rotary motion. The implication, however, from the slight accent of wear in the handle holes is that the quern was turned in a clockwise direction. The fact that the quern is thicker on one side than the other may also be deliberate, to accommodate the handle holes.

The basic characteristics of the stone, with its curved form, sloping grinding surface and hopper around a wide eye, together with the handle holes in the side, conform to Curwen's 'Wessex'-type Iron Age quern (Curwen 1937, 140–2). Given the amount of wear exhibited on the stone it could well be pre-Roman in origin. However, the style also continued in use into the Roman period with similarly-shaped stones – several of which also have worn or broken-out handle holes – having been found at, for example, Carn Euny, Carvossa, Trethurgy and Boden Vean (Christie 1978, 388; Carlyon 1987, 138; Quinnell and Watts 2004, 147–48, 149; Quinnell 2013). It was also not uncommon for 'Wessex'-type querns to have a handle slot cut across the top in order to prolong their working lives. Examples of this sort of modification have been found on Iron Age sites including Maiden Castle and Gussage All Saints in Dorset and Glastonbury Lake Village in Somerset (Wheeler 1943, 324; Buckley 1979, 94; Bulleid 1917, 614; Watts 2002, 31).

Other querns with handle slots have also been found in Cornwall, as at Carngoon Bank and Ludgvan (McAvoy 1980, 59, 60; Steve Hartgroves, pers comm), although it is not possible to say whether these were in addition to or a replacement for side handle holes. Generally speaking, handle slots, which were a typical feature of Curwen's 'Sussex'-type Iron Age querns, became more widely used in the Roman period (Curwen 1937, 142; Watts 2002, 34).

The quernstone was found upright in the top fill of posthole [27]. It is possible that the stone was inserted into the posthole to act as a chock for a post that had rotted away at ground level. A complete upper stone found in a central post hole at Porth Godrevy may have been re-used in a similar way (Fowler 1962, 27). Although the re-use of a quernstone in this situation may have been simply a practical application, the possibility of symbolic connotations must also be considered. Prior to deposition, a decision was made to take the quern out of service despite the presence of additional handle holes that could have potentially enabled it to continue in use for grinding.

The toilet set

Nina Crummy

A Roman-period copper-alloy toilet set was found in the fill of east–west gully [64] within structure 2 in enclosure 2.

Description

A copper-alloy toilet set with four instruments: two identical nail-cleaners flanking a toilet spoon and tweezers, suspended on a bar and shackle loop (Figs 12 and 13). The ends of all the instruments are missing, as is most of the shackle. The five different elements are:

a) A short bar and a D-shaped shackle with discoid terminals riveted onto the ends of the bar. The outer face of the shackle is grooved and there are small punched dots within the groove. The bar is 13mm long, the shackle was at least 12mm high but only part of one side now remains; it was probably between 14 and 16mm at the outermost point of the curve.

b) The toilet spoon has a perforated discoid suspension terminal and a plain narrow shaft of rectangular section; length 45mm, width 2.5mm. The end has broken at the point where it began to flare outwards to form the scoop.

c) The tweezers, length 51mm, have a moulding beneath the spring-loop, which fits closely around the suspension bar. The straight-sided blades, width 5mm, are decorated with a median groove emphasised by a row of small but deep punched dots. The grips are missing; they may have flared outwards slightly.

d–e) The nail-cleaners are a matching pair. Each has the same perforated discoid terminal as the toilet spoon, beneath which are prominent lugs, decorated on the outer face with a transverse groove set with punched dots. The flat blade is high-shouldered and is decorated on the outer face with a median groove, set with punched dots, which runs up to meet the transverse dotted groove on the lugs. A dot made with the same punch is set at each side of the groove at the widest part of the blade. At the broken tip the blade flares outwards towards the missing points. Both blades are 45mm long; one measures 9.5 mm across the widest part of the blade, the other 10.5mm.

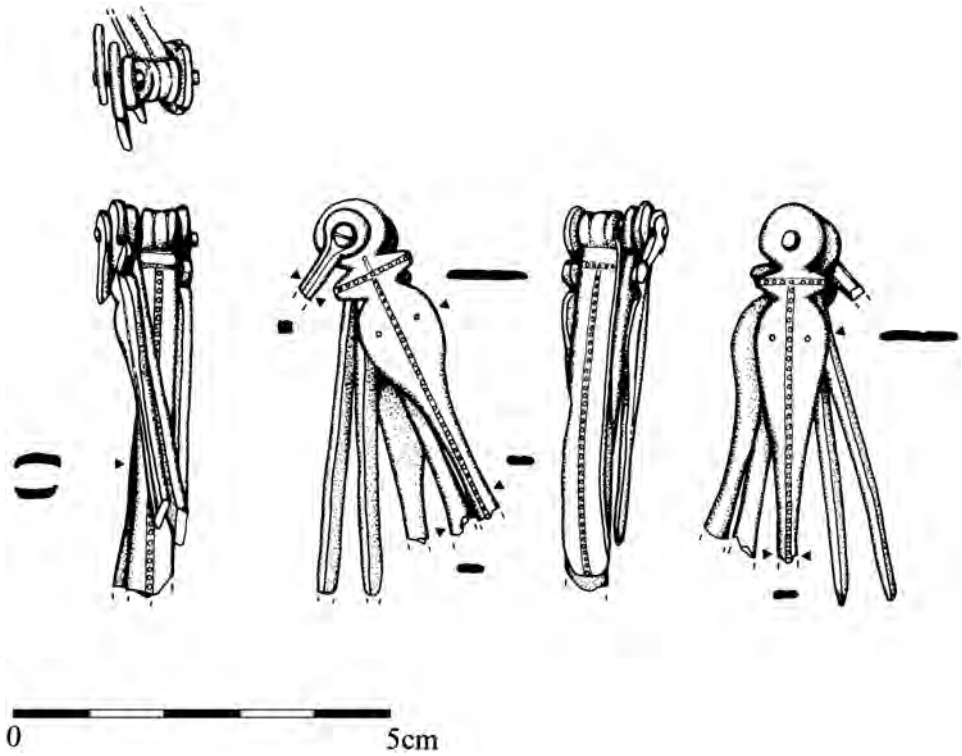

Fig 12 The early Roman-period toilet set found in gully [64], structure 2. (Drawing: Carl Thorpe.)

Fig 13 Toilet set from gully [64], after conservation. (Photograph: © Cornwall Archaeological Unit, Cornwall Council.)

Discussion

Recent work on toilet instruments in Britain has established several characteristics of toilet sets and in particular of nail-cleaners. The earliest sets and individual instruments are from Arras Culture burials in Yorkshire, influenced by contact with the continental mainland, but these pieces stand out as anomalous within the Middle Iron Age in Britain. The use of toilet instruments only truly took root in Britain in the mid to late first century cal BC among the Catuvellauni of the south east, influenced by contact with north-eastern Gaul (or migration from that area). Within the Catuvellaunian territory their use was originally restricted to a social élite, but at the tribal centre of *Verlamion* it seems to have percolated throughout more varied ranks of society during the later part of the first half of the first century AD. In the transitional years around the date of the Roman conquest, deposition of toilet sets and individual instruments in burials became increasingly widespread, with several found in the territories of the Atrebates and Durotriges, most if not all of them demonstrably the graves of high-status individuals. A surge in production across much of southern Britain followed the conquest, allowing toilet instruments to be acquired by a much wider segment of society, and this greater use went hand in hand with a decline in their deposition in burials (Eckardt and Crummy 2008, 21–4, 76–87).

Toilet sets in Late Iron Age and Roman Britain generally consisted of three instruments: tweezers, ear-scoop and a nail-cleaner with two points; the tweezers were sometimes, as here, longer than the other instruments. While the first two artefact types occur in Roman contexts on the continent, in Britain the bifid nail-cleaner is a remarkable example of an insular Romano-British survival from an earlier continental late Hallstatt and La Tène tradition. It is common over much of Roman Britain from the mid first to the late fourth or early fifth century AD but is rarely found in Roman contexts on the continent. Contact with Roman material culture associated with grooming drove this particular instrument out of use in Gaul and Germany, where the latest stratified bifid cleaners are Augustan (Eckardt and Crummy 2008, 20). The

nail-cleaner's survival and increased use in Roman Britain is almost certainly due to idiosyncratic grooming practices here. This idiosyncrasy is typified by pestle-and-mortar cosmetic grinding sets, which are uniquely British and, like nail-cleaners, flourished in the Roman period, having first appeared in the Late Iron Age. They go hand in hand with several references to Britons who coloured their skin by authors such as Caesar and Propertius in the mid to late first century cal BC and Claudian in the late fourth century AD, although the latter drew upon much earlier sources for his poetic imagery (Jackson 1985, 171; Carr 2005; Eckardt and Crummy 2008, 69–70).

An independence regarding grooming habits seems, therefore, to have marked out many Romano-Britons as distinct from the rest of the Empire. This can be further detected in a more detailed social context by the occurrence of nail-cleaners in greater numbers on small settlements than in major towns and *civitas* capitals. This impression can be enhanced by the addition of examples from rural sites and that holds good both as numbers of individual finds and expressed as a percentage of the total number of artefacts recorded from each site (Crummy with Pohl 2008, 212, 219; Eckardt and Crummy 2008, 96–102). Essentially, the use of bifid nail-cleaners after the Augustan period was a peculiarly British practice, highlighted by a greater occurrence of the instruments on Romano-British sites that can be defined as 'less Romanised' than in the larger towns.

The Penryn set is the only one to have been found in Cornwall; previously the most south-westerly toilet instruments recorded came from Exeter and its immediate hinterland (Eckardt and Crummy 2008, figs 23–6). As outlined above, the use of toilet sets that included nail-cleaners among the instruments was a La Tène practice that survived the transitional years of the conquest to become a marker of Romano-British material culture. Within Cornwall the set can to some extent be considered with the earlier Iron Age mirrors from Bryher and St Keverne, both dated to *c* 125–50 cal BC (Stead 2006, 40; Sealey 2006, 16), both being artefact types that represent grooming among an Iron Age élite. We can presume from this that the Penryn set was regarded as an important object with a perceived value, both expressing status and conferring it on its owner, and perhaps also on the owner's family or wider community. How or why it was acquired cannot be determined. The possibilities include commission, trade and gift exchange. We can nevertheless be confident that it was regarded as exceptional within its owner's milieu. The perceived value of the set is confirmed by a closer examination of the various aspects of its style and decoration.

The Penryn toilet set is unusual in form and unique in decoration, although these characteristics alone do not define it as a high-status object. Toilet sets and individual toilet instruments, nail-cleaners in particular, are noted for their diversity, with few formal types being identified. (A 'type' is here defined as comprising items of the same form, style of decoration and suspension mechanism, that derive from a workshop or group of workshops, usually with an output traded within a specific region.) Instead, most toilet instruments can only loosely be gathered into groups of varying formality, being collections of artefacts sharing some typological features but not necessarily from the same workshop or group of workshops. This diversity appears to be primarily the result of small-scale manufacture, in turn affected by regional and social traditions (Eckardt and Crummy 2008, 49–52). It is worth noting in this respect that the decoration on cosmetic grinding sets is also hugely varied, with no two examples exactly alike (Jackson 1985, 169).

The inclusion of a second nail-cleaner as on the Penryn set is rare. Two unmatched nail-cleaners found together with tweezers and an ear-scoop from *Tripontium*, Warwickshire, may have formed a set, but were only associated in the ground rather than joined, while two from Andoversford, Gloucestershire, were united by a penannular ring but had no other instruments with them (Cameron and Lucas 1973, 130, fig 22, 16; Rawes 1980, 46, fig 12, 1a–b). Better comparisons are provided by some enamelled châtelaines. Two nail-cleaners were among the six instruments originally on a set from London with an elaborate enamelled bar and shackle (one nail-cleaner is now missing); British-made enamelled châtelaine brooches from Canterbury, Kent, and Gimbsheim, Germany, also included two nail-cleaners among their instruments (Crummy with Pohl 2008, table 4.6.1, no 7, fig 4.6.2; Eckardt and Crummy 2008, 169-73; Miron 1989, 53, Abb. 9, 38). Few examples of this type of brooch retain a complete undamaged set of instruments and it may be that all had two nail-cleaners. Duplication of instruments can also

be seen on late Hallstatt and La Tène toilet sets from the continent, usually on examples intended to be displayed on the body as a mark of status, a comment that applies equally to the enamelled Romano-British sets (Miron 1989, Abb. 1; Eckardt and Crummy 2008, 18–19). Setting the two nail-cleaners at either end of the Penryn set can therefore be seen not only as providing a neat method of enclosing the two other instruments and enhancing the set's visual appearance, but also as a way of enhancing its status.

The decorative motif of punched dots within a groove used on the Penryn set is not matched elsewhere in Britain, although both grooves and dots were often used separately. Every surface of the set that was visible was decorated. The lack of decoration on the ear-scoop is entirely due to the fact that both its surfaces were hidden when the set was not in use, and this goes hand in hand with the absence of decoration on the inner faces of the nail-cleaners. Even on objects made of base metal, decorative detailing such as this is a mark of status, the greater investment of the maker's skill and time reflecting upon the object and its owner. The decoration is therefore another indication that this set was a high-status object.

The nail-cleaners combine morphological elements that occur in two informal groups, those with a high-shouldered leaf-shaped blade and those with lugs at the neck. The former group is spread across the country from Kent to Roxburghshire, and the wide blade is often marked by a median groove; however, only at Penryn is it paired with prominent lugs across the top (Eckardt and Crummy 2008, 122, 125, figs 60 and 65). Nail-cleaners with lugs at the neck form a sub-group within one of the least coherent of the informal groups. There is one example from Burgh in Suffolk and two from London that have lugs of similar form and prominence to those seen at Penryn, but the blade form of the Burgh nail-cleaner is so different that no real link can be posited between the two (Martin 1988, fig 13, 35). Both London nail-cleaners have leaf-shaped blades and, although the lugs are smaller and more pointed, provide reasonably close parallels to the example from Penryn. One was an antiquarian find, the other from a midden dated to the 70s–80s AD on the Leadenhall Court site, associated with timber buildings pre-dating the construction of the forum-basilica (Smith 1859, 129, pl 33, 8; Ward 1911, 262, fig 70, D; Crummy with Pohl 2008, 215, 218, fig 4.6.3, 30).

Broad leaf-shaped blades with flaring points and median grooves, as on the Penryn nail-cleaners, are in general of very Late Iron Age to early Roman date, especially when combined with a large suspension loop. Dated examples occur at Silchester in Hampshire, Dragonby in Lincolnshire, Crosby Garrett in Cumbria, and Thetford in Norfolk. The latter is almost certainly of Late Iron Age manufacture, and the Crosby Garrett, Silchester and Dragonby pieces may also be pre-conquest (Boon 2000, fig 157, 25; May 1996, fig 11.24, 76; Fell 1974, pl 1; Gregory 1992, 132, fig 116, 11). The Penryn set lacks the large suspension loop but, even so, may be as early as *c* AD 40. A terminal date for its manufacture is more difficult to establish but on the evidence of the London find is unlikely to be later than early Flavian.

Being the narrowest and thinnest elements of the instruments, the scoops of toilet spoons, the points of nail-cleaners and the grips of tweezers are often missing due to their fragility and susceptibility to corrosion. However, on the Penryn set the uniformity of the damage to the terminals suggests that it was deliberate, even though the broken ends are now irregular and pitted from corrosion. The toilet spoon and nail-cleaners have all been broken at the same length, and at a point where the shaft is still quite substantial. The blades of the tweezers are also broken at matching lengths, although they are still longer than the other instruments. In other words, the working element of each instrument has been removed, leaving the shafts intact and thus causing the least damage to the set's overall visual appearance. The action of corrosion would have been less discriminating and would have resulted in a range of lengths. The missing part of the shackle can therefore also be seen as deliberate damage being applied to all five elements of the set. The damage can be contrasted with that on a Roman spoon from Chysauster, on which the upper part of the handle had been cut off. Even with only a stump of a handle the spoon bowl would still have functioned quite well, while the missing upper part could not on its own be identified as coming from a spoon. In this instance the damage has been interpreted as preparation for recycling (Thorpe 2004, 15, figs 9, 11, 12).

Given this formal damage, the set should be considered as a deliberately buried ritual object, perhaps used in a rite of foundation or termination. The use of toilet instruments as

votives on sanctuary sites is well attested, with Woodeaton in Oxfordshire, Harlow in Essex and the shrine of Apollo at Nettleton in Wiltshire producing particularly high numbers. The Middle Walbrook valley in London has a concentration of instruments, particularly whole sets, that stands out as entirely anomalous within the city and its suburbs and confirms the votive character of that site's metalwork assemblage (Eckardt and Crummy 2008, 102–4; Crummy with Pohl 2008, 218–19; Merrifield 1995; Merrifield and Hall 2008, 126). As well as these well-defined votives, an ear-scoop was placed in a structured deposit of Late Iron Age or early Roman date at Ardleigh, Essex, and, most pertinent to the Penryn set, three complete toilet sets associated with the construction levels of buildings at Silchester appear to have been used as foundation deposits (Sealey 1999, 117; Eckardt and Crummy 2008, 103–4; Crummy 2011, SFs 2079, 2942, 2961).

The above examples of votive use come from the main zone of production and distribution of toilet instruments, but the many metal toilet instruments found in Scotland, all a very long distance from this zone and most from very remote areas, provide a useful context in which to view the Penryn set, in terms of both deliberate deposits and / or of unusual objects within their milieu. They have been summarised by Coleman and Hunter (2002, 93–4) as objects of the Scottish Iron Age that show a Roman influence, although in the case of nail-cleaners this is perhaps better expressed as a Romano-British influence. They include tweezers found in a souterrain at Shanzie Farm, Alyth, in Perthshire, tweezers from the Mine Howe chamber in Orkney, six tweezers and a nail-cleaner from Covesea Cave, near Elgin in Morayshire, an ear-scoop from Keil Cave in Argyll, and unusually large and idiosyncratically shaped tweezers from a broch in Kettleburn, Caithness; a mid first-century nail-cleaner was incorporated into the wall of hut II in the homestead enclosure built, probably in the first half of the second century, over the levelled ramparts at Hownam Rings hillfort in Roxburghshire (MacGregor 1976, 143, no 276; Benton 1931, fig 17; Ritchie 1967, 109, fig 2, 14; Coleman and Hunter 2002, 93, fig 18, 21; Piggott 1948, 219; Eckardt and Crummy 2008, 104, 155). The unusual Kettleburn tweezers may have been used as ritual objects and the Covesea cave finds could be votives, while the Hownam Rings nail-cleaner had probably been deliberately set into the hut wall, which was composed of natural sand and subsoil and had originally been faced with stone blocks. Some of these items may have been acquired specifically for use as ritual items, and some may have been curated for several decades, or longer, before being deposited.

The Penryn toilet set can therefore be summarised as a rare or exceptional item on several counts: its find spot, its inclusion of two nail-cleaners, its shape, its decoration and its degree of decorative detail. In addition, the deliberate damage to the operative element of each instrument points to it having been rendered ineffective for a human user, while remaining perfectly acceptable to a 'divine one'. It may have been used and curated, or unused and curated, for some time before being buried, but its final purpose seems to have been as a votive deposit.

Flint

Anna Lawson-Jones

Excavation of the Penryn College site in 2007 produced a total of 40 pieces of worked flint (and chert), plus a single miscellaneous piece of chipped white quartzite (Table 3). The assemblage included material from 11 different contexts, plus occasional unstratified pieces. Few of the pieces are strongly diagnostic, but those that are suggest a later Neolithic – Early Bronze Age date.

Raw material source and context

Twenty-six of the pieces have been recorded as tertiary and, as a result, cannot be ascribed a raw material source. However, on the basis of the variety of flint colour and quality it is probable that the majority of this material has been worked from pebbles, the most likely source for which would be local beaches. The use of pebble flint in Cornwall is not diagnostic of any particular period in prehistory. Of the seven primary and seven secondary pieces, seven were clearly pebble in origin. The remaining seven pieces have a nodular cortex indicative of a more distant source. Nodular flint does not occur naturally within Cornwall and as a result when found is ascribed an imported status, probably reaching the site via trade or exchange. Devon represents the nearest source for primary and secondary deposits of nodular flint (Tingle 1998; Newberry 2002). Beer Head is the

Table 3 The flint assemblage. Cortication: P = Primary: 50%+ remaining cortex. S = Secondary: 1 – 49% cortex. T = Tertiary: 0 – 1% cortex. Raw material: N = Nodular, P = Pebble, Q = Quartzite, C = Chert.

Context	*Lithic no.*	*Cortication*	*Raw material*	*Burnt*	*Retouch*	*Tool / form*	*Comment and period*
Unstratified	1	S	N	-	√	Point	Large amorphous flake with utilised, partially worked point. Neolithic.
	2	S/T	C	-	-	Oblique arrowhead blank?	Large, flat flake. Broad, thin, transverse projectile edge, made on prepared core. Same core as 3? Late Neolithic form.
	3	T	C	-	-	Unmodified cutting flake?	Fine, convex edged, possible cutting / slicing flake. Same core as 2? Probably Late Neolithic.
	4	P	P	-	-	Waste?	Split pebble. Possible light scraper use. Undiagnostic.
(6)	5	T	?	-	-	Waste	w
(12)	6	-	Q	-	-	Waste?	Fresh, long, thin white quartzite piece; awl / thin point shape. No obvious use-wear.
	7	T	?	-	-	Knife	Long oval flake with edge wear along one near straight working edge. Slightly abraded – may suggest either a residual origin or wear through hafting and use?
	8	T	?	-	-	Waste	Thin, fresh, sharp, pointed waste, core rejuvenation piece?
	9	T	?	-	-	Waste?	Soft-hammered, dark, good quality, rounded rectangular flake. No obvious use-wear.
	10	S	?N	-	-	Waste	Long, narrow, fresh piece. Good quality black flint. No obvious use-wear, rejuvenation piece? Neolithic.
	11	S	?N	-	√	Miscellaneous piece with crushed wear	Thick, tear-shaped flake with crushed wear along dorsal and opposing ventral side. Heaviest dorsal wear may be result of backing / hafting? Fresh where not abraded.
	12	T	?N	-	-	Waste	Small, elongate waste / debitage piece. Hard-hammered. Fresh.
	13	S	P	-	-	Waste	Elongated waste / rejuvenation (?) piece.
	14	T	?	-	-	Cutting flake	Triangular-shaped flake with focused use-related / cutting (?) damage on long edge.
(13)	15	S	P	-	-	Waste	Small, snapped piece of flake.
(78)	16	T	?	-	-	Waste	Fresh, broken flake. Core rejuvenation piece, from prepared core.
	17	S	P	-	-	Waste	Small, fresh, amorphous, faulted flint flake.
(82)	18	T	?	√	-	?Projectile	Triangular flake. Two long tapered edges, possible hafting at opposing end. Non-diagnostic form.
(88) [89]	19	P	P	-	-	Point / engraver	Long primary flake with worked end. Not retouched, but formed via flaked removals. Some use-wear.
(94)	20	T	?	-	-	Waste	Very small, fresh waste (debitage).

Table 3 cont.

Context	*Lithic no.*	*Cortication*	*Raw material*	*Burnt*	*Retouch*	*Tool / form*	*Comment and period*
(96)	21	T	?	-	-	Waste	Tiny, fresh waste (debitage).
	22	T	?	-	-	Waste	Waste flake.
	23	P	N	-	-	Waste	Fresh, thin, flat flake. Neolithic.
	24	T	?	-	-	Waste	Small, thin, sharp waste piece.
	25	T	?	-	-	Waste	Very small waste/debitage piece.
(127)	26	T	?	-	-	Waste	Small, thin, broken long flake.
	27	P	N	-	-	Broad point	Thick, fresh, elongated good quality black flint, with light use as a broad point? Late Neolithic.
(158)	28	T	?	-	-	Waste	Rejuvenation flake from prepared core.
	29	S	N	-	-	Waste	Fresh, thin, angular, amorphous rejuvenation flake. Neolithic.
	30 - 32	T	?	-	-	Waste	Three small waste / debitage pieces. Two the same pale brown, one darker grey.
(159)	33	P	P	-	√	Piercer	Distinctive smoky grey / tan piece with point worked on one side, other side formed by snapping. Some additional backing retouch at opposite end to point to facilitate handling.
	34 - 37	T	?	-	-	Waste	Four small waste / debitage pieces.
(186)	38	T	?	√	√	Scraper	Pale steep, convex-edged scraper with blistered working edge. Neolithic - Bronze Age in character.
(258)	39	P	N	-	-	Waste	Long, thin, flat piece with no obvious use-wear. Neolithic.
Unstratified	40	T	?	-	-	Waste	Very thin, flat, faulted, pale flint flake. No use-wear.
Unstratified	41	P	P	-	-	Waste	Split pebble. Probable light natural damage on edge.

largest and best-known chalk-with-flint outcrop in Devon, located on the south-east coast. Closer secondary deposits of equally good quality flint, including glacially deposited flint, exist in western Devon (Newberry 2002).

The selection of raw material for the production of flint tools became increasingly important during the Neolithic period (Healy 1985), particularly where fine, ornate or 'special' flint pieces were required for non-utilitarian purposes (Edmonds 1995). Instances where flint from a specific source might be required included items made specifically for deposition, often in pits, and frequently deposited in an unused or a near pristine state. In this instance, the discovery of a small number of substantial pits with Grooved Ware and small assemblages of unabraded, sometimes nodular flint would suggest that selective deposition was potentially one of the activities represented. However, the Penryn College assemblage is neither large, nor particularly 'select' in character.

In addition to the flint, two pieces of good quality chert were collected, unfortunately as unstratified finds. These pieces represent the only chert found on site and are of identical colour and quality. They are very likely to have come from the same core, although they do not quite conjoin. It is uncertain whether the parent material was of local or imported origin. Both have adhering flakelets, denoting both a lack (or near lack) of use and absence of disturbance since deposition. Neither shows any sign of post-depositional damage, although they do show signs of incipient recortication. These characteristics would suggest that both were in an *in situ* deposit prior to the 2007 programme of topsoil stripping.

Results

Table 3 presents a brief description and comment, plus an indication of period where applicable, for each piece of flint within the assemblage.

Discussion

Much of this assemblage is composed of unmodified waste material, showing no macroscopic signs of use-wear or focused abrasion. In addition, much of the assemblage is fresh, some of the pieces retaining the tiny adhering flakelets produced during knapping. This implies that many of the excavated flint-producing contexts contained *in situ* and essentially contemporary flint as opposed to accidentally included or residual earlier material. Very little of the material shows marked signs of abrasion indicative of long-term exposure or repeated disturbance, despite the known later activity on the site.

Although much of the flint is waste and not classically diagnostic, and few of the pieces represent specific tool forms, the generally controlled, often large flake-based character of the majority of the material suggests a Late Neolithic – Early Bronze Age date. This would make much of the flint assemblage broadly contemporary with the pits producing Grooved Ware (some of which also produced flint). There is also an unquantified but probably small Bronze Age component within the assemblage.

Of the 38 pieces of flint and two of chert, only 11 form identifiable tool types. These are two points, two engravers or points, two possible projectiles, two unmodified cutting flakes and one knife or cutting flake, one thick miscellaneous flake with bifacial crushed or cutting (?) wear and one burnt scraper. Neither of the points are heavily worked or of classic proportions. Both would have functioned well as reasonably heavy-duty points, although neither show pronounced use. Interestingly, both were made on nodular flint; one is from an unstratified context and the other Late Neolithic from pit [162], fill (127). One engraver / point came from fill (88) in a probable Iron Age or later shallow ditch [66] on the south side of the site, while the other came from basal fill (159) in pit [161] and appears reasonably fresh, undamaged and comparatively well made.

The two probable projectile pieces include an unstratified probable oblique arrowhead blank, made on the larger of the two chert flakes. A further possible projectile blank of an unmodified triangular form (representing an undiagnostic type) came from uppermost fill (82) of pit [83]. Oblique arrowheads are a Late Neolithic type (Green 1984). They have quite often been recorded in association with Grooved Ware deposits (Healy 1984), often within pits, for example at Spong Hill (Healy 1988); while undiagnostic, barely modified projectiles can occur in any period, given the Late Neolithic associations ascribed to much of this assemblage it is likely that this piece can also be given a similar Neolithic date.

Unmodified flakes apparently used for *ad hoc* cutting and slicing appear throughout the prehistoric period. During the later Neolithic these took on a slightly more uniform appearance; they were often large and thick with broad convex edges ideal for cutting and slicing without further modification in the form of the retouch or backing which knives have. These pieces do exist in conjunction with knives, possibly suggesting that they had a slightly different range of uses. They can be difficult to identify, but it is likely that the unstratified chert flake **L3** represents one such piece. A long flake from the primary fill (12) of pit [312], which also produced Grooved Ware, is more akin to a barely modified, straight-sided, lightly used knife piece than a cutting flake. This is the one piece in the assemblage to show signs of all-over or general abrasion. This could suggest residuality, or heavy use in conjunction with abrasive longitudinal hafting (running along the opposite side of the working edge). It did not seem to have undergone specific polishing, although interestingly edge-ground pieces have been found in association with Grooved Ware elsewhere; for example, at Rudston Wold East, Yorkshire (Edmonds 1995, 96). From this same Grooved Ware-associated pit context came an apparently heavily used but miscellaneous tool made on an almost certainly nodular piece of flint. This piece could be Neolithic or Bronze Age in date.

The only scraper present is of a broadly Late Neolithic – Early Bronze Age type, a chunky, flaked piece with steep, neat retouch, which came from the upper fill (186) of posthole [185] (probably associated with Romano-British structure 2). This piece is residual and is the only piece in the assemblage to have been blistered and burnt.

Several contexts produced flint from Late Neolithic pits containing Grooved Ware: pit [312]

produced nine pieces, pit [83] two pieces, pit [97] five pieces, pit [162] two pieces and pit [161] ten pieces. Much of the flint from these features is fresh and some of it nodular in origin.

The nearby site at Tremough in 2002 also produced a series of Grooved Ware-associated features, including pits (Gossip and Jones 2007; 2009–10). Several of the Tremough pit deposits produced nodular flint (Lawson-Jones 2007) and a more obviously select range of worked, frequently very fresh and barely utilised nodular pieces were recorded there. Despite the differences between the present site and Tremough, however, a broadly similar pattern can be seen linking them. It would seem that, as has been recorded elsewhere, in some circumstances fresh flint from an imported source and selected Grooved Ware sherds (often not complete vessels) were deposited together. The apparent freshness and sometimes unusual qualities of pieces (in terms of their size, workmanship or raw material origin), together with the lack of heavy use on otherwise everyday pieces of flint found in Grooved Ware-associated pits, denotes deposition associated with ritualised events, rather than more functional or routine activity.

Animal bone

Clare Randall

This was an extremely small assemblage of animal bone, all of which has been calcined. It is assumed that the lack of other material relates to ground conditions. Only one identifiable fragment could be discerned, a single very fragmentary sheep molar (probably maxillary) from context (203), ditch [204], part of enclosure 1. The remaining fragments consisted of a probable skull fragment from a sheep-sized mammal from context (59) in pit [19], within structure 2 or 3, and two long bone fragments from a sheep-sized mammal in fill (45) of field ditch [66].

The full report on bone, including a statement of method, is included in the project archive.

The charcoal

Rowena Gale

Charcoal analysis was undertaken to obtain environmental data and to indicate the character of wood fuel. Twenty-five samples of charcoal were selected for full analysis.

The quantity and quality of the charcoal varied but overall these deposits were more abundant than charred macrofossils. The charcoal is assigned as fuel debris, probably mostly from domestic hearths.

Methods

Charcoal was mostly recovered from bulk soil samples by wet sieving but that from contexts (18), (37), (213), (221), (252) and (258) was hand selected. The resulting samples were scanned under low magnification and the charcoal separated from plant macrofossils. Intact segments of narrow roundwood were infrequent. Charcoal fragments measuring >2mm in radial cross-section were considered for species identification.

The condition of the charcoal varied from firm and well preserved to poor and friable. Some pieces were very small. The samples were prepared using standard methods (Gale and Cutler 2000). The anatomical structures were examined using incident light on a Nikon Labophot-2 compound microscope at magnifications up to x400 and matched to prepared reference slides of modern wood. When possible, the maturity of the wood was assessed (heartwood, sapwood) and stem diameters and the number of growth rings recorded. It should be noted that charred stems may be reduced in volume by up to 40 per cent.

Results

The taxa identified are presented in Table 4. Classification follows that of *Flora Europaea* (Tutin *et al* 1964–80). Group names are given when anatomical differences between related genera are too slight to allow secure identification to genus level. These include members of the Pomoideae (*Crataegus*, *Malus*, *Pyrus* and *Sorbus*), Leguminosae (*Ulex* and *Cytisus*) and Salicaceae (*Salix* and *Populus*). When a genus is represented by a single species in the British flora, it is named as the most likely origin of the wood, given the provenance and period, but it should be noted that it is rarely possible to name individual species from wood features and exotic species of trees and shrubs were introduced to Britain from an early period (Godwin 1956; Mitchell 1974).

The anatomical structure of the charcoal was consistent with the following taxa or groups of taxa:

Aquifoliaceae. *Ilex aquifolium* L., holly

Betulaceae. *Betula* sp., birch
Caprifoliaceae. *Sambucus nigra* L., elder
Corylaceae. *Corylus avellana* L., hazel
Fagaceae. *Quercus* sp., oak
Leguminosae. *Cytisus scoparius* (L.) Link, broom or *Ulex* sp., gorse
Rosaceae. Subfamilies:
Pomoideae, which includes *Crataegus* sp., hawthorn; *Malus* sp., apple; *Pyrus* sp., pear; *Sorbus* spp., rowan, service tree and whitebeam. These taxa are anatomically similar; one or more taxa may be represented in the charcoal.
Prunoideae. *Prunus spinosa* L., blackthorn.
Salicaceae. *Salix* sp., willow, and *Populus* sp., poplar. In most respects these taxa are anatomically similar.

Phase 1: Late Neolithic

A sample from the primary fill (12) of pit [312] consisted almost entirely of hazel (*Corylus avellana*), although the hawthorn / *Sorbus* group (Pomoideae) was also present. Charred hazelnut shell was frequent (Carruthers, below), implying that the charcoal was domestic fuel debris. Charcoal from the basal fill (98) and upper fills (95) and (96) of pit [97] consisted mainly of shrubby species such as hazel (*Corylus avellana*), the hawthorn / *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and elder (*Sambucus* sp.), although oak (*Quercus* sp.) and birch (*Betula* sp.) were also recorded. Charred hazelnut shell was present (Carruthers, below).

Charcoal from pit [161] was more degraded than from pits [312] and [97] but indicated the same emphasis on shrubby species including mainly hazel (*Corylus avellana*) and the hawthorn / *Sorbus* group (Pomoideae), although a small quantity of birch was also present. Hazelnut shells were frequent (Carruthers, below). Samples from the uppermost and primary fills of pit [83] indicated the use of hazel (*Corylus avellana*), the hawthorn / *Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.).

Phases 2 – 4: Late Iron Age – Romano-British

HEARTH PITS
Residues from the fill of hearth pit [47] and context (37), the surface of hearth [243], the two latter both from structure 1, offer the most conclusive evidence of fuel debris. The clay-lined hearth pits [47] and [243] were located centrally within structure 1, where associated postholes suggested that they may have been protected by a roof. Pit [47] was the better preserved of the two and included several fills: a sample from a layer of charcoal-rich clay (11) consisted predominantly of oak (*Quercus* sp.) (heartwood and sapwood) but also hazel (*Corylus avellana*). This context also included charred cereal grain (Carruthers, below), thereby providing more convincing evidence of domestic origins for the charcoal. Charcoal from fill (37) of hearth [243], again probably domestic in origin, included two fragments of willow (*Salix* sp.) or poplar (*Populus* sp.).

DITCHES
Charcoal from (213), the upper fill of cut [214], part of the long curvilinear ditch of enclosure 1, was sparse but included oak (*Quercus* sp.). Tiny fragments of oak (*Quercus* sp.) also occurred in several other contexts: the recut [73] of ditch [214], the fill (74) of curvilinear gully [75] which cut [73]; and the fill of ditch [257], the northern terminal of [214]. The origin of the charcoal is unknown and although probably from hearth debris, residues from other activities in or around enclosure 2 cannot be ruled out.

GULLIES
A sample from the secondary fill (285) of gully [286], the northern extension of the ditch defining enclosure 2, included oak (*Quercus* sp.) and hazel (*Corylus avellana*).

PITS AND POSTHOLES
Fill (26) of posthole [27] in structure 2 included a quantity of charcoal with several large fragments. The bulk of the charcoal was oak (*Quercus* sp.) sapwood, probably from fragmented roundwood. Two intact stem segments measured 20mm in diameter and included ten and eleven growth rings. Oak heartwood was also present with both fast- and slow-grown wood structure. In addition, the sample included hazel (*Corylus avellana*), the hawthorn / *Sorbus* group (Pomoideae) and a quantity of unidentified bark.

Charcoal associated with structure 3 included a sample from fill (16) of pit [17], which consisted entirely of oak (*Quercus* sp.), and main fill (252) of gully [251]. The sample was small but included

Table 4 Penryn College, Penryn, Cornwall: charcoal. Key. h = heartwood; r = roundwood (diameter <20mm); s = sapwood (diameter unknown, Quercus only). The number of fragments identified is indicated.

Sample	*Context*	*Description*	*Betula*	*Corylus*	*Ilex*	*Pomoideae*	*Prunus*	*Quercus*	*Salix / Populus*	*Sambucus*	*Ulex / Cytisus*
Phase 1: Late Neolithic											
1	(95)	Upper fill of pit [97].	1	2	–	–	1	–	–	–	–
2/3	(96)	Fill of pit [97].	–	21r	–	2	1	1h,1r	–	–	–
4	(98)	Basal fill of pit [97].	–	25	–	32	–	2h	–	1	–
5	(158)	Fill of pit [161].	–	17	–	3	–	–	–	–	–
6	(159)		2	21	–	11	–	–	–	–	–
13	(12)	Primary fill of pit [312].	–	28	–	1	–	–	–	–	–
19	(82)	Uppermost fill of pit [83].	–	4	–	1	–	–	1	–	–
20	(94)	Primary fill of pit [83].	–	7	–	5	–	–	1	–	–
Phase 2–4: Iron Age / Romano–British											
8	(186)	Upper fill of posthole [185].	1	3	–	–	–	10r,4s	–	–	4
10/11	(206)	Fill of posthole [205].	–	6	2	–	–	6r,2s	–	–	5
17	(38)	Fill of pit [39].	–	–	–	–	–	3h,1s	–	–	2
26	(18)	Fill of posthole [19].	–	2	–	–	–	1s	–	–	–
27	(37)	Hearth pit [243].	–	–	–	–	–	–	2	–	–
30	(213)	Upper fill of ditch [214].	–	–	–	–	–	2r,1s	–	–	–
31	(221)	Fill of pit [222].	–	–	–	–	–	9	–	–	–
32	(252)	Main fill of gully [251].	–	–	–	–	–	5r/s	–	–	–
33	(258)	Fill of ditch [257].	–	–	–	–	–	2s	–	–	–
35	(285)	Secondary fill of gully [286].	–	1	–	–	–	2h,2s	–	–	–
36	(297)	Fill of posthole [298].	–	–	–	–	–	3	–	–	–
12	(11)	Fill of hearth pit [47].	–	2	–	–	–	12h, 32s	–	–	–
28	(72)	Fill of ditch [73].	–	–	–	–	–	2s	–	–	–
16	(26)	Fill of posthole [27].	–	2	–	1	–	10h,3r,65s	–	–	–
29	(74)	Fill of gully [75].	–	–	–	–	–	2s	–	–	–
34	(16)	Fill of pit [17].	–	–	–	–	–	15h,4r,5s	–	–	–

oak (*Quercus* sp.) and hazel (*Corylus avellana*) (Table 4); charcoal from [251] probably originated from wide roundwood.

Samples from postholes [185] and [205] associated with structure 2, included oak (*Quercus* sp.), hazel (*Corylus avellana*) and gorse (*Ulex* sp.) / and broom (*Cytisus scoparius*). The sample from fill (18) of posthole [19] was small but included oak (*Quercus* sp.) and hazel (*Corylus avellana*). A sample from (186), the upper fill of posthole [185], included birch (*Betula* sp.); holly (*Ilex aquifolium*) was recorded in fill (206) of posthole [205]. Since

these features also contained charred cereal grain and chaff (Carruthers, below), the charcoal seems likely to represent domestic fuel debris.

Small fragments of oak (*Quercus* sp.) roundwood were also present in posthole [298], one of three features which may either be associated with structure 2 or with the phase 2 ditch [58] alongside. Small quantities of charcoal obtained from the fills of pits [39] (enclosure 1) and [222] (adjacent to structure 2) included oak (*Quercus* sp.) and, in [39], gorse (*Ulex* sp.) / broom (*Cytisus scoparius*) and hazel (*Corylus avellana*).

Discussion

Charred plant remains and charcoal recovered from processed environmental samples from prehistoric and Romano-British contexts were mainly rather sparse; plant remains were particularly poor (Carruthers, below). The charcoal mostly consisted of small fragments, similar in character to those from Tremough (Gale 2007; 2009–10). This report considers the possible origins of the charcoal, in the context of what is known of the environment and the neighbouring settlement at Tremough.

Phase 1: Neolithic

Late Neolithic activity was represented by a small group of pits containing Grooved Ware. Charcoal was examined from pits [312], [97], [161] and [83]. Since these pits also contained quantities of charred hazelnut shell, it is probable that the charcoal originated from domestic hearth debris. Table 4 shows a decided bias towards the use of shrubby species such as hazel and the hawthorn group, while oak was recorded only from pit [97] and even then very sparsely.

Interestingly, the evidence from the charcoal collected from Penryn stands in contrast to that from the pits at the Late Neolithic site at the Tremough site (Gale 2007). There oak was common to each context examined and, although hazel was also frequent, usually formed the dominant taxon and included wood from fairly mature or substantial branches.

The reasons underlying the apparent preference for shrubby species at Penryn, when mature oak (a highly efficient fuel) was almost certainly available, are not clear; the preference may be related either to exploitation of a particular source of fuel (perhaps from scrub clearance or trimmings) or to species or wood type selection for a specific use. The increased ratio of atmospheric oxygen to the wood surface of narrow roundwood, for example, produces a fast-burning fire more quickly than largewood.

Phases 2 – 4: Late Iron Age – Romano-British,

In many contexts within the settlement enclosures, charred cereal grain and chaff were combined with fuel residues, thereby strongly suggesting that the charcoal represents domestic waste. Despite the uncertainty of phasing for many features, the results of the charcoal identification show a consistent preference for oak, with relatively little use of other species; those identified include hazel, birch, holly, the hawthorn group, gorse / broom and willow / poplar. The charcoal was mostly too comminuted to indicate whether fuel was sourced from roundwood or largewood, although a good-sized deposit in posthole [27] in gully terminal [23] – part of structure 2 – appears to have comprised mainly a mixture of oak roundwood and largewood (the latter including both fast- and slow-growth.

These results correlate with those from a hearth deposit within a Romano-British roundhouse at Tremough (Gale 2007, 111). While charcoal from postholes associated with settlement structures at Tremough 'fort' included a similar range of taxa to that from Tremough and Penryn, the samples were too small to assess preferential selection of species (Gale 2009–10).

The environment

Evidence from the charcoal deposits at Penryn indicates that the following taxa were available locally: oak (*Quercus* sp.), hazel (*Corylus avellana*), the hawthorn / *Sorbus* group (Pomoideae), birch (*Betula* sp.), blackthorn (*Prunus spinosa*), holly (*Ilex aquifolium*), elder (*Sambucus* sp.), willow (*Salix* sp.) / poplar (*Populus* sp.) and gorse (*Ulex* sp.) / broom (*Cytisus scoparius*). It is suggested that oak and hazel formed the major woodland components in the vicinity of the site. Open or cleared land probably supported scrubby species such as gorse, elder, blackthorn, hawthorn and shrubbier specimens of hazel; the abundance of hazelnut shell attests to growth in well-lit conditions. There is some evidence to suggest that coppicing may have been established by the Late Neolithic period, although the samples were

too small to provide conclusive proof. Whether this was practiced randomly or on a more formal cyclical basis is unknown. It is probable that mature oaks supplied structural timbers and firewood, particularly in the Late Iron Age and Romano-British periods.

Environmental data from Penryn is closely comparable with fuel residues from the sites at Tremough. Given the close proximity of Penryn to these sites, where occupation was more or less contemporaneous, it is probable that a) the overall woodland environment was similar, and b) that wood, timber and fuel were obtained from woodlands of similar character.

Conclusions

The analysis of fuel residues and deposits (charcoal) from Late Neolithic and Late Iron Age – Romano-British contexts showed distinct temporal differences in species selection, with the use of hazel (*Corylus avellana*) and the hawthorn / *Sorbus* group (Pomoideae) in the former, as opposed to the predominance of oak (*Quercus* sp.) in the latter. Comparison of these results with deposits from contemporary sites nearby at Tremough indicate that there, although local woodland composition appeared to be similar, oak was important as a fuel wood in both the Late Neolithic and the Late Iron Age – Romano-British periods. Based on the available evidence, it is suggested that oak and hazel formed the climax woodland, possibly with some areas of coppice.

Charred plant remains

Wendy Carruthers

A total of 36 flots from 30 different contexts were received for analysis. Eight of the samples consisted of small, hand-picked charcoal fragments which were not processed but were quickly scanned and passed on to the charcoal specialist (Gale, above). The remaining flots were first coarse sieved, to remove the large, identifiable charcoal. They were then sorted under a stereoscopic microscope for identifiable charred plant macrofossils. Eleven flots produced charred fruits or seeds, although in most cases the remains were scarce. It should be noted, however, that in comparison to sites like Tremough (average sample volume = approximately 25 litres; Carruthers 2007), the Penryn samples were small, averaging about 10 litres.

Table 5 presents the results of the analysis. Nomenclature follows Stace (1997).

Discussion

As at Tremough, the state of preservation of plant remains at Penryn was not particularly good, with surface erosion and silt encrustation making identification difficult in some cases. However, rootlets and slaggy material were not present at Penryn and there was less concern that contamination might have occurred.

The site at Tremough is located a short distance (less than 1 km) from the Penryn College site. Because the archaeology and charred plant remains show similarities to each other in the Late Neolithic period, comparisons have been made in the discussion below.

Late Neolithic pits

Small quantities of hazelnut shell (*Corylus avellana*) were found in six samples from three of the Late Neolithic pits at Penryn. Although these remains only amounted to very small numbers of hazelnuts in total, the consistent occurrence of these remains in pits of this period is of note, particularly when compared to samples from structural contexts (Table 5). If hazelnut shells simply represented domestic waste, casually disposed of in hearths, this sort of difference would not be expected. It could be suggested that if the buildings were domestic in function, *more* charred hazelnut shells would be found within them than in pit groups. It is likely, therefore, that the disposal of this material was deliberate and meaningful. Further comparisons of this nature on other sites would be useful.

It is probably also significant that among the few other charred remains present in the pits at Penryn (four items), a rose seed (*Rosa* sp.) and probable sloe stone fragment (*Prunus* sp.) were recorded. Charred fruit remains are usually only present in very small numbers (if at all) on most sites, so these records are likely to indicate deliberate charring and burial in the pits. Perhaps fruits and nuts were being burnt and buried for ritual purposes. It is not possible to say whether whole nuts and fruits were burned, or just the waste from feasting, as

Table 5 Quantities of hazelnut shell from Late Neolithic pits at Penryn College and Tremough

Site	*Hazelnut shell fragments per 10 litres of soil sieved*	*Number of samples*
Penryn Late Neolithic pit group samples.	6.6	6
Tremough Late Neolithic and Early Bronze Age pit group samples.	5.8	12
Tremough Early Bronze Age structures.	0	8
Tremough Early – Middle Bronze Age structures.	0.1	22

oily nuts and fruit flesh are very rarely preserved by charring.

The other two charred remains from Penryn were a grass seed (indeterminate Poaceae) and a possible poorly preserved gorse seed (*Ulex* sp.). In addition, pit [312] contained some black 'slaggy' material with grass, reed or straw stem impressions on some surfaces. Together, these suggest the burning of poor grassland vegetation, perhaps *in situ* at the site of burning the hazelnut shells and fruit stones. Alternatively, these materials could have been used for tinder, or represent burnt fodder. It is interesting to note that no cereal remains were present in these samples, and only one poorly preserved cereal was found in the Tremough pit group samples. In comparison, the Late Neolithic – Early Bronze Age structures at Tremough produced 54 cereal grains. Once again, this suggests that a specific type of material was being deposited in the pits; that is to say, foods gathered from the 'wild' rather than cultivated foods.

Iron Age – Romano-British features

A hearth pit [47] in structure 1, three postholes – [27], [185], [205] – from structure 2 and a pit [39] in enclosure 1 produced charred plant remains. The remains were present in concentrations greater than two fragments per litre (fpl) in only two cases; hearth pit [47] had 9.4 fpl and posthole [205] 2.08 fpl. As each of the assemblages was slightly different, they are discussed individually below.

Pit [39], context (38) (enclosure 1, south of structure 1)

The few remains present (1.2 fpl) were all characteristic of poor grassland: gorse (*Ulex* sp.), clover / trefoil (*Trifolium / Lotus* sp.), ribwort plantain (*Plantago lanceolata*) and grass (Poaceae). No cereal remains were recovered. This may represent burnt hay or turves burnt *in situ*.

Posthole [27], context (26) (structure 2)

Two charred round tubers – probably onion couch tubers (*Arrhenatherum tuberosum*) – were the only remains recovered. Onion couch grass often grows on land that was once cultivated but has reverted to grassland. They may have been charred *in situ* if the post was burnt out or have been deposited in the backfill, perhaps from land that had been burnt off.

Posthole [185], context (186) (structure 2)

Twelve cereal chaff fragments (glume bases and spikelet forks) were present in this feature, most of which were only identified as far as emmer / spelt (*Triticum dicoccum / spelta*). However, three glume bases confirmed that spelt (*Triticum spelta*) was being cultivated. This hardy and vigorous wheat was becoming the dominant cereal grown over most of southern England during the Iron Age and Romano-British periods, taking over from emmer and barley. The only other items recorded were two plantain seeds (ribwort and greater plantain, *P. major*) and an unidentified tuber fragment. These taxa could have been growing as crop weeds or among hay. The remains probably originated in a small amount of burnt cereal processing waste.

Pit / posthole [205], context (206) (structure 2)

Greater quantities of cereal processing waste, perhaps mixed with a little grain or whole spikelets, were present in this feature associated with structure 2. Of the eight cereal grains recovered, four were identifiable as emmer / spelt grains. Of the 17 chaff fragments present, two glume bases confirmed the presence of spelt wheat and one possible emmer glume base (*cf T. dicoccum*) suggested that emmer was probably still grown. Being less robust than spelt, emmer may be slightly under-represented in

the assemblage. The only other remains were two common weeds of cultivation, chess (*Bromus* sect. *Bromus*) and wild radish (*Raphanus raphanistrum*), the second of which is more frequently found on poor, acidic soils.

Hearth pit [47], context (11) (structure 1)

As might be expected for a hearth pit, this sample produced the largest concentration of charred plant remains (9.4 fpl). Of the 43 items present, the following ratio of grains to chaff fragments to weeds of cultivation was obtained: 4:3:2 (grains: chaff: weed seeds). The relatively high proportion of grains suggests that material from several sources was combined to produce the assemblage, perhaps including grain spilled during food preparation or grain parching, and chaff and weed seeds removed during food preparation or grain parching. In addition, some whole spikelets could have been present. These products and waste products may have accidentally fallen into the hearth or been deliberately burned. Waste materials such as cereal processing waste and contaminated grain may have been deliberately burned, either used as tinder or thrown into the fire in order to destroy pests and diseases.

The identifiable cereal component was again primarily spelt wheat, but with possible additional crops of bread-type wheat (represented by a single rachis fragment (*cf Triticum aestivum / turgidum*), barley (represented by a poorly preserved grain (*cf Hordeum* sp.)) and oats, represented by five oat grains (*Avena* sp.). The oats may have been growing as weeds, although they are known to have been grown as a crop in southern England by the Late Iron Age (Campbell and Straker 2003, 24). No floret bases were preserved to determine whether cultivated or wild oats were present at Penryn.

Five common weeds of cultivation were represented in the assemblage, including the same two as in posthole [205], as well as scentless mayweed (*Tripleurospermum inodorum*), pale persicaria (*Persicaria lapathifolia*) and orache (*Atriplex patula / prostrata*). The last two of these weeds signify nutrient-rich soils, so it is likely that manuring was necessary by the Late Iron Age in order to obtain a reasonable crop from the poor acidic local soils.

Discussion

The crop plants in the Romano-British samples at Tremough showed similarities to those from Penryn. Very little barley was present at Tremough, a little oats and bread wheat were recorded, and emmer and spelt were the main cereals grown (Carruthers 2007, 104–5). The range of weed seeds, however, was somewhat different in the Romano-British samples, with indicators of poorer soils indicating that soil impoverishment may have been causing problems by this time. Perhaps that was why leguminous crops (Celtic bean) were being grown at Tremough, as these can cope with poor soils and help to restore soil fertility.

Another site in the wider area producing charred plant remains, this time dated to the Early Iron Age, was Truro College (Carruthers, forthcoming). As with all of the Cornish sites, concentrations of charred plant remains were very low. This may be because arable cultivation was a minor component of the economies of settlements on the relatively poor, acidic soils of Cornwall. The range of cereal crops was similar, with emmer and spelt wheat dominating, but this time with no bread-type wheat. Leguminous crops were not present but crops such as black mustard and flax were being grown for oil, flavourings or fibre. Small quantities of ericaceous remains and seeds from acid-loving plants reflected the nature of the soils.

Conclusions

The charred plant remains from Penryn add valuable data to the archaeobotanical record from Cornwall. Relatively few plant assemblages from the county have been studied to date, from sites of all periods (Campbell and Straker 2003). The fruit and nut remains from the Late Neolithic pit group suggest that particular types of material were being deposited in these features. The Late Iron Age – Romano-British features contained different types of waste, but only three samples produced cereal remains, suggesting that arable cultivation was taking place on only a small scale. Cereal processing waste and grains were present in small quantities and spelt wheat was probably the principal crop cultivated. Emmer, bread wheat, barley and oats may also have been grown. The weed seeds reflected the poor, acidic nature of the local soil. Nitrophilous weeds in one sample suggested manuring may have been taking place. This is likely to have been especially necessary if

bread-type wheat was being cultivated, or if arable crops were grown for any length of time on the same, nutrient-poor soils.

Radiocarbon dating

Andy M Jones

The five samples selected for radiocarbon determinations were taken from sealed contexts. Two were on short-lived hazel charcoal from Late Neolithic pits [97] and [312] and a third, also from pit [312], was derived from charred residue on a sherd of Late Neolithic Grooved Ware pottery,

Two further determinations were obtained from hearth pit [47] in Romano-British structure 1 and from pit [27] in structure 2. Both were on hazel charcoal.

The samples were submitted for accelerator mass spectrometry dating (AMS) at the Scottish Universities Environmental Research Centre (SUERC). The probability distributions (Table 6 and Fig 14) have been calculated using OxCal (v4.2) and have been cited at 95.4 per cent probability unless otherwise stated.

The radiocarbon dating of residue and charcoal from the Grooved Ware pit group confirmed that they dated from the first half to the middle of the third millennium cal BC. The determinations are broadly similar to those obtained from pits containing Grooved Ware at nearby Tremough (Gossip and Jones 2007, 29, 113).

The determinations from hearth [47] in structure 1 and posthole [27] in structure 2 confirm occupation from the Late Iron Age into the second century AD.

Table 6 Radiocarbon dates from Penryn College

Feature	*Context*	*Lab. no*	*Age BP years*	*Material*	*Calendrical years 95.4%*
[27]	(26)	SUERC-19977	1910 ±30	Corylus charcoal	AD 21–170 (93.6%) AD 194–209 (1.8%)
[47]	(11)	SUERC-19978	1980 ±30	Corylus charcoal	45 BC – AD 77
[97]	(98)	SUERC-19979	4005 ±30	Corylus charcoal	2580–2468 BC
[312]	(12)	SUERC-19980	4000 ±30	Charred residue	2577–2468 BC
[312]	(12)	SUERC-19984	4080 ±30	Corylus charcoal	2857–2496 BC

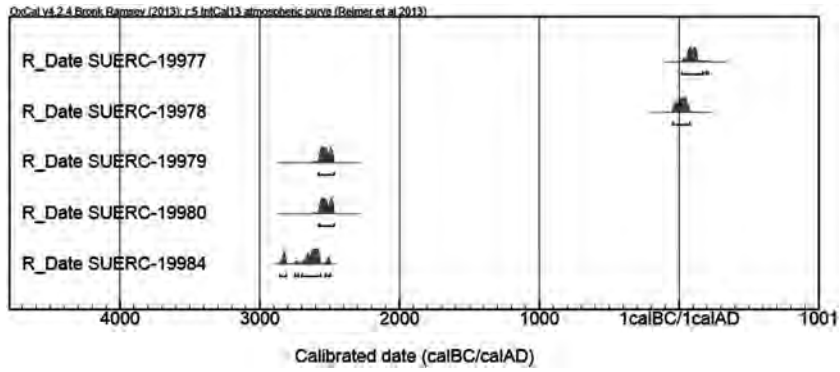

Fig 14 Radiocarbon dates from Penryn College.

Discussion

James Gossip and Andy M Jones, with Graeme Kirkham

Pit digging in the Late Neolithic

At Penryn College seven pits were found in a close group just inside the Late Iron Age – Romano-British enclosure 2 (Fig 5). Most were circular or sub-circular with concave profiles. Four were intercutting and represent several episodes of digging and backfilling. One pit, [97], was far larger than the others, nearly 1m deep and 2m in diameter. Fills were generally homogenous silty clays, the larger pit [97] containing numerous layers indicative of a succession of infill events. The radiocarbon dating suggests that the Late Neolithic Grooved Ware phase of activity occurred between 2870 and 2480 cal BC.

Broadly speaking, the Grooved Ware pits at Penryn College contained similar suites of objects: mainly unabraded pottery, unused flint waste or tool types and charcoal consistent with material from domestic hearths. This compares closely with other Grooved Ware sites in Cornwall, which are overwhelmingly associated with small-scale pit sites (Jones and Quinnell 2011, 205–6). This pattern contrasts with the chalkland of southern Britain where Grooved Ware is frequently found in large-scale ceremonial monuments and settlement contexts (Pollard 1992; 1995; Cleal and McSween 1999).

All but two of the pits produced sherds of Grooved Ware and at least 14 vessels are represented, making it the fourth largest assemblage currently known from Cornwall, after Tremough (Gossip and Jones 2007, 29), Clodgy Moor (Jones *et al* 2013) and the Truro Eastern District Centre (Taylor 2015). Shallow bowl-shaped pit [312] produced 60 sherds, accounting for eight of the vessels. A number of sherds were redeposited and were found in later Iron Age and Romano-British contexts.

Much of the Grooved Ware was fresh, suggesting that it was buried soon after breakage and that sherds subsequently lay undisturbed, despite later prehistoric activity nearby. Most pits also produced flint, much of it fresh (with the exception of a heavily used piece from pit [312]) and some from nodular sources. Although much of the assemblage is unmodified waste, there are tool forms present and absence of evidence of wear suggests that no significant use occurred between knapping and deposition (Lawson-Jones, above). A broken cobble, perhaps used as a hammerstone, was found in pit [83].

Charcoal was also present in fairly high quantities, comprising hazel and shrubby species such as hawthorn, blackthorn and elder. Some birch and oak charcoal was present, but in small quantities. As at other Late Neolithic sites in Cornwall, hazelnut shells were also recovered (for example, Gossip and Jones 2007, 8; Carruthers 2007, 102), although unusually charred fruit remains comprising a rose seed and a sloe stone fragment were also retrieved from the pits. Shrubby wood may have been the wood of choice for creating fast-burning fires and could have been generated by clearance on the edge of denser deciduous woodland. The presence of burnt grass seed may also suggest the burning of poor grassland or the use of grasses for tinder (Carruthers, above).

There is a growing body of evidence from Cornwall for pit digging throughout the Neolithic (*c* 3900–2500 cal BC). This phenomenon is found across Britain (Thomas 1999, 64–74; Pollard 2001; Allen *et al* 2004; Noble 2006, 66–8), although there are distinct regional differences in the places in which pits were dug and the material deposited within them (Garrow 2007), and changes in content over time. A number of excavated sites across Cornwall have revealed groups of pits with dates ranging across the fourth and third millennia cal BC. As at Penryn, the majority have been found to contain pottery, flint and sometimes burnt foodstuffs. Early and Middle Neolithic examples have been recorded at Portscatho (Gerrans) (Jones and Reed 2006), Metha (St Newlyn East) (Jones and Taylor 2004, 43), Poldowrian (St Keverne) (Smith and Harris 1982), Tremough (Jones *et al* 2015), Trenowah (St Austell) (Johns 2008, 6), Helston (Hood 2009) and Penmayne (Gossip *et al* 2012). The largest pit group with an Early Neolithic date range was recorded at Tregarrick, Roche (Cole and Jones 2002–3). There, six radiocarbon dates from a group of ten pits fell within a period of four centuries in the Early Neolithic, from 3790 cal BC to 3370 cal BC (*ibid*, 134).

Late Neolithic pit groups have been found in small numbers in Cornwall and include a pair of pits at Harlyn Bay (Jones and Quinnell 2014, 99–101) and another group near Probus (Jones and Nowakowski 1997). The nearest Late Neolithic pit group to the Penryn College site was discovered

at the Tremough campus, some 500m to the north west (Gossip and Jones 2007; 2009–10). The Tremough group is also closest in date to the Penryn College pits, with Grooved Ware and flint deposited between *c* 2900 and 2300 cal BC.

The characteristic deposits associated with many of these pits appear to show deliberate selection of a specific suite of materials for burial, strongly suggesting a ritualised aspect to the practice. Freshly broken pottery, freshly prepared flint and hazelnut shells are objects associated with domestic practices and the consumption of food. The ritualised disposal of otherwise ordinary objects is perhaps not surprising: everyday routine and overtly 'ritual' practices were almost certainly closely intertwined in prehistoric society (for example, Hill 1995; Bradley 2005). The burial of objects at Penryn in a ritualised manner may have marked the end of a period of occupation or, by contrast, may have been a means of securing or reinforcing connections with the land on which the pits were dug.

It is possible that the Grooved Ware pits remained special to subsequent generations or that they were marked in some way to prevent disturbance. At the Tremough Performing Arts Centre site, a large pile of stones was found adjacent to one of the Early Neolithic pits, perhaps intended as a permanent way of preventing future disturbance or as a way of marking the place of original ceremony (Jones *et al* 2015, 28–9).

The field system (*c* 100 BC – AD 200)

In recent years geophysical surveys, large scale open-area excavations and systematic plotting of evidence from aerial photographs have expanded knowledge of later prehistoric field systems in lowland Cornwall. Examples have been identified at a number of sites including Boden (St Anthony in Meneage), Higher Besore (Kenwyn), Penwith College (Penzance), Trenowah (St Austell), Halloon Farm (St Enoder), Tremough (Penryn), Stencoose (St Agnes), Penhale round (St Enoder), Trethurgy (Treverbyn), Little Quoit Farm (St Columb Major) and Pennance (St Stephen in Brannel) (Gossip 2013; forthcoming; Gossip, in preparation b; Johns 2008; Nowakowski and Johns 2015; Gossip and Jones 2007; 2009–10; Jones 2000–1; Quinnell 2004; Lawson-Jones and Kirkham 2009–10; Jones and Taylor 2010). Many of these field systems are broadly rectilinear in layout, although with elements of irregularity and wide variation in the size of the enclosures. At Trenowah ditches defining fields were radiocarbon dated to the earlier Iron Age, with a later Middle to Late Iron Age phase of larger accretive enclosures (perhaps for stock) superimposed upon them (Johns 2008). In most other instances the origins of these rectilinear field systems appear to be in the Middle or later Iron Age. In a number of cases – Penhale round, Trethurgy and Tremough, for example – enclosed settlements were subsequently built within the field systems, partly overlying the earlier fields, although it is probable that the wider patterns of fields continued in use.

A Late Iron Age field system has been investigated at Tremough Campus, less than 1 km to the north west of the Penryn College site. A ditch excavated in 2000 produced a radiocarbon determination of 2070 ±55BP, 350 cal BC – AD 60 (AA-44600), and subsequent work identified a field system comprising five sub-rectangular enclosures divided by shallow, narrow ditches which, from pottery associations, also dated to the later Iron Age. A Romano-British C-shaped enclosure and post-built structure was superimposed on its western end (Gossip and Jones 2007, 23–5; 2009–10, 20–4).

The ditched fields identified at Tremough covered an area of approximately 3–3.5ha, with individual fields having areas of approximately 1000 sq m. Fields recorded at Higher Besore (Gossip, forthcoming) were of similar size and shape, forming a system of rectangular fields extending south east from a sub-rectangular enclosure visible as a cropmark. The Higher Besore cropmark enclosure remains unexcavated but the field ditches produced Late Iron Age pottery consistent with the first century cal BC occupation of an adjacent unenclosed settlement, some structures of which appeared to sit within the field system (*ibid*).

At Penryn College parts of four fields or plots defined by ditches were present in the excavated area (fields A–D, Figs 2 and 4), probably part of a much larger area of fields. Ditches [5] dividing fields A and B and [58] between fields C and D contained South Western Decorated Ware, dating from the third to the first centuries cal BC (Quinnell, above), and it is probable that the field system was created during the Middle – Late Iron Age. The settlement developed within the field system at the end of the first millennium cal

BC, although there is no evidence to indicate that the fields did not continue in use subsequently. The rectilinear enclosures seem to form fields comparable with those recorded at Tremough and elsewhere, although because they are incomplete it is not possible to say how large they may have been. The ditches bounding the south side of field A and the north side of field D together define a ditched track, perhaps providing a route along which animals could be herded through the field system. Grain found during the excavations suggest that the fields may have been cultivated but the small quantity of animal bone retrieved during the investigations hint that animals of sheep size – probably sheep or goats – also formed part of the agricultural economy. The gap between the northern end of ditch [298] between fields C and D and the east–west ditch forming the northern side of field D may represent a gateway, although the form of these ditches is to some extent confused by the superimposed enclosure 1.

The settlement

The settlement at Penryn College took the form of two enclosures, with later modifications, within which the remains of up to five post-built structures were located. A possible additional structure was identified in field C on the eastern side of the excavated area. The structures are somewhat confused in plan and have been affected by truncation and modern ground disturbance. Postholes, some with collapsed packing stones (Fig 7) suggest post-built, roofed structures, with structures 1, 2 and 3 the most coherent. The presence of hearths suggests that some of these structures were domestic. Structure 4 may have been unroofed or perhaps an animal byre associated with the remodelling of the enclosure ditch. A possible fenced structure in field C (Fig 7) may also have been associated with livestock.

Finds suggest that the settlement had its origins in the period from the final century cal BC to the first century AD, a pattern of development comparable to that at nearby Tremough where a broadly similar although larger enclosure was recorded. The Tremough enclosure was curvilinear (phase 1), and measured 40m by 26m, bounding an area of approximately 0.08 ha. In the third century AD it was reduced in size by a second phase ditch to 25m by 19m (0.03 ha). The steep-sided, concave ditch of the Tremough enclosure was similar in shape and size to ditch [214] which formed the west side of enclosure 2 at Penryn College.

Enclosure 2 may have been open or may have had a boundary on its eastern side formed by either field ditch [58] or ditch [181], but its relationship with the pre-existing field system is hard to determine. Enclosure 1, to the north may have been added to the existing field system and similarly it too could have been open on its eastern side. The purpose and functioning of such open-sided enclosures, however, is unclear (Gossip and Jones 2007, 45–6). Comparable features have been identified elsewhere in Cornwall (Johnson and Rose 1982, fig 5) and recent plotting from air photographs carried out as part of the National Mapping Programme found that up to 20 per cent of the substantial number of enclosures identified in the hinterland of the Camel estuary had an open side (Young 2006; 2012). Almost all of these are small, measuring less than 0.3 ha. It should be noted, however, that these enclosures have not been tested by excavation and ditches not visible from air photograph mapping may nevertheless be present below ground (*ibid*).

The enclosures and structures forming the small settlement at Penryn College were inserted into or superimposed on an earlier field system. A similar sequence can be seen at other sites, including Tremough and Little Quoit Farm, which all have field systems pre-dating enclosures (Gossip and Jones 2007, 82; Lawson-Jones and Kirkham 2009–10). It is very probable that the farming community at Penryn College continued to use the fields around their settlement for both arable and livestock agriculture. The upper stone of a well-used rotary quern (Watts, above), found in a posthole in structure 2 in what may have been a deliberate ritual deposit, hints at the importance of cereal production and contexts within enclosures 1 and 2 produced direct evidence of cereal production and processing. The crops identified were mainly spelt or emmer / spelt wheat with limited evidence for bread wheat and barley and possibly oats (Carruthers, above). Hearth pit [47] in structure 1 produced the largest quantity of cereal grain and processing waste, with the remains of both whole grains (perhaps spillage from parching or food preparation) and chaff from cereal processing. However, the recovery of a sheep molar and fragments of burnt bone from animals of sheep size from two field system ditches, and of an animal skull fragment from a pit within enclosure

2 (Randall, above), suggests that livestock was also kept and may indicate manuring of the fields with domestic waste. Nutrient-rich soils created by manuring were also hinted at by the presence of particular weed species, although other evidence suggests that soils may have become impoverished (Carruthers, above).

Charcoal from postholes, pits and hearths in structures 1, 2 and 3 indicates the use of oak, hazel and gorse for domestic fires, while the presence of burnt grasses in pit [39] in enclosure 1 suggests the burning of hay or turves (Gale, above). The results of the charcoal and plant macrofossil analyses present a pattern of cultivation and nearby, accessible woodland similar to that seen nearby at Tremough.

Post-built structures of Late Iron Age and Romano-British date comparable with those identified at Penryn College have been recorded at numerous sites across lowland Cornwall, including Threemilestone round (Schwieso 1976, 56), Penhale promontory fort (Smith 1988, 177), The Rumps (Brooks 1974), Boden (Gossip 2013), Higher Besore (Gossip, forthcoming) and recently Penmayne (Gossip *et al* 2012). The structure recorded within the open-sided enclosure at Tremough was used from around AD 170 until after AD 300 (Gossip and Jones 2007). This slightly ovoid structure was characterised by a large number of features, presumably representing its maintenance and rebuilding over a long period of time, but its dimensions were similar to those of the Penryn College structures. The penannular drainage gullies which were prominent features at the Late Iron Age settlement of Higher Besore (Gossip, forthcoming) were largely absent at Penryn College. Instead, the shallow and truncated gullies surrounding the structure 4 features in enclosure 2 may have held wall footings. The architecture of oval buildings in Romano-British Cornwall has been discussed in detail by Quinnell (2004, 183–202).

It is possible that buildings within the settlement may have been formally abandoned. This is especially evident in structure 2, where one posthole was found to contain fragments from a sheep-sized mammal and another held the complete upper stone of a rotary quern. Querns have symbolic links with fertility and the transformation of harvested crops into processed food (Watts 2014, 45–58), and Late Iron Age sites including Camelford School have revealed evidence for their association with ritualised contexts (Jones and Taylor 2015). There is every likelihood that ritualised practices associated with querns continued into the Romano-British period.

The presence of the toilet set in gully [64], which is likely to have been late in the sequence for structure 2, is also significant in this regard. Toilet sets with nail cleaners such as this are peculiar to the British Roman period and have a distinctive distribution, more common in small settlements and rural sites than in major towns and *civitas* capitals but also known from religious sites as votives and from settlements on the outer margins of Roman Britain, again apparently as votive depositions (Crummy, above). The Penryn College set is the only one known from Cornwall. Its rarity, together with the apparently deliberate 'decommissioning' of the instruments and evidence from elsewhere of the votive associations of such items, suggest that it was ritually deposited. Probably dating to the first century AD, it may already have been curated as an heirloom for some time before being used as a votive. Possession of the set is likely to have bestowed special status on its owners, their family and perhaps also the settlement as a whole. Burial within the structure may have been seen as a way of preserving or memorialising this status.

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Excavation of a multi-phased roundhouse at West Northwood Farm, Bodmin Moor, 2017

ANDY M JONES

with contributions from DANA CHALLINOR, ANNA LAWSON-JONES, HENRIETTA QUINNELL and PETER ROSE

In 2017 archaeological investigations were carried out on an enclosed prehistoric settlement at West Northwood Farm on Bodmin Moor. The settlement was surveyed by plane table and a roundhouse and the enclosure bank were excavated. Initial results from the excavation of the roundhouse suggested that there were at least two distinct phases of habitation. The first comprised a stone-walled roundhouse with a south facing doorway and the second involved the insertion of an opposing entrance through the north wall. The floor was very heavily disturbed or 'poached', probably by the feet of animals which had been kept within the roundhouse. However, analysis of the artefactual assemblage revealed that the occupation was even more complex. Finely-worked Late Neolithic / Early Bronze Age flints show that the area had been occupied prior to the construction of the roundhouse. The sequence of activity associated with the house itself is dated by the recovery of a large number of redeposited ceramic sherds. The earliest date to the Middle Bronze Age and are followed by pottery dating to the Middle and Late Iron Age, and the Roman period. Three radiocarbon determinations fell in the Roman and early medieval periods. The ceramic sequence and the radiocarbon determinations on ceramic residue and charcoal from a floor deposit suggest that rather than having two distinct phases, there were at least four representing a long, if perhaps intermittent and changing use of the roundhouse, which is likely to have spanned some two millennia.

Between 26 June and 8 July 2017, Cornwall Archaeological Unit undertook an excavation at West Northwood Farm, St Neot, as part of the community project 'Dig, Eat and Sing'. The project had been organised by the landowners, Nick and Jenny Hart, along with Martin Eddy and members of the St Neot Local Historians committee, supported by the Heritage Lottery Fund.

The archaeological component of the project had three major objectives. The first was to make the first detailed survey record of the settlement, including all of the roundhouses, the enclosure and walling. Geophysical survey was also undertaken across the settlement area to identify buried features and help establish the level of preservation. This was necessary because no previous record had been made of the site and only one probable roundhouse (named site 9), a scheduled monument, had been documented in any detail. None of the other features are designated and the settlement was not covered by the extensive Bodmin Moor survey (Johnson and Rose 1994). In addition, tree and vegetation cover has meant that the site has until recently not been detectable from the air and it has therefore not been mapped in detail by the National Mapping Programme. The pre-excavation surveys would therefore help to better understand the wider context of the excavation and would be

useful for establishing the extent, character and condition of the site, guiding its management needs and informing future designation.

The second archaeological objective was to undertake a community excavation of one of the roundhouses (named roundhouse 1), which would also provide an opportunity to train volunteers from the St Neot Local Historians and members of the Cornwall Archaeological Society in the techniques of fieldwork, including surveying, excavation, drawing and finds processing. Roundhouse 1 was selected because it appeared to be a well-defined free-standing structure, which had been preserved beneath colluvial hill-wash. It was hoped that its investigation would provide much needed secure dating for roundhouse occupation on Bodmin Moor, as well as yielding evidence for the activities which took place within the structure. With this in mind, geochemical samples were taken from the floor of the roundhouse to ascertain whether Bronze Age metalworking had taken place inside it; however, further analysis was put on hold when it became clear that the sampled deposits were of a much later date. A geophysical survey of roundhouse 1 was also undertaken by the University of Brighton using a magnetometer. A couple of anomalies were revealed which had the potential to be related to metalworking. Subsequent excavation, however, revealed that the interior of the roundhouse had been heavily disturbed and the lowest floor surface post-dated the Bronze Age (below). The anomalies were found to be caused by post-medieval iron objects.

The third archaeological objective related to the consideration of the relationships between the components within the settlement. A second trench was opened up through the enclosure bank to the immediate north of roundhouse 2, where it appeared to be attached to the enclosure. The aim was to gain information about the chronology of

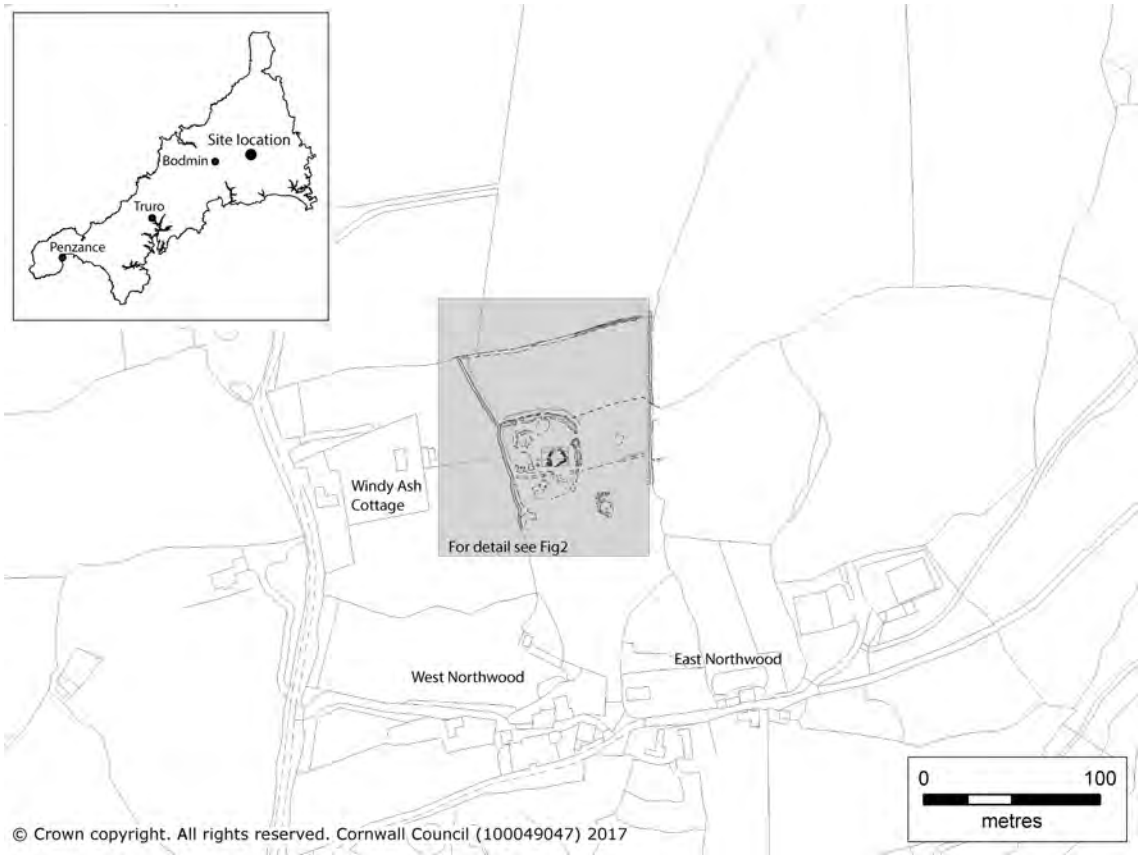

Fig 1 Location map for the enclosed settlement at West Northwood.

the settlement and the relationship between the roundhouses and the enclosure.

In addition to the specific archaeological objectives, which were driven by wider research aims, a major aim was to communicate the results to a broader audience. This public engagement has taken a number of forms. During the excavations, visits were made to the site by local schools and at the end of the two weeks an open day attracted several hundred visitors. The open day gave the opportunity to discuss the initial results with a wide range of people and there were linked demonstrations, which included bronze casting, cooking, dyeing, greenwood and willow working, as well as finds identification by the Portable Antiquities Scheme Finds Liaison Officer.

On completion of the excavation, a summary was included in the autumn 2017 *Newsletter* of the Cornwall Archaeological Society, and an archive level report was produced which will be publicly accessible via the Archaeology Data Service (ADS) website (Jones 2017a; 2017b). This paper marks the culmination of the wider engagement process by Cornwall Archaeological Unit.

Location and background

The roundhouse settlement is situated at around 245–250m above OD on the north side of an east–west aligned valley (at SX 20189 69752). The current farm of West Northwood lies approximately 150m to the south, downslope of the roundhouse settlement, and has its origins in the medieval period, being first recorded in 1327 when it was spelt 'Northewode' (Cornwall and Isles of Scilly Historic Environment Record (HER) MCO 15958; Gover 1948).

The settlement lies at the edge of Bodmin Moor, being near to the junction with the open rough ground and moorland that covers much of the higher land to the north, while to the south the landscape is predominantly enclosed fields and settlements with their origins in the medieval period ('Anciently Enclosed Land' in the terms of the Cornwall Landscape Assessment: Cornwall County Council 1996). In spite of being enclosed by field walls and adjoining West Northwood Farm, the field containing the roundhouse settlement is uncultivated rough ground. The part of the field between the farm and the roundhouses is steep, quite rocky, and covered with scrub and small trees; in the area of the settlement, and beyond it to the north, the slope becomes more moderate and the vegetation is more open, with grasses predominating. It is probably the steep slope which has prevented cultivation and led to the survival of the upstanding settlement, as well as the sealing of buried deposits beneath hill-wash. The field may also have been used historically as the main routeway between the farm and Northwood Downs to the north.

There are many Early Bronze Age cairns and barrows and Middle Bronze Age field systems and settlements in the surrounding area (Johnson and Rose 1994, map (i)). Because of the rising ground, other prehistoric sites to the north are not visible from West Northwood. However, the distinctive Berry Down, which is situated approximately 900m across the valley to the south south west, with its possible Early Neolithic tor enclosure known as 'Berry Castle' (Oswald *et al* 2001, 158) and the later prehistoric settlements on its slopes, are visible, as would be the settlements on Mutton Downs to the west. In fact, Berry Down dominates the skyline to the south west of West Northwood (Fig 10), and it is possible that it was regarded as an 'ancestral place' in the landscape.

The roundhouse settlement is comprised of at least three to four roundhouses, which appear to be single units that have been terraced into the hillslope, and another three or four possible roundhouses / structures (Rose, below; Fig 3). All but one of these roundhouses are situated within a D-shaped enclosure (enclosure 8) with dimensions of 37m east–west by approximately 43m north–south (Figs 2 and 3). The western side of the enclosure is attached to a stone field wall which forms the property boundary. It is possible that this wall and the parallel eastern field boundary are in fact of prehistoric origin and have become incorporated into the later medieval field system. Interestingly, the prehistoric settlement seems to have been situated upon two major junctions. The northern side of the enclosure bank sits upon the boundary between better drained ground and moorland. A second geophysical survey using Electrical Resistance Tomography and Electromagnetic Profiling equipment was undertaken by Penna (Penna 2017, 37). The results suggested that the settlement may be sited on a major east–west aligned anomaly. This was interpreted as a possible tin lode (an engine house is located to the west of the site) although it might also represent a void. Of course, any potential lode is deep below the surface

and there is no evidence for deep or extensive mining in Bronze Age Cornwall (for example, Herring 1997). Nonetheless, the stream valley to the south may have cut across the lode, making cassiterite deposits available locally to Bronze Age communities, and there is well-dated evidence for both the collection of cassiterite pebbles and metalworking in Bronze Age settlements (Taylor, forthcoming; Jones *et al* 2015; Hughes and Farnell 2016).

Tin was certainly exploited from the post-medieval period and later, post-prehistoric activity is also evident in the immediate area. A leat associated with an adjacent post-medieval tin mine ran east–west across the enclosure, narrowly missing the southern side of roundhouse 1. Later

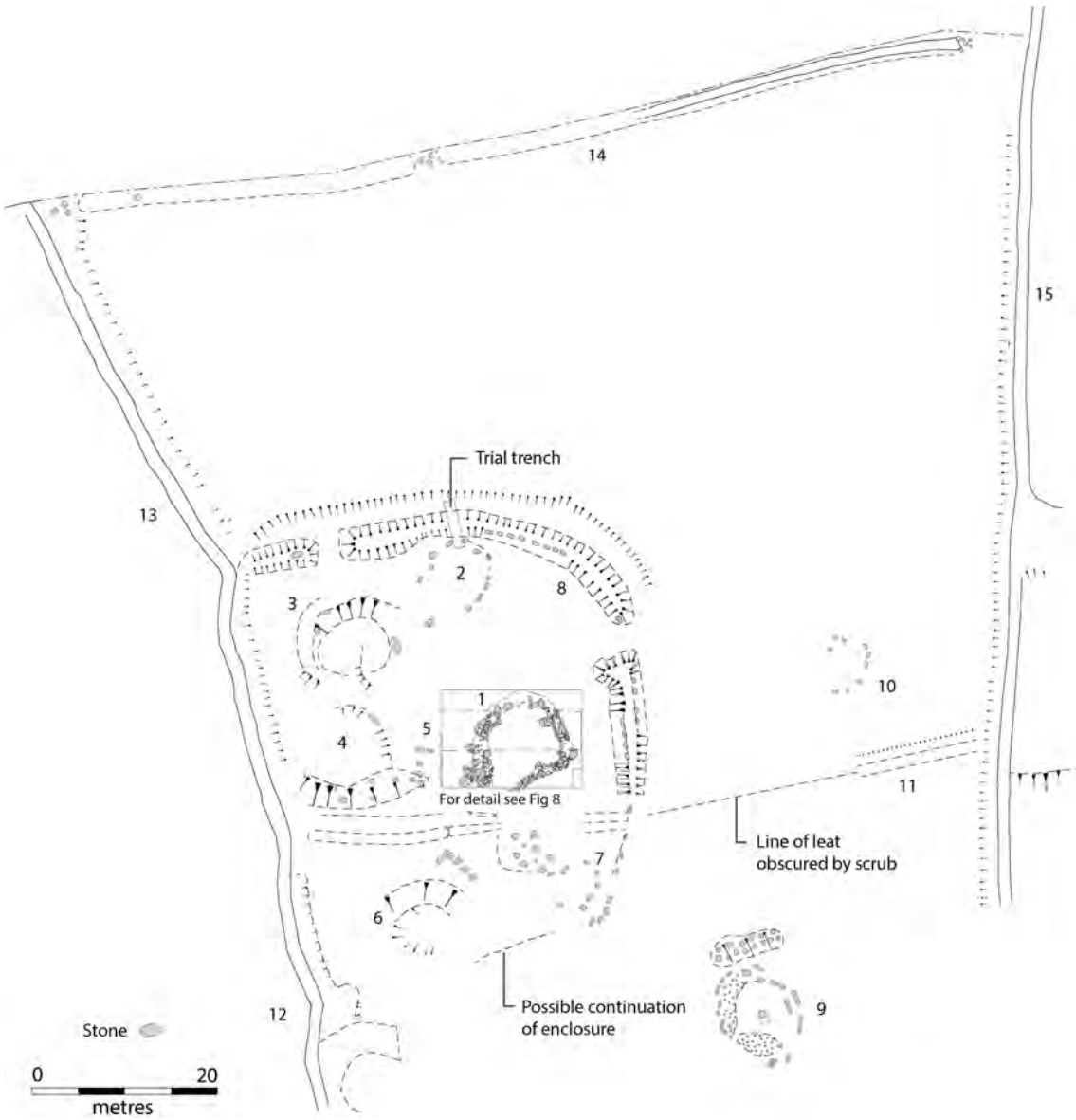

Fig 2 Plan showing surveyed area and the excavation area.

Table 1 Plane table survey results

	Site type	*Grid reference*	*Description*
1	Roundhouse	SX 2017 6976	The excavated roundhouse. Internal diameter approx. 7.5m.
2	Roundhouse	SX 2017 6978	Slightly levelled into slope. Incomplete ring of stones-on-edge marks inner face of house wall. 6.6m internal diameter.
3	Roundhouse	SX 2015 6977	A platform levelled into the slope, with a scarp 0.4m high on the N (uphill) side, two possible facing stones and traces of a low stony bank. Possible entrance to south. Approx. 6–7m internal diameter.
4	Possible roundhouse	SX 2015 6976	A slightly levelled area, with two stones which might be part of the wall. Below to the S, and extending a little to the E, is a more substantial but irregular stony bank and scarp, which may be associated.
5	Probable structure	SX 2016 6975	A rectilinear structure suggested by two lines of single stones, forming the W and N sides only, approximately 4m by 4m. (A continuation to the E has been exposed in the excavation area.)
6	Possible roundhouse	SX 2016 6974	A possible platform, with an ill-defined scarp on the uphill side and a possible edge on the S.
7	Possible roundhouse	SX 2018 6974	Arc of individual stones (approximately 3.8m across NW–SE and 5m NE–SW). May instead be the remains of the line of the enclosure bank (8). NW of the possible structure is a turf-covered spread or bank of irregularly placed boulders.
8	Enclosure	SX 2016 6976	D-shaped enclosure 37m E–W and approximately 43m N–S, internally. Possible entrance on the E. Within it are three definite roundhouses (1, 2 and 3) and four possible roundhouses or structures (4, 5, 6 and 7).
9	Roundhouse	SX 2020 6973	Scheduled Monument, list no 1005444. Strongly levelled into the slope, and defined by a ring or wall of boulder-sized stones, with some facing stones visible. Wall 0.75–1.0m high on N, otherwise under 0.5m. Entrance unclear, possibly SW or SE. The overall diameter E–W is 9.5m. The estimated internal diameter is 6m E–W and 7m N–S. An oak tree grows in centre.
10	Possible structure	SX 2020 6976	25m E of the enclosure, the feature is suggested by an arc of individual stones, but does not appear to be levelled into the slope and is probably natural. There are other stones and possible lines of stones in the area.
11	Leat	SX 2014 6975 to SX 2022 6976	This is formed by a bank on the downhill side, approx. 1m wide and 0.15m–0.3m high, with a ditch to the N of it around 1.0m–1.5m wide and 0.15m deep. The National Mapping Programme layer on the Cornwall Council mapping website shows the leat continuing W towards the buildings of Northwood Mine, but not to the E.
12	Performance area	SX 2015 6972	A small semi-circular amphitheatre created in recent years with tiered seating of granite boulders.
13, 14, 15	Field walls		The maintained field walls on the W and E sides of the field (13 and 15) are ‘stone faced walls’, or Cornish hedges, with a ditch on the side facing the surveyed field. Part of the W wall (13) appears to fossilise the W side of enclosure 8. Parts of the E wall, 15, particularly to the S, mark the edge of a field system E of the survey area which might be prehistoric in origin. The N boundary (14) appears to have been superseded by the post and wire fence running along its N side. The E half of the boundary is a stone faced wall but the W half is mostly lower and more of a bank. There is a ditch along the N side.

disturbance to the wall of the roundhouse was also caused by the rough trimming of a large block of granite, found unstratified in the roundhouse, which is likely to have come from the wall. This block may have been intended to be used as a millstone, or for use in the mine, or in the farm to the south.

Plane table survey

Peter Rose

To set the excavated roundhouse into context the whole of the prehistoric settlement was surveyed. The survey was at 1:500 scale using plane table, alidade and tapes. It covered a little under 1 ha – the northern part of the field above West Northwood Farm, on a south-facing hillside. To facilitate the survey, areas of grass had been mown and some patches of gorse and scrub cut back (Fig 3). The steep and scrub-covered southern part of the field was not surveyed. The survey was undertaken by Konstanze Rahn and Peter Rose, with assistance from Nick Hart and Akshaya Tharmasekaran, between 28 June and 3 July 2017.

Summary of results

The survey recorded a small prehistoric enclosure (8) containing three definite roundhouses (1, 2 and 3), one of which is the excavated roundhouse, and another four possible roundhouses or structures (4–7). Another roundhouse lies outside the enclosure to the south east (9). A mine leat (11) runs east–west across the lower part of the enclosure (Table 1 and Fig 2).

The enclosed settlement had previously been noted in the Cornwall and Isles of Scilly Historic Environment Record (HER; reference MCO20506). The separate roundhouse (9) is recorded in the HER as MCO20505 and is a scheduled monument (National Heritage List for England no 1005444).

Fig 3 West Northwood enclosure and roundhouses from the air (© Nick Hart). North is to the top. Roundhouses 1 and 2 are clearly visible. Longer grass can be seen on the slightly higher ground rising to the north, while the steeper slope to the south is covered with scrub.

The enclosure

The enclosure is roughly D-shaped and measures 37m east–west and approximately 43m north–south, internally. Within it are three definite roundhouses (1, 2 and 3) and four possible roundhouses or structures (4, 5, 6 and 7).

The enclosure bank is turf-covered and generally 3m wide and 0.3m–0.5m high, with, in places, upright stones forming the faces of a wall within the bank (Fig 4). There is a good stretch of inner face on the north east of the enclosure, and on the east side there are stretches of both inner and outer faces of a wall 1.5m wide. Where exposed by the excavation trench north of roundhouse 2, the wall is 1.5m wide with an earth core.

The southern course of the enclosure bank is eroded, incomplete and uncertain but is suggested by a change in slope and occasional boulders. Part of possible roundhouse 7 may be a continuation of the enclosure wall, rather than a house wall.

Along the outside of the northern perimeter of the enclosure bank is what appears to be a 3m wide ditch, defined by a slightly lower, reed filled area (although a ditch was not apparent in the trench north of roundhouse 2).

The line of the west side of the enclosure is apparently fossilised by the present field boundary, which kinks where it joins the enclosure to north and south. Although it is possible that the enclosure continued further to the west (and an unsurveyed scarp visible in the grass field to the west, roughly on the line of the south side, might suggest this) it looks more likely, from its shape, that the plan surveyed is the full extent of the enclosure.

The location of the entrance to the enclosure is not known. There are two breaks, in the north west and in the east, but neither needs be original. A stone on the north side of the eastern break might be a gatepost, and a slight stony scarp (not surveyed) running east from the south side of the entrance may be associated. However, a bulge on the inside of the bank south of the entrance may suggest that the bank has been broken through here and the material cleared to the side of the bank.

The roundhouses

The four definite roundhouses, three inside the enclosure and one outside it, are all of similar size, with internal diameters between 6m and 7.5m (Fig 2). They mostly appear as platforms levelled into the hillslope, with varying evidence for stone walling. The excavated roundhouse (1) and the roundhouse to the south east of the enclosure have walls which include substantial stones or boulders. Roundhouse 2 is defined by an incomplete ring of upright stones projecting above the turf (Fig 5). A

Fig 4 East side of enclosure, 8, looking north; July 2017. (Photograph: © Cornwall Archaeological Unit.)

Fig 5 Roundhouse 2, looking north east; July 2017. (Photograph: Peter Rose.)

slight stony scarp immediately to the south east of this house (not surveyed) might possibly be the edge of another roundhouse. No very clear signs of entrances were surveyed but they were most likely on the southern, downhill, sides of the houses.

Just west of roundhouse 1 two lines of single stones form a probable rectangular structure (5), 4m by 4m. There is another small possible structure south of roundhouse 1, defined by an arc of single stones, although this could alternatively be a robbed-out part of the enclosure bank. The remaining two possible roundhouses inside the enclosure (4 and 6) are slight platforms on the slope, of a similar size to the definite roundhouses.

The overall layout suggests that the enclosure and roundhouses within are associated and broadly contemporary, forming a settlement made up of a small enclosure quite densely packed with houses. The context of the one roundhouse (Fig 6) outside the enclosure is uncertain, although possibly it is a ring cairn rather than a house (Andy Jones, pers comm).

Field system

It is not known whether the settlement was associated with a field system. There are no traces in the rough grass immediately north of the settlement, but it is possible that features to the south are obscured by the denser vegetation. There is, however, a field system in the farmland to the east of the survey area which might be prehistoric in origin. This is suggested by the lines of removed boundaries, running along the contour, plotted from aerial photographs as part of the National Mapping Programme (Cornwall Council online mapping site). The southern boundary is extant as a field boundary (SX 2024 6972) and this is a wall running along the top of a large stony scarp or lynchet, reminiscent of the later prehistoric field systems in West Penwith (for example, Nowakowski 2016b). Earthworks of small enclosures in the north west of this eastern field (SX 2023 6977; outside the survey area) are suggestive of a settlement, although the HER records a small quarry here (MCO37161).

Results from the excavation

Excavation methods

The investigations included the excavation of roundhouse 1, the largest within the enclosure, which was located on the eastern side of the settlement area, and a 5m by 1m long trench through the bank 501, which formed the upstanding element of enclosure 8.

Fig 6 Roundhouse 9 (Scheduled Monument), looking north west; July 2017. (Photograph: Peter Rose.)

The numbering system used by the survey (see Table 1 above) was adopted by the excavation team (for example, enclosure 8 and roundhouse 1). The excavated areas were entirely hand-dug and all the stratified artefacts were plotted, given unique small find numbers and located on the site plans. Throughout this paper they are denoted by triangles (for example Δ68).

Although no structural walling was excavated, all internal floor layers and associated cut features associated with the roundhouse (with the exception of layer (109)) were entirely excavated and sampled.

In the following descriptions of excavated features, context numbers for cut features (pits, ditches and gullies) are shown in square brackets, for example [112], and layers, fills and deposits in round brackets, for example (102). Structures are numbered without brackets; for example, roundhouse 1.

At the end of the fieldwork the interior of the roundhouse was partially infilled and the turf re-laid. The full circuit of the wall is now visible.

Following the completion of the excavations, an archive level report (Jones 2017a) was produced which contains detailed reporting on the plane table survey as well as appendices listing the contents of the project archive.

Roundhouse 1

Roundhouse 1 is located on the eastern side of the settlement. Prior to excavation it appeared to be a single unit which had been levelled into the slope. The structure appeared to be well sealed beneath hill-wash and the southern downhill part of its wall was entirely buried beneath colluvium. The upslope, northern portion of the wall included substantial granite boulders, which protruded through the turf-line. The excavation revealed that the external diameter was approximately 10m and the internal diameter was 7.5m (Figs 7 and 8).

Because the roundhouse appeared to be buried beneath hill-wash it was anticipated that the level of preservation within the building would be good, and it was hoped that there would be an intact floor suitable for environmental and geochemical sampling. A 10m by 15m excavation area was set up over the roundhouse, subsequently extended by 1m on the southern side to investigate the southern entrance. A central 0.5m wide east–west baulk was established for stratigraphical and sampling purposes (Fig 9), and this was removed at the end of the excavation. The full extent of the stone walling which defined the roundhouse was revealed but only displaced stones were removed and *in situ* walling was not excavated. Nonetheless,

Fig 7 Roundhouse 1 from the air prior to excavation (© Nick Hart); north is top right.

the excavation did involve the total exposure and planning of the surviving wall.

The following sections describe the site stratigraphy from top to bottom.

Upper layers – (100), (101) and (102)

The whole of the excavation area was covered by topsoil layer (100), which was formed of decomposed vegetation and humic dark brown soil, ranging from 0.1m to 0.21m thick. A number of artefacts were recovered from this layer, including one sherd of Middle Bronze Age pottery and 15 of Iron Age / Roman period date (Quinnell, below). Several were from the junction of layer (100) with wall 103, the roundhouse wall. Ceramic residue from a sherd of pottery found in layer (100) was submitted for radiocarbon dating; however, the sample failed to produce a determination. In addition to the ceramics, a stone muller (**S3**) of prehistoric or Roman date, a finely-worked plano-convex flint knife (Δ21) dating to the Early Bronze Age and a flint pebble were recovered from this layer (Lawson-Jones, below). The wildly different dating for the artefacts reflects the displacement of artefacts from their original contexts.

Beneath (100) was layer (101), a dark, reddish-brown gritty loam, with granite fragments. Apart from the interior of the roundhouse, this layer covered the excavation area and 103, the wall of roundhouse 1. It was between 0.1m to 0.27m thick and is likely to be a colluvial deposit, which post-dated the occupation of the roundhouse. The overwhelming majority of the artefacts from the excavation were found in (101), with the majority coming from the base of the layer, close to the junction with (105), the natural subsoil. The finds included two sherds of Middle Bronze Age pottery and 147 sherds of Middle Iron Age to Roman period date. Two were of Middle Iron Age South Western Decorated ware (Δ13 and Δ78). Three of the sherds, Δ71, Δ11 and Δ17, could definitely be attributed to the Roman period, and date to the second to the fifth century AD and third to fourth centuries AD (see Quinnell, below). In addition to the ceramics, there was a slate spindle whorl (**S1**), a

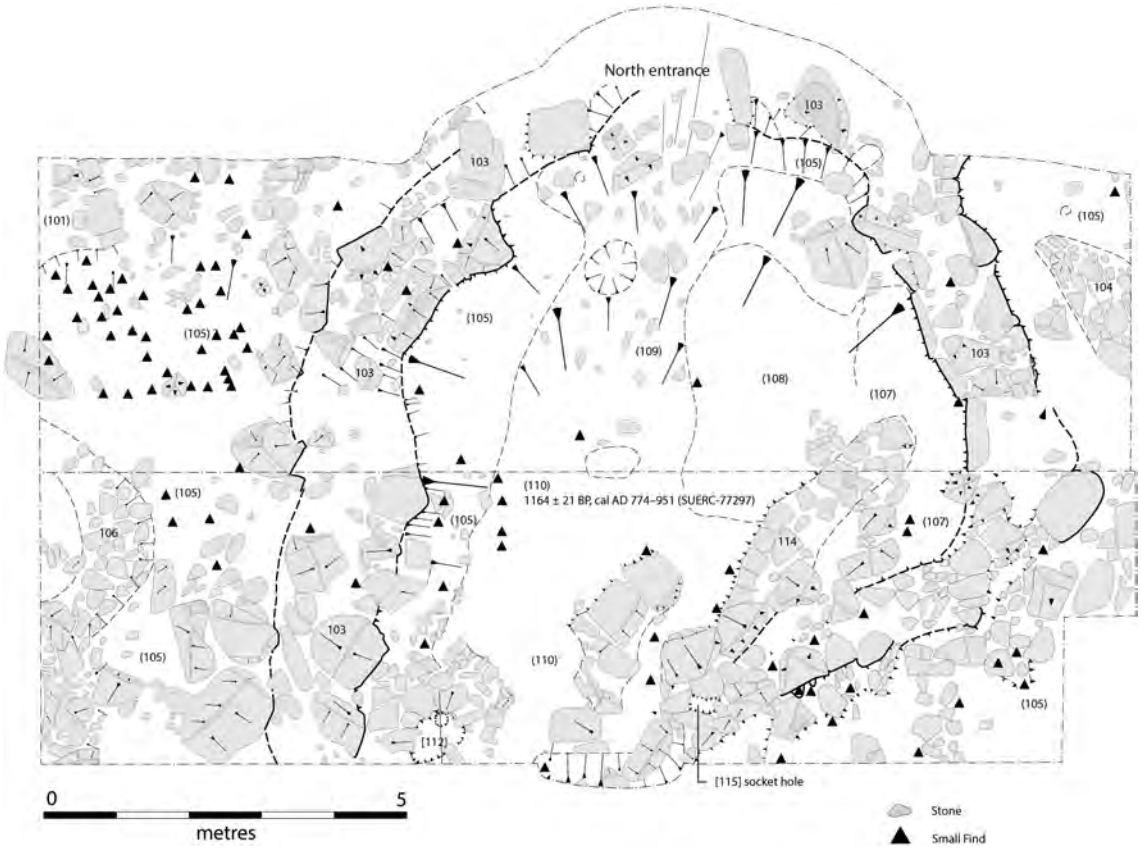

Fig 8 Plan of roundhouse 1. Triangles indicate the location of small finds.

stone rubber (**S4**), a stream cobble hammerstone (Δ 6) and three other burnt and broken stream cobbles (Δ 16, Δ 80 and Δ 85) which might have been used as hammerstones. Trimmed slate **S8** is interpreted as a pot-lid but like all of the other worked stone from this layer it could be of prehistoric or Roman period date. Several residual flints were recovered, which included Δ 42 a fine backed knife, Δ 28 a simple knife, Δ 61 a split pebble knife and worked flake Δ 2, all of which were Late Neolithic / Early Bronze Age in date (Lawson-Jones, below). Two quartz crystals were also recorded, including Δ 48, with possible use wear associated with engraving. A notable concentration of the artefacts, and especially the pottery, occurred on the outside of wall 103 towards the western end of the trench (Fig 8). Given this distribution, the poor condition of the ceramics and the intermixing of artefacts of different periods, it is possible that they had been emptied out of the roundhouse, during one or more of the subsequent reuses of it (see below). A radiocarbon determination was obtained on residue on a ceramic sherd found in context (101): 1878 ±26 BP, cal AD 70–218 (SUERC-77298). This date belongs to a Roman period phase of activity on the site.

Below (101) on the outside of the roundhouse was layer (105), the natural subsoil, a compact orangey-brown granitic clay, known locally as 'rab'. Iron staining, possibly derived from a long -decayed iron object was found embedded in the top of the natural beyond the eastern side of the house; however, it was formless and could have been a natural formation.

Within the roundhouse, layer (100) sealed (102) (Fig 9). Layer (102) was the main infilling deposit within the roundhouse and was up to 0.2m thick. It was a dark greyish-black, loamy silt, a colluvial

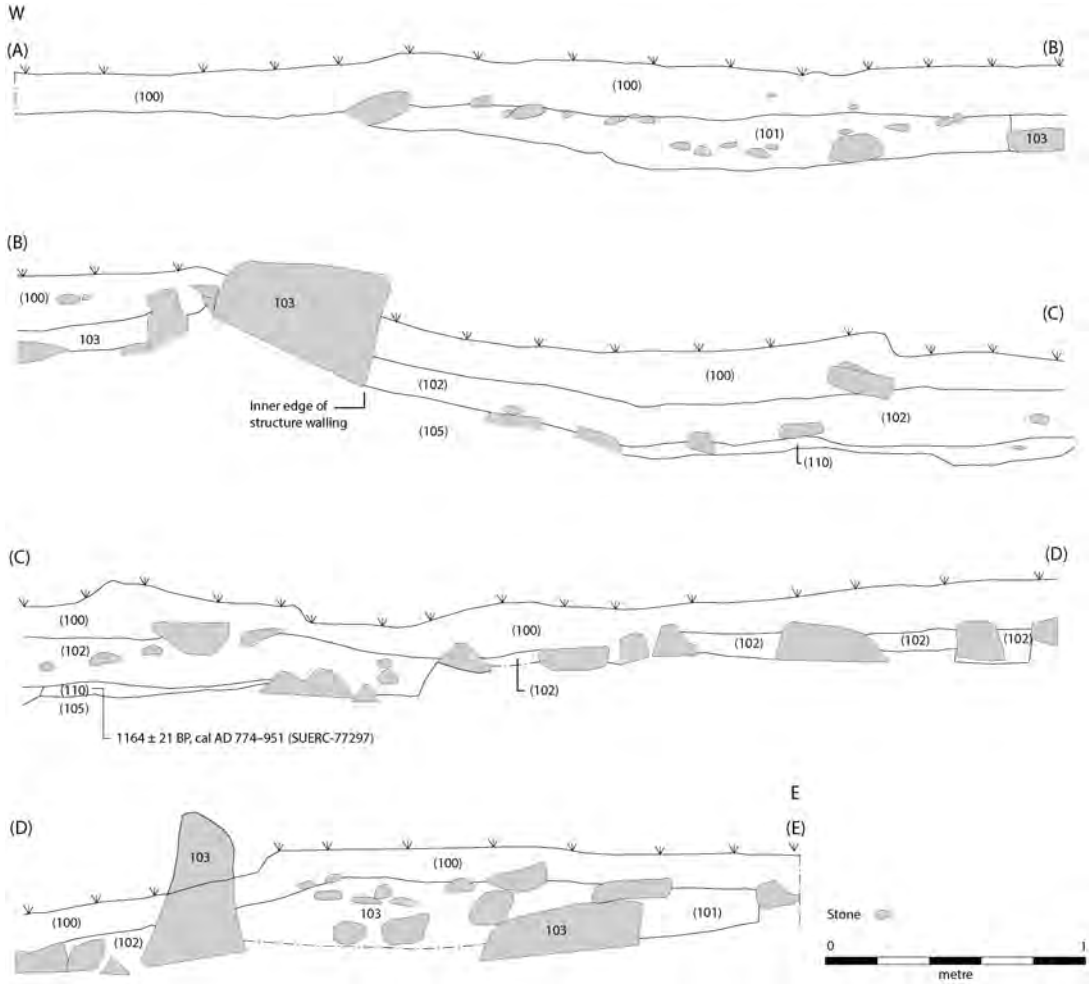

Fig 9 South facing section across roundhouse 1.

deposit which had washed downslope into the house. The northern and western part of the layer was very stony as it contained tumbled granite blocks derived from the wall of the roundhouse. It also contained patches or lenses of light silty clay, which are likely to represent localised episodes of in-wash into the structure. Several artefacts were recovered from the layer: four sherds of Middle Iron Age to Roman period pottery, including Δ 83, a later Roman type; and stream cobble (**S5**) which had been used both as a whetstone and as hammerstone. A large scraper, Δ 68, of Late Neolithic date and a small amount of baked clay, Δ 67, was also recovered from this layer. The latter may have originally been part of a floor layer that had become burnt, and subsequently displaced. As with the artefacts in layers (100) and (101) it is quite obvious that there had been a considerable amount of disturbance and intermixing, and it is noticeable that there were far fewer objects than were found above and outside the roundhouse interior.

Roundhouse wall 103

When layers (100), (101) and (102) were removed it was found that roundhouse 1 was defined by a wall, 103, that had been set upon a cut into the natural hillslope which measured approximately 7.5m internally and 10m externally (Fig 8). Where

better preserved on the eastern side, this stood to a height of over 0.5m (Figs 10 and 11). The western and northern part of the wall circuit was much more disturbed and many stones had become displaced from it. Disturbance to the wall circuit especially on the southern side, where a new wall had been built (see 114, below) gave the southern side of the building a quite flattened appearance.

Wall 103 comprised granite blocks which were up to 0.5m wide by 1m long. Where well-preserved, especially on the eastern side, the wall was found to be up to 1.4m wide and was double-

Fig 10 Post-excavation photograph of roundhouse 1 from the north. Note Berry Down in the background. (Photograph: © Cornwall Archaeological Unit.)

Fig 11 Roundhouse 1 showing the eastern well-preserved section of wall 103. Note larger stones used for the faces and the rubble and earth core. (Photograph: © Cornwall Archaeological Unit.)

skinned, with vertical set stones forming the inner face and large coarse-grained granite blocks on the outside. The space between them was filled by a rubble and firm reddish-brown soil matrix core (Fig 11). Five sherds of Iron Age to Roman period pottery and a flint flake, Δ 82, were recovered during the cleaning over the top of the wall. These artefacts are likely to be intrusive, and in the case of the ceramics, post-date the construction of the wall. A radiocarbon determination of 1762 ±35 BP, cal AD 143–382 (SUERC-78825) was obtained on *Corylus* charcoal which was also recovered during cleaning of the top of the wall matrix. Again, this date belongs to a Roman-period phase of activity, although perhaps slightly later than the determination on the ceramic residue from layer (101). Given that the sample came from the top of 103, it, in common with the artefactual assemblage, probably post-dates the construction of the wall.

Entrances

Two breaks in the wall circuit, which are interpreted as entranceways, were recorded. The first, which measured approximately 2m wide, is located on the southern, downhill side of the structure (Fig 12). The walling was quite disturbed in this part of the site and there was much displaced stone, but a large flat-laid stone, potentially marking the threshold, was located in the middle of this area. This entrance is considered to be the primary doorway (see discussion below). The only two cut features were also located here. On the west side of the entrance was a large steep-sided pit or posthole, [112], which measured 0.8m in diameter and 0.5m deep. It was filled by (111), a dark greyish-brown gritty silty clay, which despite sampling was found to be entirely devoid of charcoal for radiocarbon dating. To the east of the entrance was [115], a cut or socket which was set within wall 103. It measured 0.4m by 0.25m wide and 0.24m deep. The upper part of the feature was visible as a void in the wall. It did, however, contain fill (116), a soft dark silty loam with occasional stones, which contrasted strongly with the surrounding matrix of wall 103. The dark soft fill may have been a rotted timber, and the surrounding stones packing for a post. The socket may have been an integral part of wall 103, possibly holding an upright post, which was part of the post-ring or the doorway.

The second entrance was located on the north side of the roundhouse, and was opposite the southern entrance (Fig 13). It was narrower, about 0.8m wide, and there was a good deal of displaced stone, from the wall, to the immediate south of it. This entrance is considered to be a secondary insertion through the wall circuit.

Lower layers / floors (107), (108), (109), (110)

Within the interior of roundhouse 1, beneath layer (102) were the natural subsoil and a number of deposits. Layer (109) extended as a 0.5m to 2.4m wide band from the northern entrance to the middle

Fig 12 Roundhouse 1 showing the southern entrance area. Note the flat 'threshold' stone in foreground and socket [115] to the right within wall [103]. (Photograph: © Cornwall Archaeological Unit.)

Fig 13 North entrance into roundhouse 1. Note the spread of tumbled stone and trampling (109) extending into the interior. (Photograph: © Cornwall Archaeological Unit.)

of the interior of the roundhouse (Figs 8 and 13). This context comprised a dark greyish-brown deposit of gritty clay soil with a large number of granite stones which had been displaced from wall 103. Much of the layer was left *in situ*, but where investigated it was found to be uneven and in most places appeared to have been trampled into the floor of the roundhouse. This layer is likely to represent animal trampling and have resulted from livestock movement from the north down through entrance and into the roundhouse. A sherd of flanged bowl of Trethurgy Type 22 (**P1**) dating to the later Roman period was recovered from this layer.

Several discrete patches of surviving flooring, or perhaps occupation deposits, were also uncovered. Layer (107) was a small, 0.1m thick spread of material located close to the wall in the north-east part of the roundhouse. The layer comprised a compact, greyish silty clay and may represent an isolated remnant of a laid floor. There were, however, no artefacts or charcoal to date it.

Between (107) and (109) was layer (108). This was a very thin layer of orangey-brown, firm gritty clay. Unfortunately, it survived as little more than a thin skim that was embedded into the top of the natural subsoil (105). It may, however, represent the last remnant of a floor surface.

Layer (110) was located to the south of the east–west baulk, and beyond the southern extent of the trampling layer (109). It consisted of a gritty, mid-greyish-brown firm clay loam, from which came occasional flecks of charcoal. It was relatively stone-free, although a few larger displaced stones from the roundhouse wall were embedded into the top of it. The layer was under 0.07m thick and may represent a floor, although it is also possible that it represents a spread of occupation-related material. A radiocarbon determination was obtained on *Corylus* charcoal from layer (110): 1164 ±21 BP, cal AD 774–951 (SUERC-77297). This is much later than the diagnostic artefactual assemblage from other contexts in the roundhouse and suggests a subsequent (re)occupation in the early medieval period.

A final deposit (113) (not illustrated) was recorded in the north-east part of the roundhouse. It was a small dark linear stain, measuring 0.18m long by 0.02m wide, which was pressed into (105). Initially thought to be a feature, closer investigation revealed that it was probably a decayed root.

Internal wall 114

The only internal feature was wall 114, a north-east to south-west aligned feature, found in the south-east quadrant of the roundhouse, that ran from wall 103 in the southern entrance area for a length of approximately 5.4m (Figs 8 and 14). The wall was not excavated but it was up to 0.25m high by 0.6m wide and was built of flat-laid granite blocks which were up to 0.3m across. It seems likely that it was a later insertion into the roundhouse and was either designed to partition space within the structure or

Fig 14 Wall 114 from the south. Note wall 103 in background. (Photograph: © Cornwall Archaeological Unit.)

to reinforce wall 103. If, as is likely, the wall was associated with the later use of the building then it may have been broadly contemporary with the insertion of the north entrance. This is supported by the fact that the space enclosed by wall 114 was widest at its northern end and tapered towards the south. The function of this feature is uncertain. It is possible that the space was associated with the stalling of animals, or perhaps that the wall was associated with the rebuilding of the roundhouse on a smaller footprint (see below).

External walls 104 and 106

Outside the roundhouse, two features were identified. Wall 104 was located to the east of roundhouse (Fig 8). It was built of large granite blocks up to 0.4m across, with small stones between them. A dark reddish-brown silty clay loam matrix was recorded between the stones. The wall was up to 1m wide and was recorded for a length 1.8m before it disappeared under the eastern edge of the excavation area. The wall was not excavated but it did appear to sit within a foundation cut. Its relationship with roundhouse 1 is uncertain as there was a gap of 0.7m between wall 103 and 104 and no artefacts were recovered from it.

A second 0.6m to 0.8m wide curvilinear wall, 106, was located approximately 1.6m to the west of the roundhouse (Fig 8). It was, however, only just caught in the excavation area but the exposed section was comprised of granite stones of around 0.3m to 0.4m across with a few much larger pieces. It is likely to be part of structure 5, which was identified by the site survey (see Rose, above), and may perhaps have been sub-rectangular in plan, measuring around 4m by 4m. Again, there were no artefacts with which to date the wall, and its chronological relationship with roundhouse 1 is therefore uncertain.

Section through the enclosure 8, bank 501

Enclosure 8 was defined by a bank 501 with a probable external ditch, which was most evident as a depression on the northern and eastern sides. A north–south 5m long by 1m wide slot was excavated, extending from the northern wall of roundhouse 2 through the enclosure bank 501 and beyond. It was excavated to help establish the relationship between the roundhouses and the enclosure, and to identify the character of any external ditch (Figs 15 and 16).

The uppermost deposit was again layer (100), the dark peaty loam, which in this area was up to 0.14m thick. Beneath this on the north side of the bank were two dark peaty layers, (500) and (504), which sealed (505), a more substantive deposit. This layer was up to 0.25m thick and was a mottled brown deposit containing redeposited rab and granite stones. It seems probable that this material was derived from bank 501. Layer (506), a greyish-black loamy peat was located at the base of the section. It was up to 0.1m thick and ran under bank 501. This layer was identified as an old land surface. It directly overlay the orangey-brown natural 'rab' subsoil, which in this trench was numbered (507). A slot for samples was excavated into the bottom of bank 501, where it was found that (506) was better-preserved (up to 0.21m thick) and there were also traces of a

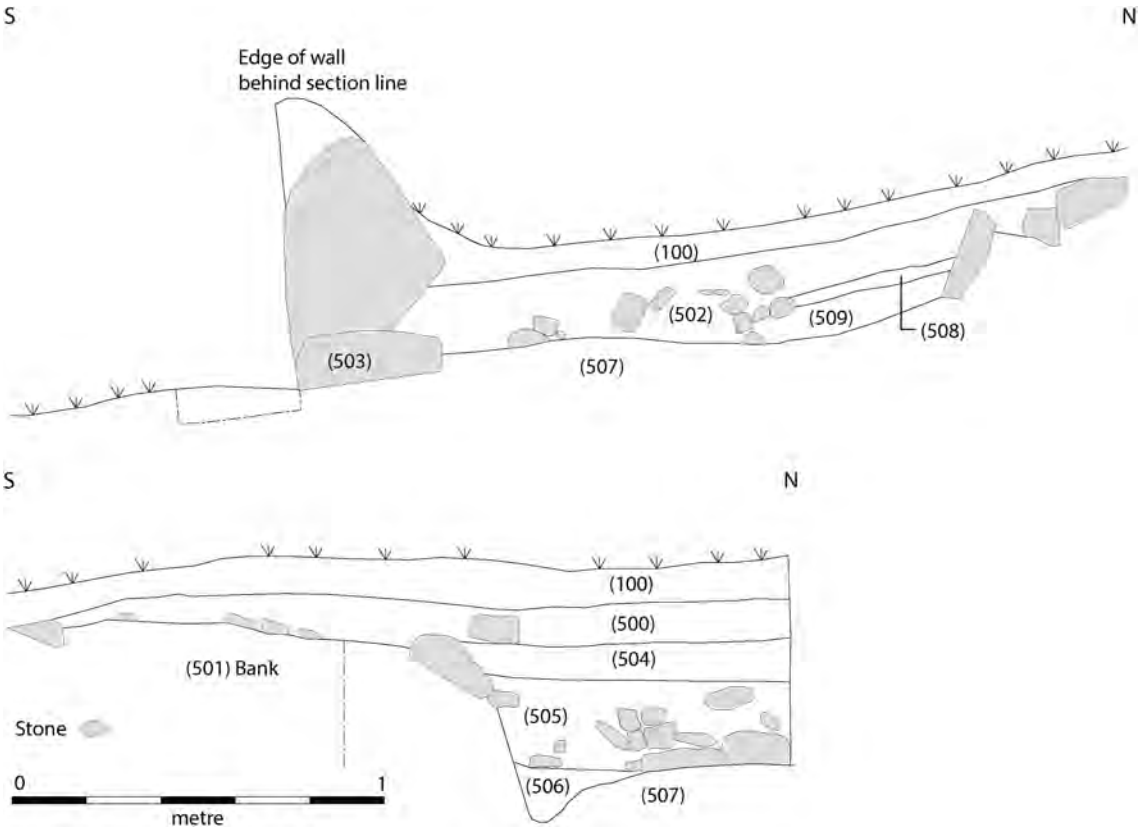

Fig 15 East-facing section through bank 501. 503 is the northern wall of roundhouse 2.

turf-line; here the old land surface was numbered (510).

South of bank 501 layer (502) filled the 1.3m wide space between the northern wall of roundhouse 2 and the bank. This layer was up to 0.22m thick and was a dark near black peaty soil which contained frequent small granite stones, which may have been either derived from the bank or the wall of the adjacent roundhouse. As with layer (500), the layer post-dated the construction of the bank. Roundhouse 2, wall 503, was only exposed at the southern end of the trench, where it was found to comprise granite blocks, the largest of which was vertically set. Where captured in the section the wall measured 0.4m wide by 0.8m high. Layer (502) covered (508), a thin 0.04m thick layer of loamy peat which is likely to represent a natural soil formation. It in turn sealed (509), a 0.1m thick deposit of greyish-brown clay loam which might represent redeposited material from bank 501. Layer (509) was above the natural subsoil, (507).

No trace of an external ditch was exposed in the excavated trench, although the site survey suggests that it is probable that one does exist further to the east of the excavated slot through the bank (especially in the area close to the east facing entrance), where there is a marked depression which runs along the outside of the bank (Fig 2). It is certainly the case that the earthy core of the bank must have been excavated from somewhere, and a ditch would have provided a convenient source of material.

Unfortunately, the objective of establishing the relationship of the roundhouses and the enclosure bank could not be achieved. There was no evidence for the relationship between bank 501 and 503, the wall of roundhouse 2. They were found to be more than 1m apart and the gap between them was filled

Fig 16 Bank 501 from the east, showing stone facing. (Photograph: © Cornwall Archaeological Unit.)

by material which post-dated both the bank and the roundhouse.

No archaeological features were encountered in the excavated trench and no diagnostic artefacts were recovered to provide any relative dating: the only find was an unworked slate from layer (504) which, given the underlying geology, is clearly introduced to the site. However, the buried soil horizon (506) / (510) sealed beneath the bank suggests that the bank had been constructed before the onset of peat accumulation, and the same is likely to have been true for the roundhouses. This, together with the spatial relationship between the roundhouses and the bank, is indicative of broad contemporaneity, although it is not currently possible to say which came first.

Pottery and worked stone

Henrietta Quinnell with petrographic comment by *Roger Taylor*

Pottery

The assemblage, 175 sherds (1069 grams), is mainly of the Middle Iron Age to Roman periods: the Middle Bronze Age is represented by three sherds (49 grams). All is gabbroic.

Middle Bronze Age

There are three abraded, thick, soft, gabbroic body sherds, Δ 25 (100) one sherd (21 grams) and Δ 47 (101) two sherds (28 grams). The fabric contains a few flakes of muscovite mica <0.5mm which suggest mixing of gabbroic clay with a small proportion of granite derived clay (Roger Taylor). The transport of gabbroic clay to be mixed with materials local to the site of manufacture is now well documented in the Cornish Middle Bronze Age (Quinnell 2012, 162) and this date is appropriate for the general character of the fabric. The sherds support an initial date for roundhouse 1 in the Middle Bronze Age.

Middle Iron Age to Roman

The assemblage, 172 sherds (1020 grams), is gabbroic with generally small inclusions. Most, 133 sherds (764 grams), is 'well-made' gabbroic, a fabric used from the Middle Iron Age to sometime in the second century AD. The remainder is 'standard gabbroic' fabric, less carefully made and not burnished, used on occasion in the later Iron Age and then through the Roman period until the fifth century AD. These two gabbroic fabrics merge into one another (Quinnell 2011a, 148). Material is much fragmented, with a mean sherd weight of 5.9 grams, compared with 9.5 grams, for example, in the assemblage of broadly similar date from Trevelgue Head, Newquay (Quinnell 2011a, table 7.1). No conjoins between sherds in different small find groups were found, and a minimum number for the vessels represented cannot be estimated. This fragmentation suggests

Table 2 Details of Iron Age to Roman period pottery by sherd numbers and weight in grams

Context	*Well-made gabbroic*	*Weight*	*Standard gabbroic*	*Weight*	*Total sherds*	*Total weight*
(100) topsoil over site.	15	52			15	52
(101) soil outside and over Roundhouse 1 wall 103.	115	708	32	196	147	904
(102) layer inside roundhouse 1 under (100).			4	15	4	15
103 roundhouse 1 wall.	3	4	2	11	5	15
(109) probable trample layer, embedded into roundhouse 1 floor.			1 P1	34	1	34
Totals	133	764	39	256	172	1020

considerable disturbance and reworking of the layers within and over roundhouse 1.

Middle Iron Age

Two small sherds have typical Middle Iron Age South Western Decorated (SWD) decoration of third to first centuries BC (Fig 17). One, Δ 13 (101), is in the Accomplished style, with close-set deeply burnished lines infilling parts of a curvilinear design. The second, **Δ** 78 (101), has this same infill but could belong either to the Accomplished style or to the Standard style which has angular geometric designs (Quinnell 2011a, 176; 2011c). There are several other small sherds from rims or sherds or shoulders which *could* be Middle Iron Age but these could also be Late Iron Age as the basic forms are found in both periods.

Fig 17 South Western Decorated sherds (Middle Iron Age) showing the infill of areas of design by parallel deeply burnished lines: Δ 13 shows part of a 'leaf' shape typical of the Accomplished style. (Photograph: Gary Young.)

Late Iron Age

Cordoned ware of the Cornish Late Iron Age now has a date range from sometime in the second century BC until the earlier the second century AD (Quinnell 2011c, 239; Threipland 1956), and thus overlaps both SWD and the Roman period. There is nothing which can be closely dated but some of the scrappy rims referred to above probably belong here.

Roman

A piece of flanged bowl Trethurgy Type 22, Δ 89 (Fig 18, **P1**) is from (109), a layer of trampling within roundhouse 1. Fragments of another example, Δ 83, from a similar bowl come from layer (102). These may date anywhere from the later third century AD until the fifth century. The other distinctive Roman period sherds are Δ 71 from (101), a Type 4 jar rim dating from the second to the fifth century AD, and Δ 11 and Δ 17 both from (101), Type 8 jar rims of the third to fourth centuries AD. The Type sequence now used for gabbroic pottery, the standard local ceramics of the Roman period in Cornwall, was devised for the

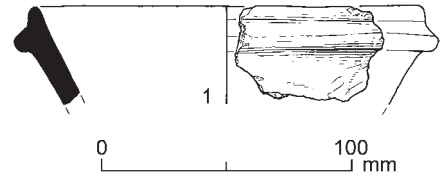

*Fig 18 **P1** rim of Type 22 Roman period gabbroic bowl. Scale 1:3. (Drawing: Jane Read.)*

large assemblage from Trethurgy round, St Austell (Quinnell 2004, chapter 5).

Overall comment

The radiocarbon date SUERC-77298, 1878 ±26 BP, calibrating to AD 70–218, was obtained from ceramic residue from well-made conjoining gabbroic sherds Δ32 in (101), and demonstrates the use of this gabbroic fabric into the Roman period. The date is broadly central to the overall range suggested by the ceramics. The survival of the later Roman sherd **P1** Δ89, the largest sherd found (34 grams), may be due to its presence in trampled clay: generally the small mean sherd size suggests considerable disturbance, confirmed by the early medieval date of 1164 ±21 BP, cal AD 774–951 (SUERC-77297). The quantity of ceramics is small and cannot be used to demonstrate continuous use of roundhouse 1, from the Middle Bronze Age through to the later Roman period.

Stonework

Stonework is all likely to have been sourced very locally, except coarse greenstone **S2** from elsewhere in Cornwall. The elvan used all appears to have been stream cobbles whose lithology suggests a common source: there are eight pieces, not all with definite use wear. There are granite stream cobbles, and a variety of (silty) sandstones and slates. Some of the pieces have been brought to the site, presumably as potential artefacts, but show no signs of use. The local source for stonework, with an occasional piece more distant, is the normal pattern for prehistoric and Roman settlement sites in Cornwall. The range of uses demonstrated – spinning, grinding, rubbing, hammering, sharpening – is also the usual pattern of domestic crafts. The disturbed nature of the stratigraphy means that no piece can be assigned a definite date, except **S1** and **S2** which have been shaped in chronologically distinctive ways.

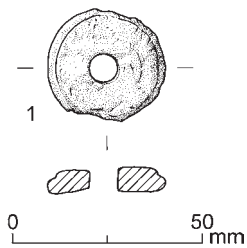

*Fig 19 Slate spindle whorl **S1**. Scale 1:2. (Drawing: Jane Read.)*

S1 (Fig 19) Δ 1 (101) Spindle whorl of weathered silty slate, 31 × 7+mm × 6+ grams, split but retaining traces of an elaborate profile with two grooves defining a central curved band. The only Cornish parallels for these elaborated whorls are of the Roman period (Quinnell 2004, 143–4; Quinnell 2011b) and any but plain whorls are rare in both the Iron Age and Roman periods.

S2 (Fig 20) Unstratified. Fragment of rock, 80 × 76 × 28mm, formed from accumulation of large pyroxene grains <5mm now converted to amphibole, broadly classifiable as very coarse greenstone; badly eroded. Not from the Bodmin Moor granite area, but probably from elsewhere in Cornwall. Possibly selected for its coarse texture as the small surviving surface, shown in Figure 20, is probably from a rotary quern. These were introduced into Cornwall at a date within the Iron Age (Quinnell 2004, 152).

S3 (Fig 20) (no Small Find number) (100) Broken stream cobble muller, 76 × 59+ × 53+ mm, porphyric elvan with some phenocrysts of feldspar weathered out: pinkish colour may indicate burning. Δ55 (101) is part of another thicker elvan stream cobble with parallel striations of muller type surviving on a small area. Δ 81 (103) is an elvan stream cobble, 205mm in length, of suitable shape for a muller but probably unused. Four other pieces of elvan from (101) have been burnt but are apparently unused, Δ41, Δ54, Δ60 and Δ63.

S4 (Fig 20) Δ 14 (101) Stream cobble of micaceous fine-grained silty sandstone, 80 × 58+ × 20mm, smooth from use on one face (Fig 20), wear extending down over end and facets on sides: some use after breakage on the other side with wear extending over fracture. Scar from casual damage. **S4** in its initial form used on soft material such as leather, after breakage more general rubbing stone use.

S5 (Fig 20) Δ37 (102) Stream cobble, 126 × 63 × 35mm, of highly micaceous siltstone with plates of muscovite <1.5mm. Fractured at one end (left on Fig 20) through hammerstone use, use of one edge as whetstone forming distinct facet (top on Fig 20). Scratches likely to be incidental due to softness of rock.

Small find Δ 6 is a small stream cobble of porphyritic elvan of suitable shape for a hammerstone, while Δ 3 (101) is a broken granite stream cobble with possible similar use. Parts of three fine-grained granite stream cobbles, burnt

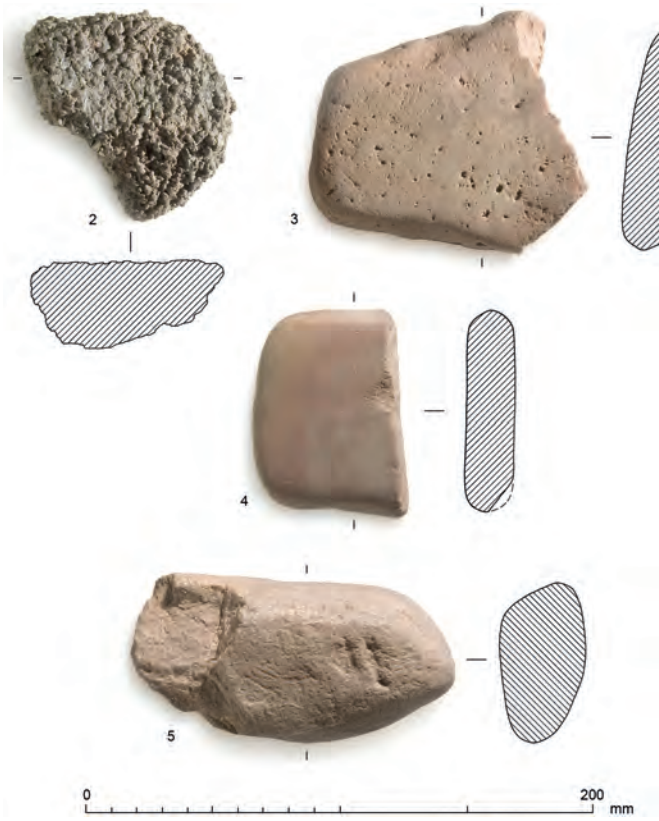

*Fig 20 Worked stone: **S2**, quern fragment of coarse greenstone, **S3** elvan muller fragment, **S4** silty sandstone rubber fragment, **S5** silty sandstone cobble used as hammerstone and whetstone. Scale 1:3. (Photograph: Gary Young.)*

and broken but not definitely used, Δ 16, Δ 80 and Δ 85 were also found in layer (101).

There are eight pieces of similar micaceous slate from the granite aureole, all probably surface fragments. Four are illustrated (Fig 21). **S6**, 114 × 99 × 13mm, and **S7**, 156 × 146 × 27mm, have been trimmed to approximate discs, damaged on parts of their circumference, and are U/S within and around roundhouse 1. **S8** Δ 30 (101), maximum dimension 104mm, has a notch 35 × 21mm, and **S9** Unstratified, 104 mm, a notch 37 × 13 mm. Such discs are generally interpreted as pot lids, with a currency through the Iron Age, the Roman and the post-Roman periods (Quinnell 2004, 142; Moffet 2017). Notched slates, with a potential range of uses, have only been noted in the last decade but have broadly comparable dates (Quinnell 2015, 45–9). The other four slate pieces, including Δ 74, are partly trimmed to various shapes and were probably broken before completion.

Baked clay

Small find Δ 67 (102), several fragments, sandy silty micaceous clay with occasional white feldspar grains, probably of local origin (Roger Taylor commented). These are probably from flooring material which has had a fire upon it.

Flint and quartz crystals

Anna Lawson-Jones

The assemblage consists of ten pieces: two quartz crystals, one pebble (flint), and seven variously worked flints, including three notably finely-worked tools (**L1**, **L2** and **L3**) (Fig 22). These three pieces are referred to below as 'special', in recognition of their distinctive size, source, colour, degree and quality of retouch, and likely reverence with which they were originally made, used and probably disposed of.

All the flint was recovered during hand excavation of the site. All the pieces were found as

*Fig 21 Worked stone: **S6** and **S7** slate discs, possibly pot lids (top), **S8** and **S9** notched slates (bottom). Scale 1:3. (Photograph: Gary Young.)*

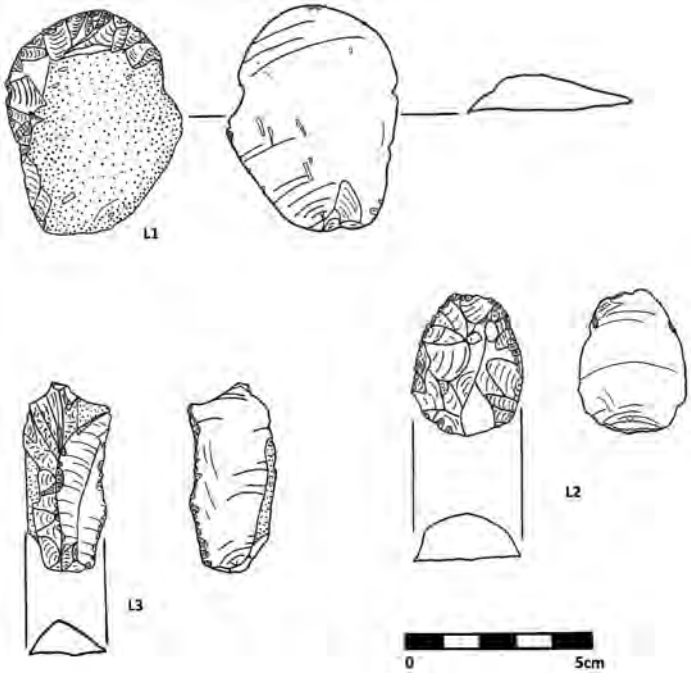

*Fig 22 Selected flints: scraper L1, Plano-convex knife **L2** and backed knife **L3**. Scale 1:2. (Drawing: Anna Lawson-Jones.)*

residual finds, and most or all of the flint work is considered to be broadly contemporary. The quartz crystals are not diagnostic, and because they were residual are not dateable. A remarkable lack of post-depositional damage was recorded throughout the flint work, despite the known later Iron Age and Roman activity on site. The flint includes three diagnostically Late Neolithic and Early Bronze Age tools which pre-date the Middle Bronze Age and later pottery found in the same layers (see Quinnell, above).

None of the flint was obviously lost, discarded, accidentally broken, worn or abraded, exhausted or burnt. Most, if not all of these characteristics, might not have been expected in a domestic assemblage or a Middle Bronze Age roundhouse. The character of the flint work assemblage more closely resembles a more formalised grouping, reminiscent of that found in structured pit deposit of Late Neolithic / Early Bronze Age date.

Raw material sourcing

All the flint has been introduced to the site from further afield, but the two quartz pieces are locally derived and reflect the underlying geology. The introduced flint has two different sources; the beach and a nodular (sedimentary, often chalk-based) flint source. The nearest beaches to West Northwood are 10 miles to the south or 14 miles to the north. Beach flint within the assemblage includes the pebble, the pale grey-cream split pebble knife Δ 61 (and by inference pale grey-cream probable knife Δ 28). Both these simple knives were made from very similar, possibly the same, core flint. The arrival of pebble flint on the site could be the result of exchange between different communities, or the result of raw material collection trips undertaken by the site occupants.

The nodular pieces show some marked colour variation, possibly reflecting deliberate selection of source or colour. The near-black backed knife Δ 42, with its small retained patches of off-white chalky cortex probably originates from Beer Head in Devon, some 66 miles to the east, which is the source of much imported flint found in Cornwall (Tingle 1998). It is, however, perhaps from one of the lesser known but closer Devon sources (Newberry 2002). A couple of other pieces, Δ 2 and Δ 82, on the basis of near black colour and excellent quality are also likely to be from the same or a very similar nodular flint as backed knife Δ 42.

The large, finely-worked, mottled pale grey scraper, Δ 68, is also nodular. It has a considerable dorsal spread of thin, abraded-possibly slightly waterworn, but still soft outer cortex.

Finely-worked knife Δ 21 could be made from either a beach pebble or a nodule. It has not retained any cortex, but its quality and rich mottled brown colour suggests importation from further afield.

Description and comment

The three 'special' pieces

These three pieces (see Table 3, below) all suggest specific production for use at a particular event or function, rather than in an everyday context. They are not components of a standard domestic assemblage, particularly Δ 42 and Δ 68. All are striking in appearance and 'special' in terms of size and form, strong colours (mottled golden browns, near black and pale grey), raw material sources, quality and extent of retouch, and their conspicuous lack of use. The three pieces include a fine complete plano-convex knife Δ 21 (**L2**), diagnostic of the Early Bronze Age, a nodular backed knife Δ 42 **(L3)**, spanning the Late Neolithic / Early Bronze Age period and a fine large scraper Δ 68 (**L1)** (Fig 22). The latter has a corticated back, rather than a flaked dorsal surface, which is diagnostic of the Late Neolithic period (Butler 2005). The pieces are representative of a distinctive range of particularly fine flint work which broadly spans the Late Neolithic / Early Bronze Age transitional period, and are often associated with a long-standing tradition (Jones and Quinnell 2011a, 197–229) of structured deposition within pits.

Potential heat treatment of the backed knife Δ 42 (see below) may be an additional component in this particular tool's significance. Heat treatment is an accepted means of improving or altering flint (Butler 2005, 46; Pannett 2011, 247–55; Lawson-Jones, forthcoming). It can also emphasize colour (a potentially significant factor in this assemblage) and produce a notably smooth, soapy textured surface (Lee 2001, 39–44).

All three pieces are characteristic of a particular range of artefacts often associated with pits, displaying a deliberate selection of materials and artefacts. For example, pits at Tremough (Penryn), Penhale (Fraddon) and Tregurra, Truro, (St Clement) (Lawson-Jones 2007; 2015; forthcoming). Pits of this type can be remarkably

Table 3 The 'special' flints

Context no.	*Small find no.*	*Type / tool*	*Description*	*Date*
(100)	Δ 21 (**L2**)	Plano-convex knife	Nodular? Short but complete plano-convex knife with all-over retouch. Made on a distinctive mottled rich brown, thick tertiary flake. Steep, narrow scraper-like distal end and a broader prepared platform (possible backing retouch on the sharply angled proximal dorsal edge). Backing suggests hafting – given the shape of the piece. Bilateral retouch is steep, neat and extends up across the dorsal surface. Crushing on right edge indicates use. Adhering flakelets indicate freshness (lack of disturbance).	Early Bronze Age
(101)	Δ 42 (**L3**)	Backed knife	Nodular. Long triangular sectioned piece with fine nibbled ventral retouch down almost the whole length of the thin edge. Limited dorsal retouch? / use damage along the same edge. Opposite thick, angled edge has steep neat backing retouch – probably for hand held use. Made on distinctive good quality very near black nodular flint. Possible heat treatment given its odd all-over glossy appearance.	Late Neolithic / Early Bronze Age
(102)	Δ 68 (**L1**)	Fine large corticated scraper	Nodular. Very fine large, broad, flat scraper made on a distinctive pale mottled grey primary flake. Retains 80% dorsal cortex, probably facilitating handling in use. Abrupt to semi-abrupt retouch around distal half which partially extends on to main body, and less neatly down one side. Crushing / damage along distal edge indicates limited use, otherwise remarkably unscathed by later site activity given size and relatively thin section.	Late Neolithic

varied and produce a wide range of finds, including very finely-worked flint, associated waste, conspicuously unused high-quality flint raw material, as well as pottery (decorated and plain), stonework (decorated or non-local), cassiterite and hazelnut shells.

Other pieces

These five pieces represent a mixed but almost certainly contemporary assemblage associated with the 'special' pieces described above (Table 4). They include pebble and nodular imported material, all five of which would have required introduction to the site, and none are abraded, crushed or broken.

The two smallest flake pieces Δ 2 and Δ 82, are of near identical colour and quality to nodular knife Δ 42 and could very well be by-products of its manufacture (prior to heat treatment). Both are soft hammered, indicative of secondary working. The two very different, very simple knives Δ 28 and Δ 61 could potentially be from the same distinctively pale coloured pebble core. Certainly both pieces are strikingly different in colour from all the other pieces in the assemblage.

The two quartz crystal pieces

There are two quartz crystal pieces in the assemblage, probably locally sourced, one of which appears to have been used (Table 5). It is feasible that the utilised crystal was brought to the site, rather than just unearthed during the site's construction (although it is not a particularly striking example). The second, unused crystalline piece has a much less eye-catching shape and appearance, is unused and is almost certainly the result of unintentional inclusion when constructing the site (during its various phases).

True or complete (geometric, symmetrical) crystals are occasionally recorded as specific archaeological deposits on the basis of positioning within a site, monument or context, despite being a geological trait of the area. For example, at Tregurra, on the eastern edge of Truro, a fine quartz crystal borer was deposited in a pit associated with an Early Bronze Age post-ring (Lawson-Jones, forthcoming), and a strikingly complete crystal was found in a pit associated within Middle Bronze Age roundhouse 1500 at Scarcewater (St Stephen in Brannel) in mid-Cornwall (Jones and Taylor 2010, 167). Although quartzite and crystal material does occur naturally on this site, no other pieces

Table 4 Other flints from the excavation

Context no.	*Small find no.*	*Type / tool*	*Description*	*Date*
(100)	–	Pebble	Small, near spherical probable flint beach pebble. Potential sling shot or possible gaming piece?	–
(101)	Δ 2	Worked flake	Nodular? Small, thin flake with fine pressure flaked removals and fine edge wear (on one side). Trapezoidal shaped / transversely worked piece. Possibly hafted – suggestive of a projectile?	Late Neolithic / Bronze Age
(101)	Δ 28	Simple knife	A very distinctive, very thin, flat broad blade with use-related damage on one straight edge. Tentative point / piercer with possible use-wear on opposite straight edge. Made on very pale tan coloured flint.	Neolithic / Bronze Age
(101)	Δ 61	Split pebble knife	Pale split beach pebble with narrow pointed and opposing bulbous end. Possible lateral backing to facilitate hand held use as a piercer with minimal shallow lateral cutting edge removals.	Neolithic / Bronze Age
(103)	Δ 82	Tertiary flake	Nodular? Small, triangular, fine-quality hinged and snapped flake. Debitage/tool manufacture waste. Near black probable nodular flint. Slight tiny damage on one side suggestive of either minimal hand held slicing use or post-depositional wear.	Neolithic / Bronze Age

of this size or appearance were noted during the excavation.

Concluding comment

The flint assemblage pre-dates the subsequent Middle Bronze Age, Iron Age and Romano-British phases of the site, although the context for their original deposition has through later disturbance been lost. Most if not all of the flint appears to be broadly contemporary, despite its very different appearance. The three 'special' pieces, because of their distinctive colour, quality of retouch, size, and pristine condition, suggest display and ostentation, and show limited use. They represent part of a recognised number of tool types which were often treated differently, including other conspicuously fine scraper and knife forms, a range of points, arrowheads, even selected, prepared but unworked cores – a clearly valuable commodity of the time. They contrast strongly with their less visually striking, but eminently functional counterparts found in standard domestic assemblages, which show repeated use, often breakage or exhaustion and ultimately disposal into a hearth, midden, other designated area, or other casual discard.

The three 'special' pieces were probably made for a particular event, long before the later activity at West Northwood. It is likely that such an event would follow a prescriptive set of rules, encompassing everything from the selection of raw material, through to tool production, waste control, tool use and ultimately disposal as part of a structured deposit. This sequence of events would explain all the characteristics seen in this small but striking assemblage.

The most likely original context into which these pieces would have been put is a pit. This would protect, separate and prevent the pieces from subsequent reuse. Clearly this worked since

Table 5 Quartz crystals from the excavation

Context no.	*Small find no.*	*Type / tool*	*Description*	*Date*
(101)	Δ 48	Quartz crystal point	Near complete, geometric shaped true crystal with naturally pointed end and adhering geological mineralisation along much of its length – slightly detracting from its appearance. The extreme tip appears abraded suggesting use as a point or engraver.	–
(101)	–	Quartz crystal	Small slightly conical/tapered piece. No obvious modification, wear or use. Probably natural to the area.	–

the pieces are all barely used and near pristine. The plano-convex knife is so fresh that it still has adhering flakelets dating to when it was first made.

Given that the West Northwood lithic assemblage was entirely residual, ending up in the topsoil layer and the two probable colluvial layers over the roundhouse, it is likely that any such pit or pits lay in the immediate vicinity of roundhouse 1. It is also likely, given that no pits were identified cutting down beneath the excavated site, that they were relatively shallow. Such pits would not be totally out of place given the site's location and the proximity of contemporary ceremonial monuments, including cairns and barrows (for example Johnson and Rose 1994; Jones 2004–5).

The charcoal

Dana Challinor

Four bulk samples were taken during the excavation and, following processing, the flots were submitted for the analysis of the charcoal (Table 6). Hand-collected samples were also taken from two contexts. Standard identification procedures were followed (Hather 2000; Schweingruber 1990).

Three of the flots from the bulk samples (contexts (102), (103) and (111)) failed to produce any identifiable charcoal. All of the flots contained a high proportion of roots, with only a small quantity of identifiable charcoal in context (110). A number of the spot samples were also sterile of any charred material. The flot from context (110) produced several fragments of *Corylus avellana* (hazel), from which one roundwood fragment was selected for radiocarbon dating. Additional fragments of *Quercus* sp. (oak) and possible *Hedera helix* (ivy) were also present. Hand-collected samples from context (103) also produced some hazel roundwood (one of which was selected for dating) and a single fragment of oak heartwood. The spot samples from layer (101) produced greater diversity; with oak (including heartwood and roundwood), *Betula* sp. (birch), hazel, Maloideae (apple, hawthorn, service / whitebeams, etc.) and *Cytisus* / *Ulex* (broom / gorse).

The paucity of charcoal in the roundhouse floor layers and wall reflects the nature of the context, representing dispersed material from household hearths, additionally impacted by trampling (at least on the floor). Layer (101) was a mixed, colluvial deposit that was not stratigraphically secure. This may explain the diversity of charcoal, which would have originated from differing events or phases. Nonetheless, the limited evidence from the charcoal indicates the use of oak-hazel woodland for domestic fuel supplies, which is appropriate for the prehistoric periods. It is tempting to speculate that the birch (which commonly colonises open areas) and the broom / gorse (which is indicative

Table 6 Results of the charcoal identifications

	Context	*(101)*	*103*	*(110)*
	Sample	*spot sample*	*spot sample*	*1000*
	Context type	*layer*	*roundhouse wall*	*roundhouse layer*
Taxa	***C14 sample***	–	*Corylus avellana rw x 1*	*Corylus avellana rw x 1*
Quercus sp.	oak	7 (1h, 1r)	1h	1
Betula sp.	birch	1		
Corylus *avellana*	hazel	2r	3r	4 (1r)
Betulaceae	birch family	1		
cf. *Hedera helix*	ivy			1r
Maloideae	hawthorn, apple, service, etc.	3		
Cytisus / *Ulex*	broom / gorse	1r		

h = heartwood; r = Roundwood

of heathland) represent a change in the landscape or how it was exploited by later phases, but the evidence is too uncertain to be conclusive.

Radiocarbon dating

A key aim of the West Northwood project was to obtain secure dating evidence from roundhouse 1. This was required to establish when the roundhouse had been occupied.

However, the lack of internal features together with the evidence for remodelling, heavy disturbance to the floor layer from later occupation and animal trampling, meant that finding suitable material from key construction phases was going to be problematic. In the final event *Corylus* charcoal from the remnant floor layer (110) and ceramic residues on pottery from layers (100) and (101) were selected. Despite the obvious potential problems with association, *Corylus* charcoal from the top of the matrix between the stones in wall 103 was also chosen for dating, primarily because it was one of the few sampled contexts within roundhouse 1 to produce short-lived charcoal.

All four samples from roundhouse 1 were submitted for accelerator mass spectrometry dating (AMS) at the Scottish Universities Environmental Research Centre (SUERC). Unfortunately, the residue sample from (100) failed to produce a determination.

The probability distribution has been calculated using OxCal (v4.3) and all radiocarbon determinations are quoted at 95 per cent throughout this paper unless otherwise stated.

Results

The radiocarbon dating (Table 7 and Fig 23), like that of the ceramics, spans a considerable period of time, and its significance will be discussed below.

Discussion

The archaeological investigations at West Northwood Farm in 2017 found evidence for episodes of activity on the site from the Late Neolithic / Early Bronze Age to the early medieval period. The absolute date for the construction of roundhouse 1 was not ascertained, although three sherds of Middle Bronze Age pottery were recovered and on morphological comparisons with other stone wall upland structures, it is likely to have been built during the Middle Bronze Age (see below). Caution is also required as both unstratified and stratified artefacts reveal that there was a good deal of disturbance to the site with objects of

Table 7 Radiocarbon determinations from roundhouse 1 West Northwood

Feature	*Lab. no*	*Age BP*	*Material*	*Calendrical years 95.4%*
Layer (110)	SUERC-77297	1164 ± 21	Charcoal: Corylus	cal AD 774–901 (81.4%) cal AD 921–951 (14.4%)
Wall 103 matrix between top of wall stones	SUERC-78825	1762 ± 35	Charcoal: Corylus	cal AD 143–156 (1.7%) cal AD 167–195 (4.4%) cal AD 201–382 (89.3%)
Layer (100)	–	–	Ceramic residue	Failed to produce a determination.
Layer (101)	SUERC-77298	1878 ± 26	Ceramic residue	cal AD 70–218 (95.4%)

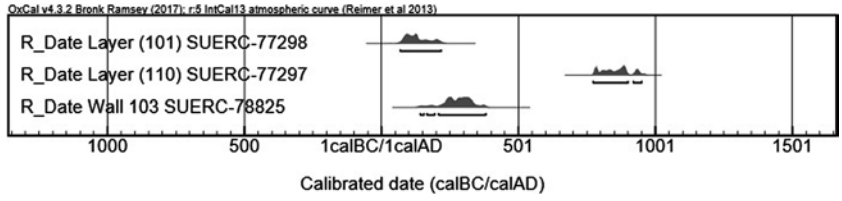

Fig 23 Radiocarbon determinations from West Northwood roundhouse 1.

prehistoric date becoming intermixed with those of much later date.

Importantly, however, radiocarbon dating and the pottery from roundhouse 1 demonstrate that the site was reoccupied several times during the Iron Age and the Roman period, with a radiocarbon determination revealing an early medieval phase for the roundhouse. The Iron Age / Roman period ceramic assemblage is the largest currently known from Bodmin Moor, and the extremely long span of occupation or more probably intermittent reoccupation is unparalleled in the context of an upland Cornish roundhouse settlement.

Before the roundhouse settlement

Several pieces of worked flint were recovered during the course of the excavation. A number of these pieces were finely worked and are of probable Late Neolithic to Early Bronze Age date (*c* 3000–2000 cal BC) (Lawson-Jones, above). All were recovered from much later contexts, and are therefore residual; however, they do indicate that there was activity in the area before the roundhouses were constructed. As is noted above, several are pristine pieces, which do not show much evidence for having been used or for later damage. Taken together it is possible that they had been part of a 'special deposit' that had perhaps originally been placed inside a pit, as for example has been found at Tregurra and Tremough (Taylor forthcoming; Gossip and Jones 2007, 30), which had been disturbed either by the construction of roundhouse 1 in the Middle Bronze Age, or through one of the later episodes of remodelling of the site.

A second potentially early element is site 9, which is located to the south east of enclosure 8. It is unexcavated and is interpreted by the survey as a probable roundhouse; however, the walling includes a lot of large boulder-sized stones which do not have the immediate appearance of being structural walling, and it is possible that it is in fact an earlier Bronze Age ring cairn. Interestingly, the flint work recovered during the excavations at roundhouse 1 would be typical of the sorts of deposit which have been found at cairns on the Moor and elsewhere (for example, Jones 2004–5). However, only excavation would resolve this possibility.

Roundhouse 1: stratigraphy and dating

Although the roundhouse is probably of Middle Bronze Age date, no prehistoric artefacts or radiocarbon dates were found associated with its primary contexts – the roundhouse walls, floors and occupation levels. The only dating evidence associated with these contexts is Romano-British and early medieval. Dating evidence from the top of wall 103, the radiocarbon date of cal AD 143–382 (SUERC-78825), together with Iron Age or Roman period sherds, is likely to be intrusive or residual, rather than providing a date for the wall. However, later Roman pot **P1** from trample layer (109) provides reasonable dating evidence for activity in the roundhouse; as this was the largest of the sherds found, it may well date the layer, rather than being a residual sherd that was incorporated into the layer at a later date. The only other dating evidence from these primary levels is the early medieval radiocarbon date of cal AD 774–951 (SUERC-77297) from floor or occupation layer (110). As well as suggesting an episode of use of the roundhouse around the ninth century AD, the date provides a *terminus post quem* for the two layers thought to be colluvial hill-wash, (101) and (102), which cover the house and its vicinity. These upper layers, and the overlying topsoil, contained the bulk of the finds from the site, including Late Neolithic / Early Bronze Age flints, Middle Bronze Age, Iron Age and Romano-British pottery, and worked stone objects. These finds had all been displaced from their original contexts which may have been the roundhouse itself or features and deposits in the near vicinity.

Roundhouse 1: Bronze Age beginnings

With an internal diameter of approximately 7.5m, roundhouse 1 falls towards the upper size range of the stone-walled roundhouses found on the Moor, compared to a typical 5–7m (for example, Johnson and Rose 1994, 55; Bender *et al* 2007, 402–3), and it appears to be a little larger than the other identified houses within the enclosure.

The method of construction of the wall is broadly comparable with a number of excavated Bronze Age moorland roundhouses found across Cornwall, including Stannon Down (St Breward), Bosiliack (Madron) and Leskernick (Altarnun) (Mercer 1970; Jones and Quinnell 2011b; Jones 2013; Bender *et al* 2007, 400). At these sites,

double-skinned walls were infilled with smaller stones and / or soil. This construction technique would have strengthened the walls and have been a good means of insulating the house. It does not in itself demonstrate a Bronze Age date for the walling, as a similar style can be found in Iron Age houses (for example, Penhale Point, Perranzabuloe: Smith 1988). However, the south-facing position of the original entrance is typical of Bronze Age houses both in Cornwall and more generally across southern Britain (for example, Bender *et al* 2007, 405; Jones and Taylor 2010, 66; Ladle and Woodward 2009, 365).

In the entrance area was a large slab which may have formed a threshold to mark the doorway into the roundhouse, and it is also the case that the only identified postholes were also located in this area (see below). Entrances into Bronze Age roundhouses are often clearly demarcated in some way, sometimes by large or distinctively coloured stones, differently coursed stonework or in the case of lowland roundhouses, occasionally by large posts or porches (for example, Nowakowski 1991; Jones 2013; Jones and Quinnell 2014, 26–31; Jones 1998–9). Such devices would have very obviously marked the way into the roundhouse but given that thresholds are often considered to be liminal or 'between and betwixt' zones they could also have symbolically defined the movement between internal domestic space and the outer world (Brück 1999: Leonard 2015, 275–8).

The remaining floor within the roundhouse was very heavily disturbed by tumbled stones from wall 103 and a layer of trampling (109), which extended down slope into the central part of the roundhouse. Where this disturbance had not occurred, the natural subsoil (105) was covered by patchy clay layers, which are likely to represent remnant laid floor surfaces.

These comprised a small patch of compacted clay layer (107), a more extensive thin skim of redeposited clay (108), and clayey layer (110). Layers (107) and (108) can reasonably be interpreted as the surviving remnants of a clay floor. The same may be true of (110), although it was much less compact than (107), more mottled in colour and flecked with charcoal which produced an early medieval determination radiocarbon 1164 ±21 BP, cal AD 774–951 (SUERC-77297). The date is much later than the diagnostic artefactual assemblage in the layers above it, and if the roundhouse was not being used as a domestic residence at this time (see below), it is possible that it was a later occupation horizon, rather than a deliberately laid floor.

Other excavated Bronze Age roundhouses in Cornwall have produced evidence for laid floors: on Bodmin Moor, a redeposited clay rab floor layer was found inside Stannon Down house site 3 (Jones 2004–5) as well as within two of the re-evaluated roundhouses at Rough Tor (St Breward) (Thompson and Birbeck 2009–10). To the west, on the Penwith moors, Bosiliack houses 1, 2 and 3 all produced evidence for rab floors (Jones and Quinnell 2011b; Jones 2013) and other roundhouses in Penwith, such as those at Trewey (Zennor) and Sperris (Towednack) (Dudley 1941; 1957b) appear to have had rab floors. Although these latter examples were identified by the excavator as being *in situ* natural subsoil, it is likely that they too were laid floors comprising redeposited rab. Likewise, recent excavations of lowland Middle Bronze Age hollow-set houses at Tremough (Penryn) and Trevalga (Trevalga) (Jones *et al* 2015, 37; Jones and Quinnell 2014, 33) have revealed evidence for clay floors. Unfortunately, the floor layer in roundhouse 1 was extensively disturbed due to subsequent activity, and was consequently very patchy and poorly preserved. Nonetheless, the laying of a floor is significant as it suggests that in its first phase the building was occupied as a dwelling.

No internal features were identified within roundhouse 1 (outside of layer (109) which was largely left *in situ*); there was for example, no evidence of an internal post-ring or a hearth. Two postholes however were, as noted above, located in the area of the southern entranceway. Feature [112], may have held a door post, and the same may have been true of socket [115], although the latter feature was situated within wall 103 and may be part of a post-ring. Given the poor condition of much of the wall circuit, and the fact it was not excavated, it is possible that further post sockets existed within the wall of roundhouse 1. Although post-rings are often found within the interior of upland roundhouses, such as Leskernick, house 39 (Bender *et al* 2007), and most lowland roundhouses (Nowakowski 1991; Jones and Taylor 2010, 9–21), there are numerous examples of upland Bronze Age houses which do not have an internal post-ring, including Stannon Down site 3, Bosiliack house 3 and on Dartmoor, Heatree hut circle 2 (Jones 2004–5; 2013; Quinnell 1991). At

Callestick (Jones 1998–9) the posts supporting the roof of the roundhouse had, like roundhouse 1 socket [115], certainly been set within the wall, rather than inside the building.

Similarly, the lack of a hearth within roundhouse 1 is consistent with several other excavated upland roundhouses within settlements at Stannon Down on Bodmin Moor, Bosiliack in Penwith and Shaugh Moor on Dartmoor (Mercer 1970; Jones 2013; Wainwright and Smith 1980; Jones 2013). This might imply that some upland houses were occupied on a seasonal basis, or that cooking and other activities were undertaken on fires or hearths which were situated outside. However, it is also possible in the case of roundhouse 1 that later disturbance caused by reoccupation of the building had removed any trace of an internal hearth place.

Because of the disturbance, it is not possible to say very much about the function or economy associated with roundhouse 1 in the Bronze Age. The overall size of the building and the well-constructed nature of the undisturbed sections of wall 103 support the suggestion that it was a domestic residence. Unfortunately, it is not possible from the excavated evidence to say much about the economy. None of the charcoal from within the house, for example can be associated with the Bronze Age occupation. The roundhouse was, however, situated within an enclosure and this does gives us the potential to consider its wider context.

Beyond roundhouse 1: the wider settlement context

Roundhouse 1 was situated within the D-shaped enclosure 8 which also encircled at least three other roundhouses (2, 3 and 4) and two possible roundhouses (6 and 7) (Fig 2). In addition to the roundhouses, a possible rectangular structure, 5, was identified by the survey and partially uncovered in the western end of the excavation trench, as wall 106. This building would be much smaller than roundhouse 1, and it may be a dwelling from a later period or an ancillary building. It is certainly the case that rectilinear and especially sub-oval shaped buildings are more common in periods subsequent to the Bronze Age (for example Quinnell 1986; 2004), and a Roman period date is possibility. Another wall, 104 was uncovered at the eastern end of the excavation trench but its function, dating and association with roundhouse 1 are unknown. It may have been part of a structure, a field wall, or a dividing wall within the enclosure, although as it was set within a cut a structural purpose is perhaps most likely. Because of depth of hill-wash it is possible that other buried structures exist within the enclosure. Overall, there is little obvious organization of space, as for example is found at Shaugh Moor, where the houses are arranged around the perimeter of the enclosure with entrances which face into the central space (Wainwright and Smith 1980). By contrast, the original entrance of roundhouse 1 faced away from the interior and the space within enclosure 8 seems to have been quite full, with the only apparently empty area being located close to the eastern entrance. This may, however, be due to the multi-phased nature of occupation within enclosure 8 and not all of the structures need be contemporary with one another. Indeed given the evidence from the ceramics and the radiocarbon dating it is very likely that just like a modern working farmyard, existing buildings became redundant, or modified and new structures were added over time.

The date of enclosure 8 is currently uncertain. The enclosed space, 37m by 43m, is small and the bank (and ditch) too slight for an Iron Age / Roman period round (Quinnell 2004, 211–14) and, given that the bank was constructed over an intact old land surface, it pre-dates the formation of the peat, which is likely to have developed by the end of Bronze Age. It is also uncertain which element, the houses or the enclosure, came first. If the unenclosed site 9 is contemporary with the enclosed roundhouses, then it is possible that enclosure 8 was a later addition and a decision may have been made not to enclose it. Alternatively, site 9 may be much earlier, for example if it is in actual fact a ring cairn, and the other roundhouses broadly contemporary with the enclosure. However, the clustered appearance of the houses in the enclosure suggests that they were constrained by it; even if the settlement began as an open settlement, it appears to have developed as an enclosed settlement.

If the enclosure is interpreted as being of prehistoric origin, then it can be argued to have parallels with enclosures that are of Middle Bronze Age date. Across Bodmin Moor there are examples of roundhouses being associated with enclosures, as at Blackator and Brockabarrow where very large numbers of roundhouses are associated with enclosures (Johnson and Rose 1994, 56–9). However, at these sites and most others, the

enclosures tend to be irregular in shape and with the roundhouses outside them or around their perimeters, not inside them. There are very few examples of the well-defined single enclosures or pounds with houses set inside them, which are found elsewhere (*ibid*, 59). At East Moor (Altarnun), however, a roundhouse may have been situated within an enclosure prior to the development of the field system in the Middle Bronze Age (Brisbane and Clews 1979). By contrast, at Roughtor South there is a large D-shaped enclosure which is attached to a major field boundary. Roundhouses are located both inside and outside the enclosure, although at least one is cut by the enclosure bank, so the chronological relationship between them is uncertain (Johnson and Rose 1994, 70 and fig 49). On the east side of Garrow Tor, there are two linked enclosures (*ibid*, 71 and fig 71). The smaller enclosure is sub-oval measuring 110m by 60m and contains around 15 roundhouses. There is also a smaller enclosure at the south end of Garrow (Johnson and Rose 1994, 70) containing four roundhouses, with a fifth adjoining the exterior of the enclosure. Several of the houses in the latter enclosure were excavated by Dorothy Dudley in the 1950s (Dudley 1957a). The excavations were never fully published; however, analysis of the finds (Guido 1978, 61; Silvester 1979) has suggested that, in common with West Northwood, there was subsequent reuse of the houses in the Iron Age (see below).

In West Penwith there are two examples of roundhouses being set within well-defined enclosures which are broadly comparable with West Northwood. At Bodrifty, several roundhouses were situated within a D-shaped enclosure (Dudley 1956; Nowakowski 2016a). In common with West Northwood, excavation of the roundhouses at Bodrifty revealed that they were multi-phased and there were traces of other structures and walling. The Bodrifty enclosure was, however, much larger, measuring approximately 120m by 90m, and it is also uncertain which element, the roundhouses or the enclosure, came first. A second D-shaped enclosure is found on Mulfra Hill (Madron). This enclosure is much smaller than Bodrifty and West Northwood, measuring approximately 30m by 20m. Although unexcavated, it appears to contain just a single roundhouse, an ancillary building, and a single smaller structure. The Mulfra Hill enclosure is very much integrated within the field system which surrounds it (Nowakowski 2016a, figs 6.9 and 6.10). The enclosure at West Northwood may also have been associated within a field system but, unlike Mulfra Hill, which appears to have been a single family farmstead, it contained several buildings and may have served a wider community. By contrast, the 13 (or more) roundhouses at Bosiliack were set within a field system rather than an enclosure. The majority were, however, arranged in a roughly oval setting so that there was a central space between them, and in common with the roundhouses at West Northwood the entrances did not all face into the central space: all but one instead faced towards the south (Jones and Quinnell 2011b; Jones 2013). Interestingly, the three excavated roundhouses at Bosiliack also had later phases of occupation inside them, which is something that has now been identified at other sites in Penwith as well (Jones and Quinnell 2011b; and see below).

It is on Dartmoor, however, where there are the largest number of Bronze Age enclosures or pounds, with some 250 recorded examples (Butler 1997, 73). Some pounds are located within and on the upper edges of the reave field systems, while others are located on valley slopes without field systems (Gerrard 1997, 48; Newman 2011, 66–80). Their shape and size varies, although they are usually single circuits of walling enclosing a circular or oval space. Most Dartmoor pounds contain just two or three roundhouses (Butler 1997, 98), although some examples, such as Grimspound and Shaugh Moor, have larger numbers of roundhouses that are situated around the interior perimeter of the enclosure. Modern excavation of these sites is very limited; however, Shaugh Moor (Wainwright and Smith 1980) appears to have been used or more probably reused over a considerable period of time (see below), and was interpreted by its excavators as being a seasonally occupied settlement associated with the grazing of rough upland pastures.

The West Northwood survey also hinted that there are surviving elements of a prehistoric field system to the east of the enclosed settlement (Rose, above). If this were the case, it is possible that the enclosure may have been an integral part of the pattern of later prehistoric land management on the Moor. Again, there is currently little in the way of secure dating, although most prehistoric field systems on Bodmin Moor, West Penwith and Dartmoor are believed to date to the Middle Bronze Age (*c* 1500–1100 cal BC) (Fleming 1988;

Johnson and Rose 1994; Nowakowski 2016a; Nowakowski 2016b). Interestingly, no evidence for a field system was located to the north of enclosure 8 and the Bodmin Moor Survey did not record any fields in the open moorland to the north. This might suggest that the Bronze Age settlement, like the later medieval farm, was located close to the upper junction of the enclosed farmland and open grazing (Johnson and Rose 1994, maps (i) and (ii)). If this was the case, this location may shed some light on the way the settlement was used.

Enclosure 8 was clearly non-defensive as the bank was less than 1m high and the excavated portion lacked any evidence for holding a palisade slot. Any ditch appears to be discontinuous, is unlikely to be very deep, and it is likely to have been dug to provide material for the bank. The enclosure may therefore reasonably be suggested to have been constructed to be stock-proof, and depending on the time of year, intended to keep animals in or out of the enclosed settlement area. Given its location on the edge of the rough ground it is reasonable to assume that, as has been argued for the settlement at East Moor (Brisbane and Clews 1979; Fleming 1988, 112), the occupants of the enclosure at West Northwood had rights to and made use of the upland grazing.

The living house: reusing roundhouses in the Iron Age, Roman period and beyond

There is a growing body of evidence for the reuse of monuments, structures and places throughout the prehistoric and earlier medieval periods in Britain and Europe (for example, Bradley 1993, 118–9; 2002, chapter 5; Williams 1998; Díaz-Guardamino *et al* 2015).

In common with several other investigated Bronze Age moorland roundhouses and structures, it is apparent that the occupation of roundhouse 1 did not end in the Bronze Age and that it was reused at several later points in time. This is in marked contrast with the contemporary lowland roundhouses, which appear to have been occupied all year round, but had finite 'lives' which often culminated with their deliberate destruction (Nowakowski 1991; Jones 2015a). This may reflect differences in rights of tenure or indeed the way that the materiality of upland ruins may have inspired different reactions with regard to attitudes to 'place'. These points will be returned to below.

The longevity of roundhouse 1 is implied by the redeposited Iron Age and Romano-British pottery and by the remodelling of the structure, and is more definitely demonstrated by the later Roman pot **P1** and early medieval radiocarbon date from floors or occupation levels. The remodelling included the insertion of a new entranceway through the north side of wall 103 and the construction of an internal wall 114. The insertion of the wall may represent some kind of internal partition being inserted into the roundhouse, for example to create an animal stall. Alternatively it may represent a rebuilding of the house on a smaller footprint. If this was the case, then it is possible that some of the disturbance to wall 103 occurred at this time. If roundhouse 1 had become an uninhabited shell, then unwanted stone could have been reused for a new structure. Many settlements on Bodmin Moor have roundhouses with internal sub-divisions (Johnson and Rose 1994, 53; fig 35, no 7) and Herring (1986; 1994, 81; 2008) has for example suggested that earlier Bronze Age structures were reused by transhumant pastoralists.

None of the structures identified by Herring have been excavated; however, it is interesting to note that at roundhouse 1, as well as the rearrangement of the roundhouse, there was a great deal of disturbance to the floor, which is interpreted as caused by the hooves of animals. This would be consistent with the settlement being associated with animals, which were perhaps kept there on a seasonal basis.

The precise time at which the alterations were made to roundhouse 1 is uncertain. Indeed, they need not be contemporary with one another, and could relate to different periods. The post Bronze Age phases of activity within the roundhouse are suggested by pottery of Middle Iron Age, later Iron Age and Romano-British date. The ceramics had been redeposited in the upper layers post-dating the roundhouse, and, as noted above, the majority came from outside the roundhouse, with a concentration of pottery sherds at the west end of the trench. It is possible that the pottery derives from other activity in the near vicinity of the roundhouse, but it is also likely that it derives from the clearing out of the interior of the roundhouse on at least one occasion, the latest of which is suggested by the early medieval radiocarbon determination, cal AD 774–951 (SUERC-77297), which came from floor layer (110), beneath the infill sequence.

Despite the displacement of the artefacts, these findings are very significant because on upland areas, such as Bodmin Moor and Dartmoor, identified Iron Age and Roman period settlements are exceptionally scarce (Johnson and Rose 1994, 74–5; Quinnell 1994), and in the past it has been argued that due to climatic deterioration the upland areas of the south-west region were largely abandoned around 1000 cal BC at the end of the Middle Bronze (for example, Burgess 1980). This picture is, however, unlikely to be correct and recent palaeoenvironmental work is emphasising the complexity of land use across the south-west region's uplands and beyond in the periods after the Middle Bronze Age (Caseldine and Hatton 1994; Tipping 2002; Straker *et al* 2008; Fyfe 2015, 64–6). Instead, there may have been changes in the way that ownership or rights of tenure over tracts of upland areas were marked, which at some involved the construction of new buildings but at others did not.

The excavations at Gold Park on Dartmoor revealed that some roundhouses continued to be constructed on the moor during the Iron Age (Gibson 1992), as at roundhouse 1, and recent investigations of Bronze Age roundhouses and structures across the south-west peninsula have revealed subsequent phases of occupation.

Modern excavations of roundhouses on Bodmin Moor have, however, been few and far between and there are only a small number of radiocarbon determinations. Nonetheless, there are hints that roundhouse 1 may fit into a wider pattern of reoccupation which is being identified across the uplands of the south-west peninsula. For example, on Bodmin Moor, sherds of Early Iron Age pottery and a blue glass bead of Middle Iron Age date were recovered from a roundhouse on the southern end of Garrow Tor, which suggests that at least two phases of post Bronze Age reuse occurred within the settlement (Dudley 1957a; Silvester 1979; Guido 1978, 61–2). A roundhouse excavated by Dudley in a large and complex settlement on the western side of Garrow produced pottery said to be of the second century AD (Johnson and Rose 1994, 71).

Similarly, although lacking artefacts, the radiocarbon dating of Leskernick roundhouses 1 and 23 (Bender *et al* 2007, 88–9) has, like West Northwood roundhouse 1, revealed evidence for Iron Age activity within them. Excavations at Stannon Down revealed a post-built structure that had been constructed within site 9, an Early Bronze Age ring cairn. This later structure was radiocarbon dated to the Middle Iron Age, and the date was supported by an artefactual assemblage which included Iron Age pottery and spindle whorls (Jones 2004–5). Unlike Garrow Tor and West Northwood, the Stannon site was not a roundhouse; however, it may have looked like a ruined house to people in the Iron Age or its importance may have lain in the fact that it was recognised to be an old 'ancestral' site, which was 'reclaimed' (see below).

In West Penwith, there is rather fuller evidence for the later occupation of older structures. Recent excavation at Bosiliack and reassessment of excavation archives have revealed that first millennium cal BC reoccupation of Bronze Age roundhouses appears to have been a frequent occurrence (Jones 2013; Jones and Quinnell 2011b). At Bosiliack, the first millennium cal BC radiocarbon determinations from house 1 and house 3, and a small amount of Iron Age pottery from within house 1, suggest that at least two of the buildings within the Middle Bronze Age settlement had complex histories of reuse over several centuries (Jones 2013). Nine roundhouses were investigated within the settlement at Bodrifty. Some of these stood over ruins of older roundhouses and Middle Bronze Age pottery was recovered from several of them. However, a number of the roundhouses also contained Late Bronze Age and Iron Age pottery and spindle whorls (Dudley 1956; Nowakowski 2016). This pattern has also been confirmed by a recent archive review of older excavated roundhouses. A reassessment of the ceramics from the 1950s excavation at Wicca Round (Jones and Quinnell 2011b) shows Middle Bronze Age Trevisker ware, as well as probable Late Bronze Age / Early Iron Age pottery and a few sherds which are almost certainly of Middle Iron Age date (Dudley 1957b, 81 and plate 4). The nearby roundhouse settlement at Sperris Croft also produced a few sherds of pottery that are probably Late Bronze Age or Early Iron Age in date (Jones and Quinnell 2011b). It is therefore probable that the settlements in Penwith excavated in the 1950s, which were initially dated to the Middle Bronze Age, were all later reoccupied, and this is likely to be true of other upland roundhouses across the Penwith moors.

Moving eastward, on Dartmoor, Late Bronze Age or Iron Age ceramics have been found within the earlier Bronze Age roundhouses at Foales

Arrishes (Radford 1952), Kestor (Fox 1954) and Shaugh Moor (Wainwright and Smith 1980). At Kestor, the large roundhouse known as the 'Round Pound Hut' was found to contain pottery which was identified as being Iron Age (Fox 1954, 48–9). Recent reanalysis of the ceramics has, however, demonstrated even greater complexity, with sherds of Middle Bronze Age, Iron Age and medieval pottery being identified (Quinnell 2016, 41–3). Furthermore, radiocarbon dating associated with iron working inside the 'hut', has demonstrated that there was post-Roman occupation within the house too (*ibid*). Likewise, at Dean Moor (Fox 1957) hut 2 produced iron slag which could be Iron Age, although in light of the radiocarbon dating from Kestor, an early medieval date is also possible. More recently, excavations of a roundhouse at Teigncombe led to the discovery of Early Iron Age pottery associated with the reuse and refurbishment of a Middle Bronze Age roundhouse. Sherds of Roman period pottery were also found inside the Teigncombe roundhouse, which were interpreted as evidence for the building being used as a shelter from inclement weather rather than formal reoccupation (Gerrard 2016). In addition to artefacts, radiocarbon determinations from Shaugh Moor house 19 and structure 804 demonstrated occupations of the later Bronze Age and Early Iron Age periods (Wainwright and Smith 1980).

This review suggests that on Dartmoor, roundhouses which were originally of Middle Bronze Age date were often reoccupied in the Iron Age and later periods. It is also important to note that, as at roundhouse 1, much of this evidence has only been recognised through recent radiocarbon dating and detailed modern analysis of ceramic assemblages. Many more Dartmoor roundhouses are therefore likely to have been reused.

Elsewhere in Devon, on Exmoor the excavation of a Middle Bronze Age hillslope enclosure at Holworthy Farm, Parracombe, produced ceramics and radiocarbon dates which revealed that centuries after the formalised abandonment of the Bronze Age roundhouse there was a second period of occupation within the enclosure during the Middle Iron Age (Green 2009). Again, this reoccupation was only identified as a consequence of the excavation and given that this is the only 'Bronze Age' hillslope enclosure on Exmoor to have been excavated under modern conditions, the same pattern may be found elsewhere.

From the foregoing, it is very evident that the reoccupation of Bronze Age roundhouses was widespread both across upland areas of Cornwall and the wider south-west region. This pattern need not, however, indicate that all occupations were of a similar character, or that they represent continuity in the form of unbroken inhabitation. Fieldwork in the Serra de l'Altmirant, an upland area of Mediterranean Spain, revealed that abandonment and reuse of structures and corrals could take very different patterns, with some being squatted or used for storage, some refurbished and others simply left to decay (Christie *et al* 2004).

Even a cursory consideration of the comparanda from the south-west uplands given above indicates that some roundhouses had been reused in the Late Bronze Age, others in the Iron Age, and some in the early medieval period. Much of this reoccupation could, as Herring suggested, be associated with transhumance, and the seasonal migration of people with their animals onto the moors (Herring 1996; 2008). However, the character of occupation in terms of who (male, female, young or old), or how many people moved with their animals, is likely to have differed over time, as are the other tasks that they may have engaged in; for example prospecting for cassiterite pebbles or working iron.

Returning to West Northwood, roundhouse 1 was located near to the junction of Anciently Enclosed Land and the open moorland, in a place which could have been more or less intensively occupied over time and not necessarily in the same fashion. Excavation of a broadly comparable landscape setting at Stencoose, near St Agnes, for example (Jones 2000–1), revealed that in the Iron Age and Roman periods the area had been enclosed by fields. It is thought to have reverted to downland in the post-Roman period as a small structure of the fifth to seventh centuries AD, possibly associated with transhumant grazing, was constructed in the field system. The area was later re-enclosed within a strip field system some time before the early fourteenth century *(ibid*). In other words, in one sense the land was continuously used over the *longue durée* but, in another, the pattern of inhabitation was not static but changed.

It is not possible to distinguish fine-grained changes between the character of occupation in the Middle Iron Age and the later Iron Age / Roman period settlement at West Northwood and neither is it possible to say whether there were any significant

chronological gaps between the episodes of use. However, the Iron Age and Roman artefactual assemblage is the largest from Bodmin Moor to date. It comprises sherds from several vessels, none of which were made of local fabrics but were instead all of gabbroic clay from the Lizard, which means that either the complete vessels or the clay to make them was transported across Cornwall and carried up onto the Moor. In addition to the ceramics, there were pot-lids of slate, and a worked stone assemblage which included a rotary quern fragment (**S2**) and a spindle whorl (**S1**). Although none of this material was recovered from *in situ* contexts and would not normally be regarded as 'high status' (but see, for example, Meillassoux 1991 and Sahlins 2017 for other forms of wealth and value not associated with prestige goods), it can be argued that the quantity of finds is likely to reflect a longer-term commitment to the settlement, which while possibly seasonal in character, does suggest the presence of a community who inhabited the settlement on more than just a passing basis. As such it is likely that roundhouse 1, or perhaps a structure adjacent to it, was in use, and that settlement-related activities were taking place within the enclosure. The possible later prehistoric fields to the east of the enclosure also provide an indication of the duration of prehistoric settlement in the vicinity. Just how extensive that activity was could only be determined by further excavation.

The early medieval period, by contrast, is not associated with any diagnostic artefacts and the early medieval Grass-marked ceramics which are commonly associated with lowland settlement activity across Cornwall including Gwithian (Gwithian), Gunwalloe (Gunwalloe) and Gloweth (Kenwyn) (Nowakowski *et al* 2007; Thorpe and Wood 2011; Wood 2015, 83; Jones 2015b) are absent from roundhouse 1. This phase was in fact only revealed by radiocarbon dating, obtained from the floor level. The date may, however, have been coeval with the animal trampling and the insertion of the secondary northern entrance, from which the trampling extended. This suggests that the roundhouse was being used in a way which differed from both the primary Bronze Age phase and the subsequent Iron Age and Roman periods. It is likely that by the early medieval period roundhouse 1 was not inhabited as a domestic residence, but was an empty shell that was cleared out and used to stall animals, probably in association with seasonal grazing of the surrounding area. At this time, around the ninth century AD, the nearest permanently occupied settlements were probably at least 1 km to the south (for example, Treverbyn and Trenant (HER MCO 53316 and 17901)); West Northwood itself, and the nearby settlements of Bowden and Wortha, all have English names (HER MCO 15958, 53318, 18408) and were probably established well after the Norman Conquest, as Cornish continued to be spoken in this area to perhaps as late as the thirteenth century (Johnson and Rose 1994, 79).

This still, however, leaves the question as to why in the majority of cases, old buildings were being reused, in preference to the construction of new ones.

On the one hand, a straightforward functionalist answer would be simply because they were convenient places of shelter, which did not require too much effort to make them habitable or stock-proof. Indeed, this explanation may provide the best model for the early medieval occupation, where we might envisage a few people moving their animals onto the Moor for the summer grazing, who travelled lightly and were happy to 'camp' among the ruins, with their animals corralled within the settlement overnight.

On the other hand, old buildings can also help reaffirm links between people and place, and this can be particularly important for communities who wish to maintain their rights over access to valuable upland pastures (Bradley 2002, 112–24). For some time, archaeologists have theorised that large monuments such as round barrows (Barratt 1999; Williams 1998; Harding and Healy 2007, 222) may have legitimated rights to 'ancestral' land, and, given their substantial architecture, the same may have been true of stone-walled upland roundhouses. Seen in this light, it is possible that the architecture of the roundhouses rendered them as monumental as the cairns and barrows. Of course, such 'claims' would have lent themselves to manipulation by later Iron Age and Roman period communities and may have been fictitious or at least heavily mythologised to suit the needs of the 'claimants'. Nonetheless, it is also true that repeated physical engagement with locales will also have engendered a sense of connection or belonging through events and memories which accrued there over time (for example, Tilley 2017, 124; Thomas 2007). This will have contributed to the settlement becoming a 'place' and roundhouse 1 being reoccupied over the millennia.

Fig 24 Site recording and the choir on the last day of the excavation July 2017. (Photograph: Andy M Jones.)

The identification of the later Iron Age / Roman and indeed early medieval period reoccupation within roundhouse 1 is therefore very significant in providing firm evidence for human activity on Bodmin Moor in the post Bronze Age period, when settlement evidence is far less visible in the landscape. Given that comparatively few upland Bronze Age roundhouses have been excavated, and still fewer radiocarbon dated, it seems likely that many more roundhouses across the south-west peninsula were reused in the Iron Age and subsequent periods. We can therefore safely predict that lots of upland roundhouses had occupation events which extended well beyond the lives and intentions of their Bronze Age builders, and we might reflect that the process of excavation, celebration and consolidation has added yet another episode in the long-term biography of the building we came to know as roundhouse 1 (Fig 24).

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Cornish Archaeology 56, 2017, 85–114

The excavation of an Iron Age site at Nansledan, Newquay

PAUL RAINBIRD AND BEN PEARS

with contributions from PAUL BIDWELL, WENDY J CARRUTHERS, DANA CHALLINOR, NAOMI PAYNE, HENRIETTA QUINNELL and ROGER TAYLOR

An archaeological excavation by AC archaeology on land at Nansledan, Newquay, revealed an Earlier Iron Age circular enclosure 17m in diameter with causeways in the east and west. There was no evidence for its use and a ritual function is proposed. After a hiatus, in the Later Iron Age the enclosure became the focus of activity comprising a gully and post-built structure around a hollow containing pits and a hearth which contained sherds of imported Roman amphora. To the south of the enclosure and contemporary with the activity within it was a ring gully enclosing a stony spread. Elsewhere postholes indicated the position of a possible rectangular structure and a four-post structure. The finds and environmental remains indicate that the activity was probably domestic in character, although the structures are unusual and consideration of a special purpose for the Later Iron Age activity is entertained. A sequence of boundary ditches forming fields spanned the period of the Iron Age activity.

An archaeological excavation was undertaken by AC archaeology during May to July 2015 on land at Nansledan, Newquay (centred on NGR SW 844 610) (Fig 1). The work was required by Cornwall Council as a condition of planning permission for a new primary school. The site is located in fields to the south east of Newquay and south of St Columb Minor along the south-west side of the A3058 road on largely level land at around 57m above Ordnance Datum. The underlying solid geology comprises Devonian mudstones, siltstones and sandstones of the Meadfoot Group (British Geological Survey 2018).

It is important to note that Nansledan is a modern, invented place-name for the development at this site. The land on which the development is taking place was historically part of the tenement of Gustivene (tithe apportionment, *c* 1840) or Gusti Vean (2nd edition Ordnance Survey 25in map, *c* 1907), which was first recorded in the early fourteenth century (Institute of Cornish Studies place-names index; Cornwall Record Office AR/4/62).

Archaeological background

The site is located within an area where previous archaeological investigations have taken place along the Newquay Strategic Route and within the Newquay Growth Area (for example, Cotswold Archaeology 2011a; 2011b; Pre-Construct Geophysics 2011). The results identified general prehistoric to Romano-British activity. The site falls within the Cornwall historic landscape characterisation zone of mainly Anciently Enclosed Land and is therefore considered to have archaeological potential for evidence of settlement and agricultural activity from the Middle Bronze Age onwards (Herring 1998, 77; Cornwall Council 2018).

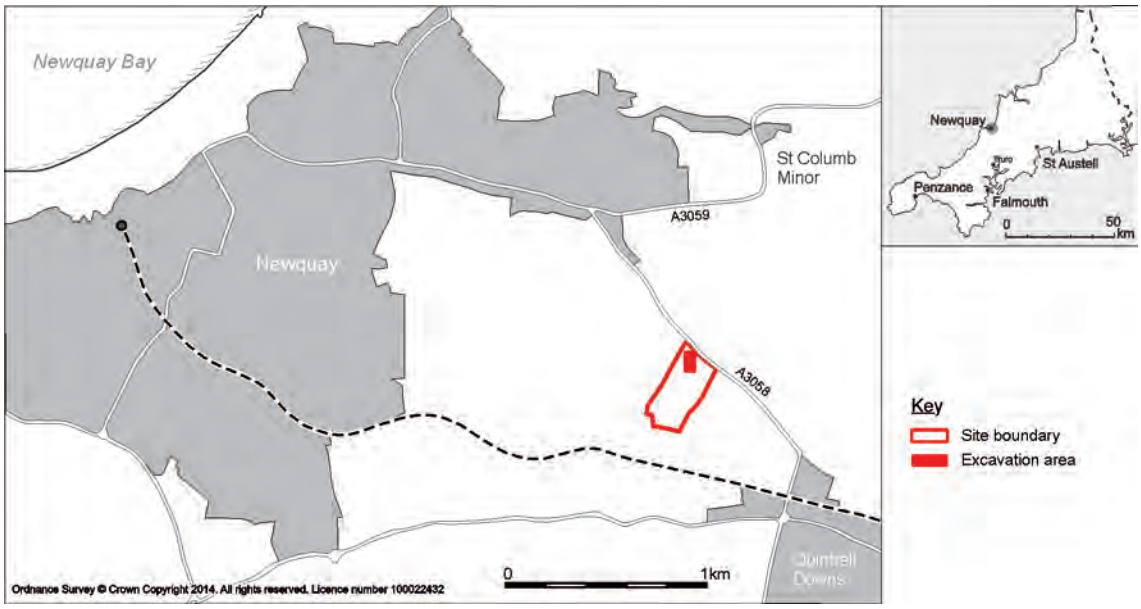

Fig 1 Site location.

Geophysical survey on the site identified linear, curvilinear and discrete anomalies of possible archaeological origin (Smalley 2012). This was followed by an archaeological evaluation (Robinson and Valentin 2015), the results of which informed the work reported on here. Significant findings from the evaluation are incorporated within this report.

Results of the excavation

The excavation area was located within the north-west corner of the application area, and measured 100m by 48m (Fig 2). The area was stripped of ploughsoil and subsoil to the top of archaeological deposits or the natural subsoil using a mechanical excavator fitted with a toothless grading bucket, under direct supervision of the site archaeologist. The overlying soil sequence varied very little and generally the ploughsoil was 0.24–0.26m deep, above 0.15–0.2m of subsoil. The report below provides a phased summary of the main findings of the excavation, followed by the results of finds and environmental analyses and concluding with a discussion of the significance of the site in its local and regional contexts. Detailed feature and context descriptions may be found elsewhere (Pears 2015).

The report uses square brackets to denote cut features and round brackets for layers and deposits (except on plans and sections).

Earliest Iron Age (eighth to seventh centuries BC)

The principal area of activity during the Earliest Iron Age was an enclosure defined by two shallow crescent-shaped ditches, [1019] to the north and [1043] to the south, enclosing a sub-circular area with an approximate internal diameter of 17m with causeways to east and west (Fig 3). The ditches measured between 2m and 3m wide; they were up to 0.25m deep with concave sides down to a flat base in the north and a more rounded base in the south ditch (Figs 4a–e). The ditch fills were generally a homogeneous brown silty clay loam. The fill (1289) of the west terminal of [1019] contained 11 sherds of Earliest Iron Age pottery while from the fill (1273) of the corresponding terminal of [1043] 64 sherds of Earliest Iron Age pottery were recovered, representing at least two vessels. Also from this fill were two tiny pieces of iron slag weighing only 2g and these should be regarded as intrusive in this context. The lower fill (1066) of the east terminal of [1043] contained a transverse arrowhead of Late Neolithic type and

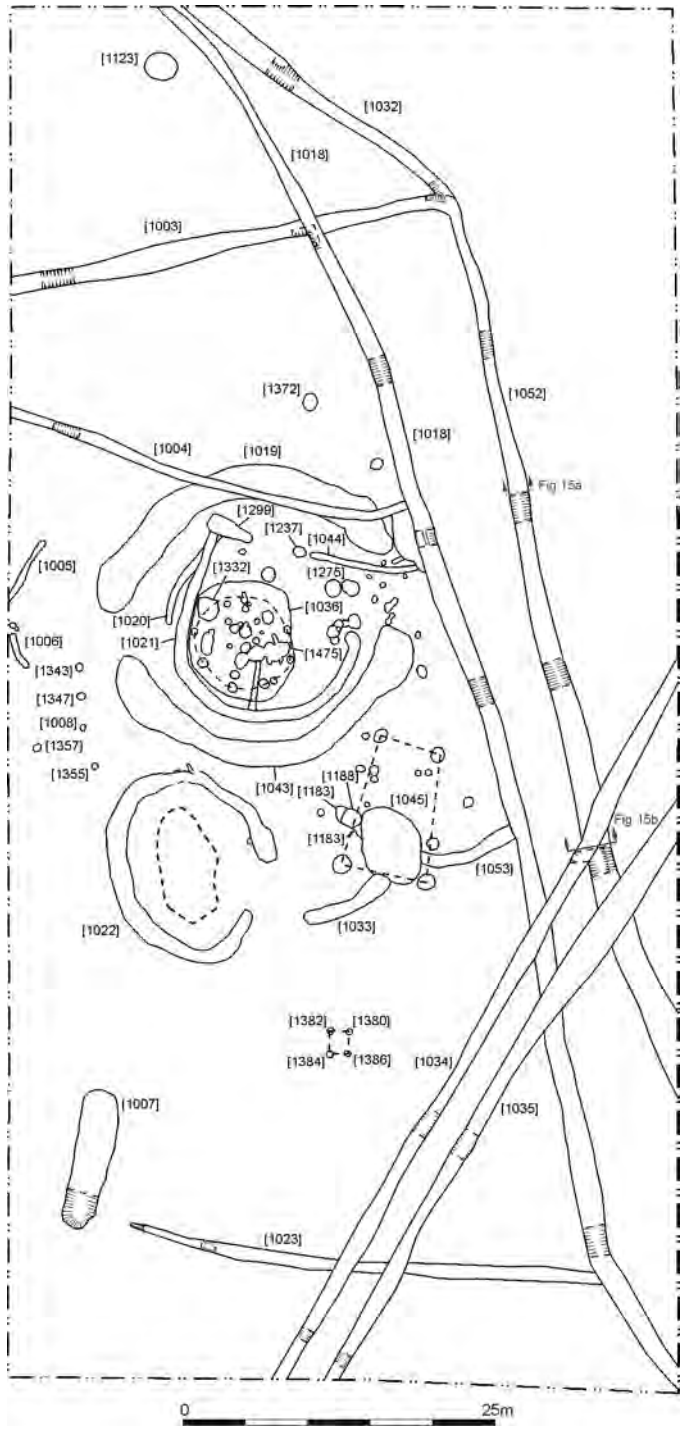

Fig 2 Plan of the excavation area.

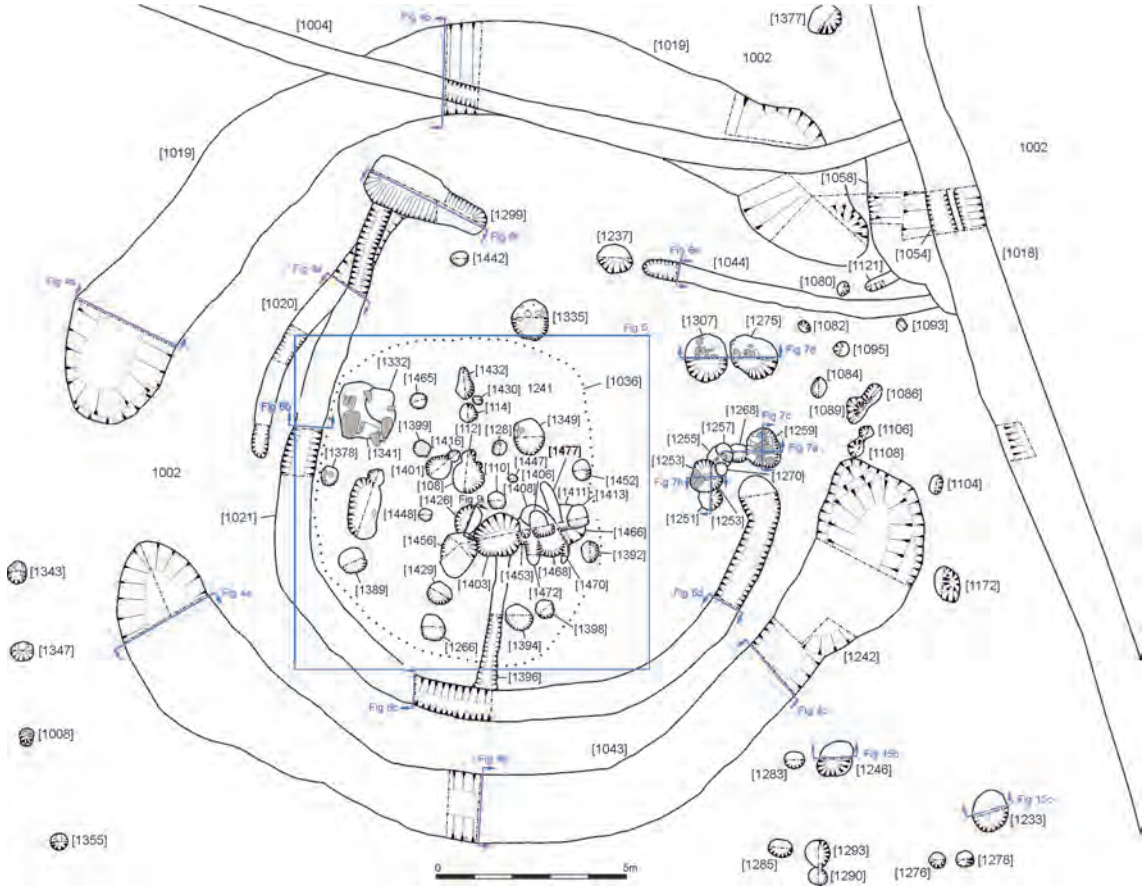

Fig 3 Plan of Earliest Iron Age enclosure [1019]/[1043] and internal features.

another worked flint, and the upper fill (1067) a sherd of Earliest Iron Age pottery. Earliest Iron Age pottery was also recovered from the fill (103/1337) of the portion of [1043] between the terminals and further pieces of worked flint were recovered from both the ditches.

Close to the east terminal of ditch [1043] a pit [1242], not fully defined, but up to 0.18m deep, was dug into the fill. The single fill (1243) of pit [1242] contained two sherds of undiagnostic Later Iron Age pottery. This pit was poorly differentiated from the contiguous fill (1245) of ditch [1043], which at this point also contained four sherds of undiagnostic Later Iron Age pottery. Given the lack of definition it is quite possible that both contexts may be regarded as actually later than ditch [1043], indicating that the enclosure should be dated by the Earliest Iron Age pottery in other contexts.

Later Iron Age (third to first centuries BC)

Finds from features enclosed by ditches [1019] and [1043] indicate that activity within the area defined by the ditches was generally of Later Iron Age date, although no direct relationship between the ditches and the features enclosed by them was observed. Later Iron Age is preferred to Middle or Late Iron Age to describe this phase as the ceramic assemblage for the features in this phase contained both South Western Decorated Ware (SWD), a Middle Iron Age ceramic type, and Cordoned Ware, more typical of the Late Iron Age and early Romano-British period; these wares overlap and the types present indicate that the date range is third to first centuries BC, although all the material could date from a shorter range, perhaps second to first centuries BC. In addition,

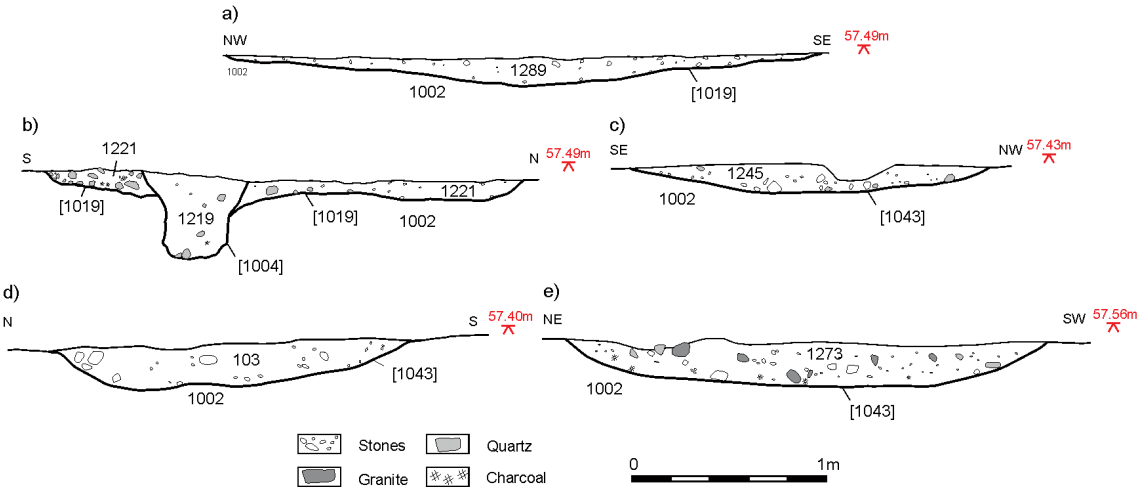

Fig 4 Sections of Earliest Iron Age enclosure ditches [1019]/[1043].

these wares share the same fabric, meaning that sherds without decoration or distinctive form may only be categorised as undiagnostic Later Iron Age (Quinnell, below).

Later features inside Earliest Iron Age enclosure

The earliest identified internal feature was the curving gully [1020], situated within the north-west arc of ditch [1019] (Figs 3 and 5). It measured 7m long by up to 0.69m wide and 0.13m deep with shallow sloping concave sides and a rounded, irregular base (Fig 6a). The gully contained five sherds of undiagnostic pottery of Later Iron Age date.

Gully [1020] was cut by curving gully [1021] which formed a semi-circle open to the north east. Gully [1021] was 0.69m wide and up to 0.13m deep with a symmetrical profile, shallow sloping concave sides and a rounded, irregular base (Figs 6a–d). Its south side followed closely the arc of ditch [1043], terminating in the east close to the terminal for that ditch. However, in the west, it turned sharply to the north at a point close to the west terminal of ditch [1043] and straightened northwards (cutting gully [1020]) and stopped short of ditch [1019] at a point where it was cut by a gully / pit [1299]. In turning northwards, gully [1021] effectively blocked the west causeway of enclosure [1019]/[1043]. Ignoring the northwards straight portion, the arc of the gully had an estimated diameter of 11m. Finds from gully [1021] comprised three sherds of undiagnostic Later Iron Age pottery and, from close to the eastern terminal (fill 1294), 44 sherds of Late Iron Age Cordoned Ware and a perforated slate worked stone. At the eastern terminal was an ill-defined possible pit or posthole [1306] 1m long by 0.8m wide and 0.12m deep. Its fill (1305) contained a sherd of Cordoned Ware.

Close to the eastern terminal of [1021] was a group of seven intercutting postholes, 2.4m long overall and arranged in an arc orientated roughly east to south west. Two of the postholes, [1251] and [1268], were shallow features, approximately 0.1m deep; they had been cut by later, larger postholes [1253], [1257] and [1259] (Figs 7a–c). Postholes [1253] and [1259] were between 0.8m and 0.87m in diameter and 0.38m to 0.4m deep, with near-vertical sides down to a flattish base. Both of these postholes contained post packing stones. Posthole [1255] located between [1253] and [1259] was smaller, measuring 0.4m in diameter by 0.35m deep. It had very steep, almost vertical sides down to a flattish base. It also contained post-packing stones and a sherd of SWD ware pottery. It was cut by posthole [1257] measuring approximately 0.4m in diameter by 0.35m deep. To the north of this group were a pair of large postholes [1275] and [1307], each measuring approximately 0.5m in diameter by 0.4m deep (Fig 7d).

Taken together, these postholes may represent an east-facing porch for a roundhouse, framing an entrance between 1.5m and 2m wide (Fig 8).

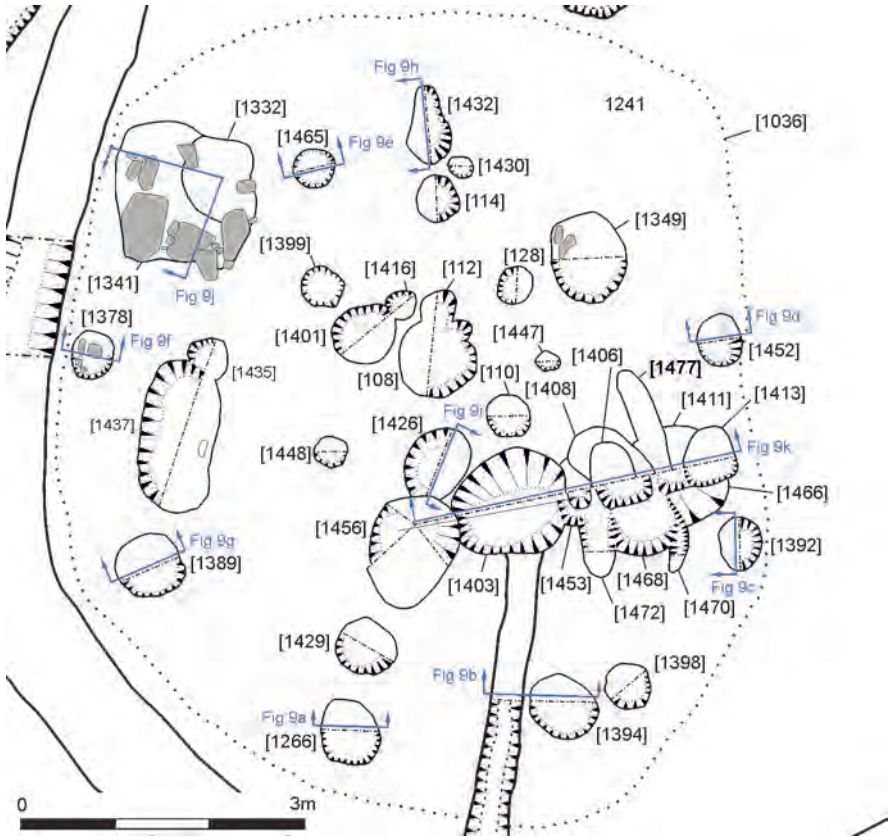

Fig 5 Detail of features within ring gully [1021].

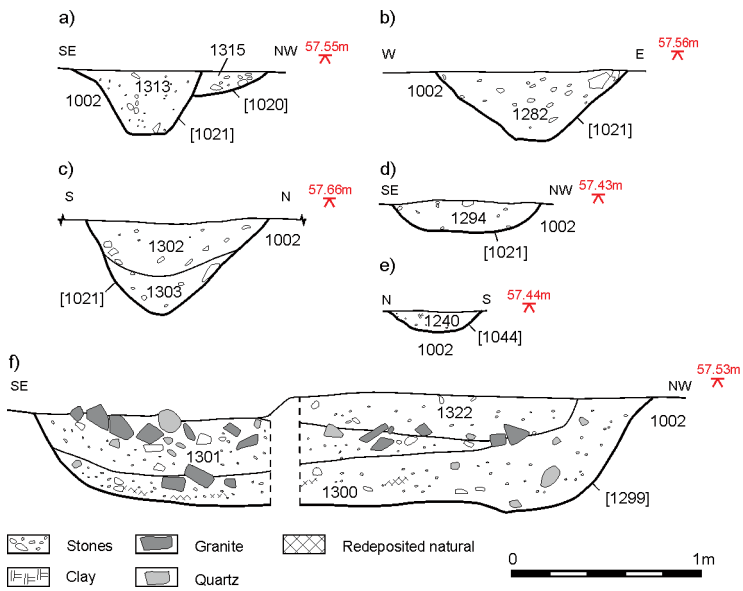

Fig 6 Sections of Later Iron Age gullies [1020], [1021] and [1044] and pit [1299].

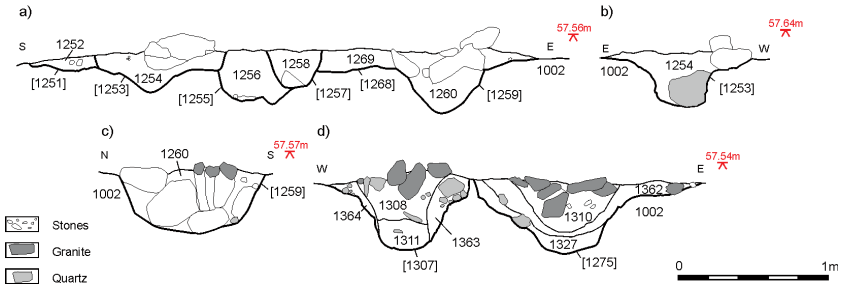

Fig 7 Sections of Later Iron Age postholes forming the probable porch structure.

However, the remainder of any associated outer roundhouse wall is more difficult to discern and the postholes or wall trench for this may have been lost to plough truncation. Taking the inner postholes (below) as a guide provides an estimate, within gully [1021], of a building 10m in diameter.

Within the arc of gully [1021] was a distinct sub-circular sunken area [1036], approximately 8m in diameter by 0.15–0.2m deep (Fig 5). This was filled by (1241), a dark greyish-brown silty clay loam with two sherds of Middle Bronze Age pottery (residual in this context), 52 sherds of SWD ware and 22 sherds of undiagnostic pottery of Later Iron Age date, together with four small pieces of iron slag, a stone bead, a rubbing stone, a perforated slate weight and a piece of worked slate.

Beneath deposit (1241), the base of hollow [1036] contained a group of pits, postholes and a hearth feature. An incomplete post-ring formed by shallow postholes [1378], [1389], [1266], [1394], [1398], [1392], [1452] and [1465] may mark the position of a structure (Figs 5, 9a–g). The post-ring had a diameter of 7m and was off-centre in relation to gully [1021], but did appear to respect it and, as with gully [1021], the gap in the ring faces to the north east. Posthole [1378] contained a sherd of pottery of undiagnostic Later Iron Age date. Central to the post-ring was large posthole [1426], which measured 0.6m in diameter by 0.44m deep with near-vertical sides and a flat base (Fig 9i). It had a post-pipe (1424) of dark greyish-brown silty loam which was surrounded by stone packing in a light yellowish-grey silty clay loam matrix (1425).

A hearth [1403] formed the central feature of a cluster of pits, postholes and channels. The

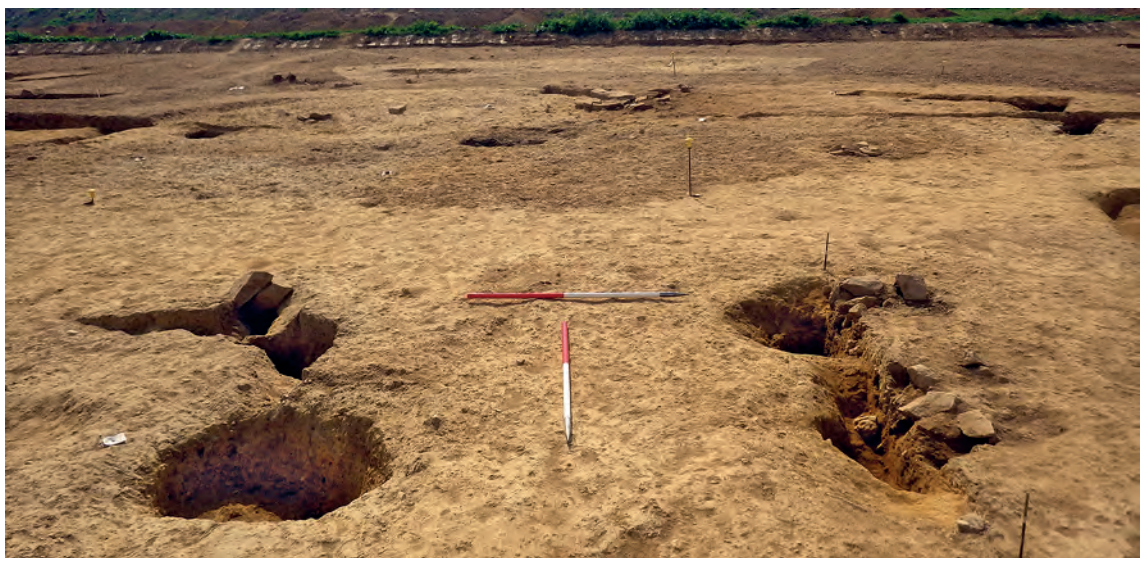

Fig 8 Probable Later Iron Age porch structure, looking west (scales 1m and 1m). (Photograph: © AC archaeology.)

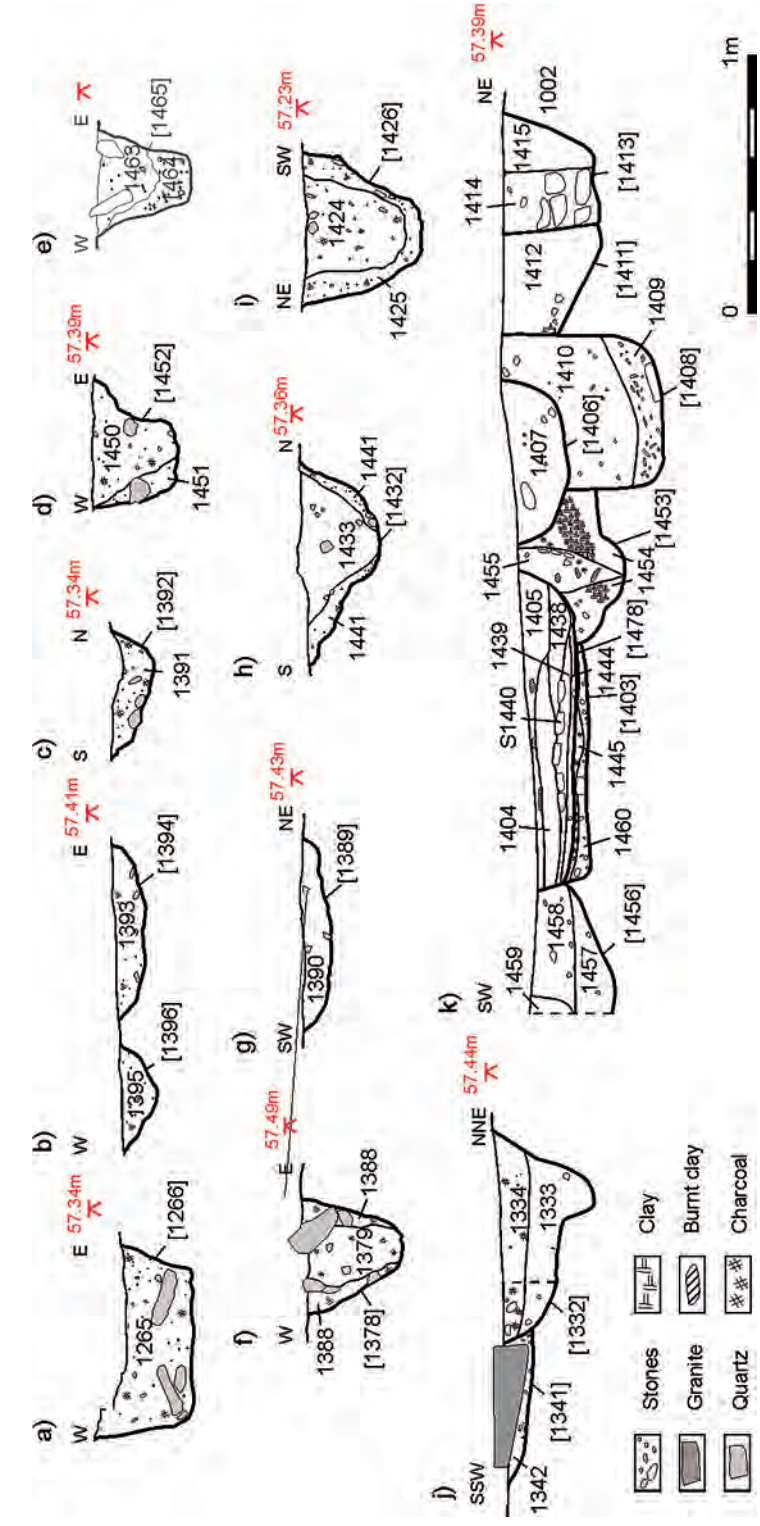

Fig 9 Sections of possible structural postholes and other internal features within Later Iron Age ring gully [1021].

pits – [1406], [1408], [1411], [1456], [1466] and [1468] – ranged from 0.65 to 0.86m long by 0.32–0.64m wide and 0.09–0.72m deep (Fig 9k). The fills ranged from dark yellowish-brown to greyish brown silty clays and silty loams. Three sherds of SWD ware pottery were recovered from [1408]. Two large postholes ([1413] and [1453]) measured 0.59–0.69m by 0.48–0.61m and 0.38–0.42m deep. Both contained distinct post pipes. Three channels, [1470], [1472] and [1477], ranged in size from 0.56m to 0.72m long by 0.19–0.33m wide and 0.15–0.24m deep. A fourth, larger, channel [1396] led between hearth pit [1403] and gully [1021]. It was 3.5m long by 0.5m wide and 0.13m deep and its fill (1395) contained three sherds of undiagnostic Later Iron Age pottery.

Hearth [1403] was subcircular in plan and measured 1.25m by 1.12m and 0.28m deep. It had steeply sloping concave sides down to a flattish base and contained a series of fills (Fig 10). A thin basal fill (1460) of redeposited natural horizon was overlain by an equally thin dark yellowish-brown silty clay layer (1445), which contained numerous charcoal fragments and probably represents a single episode of burning or the remnants of a raked-out fire. This first-phase hearth was then cut by posthole [1453] before being recut as hearth [1478] with a similar size and profile. The recut contained five fills including (1444), (1438) and (1404) which were fire reddened. There was also a formal hearth base 1440, which consisted of a 0.54m long, 0.32m wide and 0.05m depression filled with flat sandstone, mudstone and schist stones which were all heat affected. Two sherds of amphora from central Italy and dating to the Later Iron Age were recovered from the silty clay packing material between the hearth stones. Below and above the hearth stones the pottery recovered was of Later Iron Age date (mostly SWD ware); a total of nine sherds came from deposits (1444) and (1439) below the stones and six sherds from deposits (1438) and (1405) above. There were no finds from earlier hearth [1403].

Of the other postholes and pits, [108], [1332], [1341], [1401], [1437] and [1448] are of particular note.

Pit [108], north west of hearth [1403], was subcircular in plan with a maximum diameter of 0.9m; it had a gentle sloping profile and slightly uneven base at a maximum depth of 0.2m. It contained a single fill (107) composed of dark brown clayey silt with moderate charcoal flecks and a quantity of sandstone and other stone pieces, some with a burnt appearance. This feature may represent a former hearth. No finds were recovered. It had an uncertain relationship with small posthole [112] on its northern edge. No finds were recovered from either of these features.

Pit [1341], in the north-west quadrant of hollow [1036], was irregular in plan and measured 1.58m long and 1.38m wide by 0.18m deep (Fig 9j). It had an irregular base and a single stony fill (1342), which contained a quern stone which had been broken *in situ* and a muller. It had been cut by smaller pit [1332] which contained two fills; two sherds of Earliest Iron Age pottery were recovered from the upper fill (1334); this pottery ought to be regarded as residual in this context.

Pottery of SWD ware type was recovered from pit [1437], which contained 11 sherds, and from posthole [1448], three sherds; three sherds of undiagnostic pottery of Later Iron Age date came from posthole [1401].

The remaining postholes and pits – [114], [128], [1348], [1349], [1399], [1416], [1429], [1430], [1432], [1435], [1447] – represent further activity within hollow [1036], but do not provide evidence in their individual feature morphology and fills, nor

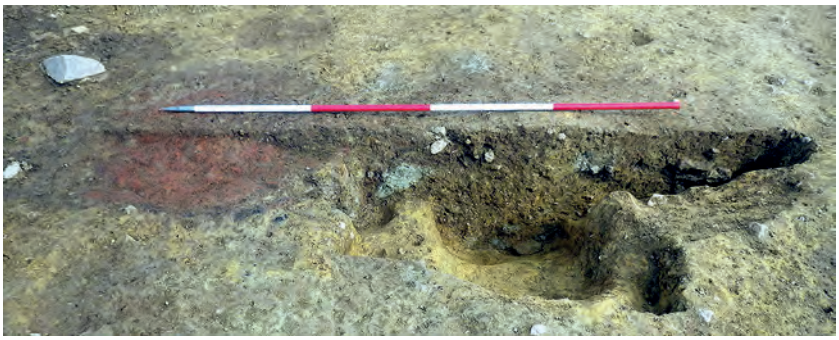

Fig 10 South-facing section of Later Iron Age hearth [1403] and associated pits (scale 2m). (Photograph: © AC archaeology.)

in the pattern presented, to enable interpretation of the activity denoted by them (Fig 9h).

Outside the hollow to the north were shallow pits [1335] and [1442]. Pit [1335] was 1.2m long, 1m wide and 0.11m deep. It had a single fill (1336) which contained a collection of four small fragments of furnace or oven lining (71g), comprising the only examples from the site. Pit [1442] was 0.57m in diameter by 0.12m deep, but contained no finds. To the north of these was pit or short ditch segment [1299]. This was 3.28m long by 0.73m wide and 0.5m deep. It had steep sides and a V-shaped base and contained three fills, with the primary fill (1300) containing three sherds of undiagnostic Later Iron Age pottery (Fig 6f); [1299] cut, and was therefore later than, ring gully [1021].

Pit or ditch segment [1299] may have been associated with ditch [1044] to the east, with which it was aligned. Ditch [1044] was orientated east – west and was 7.6m long by 0.5m wide and 0.08m deep (Fig 6e). Possible posthole [1237]) lay between [1299] and [1044], on the same alignment. These aligned features may be contemporary with ditch [1004], which runs parallel to the north, and to the south with ditches [1023] and [1007], the latter lying perpendicular to the others in this suggested pattern. Together these appear to represent another phase of activity in the Later Iron Age.

The fields defined by these ditches utilise boundary ditch [1018] as their main axis; [1018] appears to be a later re-cutting of an earlier ditch [1056] which ought to be contemporary with [1004], [1299] / [1044] and [1023]. Ditch [1004] contained seven sherds of SWD ware with undiagnostic pottery of Later Iron Age date recovered from ditches [1007] and [1023]. However, the interpretation of contemporaneity of these features is based largely on the sub-rectilinear pattern which they form; it could not be shown by the relationship between [1044] and the boundary line followed by [1018] which was complicated at the crucial junction by intercutting gullies and pits, the relative chronology of which could not be established. The several small possible postholes in this area, [1080], [1082], [1084], [1086], [1089], [1093], [1095], [1106] and [1108], together with gully [1121], may be the ephemeral remains of a structure of unknown type or phase. What can be stated with confidence is that at the time ditch [1004] was established, probably as a field boundary, Earliest Iron Age enclosure ditch [1019] was defunct and already filled.

Ditch [1018] represents a redefinition during the Later Iron Age of the field pattern established by ditches [1004], [1299] / [1044] and [1023]. Close to the main focus of activity a primary fill (1062) of [1018] (the recut of ditch [1056]) contained a sherd of amphora, possibly from the same vessel as the sherds in hearth [1478] (Bidwell, below), 14 sherds of undiagnostic pottery of Later Iron Age date and a quartz hammerstone.

Ring gully [1022]

A little over 1m to the south west of enclosure [1019]/[1043] was ring gully [1022] which enclosed an area approximately 9m in diameter (Fig 11). The ring gully indicated three phases of construction, although these were not evident in all of the slots excavated. The primary gully [1147] measured 0.65–0.8m wide by 0.21–0.36m deep (Fig 12). It was filled with a greyish-brown to yellowish-red silty clay (1145)/(1166) which contained two sherds of Middle Bronze Age pottery. This was subsequently re-cut on a different line, inside the first, as a larger gully [1144] 0.6–1.5m wide by 0.37–0.42m deep, with a dark grey brown to yellowish grey-brown silty clay fill which contained six sherds of undiagnostic pottery (in context (1146)/(1163) dating to the Later Iron Age and a single medieval sherd; evidence of bioturbation was noted in this feature and the sherd of medieval pottery should be regarded as intrusive in this context. A further re-cut [1022] formed the final ring gully and measured 1.4–1.6m wide by 0.19–0.24m deep with a U-shaped profile. The fill of this latest phase was a yellowish-brown silty clay and contained a sherd of undiagnostic Later Iron Age pottery. The ring gully opened to the south east, although both terminals were only of a single phase, either indicating that they represent an extension of the ring gully in its final phase [1022] or that the final phase removed the earlier gully cuts in these areas; the northern terminal contained two sherds of undiagnostic Later Iron Age pottery.

Overlying ring gully [1022] was a buried subsoil deposit (1060) consisting of a dark greyish-brown to dark yellowish-brown, firm to stony silty clay loam of uncertain origin, which contained 17 sherds of SWD ware pottery and 13 pieces of worked flint. Beneath this and central to ring gully [1022]

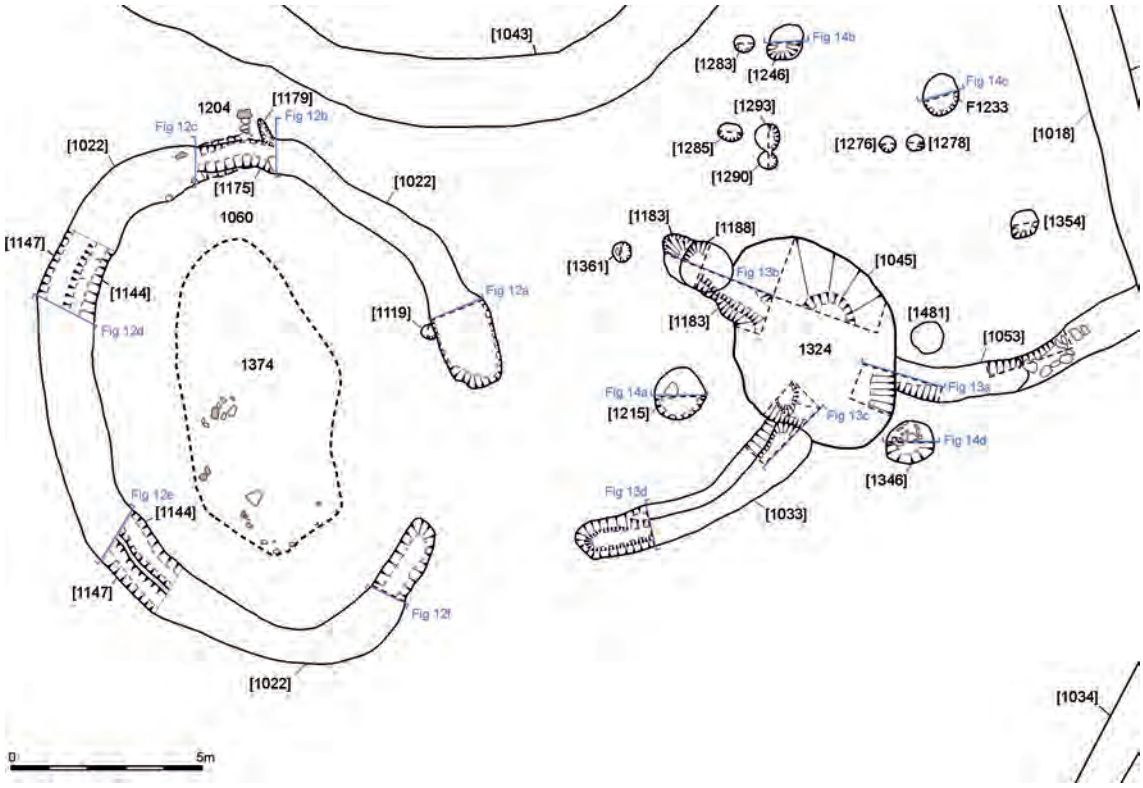

Fig 11 Detailed plan of Later Iron Age ring gully [1022] and neighbouring features.

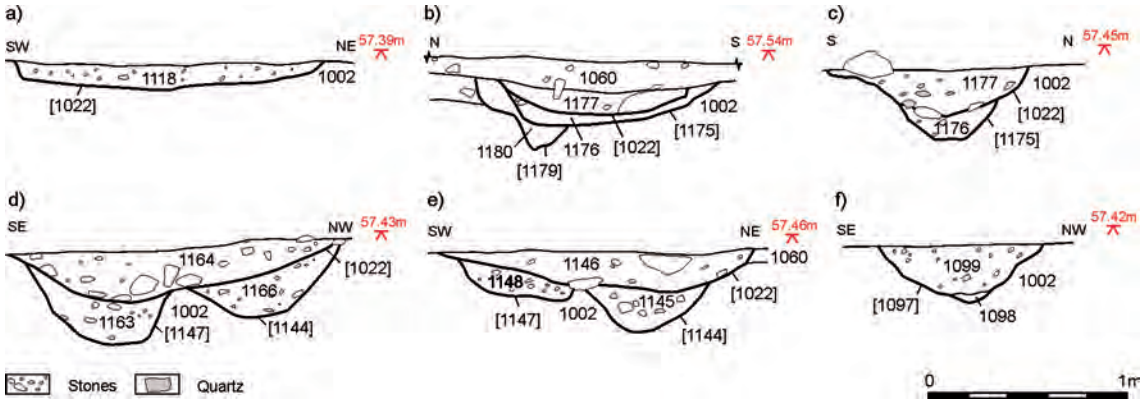

Fig 12 Sections of Later Iron Age ring gully [1022].

was a stony deposit (1374) of angular mudstone, quartz and shale fragments which appeared to fill a shallow hollow up to 0.15m deep and contained six sherds of undiagnostic Later Iron Age pottery. The ring gully cut posthole [1119] and a small gully [1179] which was interpreted as a natural burrow or root hole; there were no finds from either of these.

Possible rectilinear structure and neighbouring features

To the east of ring gully [1022] was a curving gully [1053]/[1183]. This contained 48 sherds of SWD ware but had been heavily disturbed by later features, including recut [1186], and its purpose could not be determined. The later features disturbing gully [1053]/[1183] comprised a possible rectilinear structure, defined tentatively in plan, measuring 10m long by up to 7m wide and defined by six large postholes: [1215], [1188], [1246], [1233], [1481] (unexcavated) and [1346]. The postholes were all sub-circular to circular, between 0.74m and 1.1m in diameter and 0.09–0.81m deep, with steep sloping sides and flat-concave bases (Fig 14). Some of these possible postholes are extremely shallow and must have undergone significant truncation if they had previously supported a structure; however they contained a number of fills, including primary light grey to grey-yellow clays and extremely stony dark reddish-brown packing material with a silty loam texture and inclusions of large subrounded quartz, schist, granite and sandstone blocks in excess of 100mm in size. A sherd of undiagnostic Later Iron Age pottery and a possible rubbing stone was recovered from upper fill (1217) of posthole [1215], and a small piece of iron slag and three pieces of fired clay were found in fill (1191) of posthole [1188].

Eight postholes, although undated, were within or in close proximity to the possible rectilinear structure and may be associated with it, either as internal features or further structural supports. These postholes – [1276], [1278], [1283], [1285], [1290], [1293], [1354] and [1361] – were 0.42–0.74m in diameter by 0.04–0.38m deep. The fills consisted of a light coloured primary silty clay, and distinctive dark reddish-brown to grey-brown silty clay loam packing deposits around large probable packing stone inclusions.

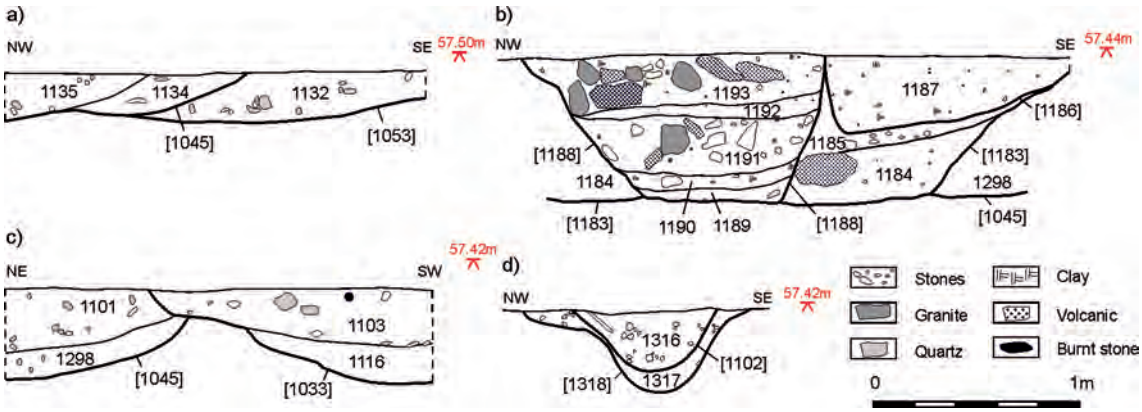

Fig 13 Sections of features to the east of ring gully [1022], including possible structural posthole [1188].

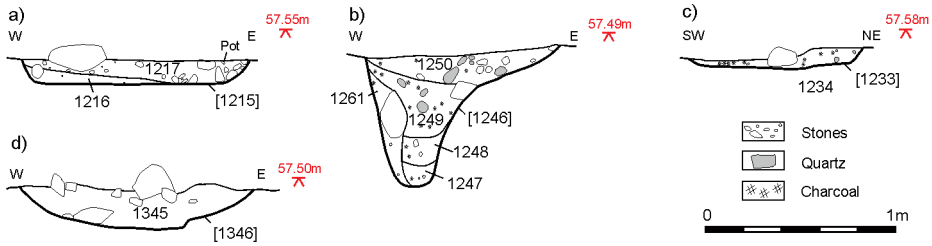

Fig 14 Sections of possible structural postholes of Later Iron Age rectilinear building to the east of ring gully [1022].

The southern four posts of the possible rectilinear structure were arranged around the edge of a hollow [1045] approximately 4m in diameter by 0.1–0.23m deep. Its character varied, and it contained several fills (for example, (1324)) of compacted mid-brown clay silt with inclusions of quartz, limestone and sandstone. This had the appearance of an occupation hollow, but no stratigraphic relationship was established with the structure and it contained no diagnostic finds. On its south side the hollow was cut by a short length of ditch [1033], and the fill (1316) of a recut [1102] contained six sherds of pottery tentatively dated to the Earliest Iron Age which, given the proximity of [1019]/[1043], are probably residual or intrusive material in this context.

Postholes [1382], [1380], [1384] and [1386]

To the south east of ring gully [1022] was a square arrangement of four postholes, [1382], [1380], [1384] and [1386] (Fig 2). They measured between 0.44m and 0.51m long by 0.23–0.35m wide and 0.09–0.12m deep with moderately steep sides and rounded bases. Each contained a single fill of dark greyish-brown silty loam with occasional gravels and pebbles. Although undated, these may represent a four-post structure of probable Iron Age date.

Prehistoric boundaries

Ditches [1032] and [1003]/[1052] probably represent the earliest phases of landscape organisation within the excavated area (Fig 15). Ditch [1032] was not directly dated but contained a small piece of iron slag and is stratigraphically earlier than ditch [1003]/[1052]; 13 sherds of Middle Bronze Age pottery were recovered from the lower fills of ditch [1052] along with 42 sherds of pottery of Earliest Iron Age pottery from a lower fill (415) excavated during the evaluation phase and a rubbing stone from upper fill (1112); a small piece of iron ore and 12 sherds of Later Iron Age pottery were recovered from upper fill (1074). Ditch [1032] was up to 0.5m wide by 0.26m deep and had moderately steep sloping sides and a concave base. It was cut by ditch [1003]/[1052] which formed a right-angled corner. [1003] was 0.4–1.35m wide by 0.4–0.56m deep and [1052] 1.44m wide and up to 1.03m deep. The southern end of ditch [1052] had been re-cut as [1230] and the fills – (1157), (1231) and (1232) – contained nine sherds of Middle Bronze Age pottery, two sherds of Earliest Iron Age pottery, worked flints and a muller. The interpreted results of the geophysical survey indicated that these ditches continued to the north west and south east, beyond the overall limits of the site.

Historic field boundary

Parallel ditches [1034] and [1035] cut prehistoric ditches [1052], [1023] and [1018] and are probably part of the historic field boundary arrangement as they demonstrate a similar alignment and orientation to the existing field pattern and removed field boundaries recorded on historic maps. Many of the excavated features were shallow, and it is clear that the site has been extensively cultivated during the historic period. This was also picked up from the results of the geophysical survey, which recorded large areas of ploughing.

Unphased features

A number of the features identified and excavated cannot be ascribed with any certainty to a particular

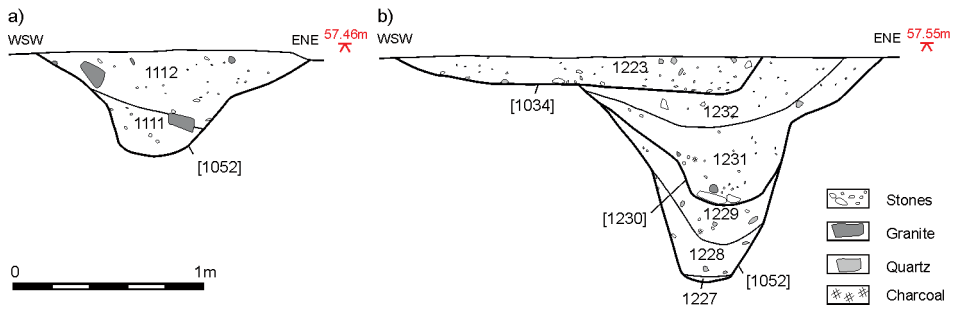

Fig 15 Sections of prehistoric boundary ditch [1052] and historic boundary ditch [1034].

phase of activity due to the lack of dating evidence or physical relationships with other features. However, the curving gullies [1005] and [1006] may represent further evidence for settlement.

Gullies [1005] and [1006]

Two small segments of gully were identified to the west of enclosure [1019]/[1043]. They measured 0.3–0.35 m wide by 0.15m deep. Both contained a distinctive light yellowish-brown silty loam fill with frequent large sub-rounded sandstone, quartz and schist inclusions. Close to the north end of gully [1006] were a pair of inter-cutting possible postholes, [1011] and [1013], which were also undated but could have been associated with the gullies.

Postholes [1008], [1343], [1347], [1355], [1357] and isolated pits

Four postholes [1008], [1343], [1347] and [1355] formed a line 7m long, orientated roughly north to south and 2–2.5m apart. Each of the postholes measured 0.3–0.6m in diameter by 0.1–0.3m deep. They each contained fills of dark yellowish-brown to yellowish-brown silty clays with moderate to large sandstone, granite and quartzite packing stones. The northernmost posthole coincided with the end of the terminal for ditch [1043] and may indicate that the ditch and post line are associated, but this must remain speculative. A further shallow possible posthole [1357], located a short distance to the west of this group, also contained a large quartz stone and is similarly difficult to interpret. Several other isolated pits, including the very large [1123], on the northern edge of the site, which measured 2.8m in diameter by 1.28m deep, contained no finds or associations with other features. These are not discussed further here.

The finds

Prehistoric pottery

Henrietta Quinnell, with petrographic comment by *Roger Taylor*

The assemblage consists of 19 sherds weighing 204g of Middle Bronze Age Trevisker date, 136 sherds (1805g) of the Earliest Iron Age and 313 sherds (1839g) from the Middle and Late Iron Ages. The most significant aspect of the assemblage is the presence of imported amphora sherds stratified in an Iron Age context.

Abrasion is only commented upon when it is moderate or more, 2 or above following the numeration system presented in Quinnell (2011b, 146).

Middle Bronze Age (Table 1)

All sherds are moderately abraded. Two contexts had material with features which suggest Middle Bronze Age Trevisker: (1145) has a sherd with part of an internal rim bevel and incised lines on the exterior, (1231) a sherd with fine incised lines. The character of the fabric, with non-gabbroic inclusions added to Lizard gabbroic clay, is entirely typical of Trevisker ware (Parker Pearson 1995; Quinnell 2012).

Table 1 Contexts with gabbroic admixture fabric by sherd number and weight in grams

Context	*Details*	*Gabbroic admixture*
–	Surface finds	2/25
(1145)	In [1022]	2/11
(1199)	Fill ditch [1003]	2/26
(1229)	Fill ditch [1052]	2/16
(1231)	Lower fill ditch [1052]	4/25
(1232)	Upper fill ditch [1052]	5/83
(1241)	Fill of hollow [1036]	2/18
Totals		19/204

Earliest Iron Age (Table 2)

P1 (Fig 16) (415) lower fill ditch [1052]. 42 sherds (1008g) almost all from this vessel. Gabbroic, very thin for the size of vessel and well fired unusually, but without any burnish or surface finish. Jar with slightly everted flat-topped rim, 300mm diameter, and a slight shoulder. Only some of the upper part of the vessel present. A single sherd with a fingernail impression probably comes from another vessel.

P2 (Fig 16) (1273) fill of ditch terminal [1043]. Neck and sharply carinated shoulder of jar with horizontal impressed lines around vessel above shoulder. Shoulder diameter approximately 190mm diameter. Gabbroic.

Table 2 Details of Earliest Iron Age pottery by sherd number and weight in grams

Context	*Details*	*Granitic*	*Gabbroic*	*Totals*
(306)	Fill pit [305]		2/50	2/50
(415)	Lower fill ditch [1052]		42/1008 **P1**	42/1008
(1273)	Fill ditch terminal [1043]	54/370 **P3**	10/151 **P2**	64/521
(1067)	Upper fill pit [1043]		1/10	1/10
(1157)	Fill ditch recut [1230]		2/51	2/51
(1206)	Unstratified.	1/1	2/17	3/18
(1337)/(103)	Fill ditch [1043]		2/47	2/47
(1221)	Subsoil		1/3	1/3
(1289)	Fill ditch [1019]		11/48	11/48
(1316)	Fill terminal [1033]		6/33	6/33
(1334)	Fill pit [1332]		2 /16	2/16
Totals		55/371	81/1434	136/1805

P3 (Fig 16) (1273) fill of ditch terminal [1043]. Shoulder of carinated bowl with horizontal incised lines above rounded carination. Shoulder approximately 240mm diameter. Granitic. *Petrology. Quartz* – transparent to translucent, white opaque 0.1–1.5mm; *feldspar* – white, generally unaltered angular to sub-angular grains, some with cleavage, 2.8mm; *tourmaline* (schorl) – black vitreous angular grains, some with striated crystal form, 0.2–0.9mm; *mica* – muscovite, cleavage flakes with abraded margins, 0.1–1.1mm, biotite, sparse dark brown cleavage flakes, 0.1–0.2mm; *matrix* – silty, finely micaceous clay. *Comment*. A granite-derived fabric with quartz and feldspar in about equal proportions, probably sourced from within a granite outcrop. Broadly similar to Fabric GR.1 at Trevelgue Head (Taylor in Quinnell 2011a).

Ditch terminal fill (1067) contained the angle from another carinated jar / bowl in a well-made gabbroic fabric. The body sherds in (306), (1157) and (1316) are only tentatively identified to this period. Other contexts listed in Table 2 have featureless sherds except (1201), which is probably a rim of this period. Some featureless sherds listed under 'Later Iron Age' in Table 3 below may in fact be of this period.

Discussion

P1 is a large and thin version of an Earliest Iron Age shouldered jar. The best published example of these in Cornwall is P7 from Trevelgue Head cliff castle, Newquay, associated with C14 dates centring on the eighth century cal BC; the shape of the rim is similar (Quinnell 2011a, 156). A small range of other material from south-west Britain may be comparable (*ibid*, 156–8). A similar but rather less well finished form contained a hoard of Sompting axes at Mylor (Bruns and Needham 2006), which should belong to the eighth century BC. **P2** and **P3** are examples of carinated bowls / jars which occur in the Earliest Iron Age in Cornwall. A variant of these is found in the same feature at Trevelgue Head as P7, referred to above (Quinnell 2011b, 156–8); again, its publication discussed other examples such as those from Bodrifty, West Penwith (Dudley 1956, fig 9). These are the first examples of the type to have grooved decoration on their shoulders and the sharpness of the carination on **P2** is currently unparalleled. The only other carinated vessel of similar date and ceramic quality is in gabbroic fabric from the unpublished excavations by Dorothy Dudley at Garrow Tor on Bodmin Moor in the Royal Cornwall Museum. The term 'Earliest Iron Age' is used for these vessels, as at Trevelgue Head,

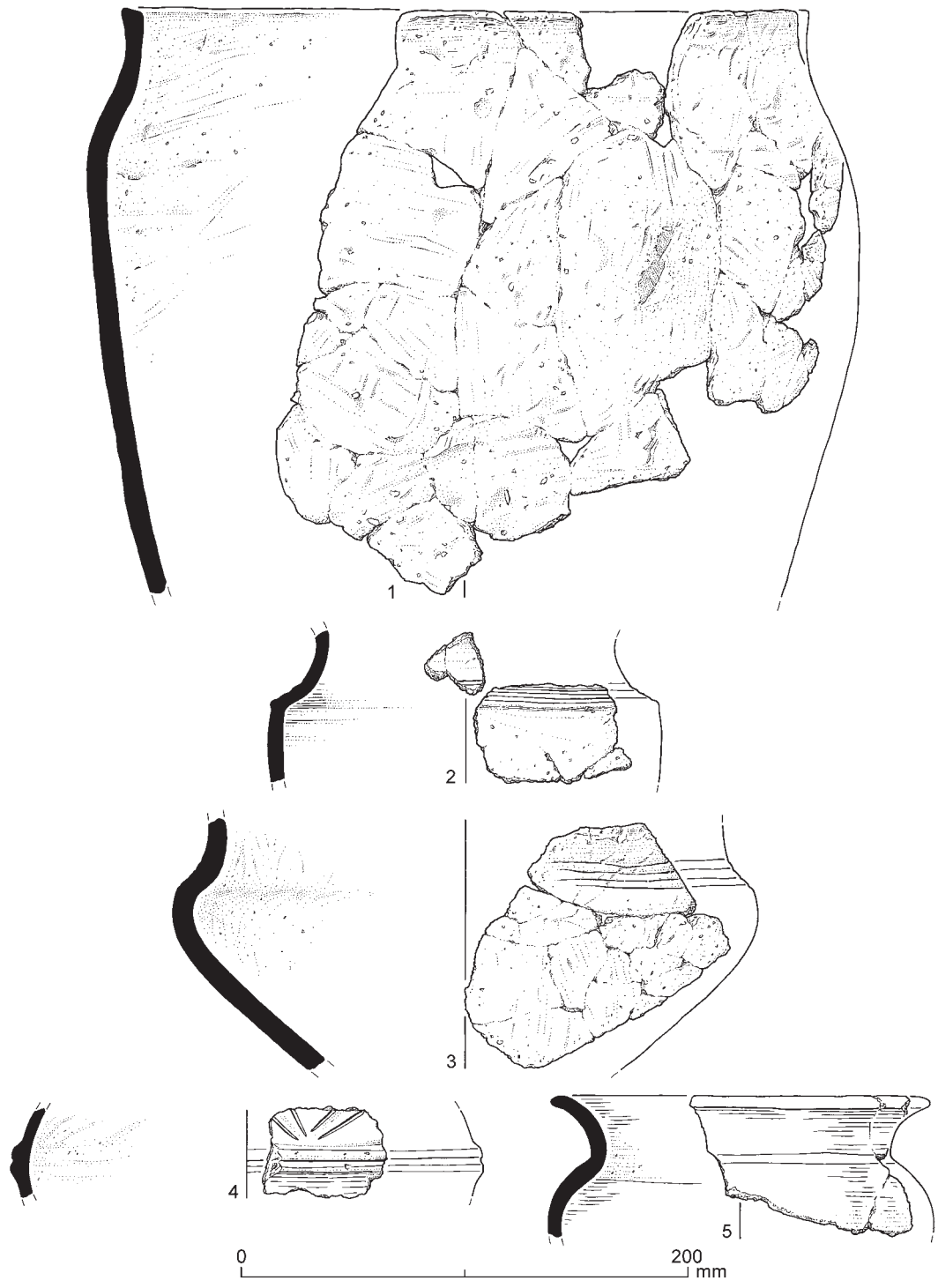

Fig 16 ***P1–3*** *Earliest Iron Age,* ***P4*** *Middle Iron Age,* ***P5*** *Late Iron Age Type D. (Drawings: Jane Read.)*

for ceramics belonging broadly to the eighth and seventh centuries BC, as opposed to the smaller jars of the subsequent Early Iron Age Plain Jar Group, broadly sixth – fourth centuries BC, which are absent from this site.

Generally, ceramics from the Earliest and Early Iron Ages occur in small quantities compared to those from the preceding and succeeding periods in Cornwall and Devon. This is the first occasion on which granitic fabric has been found together with gabbroic fabric in a securely contexted assemblage of this date on the Cornish mainland.

Middle and Late Iron Age (Table 3)

FABRICS

These follow those used in the report on Trevelgue Head (Quinnell 2011a) with granitic fabric equivalent to GR.1 derived from a source on or close to the margins of granite, possibly St Austell. There is some use of granitic fabrics in the Middle Iron Age in Cornwall but this greatly diminishes in the Late Iron Age (*ibid*, 7.9.6. 7.10.1) when gabbroic fabrics alone are generally found.

Table 3 Later Iron Age pottery by sherd number and weight in grams

Context	*Details*	*Granitic*	*Amphora*	*Standard gabbroic*	*Well-made gabbroic*	*Totals*
South Western Decorated Ware						
(1060)	Fill [1022]				17/77	17/77
(1069)	Fill field boundary [1004]			4/13	3/9	7/22
(1184)	Fill gully [1183]			44/234	1/8	45/241
(120)	= (1241)			7/28		7/28
(1241)	Deposit in [1036]			42/176	2/10	45/186
(1256)	Fill posthole [1255]			1/6		1/6
(1436)	Fill pit [1437]				11/72	11/72
(1438)	Deposit in hearth [1478]			4/19		
(1439)	Burnt clay as (1438)			6/28		6/28
(1444)	As (1438)			3/37 **P4**		3/37
(1449)	Fill posthole [1448]			1/2	2/2	3//4
Total				**112/543**	**36/178**	**148/721**
Cordoned Ware						
(1294)	Fill ring ditch [1021]			44/362 **P5**		44/362
(1305)	Fill ?pit [1306]			1/24		1/24
Total				**45/386**		**45/386**
Middle or Late Iron Age						
Total	17 contexts	**17/104**	**3/295 P6**	**14/59**	**86/274**	**120/730**
Overall total		**17/104**	**3/295**	**171/988**	**122/452**	**313/1839**

Ceramic styles and chronology

South Western Decorated Ware (SWD) belongs to the Middle Iron Age with a date range from somewhere in the fourth to the first centuries BC, and can be divided into Outline, Accomplished and Standard styles (Quinnell 2011a, 163). SWD overlaps with Cordoned Ware from the later second century BC: the latter continues through the first century BC and into the early Roman period (Quinnell 2011c). The fabrics used are generally similar throughout the Later Iron Age. Consequently, unless sherds with form or decoration are present, Middle Iron Age cannot be distinguished from Late Iron Age material. In the present assemblage the amount of Cordoned Ware is comparatively small, although **P5** of Type D (Fig 16) does not date before the first century BC. Both it and the Type H/J also present are found in assemblages where the two ceramic styles overlap. A likely range for this ceramic assemblage is third to first centuries BC, although all the material could date from a shorter range, perhaps second to first centuries BC.

Middle Iron Age sherds and contexts

P4 (Fig 16) (1444) as (1438) deposit in hearth [1478]. Girth / shoulder sherd, approximately 180mm in diameter, well-made gabbroic. SWD incised chevron design above double cordon around girth. **P4** shows a not unusual combination of SWD and Cordoned Ware styles, as at Killibury hillfort (Miles 1977, fig 41, no. 17).

(1060) buried subsoil and (1069) fill [1004]. Sherds from Accomplished SWD vessels.

(1184) fill gully [1183]. Sherds from two Outline SWD vessels with simple chevron designs.

(1241) fill [1036]. Most well-made gabbroic sherds probably come from one Accomplished SWD vessel with rouletted infill in design components.

(1436) fill pit [1437]. Sherds with SWD incised decoration.

(1438) deposit in hearth [1478]. Well-made gabbroic sherds have SWD incised decoration including a slashed neck cordon.

(1439) deposit in hearth [1478]. Burnished oxidised sherds, well-made gabbroic, from large vessel with SWD incised design.

(1449) fill posthole [1448]. SWD incised line on well-made gabbroic sherd.

Late Iron Age

P5 (Fig 16) (1294) fill ring ditch [1021]. Upper part of Type D jar, diameter 180mm. Standard gabbroic, good burnish.

(1305) fill posthole or pit [1306]. Body sherd with cordon from Type H/J storage jar. Well-made gabbroic.

Later Iron Age

Details of sherds from 37 contexts which cannot be definitely assigned to South Western Decorated or Cordoned Ware styles are provided in an archive table. These include imported amphora sherds.

Amphora sherds

Paul Bidwell

P6 (Fig 17) (1062) fill ditch [1018]. Sherd weighing 129g from the lower part of a cylindrical neck; the external diameter where the sherd curves out to join the body of the amphora is approximately 120–130mm.

(1440) fill hearth [1478]. Two sherds (166g) from a handle of oval cross-section. One sherd is from where the top of the handle joined the neck. The handle was attached horizontally and then curved down vertically; the second sherd is from this curved portion of the handle.

All three sherds are probably from the same amphora. The fabric has light orange surfaces with a slightly darker core. The fabric is soft but has been affected by soil conditions, which might also account for the slightly darker colour of the handle fragments. The most distinctive inclusions visible at ×20 magnification are of black sand, although there are also rarer fragments of quartz.

The fabric and profile of the handle allow the amphora to be identified as a Campanian Dressel 1A or 1B (Peacock and Williams 1991, Class 3 or 4), datable broadly from the last quarter of the second century BC to the end of the first century BC. Fitzpatrick (2003, 20–2; 2013) has rightly questioned some descriptions of amphora sherds from Britain as Iron Age imports, but at Nansledan there is little room for doubt. Amphorae in this fabric certainly arrived in Britain during the early Roman period, but they were of Dressel 2–4 type (Peacock and Williams 1991, Class 10) with handles of bifid section rather than of the ovoid section, as at Nansledan, which is typical of Dressel 1a and 1B. An Iron Age date for the present example is also confirmed by its context on a site

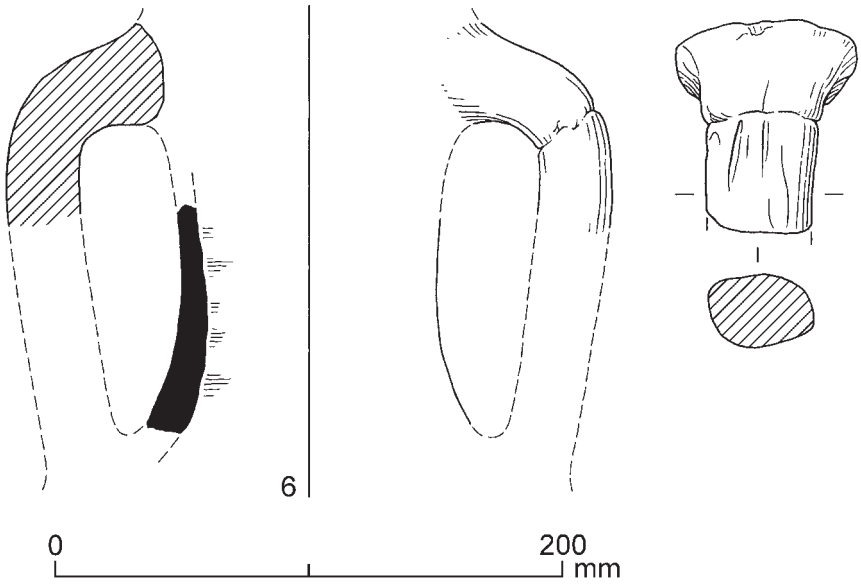

Fig 17 ***P6*** *Campanian Dressel 1A/B amphora. (Drawings: Jane Read.)*

where nothing else suggests that there was Roman occupation.

Stonework

Henrietta Quinnell, with petrographic comment by *Roger Taylor*

The items are locally sourced, as is usual throughout the first millennium BC. While both mullers (**S1**) and whetstones (**S1a**) occur throughout the Iron Age, **S1** is unusually small for its type. Most of the material is locally sourced, with six beach cobbles, one chunk of surface elvan and five pieces of slightly weathered slate likely to have been taken from a local cliff or other outcrop. Two items have more distant sources, **S3** from Cligga Head (Perranzabuloe), some 15 km to the south west, and **S14** from the Tintagel area 33 km to the north east. The generally local procurement of stone is usual in the Iron Age and best demonstrated by the assemblage from Trevelgue Head, Newquay, largely local but with a few pieces also from Cligga Head (Quinnell 2011b, 259). The only other recorded Tintagel volcanic rock from an Iron Age context comes from Sir James Smith School, Camelford, but there it was only 6km from the source (Quinnell and Taylor 2015). Some stone was brought to the site but not used; for example, Tintagel volcanic tuff **S14** and a weathered fragment of porphyritic elvan in hollow [1036]. Some contexts – (1217), (1101), (1074) and (1055) – had local pebbles collected as curios for their unusual colour, shape or texture.

The stonework has not been distinguished chronologically. All but one of the rubbing stones were also used as whetstones and most as hammerstones. Multiple use for Iron Age stonework is frequently recorded, as at Trevelgue Head, Newquay (Quinnell 2011b). A number of items appear to have been broken deliberately, a practice commented upon by Watts (2014, 115) and thought to relate to deliberate decommissioning of tools.

The stonework is generally of types common in the Cornish Iron Age. Only two other stone beads from Iron Age contexts are published as such from Cornwall, of gabbro rock from Trevelgue Head (Quinnell 2011b, fig 11.6) and of elvan from Halligye fogou (Quinnell and Elsdon 2009/10, fig 2), but both of these beads are of a different shape, both a flattened sphere with a small central perforation. However, the extensive range of pieces illustrated as 'spindle whorls' and 'pierced slates' from The Rumps cliff castle at St Minver may contain slate items better interpreted as beads or pendants (Brooks 1974, figs 33–35), and the presence of slate beads or pendants may be more frequent than recorded.

S1 (Fig 18) (1232) upper fill recut [1230] of ditch [1052]. Small muller, 99mm × 75mm × 24mm, 268g, trimming around parts of edge to remove remnant joint angle. Fine-grained elvan

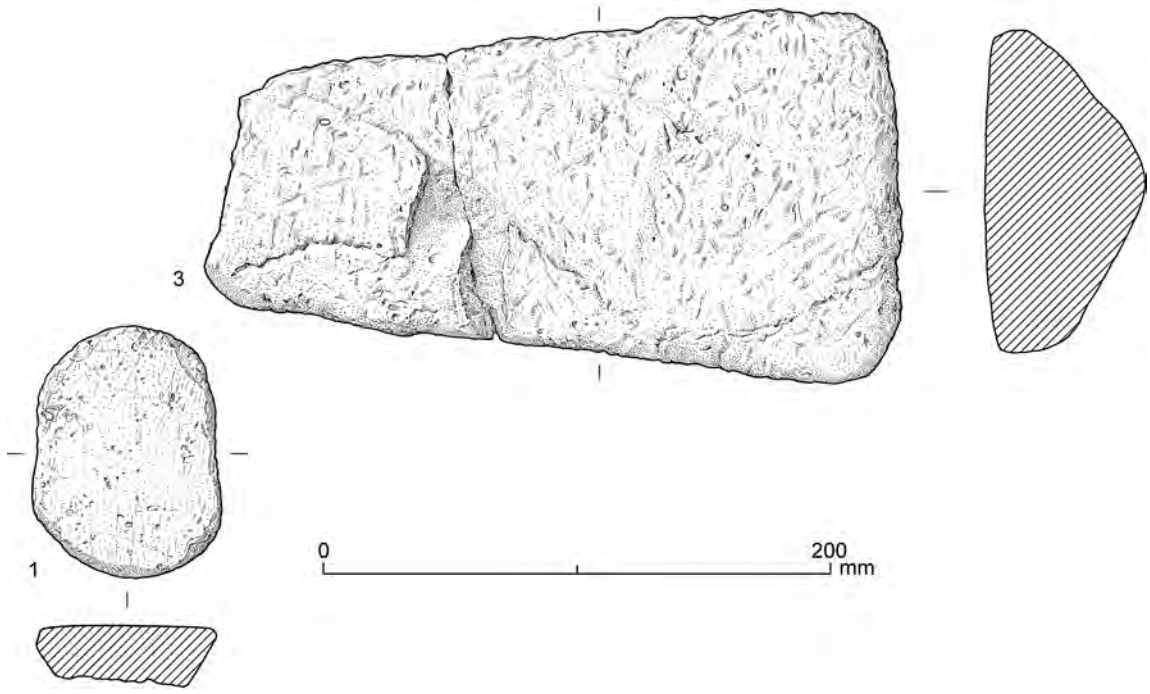

*Fig 18 Iron Age stonework: mullers **S1** and **S3**. (Drawings: Jane Read.)*

with quartz phenocrysts < 2mm, many of them euhedral, cavities remaining leached out feldspar of similar dimensions; surface fragment likely to be local. Parallel scratches running up working face indicate direction of use.

S1a (not illus) as S1. Broken bladed local beach greywacke sandstone cobble, 93+mm × 62mm × 23mm, 170g. Probable whetstone use.

S2 (Fig 20) (1342) fill pit [1341]. Saddle quern, kite-shaped with dimensions 610mm × 350mm × 110mm. Some damage along one long edge but otherwise complete. The pointed tip has broken off at the narrow end; the two pieces were found adjacent to each other, the break old but post-depositional. The upper surface is slightly concave with many faint longitudinal scratches indicating the direction of use. Aplitic granite with sparse quartz and feldspar phenocrysts (coarse elvan), heavily weathered surface fragment probably local.

S3 (Fig 18) as S2. Trapezoidal muller, 170 × 143 × 61mm, 1610g, one full working surface, one side of humped back also has some use wear, possibly deliberately broken into two fragments with small pieces from break not present. Parallel scratches running up working face indicate direction of use. Medium-grained granite with abundant dark tourmaline. Waterworn cobble possibly from Cligga Head granite.

S4 (not illus) (1112) upper fill ditch [1052]. Beach cobble of similar elvan to **S1**, 65mm × 71mm × 35mm, 637g, triangular cross section, both faces used for rubbing, long edge used as whetstone and some hammerstone use on one end.

S5 (not illus) (1125) middle fill pit [1123]. Broken greywacke sandstone beach cobble, 57+mm × 80mm × 39mm, 218g, one face used for rubbing, also hammerstone use on surviving end and anvil marks on one face. Broken during use, with some subsequent use as hammerstone producing damage on one edge of break.

S6 (not illus) (1217) upper fill of posthole [1215]. Fine-grained sandstone beach cobble, 87mm × 63mm × 26mm, 204g, one face a little used as rubbing stone.

S7 (not illus) (1241) in [1036]. Hard siltstone beach cobble, 120mm × 59mm × 30mm, 377g, both faces used for rubbing and slight whetstone facets on both sides.

S8 (not illus) (1454) packing of posthole [1453]. Bladed hard siltstone beach cobble fragment,

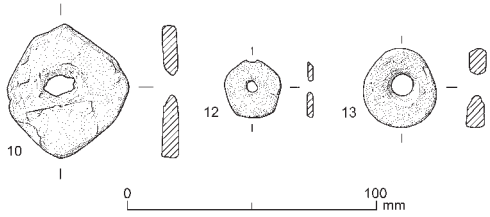

*Fig 19 Iron Age stonework: perforated slates **S10** and **S12**, bead or pendant **S13**. (Drawings: Jane Read.)*

41+mm × 40mm × 20mm, 51g, both faces slightly used for rubbing and probably deliberately broken.

S9 (not illus) (1062) fill ditch [1018]. Vein quartz triangular beach cobble, 98mm × 80mm × 30mm, 355g, with hammerstone use on both surviving corners.

S10 (Fig 19) (1294) fill gully [1021]. Quadrangular perforated local slate, 44mm × 45mm × 8mm, untidy irregular perforation worked from both sides but not worn, edges apparently ground, 23g. It appears to have been made for some special purpose.

S11 (not illus) (1241) fill of hollow [1036]. Broken perforated local triangular slate, 77mm × 64+mm × 13mm, 78g, perforation worked from both sides 9mm across and worn; probably a weight.

S11a (not illus) as **S11**. Fragment of local slate with small perforation, 28mm across, 3g.

S12 (Fig 19) (1302) upper fill of ring gully [1021]. Pentangular local slate bead, 23mm across

*Fig 20 Saddle quern **S2** from pit [1341]. (Photograph: © AC archaeology.)*

3mm thick, 1g, hour-glass perforation slightly worn, edges ground, both surfaces possibly burnished and slightly glossy from use.

S13 (Fig 19) (1265) fill posthole [1266]. Bead or pendant of weathered local slate, 30mm across, 7mm thick, 9g, perforation 8mm across worked from both sides with break-out fractures, perimeter ground and surfaces a little glossy as **S12**. Asymmetric position of perforation not appropriate for a spindle whorl.

S14 (not illus) (1241) with S11 and S11a. Elongated splinter of volcanic tuff with elongated clasts and some degree of foliation, 250mm long 35mm thick, 353g. Probably levered off a surface outcrop using joint surfaces, the nearest likely occurrence is in the volcanic rocks of the Tintagel area.

Lithics

Henrietta Quinnell

There are 95 pieces of flint and one of chert, almost all redeposited in later contexts. Most of the material has cobble / pebble cortex, although a few pieces have a nodular cortex indicative of a probable source in east Devon. The only diagnostic pieces are a Later Neolithic transverse arrowhead from (1066), fill of ditch [1043], and a double-sided scraper with lengths of semi-invasive retouch likely to be of Later Neolithic to Early Bronze Age date from (1157), fill of ditch [1052]. There is also an end scraper from topsoil which has heavy edge-wear, possibly from use as a strike-a-light.

Metalwork

Naomi Payne

Finger ring

An iron spiral ring was recovered from fill (1241) of hollow [1036]. This context also contained Middle/Late Iron Age South West Decorated pottery sherds. The object has broken into four pieces but appears to have been originally formed of two and half turns. The overall external diameter is *c* 25mm and the band appears to have an oval cross-section.

Coiled rings are more commonly seen in copper alloy and are believed to date from the later Iron Age to early Roman period (Jackson 1991, 48). Small examples are best interpreted as finger rings but larger examples may be ferrules (Manning 1985, 142). There are a number of parallels from Cornwall including a crude example from the Porthcressa cemetery site, St Mary's, Isles of Scilly (Ashbee 1983, 120–1), and several in iron and copper alloy from Iron Age burials at Trethellan, Newquay (Nowakowski and Stead 1991, 225–6).

Palaeoenvironmental analyses

During the excavations soil samples were taken from a number of features for the recovery of environmental and economic information. The samples were processed by environmental archaeologist Cressida Whitton (AC archaeology) using standard methods of flotation. A Siraf-type tank was employed with a 250-micron mesh used to catch the flot and a minimum mesh of 500 microns used to retain the residue. The flots and residues were dried and assessed by Whitton and the residues were sorted for charred plant remains. The flots and charred items sorted from the residues from three samples were sent for analysis. In addition, small sub-samples of residue were sent as a check on recovery. Since only a few traces of charcoal were observed in the residue subsamples the flotation was judged to have been effective.

The following samples were selected for having potential for full analysis:

Sample 5 – the upper fill (1334) of pit [1332], containing frequent charcoal fragments;

Sample 6 –upper fill (1405) of hearth [1478];

Sample 7 – upper fill (1445) of hearth [1403].

Charred plant remains

Wendy J Carruthers

Descriptions by sample

Sample 5 – Pit [1332] was one of a number of pits located within hollow [1036]. Although charcoal fragments were fairly common in upper fill (1334) the only identifiable charred plant macrofossils were two very poorly preserved, vacuolated fragments of cereal grain. A few other vacuolated fragments were present but could not be confirmed as being from cereal grains as there were no recognisable features. The flattened profiles of the two grain fragments and appearance of the hilum in one case were more similar to barley (*Hordeum* sp.) than wheat, but this could not be confirmed because of the small sizes of the fragments.

The traces of possible barley grains are of little interpretative value and are not further discussed.

Sample 6 – Hearth [1478] was a secondary hearth feature centrally placed within hollow [1036]. Its upper fill (1405) had a moderately rich (12.7 charred fragments per litre (fpl)) assemblage dominated by very poorly preserved emmer / spelt (*Triticum dicoccum/spelta*) chaff fragments, including glume bases, spikelet forks and rachis fragments. Both emmer and spelt were probably present, although only spelt (*T. spelta*) was confidently confirmed as being present through the identification of glume bases. A single emmer glume base was only tentatively identified (*T.* cf *dicoccum*) due to poor preservation. A single grain was identified as being of the spelt type, but the remaining hulled wheat grains were too fragmented and poorly preserved to suggest which hulled wheat might have been present. Oat (*Avena* sp.) awn fragments were present but there was no evidence for the cultivation of oats as a crop. The few weed seeds recovered included dock (*Rumex* sp.), wild radish (*Raphanus raphanistrum*) and brome (*Bromus* sect. *Bromus*). Wild radish is most frequently found as a ruderal weed of sandy, acidic soils and the other two taxa occur on a wide range of disturbed soils. This type of poorly preserved, chaff-rich sample is typical of domestic hearths that have been used for the de-husking of hulled wheat spikelets on a small, day-to-day scale.

Sample 7 – Hearth [1403] was a primary feature with the upper fill (1445) containing a chaff-rich assemblage which was very similar to that in Sample 6, but with slight differences. For example, the concentration of charred plant remains was higher (23.9 fpl). In addition, emmer glume bases were positively identified and were more frequent than in Sample 6. There was more evidence of oats in terms of awn fragments, as well as a fragment of oat grain (with visible hairs). The presence of a wild oat pedicel (*Avena fatua*) and frequency of awn fragments suggests that oat may only have been present as a weed contaminant.

Discussion

The two hearth samples have provided a little more information concerning the arable economy in the Later Iron Age. Cereal processing waste was frequent in both samples. The poor state of preservation and relatively high concentration of burnt chaff in the hearth complex is due to these activities taking place over a length of time. Over the period of use the hearth is likely to have been swept out from time to time, causing physical damage to the remains that trickled into crevices. Re-heating charred cereal remains many times in a hearth also results in poor preservation. The better preserved items such as the glume bases that could be identified to species level, may have been burnt during the last phase of use. The presence of low numbers of large, heavy weed seeds such as wild radish mericarps (sections of the fruit) and brome grass seeds, and absence of small, light weed seeds is typical of this type of assemblage, since larger, heavier weeds seeds are more difficult to separate from large, heavy spikelets during crop processing.

The range of cereals represented in the hearth assemblages was very narrow, consisting only of spelt and emmer wheat, with spelt being dominant in both samples according to the identifiable glume base counts. Since few chaff fragments could be identified to species level, comparisons of emmer to spelt ratios between the two samples are tentative. However, there may have been a reduction in the cultivation and consumption of emmer between the formations of the two deposits, according to the sparse data.

Although oat awn fragments were common in both samples and a single fragment of oat grain was recovered from sample 6 the presence of a wild oat (*Avena fatua*) pedicel in sample 7 suggests that the oats were probably only present as weed contaminants of the crops. There is no directly-dated evidence to suggest that oats were grown as a crop in the Iron Age. However, at Penhale round, 8km south east of Nansledan, cultivated and bristle oats were being cultivated by the earlier Romano-British period (Carruthers 2015). Presumably this indicates that either soil fertility or climatic conditions had deteriorated by this time such that spelt, the preferred crop in the Roman period, was becoming less economically viable.

The traces of bracken and gorse spine recovered from Sample 7 indicate additional sources of fuel or tinder, in addition to wood described by Challinor (below) and cereal chaff. Bracken and gorse are characteristic of heathland and rough pasture, habitats that are likely to have become common on the local acidic soils following woodland clearance. Of the other weed / wild plant taxa recorded, wild radish is also typical of acidic, sandy soils but docks, brome grass, ribwort plantain and grasses are all much less

specific in the range of soils and habitats in which they grow.

Charcoal

Dana Challinor

The charcoal assemblages from hearths [1403] and [1478] were very similar; dominated by oak, with traces of hazel, gorse and probable blackthorn. They could easily have derived from the same burning event or subsequent burning episodes in which similar fuel sources were used. Superficially, the assemblage from pit [1334] was also similar, dominated by oak and with alder, but the condition and immature character of the material differed from the hearth samples. Nonetheless, it is clear that oak formed the main fuel wood used, with a supplementary, although minor, component of other taxa.

Discussion

The charcoal evidence from Nansledan, albeit limited in scope, is consistent with that from other sites in Cornwall. In particular, samples from work at the Newquay Strategic Corridor site showed very similar results for a series of Middle Iron Age and Late Iron Age – early Romano-British settlement features; in which oak formed the main taxon, with hazel, blackthorn and hawthorn group as the main supplementary sources (Challinor, forthcoming).

Discussion

Paul Rainbird

The excavation at Nansledan revealed later prehistoric activity situated within part of a larger field system which was probably established at the beginning of the Iron Age, although Middle Bronze Age pottery found in the primary fills may indicate that it had antecedents of that date. *Ditched* field systems of Middle Bronze Age date are frequent in other parts of southern England (Yates 2007) but rare so far in Cornwall, although walled field systems probably of this date are known in West Penwith (Herring *et al* 2016) and in Devon on Dartmoor (Fleming 2008).

Residual Late Neolithic and Early Bronze Age flints were recovered but none of the excavated features can be positively attributed to these periods.

The main phases of prehistoric activity have been broadly divided into Earliest and Later Iron Age on the basis of pottery types. The possibility of radiocarbon dates was discussed with English Heritage's science advisor and the Cornwall Council planning archaeologist but dismissed due to the consideration at that time that the chronological definition of the two key Iron Age phases was unlikely to be enhanced, due to the potential problems of calibration of radiocarbon dates for the Iron Age period.

Earliest Iron Age

Dating to the Earliest Iron Age, eighth to seventh centuries BC, is small enclosure [1019]/[1043]. The paucity of evidence for contemporary activity within the enclosure argues against an interpretation that this is a domestic settlement. The fact that the majority of finds were derived from the terminals, may indicate that these were deliberately placed deposits. Enclosure ditch terminals have long been recognised as places where special deposits may be placed, perhaps marking the significance of crossing the threshold from mundane external space to internal sacred space (for example, Hill 1996). Pottery was particularly associated with the west terminals, with a large proportion of the Earliest Iron Age pottery being deliberately deposited at this entrance to the enclosure. In the east terminals two pieces of worked flint were found. The ancient worked flints included a Later Neolithic transverse arrowhead, a distinctive piece, which may have been deliberately curated as a special item; this is perhaps an example of referencing the past in the prehistoric past (Bradley 2002).

Sites of this period are not well-known in Cornwall and finding a parallel for this enclosure has been difficult. Its shape in plan, causeways in the east and west and little space for an internal bank is suggestive of a small henge, or hengiform enclosure, with external banks and causeways aligned with the solstices (as at Stonehenge). Against this identification is that a site of this type would be expected to date to the Late Neolithic period or Early Bronze Age in southern Britain (Wainwright 1969). Indeed, in Cornwall, such monuments are generally rare and even those identified as upstanding earthworks have not been formally dated (Jones and Quinnell 2011). Notwithstanding the character of the enclosure matching somewhat that known from earlier

periods, the dating evidence points to an Earliest Iron Age date. The mismatch between earthwork form and date has been observed elsewhere in Cornwall, leading to Andy Jones (2010) coining the term 'misplaced monument'.

Jones (2010) has identified a series of Cornish sites, all like Nansledan of first millennium BC date and described as enclosures, which are more similar to much older ceremonial monument forms. These enclosures are at Hay Close, St Newlyn East, Sir James Smith's School at Camelford and Tremough, Penryn. The St Newlyn East enclosure had a diameter of around 60m, with a V-shaped ditch nearly 2m deep and an external bank which was up to 4m wide (Jones 2014). At Camelford was a penannular enclosure 20m in diameter and defined by a ditch, which was up to 1m deep, with an entrance facing east. The fills of the ditch indicated that the bank had been external although this had not survived. No evidence for domestic settlement activity was found from within the enclosure with the only feature being a single central pit, which had been capped by two large holed slates (Jones and Taylor 2015). Nearby, to the north of the first enclosure, a second enclosure, comprising three concentric ditches up to 15m in diameter and all less than 1m deep, was uncovered. This too contained Iron Age pottery and no evidence for domestic activity, although the interior contained undated tree bowls. The enclosure at Tremough comprised a series of three concentric ditches and a gully (Jones *et al* 2015, 48–51). At least one of the ditches appears to have had a stone-revetted bank on its outer, eastern face. Late Iron Age or Romano-British pottery was recovered from the upper fills of the ditch, but the primary deposits were not reached. The overall diameter of the enclosure is estimated to be in the region of 50m and the innermost ditch would have enclosed a space with a diameter of approximately 22m.

In considering the influences that may have led to the emergence of these enclosures Jones (2010) notes, given the general paucity in Cornwall of Late Neolithic – Early Bronze Age henge and hengiform sites, that these were unlikely to be the antecedents. He also finds no similar Iron Age examples elsewhere in southern Britain, although there may be some parallels with a number of circular enclosures in eastern England (Jones *et al* 2015, 208–10). In the absence of evidence for local influences he argues convincingly that, rather than independent invention, diffusion of ideas through contacts with Ireland may be the source for these ceremonial sites in Iron Age Cornwall (Jones 2010, 222–4). The Irish sites of this date comprise a range of embanked enclosures which include circle-henges and ring barrows (for example, O'Brien 2004). Of probable Irish Late Bronze Age date (that is, first half of the first millennium BC) is the earthen ring barrow at Coumgagh in Co Kerry; this compares well with enclosure [1019]/[1043] in having an internal diameter of approximately 12m and opposing causeways facing east and west (O'Brien 2004, fig 116). Enclosure [1019]/[1043] fits well with the sites described by Jones and should perhaps be added to the list of Cornish ceremonial enclosures of Iron Age date.

Later Iron Age

The collection of gullies, postholes and pits within enclosure [1019]/[1043] post-dates it and belongs to the Later Iron Age, dated by the pottery to a period within the third to first centuries BC. Nowakowski and Quinnell (2011a, 352, fig 17.1) have noted an expansion of settlement in the broader Newquay area during the Middle Iron Age, indicating a densely occupied landscape. Ten sites within a radius of 15 km of Nansledan are dated to this period (Quinnell 2011a). The sites represented cover the full range of Iron Age site-types in mid north Cornwall, with the cliff castles at Penhale (Perranzabuloe) and Trevelgue Head (St Columb Major), hillforts at Castle-an-Dinas (St Columb Major) and St Mawgan-in-Pydar, rounds at Penhale (St Enoder) and Trevisker (St Eval), a settlement at Atlantic Road (Newquay) and middens at Kelsey Head (Cubert), Constantine Bay (St Merryn) and Constantine Island (St Merryn). There is less evidence for the Late Iron Age in the same area, the period of Cordoned Ware pottery, and it may be the case that the majority of the large sites, such as the hillforts and some cliff castles, were being abandoned at this time (Nowakowski and Quinnell 2011a, 354–5). However, the evidence of rounds and field systems in the wider Newquay area identified from air photographs suggests that it was similarly densely occupied in the Late Iron Age – Romano-British period; its classification in Cornwall's Historic Landscape Characterisation as Anciently Enclosed Land implies a long history of settlement and agricultural occupation (Herring 1998, 77; Cornwall Council 2018).

Despite a hiatus in the use of enclosure [1019]/[1043], gully [1021] appears to respect ditch [1043], indicating that the enclosure was visible as an earthwork when the gully was dug in the Later Iron Age. The closeness of gully [1021] to the enclosure ditches further supports the argument that the original enclosure was not furnished with internal banks. The role of gully [1021] is difficult to interpret. It certainly appears to have been associated with the hollow, postholes and pits within earlier enclosure [1019]/[1043], as the majority of these features cluster within the arc of the gully. However, the plan revealed does not easily match that of a roundhouse of the period, even though several individual components making up a roundhouse are present; that is, a ring gully, a post-ring, 'occupation' hollow, hearth, porch and easterly facing entrance. All the features that are required to interpret the complex as a roundhouse are present, but their distribution in relation to one another does not allow for a coherent and satisfactory plan to emerge. Similarly, adjacent ring gully [1022] appears at first sight to mark the position of a roundhouse having a penannular ditch with an entrance facing south east, which is typical of Iron Age roundhouses in southern Britain (Oswald 1997; also Sharples 2010, chapter 4), but in this case there is a lack of the other typical components, as listed above, except for a hollow which in this case is filled by a layer of stones. Other structures at Nansledan are equally perplexing.

The possible rectangular post-built building is highly speculative. It is comparable to a rectangular building tentatively identified at Trenowah, St Austell, and dated to the Late Bronze Age (Johns 2008). This was defined by six shallow postholes but was almost exactly half the size of that proposed for Nansledan, measuring 5m long by 3.4m wide. With no associated artefacts it was concluded that this was a 'small building erected for some rustic purpose' (*ibid*, 44). Two Late Bronze Age rectangular structures were also found within enclosure 1 at Tremough with another possible pair of similar or Early Iron Age date at Higher Besore, Threemilestone (Jones *et al* 2015, 40–8, 216–8; Gossip, forthcoming); no specific function has been identified for any of these. One possibility to consider here is that at Nansledan we are not dealing with a single structure, but rather a four-poster at the south end, or potentially a series of two-posters, which have been identified elsewhere on Iron Age sites and interpreted as providing posts for looms, drying racks or corn racks, among many other potential uses (Ellison and Drewett 1971).

The four-post structure, although a common form elsewhere in southern Britain, is only the second reported from Cornwall. The other pre-dated the round at Penhale (Nowakowski and Johns 2015). Four-post structures, along with six-posters, are typically regarded as raised floor structures, as no ground floor levels or internal features are associated with them, and normally interpreted as granaries, allowing air to circulate below and providing security from rodents (for example, Cunliffe 2009; Sharples 2010), although other less domestic uses have been proposed (below and see discussion in Chadwick 2012).

If Later Iron Age activity at Nansledan represents a domestic settlement site, it is relatively uncommon in being unenclosed in a lowland situation, in having a possible rectangular building and, indeed, a four-poster is unusual in Cornwall. Unenclosed settlement is much less easily identifiable than enclosed settlements and the distribution is poorly understood (Young 2012, 114–5), but they may actually have been reasonably widespread. Unenclosed settlements in lowland Cornwall were not well attested until the excavations in 2004–5 at Threemilestone (Kenwyn), west of Truro, where a series of roundhouses within a pattern of prehistoric fields has been found in proximity to enclosed settlements (Nowakowski 2011). There is no known enclosed settlement in similarly close proximity to Nansledan, but there are fields.

The structures are positioned within an organised landscape of fields which may have been first established in the Middle Bronze Age. This pattern of fields is one that is becoming recognised in southern Britain, beginning in the Middle Bronze Age, although local variation is apparent in date of establishment; at Trenowah, St Austell, a pattern of fields was established in the earlier Iron Age (Johns 2008), at Penhale, St Enoder, the field boundaries were established at a similar date prior to the construction of the round (Nowakowski and Johns 2015) and at Scarcewater (St Stephen-in-Brannel), although there may be hints of earlier field boundaries, the field pattern which survived into the medieval period was established during the Romano-British period (Jones and Taylor 2010). The palaeoenvironmental analysis showed that domestic crops in the form of spelt and emmer wheat were being cultivated.

A small amount of iron slag was found scattered in features across the site. Although a small amount of possible furnace lining came from a single feature there was no *in situ* evidence for iron working actually taking place on the site and the slag may have been brought in from elsewhere; an iron lode was perhaps being exploited at Trevelgue Head, Newquay, and smelting was taking place there beginning in the Early Iron Age – sixth to fourth centuries BC (Nowakowski and Quinnell 2011b).

So, to summarise, although all of the individual components to interpret the site as a domestic settlement of Later Iron Age date are present, there is enough that does not quite sit well with such an interpretation. If the site is not domestic, then we may consider the possibility that it was the location for specialised activity.

If the interpretation of earlier enclosure [1019]/[1043] as a ceremonial site is accepted then it may be regarded as apposite that the fading remains of its earthworks were sought out for later activity which was non-domestic in nature. The details of this activity are not obvious, but they involved the regular use of a hearth within a hollow perhaps covered by a roof supported by a post-ring and approached by a potentially substantial and elaborate 'porch' or formal entrance. The finds need not be interpreted as anything other than domestic, but elsewhere querns have been regarded as having ritual significance (Hill 1995; also Brück 2006 and Watts 2014) and broken ones may have been treated 'in a manner akin to the sacrifice of humans and animals' (Sharples 2010, 301). Pit [1341] contained a broken quern stone and muller and sunken area [1036] was filled by (1241) which contained 52 sherds of SWD ware and 22 sherds of undiagnostic pottery of Later Iron Age date, together with four small pieces of iron slag, a stone bead, a rubbing stone, a perforated slate weight and a piece of worked slate, a distinctive collection of finds that may indicate that this fill was a deliberate closing deposit. This is a phenomenon well known in the Bronze Age but is now being identified locally and further afield for Iron Age structures (Jones and Kirkham, forthcoming). Also unusual is the presence of imported Roman amphora, although the sherds do not appear to have been given special treatment, with their use to supplement hearth stones, or otherwise as ditch fill. However, it may suggest consumption on or close to the site of what must have been an 'exotic' imported beverage with associations with wealth and prestige, most probably consumed only on specific social or ceremonial occasions.

That the site as a whole was the focus of non-domestic activities in the Later Iron Age is perhaps best supported by a consideration of ring gully [1022]. This, with its central layer of stones, compares well with a further ceremonial site listed by Jones (2010), which is not in this case an enclosure. Jones describes the site of a penannular ring ditch, with an east-facing entrance and a central, low, flat cairn at Scarcewater. The cairn consisted of a low spread or platform of stony material, which was in turn surrounded by a ring ditch nearly 10m in diameter. The ring ditch was shallow but contained a significant quantity of Iron Age pottery and was radiocarbon dated to the Middle Iron Age. Early thoughts that this was the site of a roundhouse were dismissed by the excavators, as there was no evidence for a hearth, a paucity of finds and the floor would have been stony and 'uncomfortable to sit or kneel down on' (Jones and Taylor 2010, 84). As with the larger enclosures discussed above, Jones (2010) concluded that the best comparisons for this site could be found in Ireland where ring-barrow sites consisting of annular or penannular ring-ditches with external banks and internal pits, and often containing cremation burials, date to the first millennium BC.

No human remains were recovered from the Scarcewater cairn or the stone layer within [1022], but bone did not survive well at either site. In the Nansledan context the presence of one or more four-post structures may be relevant, certainly in a ceremonial context, as through ethnographic analogy it has been suggested that they could represent platforms for excarnation, where bodies were left until the flesh was removed by natural means and the dry bones collected (Ellison and Drewett 1971). This interpretation has not found general acceptance, due to the lack of small or gnawed bones surviving on sites with these structures (Sharples 2010, 271–2). A possibility is that four-posters could hold a platform for a watch tower, although a bench for a shrine or a ritual tower could equally be supported. The towers seen by Captain Cook in the temples of the Hawaiian Islands provide an ethnographic example here; these were oracle towers and were dressed with white cloth during a period of formalised ritual activity (Valeri 1985). Could comparable towers

have been a feature of the specialised activities at Nansledan?

The evidence indicates that there were two main phases of activity at Nansledan in the Iron Age and these phases were probably not continuous, being separated by centuries rather than decades. The character of the structures and activities carried out at the site has not been established, and the possibility of a specialised ceremonial function has been discussed. It is the case, however, that whatever was going on here in the Iron Age, it was being conducted in an agricultural landscape of fields.

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The archive and finds are temporarily stored at the Exeter office of AC archaeology under the project code ACD1143. In the longer term it is hoped that they will be transferred to a suitable repository as advised by the Royal Cornwall Museum.

The corresponding author is Dr Paul Rainbird.

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Cornish Archaeology 56, 2017, 115–151

Archaeological investigations of Romano-British settlement at Parkengear, Probus, Cornwall

PAUL RAINBIRD, BEN PEARS, FIONA PINK AND JOHN VALENTIN

with contributions from WENDY J CARRUTHERS, DANA CHALLINOR, NAOMI PAYNE, HENRIETTA QUINNELL, ROGER TAYLOR, SUSAN WATTS and CRESSIDA WHITTON

Archaeological works on land at Parkengear to the east of Tregony Road, Probus, established activity of predominantly Romano-British date, including two enclosures of the type known locally as rounds. One round, Parkengear round, survived as a slight earthwork and was tested in three evaluation trenches, revealing inner and outer enclosure ditches and features internal to the enclosure. Five open area excavations were undertaken external to the round. Partly encroaching on the southern edge of the site was the large curvilinear ditch of a probable second round. Both rounds appear to date to the Romano-British period, and there was also evidence for contemporary activity outside the rounds. To the west of Parkengear round excavation revealed a ring gully with internal features representing at least two phases of roundhouse, probably pre-dating the round, alongside numerous pits in all excavation areas; this Late Iron Age or early Roman-period settlement appears to have consisted of scattered roundhouses and small enclosures. Finds were present in most areas, with types of pottery in use in the Late Iron Age and Romano-British periods, as well as a Roman copper-alloy bell-shaped stud; a fragment of Roman-period tile, from the ditch of the second round, is one of only a few examples known from Cornwall. A single pit containing oat grains was dated to the early medieval period, indicating some continuing use of the site adjacent to the medieval village of Probus. The phasing of the site is supported by four radiocarbon dates. Finds of a Beaker pottery vessel and other ceramics indicate some limited activity on the site in the Early and Late Bronze Age periods.

Archaeological works on land at Parkengear to the east of Tregony Road, Probus (centred on SW 903 473), were carried out by AC archaeology between October 2012 and April 2016 prior to the residential development of parts of the site. The site occupies an area of approximately 5 ha and comprised a single irregularly shaped field of agricultural land located to the south east of the village of Probus (Fig 1). It is situated on the gentle slope of a hill, the crest of which lies in the north-west portion of the site, from which the ground slopes down to the south and east from approximately 90m to 80m above Ordnance Datum. The underlying solid geology comprises interbedded sandstone and argillaceous rocks of the Portscatho Formation (British Geological Survey 2017).

The development site is immediately adjacent to Parkengear Farm, first recorded in 1689 (Cornwall and Scilly Historic Environment Record (HER) MCO 8402); the place-name contains the Cornish place-name elements *park* and *ker* and means 'field of the fort or round' (Padel 1985, 54). The round

which gives the farm its name lies just 70m west of it and survives as a low earthwork. This was further established by an archaeological desk-based assessment (Pugh 2012) and a geophysical survey by Stratascan (Smalley 2012); the round was examined in the first evaluation phase and then set aside as a green space within the development. The earliest phases of archaeological works also took in part of a small field to the south and a large field to the north east, but these were later excluded from the development phase reported here.

Results of the archaeological works

The trial trench evaluation comprised 34 trenches excavated in two phases and was followed by five targeted open area excavations (Fig 2). These were stripped of ploughsoil and subsoil to the top of archaeological deposits or the natural subsoil using a mechanical excavator fitted with a toothless grading bucket, under direct supervision of the site archaeologist. The overlying soil sequence varied very little and generally the ploughsoil was 0.24–0.26m deep, above 0.15–0.2m of subsoil. A phased summary of the main findings of the works

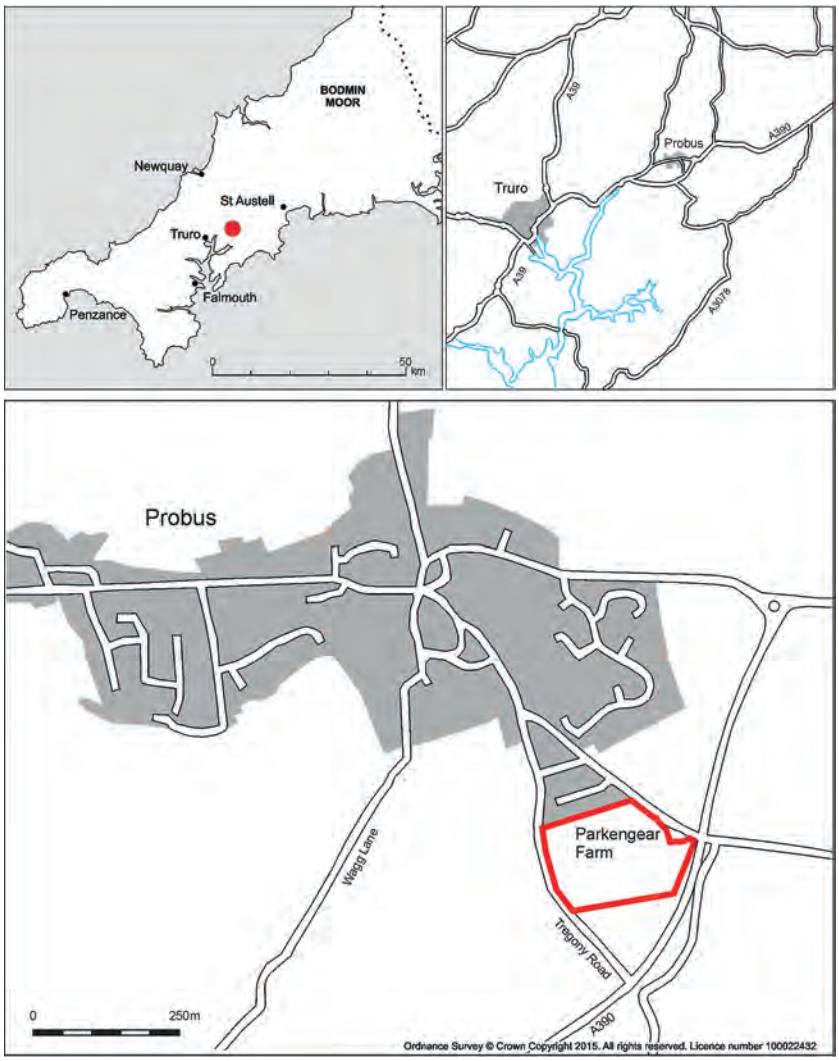

Fig 1 Location of site.

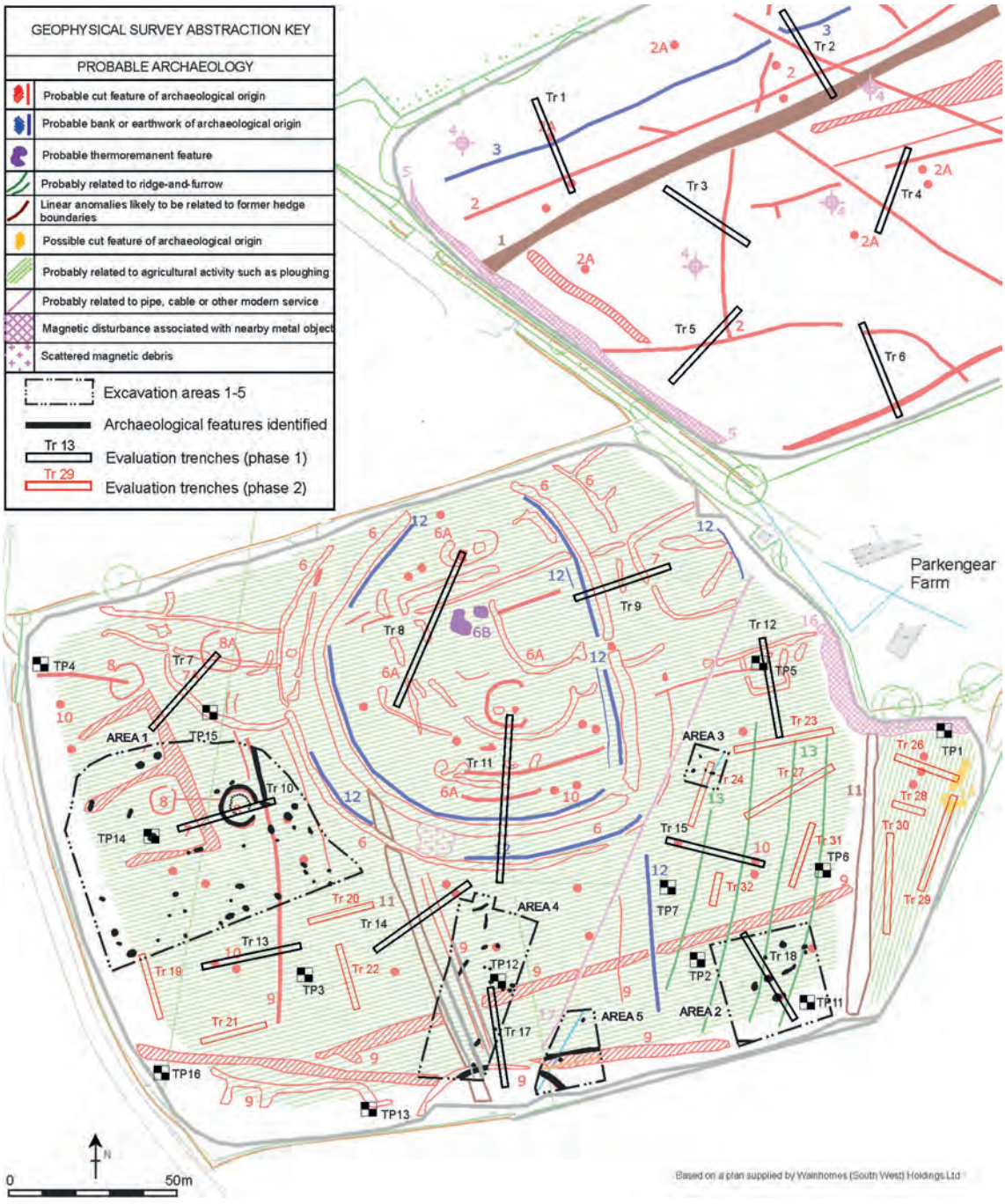

Fig 2 Location of evaluation trenches and excavation areas in relation to the results of the geophysical survey.

is presented below, followed by the results of finds and environmental analyses and concludes with a discussion of the significance of the site in its local and regional contexts. Detailed feature and context descriptions may be found elsewhere (Pink and Valentin 2013; Pears and Rainbird 2016). The conventions used in this report present square brackets for cut features and round brackets for deposits and layers. All radiocarbon dates are at the 95.4 per cent confidence level unless otherwise stated.

Bronze Age

Two pits located near the south-west corner of excavation area 1 were the earliest dated features.

Pit [5022] measured 1.75m in diameter by 0.32m deep (Fig 3a; Fig 9). It contained 80 sherds of pottery belonging to a single Beaker vessel of Early Bronze Age date (**P1**; Fig 20).

Pit [5006] was 0.65m in diameter by 0.27m deep (Fig 3b). It contained six sherds of pottery of Late Bronze Age date (**P2**, **P3**; Fig 21). A fragment of broom/gorse charcoal was dated to 915–807 cal BC (SUERC-72371).

Late Iron Age / earlier Romano-British

Ring gully [5003]

Ring gully [5003] was uncovered in excavation area 1 and was oval in plan measuring 10.5m by 9m (Figs 4–6). The gully itself measured 0.5–0.8m wide and 0.14–0.24m deep with a 3.2m wide opening facing south east. The gully had a variable but generally symmetrical profile, with steep edges on the south and south-western side and shallower, smoother edges on the north, west and north-east sides. The base was rounded and in places irregular. The fill was generally typical of washed-in sediment, with one patch showing evidence of burning (5080), but in the southern terminal 30 sherds of pottery dated to the Late Iron Age or Romano-British periods were sealed by a deposit of sub-rounded to sub-angular and tabular mudstone, schist, slate and granite stone fragments ranging from 50mm to 200mm in size. Elsewhere in the ring gully three sherds of pottery dated to the earlier Romano-British period and two pieces of worked stone were recovered. A radiocarbon date on alder/hazel charcoal provided a date of 170 cal BC – cal AD 16 (SUERC-72371); this is a little earlier than predicted by the ceramics and is discussed further below.

Ring gully [5003] cut posthole [5106] and pit [5081]; there were no finds in these features. In the centre of [5003] was a series of postholes, remnant wall, hearths and pits providing evidence for two phases of structure.

Phase 1 – structure 5004

The first structural phase was represented by 15 postholes with six of these – [5124], [5196], [5224], [5228], [5234] and [5270] – forming a broadly circular pattern to the west of an entranceway facing south east, matching the gap in the ring gully. These postholes varied in size from 0.52m to 0.55m in diameter and 0.05–0.55m deep.

The entranceway was defined by three large postholes. The two to the north ([5164] and [5166]) measured 0.4–0.5m in diameter by 0.55m deep (Fig 7). On the southern side, posthole [5133] measured 0.6m in diameter, but only 0.08m deep. To the west and north west of the southern posthole ([5133]) was an arc of six smaller postholes, which may have formed a screen within the entranceway to the building and these postholes – [5129], [5131], [5143], [5175], [5177], [5180] – measured 0.24–0.42m in diameter by 0.08–0.33m deep. Posthole [5143] contained stone packing and two sherds of pottery, with a further two sherds from posthole

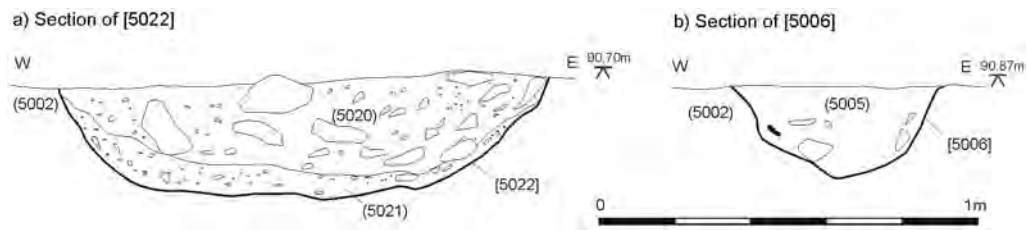

Fig 3 Sections of a) Early Bronze Age pit [5022] which contained Beaker pot P1 and b) Late Bronze Age pit [5006], charcoal from which returned a radiocarbon date of 915–807 cal BC (SUERC-72371).

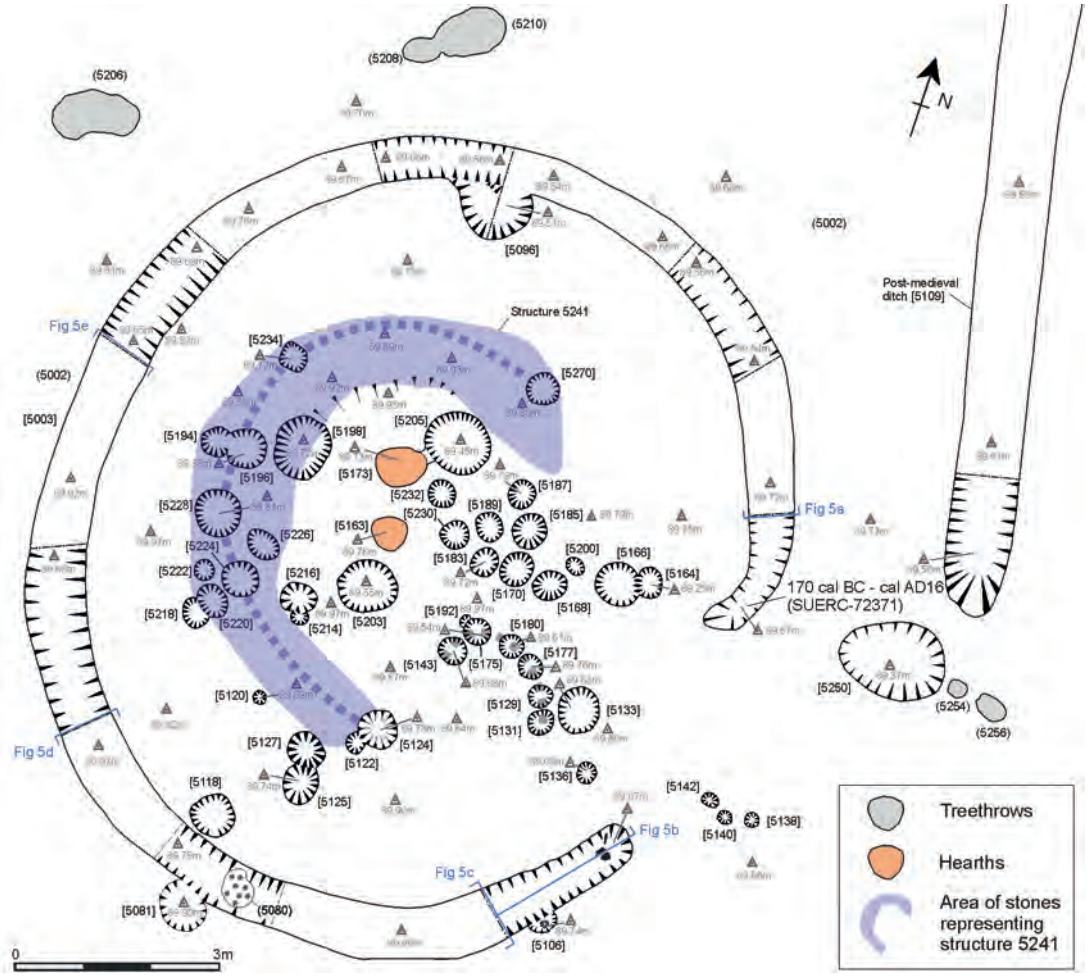

Fig 4 Plan of ring gully [5003], excavation area 1. The dashed line marks an arc of postholes possibly representing part of a structural post ring 5004.

[5129]; all of the pottery was broadly dated to the Late Iron Age or Romano-British periods.

On the northern side, to the west and south west of posthole [5166], were five postholes – [5168], [5170], [5185], [5187] and [5200] – that ranged in size from 0.38m to 0.5m in diameter by 0.1–0.2m deep and may mark the position of a structural feature within that side of the entranceway. Compared with the other postholes these generally had less steep sides. A single sherd of pottery broadly dated to the Late Iron Age or Romano-British periods was recovered from posthole [5170].

Other postholes, not forming an identifiable pattern in relation to the structure, were present within it, including [5183], [5189], [5230] and [5232] close to the entrance, which measured 0.4–0.8m in diameter and 0.08–0.27m deep. On the south-west side postholes [5214], [5216], [5218], [5220], [5222], [5224] and [5226] measured 0.3–0.64m in diameter and 0.07–0.19m deep. All of these postholes contained a single fill with no finds. To the south were a cluster of three postholes of similar size and profile – [5118], [5125] and [5127]. Posthole [5127] cut [5125] and contained six sherds of pottery broadly dated to the Late

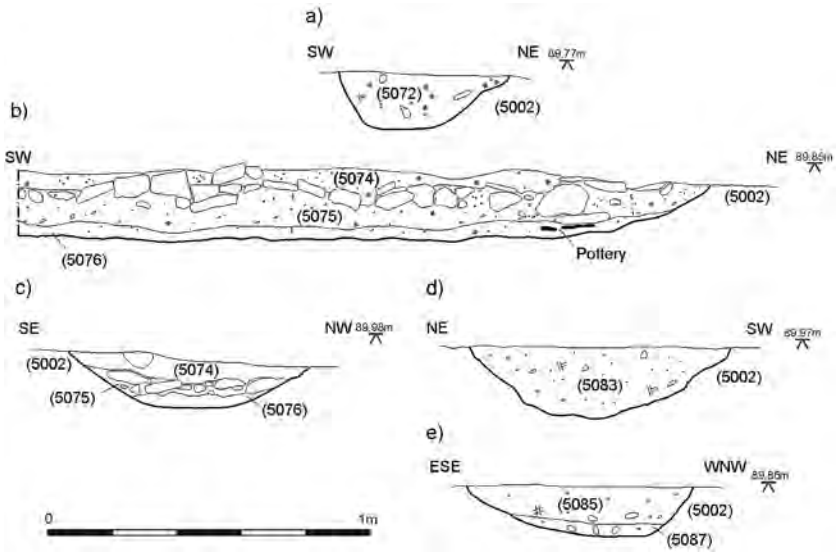

Fig 5 Sections of ring gully [5003]. Charcoal from fill (5072) returned a radiocarbon date of 170 cal BC – cal AD 16.

Fig 6 Ring gully [5003], looking north east (scales 1m and 1m). (Photograph: AC archaeology.)

Iron Age or Romano-British periods. Three small postholes [5138], [5140] and [5142] were clustered immediately adjacent to the southern terminal.

Phase 2 – structure 5241

Not long after the construction of structure 5004 there appear to have been modifications to it. An arc of large stones forming structure 5241 measured approximately 7m long by 0.4–1m wide and 0.08–0.15m high (Fig 4; Fig 8). The stones extended inside of the north-west edge of ring gully [5003] and were positioned on the opposite side to the entrance. No finds came from the remnant masonry structure, although it clearly overlay a number of postholes forming part of the structure 5004.

Internal hearths and pits – [5163], [5173], [5203], [5205], [5198]

Several internal features were present although it was not possible to define to which phase of structure they belonged. Hearth [5163] measured 0.6m by 0.5m and 0.1–0.12m deep, with steep sides with some evidence of burning and a flat base. It had a single fill (5162) which contained a

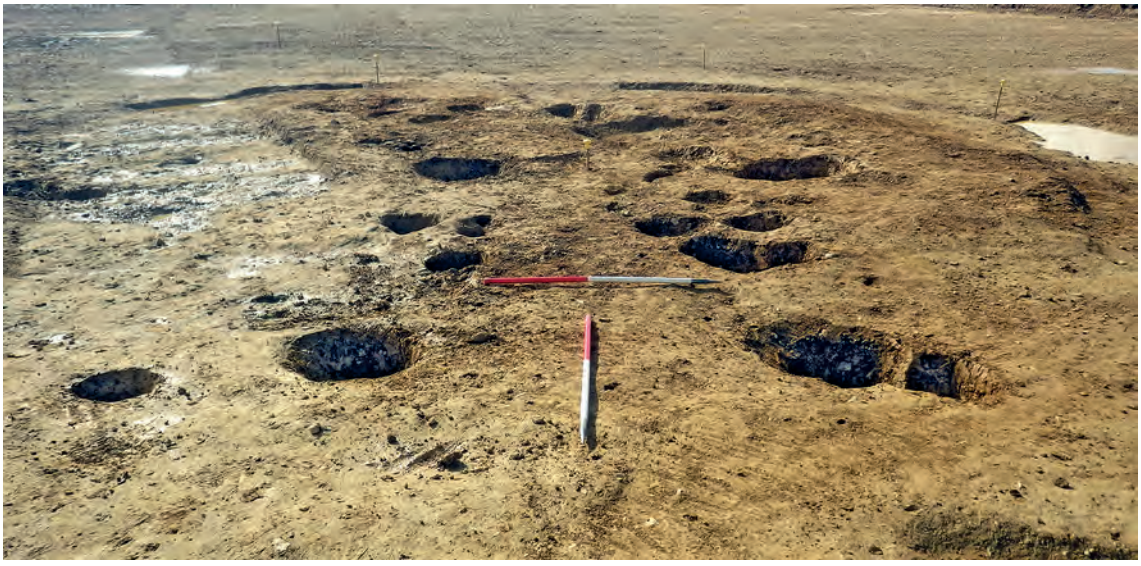

Fig 7 Structure 5004 within ring gully [5003], looking north east into the structure through its entrance (scales 1m and 1m). (Photograph: AC archaeology.)

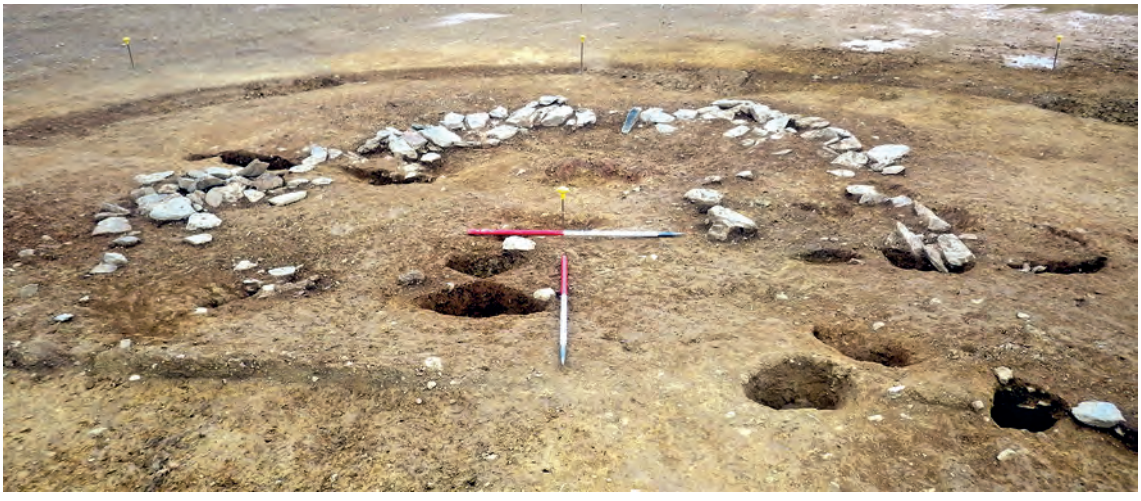

Fig 8 Structure 5241 within ring gully [5003], looking north-north-west (scales 1m and 1m). (Photograph: AC archaeology.)

single sherd of pottery. Hearth [5173] was slightly larger, measuring 0.7m in diameter by 0.1m deep with a similar profile to [5163], and it had evidence for *in situ* burning. Each of the hearths had a large neighbouring pit which may be associated with them. Pit [5203] was located to the south of [5163] and measured 0.53m in diameter by 0.3m deep with steep sides down to a flattish base. The pit had two fills with the upper fill containing three sherds of pottery. To the east of hearth [5173] large pit [5205] measured 0.9m in diameter by 0.36m deep with near vertical sides and a flat base. All of the pottery from these features was broadly dated to the Late Iron Age or Romano-British periods.

Enclosure north west of the round

Part of a probable enclosure interpreted from the results of the geophysical survey was located partially overlapping with the outer ditch of the round on its north-west side (Fig 2). It measured 40m by 60m but is likely to continue beyond the limit of the site to the north. Ditch [704], excavated in evaluation trench 7, formed part of its south-west curving corner and measured 2.3m wide by 0.74m deep. It had three fills with secondary fill (706) containing a single sherd of pottery broadly dated to the Late Iron Age or Romano-British periods and a whetstone. Within the enclosure a probable ring gully identified in the geophysical survey was tested and found to measure 0.49m wide by 0.09m deep with moderately sloping sides and a concave base. No finds were recovered.

Enclosure east of the round

A small square enclosure measuring 12m by 12m was located to the east of the round (Fig 2). It was investigated in evaluation trench 12. The north ditch [1207] measured 0.78m wide by 0.43m deep while the unexcavated south ditch (1209) was 1.2m wide. No finds came from either of these features. Within the enclosure to the north of and parallel to (1209), ditch [1204], which was not seen in the results of the geophysical survey, was uncovered. It measured 0.78m wide by 0.43m deep. It had two fills, both of which contained sherds of pottery broadly dated to the Late Iron Age or Romano-British periods. The function of this ditch was not established.

Enclosure north east of the round

A possible square enclosure situated to the north east of the round measured 30m by 30m but may extend beyond the limit of the site to the east (Fig 2). It was investigated in evaluation trench 9 (Fig 10a) where the northern terminal ditch [906] for a west facing entrance measured 2.45m wide by 0.94 deep with steep sides and rounded base. It contained three fills (903–5) with the upper two deposits deliberately backfilled with large blocks of slate. Upper fill (903) contained two sherds of coarse gabbroic pottery that is present but rare in the earlier Romano-British period, becoming more common in the later Romano-British centuries. To the west of [906] was a further ditch terminal [908], which the interpreted results of the geophysical survey showed was the southern end of a short length of north to south aligned ditch. It measured 1.14m wide by 0.36m deep and had been cut on its eastern edge by curvilinear ditch [911] which measured 0.74m wide by 0.27m deep with steep sides and a flat base. The probable return of [911] was exposed near the centre of the trench as ditch [925] which had been cut by the inner ditch of the round [921]. There were no finds but taken together [911] and [925] appear to form a roundhouse ring gully with an approximate diameter of 8m. This roundhouse pre-dates the construction of the round.

Later Romano-British

Features in excavation area 1 external to ring gully [5003] (Fig 9)

The majority of features external to ring gully [5003] within excavation area 1 were undated, and many were tree throw hollows of natural origin, which contained no finds; however, there was Romano-British pottery from a number of features, with a potential date range from the second to the fifth centuries AD. Pit [5008], in the south-west corner, contained nine sherds of pottery. To the south west of ring gully [5003] was a hearth [5090] and intercutting pits with no associated structure. The hearth measured 0.76m by 0.63m and 0.12m deep with steep sides and rounded to flat base. Its fill (5091) contained 12 sherds of pottery (including sherds from a large storage vessel and a cooking pot), a worked flint and a perforated slate. To its east, hearth [5090] was cut by a series of intercutting pits. In this group a large pit [5099] was the primary feature. It measured 1m long by 0.85m wide and 0.21m deep with steep sides and a flattish, irregular base. Its secondary fill (5100) contained two sherds of pottery. Two pits, [5101] and [5092], cut this pit, with [5092] also cutting hearth [5090]. There were no finds from these later pits. A third pit, [5111], was located to the west of hearth [5090]. This was round and measured 0.52m in diameter by 0.15m deep, with moderately steep to concave sides down to a flattish to concave base. The pit contained several fills suggesting episodes of burning, but there were no finds. To the south west, larger pit [5159] contained 14 sherds of pottery including **P5** (Fig 22).

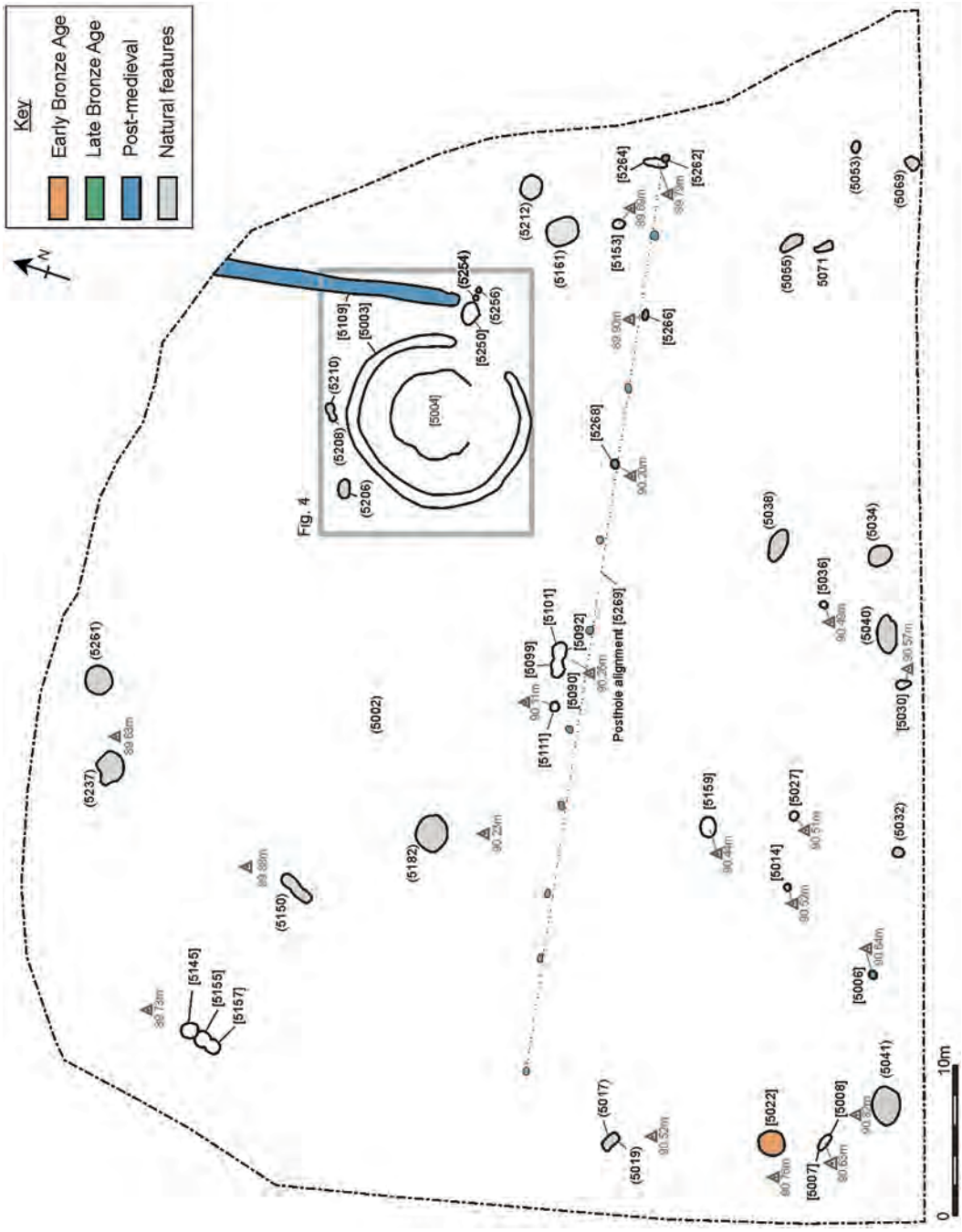

Fig 9 Overall plan of excavation area 1. In the south-west corner are pit [5022], which contained Beaker pot, and Late Bronze Age pit [5006].

Parkengear round

This substantial enclosure is roughly D-shaped in plan and occupies an area of approximately 1. 1 ha, with the internal occupation area covering some 0.5 ha. The evaluation did not identify an entrance to the enclosure, although the interpreted results of geophysical survey show possible gaps in the east side and south-east corner. The round survived as a very low earthwork. On excavation some remnant rampart material up to 10m wide was revealed along with substantial inner and outer ditches.

INNER DITCH

The inner ditch was investigated in trench 9 and trench 11, as [921] and [1103] respectively. In trench 9 it measured over 5m wide and 2m deep, whereas in trench 11 it was 5.5m wide and at least 1.4m deep, although it was not bottomed in this trench (Figs 10–12). The ditch had very steep sides. The fills largely had the appearance of deliberate backfilling using material from the inner bank, with only the lowest fills being naturally accumulated through weathering of the ditch sides. A near complete, but broken, upper stone of a rotary quern (**S1**; Fig 23) and a perforated slate object (**S3**; Fig 24) were found within (919), one of the upper fills of [921].

In trench 9 the denuded rampart (913–4) survived measuring approximately 4.35m wide and over 0.3m high on the inner edge of the ditch; it contained three sherds of pottery broadly dated to the Late Iron Age or Romano-British periods. This was overlain by a midden-like deposit (912) which contained two sherds of pottery, one of which probably dated from the second century AD. In trench 11 the rampart survived as a slight earthwork on the inner (northern) edge of the ditch with stone structure 1140 formed of three courses of large slate stone abutting its northern (inside) edge. A possibility that this formed a rear revetment to the rampart is unlikely given that the base of the bank would have measured 10m wide, which is too wide for a round of this type.

OUTER DITCH

The outer ditch, [1111] in trench 11, was 2.4m wide and 1.6m deep (Figs 10b, 11b and 13) and contained evidence for a denuded rampart (1115) on its inner (northern) edge, which was 1.8m wide by only 0.06m high. The ditch had moderately steep sides which become almost vertical towards a narrow concave base. It contained three fills with the basal fill (1112) comprising a natural accumulation of material, but the upper two fills (1113) and (1114) most probably represent backfilling using bank material. On the outer edge of the ditch was much shallower ditch [1116] on the same alignment. This measured 1.1m wide by 0.22m deep and contained a single fill (1117), which appears to have accumulated naturally. No finds were recovered from either of these ditches or the bank. There was no evidence for an outer ditch within trench 9, confirming the results of the geophysical survey, which indicated that there was only a single ditch on the east side of the round.

INTERIOR

Trial trenches 8 and 11 were excavated within the interior of the round and are described below.

Evaluation trench 8 (Fig 14)

Linear features, pits and postholes were exposed within the trench and a sample of these features was excavated. These are described from south west to north east.

Pit [829] was partially exposed, measured 0.21m deep. It had a central fill of stones (832) with the remainder of the excavated pit containing two similar fills, a very charcoal rich fill (830) overlaying heat affected natural subsoil and a less charcoal rich fill (831). [829] was cut by [833] a steep-sided pit or gully with a flat base which measured 0.45m wide by 0.27m and had an uncertain relationship with unexcavated probable pit (835). Adjacent to this group was posthole [804] which measured 0.5m long by 0.42m wide by 0.07m deep. The only find from this group was one sherd of pottery broadly dated to the Late Iron Age or Romano-British periods from fill (831) of pit [829], but a similarity in fills indicate that these features are likely to be associated.

Shallow linear hollow [811] crossed the trench in an approximate north west to south east alignment and measured 2.06m wide. It was filled by (845), a 0.19m high pile of deliberately laid large fragments of mudstones in a mid-greyish-brown sandy silt matrix which contained three sherds of pottery, two of which were of probable later Romano-British date. This feature was not identified by the geophysical survey, so its extent is unknown, making an interpretation of its function difficult.

Towards the centre of the trench were a concentration of small irregularly shaped pits and

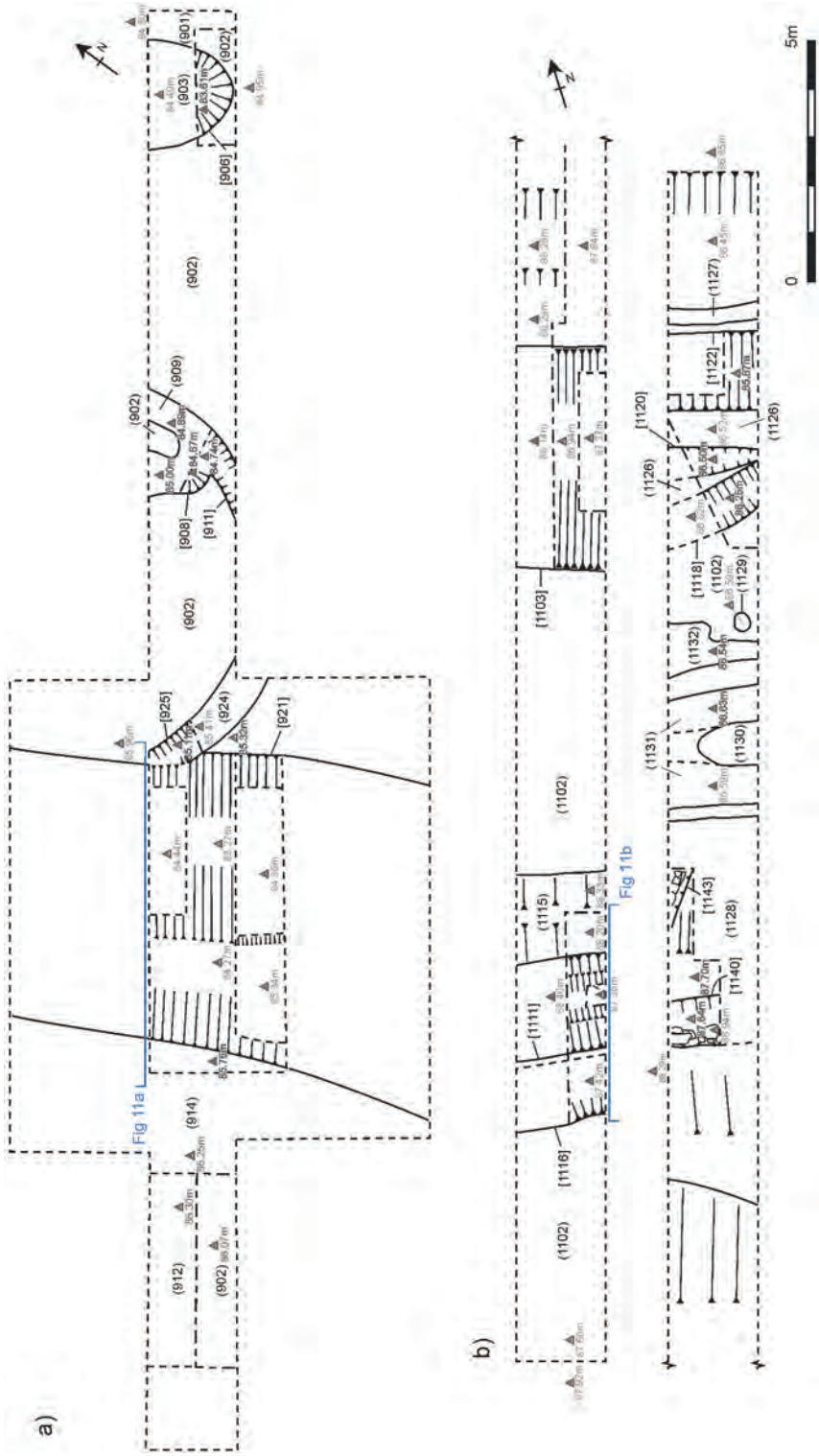

Fig 10 Parkengear round. a) plan of evaluation trench 9; b) plan of evaluation trench 11. Trench 9 recorded the large ditch marking the east side of the round, and external features including an earlier ring gully. Trench 11, across the south of the round, identified outer and inner ditches, traces of an inner rampart, and a complex of internal features.

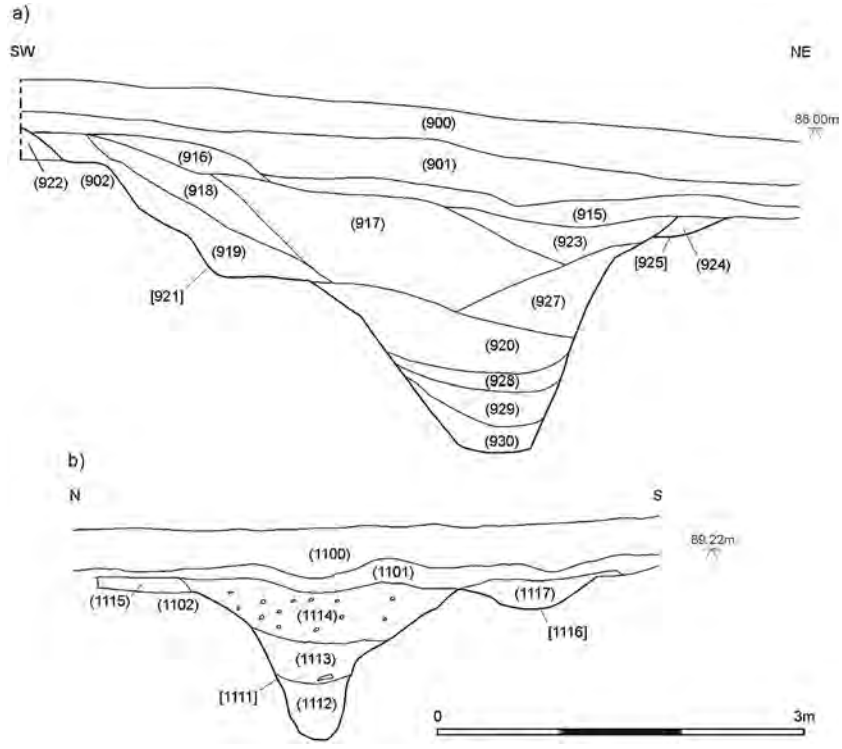

Fig 11 Parkengear round. Sections of ditches: a) inner ditch [921]; b) outer ditch [1111].

Fig 12 Parkengear round, inner ditch [1103] in trench 11, looking north (scale 1m). The position of the inner rampart behind the ditch can be seen as a slight rise in the section. (Photograph: AC archaeology.)

small rectilinear features – [807], (812), (813), (814), (815), [816], (817), [818], [819], (820), (821), (822) and (823). [816] was partially exposed within the trench and measured 0.41m wide by 0.18m deep. The nature of the fill (844) and shape in plan was very similar to nearby unexcavated

Fig 13 Parkengear round, outer ditch [1111] in trench 11, looking north (scale 1m). (Photograph: AC archaeology.)

features (814), (815) and (817) indicating that they may all be related. Small ditch [818] terminated within the trench but continued to the north west; it measured 0.31m wide by 0.18m deep with fairly steep sides and a slightly rounded irregular base. It cut possible pit [819] which measured 1.3m long by 0.64m wide by 0.19m deep and contained a single fill composed of redeposited natural clay. The nature of the fill and the irregular shape of the feature indicated that it is most probably a naturally infilled hollow. Small pit or posthole [807] was 0.65m long by 0.2m wide and 0.06m deep and contained two fills (805) and (806). Secondary fill (805) contained a single iron nail which was the only find recovered from this group of features.

Linear hollow [847] was poorly defined but measured approximately 2m wide by 0.16m deep with moderately steep sides and a flat base. It was in the position of an east to west aligned linear anomaly identified on the geophysical survey but was orientated north west to south east as exposed in the trench. At the base of the feature was posthole [849] which was oval in plan and measured 0.55m long by 0.4m wide and 0.12m deep with steep sides and a flat base. Its single fill (848) contained fragments of burnt clay, which were the only finds from these features. The linear feature can be traced for a distance of approximately 50m on the results of the geophysical survey stopping just short of the inner ditch of the round. It is interpreted as the truncated remains of a boundary ditch of unknown date; the chronological relationship with the posthole was not established.

Possible ditch [827] terminated in the trench where it was cut by very shallow sub-circular pit or posthole [828]. The ditch had maximum dimensions of 0.72m wide by 0.19m deep with shallow irregular sides and an undulating base. To the north east of ditch [827] was very shallow ditch [824] which may represent a sub-circular feature identified on the geophysical survey. At the far north-east end of the trench a large irregular hollow [826] filled with four possibly dump fills (838–841) of a very dark clayey silt and large mudstone blocks was difficult to interpret, as, along with two neighbouring possible postholes (825) and [810], no finds were present.

Evaluation trench 11 (Fig 10b)

This trench was aligned approximately north–south and was 50m long. It was positioned to target the two banks and ditches forming the round (these are discussed above), as well as an area internal to the round. A large number of features were located within the area of the round as predicted by the results of the geophysical survey; these are described beginning to the north of the inner bank of the round.

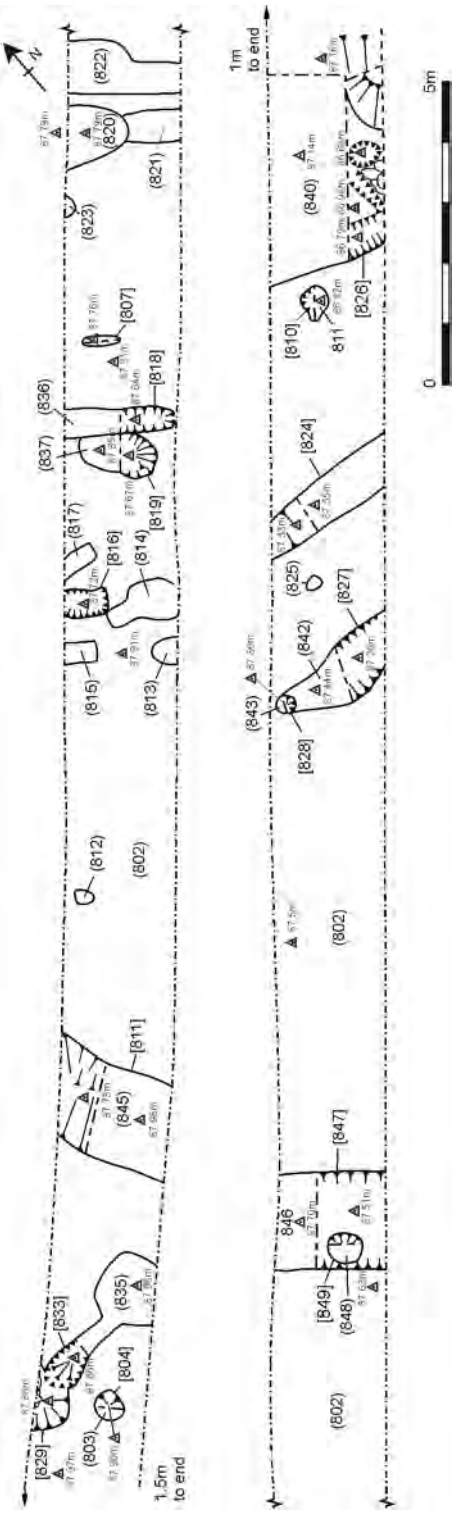

Fig 14 Parkengear round, plan of evaluation trench 8, cut across the interior of the round.

A stone structure 1140 was identified abutting the northern edge of bank material. The structure had partially slumped and been removed. A layer of clay (1135) and a deposit of charcoal (1136) overlaid a deposit of clayey silt containing fragments of shale (1139) to the north of the structure at the base of the construction cut for 1140. These deposits were sealed by a layer of highly organic material (1128) containing common large shale stones, and they most probably represent deliberate deposits following the demolition of the revetment. An additional stone structure 1143, perhaps a demolished wall, on a north east – south west alignment was present beneath the north end of deposit (1128). This structure consisted of slate stones 0.16m high in a matrix (1142) of mid-brownish-grey compact clay, with a lens of charcoal near the base. This overlay deposits (1137) and (1138) which, given their location in-between the two structures, most probably represent material associated with the demolition and subsequent backfilling of this area. Finds recovered from deposits within this area included small quantities of pottery dating to the later Romano-British period.

To the north of structure 1143 were two east–west aligned possible linear features, (1131) and (1132), which were distinct from natural subsoil (1102), but not excavated; (1131) measured 2.09m wide and included within it a separate deposit (1130). To the north (1132) represented an area of burnt material in a fairly linear alignment. Possible pit or posthole (1129) was located immediately to the north of (1132).

At the northern end of the trench curvilinear ditch [1118] measured 0.68m wide by 0.38m deep with steep sides and a concave base. This cut a layer of redeposited natural (1126) immediately to the north. This layer was also cut by shallow ditch [1120] which measured 0.45m wide by 0.14m deep with steep sides and a concave base. To the north the ditch [1122] measured 1.4m wide by 0.48m deep with a V-shaped profile; it matches a long curvilinear anomaly interpreted from the results of the geophysical survey which is a boundary of unknown date or purpose. Curvilinear gully (1127) was 0.3m wide and was not excavated, although the location of this feature at the far northern end of the trench is consistent with a curvilinear anomaly identified by the geophysical survey. No finds were recovered from any of these features.

Enclosure [8003]/[9003]

In the southern limits of areas 4 and 5 parts of a large curvilinear ditch were revealed (Figs 15–18). The ditch was exposed for a length of 8m in area 4 and 8.4m in area 5, with a northern arc of over 49m in length interpreted from the results of the geophysical survey. It measured 1.2–1.85m wide by 1–1.35m deep and had steep irregular sides down to a generally flat base that rounded at a terminal in area 5. At its base were ditch-edge erosion deposits (8044/8062), (9009/9022/9033) and (9010/9023). Above these primary deposits were eroded soil horizons and stony former bank material. Finds from the lowest secondary deposits consisted of Romano-British pottery, burnt clay and two pieces of worked stone comprising a possible whetstone and muller. Residue from a sherd of pottery recovered from an uppermost fill (8039) provided a date range of cal AD 75–230 (SUERC-72374), perhaps somewhat earlier than the date suggested by the pottery (Quinnell, below). Fill (8039) also contained a whetstone and a fragment of Romano-British tile for which a third or fourth-century date might be expected.

Pits [8013], [8071], [8073] and [8075]

Four pits in excavation area 4 contained finds of Romano-British date. Pit [8013] measured 0.74m by 0.65m, but only 0.05m deep. The feature had obviously undergone plough damage, but had a symmetrical profile with gradual, shallow sloping sides onto a bioturbated base. Its single fill (8019) contained a number of artefacts dated to the Romano-British period, comprising one sherd of pottery, a piece of bottle glass, as well as iron objects with identifiable pieces being a linch pin (Fig 26), hob nail and nail shaft; close to these was a copper-alloy bell-shaped stud (Fig 25). A further three shallow pits, [8071], [8073] and [8075], were within close proximity to one another and each contained Romano-British pottery.

Early medieval

Four large pits were identified in excavation area 2 (Fig 19). The largest of these was [6004] which was sub-circular in plan and measured 2.07m long by 1.8m wide and 0.47m deep, with moderate to steep sides down to a flattish, undulating base. Its primary fill (6018) consisted of 0.06m deep dark greyish-

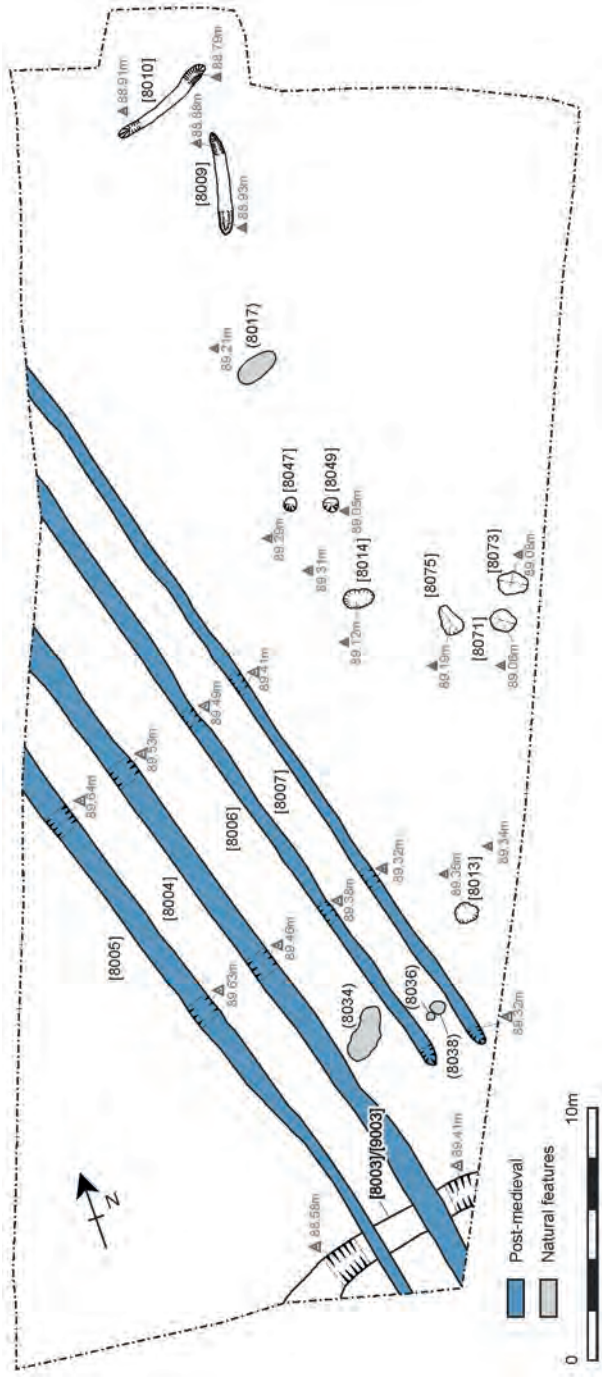

Fig 15 Plan of excavation area 4. Ditch [8003]/[9003] is the ditch of a round. Along the eastern side of the excavation, pits [8013], [8073] and [8075] contained Romano-British finds, those in [8013] including a number of metal objects and a piece of glass. The four parallel ditches are the remains of two post-medieval field boundaries.

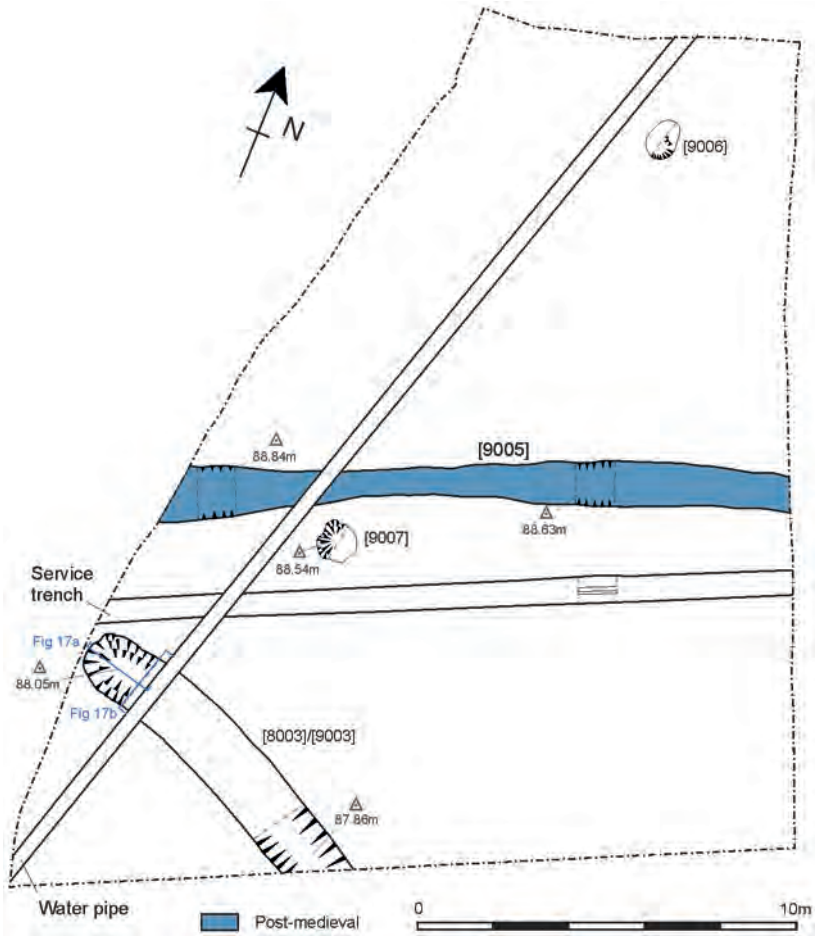

Fig 16 Plan of excavation area 5. Enclosure ditch [8003]/[9003] continues from area 4. The ditch terminal excavated in area 5 may well mark the enclosure's entrance. [9005] is a post-medieval field boundary ditch.

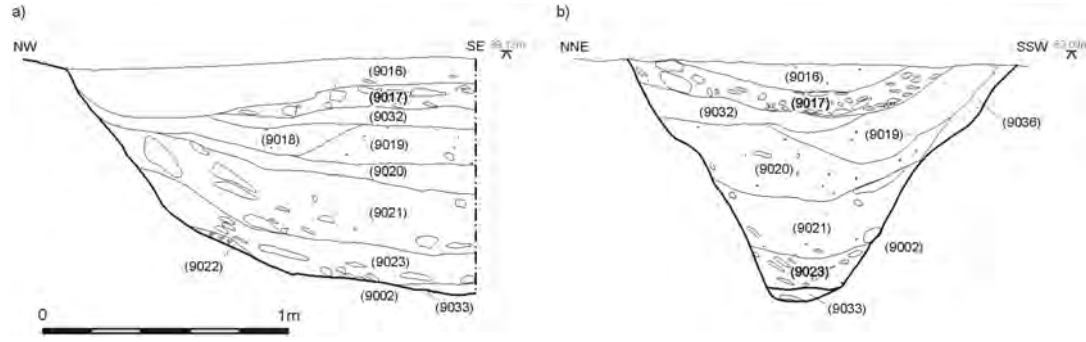

Fig 17 Excavation area 5. Sections of ditch [8003]/[9003], the ditch of a round. The ditch contained Romano-British pottery and a piece of tile and produced a radiocarbon date of cal AD 75–230 from the upper fill.

Fig 18 Excavation area 4, ditch [8003]/[9003], looking south east (scale 1m). (Photograph: AC archaeology.)

black sandy clay with frequent tabular shale and slate inclusions and charcoal fragments, and there appeared to have been *in situ* burning. This fill was sampled and found to contain large amounts of oat grains typical of a later Romano-British or early medieval date in Cornwall. A radiocarbon date of cal AD 564–655 (SUERC-72373) confirmed an early medieval date.

On its eastern side pit [6004] cut much smaller pit [6015] which measured 0.6m in diameter by 0.15m deep, with moderately steep sides and an undulating base. It contained no finds, but obviously pre-dates [6004]. The other pits in the area had much lighter coloured fills than [6004]. Circular pit [6005] measured 0.94m in diameter by 0.16m deep with moderately steep sides and an undulating rounded base. Sub-circular pit [6006] was larger, measuring 1.95m by 1.51m and 0.22m deep, with steep sides and a flat base. No finds were recovered from these pits and they remain undated.

Field boundaries (Fig 2)

The field to the north east of Parkengear round was excluded from the eventual phase of development reported here. The results of the evaluation trenching and the geophysical survey indicated differences between the archaeology in this field compared to the field containing the round. In the north-east field the plots established by small ditches are polygonal in plan; there was no dating material from these ditches, but this pattern of fields certainly pre-dates the historic field pattern and is of possibly medieval date. This pattern does not continue to the south west into the field containing the round.

To the east of ring gully [5003] north–south aligned gully [5109] terminated in line with the north terminal of [5003] which is suggestive of a relationship between the features. However, there were no finds from [5109] and the results of the geophysical survey indicated that the gully continued to the south; if it did then it would cross a posthole alignment, [5269]. As both alignments broadly match the alignment of historic field boundaries in the area, the gully and line of postholes most probably belong to this much more recent period.

Post-medieval field boundaries

Ditches related to field boundaries crossed excavation areas 4, [8004], [8005], [8006] and [8007]. and 5, [9005] (Figs 15 and 16), with others established by the interpreted results of the geophysical survey and picked up in evaluation trenches 2 and 6. The majority of these hedge boundaries had been removed by the date of the production of the Probus tithe map of 1840, with the remainder lost during the twentieth century.

The finds

Prehistoric and Roman pottery
Henrietta Quinnell, with petrographic comment by *Roger Taylor*

The assemblage consists of 274 sherds weighing 2155g. Of this 80 sherds (457g) are Beaker and come from a single pit. A further six sherds (125g)

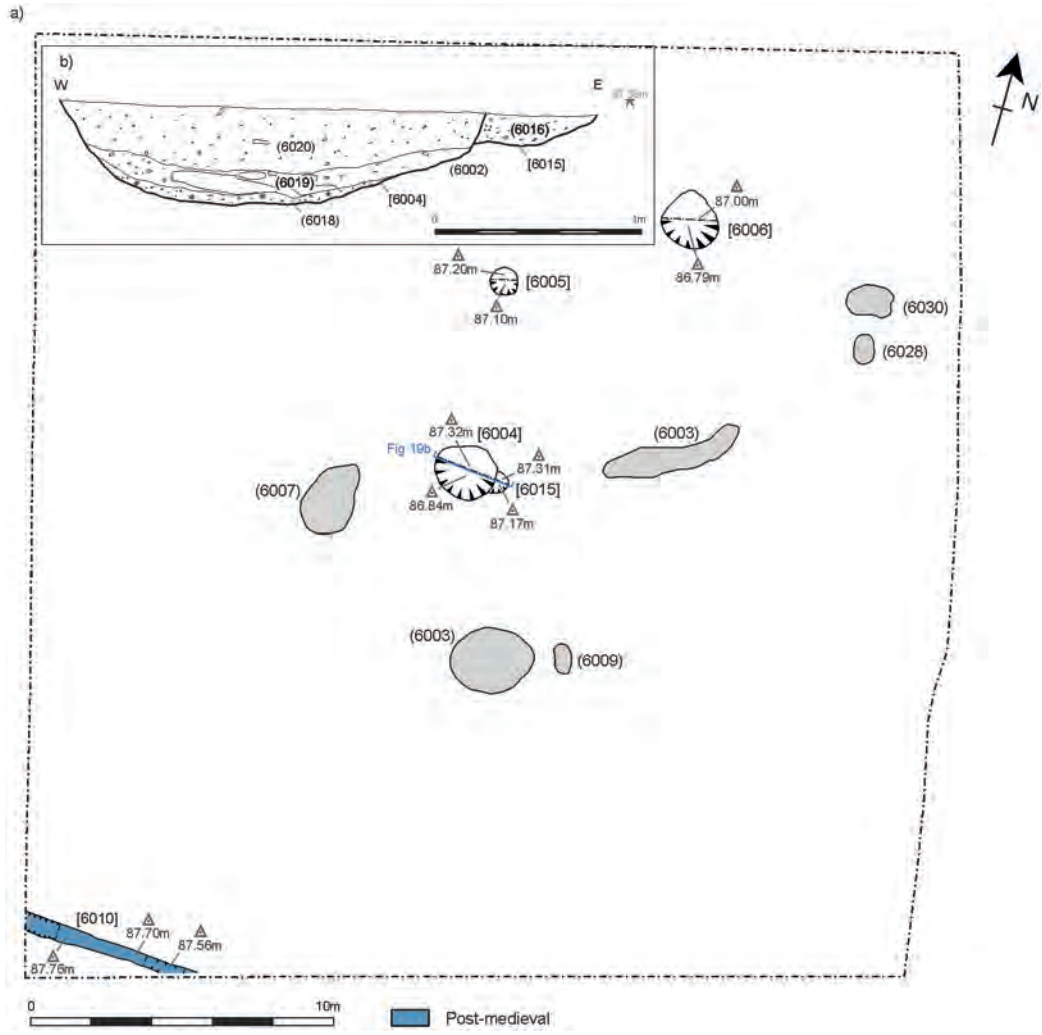

Fig 19 Excavation area 2. a) plan. [6010] is a post-medieval field boundary ditch; b) section of pit [6004]; this contained a large quantity of oats which gave an early medieval radiocarbon date of cal AD 564–655 (SUERC-72373).

are of Late Bronze Age Plain Ware, again from a single pit. The remaining 188 sherds (1793g) belong to the Late Iron Age or Roman period.

Beaker

P1 (Fig 20) (5024) fill of pit [5022]. 80 sherds 457g, rock tempered fabric, represent around a quarter of a long-necked Beaker, including rim/neck, belly and base. The shape is unusually narrow, 130mm rim diameter, for its height, possibly as much as 210mm: the shape of the lower body is uncertain. Oxidised throughout, 5 YR 6/4 light reddish-brown. The sherds are badly bioturbated, but have a zoned design formed by fine comb stamping, unusual on a vessel with walls of this thickness, 6–10mm. *Petrology. Rock fragments* – micaceous slate and micaceous siltstone, silvery to light grey and buff generally as rounded or tabular fragments, 0.05-3mm; sandstone, rare angular fragments, 1.2 mm: *quartz* – a scatter of colourless, transparent to translucent, angular to

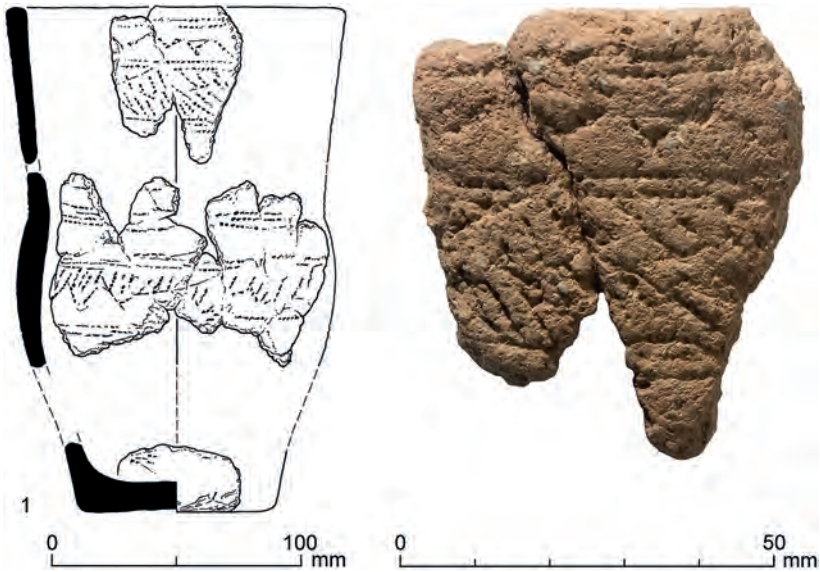

Fig 20 ***P1****. Left: reconstructed outline of long-necked beaker (scale 1:3). Right: photograph of rim/neck (scale 1:1). (Drawing by Jane Read, photograph by Gary Young.)*

rounded gains, 0.1–1.2mm: *feldspar* – a scatter of soft white altered, possibly kaolinised, sub-angular to angular grains, 0.1–2.0mm: *tourmaline* – sparse black vitreous angular grains and striated crystals, 0.2–1.2mm: *mica* – muscovite, a single contorted flake, 2.0mm: *ferruginous pellets* – soft reddish-brown sub-angular to rounded, 0.8–1.4mm: *matrix* – smooth clay with rock fragments less than 0.05mm and some fine mica. *Comment*. Rock fragments probably from the slate and sandstone of the Portscatho Formation with minor granitic input suggesting a source not immediately local to the site. The rounding of the grains and fragments suggest significant river transport. The River Fal is a possible source.

COMMENT

A number of sites in Cornwall are now known with pits, usually single, which contain sherds of Beaker pottery presumed to have been used domestically (Jones and Quinnell 2006). In Cornwall Beaker pottery first appears in domestic assemblages and as depositions in pits and only becomes associated with burials rather later. One Beaker pit with parts of three vessels of probable S-shaped form from St Stephen-in-Brannel has been published recently, with an early associated radiocarbon date, 2488–2291 cal BC (SUERC-30740) (Quinnell 2014). Another Beaker pit with parts of three vessels of 'domestic' type with finger nail decoration is known from Scarcewater some 2.5 km north west of St Stephen-in-Brannel, with a radiocarbon date, 2337–2057 cal BC (Wk-21846) (Jones and Taylor 2010, 94); the extensive excavations revealed two other scattered features with Beaker pottery. The Scarcewater vessels are, like **P1**, of broadly local fabric; the Beaker period is the only one in which gabbroic fabrics are not predominant in Cornwall. The Probus pit adds a third to these two known so far from the broader St Austell area. However, the long-necked form of **P1** is of a rather later date, probably between the twenty-second and the nineteenth centuries BC (Needham 2005, fig 13): unfortunately there was no appropriate sample for a radiocarbon date. The apparent narrow zoning of decoration is unusual in long-necked Beakers; in a Cornish context the long-necked vessel from Trevedra Common, St Just-in-Penwith (Russell 1954, fig 8), has some affinities with **P1**.

Late Bronze Age

A total of six sherds weighing 127g came from fill (5005) of pit [5006].

P2 (Fig 21) three sherds, 11g. Small vessel with simple out-turned rim and fingernail decoration on the shoulder. *Petrology. Quartz* – transparent to opaque white, sharply angular grains, 0.2–2.2mm; *feldspar* – transparent to translucent angular grains some with cleavage surfaces, 0.1–0.2mm; *mica* – biotite, dark brown cleavage flakes, 0.6, 1.0 and 1.2mm, muscovite, rare larger cleavage flakes,

0.2mm; *tourmaline* – rare black vitreous grains, 0.2mm; *rock fragment – microgranite*, quartz feldspar fragment, 1.1mm; *ferruginous pellets* – common reddish to light brown rounded, black on reduced surface, 0.2–1.5mm; *matrix* – finely sandy with abundant fine mica. *Comment*. A granite-derived fabric possibly with some added crushed quartz. The nearest potential source is the area of the St Austell granite to the north east.

P3 (Fig 21) three sherds, 116g. Two joining base sherds with a protruding base angle in gabbroic fabric.

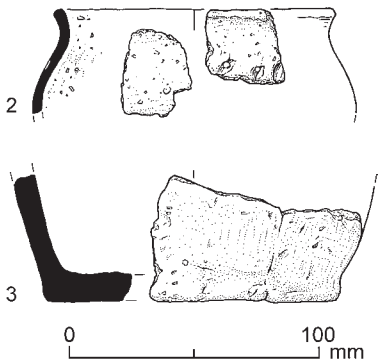

*Fig 21 **P2** and **P3**. Late Bronze Age. Scale 1:3. (Drawing by Jane Read.)*

Comment

These vessels almost certainly belong to the Plain Ware of the Late Bronze Age, a style which broadly spans the eleventh to the ninth centuries BC. A radiocarbon date of 915–807 cal BC (SUERC-72371), comes from pit [5006] and indicates that the pottery belongs in the later part of the date range for these ceramics. In Cornwall Late Bronze Age pottery tends to occur in small quantities, as for example at Scarcewater, St Stephen-in-Brannel, near St Austell (Quinnell 2010). The largest Cornish assemblage, from Higher Besore outside Truro, has comparanda in its P42 and P44 to the protruding base angle of **P3** (Quinnell forthcoming). The large assemblage with evidence for on-site manufacture at Bestwall, near Wareham in Dorset has parallels for both **P2** and **P3** (Ladle and Woodward 2009, figs 164–9).

Late Iron Age and Roman

A total of 188 sherds weighing 1793g belong to the Late Iron Age or Roman period.

Fabrics

The fabrics follow the descriptions given in the report on Trethurgy (Quinnell 2004). Of the three gabbroic fabrics, well-made gabbroic does not appear to occur after a date in the second century AD, whereas standard gabbroic occurs in the Late Iron Age and then throughout the Roman period until the fifth or sixth centuries AD. Coarse gabbroic used for storage jars occurs occasionally in the first and second centuries AD, but becomes more common in the third and fourth centuries with the greater frequency of storage jars. Descriptions of the non-Cornish fabrics are also given by Quinnell (2004).

Comment on terminology and dating

Late Iron Age Cordoned ware forms, given alpha-numeric Types (Threipland 1956; Quinnell 2011), gradually merge into Roman forms given numeric Types in the later first or earlier second centuries AD; some features such as cordons appear all the way through the Roman centuries (Quinnell 2004). The distinction between prehistoric and Roman is not therefore very clear cut. Dates ascribed to pottery Types are still poorly defined.

Contexts with illustrated vessels and other pieces with significant form

The only significant sherds in ring gully [5003] come from fill (5076), standard gabbroic sherds representing vessels of Types D/M/4 and J/13, and from its interior features Type M rim from fill (5128) of posthole [5129]. However, fill (5072) from this ring gully has a date of 170 cal BC – cal AD 16 (SUERC-72371), indicating that some of the fill formed during the Late Iron Age. However, the virtual absence of well-made gabbroic sherds in a Late Iron Age feature is unusual and it may be that much of the fill occurred rather later, perhaps early in the Roman period. The small quantity of pottery both from the fills of [5003] and the features within this indicates there was no element of deliberate deposition.

Features in area 1 outside ring gully [5003] have the following material: fill (5091) of hearth pit [5090] base of large storage vessel and Type 4 jar, the standard Roman gabbroic cooking pot; fill (5100) of pit [5099], **P4**; fill (5158) of pit [5159], **P5**. These features have a wide potential date range from the second to the fifth centuries AD, but generally appear later than the ring gully and features within it.

Table 1 Details of Late Iron Age to Roman pottery, by weight (g) and sherd number

Context	*Details*	*Well-made gabbroic*	*Standard gabbroic*	*Coarse gabbroic*	*Granitic/ S Devon*	*SE BB1*	*Grey ware*	*Totals*
(101)	Trench 1 subsoil		1/8					1/8
(706)	Ditch [704]		1/7					1/7
(831)	Pit [829]		1/16					1/16
(840)	Hollow [811]		1/1		1/1			2/2
(845)	Hollow [811]					1/2		1/2
(903)	Ditch [906]			2/62				2/62
(912)	Deposit	1/4	1/14					2/18
(913)	Rampart		3/71					3/71
(1008)	Trench 10, posthole [1007]		1/1					1/1
(1128)	Organic material				3/13			3/13
(1139)	Within cut for 1140		2/71		1/9			3/80
(1142)	Within cut for 1140		2/21					2/21
(1203)	Trench 12, fill ditch [1204]		1/10					1/10
(1208)	Trench 12, lower fill ditch [1204]		8/44					8/44
(5001)	Subsoil Area 1	2/11						2/11
(5012)	Pit [5008]		9/22					9/22
(5072)	Terminal 5073 [5003]		4/16					4/16
(5074)	Terminal 5073 [5003]		2/2					2/2
(5076)	Terminal 5073 [5003]		30/169					30/169
(5083)	5084 [5003]		2/8					2/8
(5085)	5086 [5003]		1/7					1/7
(5091)	Pit [5090]		12/586					12/586
(5093)	Pit [5092]		1/5					1/5
(5100)	Pit [5099]		2/66 P4					2/66
(5110)	Layer in [5004]		2/4					2/4
(5128)	Posthole [5127]		6/24					6/24
(5130)	Posthole [5129]		2/1					2/1
(5144)	Posthole [5143]		2/23					2/23
(5158)	Pit [5159]		14/78 P5					14/78
(5162)	Hearth [5163]		1/5					1/5
(5171)	Posthole [5170]		1/1					1/1
(5201)	Pit [5203]		3/9					3/9

Table 1 cont.

Context	*Details*	*Well-made gabbroic*	*Standard gabbroic*	*Coarse gabbroic*	*Granitic/ S Devon*	*SE BB1*	*Grey ware*	*Totals*
(5242)	Layer in (5004)		1/4					1/4
(8000)	Topsoil Area 4	1/3						1/3
(8019)	Pit [8013]		1/10					1/10
(8039)	Ditch [8003]		2/10		1/2			3/12
(8041)	Ditch [8003]		1/13					1/13
(8043)	Ditch [8003]		1/38 P6					1/38
(8058)	Ditch [8003]	1/16	13/94		3/13	1/27	1/19	19/182
(8060)	Ditch [8003]					1/18		1/18
(8070)	Pit [8071]		6/25		2/7			8/32
(8082)	Pit [8073]		5/15					5/15
(8074)	Pit [8075]				10/11			10/11
(9015)	Ditch 9008 [9003]		2/12		1/1	3/40		6/53
(9020)	Ditch [9003]				1/4			1/4
Totals		5/34	148/1509	2/62	26/61	6/108	1/19	188/1793

Enclosure ditch [8003]/[9003], at the southern edge of the excavation, probably belongs to the second or third centuries AD. Granitic, almost certainly South Devon sherds, occur in fills (8039), (8058) and (9016); this fabric is more usual in the third and fourth centuries in Cornwall than earlier. There are also South East Dorset black-burnished (SEBB1) sherds, part of a conical flanged bowl, in (8058), in (8060) part of a plain rimmed bowl and in (9015) a dish/bowl base. Black-burnished ware again is more common in late Roman Cornwall and the flanged bowl sherd should be third or fourth centuries AD. The grey ware sherd from (8060) is probably Exeter fabric 101 gritty grey ware which was made between the first and the fourth centuries AD (Holbrook and Bidwell 1991, 171–2) and is found occasionally in Cornwall, at Trethurgy (St Austell), Kilhallon (Tywardreath) and Carvossa (Probus) (Quinnell 2004, 106). Context (8043) contained **P6**. Residue on one sherd in (8039) a fill of enclosure ditch [8003] provided a date range of cal AD 75–230 (SUERC-72374). This is rather earlier than the date ascribed on the form and fabric of the ceramics and demonstrates that current understanding of Roman period ceramics in Cornwall is still very imprecise. Of pits north of ditch [8003]/[9003], [8071] and [8075] have South Devon sherds and are probably later Roman in date.

Of material from evaluation trenches 8, 9 and 11 in the round, only deposit (912) is at all closely datable. A sherd comes from a rim from a Type N/3 jar, likely to date from the second century AD (Quinnell 2004, 112). Otherwise the occurrence of South Devon and black-burnished wares in these deposits, together with coarse storage jar sherds, may indicate a date in the later Roman period contemporary with ditch [8003]/[9003].

ILLUSTRATED VESSELS (Fig 22)

P4, fill (5100) of pit [5099], rim and shoulder Type 8 jar, rim diameter 205mm. These are not common but appear to belong to the later part of the Roman period (Quinnell 2004, fig 56).

P5, fill (5158) of pit [5159], Type 8 jar, rim diameter 195mm.

P6, fill (8043) of ditch [8003], Type 9 bowl with girth groove, rim diameter 210mm. These again are not a common type but have been ascribed to the later Roman period (*ibid*): the radiocarbon date cal AD 75–230 (SUERC-72374) from another fill of [8003] indicates that the form may have started rather earlier than previously supposed.

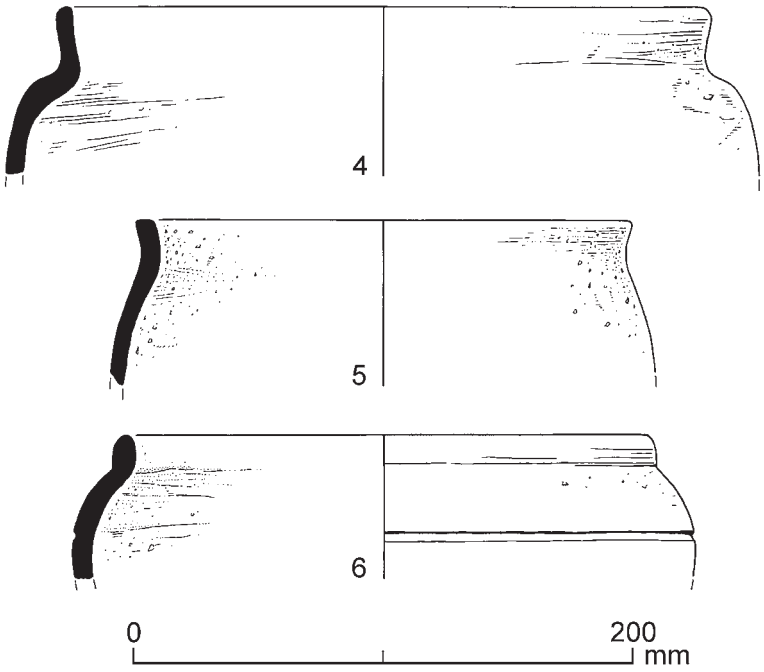

Fig 22 ***P4–6****. Gabbroic, Roman period. Scale 1:3. (Drawing by Jane Read.)*

Tile
Henrietta Quinnell

A fragment (35g) from a possible tile of gabbroic fabric comes from (8039) in curvilinear ditch [8003]/[9003]. The fragment has two flat surfaces 22mm apart which slope towards each other. A number of pieces of tile, including gabbroic fabric, were found at Penlee House, Tregony, and the report includes a summary of the two other sites with Roman tile in Cornwall, the Magor villa, Illogan, and an enclosure at Little Quoit Farm, St Columb Major (Quinnell 2012), with another more recently recovered at Gwel-an-Mor, Portreath (*Cornish Archaeology* 55, 251–2). This find would represent only the fifth site with Roman tile in Cornwall and the third with tile of this period made in gabbroic fabric. Dating for Roman tile in Cornwall is currently not clear but it can be argued that most was likely to have been made before the later third–fourth centuries (Quinnell 2012, 240).

The quernstone
Susan Watts

S1 Small find no 1 (Fig 23). Two joining halves of a near complete upper stone of a rotary quern of local elvan were found in an upper fill (919) of the inner round ditch [921] in evaluation trench 9. The quernstone has a sloping grinding surface, two opposing handle holes and a groove around the circumference. It has broken in half across the eye and through the two handle holes, the weak points of the stone. Elvan is a rather soft stone, which makes it easy to carve and shape but also makes it vulnerable to fracture and wear (Quinnell 2004, 150).

The quernstone, maximum diameter of 370mm at the grinding surface, maximum of 96mm thick, has a flat upper surface, 320mm diameter which slopes down slightly to the central hole or eye and is 13–15mm thick at the centre. The eye is oval, approximately 85mm by 70mm, the longer axis at right angles to the handle holes. There are two notches, approximately 15–17mm wide and just a few millimetres deep in the long sides for a rynd, a bar of metal or wood with a hole in the middle for locating the upper stone on the spindle

Fig 23 ***S1****. Two joining halves of a near complete upper stone of a rotary quern of local elvan from upper fill (919) of the inner round ditch [921], evaluation trench 9. (Photograph: AC archaeology.)*

that would have projected from its lower stone. The rynd notches are set about 30 degrees to the handle holes. The two handle holes are wedge-shaped, about 50mm deep with a maximum width of 40mm. One of the handle holes has broken out onto the grinding surface but the surviving handle hole is 20mm high. Slight accent of wear on one side of each handle hole indicates that the quern was turned in a clockwise direction. The circumferential groove is about 10mm wide and 5mm deep; possibly a decorative feature but the fact that it coincides with both handle holes suggests it was for a rope with which to hold the handle(s) in place. It is noticeable that the stone is thicker on one side than the other, 96mm compared to 60mm and that the grinding surface has worn through to the handle hole on the thinner side of the stone; possibly deliberately made like this to enable the positioning of one handle hole higher than the other. That the grinding surface has worn through to one of the handle holes suggests that the stone was worn out when abandoned. The grinding surface is sloping, the inner half of the grinding surface rising at a steeper angle to the eye, than the outer half. It is worn, particularly so on the thicker side of the stone with evidence of concentric rings of wear.

The rotary quern, comprising two circular stones, the upper one turned above the lower by means of a projecting handle, was first used in Cornwall in the later Iron Age. Upper stones vary greatly in design but the basic characteristics of the quernstone from Probus with its sloping grinding surface and handle holes in the side broadly conform to the types of

rotary quern found in the south west in the late Iron Age and Romano-British periods. Stones with the remains of two handle holes have also been found at Carn Euny (Sancreed) and Penryn College (Christie 1978, fig 49.8; Watts 2017); the latter example, in addition to two handle holes in the side of the stone, also had a handle slot across the top. Quernstones with circumferential rope grooves have been found at Carn Euny, Trevisker (St Eval) and Trethurgy (St Austell) (Christie 1978, 388, fig 49.1, 2; ApSimon and Greenfield 1972, fig 26B; Quinnell 2004, 148; Watts 2007). The flat top, however, is rather more typical of the Roman period (Curwen 1937).

Stonework

Naomi Payne and Henrietta Quinnell, with petrographic comment *by Roger Taylor*

Nearly all the stone used derives from various local Gramscatho deposits, the only exception being the granite cobble from (9011) which is likely to have come from a granite area, most probably St Austell.

S2 (707) fill ditch [704]. Whetstone, broken, on a bladed cobble, wedge-shaped cross-section, 96 × 42+ × 18mm. Silty slate Gramscatho Formation, probably from local stream.

(8039) in enclosure ditch [8003]/[9003]. Part of hard stone, maximum dimension 170mm+, with two incomplete wear facets, most probably a whetstone, and quite possibly of a size appropriate for use with scythes. Gramscatho Formation sandstone river cobble. The sharpness of the fractures suggests these may have been deliberate.

(9011) in enclosure ditch [8003]/[9003]. Part of cobble of tourmalinized granite, maximum dimension 100mm+, preserving some original texture, with minor use as a muller: rock is friable and fractures easily. Also, a small fragment from a cobble of a different tourmalinized granite with a small area of possible wear.

S3 (Fig 24) SF2 in fill (919) ditch [921] (inner ditch of round). Perforated slate, broadly circular, maximum diameter 68mm. Part of the outside edge damaged, remainder ground/worn. Perforation tear-drop shaped and worn with damaged edges indicating suspension. Incised lines on one side form an irregular geometric pattern and appear deliberate. Perforated slate discs around this size are common finds on Iron Age and early Roman period sites in Cornwall and are usually interpreted as pot lids, the perforation having accommodated a wooden handle (Quinnell 1992, 109). In this case however, the wear to the perforation clearly shows that the disc was suspended, probably as a small weight. Gramscatho Formation slate, probably taken from local outcrop.

(5091) fill of hearth pit [5090]. Rough trimmed perforated probable weight, 105mm across, perforation worn producing incipient grooving. Gramscatho Formation silty slate surface.

(9020) in ditch [8003]/[9003]. Perforated glossy Gramscatho slate probably cleaved from larger surface fragment with central perforation, maximum dimension 70mm, not obviously worn: probably a 'pot lid'. Also, a small square of trimmed slate, of similar lithology, possibly trimmed as a counter.

Fig 24 ***S3****. Perforated slate from upper fill (919) of the inner ditch [921], evaluation trench 9. (Photograph: AC archaeology.)*

(5083) in ring gully [5003]. Rough trimmed square, 110mm across, of Gramscatho micaceous siltstone.

(5085) in ring gully [5003]. Rough trimmed cleaved fragment of tuffaceous sandstone 140mm long, Gramscatho Formation.

One context in evaluation trench 9 and three contexts in evaluation trench 11 produced a total of six pieces of notched stone of varying sizes from 50mm to 230mm in maximum dimension. All the lithologies represented are sandstone and silty slate from the local Gramscatho Formation. Two other sites in Cornwall, both later Iron Age in date, have recently produced numbers of notched slates of different sizes, Sir James Smith School, Camelford and Higher Besore outside Truro (Quinnell 2015; Quinnell forthcoming). Their functions are not properly understood but it is probable that the notches had a variety of different uses.

Flint

Henrietta Quinnell

One broken cortical flake of pebble flint came from fill (5091) of hearth pit [5090], and three flints from occupation layer (5110) within ring gully [5003]: two broken flint blades and one damaged flake with usewear and a trace of nodular cortex. It is not possible to date these pieces at all closely but, given the blade fragments, it is probable that they are redeposited and relate to prehistoric activity. However, a nodular flint flake, obviously residual in (304), comes from a multi-platformed core likely to be later Neolithic or later in date.

Metalwork

Naomi Payne

A total of nine metal objects and fragments were recovered from three contexts in excavation areas 3 and 4. All metal objects were X-rayed to aid identification. The only metal find from excavation area 3 was an iron nail from pit [7010]. This was also the only find from this context.

A single copper-alloy object was recovered from fill (8019) of pit [8013] in area 4 (Fig 25). This is a bell-shaped stud of Roman date. The stud has an overall length of 34mm and an original diameter of approximately 17mm. The head is circular in plan with the wider upper face countersunk around a raised cone, which has a central depression. The sides taper and there is a deep horizontal groove at the centre point. The shank has a squarish profile up to 8mm across and its end is rounded and worn, hence it is not clear whether it is complete or not. Bell-shaped studs have been divided into two types, which had different functions (Allason-Jones 1985, 95–108). Type 2 studs, which have integrally cast copper-alloy shafts, are believed to have been used to attach decorative panels or lock plates to boxes or chests (*op cit*, 102). This type generally has a rectangular-sectioned shank with a perforation at the end. The Probus stud has a more chunky shank than is usual but as the shank is reasonably short, it was probably originally longer and may therefore have had a perforation (Lindsay Allason-Jones, pers comm).

Pit [8013] also produced six iron objects and fragments. They include a probable nail shaft fragment and a hobnail, a fragment of sheet and two amorphous and unidentifiable fragments. The other object is a piece of a Roman spatulate-headed linch pin, a vehicle fitting which served to hold a wheel in place. The fragment comprises part of the head and a turned-over loop; the stem has broken off (Fig 26). The loop would have allowed the pin to be tied to the axle (Manning 1985, 74). It is broadly similar to an example from Great Wakering, Essex (*ibid*, plate 31, H41).

The only other metal find was an iron nail from fill (8043) of enclosure ditch [8003]/[9003]).

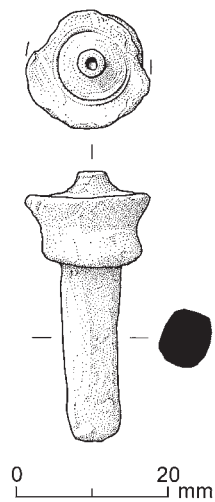

Fig 25 Romano-British bell-shaped stud from fill (8019) of pit [8013], excavation area 4. (Drawing by Jane Read.)

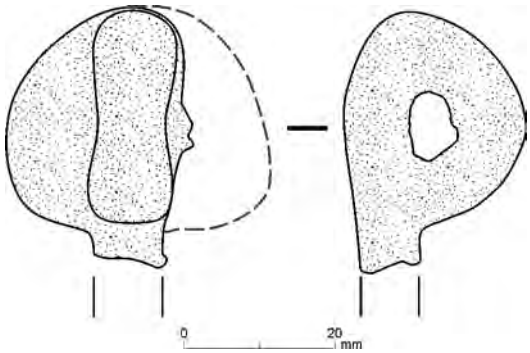

Fig 26 Romano-British linch pin from fill (8019) of pit [8013], excavation area 4. (Drawing by AC archaeology.)

Glass
Naomi Payne

A sherd of glass (5g) was recovered from fill (8019) of pit [8013] in area 4. This context also contained pottery and metalwork of Romano-British date. The sherd is a body sherd of transparent blue-green glass, with a wall thickness of 5.5mm. It has no discernible curvature and is likely to derive from a prismatic bottle of late first to early third century date (Price and Cottam 1998, 194–200).

Palaeoenvironmental analyses

Methods
Cressida Whitton

During the excavations 29 soil samples were taken from a number of features for the recovery of environmental and economic information. A preliminary assessment of the palaeoenvironmental potential showed that across the site this was generally poor. Ten priority samples were further selected for processing. The samples were processed using standard methods of floatation. A Siraf-type tank was employed with a 250-micron mesh being used to catch the flot and a minimum mesh of 500 microns being used to retain the residue. The flots and residues were dried and assessed and the residues were sorted for charred plant remains. The flots and charred items sorted from the residues from four samples were selected for having potential for full analysis:

Excavation area 1

- ***Sample 3*** – fill (5005) of pit [5006], containing Late Bronze Age pottery
- ***Sample 4*** – fill (5025) of Beaker vessel (**P1**) in pit [5022]
- ***Sample 17*** – fill (5072) of terminal of ring gully [5003]

Excavation area 2

- ***Sample 9*** – primary fill (6018) of pit [6004]

Charred plant remains
Wendy J Carruthers

Results – excavation area 1

Sample 3 – Pit [5006] contained a very small number of charred plant remains, comprising a very poorly preserved (highly eroded) possible barley grain (cf. *Hordeum* sp.), the embryo of a black bindweed seed (*Fallopia convolvulus*) and a few fragments of indeterminate rhizomes. The charred remains were too poorly preserved to represent deliberately placed burnt items, so it is most likely that they were accidentally included when the pit was backfilled. Because the cereal grain was very eroded it was not considered to be suitable for radiocarbon dating. However, a fragment of broom/gorse charcoal from this feature was dated to 915–807 cal BC (SUERC-72371), confirming the assemblage to be Late Bronze Age in date.

The possible barley grain and black bindweed seed embryo provide little information about the Late Bronze Age economy. Their poor state of preservation suggests that they may have been lying around the site for some time before (perhaps accidentally) being included in the backfill of the feature.

Sample 4 – Pit [5022] contained Beaker vessel (**P1**) which in turn contained fill (5025). A small volume of dark brownish-red silty loam from inside the vessel (context 5025, 1.5 litres) produced 150ml of large charcoal fragments, but no other identifiable charred plant remains.

Sample 17 – Fill (5072) of ring gully [5003] contained only a few small fragments of identifiable charred plant remains. They consisted of a possible oat grain fragment (cf. *Avena* sp.), a single poorly preserved cf. emmer glume base (*Triticum* cf. *dicoccum*) and one cf. spelt glume base (*T.* cf. *spelta*), two emmer/spelt glume bases

(*T. dicoccum/spelta*) and an oat awn fragment. The material represents a trace of burnt cereal processing waste. A later Iron Age date of 170 cal BC – cal AD 16 (SUERC-72372) was obtained from alder/hazel charcoal.

The small amount of probable emmer and spelt processing waste is likely to represent activities that were taking place on a small scale in the structure. The oat fragment and awn could have come from a wild oat at this time, as it is uncertain whether oats had been introduced into south-west Britain as a crop at this time.

Results – excavation area 2

Sample 9 – Primary fill (6018) of pit [6004] contained a large number of oat grains (n = 368); in addition were smaller numbers of barley grains (*Hordeum* sp.), free-threshing wheat grains (*Triticum aestivum/turgidum*) and a narrow range of weed seeds. A date of cal AD 564–655 (SUERC-72373) was obtained from an oat (*Avena* sp.) grain revealing that activities on the site continued into the early medieval period.

The high frequency of oat awn fragments and small, slender oat grains, in addition to much plumper, longer grains suggested that both bristle oat (*Avena strigosa*) and common oat (*Avena sativa*) were probably present, although this could not be confirmed as no chaff survived. It is possible that some of the small grains were either wild oats (*Avena fatua*) or grains from the secondary florets of common oat. However, differences in the morphology of the grains indicated that the assemblage most probably contained a mixture of common and bristle oats, perhaps with some wild oats growing as weeds. The ratio of oats to barley to free-threshing wheat grains was 123 : 9 : 1. Since some of the barley grains were hulled and twisted it is most likely that hulled six-row barley (*Hordeum vulgare*) was being grown. The low number of barley grains (27) when compared to oats suggests that they were present as a relict crop, having been grown on the land in a previous year, rather than as a mixed crop or 'maslin'. The three short, plump free-threshing wheat grains were probably also present as relict crops. However, this interpretation depends on whether the assemblage represents a single deposit or mixed waste from different sources.

No chaff fragments were present among the grain but 54 weed seeds from at least eight taxa were recovered. All of the seeds were small and light, of the type that could easily be removed by sieving the processed grain with a fine sieve, as well as by winnowing. However, two stinking chamomile seeds (*Anthemis cotula*) were fused together by charring suggesting that some of the weeds, such as stinking chamomile, scentless mayweed (*Tripleurospermum inodorum*) and corn marigold (*Glebionis segetum*), could have remained with the grain during fine-sieving if they had been present as intact seed heads rather than free seeds. Therefore the assemblage may represent part of a fully processed oat crop that was being parched prior to dehusking, grinding or storage. Alternatively, they may derive from semi-processed oats being used for fodder and burnt as waste.

Most of the taxa were general weeds of cultivated / disturbed ground, such as docks (*Rumex* sp.) and redshank/pale persicaria (*Persicaria maculosa/lapathifolia*). Plants such as fat hen (*Chenopodium album*) and orache (*Atriplex patula/prostrata*) are indicators of nutrient-rich soils, suggesting that manuring of the arable crops was probably taking place. In addition, stinking chamomile is an indicator of heavy, damp clayey soils and corn marigold is often found on sandy or loamy acidic soils, suggesting local cultivation. The local impoverished, acidic loamy soils would have been well-suited to the cultivation of oats, as oats are one of the least demanding of crops and they grow well in wetter climates like that of south-west Britain.

A very similar assemblage of oat grains was recovered from an oven at Black Cross, near St Columb Major (Carruthers 2015). The site, excavated prior to the construction of the A30 Indian Queens bypass, is located about 10 km north of Probus. Two oats were individually radiocarbon dated to cal AD 420–660 (Wk-9848 and Wk-9849) providing an early medieval date very similar to that from Probus. Two of the assemblages in the oven appear to represent very similar deposits of an oat maslin (cultivated and bristle oat) mixed with small amounts of fuel and kindling materials. A similar range of weeds of nutrient-rich, cultivated soils was recovered, although at Black Cross the acidic soils tended towards the sandy rather than clayey type and this was reflected in a few different weed taxa. The evidence from late Roman deposits

on two other sites along the Indian Queens bypass, Pedna Carne and Penhale round (Carruthers 2015) suggests that oats had begun to replace spelt in Cornwall prior to the early medieval period. The reason for this is likely to be because the local soils had become too impoverished to cope with a demanding crop like spelt wheat, the principal crop grown throughout the Roman period.

Charcoal

Dana Challinor

The majority of the charcoal from Tregony Road was oak; in fact, this taxon was dominant in all of the excavation area 1 assemblages (comprising 90 per cent). There were some differences in the character of the wood used (even allowing for discrepancies in preservation); the oak from pit [5006] appeared to be largely immature, roundwood or sapwood, while the oak from Beaker vessel (5024) derived from mature trunkwood. This difference in the type of wood used may relate to function as well as to period, since (5024) was of Beaker date and [5006] of Late Bronze Age date. The presence of gorse/broom in [5006] indicates that heathland resources were utilised as supplementary sources.

The charcoal from the primary fill of [6004] in excavation area 2 contrasted significantly with the other samples, being dominated by hazel roundwood, with some oak and blackthorn/cherry. The quantity of oat grains recovered from this sample (Carruthers, above) may indicate a crop processing function, for which the character of the charcoal assemblage is appropriate; bundles of roundwood of small diameter would provide a suitable heat for parching/drying purposes (in contrast to, for example, cremation which requires higher, sustained temperatures).

Radiocarbon dates

Paul Rainbird

There was a limited amount of material in the sampled fills that was regarded as suitable for radiocarbon dating. Dates were obtained from the fill (5005) of pit [5006], a fill (5072) of ring gully [5003], the primary fill (6018) of pit [6004] and organic residue from a pot sherd in fill (8039) of enclosure ditch [8003] / [9003]. All dated samples were assessed as suitable short-lived material and submitted to the Scottish Universities Environmental Research Centre. A sample from the Beaker pot (5024) failed to find suitable material for dating.

The AMS radiocarbon date results are presented in Table 2. Calibration of the results has been performed using the data set published by Reimer *et al* (2013) and performed using the program OxCal4 (on-line at: c14.arch.ox.ac.uk).

Discussion

Paul Rainbird

The archaeological works at Tregony Road, Probus, have revealed use of the site beginning in the Bronze Age, with some activity in the later Iron Age and early medieval periods, but the majority of the settlement evidence is dated to the Romano-British period. The main phases of activity are discussed below.

Bronze Age

Part of a long-necked Beaker was recovered from pit [5022] with the petrology indicating that it may have been manufactured from clay derived from the River Fal. In Cornwall Beaker pottery is dated

Table 2 Radiocarbon dating results (calibrated to 95.4% probability)

Material	*Context*	*Lab no.*	*Result BP*	*δC13 (‰)*	*cal BC/AD*
Charcoal: *Cytisus/Ulex* (broom/gorse)	(5005)	SUERC-72371 (GU43222)	2710 ±32	–25.1	915–807 cal BC
Charcoal: *Alnus/Corylus* (alder/hazel)	(5072)	SUERC-72372 (GU43223)	2057 ±32	–25.0 assumed	170 cal BC – cal AD 16
Grain: oat	(6018)	SUERC-72373 (GU43224)	1440 ±32	–23.0	cal AD 564–655
Residue on pottery sherd	(8039)	SUERC-72374 (GU43225)	1866 ±32	-27.1	cal AD 75–230

to *c* 2400–1700 cal BC with long-necked types (such as **P1**) occurring from *c* 2100 cal BC (Jones and Quinnell 2011, 208–10). Locally, Beaker pottery first appears in domestic contexts and only becomes associated with burials rather later. This is not a trend reflected in Britain as whole where the earliest Beakers, after *c* 2450 cal BC, are associated with burials (Parker Pearson *et al* 2016). Although a domestic function is most probable for the pit containing the Beaker pottery it is unfortunate that the sample from within the pot was not able to shed further light on this or provide appropriate material for a radiocarbon date.

A radiocarbon date of 915–807 cal BC (SUERC-72371) comes from pit [5006] and indicates that the pottery belongs in the later part of the date range for Late Bronze Age Plain Ware, a style which broadly spans the eleventh to the ninth centuries BC. The pair of vessels from the pit were made of clay derived from Cornwall, one from the gabbroic clay of the Lizard, the other having a granite-derived fabric. Unlike the preceding Trevisker ware this is a type of pottery shared with communities widely in the south of England with, to the east of Devon, sites of manufacture known at Bestwall, near Wareham (Ladle and Woodward 2009), and Tinney's Lane, Sherborne (Best *et al* 2013).

The small number of Cornish sites with Late Bronze Age Plain Ware appear to be settlement sites, for example Higher Besore / Truro College and Scarcewater (Quinnell 2011, 231–3; Jones and Quinnell 2011, 221–4). Pits at both sites have been interpreted as having structured deposits: a sword mould at Higher Besore and pot sherds at Scarcewater (*ibid*, 224). A Late Bronze Age pit at Manuels, Colan, with a similar date to pit [5006], 2775 ±27BP, 997–844 cal BC (SUERC-60205), but without pottery, contained a few fragments of cremated bone, probably human (Jones and Smith 2015). Despite sampling of the fill of pit [5006] it was not possible to further define the nature of the Late Bronze Age activity it represents although domestic rather than funerary use of the site is most probable.

Late Iron Age / earlier Romano-British

It was largely not possible to establish the detailed phasing of features within the small areas of excavation provided by the trial trenches or those spread across the excavation areas, but a period of squinting at the results of the geophysical survey, combined with the stratigraphic and dating evidence indicating multi-phase activity within and in the vicinity of the round, indicates that the round was built in a landscape already occupied by settlement within a series of sub-square and sub-circular enclosures connected by and within a series of plot boundaries (Fig 27). Roundhouses indicated by the presence of ring gullies are present both within and outside of these enclosures. There is no indication from the finds that any of these features were established prior to the later Iron Age or even perhaps the earlier Romano-British period.

Two of the ring gullies were investigated and another is probably present in trench 7. Trench 9, east of the round, exposed part of a ring gully approximately 8m in diameter which was found to have been cut by the ditch of the round. In area 1, west of the round, the full plan of ring gully [5003] was recovered. The radiocarbon date (170 cal BC – cal AD 16; SUERC-72371) and the pottery indicate that ring gully [5003] pre-dates the construction and occupation of Parkengear round. It took the form of a penannular ditch with an entrance in the east-south-east. This feature is characteristic of Iron Age houses in Britain (Sharples 2010, 197–201) and in Cornwall it would not be surprising if this type continued into the Romano-British period, although in this period oval forms are also known, several examples of which were fully excavated at Trethurgy round, St Austell (Quinnell 2004). The ring gully most probably defines the area of the eaves drip for a roundhouse, or an enclosing ditch, rather than a construction trench, although the patches of stone within the gully suggest that a structural function cannot be completely ruled out. The ring gully is slightly ovoid rather than circular, being 10.5m long from north east to south west by 9m wide north west to south east, where the entrance causeway is located with the north terminal curving inwards. The interior features do not make an obvious pattern and there may be more phases represented by the postholes and pits than indicated by the limited stratigraphic relationships. Various post rings can be postulated with diameters varying between 5m and 6m; the most probable line of the post ring is indicated on Figure 4. By comparison with other Iron Age roundhouses (for example, Tolgarrick, Truro, or Higher Besore, Kenwyn: Hughes and Farnell 2016; Gossip 2005 and forthcoming), it is likely that the two postholes in the south east, marking the entrance, were also

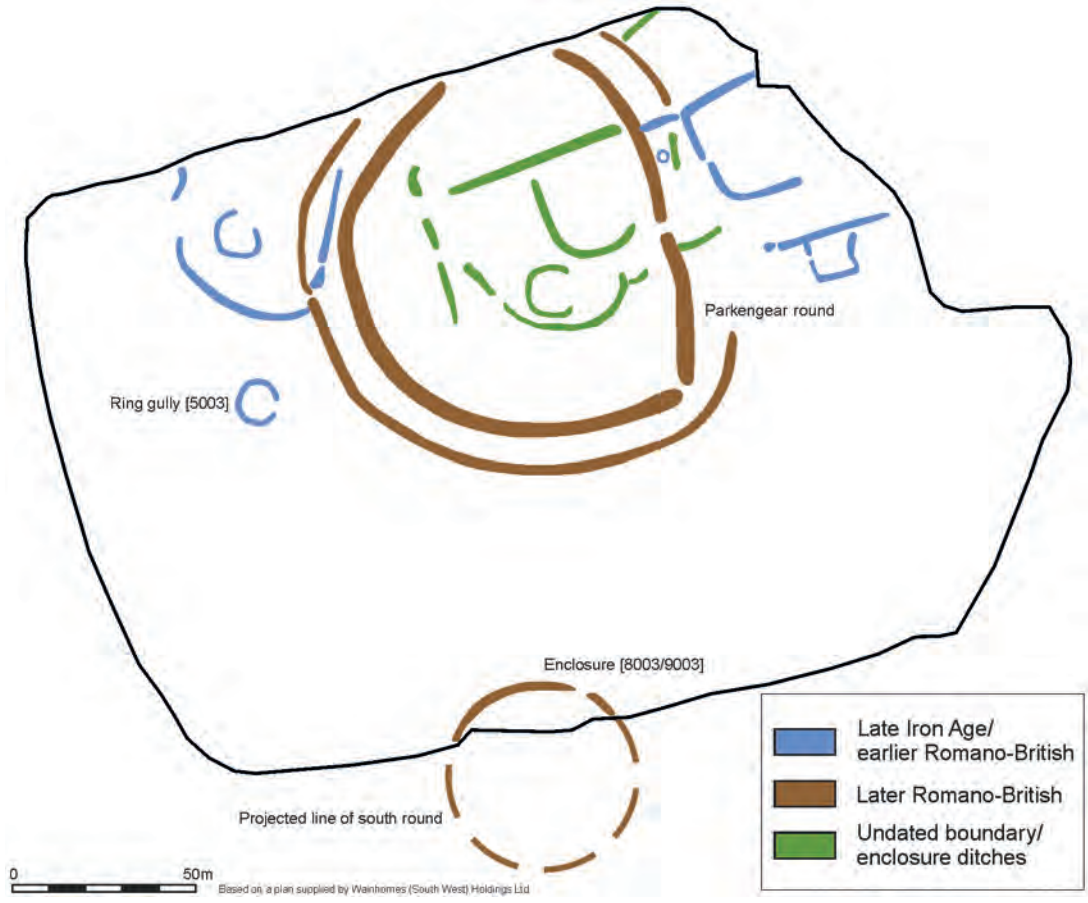

Fig 27 Phased plan of the foremost actual and probable Iron Age and Romano-British features at Parkengear. The main round ditches are shown, with Parkengear round in the north with an outer ditch on the south and west sides and the smaller round to the south.

part of the post ring and that the post ring stood within the structure, rather than marking the position of the wall, in which case the wall would have been located somewhere between the post ring and the ring gully. The internal diameter of the house would then be approximately 8.5m. The possibility of a porch structure has been discussed in the results section above. This would have formed a funnel-shaped arrangement restricting the width of access from approximately 1.5m to 0.8m – a type of porch for which parallels have not yet been found. If the two entrance postholes are part of an internal post ring, as suggested above, then the porch arrangement would also have been an internal feature, rather than a porch extending out from the house.

Hearth [5163] was located directly in line with the porch and central to the post circles and the ring gully; this hearth may be associated with pit [5203] to its south. Another hearth, [5173] was located off-centre to the north within the post rings and may have also had an associated pit, [5205], to its north east with a slight hollow behind them to the north west. Given the probable small amount of space available within the proposed structures, it would seem unlikely that these hearths were in use at the same time and it is more probable that they relate to different phases of occupation. The type of pottery recorded indicates that the phases of use within the ring gully were consecutive, with it being unlikely that there was any significant break in the use of the structure(s) between construction

and abandonment. The addition of stone in the area of the back wall of the probable roundhouse may indicate an effort to support a decaying structure. Activity within the structure is represented by the central hearth and several of the pits probably also served domestic functions. Finds other than the pottery were sparse and there is little to provide a more nuanced discussion of the activities within the structure(s).

The Late Iron Age or early Roman-period roundhouses are found in close proximity to two rounds at Parkengear. Unenclosed settlements of Late Iron Age roundhouses, suggested by ring gullies, are now known near a number of Cornish rounds, identified from aerial photographs (for example, Young 2012, 111), from geophysics (for example, Middle Amble Farm, St Kew; Borlase and Wright 2014) and from excavation (for instance, Sir James Smith's School, Camelford: Jones and Taylor 2015). At Higher Besore, Kenwyn, excavation showed that the Late Iron Age settlement of roundhouses was broadly contemporary with the nearby round at Threemilestone, though the pottery suggests that the round was constructed towards the end of the date range covered by the Higher Besore settlement; however, the round did not continue into the Roman period (Quinnell 2011, 239). The situation at Parkengear appears to be different: on the basis of the present evidence the rounds were Romano-British and post-dated the roundhouse settlement. However, finds and features from areas 1 and 4 show that there was also some form of unenclosed settlement activity in the Roman period.

Later Romano-British

Although rounds can date from the third or fourth centuries BC to the fifth or sixth centuries AD (Quinnell 2004), the two rounds investigated at Parkengear appear to be Romano-British. Generally, rounds are described as small, univallate enclosures; they are often roughly circular or oval (hence the name), but rectilinear forms are not uncommon (Thomas 1966). Rounds are usually under 1 ha in size, with ditches less than 2m deep and located on hillslopes with simple entrances facing downhill (Quinnell 2004, 213). Quinnell interprets rounds as permanent settlements with substantially built buildings, with the enclosure marking a degree of status (*ibid*). Over 2500 examples of this type of settlement have been recorded for Cornwall, many of them mapped from aerial photographs by the National Mapping Programme (Young 2012, 73); others are identified through place-name evidence, typically field names with 'round' incorporated within them, or the Old Cornish *ker* or *dyn* elements of place-names meaning 'fort' (Padel 1985, 50–4, 84–5). Parkengear, the name of the adjacent farm, contains the suffix 'gear' which is probably a corruption of *ker* (Padel 1985, 54).

Parkengear round has an internal area within the inner ditch of approximately 0.5 ha and is located just to the east of the summit of the hill, although not enough to have restricted views in any direction, and atypically had more than one ditch defining the circuit. The round was only sampled by trial trench evaluation and, although this showed evidence for intensive activity within the circuit, this is hard to interpret and some of these features probably pre-date the construction of the round. Finds of South Devon and black-burnished ware suggest a later Roman date for the deposits, although midden-like deposit (912) contained a second-century AD sherd. Inner rampart material survived in a denuded state. The inner ditch was 5.5m wide and 2m deep; the depth is comparable to other rounds but it is somewhat wider, 3m being typical (Borlase and Wright 2014, 204). The outer ditch, constructed a short distance (8m) out from the inner ditch, was slighter than the inner ditch but at 2.4m wide and 1.6m deep it was still quite substantial. Outer ditches are known at a number of rounds, and the one at Parkengear is broadly similar to those at the Late Iron Age round at Threemilestone and the Romano-British round at Penhale, St Enoder, where the outer ditch was only added in the third century AD (Schwieso 1976; Nowakowski and Johns 2015); like Parkengear these ditches are slighter than the inner ditch and both are only a short distance out from the inner ditch (3–4m), creating a sense of multivallation rather than an outer enclosed area. They may well have been added to enhance the status of the settlement. The outer ditch at Parkengear was constructed on the south, west and probably north sides, but the east side remained largely univallate. This may indicate that the round was abandoned before the completion of the outer circuit, or that the perceived need for the outer ditch was removed prior to its completion. During the infilling of the outer ditch part of a rotary quern was incorporated. The quernstone was heavily worn and was probably

disposed of in the remaining hollow of the largely filled ditch at the end of its use.

Substantial ditch [8003] / [9003], representing another probable round just 60m south of Parkengear round, had steep sides and measured up to 1.85m wide by 1.35m deep and, although no surface evidence of a bank was found, the fills suggest that one had been present. Pottery from the fills of the ditch was consistent in dating to the later Romano-British period, like Parkengear round, but a slightly earlier date is suggested by the radiocarbon date from one of the fills: cal AD 75–230 (SUERC-72374). An intriguing find from the ditch fill is a fragment of possible tile, one of only a handful of examples known from Roman Cornwall. Extrapolating a circular enclosure from the known parts of ditch [8003]/[9003] gives a diameter of 50m, making an enclosed area of approximately 0.2 ha, less when an internal bank is taken into consideration; this makes it over 0.3 ha smaller than Parkengear round, but of equivalent size to Trethurgy round, which was dated to the Romano-British period (Quinnell 2004). In excavation area 5, a terminal indicates an entranceway facing north east. No features were identified within the limited excavations inside the enclosure, but this area was truncated by historic field boundary ditches.

One of the significant results of the evaluation trenching and excavations was the identification of Romano-British activity outside the rounds, which flags up the potential for sites elsewhere in Cornwall. Some ill-defined extra-mural settlement was found in excavation area 1, to the south west of Parkengear round, where a hearth and pits appear to be contemporary with the round. Excavation area 3 was closest to the possible south-east entrance and contained a small concentration of ephemeral pit features with a variety of fills. A paucity of finds (a single iron nail) restricts the conclusions that may be drawn from the features in this area. East of the round a small square enclosure measuring 12m by 12m was investigated by trench 12. Unfortunately, its date and function were not established, but the closest parallel may be to a rectangular enclosure 13m across, excavated at Tregony, which contained a Romano-British cremation burial of the second century AD (Taylor 2012).

There were further contemporary features outside the entrance to the southern round (ditch [8003] / [9003]), perhaps an indication of extra-mural settlement. In this area pit [8013] was particularly interesting in containing several Romano-British finds, including a piece of bottle glass, a copper-alloy bell-shaped stud, probably used for fastening an object, perhaps a door or drawer, and a linch pin for a wheeled vehicle.

The intensity of later prehistoric and Romano-British activity found at Parkengear is also reflected in the wider landscape around Probus: there are 61 rounds identified by the Cornwall and Scilly HER within 5 km of the site. The nearest round is 200m to the west and is formed by a single sub-circular bank defining an area 110m across (National Heritage List for England (NHLE) 1020796). To the south of the site, at a distance of approximately 500m, Norman Quinnell identified a cropmark enclosure at Trestrayle (HER MCO 8745). At Trenithan Bennett, only 1.3 km north east of Probus, the mapping of cropmarks from aerial photography, has identified a cluster of five rounds, possibly more, and a field system in an area of approximately 75 ha (Cornwall and Scilly HER, for example, MCO 8698, MCO 8699). The current site may be part of a similar cluster. There are also more substantial enclosures in the wider area. Notable are Golden Camp, a hillfort (presumably Iron Age) 2 km east of the current site (NHLE 196889), and Carvossa, 1.8 km to the north east, a 2 ha enclosure of sub-square plan, thought to date to the mid-first century AD, with finds largely of the earlier Romano-British period; it has been put forward that the site may have been occupied by the Roman military, although this has not been substantiated (NHLE 1016890; Douch and Beard 1970; Carlyon 1987). The current evidence indicates that this was a well-populated landscape in the Iron Age and Romano-British periods and a recent review of settlement evidence indicates that in Cornwall there was a marked increase in the establishment of new settlements in the Late Iron Age with many of these continuing in use in the Roman period (Brindle 2016, 338); although the difficulties in creating a fine chronology for this transition period based on pottery types has been noted above.

The close proximity of the two rounds, with another only 200m to the west, which is undated but the largest in the group at about 0.8 ha in area, indicates a previously unsuspected cluster of rounds at Probus. The question of why such clustering should occur is intriguing, but beyond the bounds of this paper; although it may be noted that it is possible that some rounds may have had specialist functions and were not principally for

domestic settlement, or, if they were, may have been occupied on an intermittent basis and their functions may have changed over their period of use (Quinnell 2004, 211–4; Nowakowski and Johns 2015, 297; Brindle 2016, 342–3). Paired enclosures, sited within 100m of each other, have been noted as a common feature in Cornwall (Young 2012, 110); the work at Parkengear is the first investigation of such a pairing and although the function of the enclosures was not established it has at least been shown that the two sites were broadly contemporary.

Later activity

Pit [6004] in excavation area 2 provided an early medieval date of cal AD 564–655 (SUERC-72373). The purpose of the pit is unknown and although there were no finds it was suspected, because it contained a high concentration of charred oat grains, that it dated to the late Romano-British or early medieval periods as sites of these dates in Cornwall have produced a predominance of oats over other cereals (for example, Straker 1995; 1997; Jones 2014, 126; Carruthers 2015). Clearly oats were being grown locally and processed on the site with the fuelwood dominated by hazel, with some oak and blackthorn/cherry, all of which were available locally. The local soils were well-suited to the cultivation of oats, as they are one of the least demanding of crops and grow well in wetter climates like that of south-west England. No further evidence for use of the site at this date was forthcoming and the focus of early medieval settlement may already have been established to the north on the site of the current village of Probus, where the church is set within a further possible enclosure (0.6 ha in area), perhaps of *lann* type (Preston-Jones and Rose 1986, fig 9), which was already the site of a monastery by Domesday (MCO 26078; Thorn and Thorn 1979, 4.24). However, as the pit is about 600m away from the church it is likely that it was associated with an early medieval settlement in the more immediate vicinity.

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The corresponding author is Dr Paul Rainbird.

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Cornish Archaeology 56, 2017, 153–182

The medieval and post-medieval rabbit warrens of north-east Cornwall

DAVID GOULD

In north-east Cornwall there is historical and archaeological evidence for some 32 medieval and post-medieval rabbit warrens. The few documented medieval examples were components of high-status sites, mostly associated with the deer parks of the earls or dukes of Cornwall. Post-medieval sites, mostly identified through 'warren' fieldnames and as possible pillow mounds, are much more numerous and are more widely spread across the social scale. The study indicates that the area's warrens do not conform to the traditional narrative of warrening history, which sees an emphasis on commercial warrening on marginal land, as there was no rabbit industry on Bodmin Moor of a comparable scale to that seen on Dartmoor. The warrens typical of north-east Cornwall tend to be small-scale and located in farmland close to both significant houses and more humble farmsteads. An exception is a group of 10 pillow mounds at Creddacott Farm, Week St Mary, perhaps large enough to have been a commercial warren.

The remains of man-made rabbit warrens, particularly their pillow mounds, are a common feature of the historic landscape of England and Wales. The presence of further historic rabbit warrens for which no archaeological remains have been recorded is also frequently noted in documentary sources dating from the twelfth century onwards. Despite this, they are relatively little studied beyond a handful of site-specific or regional surveys: for example, Bettey (2004) produced a study of seventeenth-century warrens in Wiltshire, Harris and Spratt (1991) focused on nineteenth-century warrens of the Tabular Hills in North Yorkshire, Bailey (1988) wrote of medieval East Anglian warrens, while Dartmoor's warrens have been addressed by Linehan (1966), Haynes (1970) and Robertson (1991). Beyond these, a small number of investigations have addressed warrening on a national level, most notably those of Veale (1957), Sheail (1971; 1978) and Williamson (2007).

The national overviews by their very nature must encompass a range of different landscapes and historic periods, although something of a national historic framework has been created. According to this framework, rabbit warrens were particularly prevalent on areas of marginal lands, that is those areas unsuited to arable exploitation (Sheail 1978, 348; Williamson 2007, 17). This is ably demonstrated on Dartmoor which has the largest grouping of pillow mounds within the UK (Williamson 2007, 35, fig 9). Consequently, it might then be expected that north-east Cornwall would have witnessed a similar scale of historic warrening activity, particularly on Bodmin Moor, a landscape of the type typically viewed as ideal for sustaining a large-scale rabbit industry. Drawing on the results of doctoral research into the rabbit warrens of the south west (Gould 2016), this paper reviews the historical and archaeological evidence for rabbit warrens in north-east Cornwall and discusses their historical context, beginning with an introduction to the wider historical and archaeological background.

The north-east Cornwall study area is outlined on Figure 3; the area surrounds Bodmin Moor and

contains a high proportion of the warrens identified in Cornwall.

A brief history of rabbits in the British Isles

For most of its history in the British Isles, the rabbit (*Oryctolagus cuniculus*) has been a carefully managed commodity. Originally native to the western Mediterranean of Spain, south-west France and the Maghreb, the species' appearance in the British Isles is generally credited to the Normans (Van Damme and Ervynck 1988, 279; Williamson 2007, 11). The issue is muddied somewhat by rabbit bones showing clear signs of butchery recovered in 2001 from a Roman context at Lynford, Norfolk (Pitts 2006), while further 'Roman' rabbit bones were recovered from Beddingham Roman villa, Sussex, in late third-century fill and were considered by David Rudling of the University of Sussex unlikely to be intrusive (*ibid*). Both sets of bones have yet to be scientifically dated, however, and, even if Roman, they do not necessarily rewrite the species' history in Britain: if rabbits were present in Roman Britain, and it is known that Romans did farm rabbits in roofed enclosures, then it is likely that they died out in late Roman or early post-Roman Britain to be reintroduced seven centuries later (Williamson 2007, 11).

Nevertheless, it is unclear exactly when rabbits first appeared in Britain. Veale (1957, 86) noted a reference from *c* 1135 recording Walter de Vautort's grant of Drake's Island in the Plymouth Sound to Plympton Priory *cum cuniculi* ('with the rabbits'), with Williamson (2006, 11) calling this the first unambiguous documentary record of rabbits in Britain. However, this reference is derived from an unsubstantiated statement by the sixteenth-century antiquarian John Leland (Veale 1957, 86) and its veracity is debatable. The first substantiated reference to rabbits in Britain therefore dates from 1176 when Richard de Wyka granted the abbey of Tavistock his tithe of rabbits from the Isles of Scilly (*ibid*). These early references to rabbits on islands concord with the generally accepted view that the earliest British rabbits were introduced on small islands or sandy coastal areas (*ibid*, 85; Williamson 2007, 13), a scenario mirrored in north-west continental Europe (Van Damme and Ervynck 1988, 280).

Rabbits were not introduced into the British Isles as wild animals but were carefully managed and bred in man-made warrens named *coneygarths*. While this historic term in all its variant spellings only refers to man-made rabbit warrens, the modern use of the term 'warren' to describe them can unfortunately introduce confusion. During the medieval period, the term warren typically related to the legal concept of 'free warren' whereby an individual or institution had been granted the right by the Crown to hunt the 'beasts of the warren' within a legally defined area (Williamson 2007, 17). Unfortunately, surviving free warren grants rarely specify which animals were reserved to the grantee (Veale 1957, 87), although it is generally agreed that such grants conferred the right to hunt small quarry, which would have included rabbits (Bailey 1988, 2; Bond 1994, 116; Williamson 2007, 17; Mileson 2009, 149). So, while a free warren may have included a rabbit population within a *coneygarth*, this would only have been the case had a rabbit colony been specifically installed within it. As such, historic references to warrens, as opposed to *coneygarths*, can only give the legal potential for the presence of rabbits rather than a confirmation of their presence. In accordance with current convention, the use of the term warren in this article refers to historic rabbit warrens unless it is specifically noted that it refers to a free warren.

The earliest specific reference to a rabbit warren in England, as opposed to earlier references to rabbits, dates from 1241 when Henry III ordered hay to be carted from his *cunigera*, a variant of the term *coneygarth*, at Guildford, Surrey (*Cal Close Rolls Henry III, vol 4*, 1911, 381). It is however likely that other warrens were in existence around this time: for example, a gift of 20 live rabbits from Wirral, Cheshire, was given by the Justice of Chester to William de Ferrariis, earl of Derby, in 1240 and presumably originated from a man-made warren (*ibid*, 192).

Farmed for their meat and fur, rabbits were initially an expensive, luxury commodity and consequently the earliest warrens in Britain belonged to the medieval elite and carried connotations of wealth and status. Something of the high standing of rabbit meat during the medieval period can be gleaned from documents produced by the medieval chancery from the 1240s onwards that record royal requests to county sheriffs, bishoprics, city bailiffs and members of the aristocracy to provide rabbits for feasts. By the

fourteenth and fifteen centuries, rabbits had begun to slide down the social scale to the local gentry (Williamson 2007, 17), although access to, and consumption of, rabbits remained an indication of high status. This is ably demonstrated by a 1536 letter from Sir Edmund Bedyngfeld urging William Tyrell to make haste with some expected money for without it he would not be able to pay his warreners for rabbits and would therefore not have been able to maintain his household, something which he considered would not have been 'to the king's honour' (*Letters and Papers Foreign and Domestic Henry VIII*, 1887, 10, 43).

As well as providing meat, rabbits were also a source of fur, with rabbit fur coats, robes, tabards, capes, gowns and even bedding being appropriate royal gifts to the aristocracy from the 1250s onwards, with such gifts being regularly recorded in the Close Rolls (Gould 2016, appendix 6). Rabbit furs remained luxury items into the later medieval period, and several sixteenth-century inventories record members of the aristocracy owning rabbit fur products: Thomas Cromwell owned several items of clothing lined with black rabbit fur (*Letters and Papers Foreign and Domestic Henry VIII*, 1875, 4, 1455), while Nicholas West, Bishop of Ely, owned a mantle of grey rabbit fur (*ibid*, 6, 286). There were, however, different values attached to different coloured rabbit furs: black rabbits cost ten times more than grey rabbits during the 1550s (Van Dam 2001, 162), while grey rabbit furs were considered suitable for 'serving men and yeomen taking wages' by 1532 (Veale 1966, 177).

As symbols of wealth during the medieval period, rabbit warrens may also have had a visual significance, acting as highly visible landmarks within elite landscapes (Creighton 2009, 114). As much as they were functional rabbit 'farms' producing meat and fur, many warrens are believed to have been integral elements of designed landscapes, forming principal views from manor houses (Williamson 2007, 164). Testing this theory is difficult, however, because if warrens were constructed to visually display wealth, then this would most clearly be seen in medieval warrens, when rabbit products were at their most expensive, as opposed to post-medieval or early modern warrens when the value of rabbits had decreased; unfortunately, it is now generally agreed that most surviving rabbit warrens are post-medieval (Sheail 1971, 41; Williamson 2007, 48). Nevertheless, some medieval warrens do survive and some may well have served as conspicuous landscape features, such as the large accentuated pillow mound visible from the viewing window of Middleham Castle, Yorkshire (Moorhouse 2007, 113) (for a discussion of pillow mounds, see below). Ultimately however, the issue of what visual role, if any, elite medieval and early post-medieval warrens played within their wider landscapes is one that remains to be fully investigated.

As well as a possible visual symbolism, medieval rabbits and warrens may have had a Catholic symbolism. Stocker and Stocker (1996) argued that during the medieval period rabbits had a theological meaning and that any structures associated with them such as pillow mounds would have conveyed that meaning. They claim that while rabbits were often associated with fecundity and lust, they were imbued with a secondary symbolic meaning 'predicated upon their vulnerability, which made them iconic of the soul's defencelessness against Satan's onslaught' (*ibid*, 267). They argued that as defenceless rabbits relied on a warrener's protection, they became a metaphor for humankind's salvation by Christ. However, Williamson (2007, 168) commented that while these arguments are interesting and original, there is a danger in over-interpreting the landscape. With regards to Cornwall, Herring suggested that pillow mounds on Godolphin Hill referenced the family's Catholicism, and indeed it is because of this that he dates this warren to earlier than 1537 because it is known that the Godolphins suppressed a Catholic uprising in that year (2003, 44).

It is also noteworthy that when one examines medieval depictions of rabbits, evidence of overt religious symbolism is frequently lacking or at best questionable. Depictions of rabbits being hunted are numerous in medieval documents and while they certainly display rabbits' vulnerability, it is hard to reconcile such explicit scenes of hunting with the Stockers' proposal: killing rabbits to provide food and furs, and possibly simply for the pleasure of hunting, hardly equates with mankind's protection under Christ. Depictions of rabbits in medieval documents explicitly play on knowledge of the fact that rabbits were bred for the sole purpose of being hunted; any protection offered by a warrener was simply necessary, not to mention temporary, to ensure the supply of a product rather than representing the altruistic actions of warreners.

Moreover, the similarity of the species' Latin name (*cuniculus*) and words for vagina (Latin *cunnus*, Old French *conin*) saw rabbits being associated with women and the vagina (Abraham 1963, 592). Although Abraham wrote that this play on words occurred only in Old French, a similar scenario occurred in England where associations between the words coney and cunny existed, while the English medieval aristocracy would also have been well-versed in Latin and Old French. The link between the terms coney and cunny became so entrenched in England that by the seventeenth century 'cunny-warren' was a euphemism for a brothel (Hughes 2006, 112). Indeed, in England and France, the similarity between these terms led to the adoption of new words for the species: *lapin* in France and rabbit in England (*ibid*).

In the medieval world, rabbits were therefore part of the artistic 'language of love' and were explicitly linked with female sexuality, with male sexuality frequently represented by depictions of dogs (Camille 1998, 98). For example, a late thirteenth-century chansonnier contains a motet about love's sorrows accompanied by a depiction of two lovers, where the lady 'fondles her own smirking rabbit and her lord's thigh while he strokes his puppy and places his white-gloved hand on the lady's shoulder' (*ibid*, 101). Elsewhere, in an Old French version of The Aeneid, *Roman d'Eneas* of *c* 1160, Lavinia's mother tries to persuade her daughter that Aeneas is not worthy of her love by saying that he has disdain for the *pel de conin*, or rabbit fur (*ibid*, 102). Such connotations suggest it is doubtful that the majority of medieval society would have held rabbits in the lofty regard that the Stockers suggest.

Associations between rabbits and women may also have manifested itself in other ways. Although medieval warrens were often part of hunting landscapes, particularly located within deer parks, hunting rabbits may not necessarily have been a lordly pastime and may instead have been more appropriate for ladies (Sykes 2007, 53). Indeed, there are several medieval depictions of women hunting rabbits such as in the Taymouth Hours (British Library MS Yates Thompson 13) and Queen Mary Psalter (British Library MS Royal 2 B VII), both from the fourteenth century. Such representations also provide details of how rabbits were hunted as they depict women clubbing rabbits, catching them with nets, and using bows and arrows, while a 1393 depiction in a French manuscript shows a woman letting a ferret on a leash into the openings of a warren (Van Damme and Ervynck 1988, 282).

In fact, hunting rabbits may have been held in low regard, something hinted at by Gaston Phoebus's hunting manual *Livre de Chasse*, written between 1387 and 1389. Phoebus's work discusses hunting with nets, a method commonly used for catching rabbits, and it is evident that he believed such a method to be ignoble (Cummins 1988, 235). Phoebus complained that hunting deer with nets was a method reserved for 'fat men, old men, idle men and churchmen, not of men who wish to hunt with skill and true venery' (*ibid*). It seems likely then, though not explicitly expressed, that his views of hunting rabbits as a pastime would not have been complimentary. Indeed, Phoebus's work was translated by Edward, Duke of York, between 1406 and 1413 as *The Master of Game* and includes a comment on rabbits: 'of conynges speke I not, for no man hunteth for hem but yit it be bisshunters [fur-hunters]' (*ibid*, 236). In light of such comments, hunting rabbits should perhaps be considered as livestock husbandry rather than true hunting (*ibid*, 237).

From the fourteenth and fifteenth centuries, rabbits begun to slide down the social scale to the local gentry, while large commercial warrens proliferated during the sixteenth and seventeenth centuries (Williamson 2007, 17; Creighton 2009, 111–2). A further increase in warren numbers occurred during the late seventeenth and early eighteenth centuries as a means of diversifying agricultural outputs at a time of declining wool and grain prices (Sheail 1978, 348). Only when warrens' economic outputs fell to unsustainable levels were they abandoned in large numbers, typically during the late eighteenth and early nineteenth centuries when rising grain prices led many warren owners to revert to arable farming (*ibid*, 351). Despite their falling economic value, and the fact that rabbits had become relatively widespread in feral colonies by the eighteenth century, man-made warrens remained in use in some areas until the early twentieth century (Williamson 2007, 19). In fact, as late as 1921, 141 acres and eight perches of Poor Common in Ferndown, Dorset, were leased as rabbit warren, which is a remarkably late establishment (Dorset Archives D-CRL/B6/6/34).

It is a commonly asserted theme that these later post-medieval commercial warrens flourished

where they allowed landowners to exploit unproductive marginal lands which were unsuited to other forms of agriculture, particularly in upland areas (for example, see Sheail 1978, 348; Bailey 1988, 19; Williamson and Loveday 1988, 293; Williamson 2007, 17). The expanse of Dartmoor is the most obvious example of this scenario as numerous large commercial warrens, representing the greatest density of pillow mounds in the UK (Williamson 2007, 35, fig 9), were installed there with several warrens founded as recently as the late nineteenth century and even the early twentieth century (Robertson 1991, 250). The late creation of many of Dartmoor's warrens is explained by the fact that due to their large sizes their output volumes were high, allowing them to offset the diminished economic value of rabbits in an area where the potential for agricultural practices other than pastoral farming was limited.

The archaeology of rabbit warrens

The principal components of man-made rabbit warrens, both medieval and post-medieval, are the low earthworks, so-called pillow mounds (an archaeological term coined in the twentieth century), that were constructed to encourage rabbits to burrow and to concentrate them within a defined area in order to facilitate their capture (Fig 1). The exact number of pillow mounds is unknown, although Williamson reported that over 2,000 have been recorded in England and Wales (2006, 16), while 1,338 examples have been recorded in Cornwall, Devon, Somerset, Dorset, Gloucestershire and Wiltshire (Gould 2016, 80). Rabbit warrens can contain a range of numbers of pillow mounds, and while large commercial warrens may have had high numbers, many smaller warrens contained only single pillow mounds.

Although most commonly rectangular, various other forms of pillow mound were constructed including circular, oval, cruciform and conjoined examples, although the reasons that determined which particular form was constructed remain unknown (Fig 2). As well as displaying morphological variations, pillow mounds also exhibit a wide range of dimensions: a rectangular pillow mound at Blagdon Cross, Devon, has a length of 204m (Devon Historic Environment Record [hereafter HER] MDV2753) while two rectangular pillow mounds at White Tor in Dartmoor are only 4m long (Dartmoor HER MDV28514); other morphological forms similarly exhibit wide-ranging dimensions. The original heights of pillow mounds are harder to determine, partly as a result of erosion but also because their heights are recorded less often than lengths and widths by the various HERs, the primary source of information regarding such matters. Nevertheless, while some pillow mounds today survive as very low earthworks, others were evidently built to a substantial height, with an example on Exmoor's Warren Farm having a height of 2.4m (Exmoor HER MSO10936).

Fig 1 Pillow mound at Bruton Abbey, Somerset, probably built by the Berkeley family following the dissolution of the abbey; the pillow mound, on the south face of Jubilee Hill, is overlooked by a prominent dovecot. (Photograph: author.)

Most pillow mounds also had encircling ditches (Williamson and Loveday 1988, 241), probably to deflect water (Sheail 1971, 40), although many have today become infilled and are difficult to identify. The internal features and construction methods of pillow mounds display as much variation as their external forms (Williamson 2007, 39); while some contain no internal features and are simply mounds of earth, others have distinct interior layers and contain complex internal features. For example, pillow mounds at Llanfair Clydogau, Dyfed, covered long lines of stones with short transverse branches leading off them (Austin 1982, 146–9). Excavations of these pillow mounds apparently revealed these lines of stones to

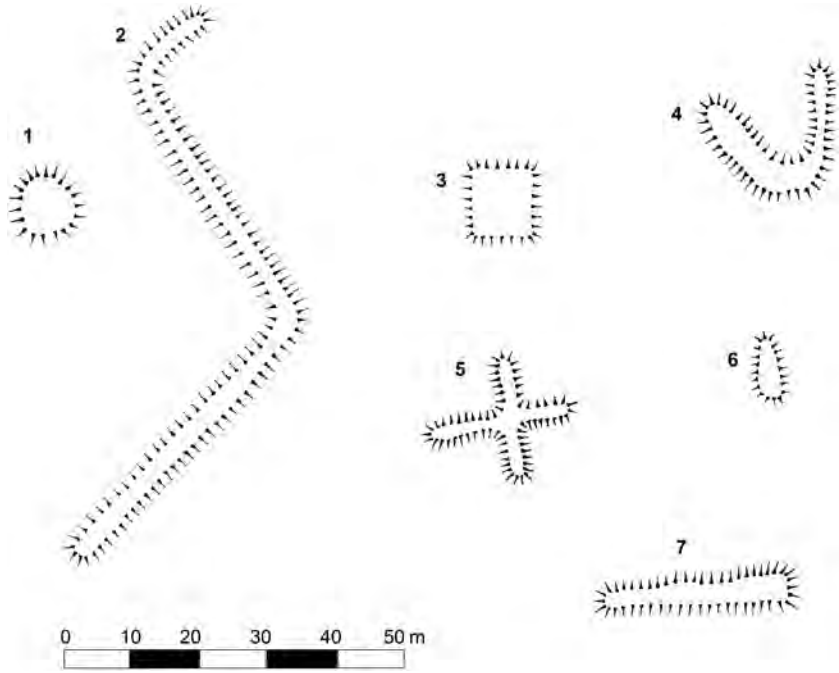

Fig 2 Examples of pillow mound morphologies: 1. circular mound at Saintbury, Gloucestershire; 2. conjoined mound at Saintbury, Gloucestershire; 3. sub-rectangular mound at Woolland Grove, Dorset; 4. chevron-shaped mound at Hyam Wood, Wiltshire; 5. cruciform mound at Banwell, Somerset; 6. oval mound at Willapark, Cornwall; 7. rectangular mound at Blockley, Gloucestershire. (All transcribed from aerial photographs by the author except 5, after Williamson 2007, fig 23A, 61.)

be reinforcements for rabbit runs that had initially been cut into the ground to provide instant shelter from predators; these runs were then subsequently lined and covered by the pillow mounds (*ibid*, 146–7). Williamson (2007, 42) considered that other pillow mounds displaying internal features served similar purposes, although it is unclear why such runs are present in only some pillow mounds. In areas where stone was less abundant, internal rabbit runs were probably capped with organic material, leaving behind a series of slots cut into the subsoil. Historical evidence of the creation of internal rabbit burrows is found from the reign of Henry VIII, where the household accounts of Hampton Court record the purchase of 'a great long nagre [auger] of irne, to make and bore cony holes within the kynges beries new made for blake conyes in the warren' (Sheail 1971, 43).

Many rabbit warrens would have been enclosed by banks, walls, fences or natural water courses, partly to prevent rabbits from straying and to provide protection from predators and poachers (Williamson 2007, 14), but also to legally define a warren's area, making it easier to prosecute poachers (*ibid*, 66). Not every warren would have been physically enclosed, however, even if having a legally defined boundary: Williamson and Loveday (1988, 297) reported that 65 per cent of pillow mounds in a sample of 190 warrens of southern Britain were unenclosed, while a study of warrens in south-west England revealed that 76 per cent of pillow mounds are unenclosed (Gould 2016, 118). While such figures in many instances simply reflect the under-reporting of warren boundaries compared to pillow mounds (*ibid*), the extent to which landowners erected boundaries was partly determined by the character of the surrounding landscape and partly by a warren's size: smaller warrens were cheaper to enclose, while rabbits were less likely to stray from large warrens if their feed was adequate (Williamson 2007, 26).

Some warrens would have been equipped with traps to catch vermin, such as stoats, weasels and foxes. Vermin traps are generally small turf-covered tunnels whose endings could be closed by a shutter placed in grooves. This generalised description hides the fact that vermin traps were not all constructed to a common design but were instead constructed to suit the local physical peculiarities of their parent warrens (Haynes 1970, 152). Although some vermin traps were made from stone, most were probably constructed from wood and consequently very few remain intact. Indeed, even on Dartmoor where the majority of examples

are recorded, most are revealed by the presence of funnel walls designed to lead the animals into the traps rather than by the traps themselves (*ibid*). How common vermin traps once were is unknown, for although Newman (2011, 174) wrote that vermin traps were used at all British warrens, their survival is rare: while 151 examples have been recorded on Dartmoor, only 16 examples have been recorded elsewhere in the south west, and even then, the identification of some remains far from secure (Gould 2016, 120–2). Only a single possible example is known from Cornwall at Godolphin, where Herring (1998, 254) considered a feature previously recorded as a culvert to be a vermin trap as he thought there was little need to provide drainage on Godolphin Hill.

Some warrens also had traps for catching rabbits (Harris and Spratt 1991, 180). Known as *types*, rabbit traps were essentially trap-door covered pits over which rabbits ran after being funnelled through small tunnels known as *muces*; no examples have been recorded in south-west England, however.

Warreners' lodges were also an associated feature of some warrens. During the earlier phase of the species' history in Britain, warrens would have been managed directly by landowners from their manor houses; during the later medieval period, landowners instead tended to move away from directly managing their warrens and instead leased them to professional warreners (Bailey 1988, 10). Warreners' lodges provided accommodation for the warrener and also served to house tools and traps with which they managed the warren's stock. While they are most commonly associated with large commercial warrens, it is often difficult to ascertain with certainty whether any particular building located near a warren served as a warrener's lodge. Nevertheless, where lodges can be identified, they had varied architectural forms ranging from small single-roomed dwellings, such as at Wasteberry Camp, Devon (HER MDV19953), to large detached buildings such as Minchinhampton's Old Lodge, Gloucestershire, which now serves as a hotel and inn.

With regard to the locations of historic warrens, it has been considered that they were frequently located according to strict topographical criteria (Bailey 1988, 2), typically on well-drained land (Creighton 2009, 114) and dry sandy areas (Sheail 1971, 90). Sloping land may also have been viewed as beneficial because it aided drainage and helped rabbits' excavation of soil when burrowing (Sheail 1971, 19; Bailey 1988, 19; Williamson and Loveday 1988, 295). This perceived preference for installing warrens on well-drained land is due to rabbits' natural physiology: originally native to Spain, south-west France and Maghreb (Van Damme and Ervynck 1988, 279), the species' natural habitat was considerably warmer and drier than the British Isles. Britain's relative abundance of damp soils has resulted in its rabbits being prone to foot-rot (pododermatitis), with their young being particularly vulnerable to cold and wet conditions (Sheail 1971, 19; Williamson 2007, 12). Despite this, a study of the locations of historic warrens in south-west England reveals that there was no particular preference for well-drained locations nor sloping land; in fact, the range of landscapes that were used for the construction of warrens is wider than has previously been recognised (Gould 2017a).

Cornwall's rabbit warrens – an overview

The locations of known rabbit warrens in Cornwall are indicated in Figure 3. Both those with surviving pillow mounds and those known only from documentary sources are distributed throughout the county, particularly along or near its north coast and in the far west, although they are more limited in its interior. The most noticeable concentration of documented warrens, especially those with surviving pillow mounds, is found in the eastern third of the county, particularly around the edges of Bodmin Moor, although the interior of the moor is itself largely devoid of rabbit warrens. It might be expected that a post-medieval rabbit industry similar in scale to that of Dartmoor would have flourished in north-east Cornwall, particularly on Bodmin Moor, one of south-west England's great expanses of marginal upland. However, whereas Dartmoor's warrens are some of the most thoroughly investigated in England and Wales (Linehan 1966; Haynes 1970; Robertson 1991; Williamson 2007; Newman 2011), Cornwall's warrens remain relatively little studied. Nevertheless, while approximately 726 pillow mounds have been recorded on Dartmoor, in at least 61 warrens (Gould 2016, 84–5), by contrast very few pillow mounds were constructed on Bodmin Moor, although the reasons are as yet

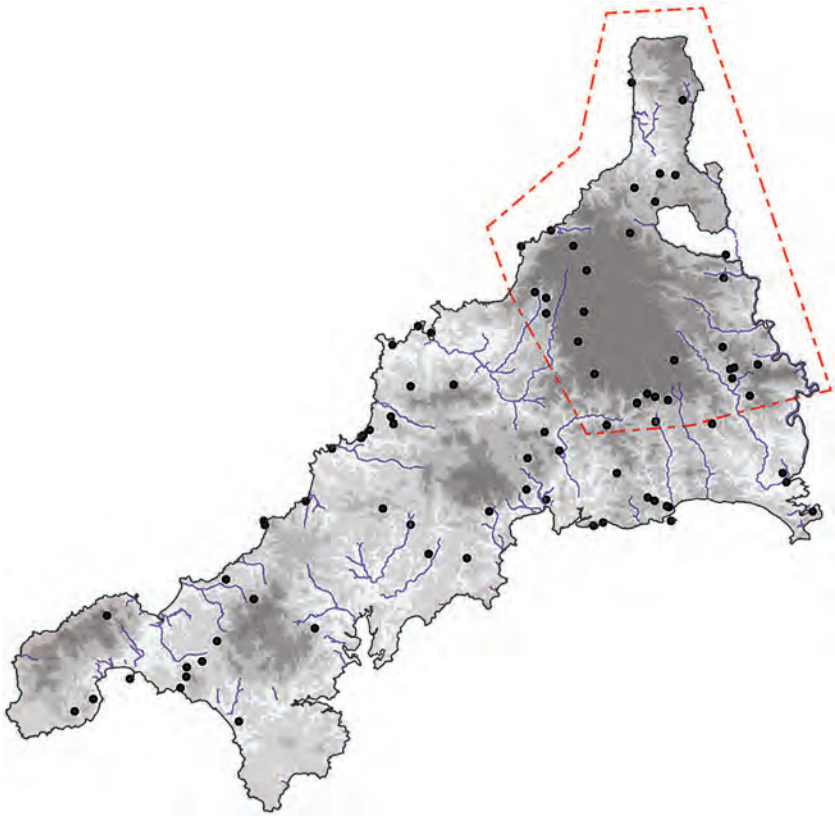

Fig 3 Rabbit warren locations in Cornwall, with the present study area demarcated. Contains OS data © Crown copyright and database right 2018 Ordnance Survey (100025252).

poorly understood; indeed, an investigation by the current author has recorded only 54 possible pillow mounds in the whole of Cornwall (*ibid*, 82).

The 54 Cornish pillow mounds represent a density of 0.02 mounds per square km (Gould 2016, 82). Within south-west England, this figure is analogous with pillow mound densities in Dorset and Wiltshire, while Somerset, Gloucestershire and Devon have higher densities of 0.04, 0.07 and 0.12 pillow mounds per square km respectively (*ibid*, 96). However, this high density of pillow mounds in Devon includes the 726 examples recorded in Dartmoor, with the remainder of the county having only 61 recorded pillow mounds at a density of 0.01 per square km (*ibid*). Such figures do however only reflect our knowledge of surviving pillow mounds: it is likely that further pillow mounds remain to be recorded, while conversely some earthworks may have been misidentified as pillow mounds. Moreover, it is apparent that not every historic warren has preserved physical traces of their pillow mounds, while some warrens would not have had pillow mounds, particularly on coastal sites that utilised expanses of sand dunes. The few pillow mound sites in Cornwall outside north-east Cornwall include the group associated with Godolphin House, Breage (Herring 1998); the pillow mounds post-date a medieval field system, and there are seventeenth-century references to the warren. A single pillow mound at Carn Brea, Illogan (HER MCO24896), was also presumably a high-status site, being within the deer park of the Basset family of Tehidy, while the context of three or four pillow mounds in coastal rough ground at St Agnes Head and Tubby's Head, St Agnes, is less clear (Johns 1998, 58, 60; Dudley 2007; HER MCO30072, 30074). Of particular interest is a pair of pillow mounds at Bodwen, Lanlivery (Harris *et al* 1977, 57), as their location is similar to that of a number of the warrens in north-east Cornwall, being in a field immediately next to the farmstead. They survived as earthwork mounds, one circular, the other elongated, and were investigated with excavation trenches; the elongated mound had flanking ditches and was made up of a homogeneous layer of gritty soil over

a spread of large granite pieces which were thought to be part of the structure of the mound (*ibid*).

The ages of historic warrens are often difficult to gauge due to inherent problems in dating their archaeological remains. Excavations have tended to yield little dating evidence as pillow mounds generally contain little dateable material, although there are some limited exceptions including the two pillow mounds at Bodwen, for which a *terminus post quem* is provided by fifteenth-century pottery (Harris *et al* 1977, 57). Most dating evidence is instead derived from assessing relationships with other archaeological features in the landscape (Williamson 2007, 47–8). While historic documentary sources can record the presence of warrens, although not necessarily their foundation dates, it is unfortunately often hard to reconcile documentary references to warrens with surviving archaeology, particularly when those references contain only vague locational data. Nevertheless, the present investigation reveals that rabbit warrens were present in Cornwall from at least the late thirteenth century, while some remained in use until the late eighteenth and nineteenth centuries and even into the twentieth century. For example, there are records of the leasing of very extensive and valuable warrens in the sand dune areas north of Perranporth at this time (Dudley and Kirkham 2011).

There are however no pillow mounds or boundary features known to be associated with these coastal sand dune sites, and it is likely that the warrening here was essentially the harvesting of a wild resource (*ibid*). In fact, it is often difficult to know whether the most recent references to warrens refer to man-made warrens or whether they simply refer to areas where rabbits were then living naturally and which therefore provided a ready supply of animals. Sheail (1978, 354) wrote that by the 1700s rabbits were able to survive in a feral state outside of a warren so there is no obvious reason why any modern reference to a warren would automatically refer a man-made warren. The confusion arises because it is known that some warrens were created into the early twentieth century, or at least certain areas of land were set aside for warrening purposes, such as the aforementioned Ferndown Warren, Dorset, which was created in 1921.

Modern references to poaching rabbits are relatively common, not just in Cornwall but throughout south-west England, indicating that even if rabbit populations were by then essentially wild, they still represented a commodity that was the possession of particular landowners. For example, poaching of rabbits was reported at St Minver in 1916 when poachers came from Padstow, with Deputy Chief Constable Blanfield saying that 'it was customary for the trappers take 400 to 500 rabbits each night and despatch them to market for human consumption. On the last two occasions the trappers had been there only 157 rabbits were taken, so it showed that something had been happening there. It was a serious thing to have the warren interfered with by poachers' (*West Briton*, 25 August 1916, p5). Another similarly late reference to a warren in Cornwall records the sale of a warren at Reen Sands, Perranzabuloe, in 1920 (*West Briton*, 22 July 1920, p8).

Medieval rabbit warrens in north-east Cornwall

Six medieval warrens are recorded in north-east Cornwall (Fig 4), with the earliest reference in this area, and indeed the entire county, recording a *conigerium* at Tintagel in the 1297 accounts of the earldom of Cornwall, although they record that nothing was received from pasture in the warren that year (Midgley 1945, 222). This reference refers only to a warren within the manor of Tintagel, and not necessarily the castle, although later references do refer to a warren in the castle. For example, Canner (1982, 28) reports that in 1423 John Butte of St Gennys had a year's lease of 'the castle called the Island with the rabbits there', although Canner does not give a source for this. The 1447–8 accounts of the Arundell family, record '6s 8d revenue of Tyntagell castle called Ilond with rabbit warren there, demised to John Lowr' (Cornwall Record Office [hereafter CRO] AR/2/7/19/5). At this time, the Duchy manor of Tintagel was under the stewardship of the Arundells, with the rabbit warren being leased to private tenants rather than being managed directly by the parent manor, as was the warren at the family's seat at Lanherne, St Mawgan-in-Pydar, recorded in 1480 as being leased to a John Ricard (Fox and Padel 2000, 99).

Although Tintagel's acidic soils tend to hinder the preservation of faunal remains, excavations have yielded a small number of animal bones including a single rabbit femur from a deposit dated to the twelfth–thirteenth century, while

a rabbit atlas was also found in the same trench but from flot residue (Barrowman *et al* 2007, 296). While this may indicate the presence, or at least consumption, of rabbits during the twelfth–thirteenth century, the excavators admit that the specimen may derive from a later intrusive animal (*ibid*, 299). In 1537 there was a proposal for grazing rabbits on Tintagel at 'an ancient rent' of 6s 8d (Thomas 1993, 118), while Richard Carew's 1602 survey of Cornwall noted that Tintagel was then being used as pasture for rabbits and sheep, although nothing is known of its subsequent history as a rabbit warren (Chynoweth *et al* 2004, 120*v*).

Further medieval references to rabbit warrens in the area date from 1347 when the Patent Rolls record the trespass of the Duchy of Cornwall's deer parks at Helsbury, Kerrybullock, Lanteglos, Launceston and Liskeard and the thefts of hares, rabbits, partridges and pheasants from warrens associated with these parks (*Cal Patent Rolls Edward III* 1908, 394; see also the Appendix for a list of sites discussed in this text). As rabbits at that time were not yet living in feral colonies, this reference implies the presence of rabbit warrens in these deer parks, and indeed a strong connection between medieval deer parks and rabbit warrens has been noted elsewhere (Williamson 2007, 89; Creighton 2009, 111; Mileson 2009, 3). However, this particular Patent Roll entry is somewhat ambiguous for although it records the trespassing of multiple parks, it treats that trespass as a single incident and it does not explicitly state from which of these parks rabbits were stolen. It is of course possible, even likely, that each of these parks had a rabbit warren, but presently all that can be conclusively shown is that at least one of them had a warren from which rabbits were stolen in 1347.

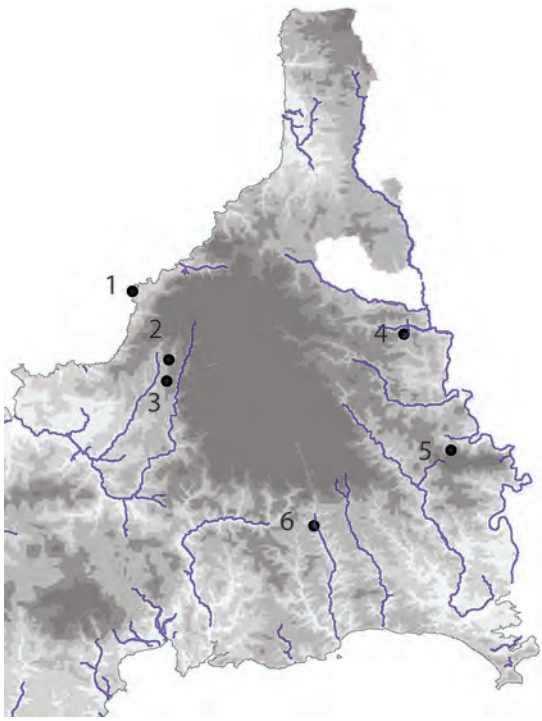

Fig 4 Medieval rabbit warrens in north-east Cornwall: 1. Tintagel; 2. Lanteglos Park; 3. Helsbury Park; 4. Launceston Park; 5. Kerrybullock Park; 6. Liskeard Park. Contains OS data © Crown copyright and database right 2018 Ordnance Survey (100025252).

An earlier reference to the trespass of Kerrybullock, Lanteglos, Liskeard, Restormel and Trematon deer parks is recorded in 1272 but at that date only deer and hares were recorded as stolen (*Cal Patent Rolls Henry III* 1913, 706). A reasonable assumption can therefore be made that the rabbit warrens from which rabbits were stolen in 1347 were installed in those parks at some time after 1272 if rabbits were not stolen during that earlier incident. While it is possible that those parks did contain rabbit warrens in 1272, this is doubtful as park break-ins were primarily symbolic gentry-led acts, performed by neighbouring landowners in a widespread activity of aristocratic 'one-upmanship' where rivals' prized hunting lands were entered and their animals stolen, animals that carried connotations of wealth and status (Williamson 2007, 15; Mileson 2009, 171). Given that the presence of any rabbits would have been signposted by the presence of pillow mounds, features that would have also aided their capture, it seems unlikely that rabbits would not have been stolen had they been present.

Aside from this reference to rabbit thefts, little is known of these Cornish parks' rabbit warrens although several were evidently long-lived, with Lysons (1814, 234) writing of Helsbury Park in the early nineteenth century that 'till lately' it was still a rabbit warren. Similarly, Liskeard Park contained a rabbit warren in the eighteenth century, recorded in a 1748 indenture of the lease of several parcels of lands and the hunting rights within them, including a 'free warren of coneyes' with a yearly

rental value of £20 (CRO EL/39/10). These same lands are recorded in several leases until 1784, and while a survey of the barton of Lodge within the park includes maps of various parcels of land, including a *Coning Wood*, they unfortunately do not allow for a more precise identification of its location (CRO EL/39/22; CRO EL/39/17). Such longevity is not necessarily unexpected: a rabbit warren at Badbury Park at Kingston Lacy, Dorset, is first recorded in 1295 (National Record Office DL29 1/1) and fell out of use only in 1740, having been leased to private tenants from the sixteenth century rather than being managed by the de Lacy family's estate (Papworth 1994, 64).

Although the 1347 reference to rabbit thefts is the earliest confirmed reference to rabbits in inland Cornwall, as opposed to the coastal promontory of Tintagel, a site typical of the earliest recorded rabbit warrens in the UK, it is possible that an earlier warren existed at Launceston. Excavations at Launceston Castle identified over 9500 faunal remains, with rabbit bones recovered from late thirteenth-century deposits onwards, although the species remained rare until the post-medieval period (Albarella and Davis 1996, 1–3). The nearby deer park is the likely source of these rabbits, and the fact that Launceston was the *caput* of the pre-Duchy Earldom of Cornwall indicates that it was a site of considerable importance and the presence of a rabbit warren at an earlier date would therefore not be unexpected.

Post-medieval warrens in north-east Cornwall

Documentary references to rabbit warrens in the area during the post-medieval period increase (Fig 5), and while such references do not necessarily indicate a post-medieval date of origin, in the case of north-east Cornwall there are etymological reasons to believe that this is indeed the case in most instances. Fourteen warrens in the area are named in post-medieval documents, with twelve taking the form of *warren* fieldnames preserved on the tithe maps and apportionments of the parishes of Callington, Kilkhampton, Lesnewth, Linkinhorne, St Cleer, St Neot, South Hill, Week St Mary and Whitstone. However, one of the two possible warrens recorded in Linkinhorne parish, near Winslade, is suggested by the fieldnames *Homer Warren's House* and *Outer Warren's House*,

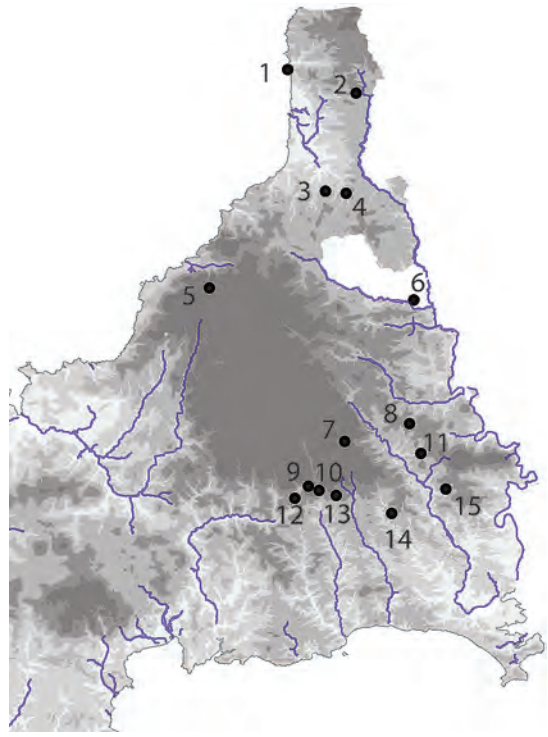

Fig 5 Rabbit warrens recorded in post-medieval documents: 1. Warren Point; 2. Moreton Pound; 3. Leigh; 4. Whitstone; 5. Tregrylls; 6. Werrington Park; 7. Henwood; 8. Winslade; 9. South Draynes; 10. Higher Treworrick; 11. Lower Manaton; 12. Higher Trengale; 13. Between St Cleer and Poketor; 14. Newton Park; 15. Castlewich. (Note that Werrington was historically part of Devon until transferred to Cornwall in 1966.) Contains OS data © Crown copyright and database right 2018 Ordnance Survey (100025252).

the form of which is atypical of other *warren* fieldnames in the area: these fields would seem to suggest the presence of a former warrener's lodge although no trace of such a building has been noted or recorded on any cartographic sources, and nor is there any other fieldname for a warren here; the names may commemorate a surname rather than a rabbit warren.

The prevalence of *warren* fieldnames instead of variations of *coneygarth* is noteworthy, given the aforementioned distinction between the two terms during the medieval period, with the former nearly always referring to the legal concept of free warren

and the latter to rabbit warrens. While there are occasional examples of medieval uses of the word *warren* to denote rabbit warrens, such as the 1462 description of a rabbit warren named *Northampton Wareyn* in Northampton (*Cal Patent Rolls Edward IV* 1897, 13), this term is not consistently used to describe rabbit warrens until *c* 1540 in the chancery rolls. *Coneygarth*-related fieldnames are common throughout England, and while this shows the longevity of the term as a place-name, it also indicates that *warren* fieldnames did not replace earlier *coneygarth*-derived fieldnames despite that earlier terminology dropping out of common usage. The frequent use of *warren* is unlikely to merely represent a Cornish alternative to *coneygarth* as field names of that earlier derivation are found throughout the county: *Conyng Close* at Carminow, Mawgan-in-Pydar, in 1447 (CRO AR/2/894), *Connynger* at East Looe in 1581 (CRO WM/188), *Park and Conyn* at Gwether, St Gluvias, in 1598 (CRO EN/585), *Coney Field* at St Gluvias in 1746 (EN/600), and *Conygerparke* at Tywardreath in 1605 (CRO B/1/23/1). It is suggested then that *warren* fieldnames in north-east Cornwall represent post-medieval rabbit warrens.

Many of the warrens suggested by these prevalent *warren* fieldnames in north-east Cornwall share similar landscape traits (Fig 6). Typically, although not exclusively, they are small and often confined to single fields and tend to immediately adjoin their parent farmstead, such as those at Castlewich (Callington), Tregrylls (Lesnewth), Higher Trengale and Higher Treworrick (both St Cleer), Henwood and Winslade (both Linkinhorne), Leigh (Week St Mary) and Whitstone (Whitstone).

The other noticeable aspect of these warrens is that many did not utilise nearby uncultivated marginal lands but were instead located among arable lands: Henwood's warren ignored Langstone Downs, Withybrook Marsh and Craddock Moor; High Trengale's warren ignored Trengale Wood, Bulland Downs and St Cleer Downs; Whitstone's warren ignored Whitstone Wood, Wadfast Wood and Trehawsa Wood; Castlewich's warren ignored Viverdon Downs. The warrens at South Draynes (St Neot) and between St Cleer and Poketor (St Cleer) differ slightly in that while they did not immediately adjoin their parent farmsteads, they nevertheless avoided the nearby South Draynes Wood and St Cleer Downs respectively. While it is not obvious whether these marginal lands formed part of these particular farms' holdings, which if not would explain why they were not used by them, the issue remains that such lands were not used. If, as has been frequently cited, marginal lands were the most economically conducive to rearing rabbits, particularly during the post-medieval period, then it might be expected that these marginal areas would

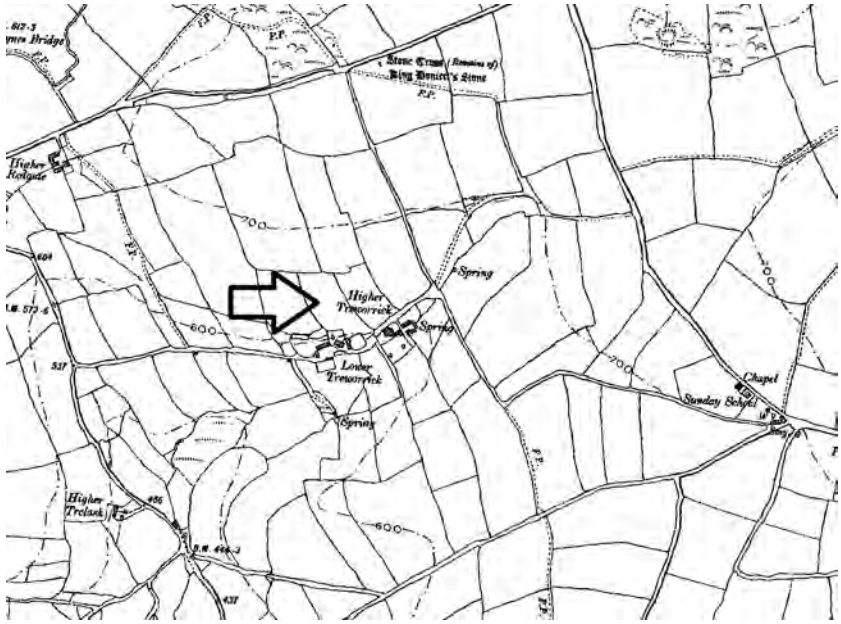

Fig 6 Location of Warren field (no. 1744 on St Cleer tithe map) at Higher Treworrick showing a setting typical of many of north-east Cornwall's post-medieval warrens. In this example the field is clearly part of a strip-derived system, suggesting former use as arable and reinforcing the probable post-medieval date. (Mapping from 1907 First Revision 1:10560 County Series OS Map.)

have been used by whichever landowners did own them. The small scale of these warrens and their parent farmsteads strongly suggests that they were private ventures that supplemented agricultural outputs rather than serving as the commercial foci of those farmsteads.

The status of the farms and settlements associated with these warrens appears to vary considerably. Some appear to be farmsteads with no obvious pretensions, but others may have been more substantial houses. For example, Tregrylls, Lower Manaton, Leigh and Whitstone were all noted on the 2nd edition Ordnance Survey 25in: 1 mile (*c* 1907) as being 'on site of mansion'. Tregrylls has been described as 'anciently the seat of the Betenson family' (Penaluna 1838, 12), Castlewich is a sixteenth- to nineteenth-century house, thought to have been built for the Crabbe family (National Heritage List for England (NHLE) 1140065), Leigh was the seat of the Leigh family in the sixteenth to seventeenth centuries (HER MCO10855), and Lower Manaton was the seat of the Manatons. The warren at Lower Manaton house, which in its current form dates to 1687, although Carew noted an earlier house in 1602, is undoubtedly an elite installation as evidenced by the survival of a stone warren boundary wall, something that is not preserved elsewhere in north-east Cornwall; the stone walls are constructed of vertically laid slates, with horizontal slates projecting from the top to contain the rabbits (NHLE 1140817). Evidence for other post-medieval warrens in north-east Cornwall associated with the more elite levels of society may also be found at Werrington Park (Werrington), Newton Park (St Ive / Quethiock) and probably Stowe (Kilkhampton).

Werrington Park's warren is first recorded in a 1641 lease and while no details of its land-use is given, that it is referred to simply as 'the warren' may suggest that it was still then functional (CRO WW/642). Werrington manor was held by Tavistock Abbey until the Dissolution and subsequently changed hands several times before being bought in 1620 by Sir Francis Drake, nephew of the celebrated and similarly-named Tudor admiral. The surviving manor house largely dates from the sixteenth century although it incorporates medieval fabric, while the surrounding Werrington Park was principally developed during the 1740s and therefore post-dates the rabbit warren. The exact location of the warren is unknown, for although the park contains a structure called *Warren House*, suggestive of a warrener's lodge, it may simply be a romantic or ornamental structure; the park contains numerous follies including a ruined castle, a temple of the sun, a triumphal archway, a hermitage and the so-called *Tomb of the Horatii*.

A rabbit warren in Newton Park is recorded in a number of documents, the earliest dating from 1571 when it was leased by William Jenkinge to Peter Coryton of West Newton Ferrers, St Mellion (CRO CY/371). Bounds cited in the document indicate that it was in St Ive parish, across the River Lynher from the house at Newton Ferrers. The bounds include 'Heathfield Lake' to the south, probably the stream running east from Heathfield Farm, and the Lynher, together with a warren wall and pale or hedge on the west and north. The St Ive tithe survey lists two fields in this area as Higher Deer Park and Lower Deer Park (numbered 1553 and 1554). The *c* 1768 will of Joanna Helyar refers to two 'coney warrens' (CRO CY/1706) and a Warren House and Warrenhouse Plantation were recorded in Quethiock parish to the south of that in Newton Park by the Ordnance Survey 1st edition 6in map. The Park warren was evidently relatively long-lived – it clearly pre-dated 1571 – and may represent a further aristocratic medieval warren associated with a deer park, an association seen elsewhere in Cornwall and nationally.

A coastal warren was located at Warren Point in Kilkhampton, for which the 1840 tithe map and apportionment names all fields adjacent to the coast as *Warren*. This was presumably associated with Stowe House, just to the east, the seat of the Grenvilles since the fourteenth century. In 1679 John Grenville, first Earl of Bath, replaced the old house with a large country house and gardens, though this was itself demolished in 1736 (Wilson-North 1993). The use of a *warren* fieldname again suggests a post-medieval date of origin. The warren is a rare example of the exploitation of the north-east Cornwall coastline for breeding rabbits, for aside from the medieval warren at Tintagel and the warren at Willapark (discussed below), no other coastal warrens are known in this part of the county.

A final rabbit warren known only from documentary sources is perhaps the most intriguing example in north-east Cornwall. Launcells' 1840 tithe map records the fields numbered 261–265 and 270–271 north of Moreton Pound as a tenement named *Conegar*. The tenement is located on the edge of local arable lands bordering Lamberal

Water in an area depicted on later Ordnance Survey maps as rough marshland. The utilisation of marginal land on the edge of cultivation, the use of a *coneygarth*-derived fieldname and the subsequent division of the warren into smaller fields suggests that Launcells' tithe map preserves an earlier, perhaps medieval, tradition of rearing rabbits at the site.

Surviving warren architecture in north-east Cornwall

Thirteen possible rabbit warrens have been identified in north-east Cornwall that have surviving elements of warren architecture, almost all pillow mounds, although as noted above, Lower Manaton's warren preserves a stone boundary wall (Fig 7). Five of the possible sites are in farmland (Lower Manaton, North Dinnicombe, Helland Barton, Polhilsa, Treconner and Creddacott); the pillow-mound sites in farmland were all identified from aerial photographs, and only those at Creddacott definitely survive as earthworks. The remaining sites survive on more marginal land: four on Bodmin Moor (Davidstow Moor, Louden Hill, Carbilly Tor and Hardhead Downs), one coastal site (Willapark) and two in hillforts (Largin Castle and Warbstow Bury). The level of field survey for the earthwork sites is variable, with only the mounds at Louden Hill, Warbstow Bury and Largin Castle having been surveyed on the ground; those at Carbilly Tor and Davidstow Moor have been plotted from aerial photographs by the National Mapping Programme (NMP).

The pillow mounds discussed in this article and listed in the appendix are those which have been recorded as such by the Cornwall HER, although in several instances this identification is tentative. For all these pillow mounds, the present author undertook further investigation by analysing aerial photographs held at the National Monuments Record (NMR) in Swindon, and LiDAR images hosted by the Geomatics Group. Where public access allowed, each site was also visited by the author in November 2015 with the initial aim of confirming or disproving the presence of any warren features recorded by various evidence sources, and then to record the nature of surviving warren architecture by confirming the numbers of pillow mounds present as well as recording their locations, morphologies and dimensions. Pillow mound locations were recorded using a GPS and the dimensions of any warren features were recorded using a 30m tape measure and by taking GPS measurements at various points around the pillow mounds' external edges, which could then be uploaded as points in a GIS and their dimensions measured. Relationships between warren features and other archaeological remains were also assessed during field visits in order to provide relative dating.

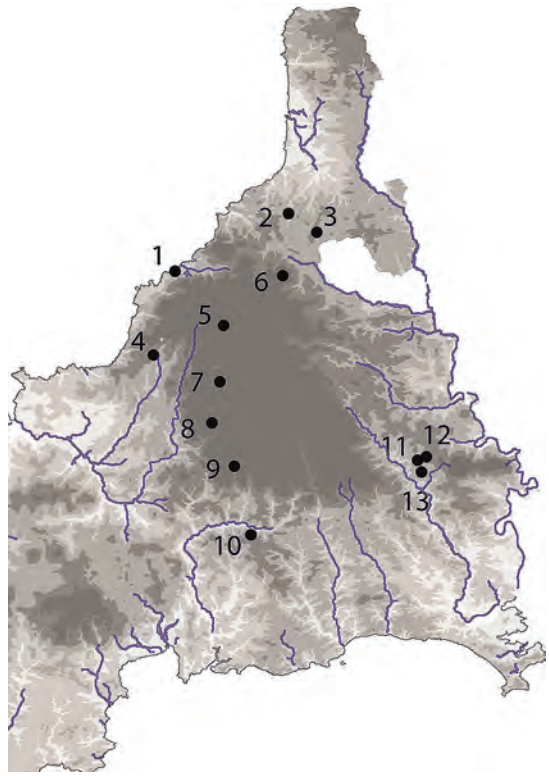

Fig 7 Surviving warren architecture: 1. Willapark; 2. North Dinnicombe; 3. Creddacott Farm; 4. Helland Barton; 5. Davidstow Moor; 6. Warbstow Bury; 7. Louden Hill; 8. Carbilly Tor; 9. Hardhead Downs; 10. Largin Castle; 11. Lower Manaton; 12. Polhilsa; 13. Treconner. Contains OS data © Crown copyright and database right 2018 Ordnance Survey (100025252).

As a result of systematic mapping from aerial photographs and intensive ground survey in the 1980s and 1990s (Johnson and Rose 1994; Herring *et al* 2008) it is clear that pillow mounds are not a

significant feature of Bodmin Moor's archaeology, as only a few somewhat uncertain sites have been identified. Five possible pillow mounds have been recorded from aerial photographs by the county HER (MCO38135) on Davidstow Moor (Davidstow), although three of these earthworks, in a north–south line, are likely to be the remnants of a scrubbed-out field boundary. The two remaining earthworks are less likely to have been field-boundaries and it is possible that they represent post-medieval pillow mounds. Ultimately, and in large part due to landscaping activities on the site during the construction of an airfield in 1942, Davidstow Moor's earthworks are particularly complex and a dedicated earthwork survey is required to better understand them.

Moreover, the history of the site prior to the construction of its airfield in 1942 is little-known, although nineteenth-century mapping records it as open moorland in contrast to much of the surrounding area which had been enclosed by the local farmsteads. The presence of scrubbed-out field boundaries at the northern edge of this area of moorland near the former Higher Grigg's Down farmstead does suggest the area of enclosures was slightly greater in extent than it is today. The rabbit warren on Davidstow Moor, if indeed that is what these particular earthworks represent, was therefore constructed on an area of marginal land which was not part of the arable fields of the nearby farmsteads, or else there was some slightly increased pastoral activity which saw the removal of a limited amount of field boundaries and included the provision of rabbit pasture.

A single circular pillow mound approximately 19m in diameter lies on the south face of Louden Hill (St Breward) in the Roughtor Commons area of Bodmin Moor (Fig 8). It is included within the scheduling of the wider historic landscape, where it is noted that it has a 'roughly level upper surface with several exposed slabs which may derive from built chambers and passages' (NHLE 1019885). As noted earlier, the internal features and construction methods of pillow mounds display great variety and while the exposed slabs here hint at internal features, this particular earthwork has not been excavated and the true nature of its internal construction remains unknown.

The date of this pillow mound is unknown, although there are grounds for suspecting a post-medieval date. The remnants of enclosed medieval fields approximately 200m to its north, associated with two longhouses, were noted during a Royal Commission on the Historical Monuments of England (RCHME) survey, indicating that arable farming was attempted in this remote area of moorland (Johnson and Rose 1994, 103, 111, fig 66, map (iii)). Documents at Cornwall Record Office (CRO BRA833/18) show that much of Roughtor Commons was used as pasture from at least 1678 onwards, as indeed it still is, suggesting that the pillow mound post-dates the abandonment of medieval arable farming and the subsequent adoption of pastoral activities: while it is possible that the tenants of Louden would have bred rabbits whilst practicing arable farming, this is an unlikelier scenario given rabbits' historic propensity for destroying local crops (see Sheail 1978, 352-3; Bailey 1988, 7). The pillow mound lies within an area of numerous prehistoric earthworks, particularly hut circles and Bronze Age cairns, and while there is often an inherent uncertainty in confidently identifying a single isolated earthwork as a pillow mound, the form of

Fig 8 Pillow mound on Louden Hill. (Photograph: author.)

Louden Hill's example differs markedly from the surrounding prehistoric earthworks which strongly suggests it belongs to a different archaeological tradition and that its identification as a pillow mound is correct.

Three circular mounds in a rough line over 120m in moorland on Carbilly Tor (Blisland), plotted from aerial photographs and measuring 9m to 12m across, have been interpreted as either pillow mounds or round barrows (HER MCO50152). Field visits undertaken by the present author have ultimately failed to determine their true identification, although their physical setting is in keeping with those of the area's other extant pillow mounds, particularly relative to former land-use: the mounds are within medieval arable fields associated with the abandoned medieval and post-medieval settlement of Bedwithiel (HER MCO22398) in an area referred to as 'mooreland' in a 1662 conveyance of land in Trevedowe Manor (CRO GRA/225/4). This document makes no mention of any agricultural activities, suggesting that arable farming had ceased by that date and that the pillow mounds' position within those former fields represents efforts to utilise land that was no longer being exploited for arable during the post-medieval period.

A single possible pillow mound on Hardhead Downs (Warleggan) lies in an area of moorland recorded as commons in the same 1662 conveyance of lands in Trevedowe Manor. The linear mound (Fig 9) was described by the RCHME surveyors in 1984 as well made and regular, 8.5m long by 4m wide and 0.6m high (HER MCO22332). It was built against a former field boundary that demarcates an area of ridge and furrow, indicating a post-medieval date of construction; as with the pillow mounds at Carbilly Tor, Louden Hill and Davidstow Moor, its presence in or adjacent to medieval fields suggests a similar experience to that noted elsewhere in the study area whereby former arable land was abandoned, or contracted, in favour of pasture, with the construction of a rabbit warren being part of that later phase of land exploitation, albeit as only an incidental component of that later pastoral landscape. However, it is worth noting that its identification as a pillow mound remains uncertain: the Cornwall HER records a field visit by Peter Herring in 1989, who interpreted the field boundary as a leat and noted a small V-shaped reservoir at the same location as the pillow mound, formed on one side by the leat and on the other side by a bank 5m by 1.5m and 0.6m high (HER MCO23798). The need to construct a pillow mound when the former field boundary already presented a readymade earthwork is also difficult to explain, although it has been noted elsewhere that pillow mounds were added to pre-existing earthworks, for example the two pillow mounds added to the long barrow called Adam's Grave in Alton Barnes, Wiltshire (Williamson 2007, 147). Ultimately, the earthwork on Hardhead Downs represents an example of the difficulty in determining any particular earthwork on Bodmin Moor as a pillow mound when there is an absence of supporting documentary evidence.

The Hardhead Downs pillow mound is situated in the immediate vicinity of Hardhead Mine, a disused tin mine recorded on the 1st edition Ordnance Survey 25in: 1 mile map (1882), while a second multi-period mine lies approximately

Fig 9 Pillow mound on Hardhead Downs. To the left is a boundary bank or leat, with the pillow mound to the right. In the middle distance earthworks show where the line of a lode has been worked. (Photograph: author.)

480m west of the pillow mound. It is known that in some instances pillow mounds were constructed on Dartmoor to feed workers in nearby mines and clay works, such as those at the Redlake and Leftlake clay works and at Eylesbarrow and Holne (Robertson 1991, 249–50). It is possible that Hardhead Downs' pillow mound was installed for the workers in the local mines, although conversely it may have simply provided extra food for nearby farmsteads who pastured on the moor, such as Tiptreehall and Higher Dewey, both of which are recorded near the warren on the 1st edition Ordnance Survey 25in: 1 mile (1882).

Two rabbit warrens in north-east Cornwall utilised the interiors of hillforts, mirroring a situation seen elsewhere nationally where frequent spatial links between pillow mounds and Iron Age defensive earthworks have been observed (Williamson and Loveday 1988, 296). Largin Castle (Broadoak) preserves a linear pillow mound set against its innermost northern rampart, recorded by the Ordnance Survey surveyor in 1972 as a ditched feature 14m long and 0.7m high (HER MCO23345). A second linear feature of similar dimensions is revealed by LiDAR images viewed by the present author near the hillfort's southern inner rampart and may represent a second pillow mound. Little is known of the site's history, although Cornwall's HER records the hillfort's interior as ancient oak woodland indicating that Largin Castle was not used for arable practices, with the construction of at least one pillow mound representing an exploitation of land that was likely considered marginal. The historic ownership of the warren is unknown although it was probably managed by Bodithiel Farm approximately 400m to its east.

The interior of Warbstow Bury hillfort (Warbstow) also preserves a linear pillow mound (Fig 10) known locally as the Giant's Grave, which according to local tradition represents the burial place of the Warbstow Giant after being killed by the Giant of Beacon (Heard 1977, 6). The mound has been surveyed by English Heritage as part of a survey of Warbstow Bury; it is 22.5m long, 9m wide and up to 1m high, with a very shallow ditch on three sides; two sub-circular depressions on the top may reflect internal structuring of the mound (Edwards 2014). The mound overlies ridge and furrow, the faintness of which has been interpreted as the result of only a limited period of arable activity, possibly just 'for a few seasons' or for preparation of the area ready for the placement of the rabbit warren (*ibid*, 26). The latter scenario seems unlikely as the warren would have needed continuous pasture for its rabbits, but the fact that the pillow mound overlies ridge and furrow clearly indicates that it post-dates the arable farming, representing a conversion to pasture. That the arable activities were evidently short-lived indicates that the hillfort was never part of the agricultural heartland of Warbstow and that the installation of a rabbit warren was a means of utilising land that was considered largely marginal and which provided a ready bounded space.

Fig 10 Pillow mound at Warbstow Bury. (Photograph: author.)

Although the mound overlies ridge and furrow, the English Heritage survey considered that the small scale of the pillow mound indicated a medieval date, representing a personal rather than commercial use by one of the nearby manor houses of Fentrigan or Downinney (*ibid*, 21). While the presence of a single pillow mound probably does represent a personal use, the implication that personal usages of pillow mounds ceased during the post-medieval period is questionable, especially as the majority of known warrens in north-east Cornwall appear to be post-medieval and were unlikely to have been commercial ventures. Moreover, rather than hiding a warren within the ramparts of Warbstow Bury, it is more likely that these manor houses would have constructed their warrens at a closer distance, partly to deter poaching but also to exhibit the wealth and status associated with medieval warrens. It is therefore more likely that the pillow mound is post-medieval.

A rare group of coastal pillow mounds in the area is preserved at Willapark (Forrabury and Minster) in a similar setting to Tintagel's warren, which lies approximately 4.6 km to the west. The warren consists of one circular mound 11m in diameter and two oval pillow mounds, one 12m by 8m and the other 9m by 5m. The mounds are situated on a rocky outcrop to the immediate west of the agricultural heartland of Boscastle, whose medieval strip fields, known as the Stitches, are preserved on Forrabury Common (Wood 1963, 29–33). The true nature of these earthworks is unknown and the Cornwall HER had originally recorded them as Bronze Age round barrows, although they currently consider that the sloping site seems an unusual barrow location, and they are perhaps more likely to be pillow mounds (HER MCO41872). Interestingly, a stone hedge which divides the promontory from the Stitches (Dudley 2003, 23–4) could be seen to represent a warren boundary, a feature that would be expected given the proximity of such a warren to these arable fields, although it may well have served to keep any grazing livestock from straying on to the Stitches. Ultimately all that can truly be said is that the landscape context of these earthworks is suggestive of an attempt to fully utilise an area of marginal land by rearing rabbits, and while a boundary wall may represent an attempt to stop rabbits straying on to arable fields, such a close proximity between a rabbit warren and arable lands is not uncommon, and indeed this scenario has been noted elsewhere in north-east Cornwall.

Although the warren clearly avoids the Stitches, and so was installed when they were still under the plough, these medieval fields remained in use during the post-medieval period, albeit under reduced ownership, and it is unknown therefore when the warren would have been installed. The ownership of this warren is unknown, although it is unlikely to have been used by the tenants of Forrabury Common so close to their arable fields; instead it is likely to have been a manorial warren, perhaps leased to a private tenant, particularly as historic references to lords' rabbits destroying local populations' crops are not uncommon (see Bailey 1988, 7; Bettey 2004, 391; Williamson 2007, 161).

A small linear mound at Trefursdon (South Hill) measuring 18m by 8m, plotted from 1946 aerial photographs, has been interpreted as a pillow mound by the Cornwall HER (HER MCO29649), although its true nature is unclear. It is situated in an area characterised by Cornwall's Historic Landscape Character assessment (HLC) as medieval farmland, and indeed there are several areas of ridge and furrow in the immediate vicinity of the earthwork, while the remains of the eighteenth-century Treconner Farm lie approximately 50m to its north-east. Although it is not certain that this earthwork should be identified as a pillow mound, it nevertheless shares similar landscape qualities with warrens noted elsewhere in the area in that it lies in the immediate vicinity of a small farmstead amongst its arable fields rather than utilising nearby marginal land, which in this instance is a short distance away on Golberdon Downs.

Two atypical pillow mound groups in the area are found at Creddacott Farm (Week St Mary) and Polhilsa (South Hill), with ten mounds recorded at the former and eleven at the latter. These are the largest pillow mound groups within Cornwall, with only the nine at Godolphin Hill (Breage) in west Cornwall being comparable. Despite the scale of these warrens, both are unfortunately little-known. Creddacott Farm's pillow mounds were identified in aerial survey by Cornwall County Council's Historic Environment Service in 2008. The six elongated and four roughly circular mounds are relatively widely dispersed over at least two fields south east of the farm, with a distance of approximately 840m separating its northernmost and southernmost mounds. The

Fig 11 Pillow mounds at Creddacott Farm, including rectangular and circular examples. (Aerial photograph: © HER, Cornwall Council; 2008; F87-225.)

large number and extent of the pillow mounds is suggestive of a commercial warren rather than an individual farmstead breeding rabbits for personal consumption. The dimensions of these pillow mounds are also relatively large, ranging between 62m and 18m in length and between 25m and 10m in width, which again suggests that this warren was a large-scale commercial venture.

There is some evidence of a contraction of the settlement of Creddacott, which is first recorded in 1298, as settlement earthworks and a possible deserted farm were noted during a 1993 Cornwall Archaeological Unit field investigation (HER MCO46201). It is probable that following a contraction of former medieval arable activities, some of this farmland was converted to pasture or allowed to revert to rough ground: the mounds are within a block of fields south east of Creddacott Farm shown as rough ground on the 1st edition Ordnance Survey 25in: 1 mile (*c* 1880). Ultimately, there is little evidence of the warren's history, although if it does represent a post-medieval commercial enterprise, it is a relatively small example in comparison to other commercial warrens in the south west, particularly those on Dartmoor where several warrens are known to have contained in excess of 50 pillow mounds, with Huntingdon Warren (Lydford) having as many as 102 pillow mounds.

Eleven possible pillow mounds at Polhilsa were identified by the NMP. Sub-rectangular and sub-oval features were noted on aerial photographs taken during a 1964 RAF sortie, although no visible remains are present today. The identification of these mounds as a warren is doubtful as the field in which the earthworks are located is recorded on the tithe map and apportionment survey as 'Great Marsh', used as pasture, which would seem an unlikely location for a warren, and although next to Polhilsa, the field is separated from it by the parish boundary and was part of the lands of Lower Manaton, which as noted above, had a

walled rabbit warren lying approximately 290m to the west of these possible earthworks. Such a close proximity between two warrens would be unusual as a survey of warrens in south-west England has failed to identify similar cases of warrens situated so close to one another (Gould 2016). If these earthworks do represent a rabbit warren, then the relatively large number of pillow mounds would be rare for the area and would likely represent a commercial warren.

Two other possible rabbit warrens have been recorded in north-east Cornwall whose identification is similarly uncertain. Cornwall's NMP interpreted single linear earthworks at North Dinnicombe (Jacobstow) and Helland Barton (St Teath) as pillow mounds. The Helland Barton site was recorded from 1946 aerial photography as a 9m long feature in a field next to the farm, and the 23m by 6m mound in farmland at Dinnicombe was recorded from 1973 photographs. Visits undertaken by the present author in November 2015 failed to identify any earthworks at these locations. Similarly, an examination of LiDAR images undertaken by the present author has again failed to identify anything suggestive of pillow mounds at either site.

Summary and discussion

The earliest known rabbit warren in Cornwall was located within the Earldom of Cornwall's manor of Tintagel in 1297 and was probably, although not certainly, located on the promontory of Tintagel Island at that time as later references record a warren there. The earliest inland Cornish warrens are associated with the Duchy of Cornwall's deer parks in the north-east of the county, where rabbit thefts were recorded from 1347, although a warren may have existed earlier at Launceston Park as evidenced by thirteenth-century rabbit bones excavated at Launceston Castle. These medieval rabbit warrens serve as a good example of the elite status and exclusivity of warrens during this period as their presence is confined to lands that belonged solely to the Duchy of Cornwall or, in the case of Tintagel and Launceston, the earlier Earldom. Aside from Tintagel, these medieval rabbit warrens form a conspicuous distribution pattern skirting the edges of Bodmin Moor, with the moor itself not exploited for rearing rabbits. This is perhaps expected given that most of the area's medieval warrens are associated with deer parks, which were around Bodmin Moor rather than on it (Herring 2003, 36).

There was an increase in the number of rabbit warrens during the post-medieval period. Much of this evidence takes the form of *warren* fieldnames recorded on tithe maps, and while this evidence does not itself provide foundation dates for these warrens, there are etymological grounds for assigning them a post-medieval date. Only one warren in the study area, the large group of pillow mounds at Creddacott Farm, would appear to have been on a scale to suggest commercial production. Instead, many of the warrens appear to be associated, spatially at least, with farmsteads that were often relatively high-status buildings, and the question therefore arises as to whether these warrens were symbolic installations whose primary function was to display status or to act as ornamental features within elite designed landscapes.

Warrens as ornamental features

Although the question is an interesting one, there are issues with such an interpretation, particularly as both the landscape and cartographic evidence suggests that the majority of these warrens are post-medieval, although a more specific date is lacking. It is now commonly accepted that earlier medieval landscapes were often contrived environments for displaying social power, with the control of nature being absolutely central to the concept of such designed landscapes (Creighton 2009, 1–2), and the construction and management of medieval rabbit warrens directly align to this concept. As such, it has been suspected that rabbit warrens during the medieval period are likely to have been located in order to demonstrate their owners' control over natural resources as well as to display their wealth (*ibid*, 114). Warrens may also have played a purely ornamental role within medieval designed landscapes. Advances in identifying medieval ornamental landscapes during the 1970s and 1980s have hinted at past generations experiencing an enjoyment of their surrounding environment (Taylor 2000, 38), with Liddiard (2007, 97) writing that features such as fishponds, mills, settlements and dovecots were carefully placed in specific locations in order to enhance the aesthetic appeal of the medieval landscape. While Liddiard does not specifically mention rabbit

warrens, Williamson (2007, 155) has stressed the effort that was expended during the medieval period in managing what he terms 'intermediate exploitation', that is forms of livestock management that 'lay somewhere between hunting wild animals and truly domesticated ones'. Rabbit warrens would represent a prime example of 'intermediate exploitation' and it might therefore be reasonably assumed that they played an aesthetic role in medieval elite landscapes in way similar to fishponds or dovecots.

The major flaw of this theory with regard to rabbit warrens is that it is very difficult to test, as most surviving pillow mounds are unlikely to be medieval, and where medieval warrens are known to have existed through documentary references, specific locational information is frequently lacking. As such, the specific sites of medieval warrens are largely unknown and testing what visual role they played within their wider landscapes is therefore not possible. The issue is also somewhat unclear when addressing post-medieval elite landscapes, for although such landscapes are more readily identified than their earlier counterparts, the roles played by rabbit warrens within them is not obvious. As noted earlier, rabbits, and by extension rabbit warrens, declined in social status during the post-medieval period as the species became more common and its value decreased. While it would be wrong to assume that rabbit warrens simply ceased to be associated with high status landscapes during the post-medieval period, to view mere proximity of a warren to an elite residence or an elite landscape as representing an example of an ornamental value or the display of status is perhaps an overly simplistic analysis of historic landscapes.

Many warrens throughout south-west England are associated with residences that today are isolated farmsteads but which historically may have been relatively high-status structures, similar to the situation found in north-east Cornwall. For example, a single pillow mound at Eastington Farm in Worth Matravers, Dorset, was originally associated with the manorial centre of Eastington, while three pillow mounds at Blockley Park Farm in Blockley, Gloucestershire, are associated with a possible former park belonging to the Bishops of Worcester. Although similar examples are numerous, this does not necessarily mean that such warrens fulfilled visually symbolic or ornamental roles, particularly when other ornamental features are frequently lacking and instead the immediate local landscapes are functional agricultural landscapes. Even when other potentially ornamental features *are* present, this too does not imply that any nearby warrens shared a similar visual role; Blockley Park Farm's warren is an excellent example here, for while it is spatially associated with a large fishpond measuring 70m by 55m, which clearly hints at the site's former elite status, this fishpond is a substantial, highly visible structure while its three pillow mounds are simply not comparable as conspicuous landscape features. Instead, the pillow mounds probably relate to changing farming practices at the site when arable activities were abandoned in favour of pastoral farming, including rabbit and sheep husbandry, rather than representing any sort of ornamental status. Even in more obviously ornamental landscapes there is similarly evidence that rabbit warrens may have played only a limited visual role: they do not figure in contemporary depictions or descriptions and are not placed in visually prominent locations (for example, Dyrham Park, Gloucestershire; Lulworth Castle, Dorset; Bruton Abbey, Somerset; Rodway, South Gloucestershire; Gould 2016). A possible exception is the *coneygree* associated with the Sir Baptist Hicks' manor house and Renaissance garden at Chipping Campden, Gloucestershire (Everson 1998, 109). The warren is absent from illustrations of the house and gardens produced by William Hughes in *c* 1750 (British Library, Kings Maps Top XIII 75.3), suggesting that it was never considered a key component of Hicks' ornamental landscape, but it did form a backdrop to one of two banqueting houses.

Godolphin Hill is a Cornish example where the visual role of an elite late-medieval or post-medieval rabbit warren is uncertain. Herring (1998, 72) considered that two of its pillow mounds acted as conspicuous skyline features when viewed from Godolphin House, and Creighton (2009, 114) wrote that four of its pillow mounds were silhouetted on the skyline. When visited by the present author in April 2016 most of the site's nine pillow mounds were obscured by bracken and scrub and none were then visible from Godolphin House, which lies approximately 800m away; it is possible that vegetation and light conditions played a part in determining the visibility of parts of this warren. The presence of scrub and bracken within the deer park may have been a deliberately cultivated feature of deer management as they would have

provided cover and fodder for fawns and there is evidence that at some locations the removal of bracken was an offence (Birrell 1992, 116). It cannot be assumed then that Godolphin's medieval and post-medieval deer park would have been kept free of vegetation, an act that would have helped to increase the visibility of its pillow mounds.

While Godolphin Hill itself is therefore highly visible and dominates the local skyline, and while any original park pale may well have formed a conspicuous landmark, its pillow mounds themselves are really only visible from within the deer park, although a small number of them may have been visible from nearer the mansion under certain conditions. While the warren is undoubtedly a representation and product of the Godolphin family's wealth, it is doubtful that it ever truly fulfilled a visually symbolic role in ostentatiously displaying that wealth or in having an ornamental value. While it cannot be ruled out that they were meant to be visible to those entering the deer park from Godolphin House, although Schofield suggests the main entrance into Godolphin itself was via the west-side of the park instead of from the house (2015, 72), the deer park itself is arguably a more imposing statement of wealth and power; the pillow mounds are merely secondary components of the Godolphins' deer park.

The above examples highlight the issue that proximity to elite landscapes and residences alone does not necessarily imply that warrens had an ornamental status or that they necessarily played any visual role. Few of the examples in the north-east Cornwall study area, other than perhaps Werrington and the walled warren at Lower Manaton, were associated with comparably wealthy and elite landscapes. Moreover, their likely date, post-medieval rather than medieval, also makes it less likely that they were ornamental installations. However, one issue that can today rarely be evaluated is the extent to which their owners considered them to have been ornamental features, nor what contemporary local attitudes to these warrens were. Certain limited historic references do shed some light on this topic, however. A walled-warren of two acres at Trewoofe (St Buryan) was described in 1870, highlighting its role in providing leisure and pleasure as it acted as a place where its rabbits could be watched 'chasing each other by hundreds together, over the rocks and around the bushes, of moonlight nights, or morn and eve, nibbling the dewy clover between their turns of skipping and frisking' (Bottrell 1870, 273). Similarly, perhaps, one of two rabbit warrens at the aforementioned Dyrham Park was located near an area of artificial wilderness and its rabbits may therefore have contributed to that contrived wilderness for the enjoyment of those walking within this pleasure landscape. However, this is countered by the fact that Dyrham Park's ornamental landscape was described at length by Stephen Switzer in 1718, and he makes no mention of either of its two warrens or its rabbits beyond saying that the Park's northern warren offered 'the most entertaining aspect all round' (1718, 125). To him, Dyrham Park's two warrens were therefore evidently not among the principal features of this extensive ornamental landscape.

Ultimately, any question of the status of historic warrens is to a large degree subjective, but the present author does not consider these warrens to have been installed as ornamental features and, Creddacott Farm aside, nor were they installed as primarily commercial warrens. Instead, they were probably used to breed rabbits for personal consumption and to augment agricultural outputs rather than acting as the foci of those outputs. With that said, that most of area's warrens were associated with farms of some status implies that warrening, even in the post-medieval period, still retained some of its former status. While they may have been a source of pride and perhaps even pleasure for their owners, it is difficult to argue the point that they were components of conspicuously elite landscapes as the majority are small and not associated with other ornamental landscape features.

Warrens and farmland

Cornwall's HLC mapping indicates that most of these warrens are located on former medieval farmland on fields previously used as arable, though their small scale suggests they were an incidental aspect of this later pastoral land-use rather than a reason for the change. Cornwall's system of convertible husbandry, where most fields would have been under grass in any one year rather than under the plough, may have meant that the conversion from such fields to rabbit warrens may not have been a great change, but it would nevertheless have meant permanent conversion to a form of pastoral farming at the exclusion of

any arable practices on those fields. This particular land-use, whereby specialised enclosures were situated close to the farmstead, has local parallels in orchards and the meadows which were used for the farm's most important and vulnerable livestock (Herring 2010, 32).

One of the factors behind this development is the change in the dominant form of settlement from hamlet to single farmstead, both around Bodmin Moor and more widely in Cornwall, between the fourteenth to nineteenth centuries (Johnson and Rose 1994, 114; Herring 2006). This change has often been linked to the upheaval caused by the Black Death (Beresford 1979, 143–5), but given the evidence that Cornwall, particularly its eastern half, was able to withstand its worst effects, it may instead be linked to a decline in soil productivity following two centuries of sustained cultivation (Johnson and Rose 1994, 115). Evidence of this settlement shrinkage, and in some places abandonment, possibly linked to a decline in land productivity, may be the reason why some of the small-scale rabbit warrens were installed on and near Bodmin Moor as they would have allowed a means to fully utilise the available lands with a reduced workforce. It has alternatively been suggested that these changes, beginning in the fourteenth and fifteenth centuries, had more to do with internally-driven reorganisation of the hamlets, to improve productivity and increase income; this started with the enclosing of strip fields, but was often followed by the hamlets shrinking to single farms as the holdings were brought into the hands of a single successful tenant, leading also to the development of the farms of yeoman and small gentry (Herring 2006, 58–66). This too would provide a context for the establishment of small warrens in farmland associated with these post-medieval houses and farmsteads.

Bodmin Moor and marginal land

Aside from associations with farmsteads and relatively wealthy residences, a further striking aspect of the area's rabbit warrens is the number of instances when nearby uncultivated, marginal lands were not selected as the sites of rabbit warrens, particularly as it is these types of lands that are traditionally viewed as being historically exploited for rearing rabbits. There is, however, some evidence for warrens on more marginal land, namely those on Bodmin Moor and the examples on coastal rough ground at Tintagel, Kilkhampton and Willapark, although the location of the first two may be due mostly to their associations with, respectively, a castle and an important house. The situation on Bodmin Moor, with just four possible or doubtful sites, all on a small scale, could hardly be more different from that on Dartmoor, where there are at least 61 warrens (Gould 2016, 84–5), many of them having large numbers of pillow mounds (for example, 102 at Huntingdon Warren), reflecting a boom in commercial rabbit warrens from the seventeenth to the nineteenth centuries (Newman 2011, 167–79).

If large tracts of open moorland were conducive to creating large post-medieval commercial warrens, then it might in fact be expected that Bodmin Moor would have rivalled Dartmoor in that regard. Given that rabbits naturally prefer warmer and drier sites sheltered from prevailing winds, Bodmin Moor would appear to be the more appropriate area for rearing rabbits: its climate is warmer, reflected in a longer growing season of 275 days per year compared to 175–225 days in much of Dartmoor; its annual rainfall is lower at around 1400mm per year compared to around 1600mm–2000mm on Dartmoor; while Dartmoor is also characterised by a high average annual number of days with hail reflecting the instability of the south-westerly prevailing winds travelling across the Atlantic Ocean as they the moor (Webb 2006, 30–1). While the underlying soils of Bodmin Moor are admittedly not particularly well-draining, this is a characteristic shared with Dartmoor.

Although a post-medieval increase in warren numbers as seen in north-east Cornwall is in keeping with the wider national historical framework of warrening, why such marginal areas were largely ignored for rearing rabbits is not entirely clear. One reason might be that as an anti-poaching measure, warrens were located near to their owners' places of residence. Another possibility is that it may reflect different traditions and constraints of land tenure; for example, post-medieval Cornwall saw previously unenclosed areas of rough ground that had traditionally been shared by several hamlets as commons become increasingly privatised (Dudley 2011, 45–9). With an increased privatisation of former commons, access to these areas would therefore have been limited in post-medieval Cornwall and consequently it may not have always been possible to utilise such areas for rearing rabbits. While this

would not necessarily have hindered the creation of small warrens, it would have likely hindered the creation of large-scale warrens seen on areas of marginal lands elsewhere in England: for example, in Dartmoor, Willing Walls Warren is recorded as covering an area of 113 ha (HER MDV13511), Hentor Warren 150 ha (MDV13510), Legis Tor Warren 93 ha (MDV14144) and Vaghill Warren 210 ha (MDV6523), while Ferndown Warren in Dorset is recorded as covering 57 ha in a lease of 1921 (DRO D-CRL/B6/6/34).

It is also worth considering whether Dartmoor is exceptional rather than the norm for marginal areas, in which case it should not necessarily be expected that the expanse of marginal moorland on Bodmin *should* have been used. While it is a commonly cited theme that marginal lands were typically exploited for warrening, particularly during the post-medieval period, with Dartmoor being the exemplar site, an investigation of historic warren locations throughout south-west England reveals that in fact a wide range of historic landscapes were used. This is true of both the natural setting, with warrens frequently built on poorly drained and flat land rather than on well-drained or sloping land, and also the historic land use as many warrens were built on former farmland rather than on uncultivated marginal lands (Gould 2017a, 155). This range of landscapes utilised for warrening in the south west is in fact seen in the present study area, for its warrens, both those known from documentary sources and those with extant pillow mounds, are found in areas of former farmland, within hillforts, on coastal rough ground and on the moorland of Bodmin Moor itself. It might then be argued that Dartmoor's large commercial warrens and numerous pillow mounds, of which 787 have previously been recorded (Gould 2016, 90), skews the perception that warrens dominate on areas of marginal land. Certainly, while the expanse of marginal land not used for other agricultural purposes facilitated the creation of large warrens on Dartmoor, it is evident that most historic warrens, at least in south-west England, were not large commercial ventures as typically seen on Dartmoor as the average number of pillow mounds per warren in the region is only 5.2 (*ibid*, 104), while over a third of its warrens that preserve pillow mounds contain only single examples (Gould 2017a, 155). It is notable too that Exmoor contained fewer warrens than Dartmoor, although commercial examples certainly did exist there, such as the seventeenth-century Warren Farm which had 11 pillow mounds. With that said, more historic warrens have been recorded by the present author on Exmoor than on Bodmin Moor, with 28 known examples.

Another explanation for why Bodmin Moor was little exploited by formal warrens is found in a poem written *c* 1694 by Edmund Spoure on daily life at Trebartha House in North Hill parish, on the south-eastern edge of Bodmin Moor (CRO FS/3/93/4/158):

> *Altho a warren here, we want*
> *You'll find that Cunneys are not scant*
> *Our Tors produce good store, tho they seem barren*
> *They are equivalent even to a warren*

The poem records that rabbits were living wild on Bodmin Moor by the late seventeenth century and as such there was therefore no need to construct a rabbit warren. Sheail (1978, 354) wrote that viable breeding rabbit colonies were only able to survive permanently away from warrens by the 1700s. Spoure's poem, although written slightly before 1700, therefore provides contemporary evidence of feral rabbit colonies living in Cornwall at around this time, although given that evidence of rabbit warrens is relatively rare within the interior of Bodmin Moor, it is unclear from where these wild rabbits would have originated. There is, however, no documentary evidence to show how this potential resource might have been exploited.

One of the principal reasons why Bodmin Moor did not see a rabbit industry like that on Dartmoor may be that Dartmoor's warrens were closer to potential major markets and 'export hubs' at Exeter, Dartmouth and Plymouth / Plymouth Dock, as well as a ring of smaller market towns around the moor. When urban populations in Cornwall did approach the scale of their Devon counterparts by the start of the nineteenth century, these large populations were concentrated in west Cornwall rather than the east of the county, although the presence of Bodmin Moor itself partly explains this phenomenon (Fox 1999, 400–16). The importance of local markets and good transport links for promoting large scale commercial warrening has been noted by Williamson (2007, 89) while Bailey (1988, 19) considered that the proximity of London's markets and ports were exploited by East Anglia's warrens from the medieval period onwards, accounting for their large number and prosperity. Sheail (1971, 70) similarly considered that many local markets were

simply too small to sustain large-scale warrening similar to that in East Anglia.

Commercial warrening

Although most known rabbit warrens within north-east Cornwall preserve no architecture, where pillow mounds have survived they tend to be limited in number. This strongly suggests that most of the area's warrens bred rabbits for personal consumption rather than for commercial means, or if rabbits were sold commercially then they were clearly not the main economic focus of their farms' produce. Although the warren at Creddacott Farm was probably a rare example of a large-scale commercial venture, a search of archives in Cornwall Record Office has failed to reveal any evidence of commercial warrening activities in the present study area. Indeed, outside of warrens being recorded on nineteenth-century mapping and the occasional reference within land conveyances, details of the area's warrens, commercial or otherwise, are unfortunately lacking and a more detailed description of these warrens' contributions to local economies is not forthcoming. This should not in fact be unexpected, however, as some of the commercial warrens on Dartmoor are surprisingly little represented by documentary evidence: for example, the Scheduling description of Sheeps Tor Warren notes that 'no documentary information is currently known concerning the warren at Sheeps Tor' (NHLE no 1021391).

The lack of commercial warrening in the area is perhaps not surprising when the county's economic history is considered. Traditionally, installing a rabbit warren represented one particular response to the Black Death as they allowed landowners to diversify their produce at a time when rabbit products were still expensive items and therefore economically viable (Williamson 2007, 17). Rearing rabbits also benefitted from cheap labour costs compared to arable farming, while cullings could be increased without a significant rise in those costs (Bailey 1988, 12). The later medieval period therefore witnessed an increase in rabbit warren numbers, although this would in turn lead to an increased access to, and affordability of, rabbits. However, this increase was not necessarily uniform across England. References to warrening in medieval chancery rolls, the only source of evidence that facilitates regional comparisons across England, indicate that the far south west of Cornwall and Devon had fewer warrens than either the area immediately to its east and particularly south-east England (see Gould 2017b). It seems likely that warrens prospered in eastern England, especially in the south east, because of trade links and market opportunities provided by London and also continental Europe (*ibid*). The relative isolation of Cornwall and Devon, along with the far north and north-west of England, probably explains why it had some of the lowest numbers of later medieval warrens in England.

Cornwall's response to the Black Death may also have hindered a growth of warrening. While it was undoubtedly affected by the Black Death, Cornwall may have been less severely affected than the rest of England as more dispersed settlement patterns lessened its impact (Coleman 2006, 70). Compared to the peasant discontent, falling rents and vacant holdings seen elsewhere (Hatcher 1970a, 142), in Cornwall many manors experienced a period of consolidation and high landlord incomes, with the first quarter of the fifteenth century being a period of 'unprecedented prosperity' (*ibid*), and analysis of tax assessments from the 1330s to the early 1500s indicates relatively high growth (Coleman 2006, 70). It is worth noting that there was also a discrepancy between the east and the west of the county, with the east suffering less from the effects of the Black Death and its manors generally receiving higher rental receipts from the 1420s onwards (Hatcher 1970a, 149–56; Coleman 2006, 70).

If Cornwall's medieval agrarian economy was less affected than the rest of England by the Black Death, particularly in the east of the county, coupled with a relative isolation from trade routes and markets, then this may help to explain why there is little evidence for later medieval commercial rabbit warrens in north-east Cornwall. During a period that has traditionally been noted for witnessing an increase in warren numbers, landowners in north-east Cornwall may simply have had less incentive for rearing rabbits. Moreover, the importance of fishing, seafaring and especially tin-mining in Cornwall (Rowse 1941, 54–66) would have augmented traditional local economies to an extent that further negated the desire to install warrens. Indeed, the importance of these non-agrarian sectors of the Cornish economy may actually have hindered pastoral farming and encouraged arable farming as crops were needed to feed the large workforce of those non-agrarian sectors

(Hatcher 1970b, 3). However, and conversely, this increased population, engaged in some part-time industrial activity, including fishing, as well as sheep farming during the later medieval and post-medieval periods, would have led to an increase in the county's urban population, thereby increasing potential markets for rabbit products.

It is likely, however, that much of the demand for rabbits in Cornwall could more easily be met by commercial warrening on unenclosed coastal areas, taking advantage of the areas of sand dunes further west in Cornwall which were particularly suited to rabbit production. Thomas Tonkin noted in the early eighteenth century that 'our warrens are not so mean or contemptible, since we have many large ones, and well stocked, especially in places overrun with the sands, as St Piran in the Sands . . . The rabbits in them are very fat, and well tasted; and we often meet with both the black and the yellow, among the common grey ones' (de Dunstanville 1811, 75n). The exploitation of the great expanse of sand dunes in Perranzabuloe which included Perran Sands, Reen Sands, Gear, Lamberran (Lanpiran), Penhale and Halwyn is well documented (Dudley and Kirkham 2011, 138). For example, the tenancy of Gear and Lamberran was advertised in 1821, with the holding including a rabbit warren 'extending over six hundred Acres of Ground' which had produced 'a thousand couple of Rabbits annually on an average for the past 20 Years' (*Royal Cornwall Gazette*, 7 July 1821). Polsue (1872, IV, 59) referred to 'extensive, prolific and valuable rabbit warrens' on the lands of Penhale. Other coastal warrens further west in Cornwall were documented in the nineteenth century, in some cases being rented out as commercial concerns: Lelant (*Royal Cornwall Gazette*, 18 Jan 1861); Upton Towans, Gwithian (*Royal Cornwall Gazette*, 5 Sept 1889); Constantine, St Merryn (*Royal Cornwall Gazette*, 29 Nov 1844); Bray Hill, St Minver (*Royal Cornwall Gazette*, 9 Dec 1871); Harlyn Warren, St Merryn (HER MCO25860); and Pencarrow, Lanteglos (HER MCO28617).

An issue when discussing any warrens of such late date is the question of whether they constitute man-made rabbit warrens of the historic type discussed in this article, or whether they represent areas where rabbits occurred naturally and which were essentially a wild resource culled for its meat and fur. Indeed, past fieldwork across the area has not identified constructed warren features such as boundaries and pillow mounds, although such features may not have been necessary on such recent coastal warrens. Given rabbits' natural preferences for well-drained areas and the species' susceptibility to rot-foot in poorly drained conditions, Dartmoor is not as naturally supportive of rabbit populations as Cornwall's sandy coastal areas, prompting the need for the pillow mounds and boundaries which were frequently present on the relatively modern Dartmoor warrens. It is likely then that while man-made rabbit warrens were never a widespread feature of north-east Cornwall, during the post-medieval period when feral rabbit colonies had become established throughout England, certain coastal areas were 'farmed' for their rabbits without a need to construct warrens.

However, sand dunes are not a feature of north-east Cornwall and instead there are only a few coastal promontory warrens – Tintagel, Willapark and Kilkhampton – which are not thought to have been commercial concerns. A small number of similarly sited warrens are known elsewhere in Cornwall such as at Stepper Point, Padstow (HER MCO26601), Trevelgue, Newquay (Fox and Padel 2000, 65), both documented in the medieval period, as well as the pillow mounds at St Agnes Head (HER MCO30072 and MCO30074) and Tubby's Head (National Trust HBSMR 96740) in St Agnes.

Conclusions

While an investigation of the warrening experience of north-east Cornwall reveals that it superficially conforms to the traditional narrative history of western England and Wales' rabbit warrens in that it witnessed a post-medieval increase in warren numbers, it in fact reveals a slightly more nuanced history. The investigation is important, not simply for shedding light on an aspect of the area's history that has hitherto received little attention, but because it highlights the issue of regionalism within rabbit warren studies and indeed within wider agrarian and landscape histories. Because warrening was a remarkably widespread feature of the historic landscape of England and Wales, previous subject overviews have by necessity created a national historical framework within which the various regions' warrens must be placed. As noted above, this historical framework posits that the late medieval and post-medieval periods saw an increase in rabbit warrens, typically on

marginal lands and particularly on upland areas in the west of England and in Wales (Sheail 1978, 348; Williamson 2007, 17).

However, the scenario in north-east Cornwall, where one might expect a large rabbit industry on Bodmin Moor, differs here as the area's warrens apparently offered less economic potential than they did elsewhere, particularly compared to other upland marginal areas. In north-east Cornwall, where warrens were installed they were predominantly small installations that would have likely bred rabbits for personal consumption or to supplement their farms' principal products; commercial rabbit warrens of both the later medieval and post-medieval periods are in contrast rare. Where warrens were installed within the area, although they appear to represent local responses to settlement shrinkage, the amalgamation of land holdings, and the associated reduction of arable lands and the local workforce, they evidently did not replace those former arable activities as the foci of the area's agricultural practices but instead typically offered additional outputs for personal consumption or for some very limited, secondary commercial purposes. North-east Cornwall's rabbit warrens therefore represent a relatively distinct history of warrening, one that fits the national historical narrative to only a limited extent.

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Appendix:Rabbit warrens in north-east Cornwall mentioned in the text

Column 4 (Notes) includes the Historic Environment Record reference number (MCO) and, for pillow mounds, a note on the how the site has been recorded.

Parish	*Site name*	*Location*	*Notes*
Blisland	Carbilly Tor	SX 1298 7581	3 possible pillow mounds; plotted from 1946 aerial photos (NMP) (MCO 50152)
Broadoak	Largin Castle	SX 1689 6457	1 or 2 pillow mounds located within interior of hillfort; one surveyed at 1:2500 by Ordnance Survey (MCO 23345)
Callington	Castlewich	SX 3651 6849	The Warren recorded on tithe map (MCO 46959)
Davidstow	Davidstow Moor	SX 1410 8571	At least 2 pillow mounds, although Cornwall's HER records 5 possible mounds, plotted from aerial photos (NMP) (MCO 38135)
Forrabury and Minster	Willapark	SX 0922 9115	3 pillow mounds (MCO 41872)
Jacobstow	North Dinnicombe	SX 2067 9694	Pillow mound recorded here, although its identification is doubtful; plotted from aerial photos (NMP) (MCO 36185)
Kilkhampton	Warren Point	SS 2030 1139	Warren recorded on tithe map (MCO 46379)
Lanteglos-by-Camelford	Helsbury Park	SX 086 798	Rabbit theft recorded in 1347; described in 1814 as being 'till lately' a rabbit warren
Lanteglos-by-Camelford	Lanteglos Park	SX 088 819	Rabbit theft recorded in 1347
Launcells	Moreton Pound	SS 2735 0898	Conegar tenement recorded on tithe map
Launceston	Launceston Park	SX 328 845	Rabbit theft recorded in 1347
Lesnewth	Tregrylls	SX 1229 8901	Higher Warren and Lower Warren recorded on tithe map (MCO 22490)

Parish	*Site name*	*Location*	*Notes*
Linkinhorne	Winslade	SX 3275 7519	Homer Warren's House and Outer Warren's House recorded on tithe map
Linkinhorne	Henwood	SX 2615 7333	Warren recorded on tithe map (MCO 22243)
Liskeard	Liskeard Park	SX 236 650	Rabbit theft recorded in 1347; rabbit warren recorded in leases from 1748–84.
South Hill	Lower Manaton	SX 3396 7210	Warren recorded on tithe map; survival of warren boundary wall (MCO 23441)
South Hill	Treconner	SX 3412 7089	Pillow mound, plotted from 1946 aerial photos (NMP) (MCO 29649)
South Hill	Polhilsa	SX 3440 7232	11 possible pillow mounds, plotted from aerial photos (MCO29653)
St Breward	Louden Hill	SX 1378 8001	Pillow mound, surveyed at 1:1000 (MCO 22833)
St Cleer	Higher Treworrick	SX 2351 6836	Warren recorded on tithe map (MCO 24641)
St Cleer	Higher Trengale	SX 2105 6749	Warren recorded on tithe map (MCO 17255)
St Cleer	Between St Cleer and Poketor	SX 2525 6785	Warren recorded on tithe map (MCO 24649)
St Ive / Quethiock	Newton Park	SX 34 66	Warren recorded between 1571 and *c* 1768. Probably associated with Higher and Lower Deer Park fields recorded on the St Ive tithe map and Warren House and Warrenhouse Plantation in Quethiock on the Ordnance Survey 1st edition 6in map.
St Neot	South Draynes	SX 2243 6877	Warren recorded on tithe map (MCO 24637)
St Teath	Helland Barton	SX 0706 8271	Pillow mound recorded here, although its identification is doubtful; plotted from 1946 aerial photographs (NMP) (MCO 38373)
Stoke Climsland	Kerrybullock Park	SX 376 727	Rabbit theft recorded in 1347
Tintagel	Tintagel	SX 051 889	Warren recorded between 1297 and 1602
Warbstow	Warbstow Bury	SX 2013 9074	Pillow mound in hillfort, 1:1000 survey (MCO 22454)
Warleggan	Hardhead Downs	SX 1521 7145	Pillow mound (MCO 22332)
Week St Mary	Leigh	SX 2416 9892	Warren recorded on tithe map (MCO 22415)
Week St Mary	Creddacott Farm	SX 2358 9497	10 pillow mounds, photographed in aerial survey (MCO 54214)
Werrington	Werrington Park	SX 332 878	Warren recorded in 1641 lease
Whitstone	Whitstone	SX 2626 9869	Warren and Warren Garden recorded on tithe map (MCO 22053)

Cornish Archaeology 56, 2017, 183–197

Mid-fourth millennium cal BC activity at Penans Farm, Grampound, Cornwall

ANDY M JONES

with contributions from DANA CHALLINOR, ANNA LAWSON-JONES and HENRIETTA QUINNELL

In August 2017 Cornwall Archaeological Unit was commissioned by Qila Energy to undertake an archaeological watching brief at Penans Farm near Grampound, during the phase 2 groundworks associated with the construction of an anaerobic digester / gas injection plant. Two significant features were uncovered: a pit which produced a middle fourth millennium cal BC radiocarbon determination and a tree throw hollow with prehistoric pottery and flint. A small quantity of mostly residual and unstratified flint from the site is of later Neolithic or Early Bronze Age date. The context of the Neolithic pit is reviewed in the light of radiocarbon dates from similar sites across Cornwall and Devon.

Following a previous stage of archaeological recording at Penans in 2016 (phase 1; Jones 2016), a second phase of work was undertaken in 2017. The phase 2 project, immediately to the west of the phase 1 area, covered approximately 3 hectares (Fig 1) (centred at SW 95263 49210). Located in the ecclesiastical parish of Grampound with Creed, the site is situated approximately 64m above OD and was set within a large field which had been ploughed.

Prior to the phase 1 development there were no known archaeological features within the project area. A geophysical survey, however, carried out in advance of the groundworks (Roseveare 2016), revealed a ploughed-out field boundary, pit type responses and parallel, slightly curving features aligned roughly north–south, which were interpreted as likely to be evidence for medieval ridge and furrow. Just south of the development area was a circular ring ditch anomaly, which is likely to be associated with a ploughed down Early Bronze Age barrow. The archaeological potential of the site was confirmed in the phase 1 watching brief in 2016, which led to the excavation of a pit that was subsequently dated to the later Mesolithic period (Jones 2016).

Results from the phase 2 watching brief

The phase 2 project recorded a range of archaeological features which included several pits and possible tree-throws, ditches, a road and features associated with a designed landscape of late seventeenth- or eighteenth-century date belonging to Penans House. Many, however, were devoid of finds, so dating was not possible. In addition to disturbance through later post-medieval landscaping, the field has been ploughed and it is likely that the recorded features had been truncated. This is indicated by the shallowness of many features, the lack of survival above ground of the designed landscape, and by the fact that any mound associated with the ring ditch just beyond the southern edge of the project area had been completely levelled. The good condition of the unstratified flint and the 'cylindrical' pebble

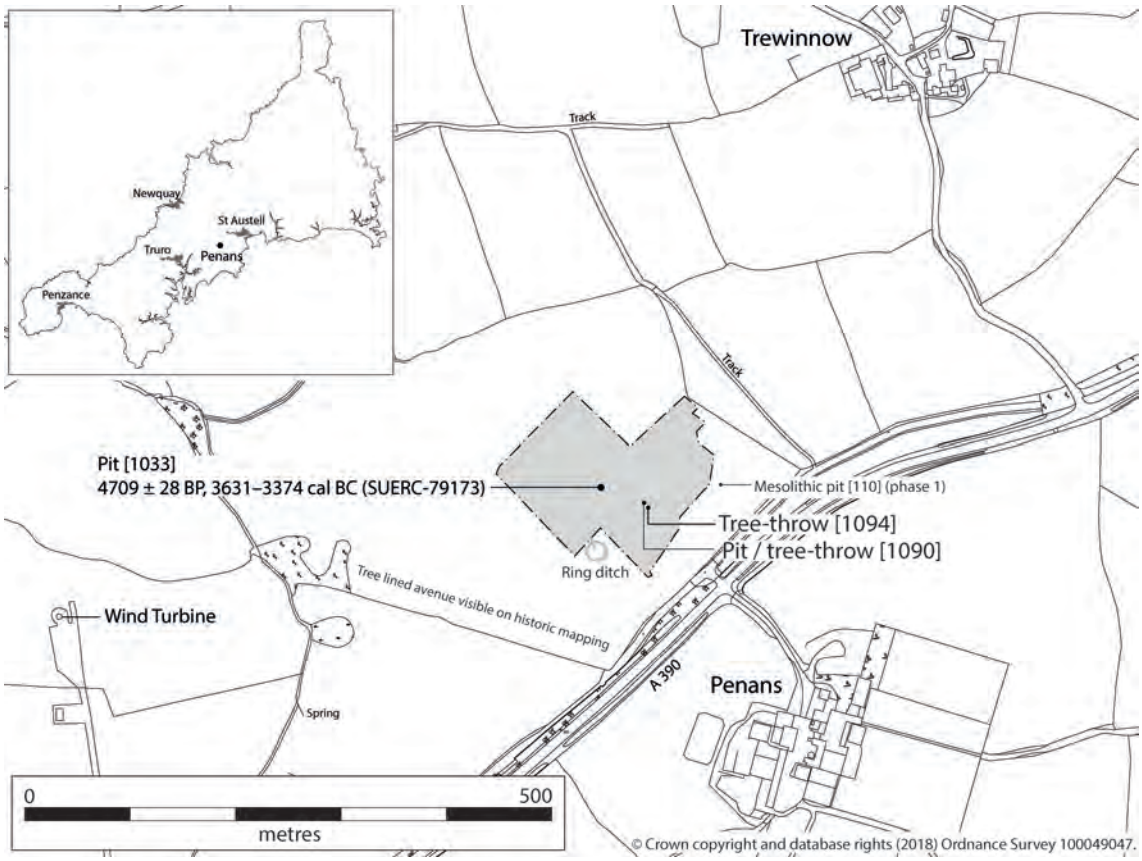

Fig 1 Penans stage 2 site – general location and the overall distribution of features.

described below also suggests that they had originally been deposited into sealed contexts which have been removed by ploughing.

All features have been described in the project archive report (Ratcliffe-Warren 2017). This paper discusses a charcoal-rich pit and a second pit / tree-throw which contained a small number of prehistoric artefacts. In addition, prehistoric artefacts, mostly unstratified or from residual contexts, are also discussed in the artefacts sections below.

Pit [1033]

Pit [1033] was located in the centre of the stripped area. The cut was near circular with a concave profile, measuring 0.7m in diameter by 0.4m deep (Fig 2). This pit had three fills. The upper (1021) was a dark reddish-brown friable sandy clay, which contained pieces of vein quartz, some heat-altered, as well as traces of burnt earth and charcoal. A radiocarbon determination from this layer, 4709 ±28 BP, 3631–3374 cal BC (SUERC-79173), dated the pit to the Early to Middle Neolithic transition period. The middle fill, layer (1031) was a dark, near black greasy, charcoal-rich deposit. The basal fill (1032) was a mid-yellowish-brown, loose redeposited natural sandy clay with moderate amounts of stone and charcoal flecks.

Pit / tree-throw [1090]

Pit / tree-throw [1090] was located approximately 50m to the south east of pit [1033]. The cut was sub-oval, measuring 2.4m by 1.9m by 0.3m deep with moderately sloping concave sides, steeper to the south, and a sloping base. It was filled by (1089), a dark brown loose friable silty clay with

Fig 2 Pit [1033] after excavation, looking south east.

occasional slate and vein quartz pieces. The fill also contained a number of prehistoric artefacts, including six sherds of pottery and a very dark, thickly corticated, snapped flint flake. The flint and the pottery are not closely diagnostic and are likely to be of very broadly later Neolithic to Early Bronze Age date (*c* 3400–1500 cal BC). On artefactual grounds, it is possible that if the finds belong to the earliest part of this range they would be broadly contemporary with pit [1033]. Alternatively, they could be later and be associated with the ring ditch anomaly to the south. The feature was identified as a possible pit, but it was felt that it was more likely to be a tree-throw. The presence of the artefacts in the pit / tree-throw is discussed below.

A second probable tree-throw [1094] was located near to [1090]. It had similar dimensions, measuring 2.4m by 2.1m by 0.17m deep. However, the fill did not contain any artefacts and the feature was interpreted as part of the tree planting associated with the later ornamental landscape.

A number of flints were also recorded as residual finds in secondary contexts or as unstratified finds which were scattered across the project area (Lawson-Jones, below)

Prehistoric pottery

Henrietta Quinnell

A very small ceramic assemblage was recovered from the watching brief at Penans Farm.

Context (1016), bottom fill of ditch [1011]

One body sherd, weighing 3 grams, abraded but shows traces of fine incised lines on a surface which is uneven, possibly the remains of a cordon. The sherd had been redeposited into a later context and is residual.

Context (1089), fill of pit [1090]

About six body sherds, weighing 24 grams, abraded and crumbling. The fabric is not gabbroic, but contains crushed vein quartz and rock, some possibly slate.

These are unlikely to be either later Bronze Age or Iron Age date: gabbroic fabrics of the Bronze Age are quite distinctive and gabbroic fabrics are ubiquitous in the Iron Age in Cornwall. It is likely that the sherds are either later Neolithic, or possibly in the Early Bronze Age. As such they may be contemporary with the flint with which they were found (Lawson-Jones, below) and or / with the radiocarbon determination from pit [1033] (see below).

Lithics

Anna Lawson-Jones

A very small assemblage of six well-preserved pieces of worked flint and a ‘cylindrical’ beach-derived pebble was recovered from Penans Farm (Table 1).

Flint

Three of the flints came from stratified contexts and three were unstratified. All were brought to the site during the prehistoric period and all fit diagnostically into a broad later Neolithic to Early Bronze Age date.

The pieces come from at least three different cores on the basis of cortex and / or markedly different flint colour. Two pebble cores are likely to have come from a local beach (Pentewan is the nearest beach, just 4 miles to the south east), before being worked on site. The third core came from a nodular source, possibly Beer Head, 83 miles away in south-eastern Devon (Tingle 1998), or from a closer source of outcropping nodular flint (Newberry 2002). The single burnt piece cannot be sourced.

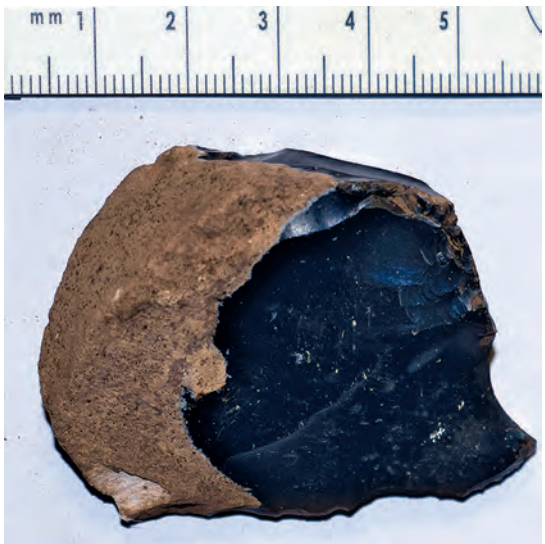

Fig 3 Small nodular flint knife or cutting flake, a residual find from posthole / pit [1009].

Discussion

These pieces span the later Neolithic to Early Bronze Age period, and include several broadly diagnostic attributes, including raw material choice, tool form and knapping technique. Only one of the pieces, from pit / tree-throw [1090], was found within an original context.

The two unmistakeably nodular pieces probably came from the same core, despite coming from two different features; posthole / pit [1009], context (1008), produced the fine simple knife or cutting flake (Fig 3), along with a medieval potsherd, and pit / tree-throw [1090] produced the snapped nodular flake. The pit additionally produced six prehistoric sherds of pottery that are likely to be contemporary with the flint (Quinnell, above). Similarly, the two very similar, distinctively speckled, mid-grey-brown, fine quality unstratified flints strongly suggest the same pebble core, although their original contexts are not known.

All three of the different flint colours represented in this assemblage are striking. The apparent significance of particularly sourced or coloured material is increasingly recognised as an important component in both Neolithic and Early Bronze Age structured pit deposits (Jones and Quinnell 2011; Lawson-Jones, forthcoming) and for some Mesolithic / Neolithic flintwork (Cummings 2010).

A comparison in size between the small (20 × 20mm) pebble core and the large (55 × 45 × 15mm) nodular flake illustrates one of the key differences between these two raw material sources for Cornwall. Bigger nodules allowed for the production of larger tools than would otherwise often have been possible, significantly expanding the potential repertoire and appearance of flintwork available for use or deposition. The colour, size and source of flint, regardless of function, will have automatically implied a range of information concerning raw material acquisition (such as trade, exchange and contact with neighbouring communities), plus other implicit detail regarding usage, to the people of the time.

Given the very small number of pieces as a whole, and the variation seen in what there is, it is not possible to infer the original setting or context for most of the flintwork. It does not appear to have been a strongly domestic, utilitarian assemblage given the notable lack of use wear, but neither does it seem overtly ritualistic or 'special'. The exception is the knife, which was a distinctive and potentially valued piece. This interesting but tiny assemblage hints at more going on in the area than so far seen. The lack of post-depositional damage for all pieces suggests that they were not simply left on the ground when discarded or deposited. It is possible that some may have originally been sealed within cut features or other protective deposits.

Table 1 Flints

Context	*Material*	*Description*
Ditch [1006], fill (1004) – residual find	Uncertain	A dark, burnt probable former blank or core tool of uncertain form (31 × 18 × 12mm). The piece is discoloured, slightly blistered and covered with hair-line fractures (Lee 2001), which has caused fracturing and edge breakage. The broad triangular shape and thickness of the few non-fractured edges suggests that it was either a chunky blank awaiting retouch or a chunky minimally retouched tool, either of which is typical of the later Neolithic period (Butler 2005). It was found in a residual context; however, its battered, abraded appearance is the result of intense heat, rather than heat followed by post-depositional wear and tear.
Posthole / pit [1009], fill (1008) – residual find	Nodular	Fig 3. A very dark, thickly corticated simple knife or cutting flake This is the largest piece and measures 55 × 45 × 15mm. It is a minimally modified, well-knapped tool, typical of the later Neolithic period (for example, see Butler 2005). The deliberate retention of a chalky backing cortex for the positioning of a forefinger greatly facilitated hand-held use (minimising slippage when slicing wet or slimy material, such as meat). The thickest, proximal end shows minimal soft-hammered, semi-invasive retouch designed to prevent the thumb being cut when in use, and a small ventral patch of edge softening where the folded middle finger would rest. The result is an extremely comfortable, easy to use, razor-sharp cutting and slicing tool. The working edge is 40mm long, near straight, thin and very sharp. It shows limited sporadic retouch or more likely dorsal scarring caused through use. A larger indent a third of the way along the edge is use-related. The posthole also contained a sherd of medieval pottery (Ratcliffe-Warren 2017) and the flint is therefore residual.
Pit / tree-throw [1090], fill (1089)	Nodular	A very dark, thickly corticated, snapped flint flake. This is the distal end of a small, thin secondary flake from a well-worked, flake-producing nodular core (probably the same core as above). It shows no evidence for modification or post-depositional damage.
Unstratified	Pebble	A mid-golden-brown speckled pebble waste flake, with a completely corticated dorsal surface. It is a soft-hammered, thin, well-controlled flake, resulting from careful primary core working, with no modification or post-depositional damage.
Unstratified	Pebble	A mid-grey-brown mottled, small multi-platform core (of good quality pebble flint, approximately 20mm) with possible use as a simple steep-sided scraper. This piece shows small soft and hard hammered flake removal scars. The concentration of small-scale scarring / retouch around part of the main platform and the steep scraper-like face suggest a Bronze Age date for this piece.
Unstratified	Pebble	A mid-grey-brown mottled utilised flake (probably from the same core as above). This well-formed, hinged piece shows limited dorsal and ventral retouch around parts of the broad, slightly rounded triangular end. Its use is uncertain. It initially suggested a simple, triangular arrowhead, with point missing through impact (see Green 1980; Devaney 2005).

The 'cylindrical' pebble

A fine, long 'cylindrical' pebble measuring 190 × 30 × 20mm was found at the junction between the bottom of the subsoil and the underlying natural (Fig 4). It is a fine grained sandstone pebble, pale grey with darker speckles (Roger Taylor, pers comm). The pebble is undamaged, apart from a very small and very recent nick towards one end and remarkably complete despite its marked length and uniformly slender girth. Long-term ploughing or disturbance would certainly have broken this piece, had it occurred. In this respect, the lack of conspicuous post-depositional damage is the same as that seen in the flintwork.

The piece fits and balances nicely within the hand. It shows tentative grinding wear at the marginally broader end. No clear evidence for concerted use as a whetstone can be seen on any of the long faces, although one slightly concave long edge does appear slightly smoothed (when viewed through a magnifying glass), suggesting short-term use as a polisher or burnisher, or perhaps use on a soft material, such as wood or leather.

This very striking piece cannot be closely dated. It was clearly brought to the site from a beach, and

Fig 4 Unstratified cylindrical pebble, which may have been used as a polisher or burnisher.

it evidently had a function which did not notably damage or alter its surface. This piece is, however, felt by the author to be of prehistoric date. It is probably associated with the later Neolithic / Early Bronze Age flint assemblage or is earlier and possibly Mesolithic in date, rather than being of a medieval or later period. Visually striking stones are known to have been actively sought, valued and carefully deposited during the prehistoric period (for example, Tilley 2017), and as such this piece may be associated with the relative 'specialness' of the nodular flint knife described above.

Charcoal

Dana Challinor

Charcoal from small pit [1033] was submitted for the selection of suitable material for radiocarbon dating and characterisation of the assemblage. Standard identification procedures were followed, as for phase 1 (Challinor 2016).

The preservation of the charcoal was generally good: clean and of reasonable size (≤8mm). Internally, the anatomical structure was relatively clear, but some blue-green staining was visible. This is characteristic of vivianite, which suggests that the charcoal was deposited in water lain or seasonally waterlogged conditions. A single taxon was identified: *Corylus avellana* (hazel). This species is usually distinguished from *Alnus glutinosa* (alder) by examining perforation plates in the radial section and this was confirmed in all 20 identifications. The remaining charcoal in the assemblage, which was scanned without fracturing, appeared to be of *Alnus* / *Corylus* type (unconfirmed, but probably hazel), although any trace elements of additional taxa cannot be discounted.

All of the identified charcoal derived from roundwood fragments, with strong ring curvature and occasional cambial edge or pith preserved. Ring counts of 8–12 years were recorded. There were occasional insect tunnels recorded in the material. The oval shape of these tunnels is consistent with the channels left by the Cerambycidae (long-horned beetles), which inhabit dead wood with bark attached, rather than cut, structural timbers (Prof Mark Robinson, pers comm). This suggests that the charcoal derived from (seasoned) fuelwood rather than burnt structural or artefactual remains.

The assemblage from Mesolithic pit [110] from the earlier investigation (2016) included a significant quantity of mature oak, which is not present in the charcoal from pit [1033]. However, hazel roundwood was recorded in both pits, and the absence of oak from the current assemblage may relate to function, rather than period.

Radiocarbon dating

Given the complete absence of artefacts in pit [1033], the key aim was to obtain secure dating evidence for it. The charcoal sample from fill (1021) was a piece of *Corylus* (hazel) roundwood (8+ years' growth), which is a short-lived species. It was submitted for accelerator mass spectrometry dating (AMS) at the Scottish Universities Environmental Research Centre (SUERC) (Table 2).

The probability distribution has been calculated using OxCal (v4.3) and all radiocarbon determinations are quoted at 95.4 per cent probability throughout this paper unless otherwise stated.

Table 2 Radiocarbon dating from pit [1033]

Feature	*Lab. no.*	*Age BP*	*Material*	*Calendrical years 95.4%*
Pit [1033], fill (1021)	SUERC-79173	4709 ±28	Charcoal: Corylus Hazel	3631–3579 cal BC (22.5%) 3534–3493 cal BC (21.3%) 3467–3374 cal BC (51.6%)

Results

The radiocarbon determination (Fig 5) fell in the middle fourth millennium cal BC, with the weight of the date falling after 3500 cal BC. This is a period for which there are still comparatively few radiocarbon dates in the south-west region as a whole. The significance of the dating will be discussed below.

Discussion

The archaeological watching brief at Penans Farm has produced some very interesting results, which include an unexpected radiocarbon date, and tentative evidence for 'odd' deposits associated with a pit and a probable tree-throw. The work has extended the evidence for prehistoric activity on the site, adding a pit of the mid-fourth millennium cal BC and flints from around the third millennium BC to the previous discovery of a Mesolithic pit of the mid-seventh millennium cal BC.

The context of pit [1033]

The radiocarbon date from pit [1033] and potentially the artefactual assemblage from [1090] are significant because they reveal activity at Penans Farm during a time for which there are comparatively few known sites in Cornwall.

Since pit [1033] appears to have been infilled with three distinct fills, with no evidence for silting, it is unlikely to have been open for a long period. As the charcoal sample was from a fast-growing species (*Corylus avellana*, hazel), the resulting radiocarbon determination 4709 ±28 BP, 3631–3374 cal BC (SUERC-79173) probably relates closely to the digging and infilling of the pit. This date lies at a point in time from towards the end of the Early Neolithic and extends into the start of the Middle Neolithic period, at a time following the main *floruit* of chambered tomb and tor enclosure construction (Bayliss and Whittle 2007; Whittle *et al* 2011; Mercer 1981), on the cusp of the transition to Middle Neolithic Peterborough Wares (*c* 3400–3000 cal BC) (Ard and Darvill 2015), when monument construction is far less common. Given that the weight of the determination falls after 3500 cal BC (3467–3374 at 54 per cent) the pit will be described as being of middle fourth millennium cal BC date.

Features dating to this period in Cornwall and the south-west region are confined to pits and a lightly built structure which was recently investigated at the Grampound Tannery site, a couple of kilometres away to the west (Lawson-Jones and Jones 2016). The radiocarbon determination from this site – 4721 ±34 BP, 3634–3376 cal BC (SUERC-62533) – is similar to that from pit [1033] and the two features may therefore be broadly contemporary. They are both also similar in that neither was associated with any artefacts. Elsewhere in Cornwall there is, however, some evidence for activity at this time at much older monuments. Cremated bone from Sperris Quoit and Zennor Quoit (Zennor) has been radiocarbon dated to 4712 ±39 BP, 3633–3373 cal BC (UB-6754) and 4471 ±38 BP, 3342–3024 cal BC (UB-6755) respectively (Kytmannow 2008, 105–6) and bone fragments from Carwynnen Quoit (Camborne) have an associated Middle to Late Neolithic date of 4371 ±19 BP, 3080–2916 cal BC (SUERC-55957) (Sustainable Trust 2014, 11). In addition to the reuse of chambered tombs, the early fourth millennium tor enclosures at Helman Tor (Lanlivery) and Carn Brea (Illogan) have modelled dates for end of activity of 3630–3380 cal BC and 3495–3080 cal BC respectively (Whittle *et al* 2011, 504, 508), which again overlap with pit [1033]. Carn Brea, however, was noted for the current lack of precision regarding its modelled dating (*ibid*). Nonetheless, these dates suggest that although there is little evidence for the building of new monuments, much older sites continued to be of importance long after their construction, and it is possible that communities in Cornwall in the middle fourth millennium cal BC considered them to be 'ancestral' places in the landscape.

Radiocarbon dating of pits in Cornwall and the Isles of Scilly has resulted in other features, especially pits, being securely dated to the middle and second half of the fourth millennium cal BC

(see Table 3 and Fig 5 for details). These pits are undoubtedly similar to those of the Early Neolithic such as Tregarrick Tor (Roche) and Portscatho (Gerrans) (Cole and Jones 2002–3; Jones and Read 2006) which have been modelled to start in the period 3940–3735 cal BC to 3615–3465 cal BC (Whittle *et al* 2011, 516) and indeed dates from some of the pits within both these groups extend into the period under discussion.

The mid-fourth millennium pits probably represent continuity of established depositional practices involving the clearing away of charcoal-rich deposits and artefacts. However, they are significant as they shed light on the activity in between the well-defined Early Neolithic of the first half of the fourth millennium and the Late Neolithic of the third, when both artefacts and monuments are far more common. They are also important because they suggest continuity in the use of bowl ceramics to a later date than has been has been thought (see below). This should not, however, be taken to suggest that society was static in nature and that there was no change in its character between the onset of the Neolithic *c* 4000 cal BC and the appearance of Peterborough Ware in Cornwall *c* 3300 cal BC (Table 3).

In common with pit [1033], several of the pits dating to the middle centuries of the fourth millennium cal BC have produced either no or few artefacts and without radiocarbon dating it would have been impossible to assign a period to them. For example, two charcoal-rich pits on the North Cornwall pipeline which ran between Tintagel and Boscastle (Jones and Quinnell 2014) were found to contain flints and produced radiocarbon determinations of the mid-fourth millennium very similar to pit [1033].

Other similar pits, without diagnostic pottery, have produced slightly later radiocarbon determinations, from the later part of the fourth millennium. Most recently, a charcoal-rich pit [206] at Preeze Cross (Blisland) produced a determination (SUERC-80824) which fell in the centuries after 3500 cal BC (Jones and Lawson-Jones, forthcoming). Likewise, at Trenowah, on the St Austell North-East Distributor Road, a charcoal-rich pit, [38], was devoid of finds but produced a later fourth millennium date (Johns 2008).

Other later fourth millennium pits have been found to contain charcoal and flints which are not closely diagnostic. These include pit [370] at Metha (St Newlyn East); (Jones and Taylor 2004, 41). Taken together it suggests that activity in the middle centuries of the fourth millennium is likely to be widespread but, in the absence of diagnostic finds or monuments, identifying it is often dependent on radiocarbon dating, a point which has also been recently made by the discovery of a significant later Neolithic deposit of charred hazelnuts which had been reburied within a Roman-period ditch at Newquay (Table 3; Jones, 2019).

In addition to pits with few or no finds, there is also a growing number of pits in Cornwall that contain 'Hembury-type' vessels, including carinated and bowl pottery, which are normally regarded as being the ceramic style of the Early Neolithic (that is to say, firmly in the first half of the fourth millennium cal BC) (for example, Jones and Quinnell 2011). However, several pits have returned radiocarbon determinations which straddle the middle centuries of the fourth millennium cal BC, broadly contemporary with pit [1033], thereby spanning the end of the Early Neolithic period and into start of the Middle Neolithic period (Jones and Quinnell 2014, 131).

Recently investigated sites producing bowl pottery radiocarbon dated to the middle centuries of the fourth millennium include Penmayne (St Minver), pit [403], which contained carinated bowl pottery (Gossip *et al* 2012). Likewise, at Tremough (Penryn), pits [102] and [105] contained bowl type pottery and produced identical radiocarbon determinations (Jones *et al* 2015, 150). Beyond Cornwall at Waylands, near Tiverton in Devon, sherds from several Neolithic bowl pottery sherds were found within feature [1510], which was dated to the same period (Leverett and Quinnell 2010). These determinations all start towards the end of the Early Neolithic at around 3600 cal BC and although possibly pre-dating 3500 cal BC they potentially extend to a little after 3400 cal BC. The dates on these pits are therefore likely to fall within the established timeframe for the later use of earlier Neolithic pottery styles in Cornwall.

One of the pits on the Tintagel to Boscastle pipeline, pit [235] at Bossiney, which was found to contain sherds of bowl pottery, was probably at the later end of this date range (Jones and Quinnell 2014, 16). The radiocarbon date (SUERC-42047) is close in time to that from pit [1033] with the weight of the determination falling into the period 3471–3372 cal BC (at 67.1 per cent). This could indicate the continuing use of early ceramic styles.

Table 3 Middle to late fourth millennium cal BC pits and other non-monument related contexts in Devon and Cornwall with radiocarbon determinations.

Site	*Context/association*	*Lab. no*	*Age BP years*	*Calendrical years 95%*
Cornwall				
Grampound, Tannery site	Posthole [156], part of a structure. Contained hazel charcoal (Lawson-Jones and Jones 2016).	SUERC-62533	4721±34	3634–3376
Metha	Pit [370], charcoal-rich feature which contained flints, hazelnut fragments and an apple pip, with hazel (dated) and *Pomoideae* charcoal (Jones and Taylor 2004).	Wk-12676	4505±68	3486–2938
Newquay Strategic Road	Deposit of hazelnuts redeposited into Roman period ditch [204] (Jones 2019).	SUERC-63278	4420±28	3316–2922
North Cornwall pipeline	Pit [235] containing hazel charcoal, found with open bowl pottery, a quarzitic pebble and a leaf-shaped arrowhead (Jones and Quinnell 2014).	SUERC-42047	4690±23	3624–3372
North Cornwall pipeline	Pit [237] containing hazel charcoal and flint flakes (Jones and Quinnell 2014).	SUERC-42049	4703±23	3627–3375
North Cornwall pipeline	Pit [185] containing hazel charcoal and flints (Jones and Quinnell 2014).	SUERC-42048	4755±26	3637–3384
Penans Farm	Pit [1033] containing large quantity of hazel charcoal (this paper).	SUERC-79173	4709±28	3631–3374
Penmayne	Pit [403], hazelnut shell found in pit with carinated bowl sherds (Gossip *et al* 2012).	SUERC-315182	4770±30	3641–3384
Penmayne	Pit [403], hazelnut shell found in pit with carinated bowl sherds (Gossip *et al* 2012).	SUERC-315183	4775±30	3642–3387
Tregurra Valley	Pit [1082], hazelnut shell dated. Artefacts included Peterborough Ware and flint (Taylor, forthcoming).	SUERC-64427	4451±37	3338–2937
Tregurra Valley	Pit [1082], oak and hazel (dated) charcoal with some hawthorn-type, blackthorn, burnt hazelnut shell fragments and apple pips and core fragments. Artefacts included Peterborough Ware pottery and flint (Taylor, forthcoming).	SUERC-64428	4455±37	3340–2943
Tregurra Valley	Pit [1137], hazelnut shell dated. Artefacts included Peterborough Ware pottery (Taylor, forthcoming).	SUERC-64432	4466±37	3341–3022
Tregurra Valley	Pit [1107], charcoal, hazel dated. Finds included Peterborough Ware, flints, and two worked cobbles.	SUERC-64435	4545±37	3369–3101
Tregurra Valley	Pit [2312], hazelnut shell dated. Artefacts included Peterborough Ware pottery, flints and a sandstone cobble (Taylor, forthcoming).	SUERC-64437	4594±37	3513–3117
Tregurra Valley	Pit [2438], hazelnut shell dated. Artefacts included large quantities of Peterborough Ware pottery and flints (Taylor, forthcoming).	SUERC-64446	4509±37	3356–3095
Tregurra Valley	Pit [2438], charcoal, alder/hazel dated. Artefacts included large quantities of Peterborough Ware pottery and flints (Taylor, forthcoming).	SUERC-64447	4550±37	3482–3101

Table 3 cont.

Site	*Context/association*	*Lab. no*	*Age BP years*	*Calendrical years 95%*
Tregurra Valley	Pit [2438], hazelnut shell dated. Artefacts included large quantities of Peterborough Ware pottery and flints (Taylor, forthcoming).	SUERC-64445	4527±37	3362–3099
Tregurra Valley	Pit [2441], Charcoal, hazel dated. Artefacts comprised flint waste (Taylor, forthcoming).	SUERC-66212		
	4524±26	3361–3098		
Tregurra Valley	Pit [2496], hazelnut shell dated. Artefacts included Peterborough Ware pottery, flints and a small saddle quern (Taylor, forthcoming).	SUERC-64455	4427±37	3329–2922
Tregurra Valley	Pit [2496], hazelnut shell dated. Artefacts included Peterborough Ware pottery, flints and a small saddle quern (Taylor, forthcoming).	SUERC-64453	4404±37	3317–2911
Tregurra Valley	Pit [3068], charcoal, hazel dated. Artefacts comprised a small number of flints (Taylor, forthcoming).	SUERC-64456	4406±37	3322–2912
Tremough PAC, pit.	Pit [102], charcoal, hazel dated. Sherds of Neolithic pottery (Jones *et al* 2015).	SUERC-29387	4750±40	3640–3378
Tremough PAC, pit.	Pit [105], charcoal, hazel dated. Sherds of Neolithic pottery (Jones *et al* 2015).	SUERC-29383	4750±40	3640–3378
Trenowah	Pit [38], charcoal, including *Salicaceae* (Johns 2008).	Wk-11935	4429±41	3331–2921
Isles of Scilly				
Old Quay, St Martins	Pit F56, charcoal, *Prunus* dated. (Garrow and Sturt 2017).	OxA-31872	4511±33	3355–3097
Old Quay, St Martins	Pit F53, charcoal, wheat dated. Sherds of bowl pottery present (Garrow and Sturt 2017).	OxA-31868	4506±31	3351–3097
Old Quay, St Martins	Pit F33, charcoal, *Leguminosae* dated. Sherds of bowl pottery, flint and a pebble (Garrow and Sturt 2017).	OxA-31990	4451±31	3337–2945
Old Quay, St Martins	Pit F33, charcoal, *Leguminosae* dated. Straight sided bowl pottery, flint and a pebble (Garrow and Sturt 2017).	OxA-31871	4442±35	3334–2929
Old Quay, St Martins	Posthole F16, charred ceramic residue dated (Garrow and Sturt 2017).	OxA-29340	4407±30	3265–2916
Old Quay, St Martins	Posthole F69, charcoal, *Leguminosae* dated (Garrow and Sturt 2017).	OxA-32024	4414±30	3312–2918
Devon				
Hems Valley, Site 17	Pit 02.02.004. Hazelnut shell dated. Sherds of Peterborough Ware, flint and rubbing stones (Mudd and Joyce 2014).	NZA-36262	4446±20	3327–3020
Hems Valley, Site 17	Pit 02.02.006. Hazelnut shell dated. Sherds of Neolithic pottery and a flint (Mudd and Joyce 2014).	NZA-36263	4431±20	3314–2933

Table 3 cont.

Site	*Context/association*	*Lab. no*	*Age BP years*	*Calendrical years 95%*
Hems Valley, Site 17	Pit 02.02.010. Hazel charcoal dated. Sherds of Peterborough Ware, flint and a hammerstone (Mudd and Joyce 2014).	NZA-32773	4495±25	3341–3097
Hems Valley, Site 17	Pit 02.02.010. Hazel charcoal dated. Sherds of Peterborough Ware, flint and a hammerstone (Mudd and Joyce 2014).	NZA-36264	4458±20	3330–3025
Waylands, Tiverton	Pit [1510], oak charcoal dated. Found in association with sherds of Neolithic pottery (Leverett and Quinnell 2010).	Wk-27272	4722±30	3634–3376

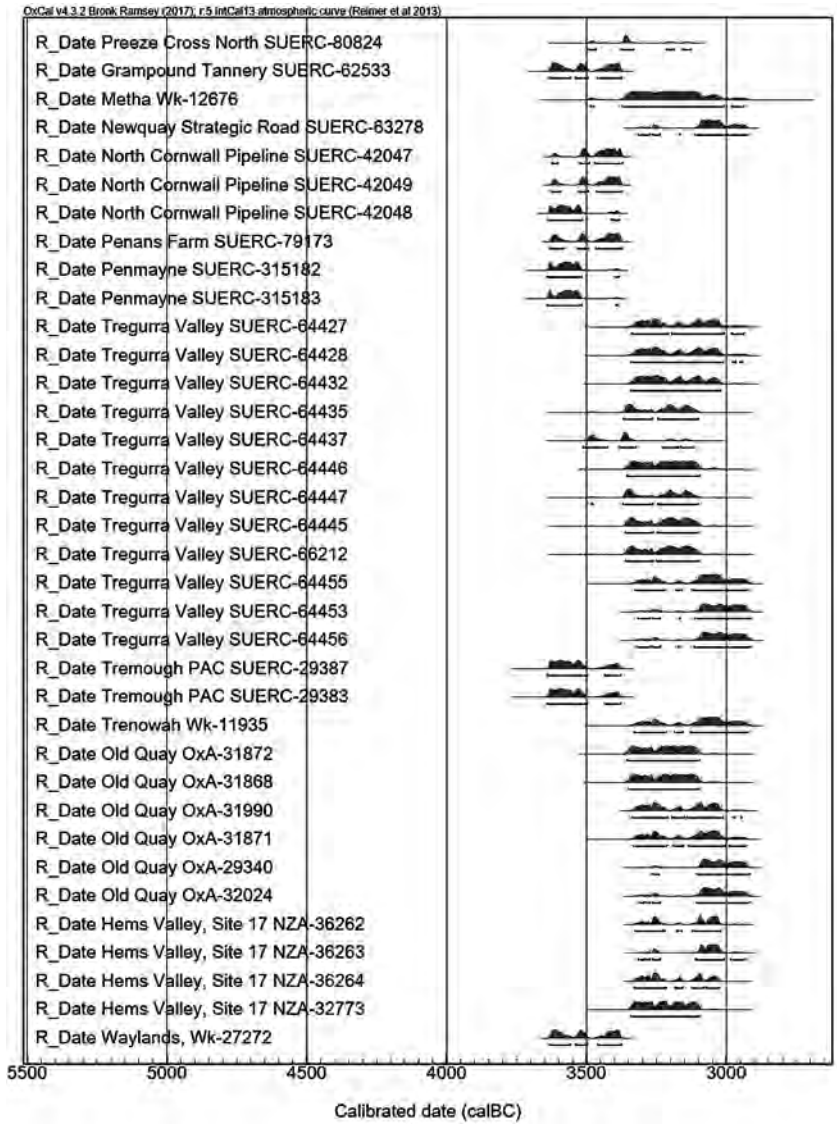

Fig 5 Middle to late fourth millennium cal BC radiocarbon determinations from pits and other non-monument related contexts in Devon and Cornwall.

Indeed, radiocarbon dating from recent excavations at Old Quay on St Martin's on the Isles of Scilly identified features associated with bowl pottery which calibrated to the period 3360–2920 cal BC (Table 3). This clearly demonstrates the continued use and deposition of older forms of pottery into the middle centuries of the fourth millennium cal BC in Cornwall, and later still on Scilly. This is significant because Peterborough Ware was in use elsewhere during this time. Peterborough Ware is still scarce in Cornwall and at present the only secure dates for it are a group of 12 determinations from the Tregurra Valley (Truro) (Taylor, forthcoming) which span the period *c* 3500–2900, with the weight of the dating falling around 3300–3000 cal BC (see Table 3). Very similar date ranges were obtained from three pits in the Hem Valley in Devon, two of which were associated with sherds of Peterborough Ware (Mudd and Joyce 2014, 19–21).

Pit [1033] therefore appears to sit at a period of time after the initial *floruit* of pit digging at the start of the Neolithic (*c* 3900 cal BC), at the cusp of a period when marked change in ceramic styles was occurring elsewhere. However, in Cornwall and especially the Isles of Scilly (and perhaps parts of Devon) older traditions seem to have lingered on down to and even after *c* 3300 cal BC, beyond the established time bracket for South-Western style pottery *c* 3960–3753 cal BC to 3615–3465 cal BC (Whittle *et al* 2100, 516).

Pit [1033] and pit / tree-throw [1090]; discard in pits and tree-throws

The investigated features at Penans Farm are part of a wider Neolithic pit digging tradition, recognised at numerous sites throughout southern Britain and along the Atlantic façade. In Cornwall, as elsewhere, the artefactual and environmental assemblages associated with these pits typically include pottery, stone, flint, charcoal and hazelnut shells, and their occurrence spans the period from at least the earliest to the latest Neolithic and into the Bronze Age (Cole and Jones 2002–3; Gossip and Jones 2007, 28–9; Jones *et al* 2012).

Pit [1033] was devoid of artefacts; however, small pits filled with charcoal-rich deposits and / or quartz are well-documented in Cornwall (for example, Cole and Jones 2002–3; Jones and Read 2006; Gossip and Jones 2007, 6–12), and recent investigations at Penans Farm also revealed that similar practices occurred much earlier, in the Late Mesolithic period (Jones 2016). Pit [1033] can therefore be seen as belonging to this long tradition. Pit / tree-throw [1090] is not radiocarbon dated and the artefactual assemblage, whilst not precisely dated, does, nonetheless have the potential to provide more information about the deposition of artefacts in the later prehistoric period.

Interpretation of the way pits were infilled in the Neolithic has formed the basis for much discussion. Since the 1980s (for example, Richards and Thomas 1984; Thomas 2013, 396) it has been argued that many Neolithic pits were deliberately infilled and that residues from occupation may have been meaningful and carefully buried. The term 'structured deposition' has been widely used since the 1990s as a convenient shorthand for this process. However, it has also been pointed out that not all material which enters pits needs to have been symbolically placed with great care or as a ritual event (Garrow 2012). Joanna Brück (1999), in discussing the problems of interpreting 'ritual' at prehistoric sites, has suggested that 'special' deposits need not always have been viewed as such by prehistoric communities, who may have seen them as being routine, rational and effective actions, which led to desired outcomes. Indeed, in most prehistoric societies, it is likely that divisions between the sacred and the profane were far less distinct than they are today (Bradley 2005, 169).

The Penans Farm features contained contrasting fills. Pit [1033] was filled by three deposits, two of which merit discussion here. The middle fill (1031) was charcoal-rich but there are no indications that it had been burnt *in situ*. In other words, it had been brought to the pit from another place after it had cooled. It was, therefore, associated with an event that had occurred elsewhere. The abundant charcoal deposit, like those recorded in many contemporaneous pits in Cornwall, indicates that fires were closely linked to the pit digging and reburial process, with significance attached to the inclusion of some of the charred remains. This process would not, as Brück (1999) has argued, necessarily have been seen as being 'special' but if thought about at all would probably have been considered to have conformed to the 'right' way of dwelling in the landscape.

The upper fill (1021) also contained charcoal but the main significance of this deposit was the quantity of vein quartz pieces, some of which showed signs of heating. It is possible that in the

past certain stones and pebbles were selected for deposition because they were considered to be imbued with their own symbolic properties, and may in some instances have been thought of as being animate in their own right (for example, Tilley 2017, 264). It is certainly the case that pits and other ceremonial contexts containing quartz are widely found across Cornwall and western Britain (for example, Darvill 2012; Jones and Read 2006; Jones and Smith 2015). In the case of pit [1033], it is likely to have been used to seal the layer of charcoal below. Interestingly, a very similar practice was observed at Penans Farm pit [110] which was associated with a Late Mesolithic radiocarbon determination, 7627 ±30 BP, 6563–6428 cal BC (SUERC-71139) (Jones 2016).

By contrast, pit / tree-throw [1090] contained artefacts, which included sherds of pottery and a flint of later Neolithic or Early Bronze Age date. The precise date of the feature is more ambiguous and the artefacts could be suggested to be residual. However, it is perhaps unlikely that several broadly contemporaneous sherds of pottery and a flint would have found their way into the same secondary context. The fill, (1089), also contained pieces of vein quartz, unlike similar features which were associated with later tree planting.

The identification of [1090] as a tree-throw hollow is paralleled elsewhere in Cornwall and the south-west region. For example, at the Tremough PAC site, two tree-throws each filled with deposits containing charcoal and burnt stones were found near to pits [102] and [105] which contained fresh sherds of Neolithic pottery (see above) (Jones *et al* 2015, 31) Likewise, an amorphous pit identified at the Travel Inn site, Helston, is thought to be a possible tree-throw. This feature had been deliberately backfilled with Middle Neolithic Peterborough Ware pottery and flints (Quinnell 2009). In Devon a tree-throw hole containing sherds of Neolithic bowl pottery and a rubbing stone were recorded at Waylands, Tiverton (Leverett and Quinnell 2010), and these were interpreted as representing a deliberate deposit which had been placed into the open hole. Likewise at Old Rydon Lane in Exeter, a tree-throw was found to contain sherds of Middle Neolithic Peterborough Ware pottery and a flint axe (Henrietta Quinnell, pers comm).

Beyond the south-west region, the frequency of tree-throw features associated with Neolithic artefacts has generated discussion regarding the intentionality of deposition of material culture in tree-hollows, created either by natural processes such as storm damage, or deliberately as part of woodland clearance (for example, Evans *et al* 1999; Allen *et al* 2004; Ray and Thomas 2018, 184). Neolithic artefacts and dark soils in some tree-throw holes may in some instances have been middening deposits which entered the hollow after the trees had fallen. It is possible, therefore, that some tree-throws were the foci for deposits following the acquisition of new land for cultivation and settlement (Leverett and Quinnell 2010). It is, however, likely, in a world which was covered by large areas of woodland, and with their long life-cycles, that trees could have become personified and associated with generational conceptions of human time (Evans *et al* 1999). As such, it is possible that the sites of 'well-known' fallen trees with long biographies may also have been symbolically marked with deposits, out of respect.

Returning to Penans Farm and feature [1090], the flint and sherds of pottery and quartz in the infilling deposit (1089) may be an indicator that the hollow was used as a receptacle for a small amount of occupation-related material. The composition of the deposit is comparable with the much more commonly occurring Early and Late Neolithic pits which are found across Cornwall (Gossip and Jones 2007, 28–9; Jones and Quinnell 2011), which as discussed above, often contain varying amounts of pottery, quartz and flint. It is possible therefore that these natural hollows, created by fallen or felled trees, were seen as being similar to and were in use at the same time as deliberately dug pits. In both cases people could use cultural material to mark, build and reaffirm their connections with the land, and the natural features found within it.

Summary

The archaeological recording at Penans Farm was interesting as it has provided evidence for mid-fourth millennium cal BC activity and potentially for structured deposition. Review of the wider dating evidence suggests that although this period came after the main phase of monument construction, the ancient sites continued to be of significance at this date, and traditions associated with earlier styles of pottery and with pit digging persisted. The presence of charcoal and especially the vein quartz in pit [1033] is indicative of a

continuing selection of this material for burial in pits, which is found across Cornwall throughout the Neolithic period, and at Penans Farm, since the Late Mesolithic. Likewise, the small number of finds and quartz in pit / tree-throw [1090] can also be viewed as being part of a wider tradition of artefact deposition.

As with the unexpected results from the first phase recording at Penans Farm, the second phase project has again emphasised the need to undertake radiocarbon dating on a wide range of archaeological features. This should include those features that are without artefacts, which prior to radiocarbon dating, might have appeared to be of little interest.

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Cornish Archaeology 56, 2017, 199–202

A note on the Leskernick propped stone

DAVID SHEPHERD

This short note indicates aspects of the propped stone feature near the summit of Leskernick Hill which have not previously been described: in particular, how the stone may have derived from the underlying outcrop, which itself appears to have been propped.

The Leskernick propped stone, in Altarnun (SX18279 80202), has been well-known and remarked upon for some time (Tilley 1996; Herring 1997; Blackman 2011). In particular, the orientation to neighbouring landmarks and solar horizon events, and the apparent association with adjacent prehistoric features, including a long mound which is aligned on it, have all been demonstrated. Based on this, a date in the fourth millennium BC has been suggested for the site (Herring 1997).

Leskernick was the first site of this type to be identified in Cornwall and was initially termed a 'pseudo-quoit'. Many more have subsequently been discovered in the granite uplands and they are now known as 'propped stones' (Blackman 2011). The only Cornish example to have been excavated, Hendraburnick (Davidstow), produced a Late Neolithic radiocarbon date of around 2500 cal BC from beneath the stone (Jones and Goskar 2017). Comparable features have been recorded in, for example, the south Pennines and Yorkshire Dales (Shepherd 2013), in south Wales (Darvill and Wainwright 2016) and in Ireland (Burns and Nolan 2017).

Close examination during a recent field visit to Leskernick revealed further points worthy of notice.

The whole is composed of silver-grey, megacrystic granite of the Bodmin Intrusion; no other rock is present. The raised slab, approximately 2.6m long, 1.8m at its widest and 0.4m thick, is supported by two weathered boulders showing identical erosion shadows (that is, raised areas of the underlying bedrock protected from erosion) and the slab has one point of contact, on its lowest edge, with the bedrock beneath. An angular block is positioned under the slab adjacent to the point of contact, but has no erosion shadow and will move slightly; the block does not bear the weight of the slab and appears to be a later addition (Fig 1). There are three similar blocks positioned as a rough seat or table where the bedrock meets the turf some 6m away from the propped slab. These do not appear in earlier photographs and, again, seem to be a later addition. The original feature therefore is strikingly similar to propped stones recorded in the South Pennines and Yorkshire Dales (Shepherd 2013).

The propped slab shows two parallel ridges, 10 to 15mm high and 200 to 250mm apart, extending along its longest axis on the upper surface (Fig 2). In section, at the ends of the slab, these are seen to be manifestations of two quartz-filled, crack-seal veins 1 to 2mm wide, hading at approximately 30 degrees as shown in Fig 3. (The 'hade angle' is a geological term referring to the deviation from vertical of such veins). Presumably the effect of the hydrothermal fluid invading these seismically-induced stress fractures was to make the surrounding granite slightly more resistant to weathering. Fine, parallel veins of this nature are typical in granite (Renard *et al* 2005).

The bedrock outcrop below the propped slab also has two parallel ridges. They are the

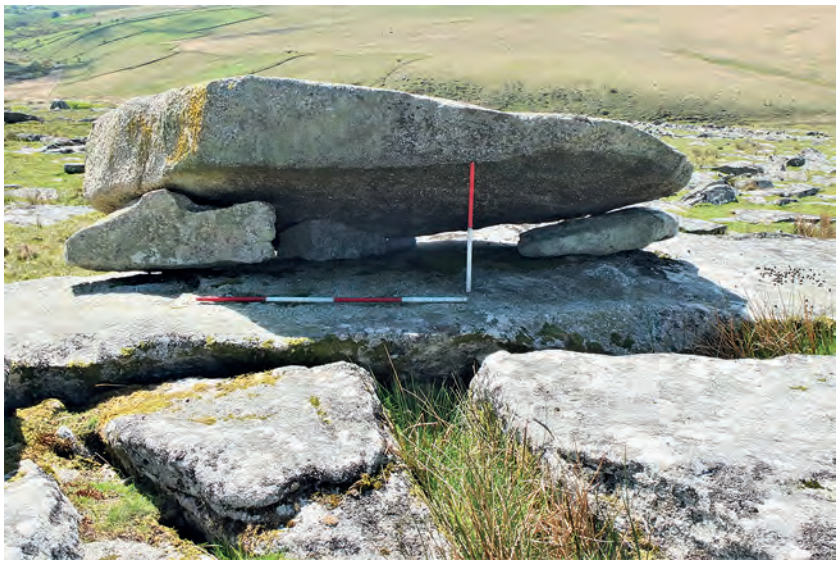

Fig 1 Leskernick propped stone, viewed from the north. Erosion shadows can be seen under the two original props. (The scale is in 250mm segments throughout.)

Fig 2 The ridges running along the propped slab, viewed from the west. The scale is lying between them.

Fig 3 Close-up of a vein in section at the east end of the slab. It is the discontinuous dark line to the right of the pen.

Fig 4 The ridges on the bedrock. They lie to the right of the scale. The angle of hade can be seen in the section on the north face of the outcrop.

same distance apart, in section the veins are of comparable width and they hade at the same angle in the same direction (Fig 4). The thickness of the east end of the propped slab corresponds with that of the north edge of the bedrock. The compelling conclusion is that the propped slab was once part of the exposed outcrop and has been moved into its present position (Fig 5). The shapes of the two matching components do not fit exactly, there is material missing and, although there is some arguable deckling – crescent forms indicative of the use of wood wedges – there is no clear evidence to indicate whether the slab was detached naturally by weathering mechanisms exploiting a 'joint' formed during initial cooling, or whether there might have been anthropogenic action. Megalithic refitting has been explored by Mens (2008) in Brittany and successfully applied to similar features in Ireland (Burns and Nolan 2017).

Such veins do not seem widespread on Leskernick Hill and the nearest slab displaying them, some 60m away with the propped stone on the skyline, has also been propped. A defensible suggestion is that 'unusual' elements of appearance have been one criterion for selection.

When the whole feature is viewed from the south it becomes apparent that the bedrock outcrop itself is heavily undercut. There is an unfeasibly long tongue of rock with a space beneath apparently created by the deliberate removal of underlying rock weakened by the cooling 'joints' and the 'bedding planes' created by the expansion of granite as vertical pressure eased. A parallel for such removal activity has been noted by Burns

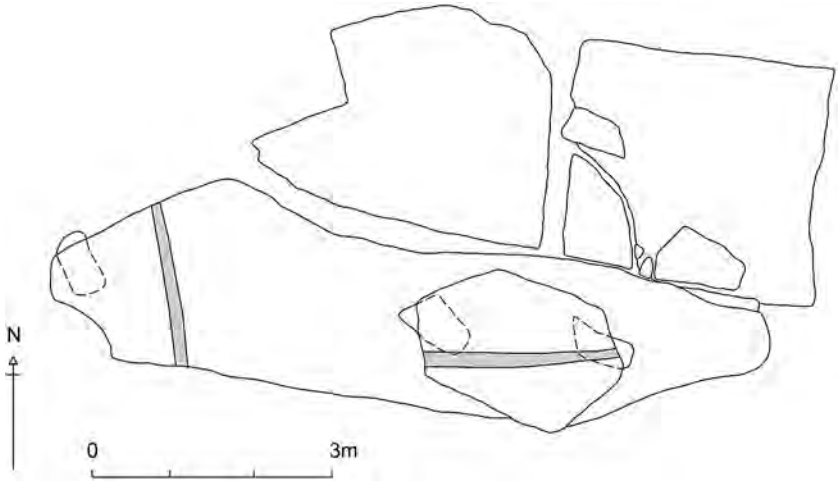

Fig 5 A diagrammatic representation of the positions of the weathered ridges associated with crack-seal veins. (Redrawn by Frank Jolley and based on a plan by Herring 1997.)

Fig 6 A view of the whole double feature from the south.

and Nolan. The long tongue is supported at its extremity by a large block that has itself been moved to reduce the area of contact, it has not simply been left in position in more secure contact with the rock above and below. Two small slabs are stacked under the middle of the overhang. The whole feature would thus appear to comprise a selected slab propped on top of a propped outcrop (Figs 5 and 6).

Addendum: The present writer was in communication with the late Tony Blackman regarding propped stones noted in the south west, the south Pennines and the Yorkshire Dales. Sadly the planned collaborative paper could not appear. This belated visit, working from sparse information, found some 11 propped stones, most if not all of which must already be known (Shepherd 2018–19). It is fitting that, although the writer and Tony never met, Tony's Stone on Twelve Men's Moor was successfully located and some quiet time spent there.

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The deliberate destruction of Late Bronze Age socketed axeheads in Cornwall

MATTHEW G KNIGHT

The deliberate destruction of socketed axeheads is a common feature among Late Bronze Age finds. It is particularly noticeable in the numerous single finds and hoards that have been recovered from Cornwall recently. Interpretations have tended to focus on why these objects were damaged, with little understanding of how this was undertaken. This contribution summarises a series of experimental activities conducted on modern replica axeheads, based on an example from St Buryan, to better understand the practice of deliberate destruction. The results are then compared with prehistoric metalwork from Cornwall. It is argued that by understanding the processes by which these objects were destroyed, one can better interpret the technological processes and the people that were involved in preparing the objects for deposition. This paper closes with some suggestions for future research into experimental destruction.

The deliberate destruction of metalwork is widely recognised in Late Bronze Age hoards of metalwork dating to *c* 1000–800 BC (for example, Needham 1990; Turner 2010). In Cornwall, this is particularly evident in objects recorded in recent years, including hoards from Breage, St Michael's Mount and St Levan (Knight *et al* 2015, 29, 34; Ratcliffe-Warren *et al* 2016) as well as single finds reported through the Portable Antiquities Scheme. Socketed axeheads form a significant number of these discoveries, occurring in complete and incomplete conditions. Sometimes damage sustained on these axeheads suggests intent, such as the crushing or plugging of sockets; in other cases, it is more difficult to determine if individual fragments of axeheads, sometimes representing the body or the cutting-edge, should be considered the result of deliberate destruction.

The limited understanding of *how* an axehead might become fragmented (for instance, through use or intent), and how one might recognise different practices that form the archaeological record, ultimately limits the extent to which interpretations might be made. Nonetheless, the focus when studying fragmentary Late Bronze Age material is traditionally on understanding *why* it was deposited, such as for scrap or recycling purposes (Briard 1965; Burgess 1968; Eogan 1983, 3–4).

This paper presents an overview of experimental destructive activities conducted on replica socketed axeheads based on an example from the Late Bronze Age hoard from St Buryan, to better understand the technological aspects of deliberate destruction in the past. This can offer insights into the tools, skills and knowledge required to destroy objects, which can in turn highlight the people who may have been involved, such as metalworkers. This all aids and informs interpretations of the archaeological material. The results of these experiments are then compared with 32 axeheads studied from Cornwall. Cornwall is a pertinent region to this investigation as fragmented socketed axeheads are common discoveries, particularly since the introduction of the Portable Antiquities Scheme. Furthermore, these have received relatively limited study; therefore, the information garnered can be used to demonstrate the effectiveness of this approach and

emphasise the implications for the archaeological material elsewhere in Britain.

Aspects of destruction and previous destructive experiments

The deliberate destruction of Bronze Age metalwork has received little attention from a practical perspective. Experiments exploring the destruction of metalwork lie in unpublished theses (Hardman 2016; Moyler 2007) or as addenda to longer papers (Bietti Sestieri *et al* 2013), and thus there is limited overall understanding of this process. There are several elements that should be considered ahead of the experiments presented here, such as the material properties of bronze and the impact of use on the object. These are useful for better understanding the resulting archaeological material. It is important to note that while these aspects are explored here in relation to socketed axeheads, they also apply to other object types, such as swords and spearheads, which merit further attention (Knight 2018; forthcoming).

Firstly, the material itself is an important factor as this ultimately dictates how an object will behave under different circumstances. While there has been a long-standing interest in understanding the metallurgical composition of Bronze Age bronzes, the properties of different bronzes are only recently being considered in relation to the behaviour of bronze, specifically how use will impact on the material (for example, Horn and von Holstein 2017; Sáez and Lerma 2015). Bronze in the Late Bronze Age is typically composed of copper, tin and lead, though exact percentages can vary drastically; the percentage of lead for instance can range from 1 to 15 per cent, while tin has been found to be as high 35 per cent though typically falls around 10 per cent (Allen *et al* 1970; Brown and Blin-Stoyle 1959). Differences in these proportions result in varying effects. For instance, a bronze with a high tin content will be more brittle and less plastic than one with a low tin content; meanwhile work-hardening bronze will improve the toughness and tensile strength of the metal, while decreasing the plasticity and increasing the likelihood that it may fracture under duress (Scott 2012, 139). As bronze is worked and used, the metal becomes harder while also becoming more brittle (Coghlan 1975, 82–3). This means that eventually the metal is prone to break unless this stress is relieved by, for example, annealing the object. Understanding the mechanical properties can thus assist in understanding how and why a bronze object broke or was broken in the past.

The disposition of a socketed axehead to break will also be affected by the production process, the subsequent preparation, and the eventual use of the object. Casting flaws, such as mineral inclusions and air bubbles, may occur when the metal is poured into the mould and will create inherent weaknesses. For instance, casting flaws have been highlighted in broken Early Bronze Age flat axeheads in Scotland, suggesting these breakages were unintentional (Moyler 2007, 147). Therefore, where such flaws can be observed this must be balanced against the likelihood of human agency.

Similarly, understanding the extent to which a socketed axehead has been used is also important. Damage is typically considered intentional if it could not have been sustained through a presumed utilitarian function (Nebelsick 2000; Turner 2010, 60ff; York 2002, 80); in other words, a crushed axehead socket or an axehead broken into multiple pieces will be deemed deliberate *because* it is unlikely to have occurred through use. However, this usually relies on a subjective approach and damaged objects are rarely compared to replicas that have been subjected to use-wear experiments. Published experiments involving socketed axeheads are rare; the key example is that by Roberts and Ottaway (2003). In their experiments, the authors produced two replica socketed axeheads and used them to strip bark and chop branches. This produced a range of wear on the edge of the socketed axeheads, although no extensive damage such as deformation of the edge or fragmentation. The short-lived nature of this experiment means it is unlikely that the axeheads would have broken, although it is possible that over time axeheads may weaken and break, especially if misused.

The idea that axeheads may achieve material failure through misuse is supported by a longer experiment constructing the Morgawr replica Bronze Age boat (Van de Noort *et al* 2014). During this project 27 replica flat and flanged axeheads and chisels were used, of which one flat axehead is reported to have broken across the narrowest part of the object (*ibid*, 302–3), though further details are unavailable. As these implements were largely used by volunteers, it is plausible that the axehead broke as a result of misuse, especially as

it broke across a narrow weak point. Although the form of a flat axehead is not strictly comparable with a socketed axehead, it is clear that identifying *deliberate* damage must be considered alongside these other factors.

This can be furthered by experiments specifically studying the deliberate destruction of objects, though such experiments are rare in the academic literature (for example, Hardman 2016; Moyler 2007, 134–9). Moyler (*ibid*) explored how easily one might break an Early Bronze Age flat axehead. He attempted this by clamping the axehead with the butt projecting and then striking it with a stone hammer. When this failed he used a steel hammer, which caused the axehead to fracture and transversely bend but a 'clean' fragmentation was not achieved. An alternative approach was utilised by Hardman (2016), who studied the impact of temperature on breaking tin-bronze bars. He hypothesised that increasing the temperature would cause different patterns of breakage and deformation that could then be compared to the archaeological literature. He heated the bars at increments up to 800°C, breaking them at different temperatures. He found that there was a statistically significant correlation between an increase in the temperature and a decrease in the angle of deformation (that is, the extent of bending) associated with the break (*ibid*, 18, fig 13). These results were compared with damaged objects from Late Bronze Age hoards in South Wales. Hardman (*ibid*, 34–5) found that while he could compare the angle of deformation on sword blades to suggest the temperature at which these were broken, it was more difficult with complex objects, such as socketed axeheads. Nonetheless, it is clear from comparing Moyler and Hardman's experiments that temperature is a key factor in the destruction of objects. Destructive experiments specifically concerning socketed axeheads have never been undertaken.

The experiments

Introduction

The experimental activities presented here were designed according to a set of aims and hypotheses that would further the identification of deliberate destruction on prehistoric artefacts. Three experiments on four socketed axeheads were conducted, which are summarised here.

Aims and hypotheses

The experiments were undertaken with a simple question in mind: how does one best destroy a bronze socketed axehead? The simplicity of this question is necessary because no recorded destructive experiments have ever been undertaken on a socketed axehead. The prehistoric deliberate destruction of this object may have been undertaken in a variety of ways, including crushing and fragmenting. Furthermore, previous destructive experiments indicated that the temperature of the metal was likely to be an important factor. The experiments were therefore directed by the following aims:

- To explore the effect of temperature and composition on the disposition of an object to break;
- To understand the techniques required to damage an object;
- To explore the processes involved in crushing an axehead socket; and
- To identify marks and characteristics on broken experimental axehead pieces that might be compared with archaeological specimens.

In support of these aims, and building on previous research, the following hypotheses were put forward for testing:

- A bronze hammer will be more effective than a stone tool at crushing and breaking an unheated socketed axehead.
- The composition will affect how the socketed axehead will damage and break.
- An axehead will be easier to break when heated than unheated.

Design and production

A Type Welby socketed axehead (following Schmidt and Burgess 1981, 221–3) was selected for experimentation. Welby axeheads encompass a broad range of ribbed socketed axeheads present across southern Britain (Needham 1990, 32; Schmidt and Burgess 1981, 221) and are frequently found damaged; this generic form is thus an appropriate type to reproduce for the purposes of broad experimentation. The replica axeheads were

Fig 1 The St Buryan socketed axehead. (Photograph: author; courtesy of Royal Institution of Cornwall.)

based upon a largely complete axehead example from the St Buryan hoard, Cornwall (Fig 1). This hoard dates to the Ewart Park phase (920–800 cal BC) (Needham *et al* 1997) when the deliberate destruction of metalwork was a common practice (Turner 2010); the St Buryan hoard also includes a fractured socketed axehead, nine ingot fragments and a flint flake (Fig 2). This example was thus suitable for exploring deliberate destruction.

An experienced bronze caster, Neil Burridge, was commissioned to produce four socketed axehead replicas. The Royal Institution of Cornwall kindly provided a cast of the St Buryan axehead from which Mr Burridge could reconstruct a model. The axeheads were cast in sand moulds based on this model in three different metallurgical compositions. In the end, eight axeheads were successfully cast and four were selected for experimentation based on their casting quality and encompassing the three compositions (Table 1) (Fig 3).

Few post-casting processes were undertaken on the axeheads to minimise the variables involved. The casting material was removed, including 'flash' down each side of the axehead and the casting feeders, but the axeheads were otherwise left as-cast. This decision was made because the limited research conducted into the destruction of socketed axeheads meant it was more important to focus on fewer variables (for example, temperatures to which the axeheads are heated or the tools used to break the axeheads), rather than add to them by working and using the axeheads.

Setting up the experiments

The experiments were conducted over two sessions in October 2016 and May 2017 at Neil Burridge's workshop. The activities explored two main variables for replicating damage seen on prehistoric objects: the effect of temperature; and the impact of different tools. A small 'kiln' consisting of a small clay-lined frame containing a bed of charcoal was provided by Mr Burridge into which the axeheads could be inserted and heated; the temperature was monitored using a temperature probe. The tools

Fig 2 The St Buryan hoard, consisting of two incomplete socketed axeheads (top left) and nine pieces of copper/copper-alloy ingots and a flint flake (bottom right). (Photograph: author; courtesy of Royal Institution of Cornwall.)

utilised were an unhafted granite beach cobble used as a hammerstone (Fig 4), supplied by the University of Exeter Experimental Archaeology Department, and a replica hafted bronze hammer supplied by Mr Burridge (Fig 5).

Experiment 1: Striking an unheated axehead with a hammerstone

Axehead 1.5 was utilised in the first experiment, which explored the effectiveness of a granite hammerstone in breaking an unheated axehead. The specific goals were to separate the cutting-edge from the axe-body and to crush the socket. The metallurgical composition of the axehead was 8 per cent tin, 2 per cent lead and 90 per cent copper. Blows to the axehead were delivered from the elbow with the stone gripped in the researcher's hand while the other hand held the axehead in place (Fig 6).

Blows were initially aimed at the face of the cutting-edge and the internal opening of the axehead as this is where prehistoric breakage is frequently observed and assumptions are often made about this as the weakest part of the axehead. Blows were also delivered to the socket end of the axehead face to achieve crushing. After 25 minutes, repeated hammering caused shallow depressions in the body of the axehead and extensive surface damage but no fracturing, fragmentation or significant crushing of the axehead. The experiment was terminated at this point. It is reasonable to assume that the stone

Fig 3 The replica socketed axeheads.

Fig 4 The hammerstone used in Experiment 1.

Table 1 Dimensions and composition of the replica axeheads

Axehead no.	***Dimensions (mm)***				***Composition***		
	Length	*Blade width*	*Socket width x height*	*Weight (g)*	*Copper*	*Tin*	*Lead*
1.1	103.5	50	43.4x40.2	256	84%	15%	1%
1.2*	104.3	49.8	43.9x40.1	328	84%	15%	1%
1.3	**103.4**	**49.6**	**44x40.3**	**246**	**84%**	**15%**	**1%**
1.4	104.1	49.9	43.7x40.1	238	90%	8%	2%
1.5	**103.9**	**50.9**	**43.8x40.8**	**273**	**90%**	**8%**	**2%**
1.6	**103.6**	**49.6**	**43.1x40.4**	**267**	**90%**	**8%**	**2%**
1.7	105	50.4	43.8x40.7	301	88%	8%	4%
1.8	**104.1**	**50.2**	**43.8x40.5**	**286**	**88%**	**8%**	**4%**

Bold = the axes chosen for experimentation.
*This axehead was left as-cast with the casting jet still attached.

hammer would have benefited from being hafted to allow greater leverage and thus transference of force upon impact. Nonetheless, this experiment offered insights into how deliberate destruction was *not* achieved.

Fig 5 The hafted bronze hammer used in Experiments 2 and 3.

Fig 6 Striking a replica axehead with the hammerstone (Experiment 1).

Experiment 2: Striking an unheated axehead with a bronze hammer

The second experiment was conducted with the same aims as Experiment 1, but sought to address the key limitation described above. The hafted bronze hammer was thus used to allow a greater transition of energy into the blows striking the axehead. Axehead 1.8 was selected for this experiment with a metallurgical composition of 8 per cent tin, 4 per cent lead and 88 per cent copper. It was hypothesised that the higher composition of lead would lower the toughness of the bronze and this, combined with the improved tool, would enable crushing and fragmentation.

The experiment was also enhanced by clamping the axehead between two large stones and recording the damage sustained after increments of five blows. Table 2 presents details of the experimental process and the accumulative damage caused. After 105 blows, the experiment was terminated, having again failed to achieve fragmentation of the axehead or full compression of the socket. The socket was however more greatly deformed into a 'peanut-shaped' section (Fig 7) with small cracks beginning to form around the side loop and down one side. Additional blows would have eventually achieved complete crushing and probably fragmentation, although the overall ineffectiveness of this method meant the experiment was terminated.

Experiment 3: Striking heated socketed axeheads

Experiment 3 used Axeheads 1.3 and 1.6 to investigate the impact of temperature on fragmenting socketed axeheads, as well as the

Fig 7 Axehead 1.8 after Experiment 2.

potential effect of composition. Axehead 1.3 had a metallurgical composition of 15 per cent tin, 1 per cent lead and 84 per cent copper, while Axehead 1.6 had a composition of 8 per cent tin, 2 per cent lead and 90 per cent copper. Axehead 1.6 could thus also be compared with Axehead 1.5 in Experiment 1. Both were placed in the 'kiln' and heated to approximately 500°C; this temperature was chosen following discussions with Mr Burridge and a well-constructed sheltered fire or hearth could easily achieve this temperature. For instance, experiments replicating Bronze Age cremation pyres have been found to reach up to 1000°C without any additional equipment such as bellows or tuyères (Marshall 2011, 14–5, 25–6).

After 25 minutes, the probe registered the temperature of the axeheads at 490°C, although this did not increase any further. Axehead 1.6 was thus removed at this point and the cutting-edge was struck with the bronze hammer with blows delivered from the elbow in a kneeling position. The blows failed to cause fragmentation and the axehead was returned to the kiln. It was hypothesised that the axehead needed to be heated for longer to achieve fragmentation and more charcoal was added and the temperature quickly rose to 670°C. The axeheads were left in the kiln until the temperature had decreased closer to the planned temperature.

After approximately 50 minutes, Axehead 1.6 was again removed, having reached a temperature of 560°C. Three blows delivered to the cutting-edge caused fragmentation and separation of the edge from the main body. The surviving socket was then struck twice, which caused the axehead to shatter into nine fragments (Fig 8). A similar result was achieved for Axehead 1.3, which broke into 16 fragments (Fig 9). The cutting-edge and part of the lower blade of both axeheads survived largely intact, although with some crushing of the internal socket opening, while the upper body and socket mouth fragmented into small bits.

This extreme fragmentation was unexpected but it is possible the axeheads were much hotter than the temperature measured by the probe, causing a heightened reaction. The material properties

Table 2 Results of Experiment 2 using Axehead 1.8

Cumulative no. of blows	*Face of axehead*	*Axehead position*	*Strike location*	*Effect*	*Additional Notes*
5	Side loop right	Clamped, set above the ground	Socket rim	Slight bowing of the socket, but only at the rim; aesthetic surface deformation; minor counter impact on opposite face.	
10	As above	As above	As above	As above.	
15	As above	Clamped, set on ground	As above	As above.	Lack of effectiveness prompted change in tactic; the socket rim may be too thick.
20	As above	Clamped, set above the ground	Body	Minor bowing of the body; flattening of ribs; minor counter impact on opposite face; sides of axehead around the socket beginning to bow outwards.	
25	As above	Clamped, set on ground	As above	As above.	
30	Side loop left	As above	Socket rim	Continued bowing of the socket; surface deformation.	
35	As above	Clamped, set above the ground	Body	Minor bowing of the body; flattening of ribs.	Blow increments increased.
45	As above	As above	Socket rim	Increased socket compression to a semi 'peanut' section.	Still no associated fractures or cracking.
55	Side loop right	As above	As above	As above, but still no cracking.	Blow increments reduced again to observe any gradual effects.
60	As above	Clamped, set above the ground	Body	Minor compression of the body; flattening of ribs.	
65	Side loop left	As above	As above	As above.	Blow increments increased to 20 (10 on each side).
85	Both	As above	As above	Increased bowing into definite 'peanut' section.	
105	Both	As above	Socket rim	Minor cracking beginning around the sides and the side loop.	Axehead still not broken nor fully compressed. Experiment terminated.

of the bronze altered when heated, causing the tensile strength, toughness and the plasticity of the bronze to lower while inversely increasing the brittleness. This ultimately led to material failure and fragmentation.

Fig 8 Axehead 1.3 after Experiment 3.

Fig 9 Axehead 1.6 after Experiment 3.

Results

A comparison of Experiments 1 and 2 demonstrated that the use of a hafted tool was more effective than an unhafted one as it enabled more force to be delivered with each strike. It is difficult to judge, however, if the material of the hammer influenced the resulting damage. Additionally, it seems that the metallurgical composition had limited discernible impact, with both axeheads suffering extensive surface damage and neither achieving breakage.

Most significantly, it is clear from these experiments that temperature plays a major role in the damage a socketed axehead will sustain when struck with blunt implements. The unheated axeheads could not be broken, though deformation to the sockets was caused in the process, associated with surface damage such as the flattening of the ribbed decoration. By contrast, heating the socketed axeheads and then striking them caused extensive fragmentation. Analysis of the fragments from Experiment 3 afterwards showed few signs of archaeologically visible impact points, such as hammer marks, demonstrating that the application of heat results in different indicators of deliberate damage. This is particularly important as it means that archaeological fragments that are the result of intentional destruction may not display signs of hammering. Differences in the composition had no marked effect on the breakage of the axeheads in this latter experiment. It is, however, possible that metallographic analysis would reveal differences on a microstructural level.

Discussion

The aims and hypotheses of these experiments were necessarily led by the basic notion of better understanding the deliberate destruction of socketed axeheads. These experiments go some way towards achieving this overall aim by emphasising some of the difficulties in fragmenting socketed axeheads. It is not as easy as simply hitting them with a hammer.

Indeed, a limitation of this set of experiments was the author's lack of experience handling the implements and tools. This became particularly evident during Experiments 1 and 2 when trying to assess how best to secure or strike the axeheads to achieve the most effective and efficient results. This was partly negated by the assistance of Mr Burridge, whose expertise and advice proved invaluable throughout the experiments. Although the destruction of axeheads might not initially appear to be a skilful activity, knowledge of metalworking techniques and familiarity with the materials, tools and technology would clearly be of great benefit.

In each of the experiments it was possible to view indicators of the method used, either through the fragmentation caused by heating the axeheads first, or the surface damage and deformation resulting from striking them unheated. These indicators thus mark the beginning of a reference collection that can be compared with the archaeological record to enhance judgments of deliberate damage.

Comparisons with socketed axeheads in Cornwall

Approximately 55 Late Bronze Age socketed axeheads are known from hoards and as single finds from Cornwall (based on data from Knight *et al* (2015), Pearce (1983) and the Portable Antiquities Scheme database, accurate to 24 March 2018). Of these, 32 were studied and assessed as part of PhD research conducted between 2014 and 2018. The axeheads were studied macroscopically

Table 3 A summary of the Damage Ranking system and key criteria (source: Knight 2018, 273, table 7.2)

Damage Ranking	*Description*	*Criteria*
0	Not deliberate	Evidence of corrosion and post-depositional processes or casting flaws that would have caused damage
1	Probably not deliberate	Damage combined with use-wear or consistent with unintentional damage
2	Probably deliberate	No associated marks but consistent with damage one would expect from intentional practices informed by experiments
3	Deliberate	Damage that could only have been sustained intentionally, typically with associated marks
n/a	Not applicable	Complete objects
Uncertain	Uncertain	Objects displaying several features that cannot be conclusively determined

Table 4 Late Bronze Age socketed axeheads studied from Cornwall

No	*Findspot*	*Axehead type*	*Method of study*	*Completeness*	*Damage*	*Use-wear*	*Damage Ranking*	*Context*	*Museum/ PAS no*
1	Breage I	Ribbed	Macroscopic	51-75%	Broken across the body so socket mouth and upper body surviving. Plugged with fragments of a sword, a torc, a knife and another socketed implement.	Uncertain.	3	Hoard of 24 objects, almost all fragmentary.	TRURI 2007.20
2	Breage I	Ribbed	Macroscopic	0-25%	Part of socket mouth and body broken on three sides.	Uncertain.	3	As above.	TRURI 2007.20
3	Breage II	3-ribbed	Macroscopic	0-25%	Slightly crushed mid-body fragment, missing the socket mouth and cutting-edge.	Casting flaws; casting material prepared/removed.	3	Hoard of 7 objects, including sword and ingot fragments.	TRURI 2007.21
4	Breage III	Uncertain	Macroscopic	0-25%	Lower blade broken above the socket aperture.	Worn cutting-edge.	2	Single find.	CORN-10D5E6
5	Deviock	Ribbed	Observations from images	26-50%	Lower blade broken above the socket aperture.	Casting material partially prepared; misaligned core; notches; worn cutting-edge.	1, 2	Single find.	CORN-E91A21
6	Gillan	Type Meldreth	Macroscopic	76-99%	Broken side-loop; incomplete socket mouth.	Bevelled edges; blunt cutting-edge; casting material prepared/removed; rounded tips.	1	Found near three lumps of ingot.	TRURI 1966.18.1
7	Gwithian-Gwinear II	Uncertain	Observations from images	0-25%	Lower blade broken above the socket aperture.	Uncertain.	0, 2	Single find.	CORN-EF36FD
8	Ludgvan	Uncertain	Observations from images	0-25%	Cutting-edge broken at the socket aperture.	Uncertain; worn cutting-edge.	0, 2	Single find.	CORN-F29E04
9	Maker-with-Rame	Gwithian	Macroscopic	76-99%	Broken side-loop; three-quarters of the socket mouth broken away.	Bevelled cutting-edge; casting material prepared/ removed; nicks.	1	Single find.	CORN-E98BB3

Table 4 cont.

No	*Findspot*	*Axehead type*	*Method of study*	*Completeness*	*Damage*	*Use-wear*	*Damage Ranking*	*Context*	*Museum/ PAS no*
10	Padstow	Poss. South-eastern	Observations from images	0-25%	Socket mouth fragment.	Uncertain.	Uncertain	Single find.	CORN-431AF8
11	Penpillick	3-ribbed	Macroscopic	51-75%	Socket mouth and upper body broken unevenly leaving only the cutting-edge and lower body.	Chips; possible casting flaws; uncertain.	0, 1	Single find.	TRURI 2008.25
12	Riviere Farm, Phillack	Type Welby	Observations from images	0-25%	Socket rim fragment broken on three sides.	Casting material prepared/ removed; uncertain.	2	Single find.	CORN-C5C0B5
13	Sennen	Uncertain	Observations from images	0-25%	Mouth and collar fragment.	Uncertain.	2	Single find.	CORN-214B63
14	St Buryan	Type Welby	Macroscopic	76-99%	Broken at the socket mouth on one face removing the collar and upper body.	Casting material prepared/ removed; grinding; hammering; uncertain.	1	Hoard of 11 objects comprising axeheads and ingots.	TRURI 2014.5
15	St Buryan	Uncertain	Macroscopic	0-25%	Cutting-edge fragment broken unevenly across the socket aperture.	Casting material prepared/ removed; hammering.	2	As above.	TRURI 2014.5
16	St Columb Major	Uncertain	Observations from images	0-25%	Lower blade broken above the socket aperture.	Blade asymmetry; casting material prepared/removed; worn cutting-edge.	2	Single find.	CORN-6CB647
17	St Enoder	Type Meldreth	Observations from images	76-99%	Socket mouth broken away but mostly complete.	Blade asymmetry; casting material prepared/removed; hammering.	1	Single find.	CORN-60E6C4
18	St Erth Hoard I	Uncertain	Macroscopic	0-25%	Socket mouth and side-loop fragment.	Uncertain.	3	Hoard of 22 objects in 27 fragments, including swords, axeheads, a gouge and ingots.	TRURI 2005.94.1.6
19	St Erth Hoard I	Poss. Ribbed	Macroscopic	0-25%	Socket mouth and body fragment in two refitting pieces.	Uncertain.	3	As above.	TRURI 2005.94.1.7

Table 4 cont.

No	*Findspot*	*Axehead type*	*Method of study*	*Completeness*	*Damage*	*Use-wear*	*Damage Ranking*	*Context*	*Museum/ PAS no*
20	St Erth I	South Welsh	Macroscopic	76-99%	Largely complete but cracked down one side.	Casting material prepared/ removed; uncertain.	0	Two axeheads possibly found together.	PHGM 75/514
21	St Erth I	Type Welby	Macroscopic	51-75%	Part of socket and one side of the axehead has fragmented away; socket crushed.	Casting material prepared/ removed; hammering; uncertain.	3	As above.	PHGM 75/515
22	St Levan	Uncertain	Macroscopic	0-25%	Upper body broken unevenly with socket mouth and side-loop intact.	Casting material prepared/ removed; uncertain.	2	Hoard of 53 metal objects, almost all fragmentary.	CORN-E8DF11
23	St Levan	Ribbed	Macroscopic	0-25%	Mid-body fragment broken on all sides.	Uncertain.	3	As above.	CORN-E8DF11
24	St Levan	Uncertain	Macroscopic	51-75%	Upper body and socket mouth have broken away, with associated cracking.	Blade asymmetry; casting flaws; casting material prepared/removed.	Uncertain	As above.	CORN-E8DF11
25	St Michael's Mount	South Welsh	Macroscopic	76-99%	Socket mouth incomplete; cutting-edge chipped.	Casting flaws; casting material prepared/removed; uncertain; grinding; hammering.	0, 1	Hoard of approx. 50 objects including axeheads, swords, sheet fragments and ingots.	National Trust
26	St Michael's Mount	Type Meldreth	Macroscopic	26-50%	Broken across the middle of the body so only the upper part survives; plugged with a fragment of another socketed axehead, which is compressed around a fragment of another object.	Casting material prepared/ removed; uncertain; grinding; striations (polishing).	3	As above.	National Trust
27	St Michael's Mount	3-ribbed	Macroscopic	26-50%	Cutting-edge and lower body piece; crushed.	Casting material prepared/ removed; mis-aligned moulds; uncertain.	3	As above.	National Trust

Table 4 cont.

No	*Findspot*	*Axehead type*	*Method of study*	*Completeness*	*Damage*	*Use-wear*	*Damage Ranking*	*Context*	*Museum/ PAS no*
28	St Michael's Mount	3-ribbed	Macroscopic	0-25%	Mid-body fragment; crushed.	Uncertain.	3	As above.	National Trust
29	St Michael's Mount	Uncertain	Macroscopic	0-25%	Socket mouth fragment.	Uncertain.	2	As above.	National Trust
30	St Michael's Mount	Uncertain	Macroscopic	0-25%	Body fragment broken on all edges; bowed and warped; hammer marks.	Uncertain.	3	As above.	National Trust
31	St Michael's Mount	Uncertain	Macroscopic	0-25%	Cutting-edge fragment broken above the socket aperture; associated hammer marks.	Bevelled edges; blade asymmetry; blade blunted.	3	As above.	National Trust
32	St Minver Lowlands	Uncertain	Observations from images	0-25%	Lower blade and cutting-edge broken unevenly above the socket aperture.	Worn cutting-edge.	0, 2	Single find.	CORN-52EF32

when available, although images and details from the Portable Antiquities Scheme were utilised where axeheads had been recorded and returned to finders. Possible indicators of deliberate damage were recorded, including evidence of crushing, hammering and plugging. Breakage was also recorded and the completeness of the axeheads was used to distinguish 'fragments' (any object less than 25 per cent complete) from 'pieces' (objects greater than 25 per cent complete). All the axeheads were damaged in some way.

An initial assessment was made to determine if the damage could be considered genuinely ancient (that is, occurred in the Bronze Age) or whether they were the result of post-depositional and post-recovery processes, such as corrosion or cleaning. Similarly, any signs of manufacture or use were recorded, as well as the nature of any breaks, including the position, associated marks and evidence for casting flaws. The damage observed was ranked according to a Damage Ranking System developed during the author's PhD research (Knight 2018, 153–202), which is summarised in Table 3. This system offers a simple means for categorising damage based on the likelihood that such damage is deliberate. Due to multiple instances of damage being present on some objects, it is possible for some objects to possess multiple rankings. A summary of the details of the axeheads studied is presented in Table 4.

Most of the damage observed was probably or definitely deliberate (Fig 10). The experimental work was particularly useful in identifying when an axehead had probably been destroyed, despite showing no immediately obvious signs such as crushing or hammering. For instance, the extreme fragmentation achieved when the axeheads were heated resulted in multiple smaller fragments which showed no signs of the process of destruction. Fragments of axeheads in larger hoards, such as St Buryan and St Michael's Mount (Nos 15 and 29), can be more definitively considered the result of intentional fragmentation by comparing them with the experimental fragments (Fig 11). This is further strengthened by other deliberately destroyed objects in these hoards, such as the crushed and plugged socketed axehead from St Michael's Mount (No 26) (Fig 12).

Where these comparisons have real benefit, however, is in the study of single, stray finds often lacking a context. Typically, these are seen as pieces of lost scrap, which indeed they might be, but by establishing that they may have been the result of intentional destruction one can contribute to the object biography of otherwise oft-ignored objects. A consideration of the destructive process alongside other elements, such as a study of the landscape, could be insightful. Such a study is beyond the confines of this paper, but would be important because of the number of socketed axehead fragments that are being recorded through the Portable Antiquities Scheme across England and Wales. If finds such as those from Sennen and Padstow (Nos 10 and 13) are the result of intentional fragmentation, this could suggest the movement of a metalworker through the area or, where multiple fragments are found, an ephemeral site of a deliberate fragmentation event. An analysis of the landscapes in which these fragments are found could also add to this. These suppositions of course require further investigation of fragments of multiple objects across different areas; in this

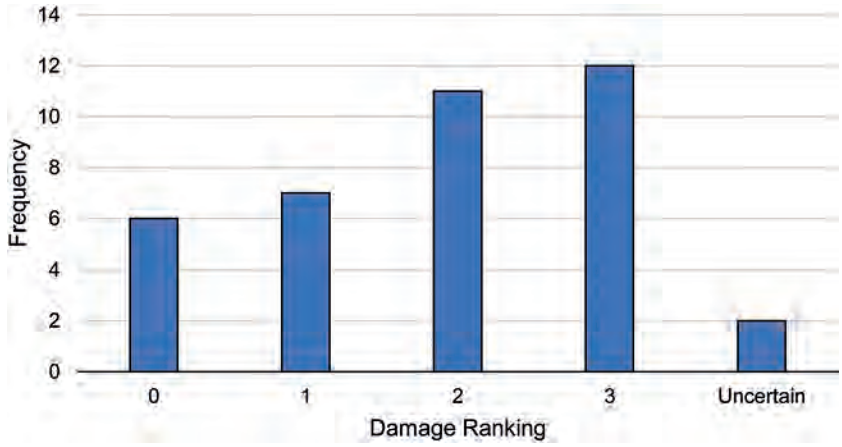

Fig 10 The frequency of each Damage Ranking was recorded for the axeheads from Cornwall (Tables 3 and 4).

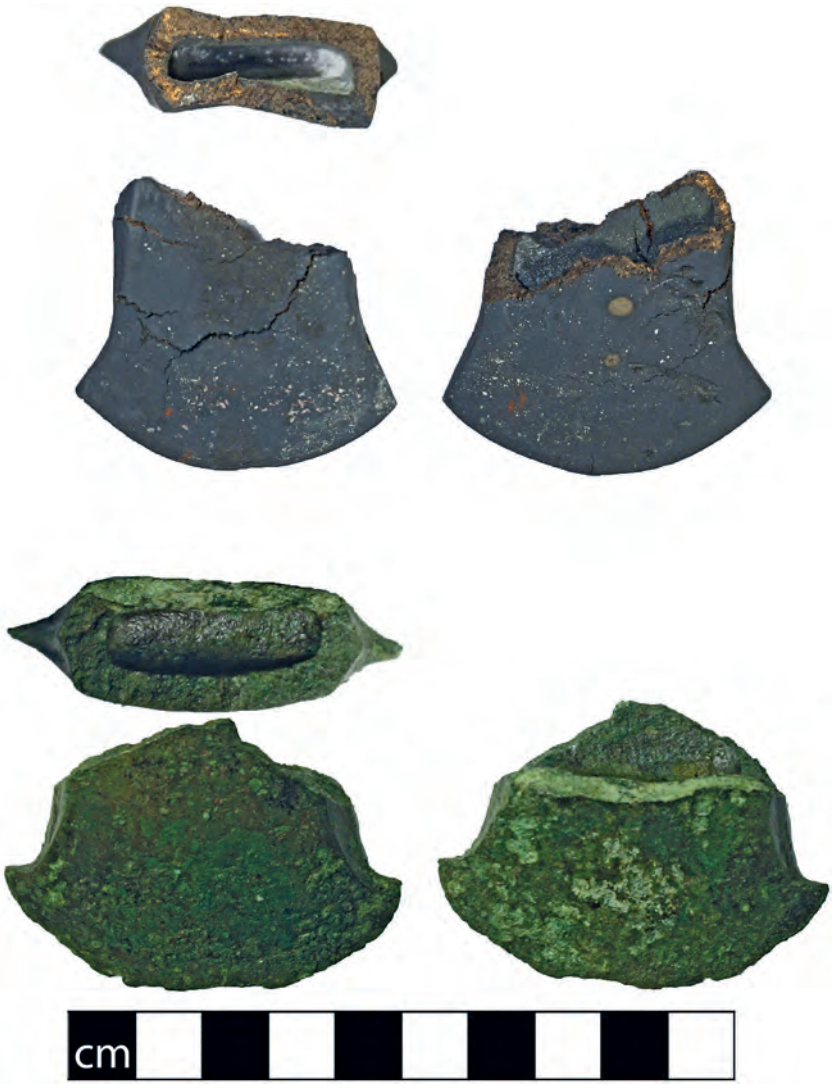

Fig 11 The cutting-edge of Axehead 1.3 (top) compared with a socketed axehead fragment from the St Buryan hoard (bottom). (Photograph: author; courtesy of Royal Institution of Cornwall.)

regard, the Portable Antiquities Scheme would present a useful resource to further the relationship between Bronze Age metalwork and the landscapes in which it was deposited, similar to the work that has been done for Roman material (Brindle 2014).

Another interesting consideration is the pattern of breakages that can be observed on socketed axeheads. Nine of the axeheads are represented by the cutting-edge and lower body of a socketed axehead; in some cases, such as at St Michael's Mount (No 27), this is clearly the result of intent due to the association of a crushed body. This can be mirrored with the experimentally crushed and broken cutting-edge of Axehead 1.3 (Fig 13).

However, where no associated damage is present, two options present themselves for why a socketed axehead may have broken at this point:

1. This is a naturally weak point of the axehead; or
2. These cutting-edges represent the result of deliberate fragmentation but display no obvious signs.

Assessing these theories in the present research is difficult. The first suggestion might be supported by extensive use observed on the fragmented pieces; the cutting-edges from Breage III, Deviock and

Fig 12 A plugged socketed axehead from the St Michael's Mount hoard. (Photograph: author; courtesy of National Trust.)

Ludgvan (Nos 4, 5 and 8), for instance, are worn and damaged, indicating a potentially long use-life that may have resulted in material failure. This, however, requires longer term experimentation to determine how an axehead may break after extensive use; such use-wear experiments have yet to be undertaken.

Alternatively, that some of these edges show signs of intentional breakage, such as the pieces from St Michael's Mount (Nos 27 and 31), could strengthen the idea that detached socketed axehead cutting-edges are the result of intent. Indeed, the experiments showed that when fragmented these are the sections of the axehead that are most likely to survive as larger pieces and do not necessarily leave traces of the fragmentation process. What cannot be denied is that the lower body and cutting-edges of socketed axeheads are commonly recovered in the archaeological record. An assessment of the socketed axeheads from Devon, Dorset and Somerset showed that a further 55 examples present in hoards and as single finds are known in the south-western region alone (Knight 2018). Furthermore, the pattern of socketed axeheads broken across the body has been noted in hoards across Britain and Europe (Bradley 2005, 145–64). The combination of the pattern of deposition and the experimental work suggests one ought to consider isolated fragments of socketed axeheads more carefully; certainly it seems unlikely that every single fragment is the result of unintentional loss and accidental breakage.

Where deliberate destruction is more obvious, such as crushed sockets or hammering associated with breakage, the experiments contribute a better understanding of these processes. The experiments demonstrated that there is a noticeable difference in how the axeheads crush and break when heated or unheated. The experiments failed to fracture Axeheads 1.5 and 1.8, which were left unheated, but in the process did cause some crushing and, significantly, extensive material damage to the surfaces of the axeheads almost totally removing the ribbed decoration. By contrast, striking Axeheads 1.3 and 1.6 when heated did not achieve crushing, though the surfaces survive largely as they were cast. None of the archaeological axeheads studied demonstrated surface damage to the extent seen on Axeheads 1.5 and 1.8, suggesting that where deliberate destruction is observed, it was either not undertaken using the tools and methods tested above, or most deliberate destruction was undertaken when the axeheads were heated first.

As seen above, one of the closest comparisons can be drawn between the replicas and the axehead from St Michael's Mount. However, more substantial pieces demonstrating crushing, such as the St Erth I axehead (No 21) or the mid-body fragments from St Michael's Mount (No 28) and

Fig 13 Axehead 1.6 (top) compared with a socketed axehead from the St Michael's Mount hoard (bottom). (Photograph: author; courtesy of National Trust.)

Breage II (No 3), require further consideration as parallels for this damage were not replicated. Hardman's (2016) experiments testing the effects of temperature on the deformation of bronze bars suggests the most likely reason for the lack of comparable experimental damage. The axeheads in the experiments presented above were heated to high temperatures (approximately 560°C), which caused the material to become very brittle and thus broke with limited deformation. One can hypothesise that lower temperatures would cause the bronze to retain more of its plasticity and thus crush and

deform more greatly before or as part of breaking. The implications of this are discussed further below.

A final point can be made about the use of tools. A broad bronze hammer was used for three of the four destructive experiments. When the axeheads were heated first the hammer left no discernible impact marks except where the metal deformed during breakage; meanwhile, when left unheated the axeheads suffered large dents and flattening of the ribs that were not observable on the prehistoric artefacts. Hammer and impact marks associated with breakages were rarely identified on the socketed axeheads studied, though one from the St Michael's Mount hoard had a small circular indentation which was probably caused by a hammer. Bronze Age bronze hammers are relatively rare with none currently known from Cornwall. A probably Late Bronze Age example is known from Loddiswell, Devon (Partridge 2015), which is quite slender by comparison with the tool used in the experiments; indeed most forms of Bronze Age metal hammers are quite narrow (Fregni 2014, 81-92). The lack of archaeological examples should, of course, not be taken as evidence that none existed, but the brittleness of the metal achieved through heating means that hammers of other materials, such as stone or antler, were likely also to be effective at achieving breakage and probably crushing. Furthermore, if a metal hammer was used, it was probably narrower than the one utilised here.

Wider implications for the archaeological record

So far the experiments have largely been compared with a dataset from Cornwall, though there are clearly wider implications for the archaeological record. Firstly, the importance of heating the objects before fragmentation has been emphasised. The involvement of fire in the fragmentation process is not a new concept (for example, Turner 2010) and the idea that many large fragmentary hoards across Britain were abandoned scrap has been commonly suggested (Burgess 1979; Eogan 1983, 3–4). However, by appreciating the temperatures required to achieve fragmentation, one can better understand the nature of the destruction event.

The melting temperature of leaded tin-bronze is around 1000°C depending on the relative quantities of lead, tin and copper (Scott 2012, 243); therefore, it is clear that a fire hot enough to melt bronze was not necessary to fragment it. An effective temperature for fragmenting bronze was found to be around 500–600°C, but Hardman (2016) demonstrated breakage could be achieved from as low as 100°C. This draws into question the nature of the individual involved in destroying bronzes and the skills required. If a metalsmithing setup was not required for metal destruction, is it appropriate to consider that these breakages were the consequence of a metalworking event? The experiments illustrated that a working knowledge of the material, the tools and the construction of a fire were all essential for conducting the fragmentation of objects, so this question should not be seen as removing the hypothetical metalworker from this process. However, by questioning the traditional interpretations of broken metalwork as a process of metal scrapping, and understanding the various aspects of the practice, one can begin to achieve a more nuanced interpretation of the nature of the deposit and those who may have been involved.

Furthermore, the experiments demonstrated the ease with which socketed axeheads might be fragmented in the right conditions. This challenges previously conceived notions on the behaviour of the material. For instance, Wiseman (2018, 43) has recently suggested that some socketed axeheads remained intact in Late Bronze Age hoards because they were more difficult to fragment. This is certainly true if one had no means of heating the objects, but where complete socketed axeheads are present alongside other fragmentary material a different explanation for their inclusion is required. By considering the processes by which objects within a single accumulation may have been damaged and comparing the conditions and completeness of the objects, it is possible to suggest that at least some of this material may have been the result of a deliberate selection process (q.v. Hansen 2012; 2013). Where incomplete deliberately destroyed axeheads and complete undamaged axeheads are found together, one can more convincingly suggest that these were accumulated from two different situations over time.

Conclusions and future directions

The experiments on socketed axeheads and the comparison with prehistoric artefacts from Cornwall demonstrate the potential of investigating

how deliberate destruction was undertaken in the past. The experiments explored different methods for crushing and fragmenting a socketed axehead, involving two different tool types, different compositions and the impact of heating the axeheads first. It was clear that heating and striking the axeheads was the most effective method of achieving fragmentation and this could be clearly paralleled with some of the archaeological specimens, particularly those in larger hoards such as from St Michael's Mount and St Levan. However, this represents only an initial attempt to explore this topic and there is much more that could be achieved to enhance one's understanding.

First and foremost, it would be beneficial to further explore the impact of temperature on the resulting damage. Hardman's (2016) experiments recording changes in the angle of deformation achieved when breaking bronze bars at different temperatures demonstrate the potential. Heating socketed axeheads to different temperatures would be likely to cause differences in the resulting deformation or breakage of socketed axeheads. This could then be used to more accurately interpret situations where various forms of damage are observed.

Secondly, the actualistic experiments presented here would be enhanced by complementary laboratory experiments designed to measure forces involved, the stresses the material can withstand, and the hardness of the metal. A controlled set of standardised results could then accompany the understanding of the human actions involved.

Thirdly, this study has looked at a relatively small dataset of a specific object type from Cornwall. The wider implications highlighted indicate that the results of these experiments could be used to reconsider or strengthen previous ideas about the nature of hoarding destroyed objects across Britain. For instance, large Late Bronze Age hoards in Essex and Kent have high numbers of deliberately destroyed socketed axeheads (Turner 2010), which would make an interesting case study for comparison with the experimental results presented here.

Overall this paper highlights that it is clearly no longer appropriate to simply consider the *why* behind fragmentation without due appreciation of the *how*. Appreciating the processes by which objects were broken and the inherent knowledge required means one can better interpret the events immediately preceding deposition and further the interpretations applied to the material in the future.

Acknowledgments

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Survey, restoration and repair at the Stripple Stones circle-henge, Blisland, Cornwall

ANN PRESTON-JONES, DAVID C ATTWELL, JAMES GOSSIP, GRAEME KIRKHAM AND RYAN P SMITH

In 2015-16 survey, restoration and repair work took place on the Stripple Stones circle-henge, Blisland. Seven stones were re-erected under archaeological supervision and a late nineteenth-century hedge which had cut through part of the site was removed and rebuilt away from the monument. The earthwork survey of the monument revealed a possible second entrance on the eastern side, potentially reclassifying the monument as akin to a class II-type henge. The re-erection of stones on the western side of the monument has reinforced its visual connection with the nearby Trippet Stones stone circle.

In 2015–16, work was undertaken on a number of archaeological sites on Ivey and Hawkstor Farms on Bodmin Moor, as part of the capital works programme of a Higher Level Stewardship (HLS) agreement funded by Natural England (Attwell and Gossip 2016). The works involved survey, boundary repair and scrub management on two longhouse settlements, at Menadue and Bedwithiel, works on Garrow Tor to repair and stock-proof a main pasture boundary and repairs to walls and hedges at the core of the medieval farmstead at Garrow, including the restoration of the nineteenth-century beehive hut.

The HLS programme also provided a unique opportunity to survey and carry out restoration works at the Scheduled Monument known as the Stripple Stones circle-henge (National Heritage List England no 1006693). The results of this last project are summarised in this note. The site is located at NGR SX 1437 7521 on Hawkstor Downs, in the parish of Blisland, and stands at a height of 275m OD (Fig 1).

A circle-henge is a stone circle set within an enclosing ditch and bank, pierced by one or two entrances, with the bank set outside the ditch; the monument type includes what Aubrey Burl has described as some of Britain's 'most spectacular prehistoric monuments', among them Avebury, in Wiltshire, Arbor Low, Derbyshire, and the Ring of Brodgar in Orkney (Burl 1976, 274). The site type is conventionally dated to the Late Neolithic (*c* 3000–2000 cal BC) (Barnatt 1982, 89). Nationally such monuments are rare, with only 18 known examples in the British Isles (Burl 2000, 36, 37, fig 3). The Stripple Stones is particularly significant as the only monument of this type in the south west (Burl 1976, 28). It is one of 16 recorded stone circles on Bodmin Moor but is one of only three probable henge sites in Cornwall (Johnson and Rose 1994, 31; Barnatt 1982, 90–1).

History of the monument

The monument was first recorded as the 'Strypple Stones', noted as a point on a moorland boundary traced in a document dating to the reign of Elizabeth I (Maclean 1868, 24; Tregelles 1906, 391). The site was first surveyed in detail by W C Lukis and W C Borlase in 1879, with the resulting plan (Fig 2) published by Lukis in his *Prehistoric stone monuments of the British Isles: Cornwall*

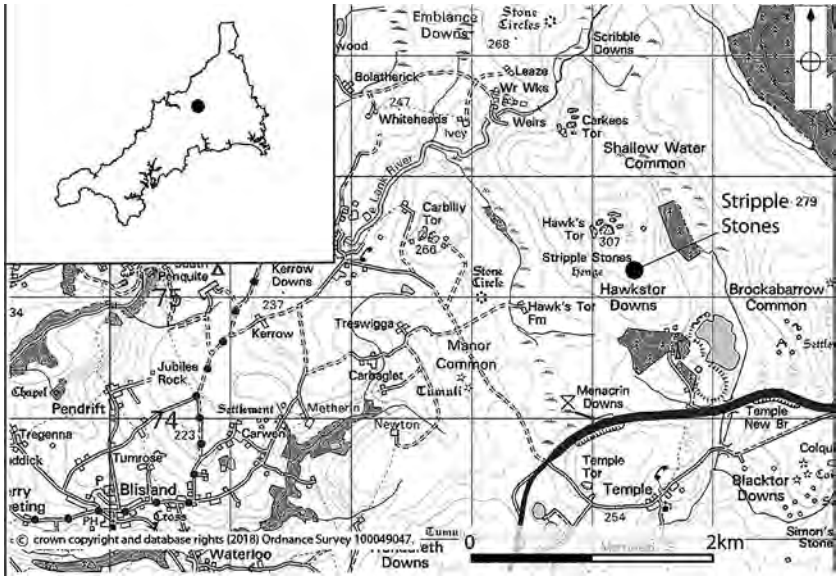

Fig 1 Stripple Stones: location.

(Lukis 1885, pl VIII); the latter noted it as 'the most interesting and remarkable monument' in Cornwall (*ibid,* 3). Borlase reported the survey work in *The Athenaeum,* from which an account was extracted by the Cornish press: the *West Briton* reported that one of the antiquities surveyed was a 'circle on Hawks Tor, near Liskeard' – the name Stripple Stones does not appear to have been used by antiquaries prior to Lukis' publication – which 'proved to be the largest in the west of England, both in its diameter (150 feet) and in the size of its stones, many of which were 9 ft. long, the largest being 13 ft, long, a fine prostrate pillar in the centre' (*West Briton,* 18 September 1879, p6; *cf* Barnatt 1982, 61, 63). The monument was subsequently described by A L Lewis (1896) and G F Tregelles (1906) before being the subject of excavations by Harold St George Gray in 1905 as part of the British Association for the Advancement of Science's 'Age of Stone Circles' initiative (Gray 1907; 1908; Hoare 2017) (Fig 3).

At the time of Lukis and Borlase's survey the centre stone had already been split and the henge bank and ditch on the south side of the circle 'nearly levelled' (Lukis 1885, 3). Probably in the same year that the survey was published the site suffered further damage. It had previously stood on the unenclosed open moorland of Hawkstor Downs, but in about 1885 a 'newtake' field boundary was constructed across its eastern side (Anon 1889; Tregelles 1906, 390; Gray 1908, 3). This bounded a field forming part of a new smallholding named Hawkstor Farm (HER MCO 14765): the Ordnance Survey 1st edition 25in map, surveyed in 1882, showed only two isolated fields enclosed from rough ground to the east of the Stripple Stones; the 2nd edition, revised in 1905, showed the recently constructed farmstead just over 350m north of the circle and a further six fields, together enclosing a total of 42.5 acres (17 ha) (Figs 4a and b). Some of the new fields were cultivated – Gray (1908, 9) found a corn crop growing in the enclosure adjacent to the Stripple Stones – and this resulted in the ploughing out of the ditch and bank of the henge on the east side and the removal of up to three standing stones.

An anonymous contributor to the *Journal* of the Royal Institution of Cornwall reported in 1889 that there had been recent damage to the circle resulting from the building of the newtake hedge: 'some of the stones were split up, and taken for the purpose, not long ago; even the central member being divided – and now but few stones of the circle remain, to indicate its former outline' (Anon 1889). The Reverend Sabine Baring-Gould visited two years later and complained in a letter to *The Times* (10 July 1891, p3) about the new stone hedge which had been 'carried through the circle, cutting off a segment to the north-east, to the destruction of those very unique features on which Mr Lukis commented.'

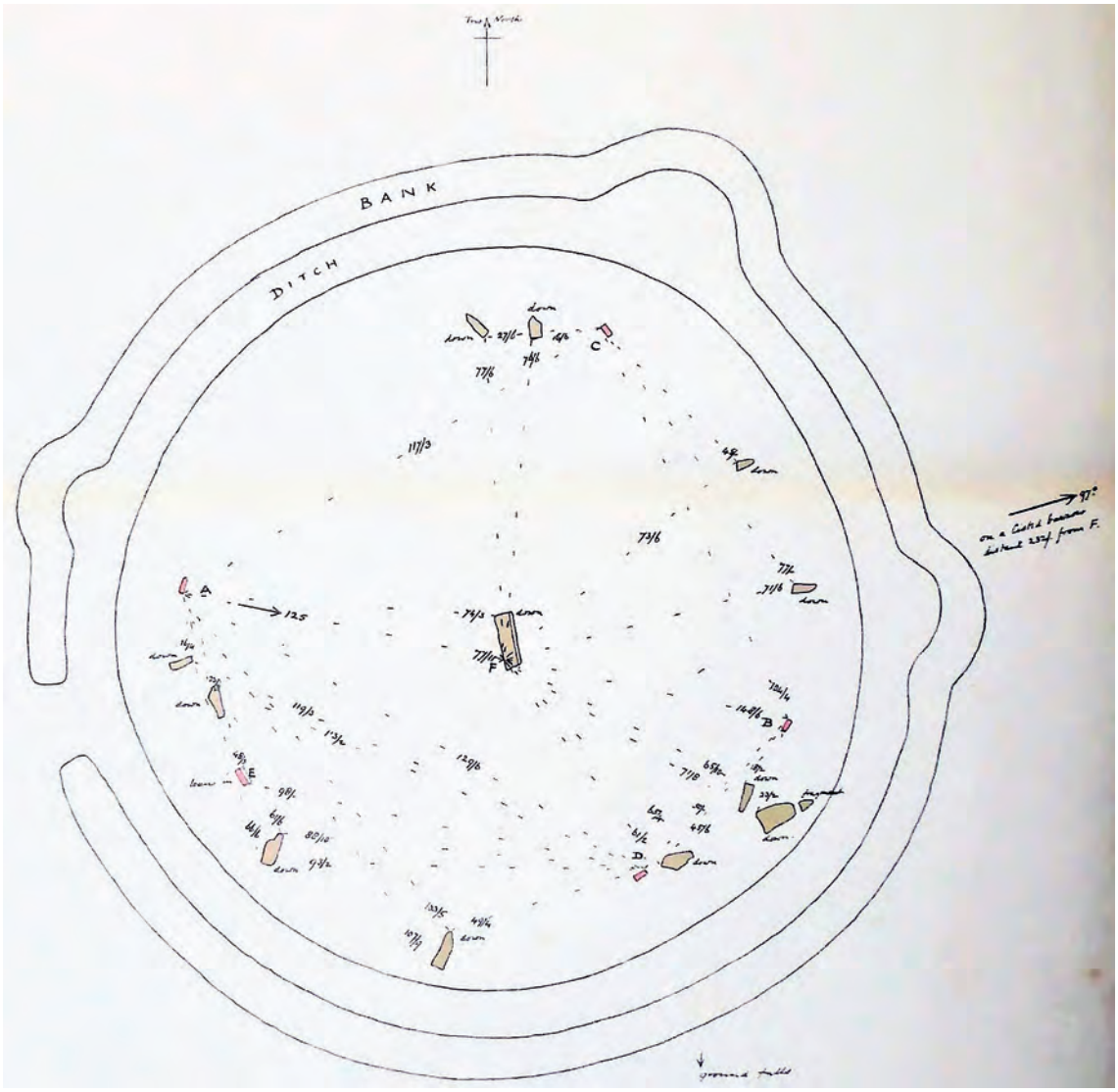

Fig 2 Plan of the Stripple Stones made in 1879 by W C Lukis and W C Borlase (Lukis 1885, pl VIII).

Tregelles produced a further survey of the site in 1902 and noted it as 'at once the finest and most injured of our stone circles'; in addition to the construction of the hedge he observed that '[T]ime, exposure, the feet of cattle, and neglect have all done their worst' (Tregelles 1906, 390). In 1905 Gray found that carts going from the new Hawkstor Farm to the main Bodmin to Launceston road (now the A30) were passing through the circle, damaging the earthworks (Gray 1907, 372n; 1908, 5n, 6; *cf* Tregelles 1906, plan facing p390). A stone on the eastern side had been drilled for splitting and two recumbent stones which had been present in 1879 had been removed (*ibid*, 22, 43, 44). Much of the monument was overgrown with furze (gorse) and the remaining stones surrounded by erosion hollows (*ibid*, 8, 9).

H O'Neill Hencken (1932, 57) noted the Stripple Stones as the 'most interesting' of the Cornish circles but found it 'badly ruined'. In

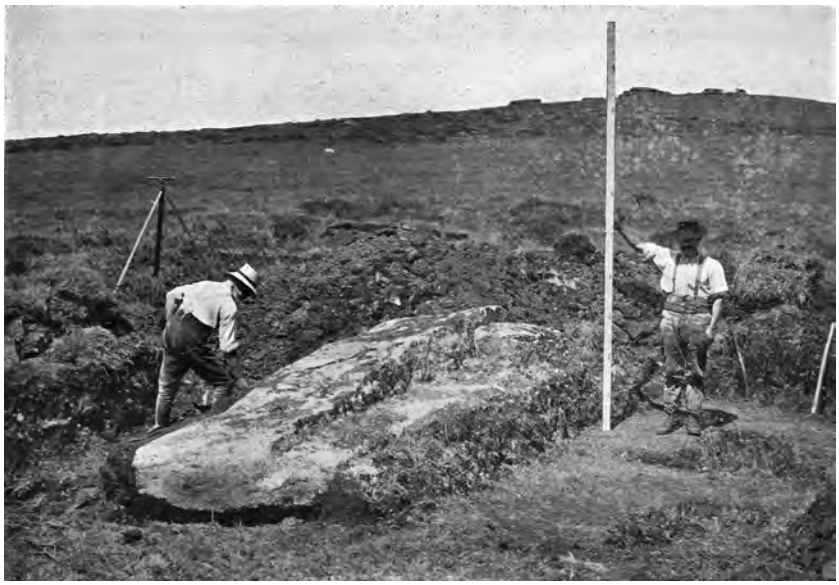

Fig 3 The massive central stone of the Stripple Stones during excavation by Harold St George Gray in 1905 (Gray 1908, fig 1). The original caption read: 'View taken from the S.S.E. showing the excavations made round the central prostrate stone, with Hawk's Tor in the distance. The dark shadow in the foreground indicates the hole in which the monolith originally stood.' (Image courtesy of the Society of Antiquaries.)

1934 R Morton Nance, Grand Bard of the Cornish *Gorsedd*, urged the site as the venue for a future gathering (*Cornishman*, 27 September 1934, p3); this appears to have been planned for the *Gorsedd* of 1938 but the event in fact took place at the rather more accessible Trippet Stones nearby (*Western Morning News*, 31 March 1938, p6; 24 August 1938, p3). Four decades later Aubrey Burl called the Stripple Stones 'sadly desolate . . . its bank overgrown, its stones collapsed, a field-wall built contemptuously through it' (Burl 1976, 121).

The restoration project

At the outset of the HLS conservation project only four stones remained standing (as had been recorded by Gray in 1905), set within waterlogged and eroding hollows, and the area was overgrown. In summary, the monument was poorly defined, neglected and little understood, with the risk of further degradation. It was until recently on the Historic England Heritage at Risk Register. The principal aim of the HLS project was to ensure the site's long-term future by carrying out work to enhance and re-define the monument and its immediate landscape setting. This was achieved through a combination of archaeological recording, the re-erection of fallen stones and realignment of the late nineteenth-century boundary, together with erosion repairs, scrub removal and adjustment of the grazing regime to one more sensitive to the needs of the site.

The initial stages of the project involved detailed topographical and geophysical surveys to enable prioritisation and planning of the works (Fig 5). These commenced in September 2015 after Scheduled Monument Consent was granted. In a first phase, the nineteenth-century boundary overlying the eastern side of the circle was removed and re-aligned, three recumbent stones re-erected and erosion repairs carried out. A second phase of work in 2016 re-erected a further four stones.

Archaeological recording was undertaken at every stage, although relatively little new information was acquired from below-ground investigation (Atwell and Gossip 2016). One undiagnostic flint was recovered and many stone-hole packing stones recorded; the stumps of two broken standing stones were located and one tiny set stone was identified.

The paucity of artefacts recovered during the recent work is very much in keeping with what Gray reported from his interventions in 1905, although these lasted less than two weeks (and included opening a nearby cisted cairn) and were undertaken with workmen armed with picks and shovels (Fig 3). Gray's 25 trenches and cuttings within the site, including the opening of a 27m long section of the henge ditch, recovered a total of three pieces of worked flint, a piece of burnt flint and a fragment of animal bone; some small pieces

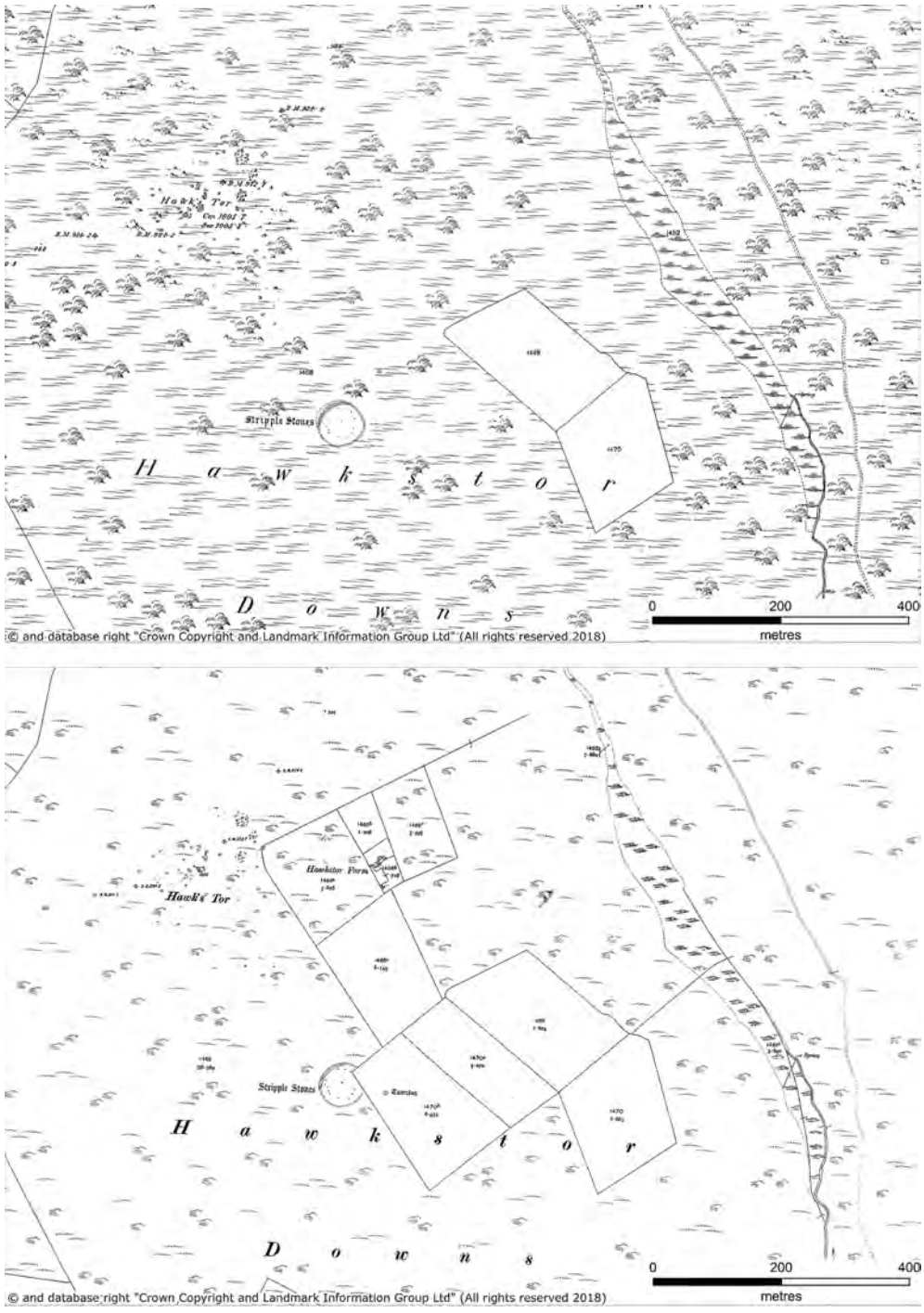

Fig 4 The development of the late nineteenth-century Hawkstor Farm, including the encroachment on the Stripple Stones, shown on (a) the Ordnance Survey 1st edition map 25in: 1 mile map, surveyed in 1882, and (b) the 2nd edition map, based on a revision of 1905.

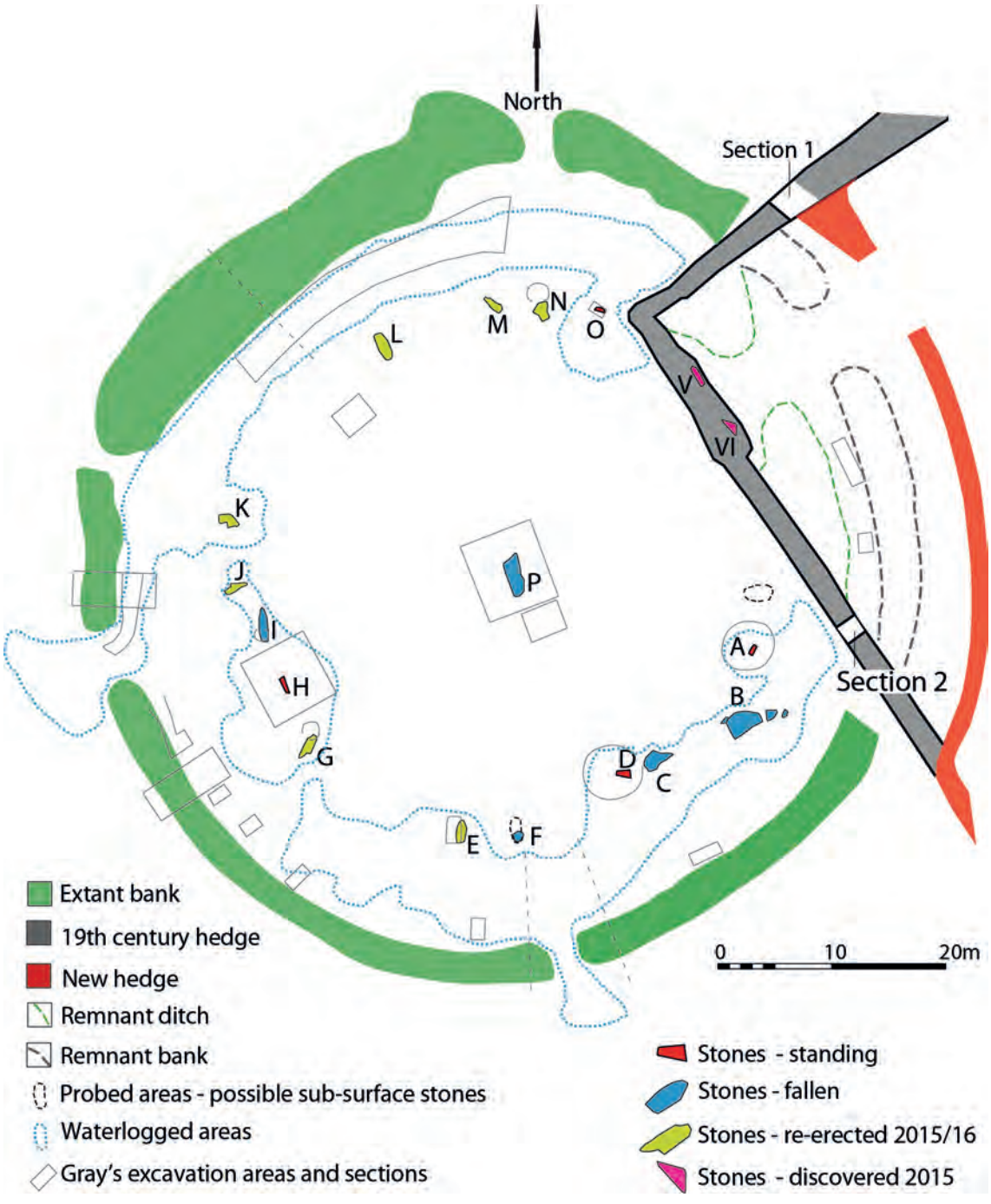

Fig 5 The new survey of the Stripple Stones produced by Cornwall Archaeological Unit as part of the restoration project. (© Cornwall Archaeological Unit.)

of oak which he considered to have possibly been worked were recovered from waterlogged ditch deposits (Gray 1908, 10, 18–19, fig 1). He found only one socket in which granite blocks had been used to trig an erect stone into position (*ibid*, 13).

This meagre haul from the Stripple Stones is comparable with what has come from other investigations of stone circles in Cornwall – for example, Boscawen-Un (Blight 1865, 122–3; Borlase 1872, 130) and recent work at the Hurlers – but contrasts strongly with the quantities of finds from excavations at other sites in Britain classified as henges, and from other Late Neolithic and Early Bronze Age sites in Cornwall (Andy M Jones, pers comm).

Views and landscape effects

While the project at the Stripple Stones produced only a relatively limited gain in understanding from the buried archaeology, the physical work of reconstruction has had a dramatic effect in restoring the monument's connection with the landscape and revealing other secrets of the site. The re-erection of stones has made the monument considerably more conspicuous in the landscape, particularly from the west (Fig 6). Only two stones were visible previously on the crest of Hawkstor Downs; the six now standing on the south and west sides of the circle and breaking the skyline when viewed from the lower ground of Manor Common have become a striking visual feature, at least partially restoring the prehistoric design of the monument.

Two of the newly re-erected stones on the west, K and J, are notable for their unusual notched shapes – the adjacent stone H is also distinctively shaped – and they may have been selected because they emphasised views in this direction and perhaps particularly the relationship of the site with the Trippet Stones circle, which lies 1.2 km to the west (Figs 6, 10). Lukis noted the visibility of the Stripple Stones from the Trippet Stones and Lewis recognised that the Stripple Stones' western entrance faced towards the Trippets (Lukis 1885, 3; Lewis 1896, 7). Gray (1908, 5) additionally observed that when upright the central stone of the Stripple Stones – not in fact at the centre of

Fig 6 The Stripple Stones from the west in December 2017, showing the henge bank in front of the distinctive shapes of (centre) the newly re-erected stones K and J and, to the right, stone H. These stones are skylined (although not prominent) in views from the Trippet Stones circle on the lower ground of Manor Common to the west. (Photograph: Graeme Kirkham.)

Fig 7 The view north from the circle towards Roughtor (left) and Brown Willy, with the re-erected stones M and N (left and centre) and stone O to the right. Stone N may have been selected and positioned to mimic the shape of the summit of Roughtor. (Photograph: Graeme Kirkham.)

the stone circle – would have formed an alignment through the middle of the western entrance to the Trippet Stones.

This link between the adjacent stone circles has been reinforced by more recent observations. The Stripple Stones was one of the first sites at which the 'Roughtor effect' was noted (Peter Herring, pers comm; Tilley 1995, 27–8; 1996, 169–70). Here, as at a number of other prehistoric monuments on Bodmin Moor, the components of the monument are subtly positioned in the landscape so that as the site is approached from a certain direction, in this case from the Trippet Stones, the distinctive summit of Roughtor, hitherto invisible, is 'revealed' at a critical moment. A visitor approaching through the Stripple Stones henge's western entrance has the revelation of Roughtor's peak gradually appearing as the circle is entered. By the time the centre is reached, with its once massive central stone, Roughtor is fully in view. The re-erection of substantial stones on the western side of the circle has reaffirmed the importance of this entrance.

From the centre of the circle, the Stripple Stones' outstanding visual relationship with Cornwall's two highest hills, Roughtor and Brown Willy, is clear (Fig 7). These two spectacular summits, divided by the arrow-straight valley of the De Lank river, form a majestic backdrop on the north and north north east. The form of one of the largest of the re-erected stones (stone N, to the north) may even mimic the shape of Roughtor's rocky summit (Attwell and Gossip 2016, 78). At the same time, another newly re-erected stone on the north side of the circle (L) helps focus attention on nearby Hawkstor, to the north west, which Barnatt (1982, 180) suggested may have been of particular significance at this site.

Hawkstor is certainly prominent in the near vicinity and is the only nearby point from which the Stripple Stones can be overlooked (Fig 8), but Roughtor, which lies due north from the Stripple Stones, is acknowledged as the 'dominant tor' in views from the site (Lewis 1896, 7; Gray 1908, 4; Tilley 1995, table 5). This choice of location, with a topographically distinctive tor or hill directly to the north, is a feature of other stone circles in Cornwall. Examples on Bodmin Moor include Fernacre circle, also dominated by Roughtor, and the Hurlers circles and Stowe's Hill (Tilley 1995). In west Cornwall there are spectacular views north from Boskednan circle (Nine Maidens) to Carn Galva and from the Tregeseal circles to Carn Kenidjack (Dudley 2011, figs 32, 78). Other sites have similar visual relationships with distinctive outcrops, as at Boscawen-Un and Crowan Beacon (Herring 2014, 97).

A second entrance

One of the most significant discoveries made by the earthwork survey carried out during the HLS project was a probable second entrance through the encircling bank on the eastern side of the monument (Fig 5). Sir John Maclean referred to an 'entrance on the east side' of the monument in 1868, prior to the disturbance caused by construction of the newtake enclosure hedge (Maclean 1868, 24).

Gray, in his initial report on his investigations, noted that he had observed a 'slight dip' in the bank where it passed through the enclosed land on the east side and, 'thinking it possible that an entrance existed on this side of the circle approximately in line with the central monolith and the western entrance', he opened trenches to the north and south of the depression in an unsuccessful attempt to locate an internal ditch (Gray 1907, 380). His subsequent account, however, did not refer to this feature as a possible entrance, noting instead that its position coincided with that of a 'bay' or 'demi-lune' in the bank identified by Lukis (Gray 1908, 21).

These 'bays' were probably the result of post-medieval disturbance and the site has subsequently been considered to have only a single entrance, that to the west (Barnatt 1982, 180; Johnson and Rose 1994, 33). However, the measured earthwork survey carried out as part of the HLS work identified a possible entrance on the east side, to the north of and distinct from that suggested by Gray (Fig 5); the geophysical survey also hinted at an entrance in the same location. Perhaps significantly, this entrance is aligned on the space between the positions of Gray's stones V and VI; these stones were rediscovered when the newtake hedge was removed during the recent work, together with a socket containing a broken stone stump and packing stones adjacent to stone V (Fig 9). Both stones had been drilled and split and it is unclear whether they in fact represent the remains of a former single stone. However, their positions conceivably mirror those of the distinctive stones J and K re-erected on the west side of the circle, which have been suggested as possibly 'framing' a significant landscape view when viewed from the central area (Attwell and Gossip 2016).

The identification of a possible second entrance potentially reclassifies the Stripple Stones as akin to a class II-type henge with two opposed entrances (Piggott and Piggott 1939). Roy Loveday has made the intriguing discovery that the alignments established by the entrances of monuments of this type very frequently parallel those of nearby long-established routeways, suggesting that Late Neolithic double-entrance henges may have been important points on contemporary paths of pilgrimage or trade (Loveday 1998; *cf* Bradley 2007, 134). Burl had previously noted the locations of circle henges close to routeways, describing them as set 'along the routes connecting northern and southern Britain' (Burl 1976, 282). In this instance, the entrances at the Stripple Stones are oriented approximately west south west – east north east, very comparable to the alignment of the A30 – certainly an historic spinal route through Cornwall – as it passes across the Moor about 1 km to the south! In this connection it is notable that the historic route represented by the A30 also passes close to the probable henge site at Castilly (Luxulyan).

A gateway has now been provided in the re-aligned hedge on the east side of the Stripple Stones so that connections which the second entrance may have with the surrounding landscape (including the site of a cairn which lies nearby within the Scheduled area) are not blocked (Fig 9). Because there are fewer surviving stones on this side of the circle the newly discovered north-east entrance

Fig 8 The view to the Stripple Stones from Hawkstor, the only point from which the site of the circle-henge can be overlooked. The sky-tips of Hawkstor china-clay works, which ceased operation in 1971, are prominent to the south, with Colliford reservoir to the south east. The re-positioned hedge arcs around the monument on the left. (Photograph: Graeme Kirkham.)

Fig 9 Looking north east from the centre of the circle over the position of the probable second entrance, framed by the recumbent stones V and VI. These were previously covered by the slumped late nineteenth-century newtake hedge. Drill marks are clearly visible on stone VI to the right and it is likely that these were originally one stone; a stone stump found close to stone V may indicate its position. The prominent skylined summit between the two stones is Tolborough Tor, near Bolventor. (Photograph: Graeme Kirkham.)

received less attention through the conservation project than other aspects of the site. It certainly merits further exploration. The most prominent visual focus in this direction is Tolborough Tor, 3.8 km to the north east, which has a tor cairn and a short stone alignment on its summit (HER MCO 4590, 18501).

Conclusion

The primary purpose of the Stripple Stones project was conservation rather than research and in this respect it was highly successful: at the end of the project, once all work was complete and a sensitive and appropriate grazing regime established, the site was removed from the Heritage at Risk register. The investigations carried out prior to and during the restoration work provided important new information on the monument. Beyond these benefits, however, a particular delight of a project such as this is that it also raises many new questions, certainly more than it answers. Among the questions that arose for those involved as the work progressed was the source of the stones used in the circle: we assume that they came from a nearby tor, possibly Hawkstor, but this could be confirmed. What was the chronological relationship between the stone circle and the henge elements of the monument? Tilley (1996, 170) suggested that the circle was created first with the henge bank and ditch added as a subsequent elaboration, reinforcing the monument's landscape links with Roughtor and the Trippet Stones. What was the original size of the now broken central stone and what was its relationship with the other components of the site?

Fig 10 From the central area of the circle the unusual 'notched' forms of stones J and K focus attention on the view west towards the Trippet Stones. These are distantly visible in the photograph to the right of the third fence-post from the left. (Photograph: Graeme Kirkham.)

What was the original form of the stone 'circle'? The new plan (Fig 5) suggests near straight alignments of the stones forming the southern and western sides: was the original form of the 'circle' rather closer to quadrangular or polygonal? What of the four large pits which Gray found adjacent to the central stone (1908, 12)? If these formerly held substantial timber uprights there may be comparisons with other probably broadly contemporary sites such as Stanton Drew, Somerset, where geophysics revealed multiple rings of post-holes within the principal circle, and the henge at Bow, in Devon, which has a central oval of substantial pits, probably also originally holding upright timbers (David *et al* 2004; Griffith 1988, 25). Conceivably, the Stripple Stones saw a sequence whereby some original form of timber monument developed into one in which stone was the dominant element (*cf* Parker Pearson and Ramilisonina 1998a; 1998b; Parker Pearson 2000; 2002). Finally, how does a tiny standing stone only 0.32m high which was revealed when stone K was moved relate to the far larger stones which make up the rest of the monument?

Future work may provide answers to some of these questions, or simply refine them and pose new ones. For the moment, the previously neglected, damaged and 'at risk' monument has been considerably enhanced, not least by having been made more visible and accessible as a component of the Bodmin Moor landscape.

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Russell of Historic England advised on Scheduled Monument Consent.

The archaeological survey and recording were undertaken by Cornwall Archaeological Unit (Cornwall Council) led by Ann Preston-Jones and James Gossip (Archaeologists) with Ryan Smith acting as the Field Archaeologist for works. Other contributions included a geophysical survey led by Richard Mikulski of RM Archaeology with members of the local community. Roy Goutté coordinated a group of volunteers to assist with clearance and interpretation at the Stripple Stones in 2016. The report on the project was prepared for publication by Graeme Kirkham, who also contributed an overview of previous observations and investigations on the site and reviewed the significance of the possible second entrance.

The corresponding author is Ann Preston-Jones.

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Cornish Archaeology 56, 2017, 237–249

Warbstow Bury hillfort, Warbstow, Cornwall

ZOE ARKLEY

A detailed earthwork survey at Warbstow Bury hillfort, in north Cornwall, was undertaken by English Heritage (now Historic England) in October 2013. This is one of the largest and best preserved multivallate hillforts of the Cornish Iron Age and covers about 8ha on a spur overlooking Warbstow village. The substantial earthworks of three ramparts are thought to represent the development of the hillfort over three phases, with the slighter and now incomplete middle rampart belonging to the earliest phase, followed by the construction of the outer rampart in the second phase, and with the very substantial inner rampart being added in the final phase. The hillfort has two entrances, and the survey showed how the south-east entrance through the inner rampart was enhanced and elaborated to control passage through it. Within the hillfort a central long mound, which overlies ridge and furrow, is interpreted as a medieval or post-medieval pillow mound; like many monuments in north Cornwall, the mound has been linked to Arthurian myth. In the Second World War the hillfort was used as a lookout point by the Home Guard, and the positions of two sentry posts are marked by earthworks against the inner rampart.

Survey background

The survey and investigation covering Warbstow Bury hillfort was undertaken by English Heritage (now Historic England) between October 2013 and January 2014. The study was undertaken in order to improve understanding of the history of the site, and therefore provide better guidance on its management so that it can be preserved for the continued study and pleasure of others. The project also contributed to landscape archaeology training for the author, who was being hosted by English Heritage under their Historic Environment Placements scheme (managed by the Chartered Institute for Archaeologists and supported by the Heritage Lottery Fund).

The earthwork survey took place in October 2013 using Global Positioning System (GPS) receivers working in Real Time Kinematic (RTK) mode (for further details see Edwards 2014). The data was transferred into AutoCAD 2008 to print at a scale of 1:1000 and additional detail was added by hand in the field using tape and offset from previously positioned control points. The completed survey was imported to a project GIS and Adobe Illustrator for analysis and illustration.

Desk-based survey involved a review of the aerial survey of the area which was conducted as part of the National Mapping Programme (NMP), and visits to the Cornwall Record Office and Cornwall Historic Environment Record (HER), Truro. Insightful personal accounts from residents of Warbstow were obtained through Ann Preston-Jones (Historic England Heritage at Risk Project Officer, Cornwall).

This paper summarises the English Heritage Research Report produced by the author in 2014 (Edwards 2014).

Location and topography

Warbstow Bury hillfort is situated within the parish of Warbstow, 12 km north east of Camelford and 14 km north west of Launceston. The hillfort is centred at SX 2013 9074 and is a Scheduled Monument (National Heritage List for England, 1006710). It sits above Warbstow village on a spur protruding from higher ground, which peaks at 240m OD just over half a kilometre to the south west. The south-western edge of the ramparts is at 235m OD, with the height decreasing gradually to 225m at the edge of the spur on the north east. The opposite side of the hill descends more steeply towards Tredarrup in the south west, preventing any view of the hillfort from this side. There are extensive views from the hillfort in all directions except to the west. The sea is visible to the north and north west and on a clear day the island of Lundy can be seen to the north-north-west beyond the GCHQ satellite dish installation on the headland at Lower Sharpnose Point in Morwenstow.

Springs issue from the site to the north and south of the hillfort, and the rampart ditches can become saturated with water during prolonged periods of wet weather. At the time of survey the hillfort was under pasture and scrub. The site is owned by Cornwall Council and is publicly accessible from a small car park at the south-eastern side of the site.

Geology and vegetation

Warbstow Bury sits on the mudstones and siltstones of the Boscastle Formation and is surrounded by other formations of sandstones, slates, and localised areas of quartzite within about 5 km (British Geological Survey, sheet 323). The soils are free draining, slightly acidic loamy soils (as indicated by NSRI Soilscapes mapping), which are not conducive to the good preservation of organic materials over time.

Sheep graze on the hillfort where the bracken, brambles and gorse are not impenetrable. At the time of the survey, gorse cover was extensive

Fig 1 Warbstow Bury hillfort, from the south east. (Aerial photograph: 18468/22 05-AUG-1999, © Historic England.)

on the ramparts, with bracken in the ditches and covering around half of the interior in a wide circuit following the edges of the inner rampart. Trees were growing on some sheltered areas of the ramparts, and the more level areas of the hillfort were mown. A Natural England Higher Level Stewardship scheme was underway to tackle the vegetation on the hillfort, and at the time of survey (October 2013) had already made a considerable difference in some areas. On a subsequent visit to the site in September 2015, the vegetation at the site was significantly reduced.

Historic background – the surrounding historic landscape

There is limited evidence of activity in the landscape surrounding the hillfort before the Bronze Age, when round barrows typical of this date were placed upon the ridges and high points surrounding Warbstow. Examples to the north and east of the hillfort are in view from the site.

Evidence for activity in the Iron Age in north-east Cornwall is mostly in the form of enclosed settlements. There are a number of other hillforts or similar sites scattered across this area: Ashbury Camp (Week St Mary), a univallate hillfort 7 km to the north-north-east of Warbstow Bury; Castle Goff and Newberry Round (St Teath) 14 km to the south west; Helsbury Castle (Michaelstow), 16 km to the south west; Pengold Camp (St Gennys), 6.5 km to the north west; and Kestle Rings (St Thomas the Apostle), 11 km to the south east. Warbstow Bury is the largest and most substantial of these sites. If contemporary, these hillforts may all have been important focal sites in a series of neighbouring territories. As well as these major enclosures, there is a larger number of lesser enclosures, known from earthwork and cropmark evidence, which were probably enclosed farming settlements ('rounds'). The closest examples are two possible cropmark enclosures, one 3.7 km to the north-north-west near Tregune in the north of the parish, the other 2 km to the east-south-east near Trussel in Tremaine parish (Cornwall HER MCO 36727, 36367). It is also likely that there would have been unenclosed Iron Age settlements in the area, as found for example at Middle Amble, St Kew, where a large unenclosed settlement has been identified by geophysical survey adjoining the site of a bivallate enclosure (Borlase and Wright 2014, 183).

No evidence of agricultural activity dating to the Iron Age is currently known to survive in close proximity to Warbstow Bury, perhaps due to the destructive nature of later farming and development. The only recorded material evidence in the area is the Youlstone Bowl. This decorated bronze bowl was found in marshy ground on Youlstone Farm, 1.4 km to the south of Warbstow Bury; Hencken (1932, 111–2) suggested that the bowl had been crafted by a native British individual but influenced by Roman art.

Further evidence of historic settlement lies in local place-names, many of which share the prefix *tre*, implying the location of an early medieval farming estate (Padel 1985, 223), which may have been defined by boundaries dating to at least as early as the seventh century. Examples of such place-names are found near the hillforts at Ashbury and at Warbstow Bury, where there are clusters to the north west, south and south east (Preston-Jones and Rose 1986, 140–2, fig 3). The distribution of early medieval *tre* settlements is thought to reflect the general pattern of later prehistoric settlement (*ibid*). To the east of Warbstow Bury there is a large block of poorer agricultural land, about 8 km by 8 km, without any of these early medieval settlements, which was probably an area of extensive rough grazing in later prehistory and through most of the early medieval period (*ibid*).

The settlement at Warbstow is evidenced from the thirteenth century when there is a record for the church of Sancta Werburga, although it is probably of Norman origin (Pearce 1978, 74). The parish eventually took the name Warbstow from Warberstowe – 'Holy place of St Waerburh' (Orme 2000, 253). *Stow* is also interpreted as a pre-Norman ecclesiastical place name (Edwards 1996, 49), providing further dating for the first phase of the chapel or church in Warbstow. A hollow way from Warbstow Bury links the church and surrounding settlement to the high ground and would have provided a route to move livestock for grazing in the summer months. Further evidence of agricultural activity includes faint surviving earthworks of ridge and furrow in some of the fields surrounding the hillfort, which may have been ploughed by the inhabitants of the dispersed villages in the wider landscape.

The Warbstow tithe records of 1841 (Cornwall Record Office, TA/246) show that 61 acres of land (plot reference 743) which included and surrounded 'Warbstow Burrows' was owned by the

Reverend Charles Sweet, and occupied by Edward Uglow who owned the Fentrigan estate at the time. Charles Sweet also rented a small neighbouring holding to the south west of the hillfort to Edward Uglow (744). Both plots were under arable at this time, although the large open area of plot 743 was probably previously used for rough grazing. By the time of the 1st edition Ordnance Survey 25in:1 mile map (1884) this area had been divided into five fields, one enclosing the hillfort and four surrounding it; this was much as the site appears today (Fig 1).

Past research

Previous research focused on Warbstow Bury includes a number of earthwork surveys, produced between 1814 and 1976 (for example, Lysons and Lysons 1814, ccxlix; Peter 1902, 107–19; Forde-Johnston 1976, 173). Of particular note is a 1:2500 Ordnance Survey plan made in 1975, which was the most detailed survey of the hillfort undertaken before this assessment.

A watching brief on the road which runs along the south side of the hillfort (Exeter Archaeology 2002) found no significant archaeological remains. There have been no recorded excavations at Warbstow Bury.

More recently, an aerial photographic assessment of the area was conducted as part of the National Mapping Programme (NMP). The majority of new features recorded were related to the agricultural landscape of medieval and post-medieval Warbstow. A possible post-medieval trackway leading westward from the hillfort was also recorded as part of the survey.

The earthworks and structures at Warbstow Bury

The earthworks at Warbstow Bury survive as three sub-circular ditch and bank ramparts, with two present entrance ways, and evidence of later phases of use within. A survey plan and phase plan are shown in Figures 2 and 4.

The outer rampart

The outer rampart consists of a bank, a ditch, and a counterscarp bank. The smooth curve of this rampart's western side contrasts with the more linear form of the circuit on the eastern side, which follows the natural topography more closely. On this side, there appear to be three straight sections, including a long central stretch which leaves a narrower gap between the inner and outer ramparts along most of the eastern side. This may relate to the phasing of the ramparts and is discussed further below.

The earthworks of both the inner and outer circuits are at their least substantial in the east and south east. Higher ground to the west requires that the ramparts on this side need to be larger to be as prominent as those to the east and south. The height of the outer bank measures between 1m and 4m from the ground level, with the partial ditch on the north-western side reaching a maximum depth of about 1.5m.

The inner side of the rampart in the south has two almost semi-circular mounds protruding from beneath it. These slight earthworks may have been spoil piles intended for use in the construction of this rampart which were later flattened and spread when they were not needed. Alternatively, they might be naturally formed mounds or potential archaeological features of earlier prehistoric date.

West of the mounds, a break in the slope extends for 80m along the inside of the rampart, forming a berm of about 2m width. Further west of this (at A on Figure 2), a modern pathway cuts through it (marked by a gatepost on the counterscarp bank) and the berm continuing beyond this is minimal. These breaks of slope appear in several locations along the inner and outer circuits of the hillfort, and, in some cases at least, may represent the former ground level on which the banks and ditches were constructed. An internal quarry cut 100m long in the north of the hillfort is also thought to relate to the construction of the hillfort.

The north-east facing outer rampart is considerably less impressive, with a smaller bank and no ditch for the majority of its length. However, at its northern extremity the ditch is present and the bank is as prominent as that on the south-western side. On its outward facing side, the north-eastern bank descends steeply toward a break in slope, below which its gradient becomes less severe.

In the south, and along most of its eastern side, the upper slope of the bank is almost vertical. Sections of exposed stone walling close to the south-eastern entrance probably provide an explanation for this. The date of this walling is unknown, although it is likely that it was constructed to enhance the bank for use as a field boundary which is shown on the

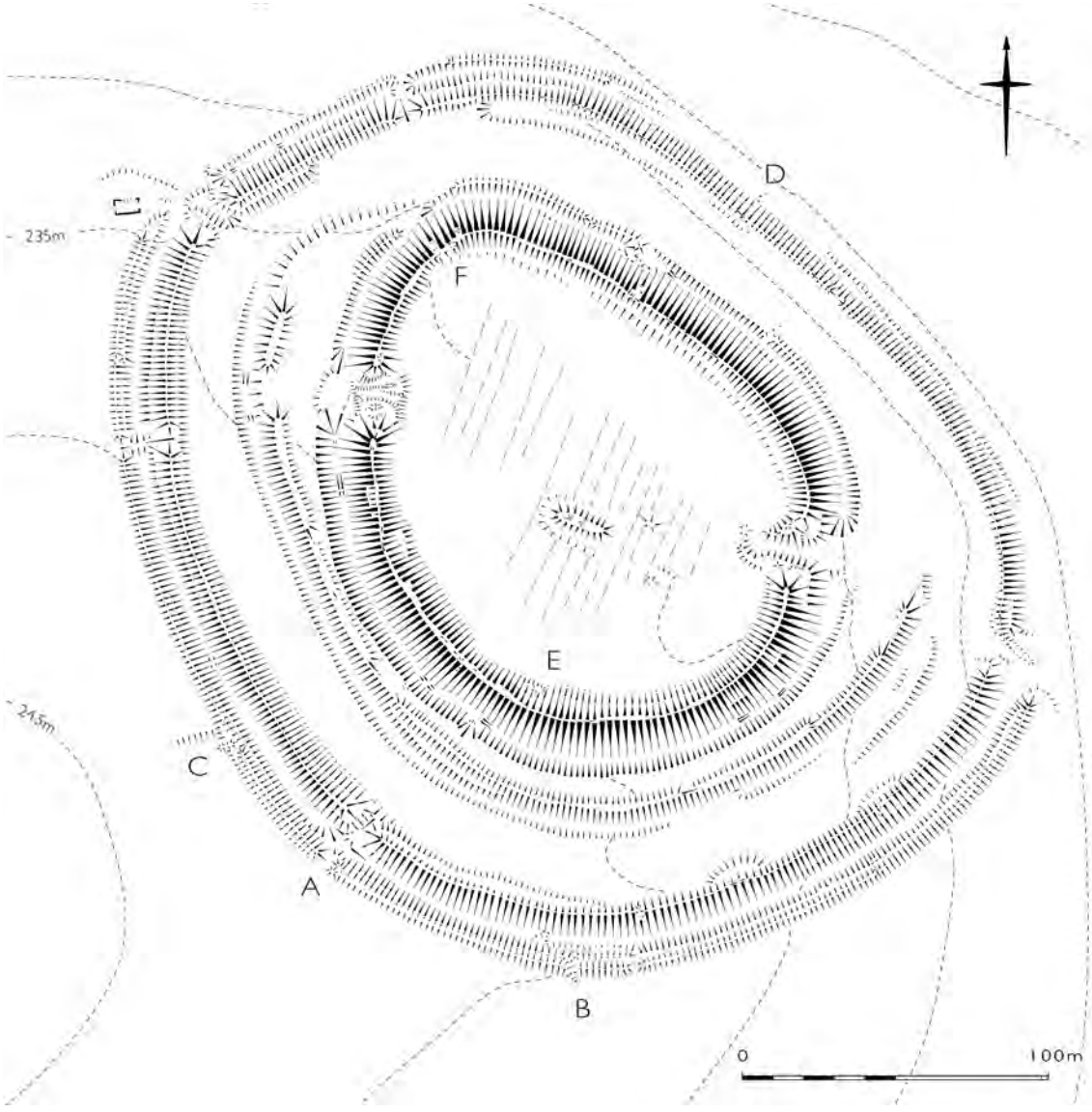

Fig 2 Earthwork survey plan, shown at 1:2500, reduced from an original survey drawing at 1:1000 (© Historic England).

eastern part of the outer rampart on the 1st edition Ordnance Survey 6in: 1 mile map (1889).

The outer rampart has a counterscarp bank present on the south, west, and north, but it is absent on the east side, north of the south-east entrance. It is possible that this relates to later use of the site, as along this stretch (to D on Fig 2) the nineteenth-century field boundary which encloses the hillfort, noted above, follows the circuit of the outer rampart and runs along the main bank rather than following the counterscarp as elsewhere. The counterscarp bank is, for the most part, continuous along the south-western side of the outer rampart. However, it exists only as smaller, interrupted sections of bank beyond the north-western entrance and it is no longer traceable where it meets the

line of the current field boundary. Any former continuation is likely to have been lost through ploughing. The height of the counterscarp bank is approximately 1–2m.

Four pathways eroded through the outer counterscarp bank by livestock (and possibly visitors) were recorded along the south-western side, and lead to respective gaps in the ditch and bank. This includes a significantly flattened pathway up to 5.25m wide, with a surviving stone gatepost, recorded on the outside of the rampart on the south west (Fig 2, A). A field boundary is present further north on the rampart, which is followed by another cut into the outer rampart. This is much less substantial, but these may represent former entry routes to the two adjacent agricultural fields.

A gatepost similar to that in the south west of the hillfort is present on the counterscarp at the south-eastern entrance, opposite a stone field wall which joins the hillfort at this point, and is likely to relate to the use of the north and south-eastern ramparts as field boundaries in the nineteenth to twentieth centuries (1st edition Ordnance Survey 6in map (1889). Additional eroded pathways were recorded on this side of the rampart, along with other significant intrusions caused by badgers.

Two linear banks extend from the counterscarp bank for 6.8m and 8.8m (Fig 2, B and C). The longer of these (B) appears to be part of a bank which continues along the top of the counterscarp for 22m, where it runs into the inner edge of the counterscarp bank. The other (C) is situated close to a slight upward slope outside the rampart and heading north. Both of these banks appear to be aligned with the position of the current field boundaries. The nineteenth-century field system appears to have utilised the outer rampart at this location (discussed below). A former fence line along one of the linear banks (C) continued onto the rampart causing considerable animal erosion in this area, before it was removed as part of the conservation management plan arranged by North Cornwall District Council on the advice of Cornwall Archaeological Unit in the late 1980s (HER document reference 114204).

The middle rampart

The earthwork of the middle rampart is less substantial than that of the outer rampart and cannot be traced in the east or north-east of the hillfort. In the past, this has been interpreted as a final phase of construction which was abandoned (Forde-Johnston 1976, 122). It shares most symmetry with the outer rampart in its plan form.

This rampart is approximately 1.5m high internally for the extent of its circuit and was traceable as a spread scarp curving back towards the inner rampart for an additional 56m on the northern side. This previously unrecorded extension is also visible in some aerial photographs (including CCR 5122/81 22-APR-1987, Historic England Archive). Bracken coverage prevented a detailed survey of the equivalent earthwork in the south east, although a trace of a similar continuation was noted for a short distance.

Given the direction of the traceable section of this rampart, it is suggested that the inner rampart may in fact overlie the former position of the middle circuit on the eastern side of the hillfort, indicating that the middle rampart represents the earliest phase of the hillfort. Taking this into consideration, it is reasonable to further suggest that the outer rampart was constructed to mirror the form of the earlier (middle) rampart. The relatively slight first phase of construction may represent a hilltop enclosure, pre-dating the hillfort.

The remaining middle rampart on the western and southern sides was slighted but not destroyed during the third phase of the hillfort, in which the inner rampart was constructed. The possible locations of entrances through this rampart may have been in line with that of the middle rampart, and therefore cut as part of a later phase at the site. A full description of the rampart entrances is provided below.

The inner rampart

The ramparts of the inner circuit are by far the most substantial on the site. Like the outer rampart, they are at their largest on the western side. Here the bank of the inner rampart reaches about 4m high and the ditch 3m deep. There are a number of breaks in slope indicating the former ground level as discussed previously for the outer rampart.

There is a slight interrupted counterscarp on part of the north-eastern side of the inner rampart, but no berm is visible between the ditch top and the counterscarp. Also on the north-eastern side is a sub-circular hollow in the ditch which, like many of the deeper ditch areas, fills with water after a period of rainfall. Its shape would suggest that it

Fig 3 The south-western side of the inner rampart, at the time of the survey, looking north west. (Photograph: Mark Bowden, © Historic England.)

was a pond, either constructed in prehistory or, more likely, much later, perhaps with more than one phase of use.

The slope of the inner rampart is slighter in the interior of the hillfort than on its outer face along most of the northern side, and around about half of the southern side. The purpose of this remains uncertain, but if it was not part of the rampart's original construction it is possible that it is related to the medieval use of the site (below).

Some eroded areas of the bank show quartz blocks of various sizes, which, while uncommon, is not unheard of as a rampart facing (Toby Driver, pers comm; Driver 2013, 88). Examples are present in Wales, including at Castell Grogwynion in Cardiganshire, where the extensive use of quartz on the rampart banks, presumably for deliberate effect, is reflected in its name, which means 'stronghold of white pebbles'.

Recent intrusions include sheep scrapes, eroded walkways, and more regular, sub-circular cuts into the earthworks (generally no more than 3m in diameter) which may relate to the site's agricultural past, or to the phase of activity during the Second World War. In particular, this comprises a rectangular terraced platform on the south side of the interior (Fig 2, E). The platform, which was cut into the rampart, measures 7.5m by 2.0m and has a small sub-rectangular depression cut into its surface. This may have been related to a structure seen on RAF photographs (including RAF/3G/TUD/UK/146 Vp4 5340-1, 13-APR-1946) on the other side of the rampart at the top of the ditch. The photographs depict a collapsing concrete structure, which in later photographs had continued to collapse into the ditch. This has left a slightly shallower ditch bottom in this area, and a cut to the outer edge of the ditch. The two features may have been linked by a cut through the rampart, a little to the west. A personal account offered by local resident George Rundle (Mike Lewis, pers comm via Ann Preston-Jones) reveals that during the Second World War there were two Home Guard sentry posts on the hillfort, one in the north, and one in the south. It is likely that the platform, the rampart cut, and the site of the small structure relate to the southern sentry post. From the platform on the inner face of the rampart there is a good view to the north and east, as well as to the coast at Lower Sharpnose Point, the former location of a Second World War military airfield. A sub-rectangular cut into the northern part of the inner rampart may be the position of the other sentry post (Fig 2, F).

Entrances

The largest gaps in the ramparts lie in the north west and south east and are used in the present day

by a public footpath across the hillfort. A number of factors are suggestive of these gaps having been the hillfort's original entrances, although there is evidence that subsequent alteration has taken place. It is unclear whether these alterations took place in prehistory or later.

The footpath from the visitor car park goes through the south-eastern hillfort entrance. The outer rampart's western terminal on this entrance appears to be in its original form, with a smooth and rounded end. The eastern terminal here is more complex, showing stone walling previously discussed as potentially being related to nineteenth-century field boundaries, and a vertical end at a different elevation to that of the western terminal. This would suggest that this terminal has been modified. In contrast, the respective ditch terminal displays typical features of a true terminal end, indicating that later modifications are masking the original bank terminal close to its present location.

Once through the outer entrance, the easiest route to the centre of the hillfort is around the end of the middle rampart, which then places the modern visitor (and perhaps the ancient visitor) in perfect line with the entrance through the inner rampart. The entrance through the inner rampart is staggered to the north by approximately 18m from the outer rampart entrance on this side.

The terminals of the banks and ditches on either side of the entrance through the inner rampart are smoothly rounded and symmetrical enough at this point to suggest that at least the majority of the remaining earthworks are original features. There are stone-lined platforms on either side of the entrance, now almost completely covered by turf. While it is possible that these are not late prehistoric features, it remains most likely that these platforms are part of an original phase in the construction, with the upper part of the bank constructed on top of them to create more height. It is suggested that they may have had a function relating to the position of gates or a gate structure.

The platform on the southern side of the entrance continues as a section of low bank beyond the extent of the rampart and into the interior of the hillfort, where it curves back towards the eastern rampart. This significantly constricts access to the hillfort and guides entrants towards the eastern rampart. Vegetation cover at the time of the survey meant that no evidence of the nature of the activities taking place in this area of the hillfort could be determined. At its end point, the bank is no more than 0.5m high and has presumably been flattened and further eroded by later vehicle and visitor traffic. Similar examples of in-turned entrances in Cornwall include Pencarrow Rings in Egloshayle, Largin Castle in Broadoak, and Bury Down, Lanreath. Banks of this form are rarely seen as an internal feature, with most earthwork extensions appearing as external entrance features (for example, Brentor, Dartmoor; Newman 2011, 92, fig 4.8).

The north-western entrance through the inner rampart shows clear signs of later disturbance, with several levelled sections cut into the edges of the rampart, and small mounds of unknown purpose. A slight scarp is present on the exterior of the entrance which implies the former presence of a bank, although the ditch terminals do not present any defining features to suggest that the terminals were not original. The nature of the earthworks suggests that if this was an original entrance it may have been blocked and re-opened, but it is also possible that this entrance was cut later. The width of this entrance varies between 2m and 3m through the bank, with the causeway across the ditch being 10m wide.

The bank of the middle rampart has been broken directly opposite the north-western inner entrance. The gap measures 10m in width and shows that there has been heavy erosion by vehicles. About 34m north-north-west of this is the entrance through the outer rampart. The bank and ditch terminals of this are well rounded and appear to be original, although the nature of the northern ditch terminal makes this more uncertain. It is possible that the variations here are due to later tampering to widen the gap for vehicles. The gap is 2.8m wide and lies close to a later platform (no more than 0.3m high) outside the hillfort on which stand the remains of stone-walled structure. The entrance is also close to the current fence line, with a gate into the adjacent field 33m to the north-west.

Interior features

There are 15 very faint furrows recorded within the hillfort interior which represent ridge-and-furrow cultivation. The furrows lie about 5–6m apart. The bracken in the south-western part of the interior covers more furrows, which can be seen continuing to the edge of the ramparts on aerial photographs (for example, NMR 18579/1, 12-OCT-1999). The earthworks are very slight which may suggest

little more than a single ploughing phase, probably during the medieval period.

A long mound is situated slightly to the south of the centre and is surrounded on three sides by a shallow ditch. The oblong earthwork measures 22.5m by 9m and its height varies between 0.5 and 1.0m. The ditch is no more than 0.2m deep and is barely traceable. Two sub-circular depressions have been recorded on the top of mound, both of about 2m diameter, with one of these appearing to have a linear cut extending from it towards the edge of the mound.

Folklore claims that the long mound is a burial mound, having been given the name 'Giant's Grave' (for example, 1st edition Ordnance Survey 25in: 1 mile, 1884), or alternatively 'King Arthur's Grave' (Murray's *Handbook for travellers in Cornwall*, 1893, quoted by Anon 1967). One such tale suggests that this is the grave of the Warbstow Giant, after he was defeated by the Giant of Beacon, Jacobstow (Heard 1977). R S Hawker's 1832 poem of Warbstow Barrow (Anon 1967) ponders further over who fought here (the 'race of Pendragon', the Danes, the Normans?) and who was buried here – a chief, or a druid?

However, the remnant earthworks of ridge-and-furrow underlie the long mound, providing conclusive evidence that this feature is medieval or later. The mound was therefore most likely to have been a pillow mound (artificial rabbit burrow) rather than an earlier burial mound, which is also more consistent with the characteristics of the mound. The sub-circular depressions may be the result of collapsed interior passages. Only one other pillow mound is known to have been constructed in a hillfort in Cornwall, at Largin Castle, Broadoak. As a single, isolated example it is likely that the pillow mound was constructed for personal use, rather than being for commercial rabbit breeding. While the English Heritage Research Report (Edwards 2014) has suggested that this is indicative of medieval rabbit warren use, perhaps associated with the local manor of Fentrigan or Downinney, more recent studies have suggested that a post-medieval date should not be discounted in this instance (Gould 2017 [this volume]).

Nine metres to the east of the long mound is the slight earthwork of a circular mound of 9m diameter. The earthwork rises only 0.1m–0.2m above the surface and has not been noted in any of the previous work on Warbstow Bury. A further two earthwork mounds are situated 10.5m to the south; these are more linear in form and are untraceable where they continue beneath the bracken. One survives only as a slight east-facing scarp, while the other is a linear bank. Each is a maximum of 0.3m high. All three of these mounds overly the ridge and furrow, providing useful phasing information. Some accounts suggest that Warbstow Bury was one of many sites of high ground chosen to display a commemorative beacon for Queen Victoria on her Jubilee in 1887 (*Royal Cornwall Gazette*, 20 June 1887, p7); these earthworks may relate to that event, if they are not in fact associated with the phase of use relating to the pillow mound.

Exterior features

The external features appear to be associated with the modern agricultural use of the hillfort and its surrounds. As previously discussed, a number of field boundaries meet the outer rampart of the hillfort, and in some cases would seem to contribute to a modern enhancement/extension of the rampart or counterscarp. This is particularly evident on the north east of the outer rampart, where the bank merges into a stone wall and presently acts as a boundary. This, and other field boundaries which meet the ramparts of the hillfort, appear on the 1st edition Ordnance Survey 6in map (1889), although some have been lost to field amalgamation within the last century.

The modern use of the site is also evident from the two stone gateposts; one to the south west of the hillfort (Fig 2, A), and one close to the south-eastern entrance to the site. Both of these correlate with the location of a wide break in the ramparts, which is suggestive of access for livestock in recent history.

Seventeen metres west of the north-west outer entrance are the remains of a stone-walled building. The surviving walls, no higher than 2m, are of stone resembling the type used for the field wall at the south-east site entrance. Rubble from the walls surrounds the 5m by 8m building, which sits on a slight platform above the level of the footpath from the hillfort entrance. There are two symmetrical gaps in the centre of the shorter sides of the building, with hinges fastened into the adjacent stone, presumably to support former doors, indicating that this structure is likely to have been used to house livestock, feed, or farm vehicles. The building post-dates the Ordnance Survey 25in:

1 mile map of 1906 but aerial photographs show that it was extant in 1946 (RAF/3G/TUD/UK/146 Vp4 5340, 13-APR-1946) and in decline by 1987.

Discussion

Prehistory at Warbstow Bury

The results of the survey have provided an opportunity to consider an alternative chronology for the construction of the site, which challenges previous interpretations. Forde-Johnston (1976) (among others) suggested that the form of the partial, middle rampart indicated that this was the final phase of construction at the hillfort, which was abandoned before the circuit could be completed. Conversely, the findings of this research show that the middle rampart is more likely to be part of the first identifiable phase of activity on this site, as suggested by the way in which the eastern side of the middle rampart appears to have been overlain by the inner rampart. This phase consisted of a single bank and ditch enclosing an area 220m by 140m, perhaps in the form of a settlement enclosure, with possible entrances at the north west and south east (although these breaks may have been made later in relation to the entrances of the inner rampart). A similar phasing of ramparts has been interpreted from the findings of excavation at Castle-an-Dinas hillfort in St Columb Major, where Wailes' excavations (1963; 1964; 1965) suggest that the middle rampart at Castle-an-Dinas was the earliest enclosure on the site. The results of a 2011 survey undertaken by English Heritage at this hillfort concluded that the form of the circuit resembled an enclosure of late Bronze Age – early Iron Age date (Bishop 2011; Soutar 2013), the dating of which may also be applicable to the middle rampart at Warbstow Bury based on the similarities in form. A further example is the possible early phase of hilltop enclosure at Caer Bran, Sancreed, for which a Bronze Age date has been suggested (Jones 2016, 13). However, the ovate form of the intermediate rampart at Warbstow is perhaps more suggestive of an early phase of an Iron Age feature, more closely related to its subsequent use.

The second phase is thought to have seen the construction of the outer rampart, which was built more or less concentric to the phase 1 rampart. It is uncertain whether the hillfort was bivallate in this phase, but the slighter form of the phase 1 rampart suggests that phase 2 may also have been in effect a univallate enclosure. Measuring 280m by 225m internally this would have been one of the largest hillforts in Cornwall, comparable in scale and form to Castle Canyke, Bodmin (HER MCO 47). The surviving counterscarp is present around its full circumference, with the exception of the eastern side where it appears to have been ploughed out. The apparent entrances are not perfectly aligned between the ramparts of the first and second phases.

In the third and final phase the construction of the largest, inner rampart saw the development of the site into a bivallate hillfort with widely spaced ramparts, separated by between 20m and 50m. Comparable Cornish sites, with concentric or widely spaced ramparts, are Castle-an-Dinas, St Columb Major (Soutar 2013), Killibury, Egloshayle (Miles 1977) and Tregeare Rounds, St Kew (HER MCO 82). It is possible that this phase also involved the strengthening of the outer ramparts by constructing a stone wall on the top of the bank.

The layout of the entrances through each rampart is suggestive of an effort to control the movement of people to the interior of the hillfort. This is most evident on the inner rampart's internal work on the south-east entrance. Assuming this has been slighted through more recent use of the site, this bank would have directed access eastward on entry, forcing all visitors to the south-east of the interior. The specific reason for the need of such controlled entry here is uncertain; however, it does demonstrate a desire to put entrants into a weaker position before moving into the centre of the site. Further evidence of controlled movement includes the offsetting between the entrances on the inner and outer ramparts, with the intermediate rampart limiting a view between them.

The position of the hillfort affords it excellent intervisibility with its wider landscape setting, particularly to the north, east, and south. This view exceeds its territorial land, the northern boundary of which may have met the lands of Ashbury hillfort. Its visibility in the landscape would have been further enhanced by the size of the ramparts, and its possible bright, light-reflecting quartz seen in eroded components of the inner rampart and in blocks across the site, as at Castell Grogwynion, 'the stronghold of white pebbles' (Driver 2013, 88).

Further characteristics of hillfort settings include their frequent close proximity to earlier

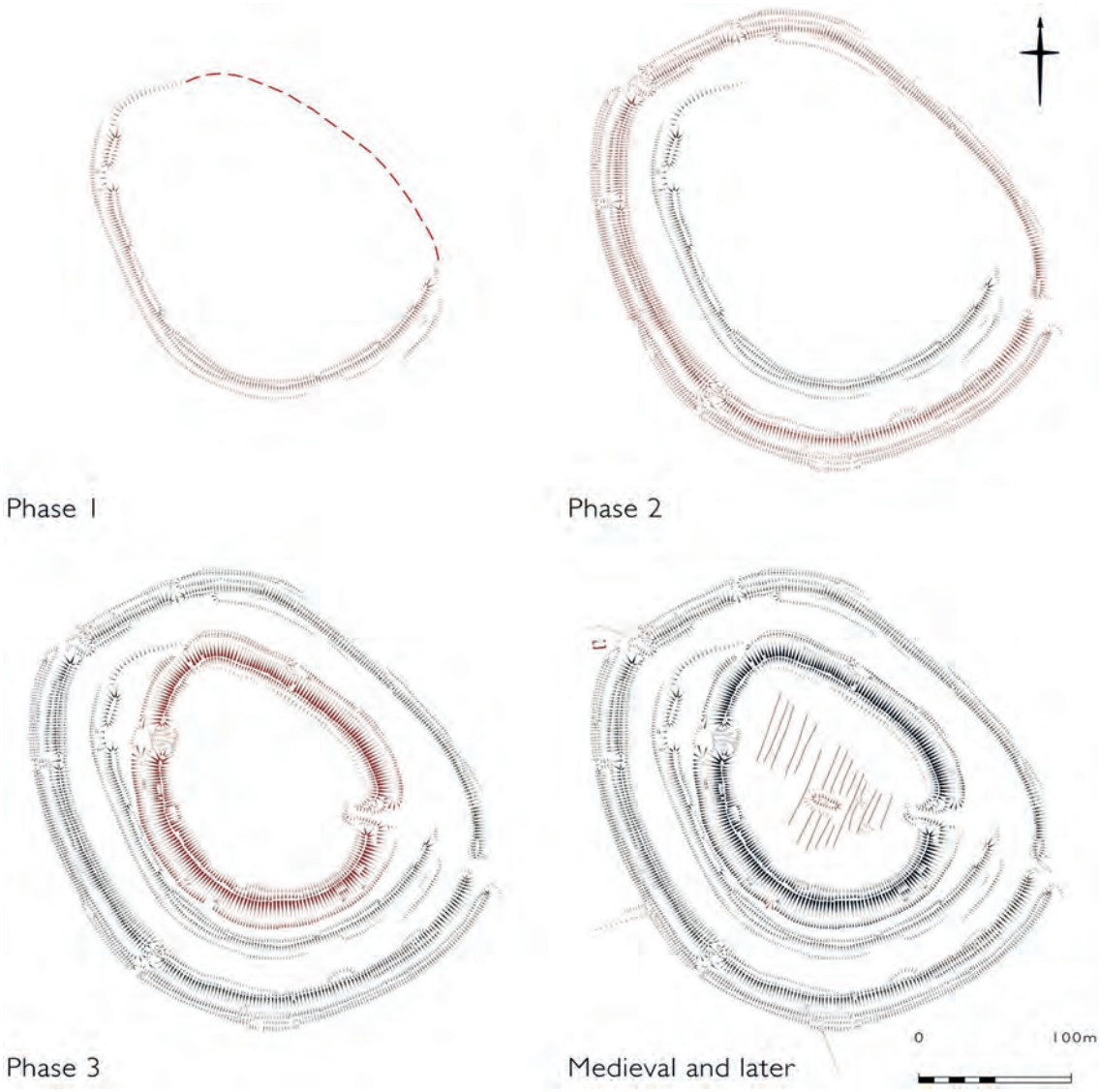

Fig 4 Phase plan. ***Phase 1*** *– A roughly ovate enclosure, possibly late Bronze Age – early Iron Age.* ***Phase 2*** *– The construction of the substantial outer rampart, more typical of an Iron Age hillfort. This rampart was constructed concentric to the phase 1 rampart, but the hillfort may have been univallate at this time.* ***Phase 3*** *– The construction of the inner rampart, the most impressive earthworks at the site. This appears to follow the line of the ramparts of phase 1 in the north east. The hillfort in this phase was bivallate, consisting of the inner and outer ramparts.* ***Phase 4*** *– The medieval to modern evidence includes ridge-and-furrow cultivation in the interior, overlain by a post-medieval pillow mound. There are also remnants of Home Guard activities from the Second World War (not shown). Field boundaries are shown as dashed lines leading away from the earthworks. (© Historic England.)*

monuments. Warbstow Bury is no exception, with a large number of prehistoric round barrows lining the high ground in the distance. These may have been invested with meaning by the hillfort builders as ancestral funerary monuments, thus strengthening their hereditary connection to the land (Bowden and McOmish 1987, 80).

It is clear that this was a site intended to be seen. The reason for this may have been to allow the observation, and perhaps control, of the area it overlooked. Herring (2011, 166) describes the features of this hillfort as perhaps a 'deliberate design allowing the gathered crowd [within the hillfort] to view the country, or territory that was most meaningful to them'. It is also reasonable to suggest that ramparts here were constructed to be what Cunliffe (1984, 30) describes as 'defensive characteristics for display, beyond the reasonable needs of defence'. Its size and distinction in the landscape is uncommon in north Cornwall, which perhaps reflects a specific significance of the location, authority, or the status of those with whom it was associated.

Warbstow Bury after the Iron Age

After the abandonment of the hillfort, in the early medieval period the site is unlikely to have been used frequently for anything more than the summertime grazing of sheep, which would have been led to the higher ground from Warbstow village via a hollow way originating at the church of St Werburgh. It was probably later in the medieval period that the interior of the hillfort was ploughed, perhaps just for one or two seasons. It may be that after a few years of poor crops due to bad weather, soil poverty, and other factors, there was a change of land-use to pasture.

Given the short-lived phase of medieval cultivation within the hillfort, it is reasonable to suggest that the pillow mound was constructed during the medieval period if the soil quality was considered to be too poor for crops. The land at Warbstow Bury is shown in the tithe apportionment to have been occupied by the owner of the manor or Fentrigan (or Ventrigan), the manorial residence of which lies 800m west of the hillfort. It is possible therefore that the construction of the pillow mound was directly associated with the recreational activities of the landowner, assuming that the land was under the same ownership for several centuries. This provides a possible purpose for the linear earthwork leading westward from the hillfort which was interpreted as a post-medieval trackway. However, Gould's study of the medieval and post-medieval rabbit warrens of north-east Cornwall suggests that the distance between Warbstow and Fentrigan manor would have made it vulnerable to poaching, therefore limiting the status value of the warren compared to setting it closer to the grounds of the manor house. Gould characterises this pillow mound as more probably of post-medieval origin (Gould 2017 [this volume]).

In the latter half of the nineteenth century, the land on the hill was enclosed into a number of fields to accommodate changing farming practices. In some areas, the outer rampart was utilised as part of the new field system, which would explain features such as the presence of stone gateposts, the ploughing out of rampart earthworks on the east of the site, and fences which have since been removed from the rampart. A small agricultural building was constructed beyond the north-west entrance of the hillfort in the first half of the twentieth century, presumably in connection with the use of these fields.

The slight earthwork mounds recorded in the interior of the hillfort may be associated with the pillow mound or may be explained by the placement of a beacon commemorating Queen Victoria's Jubilee in 1887. This would have post-dated adjustments to the south-west outer ramparts for use as field boundaries.

More recently, the personal accounts of the activities of the Home Guard on Warbstow Bury given by Mr Rundle indicate that there were two sentry posts on the hillfort; one in the north facing Canworthy Water, and one in the south facing towards Plymouth. These were manned each night by two members of the Warbstow Home Guard, with a tommy gun and a machine gun, awaiting the approach of enemy aircraft. Mr Rundle recalls searchlights being visible in the distance as far as south Wales. This highlights how the location of Warbstow Bury was perfectly situated to view the landscape. The earthworks confirm the position of the sentry posts, which were terraced into the interior of the inner rampart.

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Tintagel Castle, Richard of Cornwall and the story of Tristan and Yseult

MARK BOWDEN

This paper arises from re-survey of Tintagel Castle and Island by Historic England in 2015. Three enigmatic features of the castle's landscape are discussed, and it is suggested that they were created in the thirteenth century by Richard, Earl of Cornwall, and refer to the story of Tristan and Yseult.

Tintagel Castle and Island were surveyed by Norman Quinnell and Martin Fletcher of the Royal Commission on the Historical Monuments of England (RCHME) in 1984, following the disastrous peat fire of the previous year (Thomas and Fowler 1985). For various reasons beyond their control, the report to accompany their very diligent survey was not written up. In 2014 English Heritage (EH) required a new survey to enhance the visitor experience; it was recognised that the 1984 plan was fit for purpose and that all that was required was field checking and the preparation of an account of the visible surface remains. This was undertaken early in 2015 and published as a Historic England Research Report (Bowden and Jamieson 2016). (This project also led to the recognition of historic harbour remains in Tintagel Cove, which were surveyed and reported separately (Herring 2016).) This paper concentrates on just one aspect of Tintagel's long and enigmatic history: the works undertaken in the thirteenth century by Earl Richard of Cornwall.

Castles were never just defensive structures. They were also centres of administration and justice but above all they were the power bases and homes of the feudal elite. Their design reflects the concerns and interests of their royal and aristocratic owners, including their literary interests. Many castles, for instance, were associated with stories of King Arthur and the evidence can sometimes be seen in their fabric or in artefacts associated with them. Winchester Castle is now almost destroyed except for its great hall, which still holds the massive Round Table, probably made in about 1290 during the reign of King Edward I, who was an Arthurian enthusiast; it was probably used during Arthurian tournaments, games and pageants (Biddle 2000). Edward's masterpiece at Caernarvon was also explicitly Arthurian as well as an imperialist construction (Morris 1998, esp 69–71). Dunstanburgh Castle was built by Earl Thomas of Lancaster, cousin of King Edward II, in the early fourteenth century. He led opposition to the unpopular king and had ambitions to obtain the throne himself. He was known to his confederates as 'Roi Arthur'. Lakes were created around Dunstanburgh, echoing the literary convention of water surrounding Arthurian castles and Arthur's final resting place in the Isle of Avalon (Oswald *et al* 2006). At Windsor, Edward III held a great tournament in 1344 and announced the formation of a new Order of the Round Table; he began to build a large Round Table House for it but work was soon abandoned and in 1348 the more exclusive Order of the Garter was founded instead; traces of the Round Table House were

Fig 1 Tintagel 'Island', showing the garden, chapel, 'tunnel' and other features. (Photograph: Damian Grady: 26570/024, 2010. ©Historic England.)

found in 2006 (Munby *et al* 2007, esp 1–9, 60–5, 158–77).

It is now generally accepted that Tintagel Castle was built by Richard (1209–72), Earl of Cornwall and King of the Romans, younger brother of King Henry III (Padel 1988). The documentary sources for Richard's life are full in some respects but lacking in others; historians have taken this lack of evidence at face value, stating, for instance, that 'in Richard's career there is no hint . . . of literary interests' (Denholm-Young 1947, 155). The archaeological evidence, and closer attention to the historical and literary evidence, suggests otherwise.

Having been given the county of Cornwall soon after his sixteenth birthday in 1225, Richard went to some trouble to acquire Tintagel in 1233–6, at an early stage in his career. He exchanged the manor of Bossiney, which included Tintagel, for three apparently more desirable manors elsewhere (Thomas 1993, 12, 17–18; Padel 1988, 64). He then expended much resource in the 1230s building a castle of no apparent military value and in a location of little strategic importance (Figs 1 and 2). His desire for a new castle may be due to the experience of being briefly left without any house of his own except Launceston Castle in 1227 (Denholm-Young 1947, 14), but the choice of Tintagel as a location can only be explained on the grounds that Tintagel was known as the seat of previous legendary rulers of Cornwall and that Richard was using these associations to bolster his position amongst his Cornish tenants, a position which was somewhat precarious (Page 2000); Charles Thomas imagines him asking 'where else, save at Tintagel, would you expect me to reconstruct my seat?' (1993, 18).

There are certain aspects of this castle, apart from its location, that are puzzling (Fig 3): the walled 'garden' on the exposed plateau; the chapel, which is not within the castle but inconveniently located on the edge of the plateau above it; and a rock-cut 'tunnel', which has defied all rational explanation but has until recently been described as a 'larder' or food store. The location of the castle

Fig 2 The thin, unmilitary curtain wall of Tintagel Castle. (Photograph: © Mark Bowden.)

can be explained if it is accepted that Richard did have some literary interests, at least in so far as Cornish tales are concerned. The other enigmatic features can be explained in the same way.

Description

The castle

The castle consists of three wards, two on the mainland and one on the 'Island' of Tintagel, which in the thirteenth century was connected to the mainland by a narrow land bridge. The location is unusual. A substantial but unknown proportion of all three Wards has fallen into the sea since the castle was built in the 1230–40s. As a result, relatively little medieval fabric survives and it is difficult to reconstruct the original appearance of the site. The Inner Ward is defended on the Island side by a surviving curtain wall which is thin and un-military in appearance, despite its crenellations (which are probably original, *pace* Radford 1942, 40). It contains a Great Hall which now appears to be of modest proportions, although its southern end has been lost to erosion, and it has had later lodgings inserted into its shell. The defences of the Outer and Upper Wards on the landward side are more substantial.

The amount of ground that has been lost to erosion between the Inner and Outer Wards since the thirteenth century is unknown, but it may be considerable. Nor, of course, is it possible to say when the erosion took place and whether it has been a matter of constant attrition or whether large blocks were lost catastrophically as a result of particular storms or similar events. This uncertainty led Charles Thomas into protracted digressions on two topics, the narrow passage which could be defended by three men, which is a central part of the story of Arthur's conception as related by Geoffrey of Monmouth, and the question of whether the castle ever had a drawbridge (1993, 23–5, 37). On the first question Thomas assumed that the 'narrow rocky passage' is the gap between the curtain wall of the Upper Ward and the terminal of the Great Ditch, which as Herring (2016, 40) points out is by no means certain; the passage could have been, and is perhaps more likely to have been, the isthmus between the mainland and the 'Island'. On the second question Thomas demonstrated convincingly that there is no evidence for a drawbridge between the mainland and 'Island' but then concluded from this negative evidence that no drawbridge ever existed, which is not certain.

The garden

The garden has been well described and discussed by Rose (1994). It is a walled enclosure, with some internal paths and beds uncovered by C A Ralegh Radford in the 1930s, situated on the south-east-facing slope of the slight saddle that runs across Tintagel Island. It is not on the highest part of

the plateau but nevertheless it is in an exposed location. Although its dating and function are far from certain there is a consensus (for example, Creighton 2002, 74) that it is an enclosed garden and that it dates to the same period as the main phase of the castle; that is, the early or mid-thirteenth century.

The chapel

The chapel is a rectangular structure with separate nave and chancel, built over and clearly post-dating the 'Dark Age' buildings of Site A. The interior was 'explored' or excavated by John James Wilkinson in 1855 (Thomas 1993, 28–9). The altar at its east end is a late nineteenth-century re-creation, although possibly re-using an original top slab. A curious feature of the chapel is its positioning, perched on the eastern edge of the Island's plateau directly above a very steep drop to the narrow ledge which is the location of Ralegh Radford's Site H.

It has been argued that the chapel is a two-phase structure, built in the twelfth and extended in the thirteenth century (Thomas 1993, 110–12). However, the dating evidence for a twelfth-century origin is not strong, being based only on a few portable carved stones and a tub font allegedly found there, and on the unusual dedication to St Juliot.

The 'tunnel'

The 'tunnel' or cave is an elongated curving underground chamber on the west side of the Island, about 80m from the garden. It has an arched profile. There are three steps cut into the sloping floor and there is some evidence that a door was fitted at the seaward, north-western, end. It was cut with iron tools and is generally agreed to be of medieval origin. It is unfortunate that no records were kept when it was 'cleared out' in the 1930s. There is no indication as to whether any artefacts were found, or even looked for. The only surviving documentation from this episode is a single section drawing (Fig 4); this suggests that large amounts of 'fallen roof' were taken out, as well as soil. Where all this material went is unknown; it seems unlikely that it was removed from site and it was quite possibly jettisoned downslope into the sea. If we had the collapsed roof material we might be able to arrive at some estimate of its amount and come closer to a resolution of the question as to whether we are dealing, as I believe, with a cave closed in at the south-eastern end, or whether it always was open at both ends.

Another question is whether this underground feature was ever completely dug out as intended. The smooth floor gives place at the extreme south-eastern, inner, end to a rough unfinished-looking slope. This could be explained on the grounds that the roof may have collapsed while the cave was under construction and that the project was abandoned. This feature has been explained in functionalist terms as a larder, again leading Charles Thomas into some special pleading to explain its location at such a distance from the castle (1993, 47).

Discussion

In medieval literature Tintagel is rather marginal to King Arthur's story, being mentioned by Geoffrey of Monmouth only as the place of Arthur's conception; it was not until the fifteenth century that it became also the place of his birth (Thomas 1993, 26; Padel 1981, 71). Far more significant at Tintagel is the story of Tristan and Yseult, a tale with strong Cornish connections (Jenner 1926; Padel 1981). Large parts of this story are set at Tintagel, which is one of the named courts of King Mark. It is, incidentally, the place where Tristan, like Arthur, is conceived but Tristan's connection with the place is much more substantial – he repeatedly returns to it throughout his much-travelled life. Although the twelfth- and early thirteenth-century versions of the story, with which Richard and his family would have been familiar, survive only in fragmentary form, they share some features in terms of the landscape of the story. There are three physical features which are integral to significant episodes: a garden or orchard; a chapel on a cliff; and an 'underground' element in the form of a grotto, cave or cellar. The most logical explanation for the curious features of medieval Tintagel therefore seems to be that Richard created a theatrical landscape to embody physically the tale of Tristan and Yseult.

The matches between the story and the features at Tintagel are not all exact but the legend existed in many versions that differed in detail. In Beroul's version the garden contained a spring (Fedrick 1970, chapter 2); at Tintagel there is no possibility

Fig 3 Visible remains at Tintagel Castle, highlighting: a – garden; b – chapel; c – 'tunnel'. Plan by Norman Quinnell and Martin Fletcher, RCHME 1984, with additions by Mark Bowden and Elaine Jamieson, EH 2015. (©Historic England.)

that there was ever a spring within the walled garden, although there are three springs within a short distance and Peter Rose has already made the case for a connection between this garden and the Tristan and Yseult story (1994, 176–7). The reflection in the water, which is the crucial point of this episode in the story, could have been achieved in the absence of a spring. On the other hand, the description of the topographic location of the chapel given by Beroul bears a remarkable resemblance to that of the chapel at Tintagel, a point that was appreciated by Peter Rose (1994, 177). The chapel is positioned so that its eastern end is directly above a cliff (Fig 4). Tristan, in

order to evade his captors, begs to be allowed to pray in the chapel; he points out that there is only one door, so that they may easily guard it to ensure that he does not escape; he then leaps through the east window down the cliff and gets away.

As noted above, it has been argued that the chapel was originally built in the twelfth century. If this is so, its position was pre-determined before Richard's time. However, this dating relies heavily on the few portable carved stones allegedly found there. Such stones are frequently re-used. It could be argued that in recreating the 'chapel-on-the-rocks' of Tristan's legendary leap, Richard might deliberately have incorporated archaic architectural details. On the other hand, the dating of these fragments to the twelfth century is by no means clear cut and they might be of thirteenth-century date anyway (Michael Carter, pers comm via Susan Greaney).

The underground elements of the Tristan and Yseult story vary between versions but a common element is that Tristan and Yseult, while hiding together in the forest, occupy a grotto or cave. The underground chamber at Tintagel, if it was a cave rather than the 'tunnel' that now exists, would make a much better romantic lovers' grotto than it does a prosaic but unlikely 'larder' (Fig 6).

It would be unwise to assume that Richard alone was responsible for the creation of this landscape. He was noted as an admirer of female beauty and married successively three of the most admired women of the age: Isabella Marshal, Sanchia of Provence and Beatrice of Falkenberg; he also had a Cornish mistress, Joan de Valletort (Rose 1994, 175; Taylor 1911). One of these ladies might have been an aficionado of the Tristan and Yseult legend and responsible for these works at Tintagel. On the other hand, there is one piece of literary evidence which points directly to Richard as the instigator. In Thomas of Britain's version of the tale (*c* 1155–60) the story has been subtly altered as a compliment to King Henry II and Queen Eleanor, Richard's formidable grandparents; Eleanor may have been Thomas's patron (Hatto 2004, 356; Rose 1994, 176). This and later versions even give Tristan the armorial bearings of the House of Anjou (Hatto 2004, 356–7, 365–6). It is perhaps worth noting in this context the close family connections of other royal enthusiasts for legendary re-creations: King Edward I was Richard's nephew and as a young man seems to have spent much time in Richard's company; Earl Thomas of Lancaster was Richard's great-nephew.

Exactly how these contrived landscape elements at Tintagel were used is, of course, unknown. Were visitors shown these locations as the 'actual' sites of events in the stories? Or were they used as scenes in a promenade drama in which actors played out the episodes of the legend? Either or both seem possible, especially in view of the royal popularity of dressing-up 'hastiludes' (medieval amateur dramatics) of the following century (Vale 2005). Certainly, if one wished to push the idea of an enacted scenario further, one could suggest that the damp area towards the south-western edge of the plateau represents the marshy *Gué Aventuros* – 'the ford at which things are liable to happen' (Padel 1981, 61), the location of other significant dramatic episodes, including that in which the conniving Yseult has herself carried across the

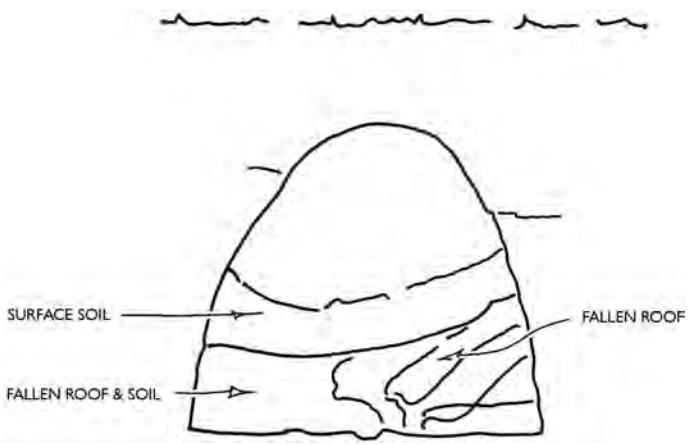

Fig 4 Section of the 'tunnel', re-drawn from an original by J A Wright (Historic England Archive MP/TIN 0043). There is no scale bar on the original drawing but the 'tunnel' is 1.7–2.4m wide at the floor and 1.5–1.9m high.

Fig 5 The fence marks the east end of the 'chapel-on-the-rocks'. Photograph: © Mark Bowden.)

water by Tristan in disguise, in order to deceive King Mark.

Historians are cautious about such interpretations, pointing out that there is no clear evidence that Richard spent much, if any, time at Tintagel. This point can be answered in two ways. First, the lack of evidence for Richard's presence at Tintagel is of doubtful significance. He travelled as much as other feudal grandees and his whereabouts can generally only be reconstructed from occasional chroniclers' references and from the records of places where he issued charters or from which he sent letters; this leaves considerable gaps where his whereabouts are completely unknown (Appendix I). The observation that Richard never issued charters at Tintagel may reflect only that Tintagel was a place he visited to get away from the cares of state and feudal duty. Secondly,

Fig 6 The 'tunnel' from the west. (Photograph: Graeme Kirkham.)

intention and opportunity are different things; if Richard genuinely did not go to Tintagel it cannot be assumed that he did not wish to go there and intend to go there. On the contrary, the fact that he went to some trouble to acquire Tintagel and to build a castle there can be taken as an indication that he had a considerable interest in the place and did intend to use it. If affairs of state, domestic and foreign, kept Earl Richard away from Tintagel, that might be reflected in the possibly unfinished state of the cave.

It has been persuasively argued that castle builders 'saw nothing frivolous or inappropriate in designing buildings to reproduce iconography from literature' (Ashbee 2004, 36). Such builders included King Edward I and his Queen, Eleanor of Castile, Roger Bigod, 5th Earl of Norfolk, and Count Robert of Artois. Richard, Earl of Cornwall and King of the Romans, belongs in such company.

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Appendix I: towards an itinerary for Richard, Earl of Cornwall

It is possible to construct a partial itinerary for the life of Richard of Cornwall, largely from Denholm-Young (1947) with some additions from other sources (for example, Padel 1988; Smith 2010). The principal gaps when his whereabouts are unknown and the times when he is known to have been in Cornwall can be briefly summarised.

His movements are largely unknown: between September 1227 and April 1230; between August 1233 and June 1236, except for two short periods

when he was 'at court' – this is the period during which he was acquiring the site of Tintagel and subsequently the whole manor of Bossiney in which it lay; between October 1242 and November 1243; for most of 1247–8 (although he must have been at court for much of this period while he was directing the re-coinage (Denholm-Young 1947, ch 4)); from April until October 1259; between February and October 1261; and from July until October 1263.

Conversely, he is known to have been in Cornwall: in June 1238 (and maybe for longer – he is not known to have been elsewhere until April 1239); briefly in January 1240 when the sudden death of his first wife, Isabella, caused him to leave hurriedly; and at Christmas 1259. At Easter 1249 it is specifically recorded that Richard 'retired . . . to a distant part of Cornwall, *as if on business*' (Denholm-Young 1947, 72–3). The latter phrase in italics is apparently a reference to a dispute with his brother the king. The brothers quarrelled frequently. On this occasion a fragmentary letter from Richard to the king (Shirley 1862, 107) suggests that Richard had made arrangements to spend Easter in Cornwall with his friends and refused to break this engagement to come to court as the king demanded, stating that 'our absence ought to have been graciously excused'. Richard was almost certainly at Tintagel in 1245 or earlier to receive his nephew Dafydd ap Llewelyn (Smith 2010).

Cornish Archaeology 56, 2017, 261–267

The excavation of two contrasting mine dumps adjacent to Restormel iron lode

STEVE HARTGROVES, SEAN TAYLOR AND JOHN SMITH

incorporating contributions from GILLIAN JULEFF, FELIPE DO NASCIMENTO RODRIGUES, THOMAS RAISEN and JAKE KEEN

As part of Cornwall Archaeological Society's Roman Cornwall project, trenches were excavated across two mine dumps associated with an iron lode near the Roman fort at Restormel. Iron-smelting slags, likely to be Roman, have been found during fieldwalking around the fort. One of the dumps was found to be of simple form and may pre-date the historical exploitation of the lode, recorded from the 1790s. A radiocarbon date was secured, but showed only that the dump was later than the Middle Neolithic. Although a closer date could not be established for the workings, the project showed them to be complex and multi-phase.

This recording project was devised by the Roman Cornwall Research Group (RCRG), a sub-committee of the Cornwall Archaeological Society (CAS) formed in 2013 following the discovery of the two 'new' auxiliary forts in Cornwall in 2007 at Restormel (Hartgroves and Smith 2008) and Calstock (Smart 2013; 2014). The objective of the RCRG is to reassess the existing information base and to update our understanding of the Romano-British period in Cornwall and the south west through research, fieldwork and excavation.

The Roman fort at Restormel, 1.2 km north of Lostwithiel, is located close to a major iron lode, and smelting slags have been found in fieldwalking around the site of the fort. The aim of the current project was to record cross-sections through surface mine dumps associated with the iron lode in order to recover information about mining technologies in use at the site. It was also hoped that the investigation might produce evidence for dating the extraction of the ore. Although the chance of finding dating material was considered very low, the recovery of evidence which could possibly link the fort with iron extraction and processing would be an archaeological discovery of national importance.

This paper is a summary of the full excavation report (Hartgroves *et al* 2017) which will be lodged with the Historic Environment Record at Cornwall Council and will be available online through the 'Events' layer of the Cornwall Council mapping website.

Restormel auxiliary fort

Geophysical surveys carried out by Tamarside Archaeological Survey from 2007 to 2009 (Nicholas 2009) confirmed the site as a Roman auxiliary fort, measuring about 70m by 60m internally (Hartgroves and Smith 2008). The fort is on a spur above the River Fowey (at NGR SX 1025 6106), to the south of the medieval Restormel Castle, and is a Scheduled Monument (National Heritage List for England 1004660). The surveys were prompted by the assessment and analysis of a large and varied artefact assemblage from the fort and the surrounding fields (Thorpe

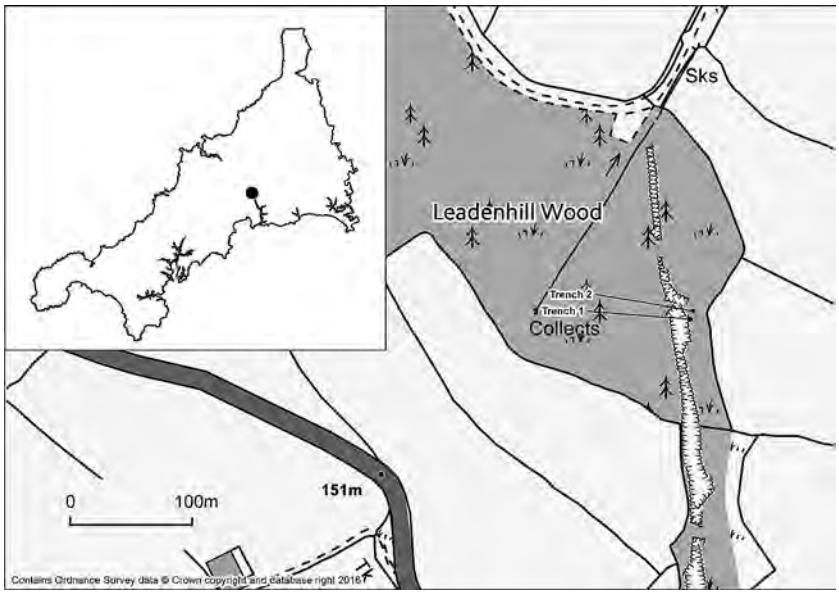

Fig 1 Location of the two excavation trenches relative to the openworks in Leadenhill Wood.

Fig 2 The Restormel area, from the south. The site of the excavation in Leadenhall Wood is circled. The Restormel iron lode is the tree-covered linear feature running obliquely from the bottom left hand corner of the image. The Roman fort is visible as low banks defined by highlights and shadows, below and right of centre, above the wood in the foreground, and Restormel Castle is to the right. (Photograph: Steve Hartgroves, 10 December 2008; CAU/ADI/F88/158. © Historic Environment Service, Cornwall Council.)

and Smith 2007). This assemblage resulted from several episodes of field walking carried out over a number of years, in particular by Jack Major and CAS members in 1996 and by Jonathan Clemes in 2004–5. The assemblage included an unusually high proportion of imported pottery of the first and second centuries AD in comparison to locally made wares and the report's authors concluded that the site had been occupied from the first to the third and perhaps into the fourth century AD, although whether this occupation was continuous is uncertain. The duration and complexity of the occupation may be reflected in the results of the geophysical survey, which show that the fort had annexes to east and west, and that immediately to the west there was a larger fort, probably an earlier marching camp. Surrounding the auxiliary fort there appears to be a large roughly rectangular enclosure of unknown date.

Less than 400m to the west of the fort lies a major iron lode aligned roughly north–south over a distance of approximately 1000m. The presence of significant amounts of tap slag among the finds assemblage seems to indicate that iron smelting was being carried out somewhere in the immediate vicinity of the fort. Analysis in 2006 by Jens Andersen confirmed that the slag was the result of iron smelting and showed that trace elements in the slag matched those in samples from the iron lode (Thorpe and Smith 2007, 25). The exploitation of this lode is documented from the 1790s onwards (Dines 1956; Brooks 2011, 23), but the slags are very unlikely to be of this date as iron ore was not smelted in Cornwall in the eighteenth and nineteenth centuries, being exported instead to areas with coalfields such as south Wales and the Midlands (Brooks 2011, 13–16; Thorpe and Smith 2007, 25). The slag is of a type first encountered during the Iron Age and Roman periods, and is likely to date to no later than *c* AD 1500 (Thorpe and Smith 2007, 25–6). However, there are no documentary references to any earlier phases of ironworking here, or indeed, anywhere else in Cornwall prior to the eighteenth century (*ibid*, 25). Given the absence of any records for medieval working, this raises the distinct possibility that iron was being extracted and processed at Restormel in Roman times, and that proximity to the lode may have been a crucial factor in the siting of the fort. This was clearly an aspect of the site which merited further investigation.

It is possible that the other two auxiliary forts currently known in Cornwall, at Nanstallon (Lanivet) and Calstock, were also located to take advantage of mineral resources, although for all three their location close to major rivers may have been the main consideration for their siting. Nanstallon fort, close to the River Camel 9 km north west of Restormel, has an iron lode 1.5 km to the west (Brooks 2011, 158–61), as well as deposits of silver, lead, tin and copper within 3 km. It overlooks the Boscarne streamworks in which prehistoric and Roman artefacts have been found, indicating the early exploitation of tin (Penhallurick 1986). Excavations at Nanstallon (Fox and Ravenhill 1972) retrieved evidence, in the form of iron slags, traces of precious metals (gold and silver) on crucibles, and possible furnace bases, suggesting that metal smelting was carried out on site. Calstock fort, on the Tamar, was discovered in 2007 and excavated from 2008 to 2010 (Smart 2014). It is in an area rich in mineral deposits, including copper, tin, arsenic, lead and silver (*ibid*, 108–9). The excavations found evidence for smithing of iron, as might be expected in any Roman fort, but, as at the other forts, a demonstrable association with the local mineral resources remains elusive.

Restormel iron lode

The earliest documentary reference to the exploitation of the iron lode occurs in the 1790s, when it was known as Trinity Mine. Queen Victoria and Prince Albert visited the mine in 1846, and it was subsequently renamed as Restormel Royal. Workings were developed from the floor of the gunnis down to 60 fathoms in the nineteenth century and outputs are recorded until 1910 (Dines 1956; Brooks 2011).

The surface workings on the Restormel iron lode are not continuous but are rather divided into four sections separated by three areas of undisturbed ground (Thorpe and Smith 2007, 25–6). Along the southern sections the ore was extracted in deep regular linear excavations, or gunnises, but at the northern end, where the lode enters Leadenhill Wood, the character of the workings changes and becomes far less regular in appearance. At a point just inside the wood the gunnis appears to have encountered older more primitive workings, including a series of interlinked vertical stopes

and what appears to be a narrow footway shaft. Considering the absence of documentation for pre-eighteenth-century working, either these irregular workings were associated with the earliest recorded exploitation of the lode towards the end of the eighteenth century, or they were significantly earlier in date. Collecting evidence to establish the earliest phase of exploitation on any extractive site is not a simple matter however, because of the problem of disturbance or destruction of earlier layers by later activity.

Forestry work during 2016 along the downslope, eastern side of the iron lode in the vicinity of these 'earlier' workings revealed some mine dumps containing quantities of shattered iron-bearing quartz rocks, obviously originating from the iron lode. Since it seemed likely that, if evidence for the earliest phases of exploitation of the lode survives somewhere on site, this would be one of the most likely places to begin looking, permission was obtained from the landowners (the Duchy of Cornwall) for the cleaning and recording of archaeological sections across selected dumps.

Recording the dumps

Sections were cut and recorded across two separate dumps by volunteers from Cornwall Archaeological Society and members of CAS's Roman Cornwall Research Group over a long weekend, September 2–5, 2016. Although separated by just 5m, the two dumps were very different in external shape and size.

The first dump examined, Dump A, consisted of a layer of mainly broken quartz ore rock, with some shillet, approximately 0.7m thick, overlying four layers of reddish silty clays, approximately 1m in depth, interpreted as a sequence of buried or redeposited soils, over bedrock (Fig 3). The oval shape of the mound and the tip lines observed in the cross section seemed typical of small barrow or basket dumps found elsewhere in Cornwall in association with early mines (John Smith, pers comm). It is not possible to assign precise dates to this technique because of the persistence of 'simple' methods into later periods, but in this case we can provisionally interpret this to mean 'earlier than the opening of the Trinity Mine' on the iron lode in the late eighteenth century.

Dense vegetation growth masks the fact that dumps of this kind spread downslope from the iron lode over a fairly wide area below the excavation site, but have not yet been identified in other locations along the lode. Such dumps are extensive and wasteful of land – once a dump exceeds a very restricted size and height a new dump must be commenced close by. This also suggests that the dump should be associated with an early phase of working before the exploitation of the iron lode had reached the point where the deep gunnis was created.

A 42kg bulk sample of the 'quartz ore rock' layer from Dump A was assessed and characterised at Exeter University (Juleff *et al* 2016) as part of a Master's degree project. Based on the proportion of rock (approximately 85 per cent) over soil matrix (approximately 15 per cent), and the

Fig 3 Trench A in cross-section excavated to bedrock. Note the thick layer of vein material above a sequence of redeposited soils, and the well-defined tip lines running downslope. The Middle Neolithic radiocarbon date came from the layers beneath the dumped vein material.

density, uniformity and dominance of palm- to fist-sized lumps (4–11cm), the study concluded that the sample was likely to be the product of hand-dressing and sorting of the ore after it had been extracted from the lode. This was further supported by the frequent occurrence of notch and sharp-angle fracture features indicating manual rock breaking. This represents a very basic and small-scale technology and could be of almost any date. The lack of soil matrix also suggests that the material was deposited as a single or restricted event rather than over time. Despite the density and apparent high-iron mineralisation of the ore lumps, the survival of the material on site implies that it was discarded as unsuitable for smelting.

Samples of what was judged the 'best' ore from the bulk sample, along with similar material collected from the surface elsewhere on the site, were then used as the charge for an experimental iron smelt by Jake Keen, an experienced smelter, with students from Exeter and members of the Historical Metallurgy Society. In all respects the smelt went well, reaching high temperatures using hand-pumped bellows and generating fluid slag, However, Jake was unable to produce a consolidated bloom of iron. While disappointing this did lend strong corroboration to the interpretation that the concentration of iron in the rock was insufficient to be successfully smelted in a pre-industrial bloomery-type furnace, confirming that the dump was composed of waste material, rather than being a stockpile for further processing (Gill Juleff, pers comm).

The second dump examined, Dump B, was of quite different character (Fig 4). The sequence of deposits was very much deeper than in Dump A, and the excavation extended over 2m, from top to bottom of the section, without reaching bedrock. Four thick layers of redeposited soils or subsoils were found to overlie a deposit of large angular broken stones with large voids between, somewhat similar to the quartz layer of Dump A, although mostly composed of shillet. The interface between the soils above and the dump material below was quite clean and abrupt, and it is unlikely that it was simply the basal layer to Dump B; this material was therefore recorded as Dump C. The trench was excavated a further 0.25m at which point excavation was curtailed due to the overall height of the section and the increasing depth of the sondage.

Dump B is interpreted as a finger dump, that is, a flat-topped linear mound created by tramming

Fig 4 Trench B in cross section showing the depth of the sequence of redeposited soils (over 2m), with the stony dump below.

wagons along rails from the point of extraction and extended by tipping off the end. These dumps are usually arranged to run down or across sloping ground and increase in height as their length grows. It is assumed that the recorded face represents the nose or end of the dump, although we might possibly have been looking at a dump truncated by later spoil removal. The earthy material suggests that this is an overburden dump where the soil and subsoil covering was being stripped from the lode working area.

Finger dumps are a much more efficient method of dealing with waste material than small barrow dumps, and mostly seem to date from the nineteenth century in Cornwall. They should certainly belong to a later period than Dump A and can almost certainly be associated with the eighteenth- to nineteenth-century workings.

Dating the dumps

A small lens of charcoal was recovered from one of the soil layers below the quartz layer on Dump A. This was first examined by Denise Druce of Oxford Archaeology who was able to isolate and identify three fragments of hazel twig charcoal. These were sent to the Scottish Universities Environmental Research Centre AMS Facility (SUERC AMS) for radiocarbon dating. The charcoal (Sample Reference: RM16/C14/1) produced a date of 4476 ±33 BP (SUERC-72567 (GU43308)).

The age determination was calibrated using the University of Oxford Radiocarbon Accelerator Unit calibration program OxCal v4.2.4 (Bronk Ramsey 1995). Due to the shape of the calibration curve, the C14 age intersects it at two points resulting in two calibrated dates. The result is that there is a 95 per cent chance that the true date of the charcoal lies in the ranges 3341–3084 BC or 3065–3028 BC. These are very close and, for convenience, multiple date ranges are often amalgamated by taking the highest and lowest values. In this case that would result in a date falling between 3341 and 3028 cal BC, in the Middle Neolithic period.

In respect of the possibility of linking the construction and occupation of the fort with the extraction of iron from the lode, this date is not helpful as it is axiomatic that iron extraction and processing will post-date the Neolithic and Bronze Ages. The survival of Neolithic charcoal in the lower levels of Dump A was unforeseen, but it is not altogether so surprising. There is ample evidence for Neolithic activity in the wider area in the form of flint scatters, as at Bodwen (Lanlivery) for example (Harris 1977) and 'worked flints were found in several fields' during the construction of the Bodmin bypass (Irwin 1976). The summit of Helman Tor (Lanlivery), 4 km to the west, is surrounded by a Neolithic tor enclosure (Mercer 1997), and a quoit or chambered tomb lies 3.5 km to the north west at Lesquite Farm (Lanivet) (Miles and Trudgian 1976). There is also a suggestion of Neolithic activity in the prehistoric finds collected during fieldwalking in the immediate vicinity of the fort (Thorpe and Smith 2007, 12): some of the collection of 31 mostly undiagnostic flints and pieces of worked granite, including a possible saddle quern fragment, a rubbing stone and a hammerstone, could date to the Middle Neolithic period. A granite cobble with two opposed conical depressions thought to be, possibly, a pivot stone for a bow drill may be Neolithic – and may be associated with fire-making! The charcoal could, of course, be the result of natural causes such as a lightning strike. Even so, the date does provide a *terminus post quem* for the Dump A quartz layer, and leaves the door open to the possibility that this dump is Roman in origin.

Conclusion

Two dumps in close proximity to what seems to be the oldest surviving section of the ironworks have been excavated, examined, sampled and recorded. This is useful in itself, providing the first detailed information on the character and make-up of the dumps at Restormel, and will be useful as a comparison should it be possible in future to examine dumps from other parts of the site, or indeed dumps at similar sites elsewhere.

Although the investigation did not recover definitive evidence for the date of the dumps and was not able to demonstrate a link between the fort and the mine, it did make significant discoveries concerning the technologies used in the extraction and processing of iron ore on site. To find contrasting dumps of this kind in close proximity indicates both a technological and a temporal depth and complexity to the archaeological features. In addition, it would seem that the later phase of waste disposal through the creation of finger dumps was burying an earlier, simpler, mining landscape.

This project has confirmed that the iron mine known in later years as Trinity Mine and Restormel Royal is, as suspected, an extremely complex, long-lived, multi-phase site. It has also reaffirmed the view that this site has great potential for further fieldwork and archaeological investigation.

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Explanatory information on the calibration of the radiocarbon date, included in the report above, was provided by Dr Brian Tripney of the SUERC Radiocarbon Laboratory, East Kilbride.

The corresponding author is Steve Hartgroves.

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Cornish Archaeology 56, 2017, 269–286

Recent work in Cornwall 2017

Cornwall Archaeological Unit

A30, Chiverton to Carland Cross

Cornwall Archaeological Unit undertook a programme of evaluation trenching along the 12.9 km route of the A30 road improvements between Chiverton Cross and Carland Cross. More than 100 evaluation trenches were excavated, located to investigate anomalies identified by a geophysical survey and to test areas which appeared blank on the geophysics.

Significant features identified include a Late Mesolithic / Early Neolithic flint scatter and a Middle Neolithic ditch, possibly part of a structure, at Ventonteague; potential Bronze Age barrows or cairns were located at Ventonteague and Trevalso. Evidence of Bronze Age settlement, including a pit containing a whole Trevisker urn, was identified at Nancarrow.

Iron Age and / or Romano-British field ditches were identified at Tolgroggan, Nancarrow and Marazanvose. Medieval ridge-and-furrow cultivation was recorded at various locations along the route and field ditches of medieval date were found at Marazanvose and Nanteague, the former possibly representing a settlement. Medieval iron smelting was identified at Nancarrow. Post-medieval enclosure was recorded in many of the former areas of downland along the route, and nineteenth-century mining remains were found at Ennis Farm.

- Project Manager: Sean Taylor. Project Officers: Peter Dudley, Cathy Parkes, Francis Shepherd. Site assistants: Alan Burchell, Fuller Hughes, Graeme Kirkham, Sorcha Maddern, Laura Ratcliffe-Warren, Ryan Smith.

Lizard Point

In spring 2017 a rapid archaeological and historic assessment was carried out for the National Trust covering the Trust's land at the Lizard Point, Landewednack, centred at approximately SW 70560 12070. The large study area, approaching 100 hectares in extent, comprised the southern tip of the promontory, taking in the coast from Old Lizard Head on the west to Bass Point to the east, and extending inland as far as Lizard village. A special study focused on land near the centre of this coastline, at Polpeor Cove and in part of the adjoining small settlement of Polpeor.

The assessment shows that the Lizard Point area is rich in archaeological sites and historical associations, many of which reflect its maritime importance as mainland Britain's southernmost major headland. It has also offered landing places to mariners familiar with its navigation and also forms one side of Falmouth Bay into which opens the great natural harbour of the Fal Estuary.

Archaeology relating directly to the coast includes the possible platform of a Jacobean lighthouse and elements of the extant, Georgian

lighthouse complex; features of a lifeboat station of 1859 to 1961; other sites relating to coastal charting, safety infrastructure and defences; and upstanding mounds, possibly graves of victims of the wreck of the *Royal Anne Galley* in 1721 or of other shipwrecks. A restored Marconi station of the early twentieth century reflects innovations in long-distance wireless telegraphy, as well as the development of the earlier coastal signalling and telegraphy marked by the Lizard Signal Station (known as the Lloyd's building) and other features.

Possible prehistoric sites meriting further investigation include a standing stone and a mound on the cliffs as well as crop-marks of buried enclosures in the fields. The high productivity of these fields in the past is attested by pits dug for marl, a fertile subsoil. The property in general is characterised as a medieval farming landscape with a belt of cliff-top pasture formerly held in common, the 'morrop'. A well-preserved network of routes includes early sinuous ways linking the coves and morrop to the strip-derived fields and farmsteads. A summit above Old Lizard Head may be the site of the *lys* or pre-Norman administrative centre for which the Lizard is named; potential remains of enclosing earthworks lie on the edge of the Trust land.

Recommendations arising from the assessment include measured survey and other archaeological fieldwork to aid interpretation, management and presentation of sites, groundworks to restore historic landscape character and provide sustainable vegetation control, and development of interpretation materials and community events drawing on the assessment.

- Project Manager: Charles Johns. Project Officer: Cathy Parkes.

St Pol de Leon church, Paul (SW 46442 27090)

Archaeological recording was carried out on behalf of the St Pol de Leon Parochial Church Council during groundworks in the churchyard for the installation of improved facilities.

St Pol de Leon church is a Grade I Listed Building and is possibly the site of an early medieval monastery. Built into the wall of the north aisle and western churchyard wall are fragments of a churchyard cross of tenth- or eleventh-century date.

The current church dates from the fifteenth century, with evidence for major rebuilding after it was burned during a Spanish raid in 1595. The church underwent further renovations in the nineteenth century. The eighteenth – nineteenth-century churchyard wall and an early medieval cross set upon it are both Grade II Listed structures.

The project provided considerable evidence for past burial activity and the archaeological potential of the churchyard. Prehistoric activity in the area

A large upright stone, possibly a prehistoric standing stone, although other interpretations are possible, rising from a bank in a dramatic position above Housel Cove, Lizard. (Photograph: © Cornwall Archaeological Unit.)

was indicated by the presence of a Neolithic flint blade. Details of 23 graves were recorded, including both adult and child burials; the majority of the graves appear to have been shroud burials. No direct dating evidence for the graves was obtained but the shroud burials are likely to date to the fifteenth to seventeenth century.

- Project Manager: Andy Jones. Project Officer: Carl Thorpe.

Enys Farm, Penryn (SW 79127 36420)

Proposals to renovate and convert a group of Grade II Listed farm buildings at Enys, near Penryn, prompted a programme of survey and recording in advance of alterations. The farm buildings are located north of Enys House. They are shown on estate plans and the oldest range, closest to the main house, dates from the late eighteenth century. An elaborate two-storey barn was completed *c* 1800 and soon afterwards three other building ranges were added to create a large quadrangular farmyard. The north-west range within the farmyard was originally built with an open-fronted linhay as an imposing central block with three pigsties on each side. The other ranges included spaces to accommodate other farm animals, including cattle and working horses.

With the exception of the oldest range, all of the principal buildings incorporate very high-quality ashlar masonry and other fine architectural details. The close contemporaneity of the main ranges indicates that this is a rare surviving Cornish example of a model farm, where wealthier families were able to create exemplar farmsteads incorporating the latest agricultural developments.

During the accompanying watching brief no archaeological finds or features were revealed from the pre-farm complex phase. However, the watching brief in the horse engine house revealed the central mellior stone and the footings of a pillar associated with an earlier horse engine house.

- Project Officer: Jo Sturgess.

West Northwood, St Neot (SX 20189 69752)

Archaeological investigations were carried out at an enclosed prehistoric settlement at West Northwood Farm, St Neot, on the southern fringe of Bodmin Moor. The investigations were undertaken to gain further information about the settlement and included a survey of the site and excavation of one of the roundhouses within the enclosure. The survey revealed that the roundhouse is located within a D-shaped enclosure, within which were a number of other structures. To the south of the enclosure is a feature which is likely to be a large roundhouse or perhaps a ring cairn.

The excavation indicated that there were several distinct phases of use. The first comprised a stone-walled roundhouse with a south-facing doorway; which on morphological grounds and a small quantity of ceramics is likely to belong to the Middle Bronze Age. Ceramics indicate some further activity in the Middle Iron Age and there is a significant assemblage of plain probable Cordoned Ware indicating use in the Late Iron Age or early Roman period. A sherd of flanged bowl and a radiocarbon date indicate continued activity in the later Roman period and a further radiocarbon date from inside the building suggests early medieval occupation. A secondary entrance

The south-west range at Enys Farm. (Photograph: © Cornwall Archaeological Unit.)

was inserted through the northern part of the wall circuit at some point and there was evidence for animal activity in the form of poaching into the floor which extended from this entrance into the interior. An internal sub-dividing wall may also have been inserted during this phase. [A full report appears in this volume.]

- Project Manager: Andy Jones. Project Officer: Anna Lawson-Jones.

Boscoppa farmhouse, St Austell (SX 04134 53980)

Cornwall Archaeological Unit was commissioned to carry out a historic building record prior to the refurbishment and conversion of the old farmhouse at Boscoppa Farm. The Grade II listed building has not been used as a dwelling for many years and had fallen into a state of disrepair.

Surviving elements of the house indicate that it dates to the seventeenth century, although it may have medieval origins. Sections of the house have been altered or rebuilt in various phases, including a major phase of remodelling in the late nineteenth or very early twentieth century. In the late twentieth century work was carried out in an attempt to stop the building crumbling. This involved entirely repointing the exterior and rendering areas of the rear elevation and many of the interior wall surfaces, all using cement mortar. Possibly at the same time or perhaps at a slightly earlier date the ground floor surfaces were replaced or covered with concrete.

- Project Manager: Jo Sturgess.

St Clare, Penzance (SW 46688 30760)

A historic building record was commissioned in advance of the demolition of the Grade II listed Quadrangle building and the development of a new health centre at St Clare, Penzance.

The Quadrangle and Link buildings at St Clare are later extensions of York House, an early nineteenth-century Grade II Listed Building, located on the north-west side of Penzance. As adjoining buildings, the later extensions form part of the Listed structure. The Quadrangle was built in 1938 as new classrooms and an assembly hall when the site was occupied by West Cornwall College for Girls and is significant as an early example of a Modernist school building. The Link building is likely to have been constructed in the 1980s by Penwith District Council (PDC), who acquired the site in 1974.

The recording work on the Quadrangle revealed that the majority of the school building retains its original features and fittings internally, with some alteration made during the course of PDC ownership.

No archaeological features were uncovered during the accompanying watching brief but a few unstratified pottery sherds dating from the fifteenth to the nineteenth century were recovered.

Along the southern boundary of the site a decorative seventeenth-century kneeler stone from the gable end of a building was found, reused as a garden feature.

- Project Manager: Andy Jones. Project Officers: Jo Sturgess, Carl Thorpe.

Early wallpaper, possibly dating from the 1890s, in situ at the top of a staircase in Boscoppa farmhouse. (Photograph: © Cornwall Archaeological Unit.)

Penans, Grampound (SW 95263 49210)

A geophysical survey undertaken in 2016 prior to development of a site at Penans Farm, Grampound, revealed a large number of anomalies with archaeological potential. During 2017 the geophysical survey was followed by a programme of evaluation trenching and a watching brief.

The majority of the features recorded by the watching brief and evaluation appear to represent field boundaries and land drains associated with a fairly recent agricultural landscape, these being imposed over the remains of an ornamental landscape associated with the house at Penans during the late seventeenth or early eighteenth centuries. The more recent agricultural activity appears to have been accompanied by several phases of deliberate infilling of hollowed areas and brick pits which may be associated with the construction of the house and associated features.

Earlier agricultural activity was represented by a prehistoric or later boundary ditch which was aligned to respect a Bronze Age barrow in the south-west part of the site. [Reports on elements of this work appear in *Cornish Archaeology* **55** (2016, 241–8) and this volume.]

- Project Manager: Adam Sharpe. Project Officer: Laura Ratcliffe-Warren.

King Edward Mine, Camborne (SW 6645 3890)

King Edward Mine was established in the late nineteenth century as the Camborne School of Mines training mine, on the site of the former South Condurrow mine, and was used as such until relatively recently. It was taken over by Cornwall Council which assisted in its conversion into a mining heritage centre. The site, which is largely staffed by Trevithick Society volunteers, has recently been the subject of a major conservation programme.

Cornwall Archaeological Unit was commissioned to record structures uncovered during excavations carried out by volunteers in two areas at the mine: a small Brunton arsenic calciner and a wall of the boiler house associated with the South Condurrow stamps engine house.

- Project Manager: Adam Sharpe. Project Officer: Sean Taylor.

Viaduct Hill, Hayle (SW 57200 37750)

Full-scale archaeological excavations were undertaken at Viaduct Hill, Hayle, in advance of a housing development. Phase 1 of the work revealed an enclosure consisting of two concentric ring ditches with an overall diameter of around 20m, within which were the remains of at least

The Late Iron Age furnace at Viaduct Hill, Hayle, after excavation. (Photograph: © Cornwall Archaeological Unit.)

two iron smelting furnaces dating to the Late Iron Age. This is an extremely rare find, and although there are other examples, this is the best example of its kind found in Cornwall to date. As well as the iron smelting residues from the final smelting, there was pottery and an unusual double-sided stone mould. It is uncertain what a mould of this type would have been used for, possibly casting a lead or tin ingot. Phase 1 also produced a flint spear-point and scraper of late Neolithic date, although no structures from this period were found. Next to the furnace was another contemporary structure surrounded by a curving ditch, possibly representing a building where further metalworking was carried out. Topsoil stripping also revealed deep ditches that would have created an access route to the site from the south.

The northern end of the development (Phase 2) produced a Neolithic polished stone axe and pottery dating to the Romano-British period, probably third to fourth century AD. This includes South Devon Ware and fragments from amphorae.

- Project Manager: James Gossip. Project Officers: Fiona Fleming, Carolyn Royall, Francis Shepherd, Ryan Smith, Megan Val Baker, Laura Ratcliffe-Warren, Martin Andrewes, Richard Mikulski.

Morrops Field, Gwithian (SW 58017 41261)

Cornwall Archaeological Unit was commissioned to carry out a programme of evaluation trenching ahead of the development of chalets at Morrops Field, Gwithian Towans.

Seventeen trenches were excavated, four revealing ditched field boundaries and one a possible pit; a single sherd of pottery dating to the late fifteenth to early sixteenth century was recovered. Remains of former field boundaries could not be dated by artefactual material and could have been created at any time between the Bronze Age and the medieval period. However, a late medieval potsherd recovered from a ground surface subsequently covered by sand indicates that the dune inundation at this location must have begun after the late fifteenth century.

- Project Manager: Adam Sharpe. Project Officers: Ryan Smith, Laura Ratcliffe-Warren, Fuller Hughes.

Tintagel Castle Archaeological Research Project (TCARP)

The second season of the five-year research project at Tintagel Castle involved opening up and excavating part of the southern terrace where the previous year's evaluation trenching had revealed the stone footings of well-preserved buildings, slate floors and rich middens. The stone walls of three large rectangular buildings were revealed in plan. The entire complex was covered in a mass of collapsed and displaced heavy stone (structural building material) indicating that the whole area had been abandoned after the buildings had fallen into ruin. The limited amount of later medieval pottery would suggest that this abandonment occurred before the twelfth century AD.

A large number of artefacts were found, the most numerous being sherds of imported fine table wares (A wares) and amphorae, alongside decorated pieces of glass drinking vessels and bowls, all confirming occupation in the fifth to seventh centuries AD. Of particular note are the rim of an Anglo-Saxon glass claw beaker and a piece of Egyptian blue frit (moulded paste used as a decorative inlay), as well as a tiny shard of cobalt blue glass which had clipped edges. All are unique and underline Tintagel's high status and significant role in international trade networks during the post-Roman period. The discovery of early medieval bar lug pottery is also a first for Tintagel and its presence here suggests activity extending beyond the seventh century AD.

The middens produced a massive amount of animal bone and their future study will reveal much about diet and economy in this period. Early indications would suggest that the southern terrace was the focus for an extended period of occupation from at least the fifth to the seventh and even perhaps to the ninth centuries AD.

- Project Manager: Jacky Nowakowski. Project Officers: James Gossip, Carl Thorpe, Megan Val Baker, Graham Britton, Brett Archer, Martin Andrewes.

Lowland Cornwall: the hidden landscape

The Lowland Cornwall project, which was funded by Historic England and completed in 2017, aimed to develop a method for predictive modelling of the lowland prehistoric and Romano-British landscape; that is to say, to establish the relative probability for the presence of archaeological

The southern terrace at Tintagel under excavation, August 2017. (Photograph: © Cornwall Archaeological Unit.)

remains in different parts of the lowland landscape. Lowland Cornwall was defined as those areas of the county which are predominantly actively farmed, including land which is improved in some way rather than left as unimproved grassland or rough ground. Cornwall's lowland areas probably have the highest archaeological potential in the county to contain buried archaeological features but are poorly understood and increasingly subject to the impacts of major change in land use and development. The results of the project were intended to help to inform advice and decision-making regarding these changes.

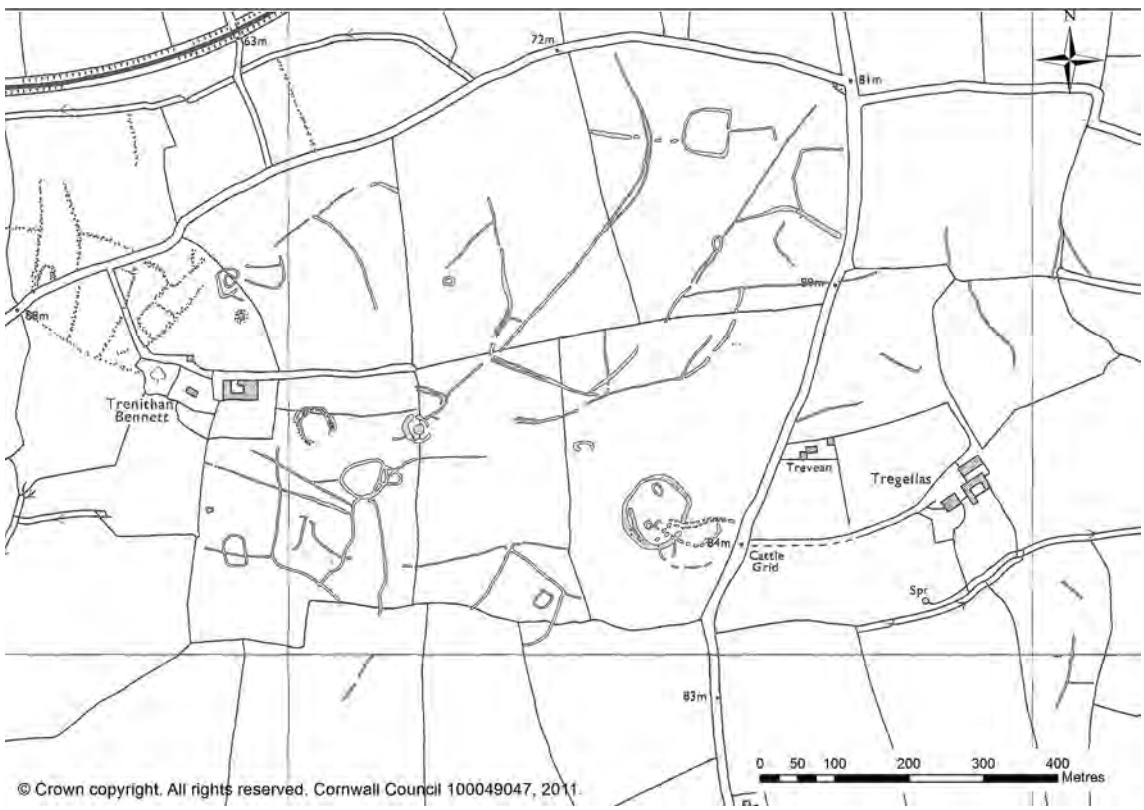
The methodology was built around comparing the archaeological potential found in the different historic landscape types defined by Cornwall's Historic Landscape Characterisation (HLC), undertaken in 1994. Although some 20 historic landscape types were identified in the project area, by far the largest areas were covered by two main types: 'Anciently Enclosed Land' (AEL), where the pattern of fields and settlements is mostly derived from the medieval period; and 'Recently Enclosed Land', where the field patterns, often with straight-sided rectangular fields, were mostly the result of the enclosure of rough ground in the eighteenth and nineteenth centuries. There is much circumstantial evidence to support the proposition that the medieval farming heartlands (AEL) corresponded to the later prehistoric and Romano-British extent of farmed land and a key aim of the Lowland Cornwall project was to test this model.

The method involved correlating the known distribution of sites recorded in the Cornwall and Isles of Scilly Sites and Monuments Record (SMR) with the various HLC types. The monument types studied included enclosures, field systems, open settlements, Bronze Age barrows, early medieval settlements and find spots. For each monument type the results were assessed statistically to ensure their validity and on this basis the different HLC types were characterised as high, medium and low probability zones to create the predictive models. In general terms the results confirm the suggestion

that the zone of medieval settlement and farming heartland in Cornwall was also the prehistoric and Romano-British settlement zone.

These models were then tested further using data contained in the Cornwall and Isles of Scilly Events Record, which records interventions such as geophysical surveys, excavations and watching briefs, carried out on, for example, development sites. This offered another level of evidence for the nature of the buried archaeology found in the various historic landscape character types. Much of this data had not been input to the Sites and Monuments Record so provided a useful independent data sample for testing purposes. This analysis confirmed that AEL is a high probability zone for enclosures and field systems, but in addition showed that prehistoric and Romano-British open settlements are also most likely to be found in these same areas. Based on the SMR information alone, the open settlements had been more commonly found in Rough Ground and Recently Enclosed Land, presumably reflecting survival and visibility rather than their actual distribution.

The next stage of the project involved refining HLC in four discrete study areas (groups of parishes around Probus, Pelynt, Poundstock and in Penwith), with the aim of using the refined HLC to produce more accurate and precise models for archaeological potential in the various landscape types. This involved dividing some of the landscape types into sub-types, with the medieval farmland (AEL), for example, being mapped to reflect the different historic processes that could be seen reflected in the field patterns. As well as the present-day landscape, characterisation was also



At Trenithan Bennett (Probus), near Grampound Road, an example of the hidden archaeological landscape in lowland Cornwall can be seen as a complex of cropmarks recorded by the National Mapping Programme. Late prehistoric enclosures and field systems are found in the same area as settlements of medieval or early medieval origin.

carried out for earlier time-slices – *c* 1880, *c* 1840 and late medieval – as part of the HLC refinement. The results were perhaps more informative about the development of the landscape in general, rather than further developing the predictive models. One striking outcome of using these time-slices was the finding that in each study area, by the time of the *c* 1840 tithe maps, many fields had undergone extensive sub-division, creating numerous much smaller fields. By *c* 1880 removal of the sub-dividing boundaries was already under way, and most had been removed by the time of the present-day time-slice. It was also notable that in all four study areas the extent of Rough Ground had diminished significantly over time, having shrunk by 83 per cent from the late medieval time-slice to the 2011 time-slice.

Another outcome of this more accurate characterisation was to show that in the southern part of Penwith, in west Cornwall, large areas of field patterns that had been characterised in the broad-brush 1994 exercise as being derived from prehistoric field patterns had been altered to such an extent in the medieval period that they were best interpreted as medieval-derived; however, some 'new' areas of prehistoric fields were identified in the Perranuthnoe area.

The more detailed interpretation of the landscape undertaken in the Lowland Cornwall HLC also found that some areas which had previously been interpreted as Recently Enclosed Land were now thought, on closer inspection, to be Anciently Enclosed Land. Probably reflecting this greater accuracy, in most of the study areas the correlation between the distribution of enclosures and the medieval-derived farmland was even higher than in the Cornwall-wide assessment. However, the results also suggest that there was a shift in settlement locations to lower ground in the early medieval period. Many early medieval settlements favoured south-facing slopes whereas the later prehistoric and Romano-British settlements more often simply fitted into the lie of the land.

While it was possible to create more detailed models in each individual study area using the refined HLC, variations within Cornwall meant these models could not satisfactorily be applied on a countywide basis. Furthermore, the models for barrows tended to be less clear cut than those for settlements and field systems. Finally, all the models for find spots were rejected by the testing process; the distribution of find spots appears only to reflect the activity of a small number of individuals.

The predictive models can be used to identify those areas of the county with high archaeological potential. A key aim of the project is that in the event that developments which may impact on the historic environment are proposed within those areas, the models will form the basis of advice provided to planners that some form of archaeological mitigation on the development is required. This is the case regardless of whether or not archaeological features are recorded in the SMR at those sites.

On a more strategic level the models could also be used to influence decisions on where developments are proposed. An example of this is the sensitivity map produced by Cornwall Council around 2005 showing zones of high, medium and low archaeological sensitivity to the impact of biomass plantations at a time when a number of these were proposed. In other words, the designation of archaeologically important zones by means of predictive modelling can also be used to persuade developers to choose the areas with the least 'archaeological risk' for their plans.

The project was published as four detailed reports and a fifth which provides an overview. All five reports can be found online in the Archaeology Data Service's grey literature library (search on 'Lowland Cornwall').

- Project Officers: Andrew Young, Peter Dudley.

AC archaeology

Land at Seaways Farm, Porthloo, St. Mary's, Isles of Scilly (SV 9108 1125)

Archaeological monitoring and recording on land at Seaways Farms, Porthloo, St Mary's, Isles of Scilly, was undertaken by AC archaeology during May and June 2017. The work comprised the monitoring of groundworks associated with the construction of a new agricultural building. A total of 18 archaeological features comprising small pits and a possible posthole were exposed during the monitoring. Finds were recovered from five of the pits which provided a broad date range extending from the Mesolithic to the Late Iron Age or Romano-British periods. These consisted of worked lithics, including a flake fragment of Portland chert, an unusual find from the Isles of

Scilly. Other finds comprised sherds of Bronze Age and Late Iron Age or Romano-British pottery.
- Project Supervisor: Abigail Brown

York House, St Clare, Penzance (SW 46630 30680)

Historic building recording of York House, St Clare, Penzance, was carried out by AC archaeology in July 2017. The building has previously been the subject of a detailed statement of significance in which the development of the building had been established. It was constructed as a rural villa in 1825, became the West Cornwall School for Girls in 1929, was the Penwith District Council offices from 1974 until 2009 and Cornwall Council offices until 2017. The aim of the investigation was to provide a thorough record of the building before redevelopment.
- Project Officer: Stella De-Villiers

Land adjacent to Perranwell Road, Goonhavern (SW 78320 53577)

An archaeological watching brief during groundworks associated with the construction of a single dwelling on land adjacent to Perranwell Road, Goonhavern, was carried out by AC archaeology in November 2017. No archaeological features, deposits or finds were exposed by the groundworks.
- Project Supervisor: Abigail Brown

Cotswold Archaeology

Land at Hendra Road, Stithians (SW 7299 3722)

An excavation identified a small assemblage of Mesolithic to Early Neolithic worked flints. A single pit containing a sherd of Early Neolithic pottery was also found and the site was later used for the un-urned burial of Middle to Late Bronze Age cremated human remains. Medieval to post-medieval remains included traces of a field system, a hollow way and a quarry pit. An undated post structure was also found.
- Project Officer: Martin Gillard.

Land at Chapel Gover, Newquay (SW 83059 61169)

An evaluation identified a series of undated ditches, a posthole and furrows.
- Project Archaeologist: George Gandham.

Kernick Park Phase 2, Penryn (SW 7746 3380)

An evaluation identified undated ditches and pits.
- Project Officer: Jonathan Orellana.

Land at Tolgus, Redruth (SW 6885 4215)

A watching brief recorded undated ditches and pits representing at least two phases of agricultural activity.
- Supervisor: Jeremy Austin.

South West Archaeology

Penbro Farm, Breage (SW 62124 28145)

Building recording and monitoring works were carried out during the conversion of historic farm buildings to residential use. The complex consists of a U-shaped range of farm buildings with a former farmhouse to the open side. All the structures were built of local slatestone with granite dressings and pitched slate roofs carried on simple later nineteenth- or twentieth-century nailed trusses. The U-shaped range is a single-storey structure except for a two-storey barn. The range was probably built primarily after 1840 in several phases, although the barn incorporates earlier fabric. The former farmhouse was gutted by fire in the late nineteenth century and replaced by a new farmhouse located to the south west. The old farmhouse became a granary. Very few historic fixtures remained as the complex had been partly rebuilt and repaired in the mid twentieth century and fitted out for dairying.

Penbro was described as a mansion in a seventeenth-century source, but only two pieces of architectural spolia were observed: a granite lintel (re-used upside down) scored to mimic voussoirs, and the dressed, moulded granite jamb to a seventeenth-century fireplace. Archaeological monitoring determined that the site had been heavily disturbed and truncated during its nineteenth- and twentieth-century use but located a

ditch more than 2.6m wide and 1.44m deep on one side of the farmyard which produced four sherds of Romano-British pottery.
• Project Officer: Bryn Morris.

Kingsley Village, Fraddon (SW 90674 57291)

A programme of archaeological investigation was undertaken on a 0.8ha site prior to a retail development. A geophysical survey identified several linear anomalies that appeared to be continuations of ditches investigated on the adjacent Penhale Round site. Excavation focused on a concentration of shallow postholes in an area measuring approximately 30m × 30m. The site strip revealed 172 postholes and 58 stakeholes, most less than 0.2m across and deep and forming no clear pattern. The few postholes that could be dated contained post-medieval finds. The field in which the site was located was listed in the tithe apportionment as 'Homer Fair Close'. A fair is known to have been held at Penhale from at least the early thirteenth century, transferring to Summercourt in the early eighteenth century; this concentration of postholes and stakeholes is interpreted as clear archaeological evidence for the fair.
• Project Officer: Lazlo Lichtenstein.

Italian Pavilion, Tehidy, Illogan (SW 64675 43375)

Building recording was undertaken prior to renovation of the basement of the Italian Pavilion at Tehidy, with monitoring of associated groundworks. Tehidy was rebuilt by the Basset family in 1734-39 as a large, fashionable house with four pavilions. The south-west pavilion was demolished and rebuilt in 1863 in the Italianate style. The house became a sanatorium in 1917 but was gutted by fire in 1919, leaving only the pavilions; a new structure linking the three surviving pavilions was used as a hospital until closure in 1988 and subsequent conversion to private flats.

Recording determined that the basement of the Italian Pavilion had been heavily modified but that the south-west part retained its 1863 brick vaults. Monitoring of a deep service trench and soakaway exposed the truncated outer wall of the eighteenth-century pavilion and revealed that the terrace in front of the house was composed of made ground at least 2m deep.
• Project Officers: Bryn Morris and Emily Wapshott.

Trethurffe Manor, Ladock (SW 89676 50959)

A geophysical survey carried out in advance of a proposed housing development identified two large ring ditches. Topsoil strip monitoring of the 0.8 ha site confirmed the results of the geophysical survey and also identified a scatter of small pits and the heavily truncated remains of a probable, sunken-featured roundhouse of Middle Bronze Age date.

The ring ditches defined roundhouses of Late Iron Age date. Ring ditch 1 was 1.35m wide and 0.25m deep with an external diameter of 14.5m. Ring ditch 2 extended beyond the edge of excavation at the southern end of the site. The ditch was about 1m wide and 0.25-0.5m deep with an external diameter of about 13.5m. Traces of a central hearth survived, and four postholes which may relate to a post-built porch or entrance structure. Charcoal from the ring ditch and a posthole returned dates of 166-1 cal BC and 96 cal BC to cal AD 27 (SUERC-81322; SUERC-81216). A total of 41 sherds (367g) of Iron Age pottery, including South Western Decorated ware, was recovered from these features. A scatter of pits across the northern half of the site produced Middle Bronze and Late Iron Age dates.

The truncated probable sunken-featured roundhouse comprised a curving spread of charcoal-rich material set into a slight step in the slope, approximately 7m long and 1.15m wide, which would correspond to a structure roughly 9m across. Charcoal from this feature produced a date of 1526-1435 cal BC (SUERC-81207).
• Project Officer: Joseph Bampton.

Jelbert Way, Penzance (SW 49012 31502)

Following earlier work by AOC Archaeology and WYG, South West Archaeology undertook an archaeological evaluation on land just to the north of the A30 Long Rock bypass in advance of planning for the new Penzance Heliport. The evaluation demonstrated shallow peat deposits across the eastern half of the site were sealed by up to 1m of made ground derived from the creation of the bypass in the late 1980s. The peat was sampled but was judged not suitable for further analysis. The evaluation trenches identified historic field boundaries and a multitude of land drains,

including some stone drains composed entirely of broken nineteenth-century pottery.

A geophysical survey undertaken by AOC identified a faint possible double ring ditch in the western part of the field. An area 25m × 26m across was stripped and opposing quadrants of the feature excavated. This revealed a highly truncated complex barrow consisting of a slight platform on which a working surface of small angular stones had been laid, around which a sub-oval ring ditch, 12-15m in diameter but only 0.8m wide and 0.24m deep, had been excavated, creating a slight internal bank. In the centre of the area defined by the bank a pit 2.05m long by 1.5m wide and 0.64m deep had been dug. This contained multiple jumbled fills. Finally, several large pits containing large stones were dug through the monument on its eastern side. The finds included five sherds (16g) of highly abraded possible Bronze Age pottery from the ring ditch, but many of the prehistoric contexts also produced intrusive nineteenth-century material. However, charcoal from the main features dated the ring ditch to 1750-1622 cal BC (SUERC-78031), the central pit to 1503-1400 cal BC (SUERC-78029) and one of the large pits to 1426-1276 cal BC (SUERC-78030).

- Project Officer: Joseph Bampton.

Newton Farm, Launceston (SX 34601 83338)

A geophysical survey was carried out in advance of a planning application across three fields covering 3.1 ha just north of Newton Farm at Stourscombe. Curving linear features relating to ridge and furrow cultivation were identified, together with a sub-rectangular enclosure about 50m across on the western part of the site. In 2016 a similar but more complex enclosure was identified by Archaeological Surveys Ltd in the field immediately to the west.

- Project Officer: Peter Webb.

Mount Hawke, St Agnes (SW 71755 47740)

A geophysical survey was undertaken across two fields covering 3.4 ha just north of Mount Hawke in advance of a planning application. The survey identified a series of post-medieval relict field boundaries, a scatter of pits and a probable mine shaft.

- Project Officer: Peter Webb.

Bridge Road Motors, St Austell (SX 00932 52306)

A limited programme of monitoring and evaluation trenching was undertaken during a small residential development next to the sixteenth-century Grade II Listed bridge over the White River. Historic maps show a series of dwelling houses and gardens on the site, most of which were demolished in the mid twentieth century. A commercial garage was then built on the site. The monitoring work determined that the ground had been heavily disturbed leaving no trace of the historic structures. River gravels were encountered at a depth of up to 1.5m below current ground level; the stratigraphy above the gravels consisted of layers of mixed made ground containing post-medieval and modern material. No features relating to the former structures on the site were encountered.

- Project Officer: Joseph Bampton.

St Erth Multi-Modal Hub (SW 54243 35709)

Following a geophysical survey carried out in 2016, monitoring was undertaken in advance of development of the site. Several areas were targeted, including the footprint of a farmstead called *Peden an Pons* which disappeared in the nineteenth century, and an area where the geophysical survey had identified a series of pits and linear features. The farmstead was found to have been completely destroyed by a large borrow pit filled with modern material, but an adjacent ditch produced sherds of fourteenth to fifteenth-century Cornish micaceous coarseware. A large granite cider press base was subsequently identified in one of the spoil heaps.

The pits identified by the survey proved to be a mixture of dumped material and modern geotechnical pits. The mining remediation engineers also exposed a timber-lined mine shaft and broke into the top of a shallow adit. A post-medieval road crossed the southern part of the site. The final construction phase of the road consisted of a solid mass of redeposited natural with traces of metalling about 7m wide flanked by ditches which had been re-cut several times. The redeposited material was 0.7m thick and sealed an earlier road surface about 4m wide, also flanked by re-cut ditches.

- Project Officer: Bryn Morris.

Roseland Terrace, Zelah (SW 81018 51800)

A small evaluation identified a single pit, 1.85m across and 0.3m deep with a steep-sided, concave profile, the base of which appeared to have been subject to heating. The pit was accompanied by a single posthole.

- Project Officer: Joseph Bampton.

Trevarrick Road, St Austell (SX 00669 52421)

Building recording and monitoring were carried out during the demolition of the remains of a small nineteenth-century farmstead. The ruined farm buildings were associated with Trevarrick House and were built in the early nineteenth century when Robert Gould Lakes aggrandised Trevarrick and landscaped the gardens. The ruins comprised a single range of three conjoined structures. The quality of the stonework would indicate the southern building had probably been a stable. The central structure had been adapted as a granary with the provision of a set of external stone steps. The northern building was an open-fronted cart shed or linhay, but most of this building had already been demolished. Monitoring works revealed little additional detail as the site had been terraced into the slope.

- Project Officer: Bryn Morris.

Kergilliack Road, St Budock (SW 78510 33460)

A geophysical survey was carried out on a field of 1.1ha to the north of Kergilliack Road, St Budock. The survey identified part of a double-ditched sub-rectangular enclosure of probable late prehistoric or Romano-British date, a contemporary field system and other features including two possible ring ditches.

- Project Officer: Joseph Bampton.

Trispen Hill, St Erme (SW 84320 49988)

A geophysical survey carried out in 2015 in advance of a proposed development identified two linear features and a scatter of possible pits. An evaluation determined these to be the remains of medieval field boundaries and natural (tree-throws).

- Project Officer: Joseph Bampton.

Carninney, Carbis Bay, St Ives (SW 52157 38358)

Building recording and monitoring works were carried out at Carninney during conversion of the historic farm buildings to residential use. Unlike many Cornish farmsteads, Carninney was not comprehensively rebuilt in the nineteenth century and comprised a scatter of small single-cell outbuildings of probable eighteenth-century date and a rather mutilated seventeenth-century farmhouse. Groundworks associated with the extension of West Barn revealed a large number of modern features, but also the edge of what is interpreted as a Middle Bronze Age sunken-featured roundhouse, dated by seven sherds (266g) of Trevisker ware recovered from its fill and an adjacent gully.

- Project Officer: Bryn Morris.

Trehannick Close, St Teath (SX 06401 80242)

A geophysical survey was carried out across 1.2 ha on the southern edge of St Teath and identified a possible sub-rectangular enclosure.

- Project Officer: Peter Bonvoisin.

South West Archaeology: earlier work

2014

Higher Trewhiddle Farm, St Austell (SX 006 517)

A desk-based assessment, walkover survey, geophysical survey and evaluation trenching took place on a 20ha site at Higher Trewhiddle Farm in advance of proposed development. The work identified a range of archaeological features, including a pair of Middle Bronze Age sunken-featured roundhouses, an extensive relict field system, a late prehistoric or Romano-British circular enclosure (round) and part of a second, a large sub-rectangular enclosure of unknown date, scattered pits and a series of parallel linear anomalies along the southern boundary of the site.

One of the sunken-featured roundhouses was sampled and found to be more than 9m in diameter with one pit and 18 postholes; two granite mullers were recovered from the postholes. The first round had a ditch 2.55m wide and 1.6m deep which produced six sherds (124g) of first- to

The stony bank defining a large, undated sub-rectangular enclosure, exposed in trench 16 at Higher Trewhiddle. (Photograph: © South West Archaeology.)

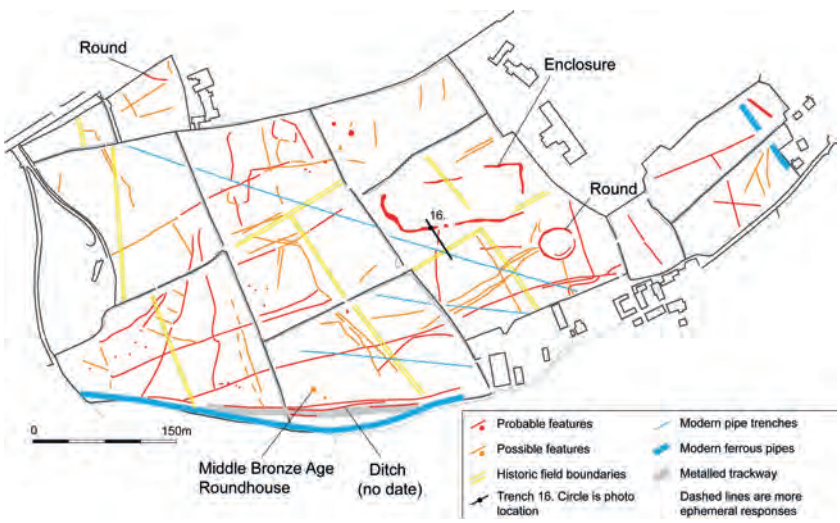
second-century Romano-British pottery from the uppermost fill. The trench uncovered postholes and gullies outside the round as well as features and layers surviving within the interior. The second round, on the northern edge of the site, had a ditch 2.75m wide and more than 1.7m deep but did not produce any finds.

The large sub-rectangular enclosure was located below the first round, on the slopes of a dry valley, and defined by a bank of loose blocky stones approximately 6m wide and up to 0.65m high. There were no finds associated with this feature. The parallel linear features running along the southern site boundary resolved themselves into a single massive feature 9m across and 3m deep containing a series of distinct fills but no finds. This may represent an infilled holloway but could perhaps relate to mining or just possibly represent a linear earthwork comparable with the Giant's Hedge. The later field boundaries were similar to and may perpetuate prehistoric land divisions.

- Project Officer: Bryn Morris.

Brynn Mill, Roche (SW 98246 63325)

Building recording and monitoring were undertaken during the partial demolition of the remains of a ruinous mill prior to its reconstruction. Brynn Mill stands on the northern edge of Roche parish. Documentary sources for it are patchy and largely date to the nineteenth century, but the structural evidence suggests the Grade II Listed



Interpretation of the geophysical survey of the site at Higher Trewhiddle Farm. (© South West Archaeology.)

mill is of greater antiquity. The mill has a single wheel driving two sets of millstones. It was intact but unoccupied in 1988 but had since fallen into ruin. It consisted of a later cottage of stone and cob attached to a single-cell two-storey mill building primarily built of stone. A detailed analysis of the mill's surviving structure and operational functionality was undertaken by Martin Watts and the wheelpit wall recorded stone-by-stone. This analysis identified seven clear building phases, charting a progression from a tailrace wall with platform for the wheel shaft to a two-storey masonry building.

- Project Officer: Bryn Morris.

Polharmon Farm, Tywardreath (SX 08482 56895)

Following desk-based, walkover and geophysical surveys, evaluation trenching was conducted in advance of a planning application for a proposed wind turbine. The geophysical survey for the cable-run identified a series of features including a 12m diameter ring ditch. The ditch was found to be 0.36m wide and 0.32m deep and was associated with a posthole but there were no finds. The feature was interpreted as a probable roundhouse and may be associated with a settlement known from cropmarks located approximately 100m to the west (MCO 40836).

- Project Officer: Joseph Bampton.

2015

St Cadix, St Veep (SX 13466 54581)

Building recording and monitoring works were carried out at the site of the former priory of St Cadix during renovation and redevelopment of the site. An initial assessment of the Grade II Listed house had previously been carried out by Eric Berry.

The house and outbuildings are located in the base of a deep coombe dropping down to Penpoll Creek, a tributary of the River Fowey. The extant building appears to be an eighteenth-century structure, with its principal elevation overlooking the creek, but is actually an earlier structure that was later re-fronted. This was the site of a Cluniac priory attached to Montacute in Somerset, and architectural spolia from the priory is a noted feature of the site.

Monitoring work during trenching around the property identified a possible wheelpit and a leat approached the house from the north. These features may relate to activity by Burchard Cranach, an enterprising metallurgist who leased the site in the 1550s and persuaded Mr Sayntclere of Ashburton and Sir William Godolphin to finance a mill and smelting house. A drain across the front of the house exposed the walls of an apsidal structure likely to be a chapel mentioned in historical accounts. Most of the finds from the site were residual but included a range of Cornish medieval micaeous coarsewares and a decorated crested ridge tile.

- Project Officer: Joseph Bampton.

An apsidal structure revealed in a service trench at St Cadix, viewed from the north west (scales 1m and 2m).

Marver Chalets, Mawgan Porth (SX 85150 67250)

A small evaluation was carried out in advance of the planned redevelopment of a holiday camp at Mawgan Porth. The chalets lie within the Scheduled area attached to the early medieval settlement site excavated by Rupert Bruce-Mitford.

Six short trenches were excavated around the existing chalets. All the trenches were dug into the sand that covers the site but only the two closest to the Scheduled structures reached the buried soil at the base of the profile. The four trenches on the eastern part of the site were dug through redeposited sand more than 2m deep; in the two trenches to the west the sand was over 1m deep and the side closest to the monument was quite disturbed. Despite the proximity of the Scheduled monument, only one possible feature was encountered. This was a steep-sided pit cut into the sand at a high level which contained two mussel shells. The small number of finds included a notched slate, three waste flint flakes and one sherd of Cornish medieval micaeous coarseware.

- Project Officer: Sam Walls.

2016

Eastern Green, Penzance (SW 48838 31283)

The removal of peat deposits up to 1.1m thick was monitored prior to commercial development. The site formed part of the former Penzance Heliport site and the peat deposits were covered by up to 1m of dumped quarry waste. The thick clayey sediments below the peat sloped gently down from north east to south west, where the thickest deposits of peat were observed. An Iron Age date of 728-394 cal BC (SUERC-73557) was achieved from the lower deposits and a date of cal AD 674-868 (SUERC-73561) came from the top of the sequence. The peat was sampled for analysis by Ralph Fyfe of Plymouth University who determined that it developed within a freshwater environment behind a sedimentary coastal barrier; a large pool is shown here on the Ordnance Survey 1in Old Series maps. Pollen preservation was good. The lower part of the sequence was dominated by alder with fern spores, the upper sequence by grasses with some limited evidence for improved grazing or meadow. Surprisingly, diatom and foraminifera did not survive.

- Project Officer: Bryn Morris.

Carninney Rise, Carbis Bay (SW 52120 38350)

A geophysical survey carried out by Stratascan in 2016 in advance of a proposed housing development identified part of a large sub-circular enclosure and a series of linear features. The evaluation determined that the possible enclosure was a line of blocky granite rubble sitting just above the granite growan substrate. This was interpreted as a natural feature.

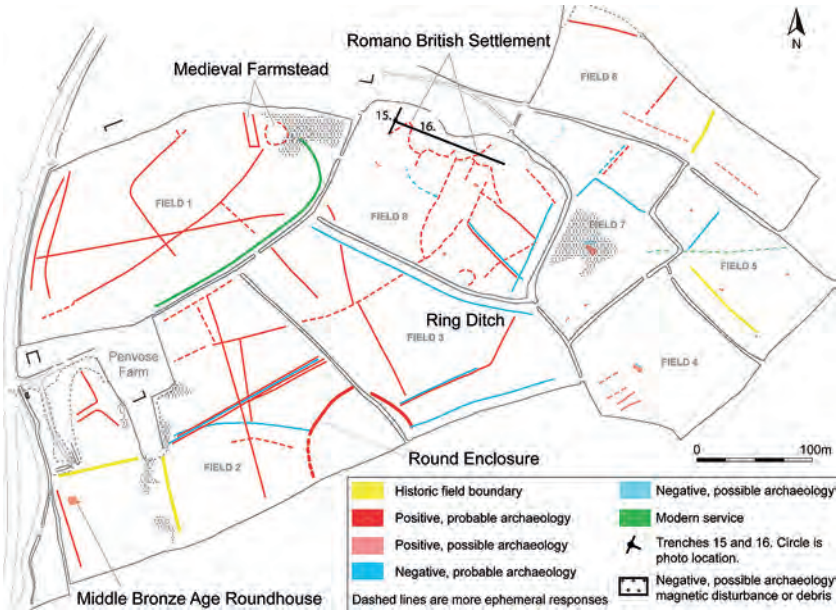
- Project Officer: Joseph Bampton.

Penvose Farm, St Gluvias (SW 770 357)

Desk-based work, a walkover survey, geophysical survey and evaluation trenching was carried out on a 20ha site at Penvose Farm in advance of a planning application for a proposed student village. The desk-based assessment determined that the site formed part of three post-medieval holdings, Penvose, Roscrow, and Gwealden, with hints that parts once formed a portion of a polite landscape associated with Roscrow. The medieval farmsteads of Penvose and Gwealden were abandoned in the later nineteenth century. The geophysical survey identified features including a relict field system of probable late prehistoric date, a probable Middle Bronze Age sunken-featured roundhouse, a ring ditch, part of a large (approximately 1ha) enclosure (round) and a confused group of faint linear features suggestive of a settlement.

The potential Middle Bronze Age roundhouse was not sampled in subsequent evaluation excavations, but in the adjacent trench nine shallow irregular features were identified, some with evidence for *in situ* burning, and a single sherd of abraded Bronze Age pottery was recovered. The ring ditch also produced a sherd of Bronze Age pottery. A trench within the interior of the round was devoid of features but as less than one per cent of the enclosed area was sampled this was not seen as representative. The enclosure ditch was 3.5m wide and 1.6m deep and did not produce any dating evidence.

The possible open settlement was confirmed and 31 features, mainly postholes and small pits, were excavated and 24 sherds (695g) of second to third century AD Romano-British pottery recovered. A large probable quarry pit of Romano-British date was also encountered. The site of the medieval farmstead was trenched, and while features did survive, no structural evidence was found for buildings shown on a 1793 map.



Interpretation of the geophysical survey from the site at Penvose, St Gluvias. (© South West Archaeology.)

A substantial stone-faced Cornish hedge runs along the break of slope above the valley to the east, with almost all the prehistoric and Romano-British sites and the relict field system located to the west of this boundary and very little to the east. The line of this boundary therefore appears to perpetuate a prehistoric landscape division and may be the earthwork referred to in the place-name Penvose, from Cornish *pen* + *fos*, the head or end of the dyke.

- Project Officer: Peter Webb.

Sardine Factory, West Looe (SX 25450 53142)

Building recording and monitoring works were carried out at the former Sardine Factory prior to demolition and replacement. The building was a composite structure, built largely in the mid and later nineteenth century on the site of a former copper-ore yard. The two-storey building was of stone rubble with brick detailing and originally had a flat roof, later replaced with a pitched slate roof carried on simple trusses. During the monitoring work seven salting pits, each approximately 2-3m across and up to 2m deep, were exposed beneath the ground floor, together with traces of cobbling to the quayside.

- Project Officers: Joseph Bampton and Emily Wapshott.

Glendorgal Hotel, Newquay (SW 82540 62729)

A desk-based assessment with impact assessment and walkover survey were carried out at the Glendorgal Hotel in advance of proposed alterations. The core of the building is a small seaside cottage, built *c* 1850 by Francis Rodd IV of Trebartha. This was sold to Arthur Pendarves Vivian in 1873, substantially augmented and then sold to the Tangye family in 1882. The Tangyes again extended the house and created a small polite landscape around it and its headland. After 1950 the house became a hotel and is now encased by modern extensions. A barrow was destroyed during those works (excavated by Dorothy Dudley and published in 1962 in the first volume of *Cornish Archaeology*).

- Project Officer: Bryn Morris.

Land off Round Ring, Penryn (SW 78555 35134)

A geophysical survey carried out in 2016 in advance of a proposed housing development identified a series of linear features relating to removed historic field boundaries and others that appeared to form part of a field system of prehistoric or Romano-British date. An evaluation recovered two sherds of late prehistoric or Romano-British pottery, together with a sherd of Cornish medieval micaeous coarseware.

- Project Officer: Joseph Bampton.

Trewoon, St Mewan (SW 99715 52511)

Following a desk-based assessment and walkover in 2015, the 0.6 ha site was stripped of topsoil under archaeological supervision. Four archaeological features were identified: two small isolated postholes and two narrow ditches. None of the features produced any finds but the two ditches are considered to form part of a relict field system previously identified on the adjacent Coyte Farm site.

- Project Officer: Peter Webb.

Truro Prep School, Highertown, Truro (SW 80240 45336)

A desk-based assessment, walkover and archaeological monitoring were carried out for works at the later nineteenth-century Treliske House, on the site of a medieval farm settlement. The monitoring work exposed part of a twentieth-century garden path but no other features or pre-nineteenth century finds.

- Project Officer: Peter Webb.

Menehay, St Budock (SW 78891 32025)

Geophysical survey and archaeological evaluation in advance of a proposed development identified a relict field system of prehistoric or Romano-British date, a Middle Bronze Age sunken-featured roundhouse, a ring ditch and a possible sub-rectangular structure. The roundhouse was at least 7.5m in diameter with five postholes and was accompanied by two smaller sunken-featured structures. These were oval and approximately 3-4m across with four and five internal postholes. These structures produced 20 sherds (740g) of Middle Bronze Age Trevisker pottery. In the same trench, three shallow pits were excavated which produced 40 sherds (606g) of Early Neolithic pottery, including sherds from two South Western or Hembury-style bowls, one with a trumpet lug, dating to *c* 3900-3350 BC. An unusual third vessel has a part-burnished exterior, an applied raised cordon to each side and a pre-firing piercing.

The ring ditch was sampled but produced no finds. The possible sub-rectangular structure was found to be modern dumped material, but a pit 0.8m in diameter and 0.4m deep with evidence for *in situ* burning, together with two ditches, was located beneath it. The adjacent trench contained several pits, a posthole and a gully, indicative of settlement activity; one sherd of Iron Age and 11 sherds (65g) of Middle Bronze Age pottery were recovered from these features. Late prehistoric pottery was recovered from the fills of some of the relict field boundaries.

- Project Officer: Joseph Bampton.

Cornish Archaeology 56, 2017, 287–289

Review

An intellectual adventurer in archaeology: reflections on the work of Charles Thomas, edited by Andy M Jones and Henrietta Quinnell, 2018. Archaeopress Publishing Ltd: Oxford. ISBN 978-1-78491-861-3. Pb, xiv + 285 pages.

This volume is an affectionate tribute to the late Charles Thomas by a wide range of friends and colleagues, but it also contains an array of articles that shed light not only on his diverse academic interests but also on the man himself, well known to readers of this journal as the founding editor and a frequent contributor. The articles and shorter pieces in the collection (25 chapters in all) illuminate Charles's love of his native Cornwall and the seascape of Scilly, his deep knowledge of Cornish archaeology, alongside aspects of his career beyond the Tamar. His multidisciplinary intellectual acumen, infectious enthusiasm, and his prodigious energy are all clearly evident, as well as his ability to engage and inspire others.

After a brief introduction, the volume begins with an assessment of Charles's archaeological career by Nicolas Johnson that complements his obituary in this journal (*Cornish Archaeology*, 54 (2015)). This demonstrates how invitations to give public lectures inspired some of Charles's major books and also sheds light on his principal achievements in public archaeology. In addition, there is a very useful appendix listing all his numerous publications by subject, some of which appeared in obscure places.

Many of the next ten chapters begin with personal reminiscences and are arranged broadly chronologically, starting with three on prehistory. As one might expect, two focus on research associated with Charles's major work on the north Cornish coast, centred on family land at Gwithian. As Andy Jones indicates, here, from the late 1940s onwards, Charles amassed a huge collection of Mesolithic flints and greywacke tools as well as Neolithic axes and arrowheads. Although much of this work remained unpublished, it nevertheless enabled identification of a number of sites and ultimately led to a field-walking project and recent trial excavations focused on Hudder Field that included the discovery of a rare Mesolithic decorated pebble. Vanessa Straker and Thomas Walker also consider environmental evidence gained from the Gwithian sand dunes while the late Roger Mercer addresses the Late Mesolithic – Early Neolithic transition in Cornwall.

It will be no surprise that the other articles mainly focus on research and excavation related to or arising from Charles's enormous contribution to early medieval archaeology, including his work on Christian island sites, Tintagel and inscribed stones and stone sculpture. Charles Johns publishes an annotated version of Charles's draft report of his 1956 excavations on the island of Teän, which initiated his interest in Scilly. These revealed late

Roman activity, post-Roman imported pottery, and an early medieval cemetery and chapel. Henrietta Quinnell critically considers some of the problems arising from Charles's unpublished excavation backlog and that of Lundy Island in particular, where in 1969 he investigated a multi-period site associated with the early medieval Beach Hill cemetery with its four inscribed stones. Some of the same issues are addressed in Ewan Campbell and Adrián Maldonado's similarly perceptive contribution on Charles's archaeological career in Scotland, where he lectured at Edinburgh University in the later 1950s until his appointment to a chair at Leicester in 1967. His most important and extensive archaeological excavations during this period were on the site of St Columba's monastic foundation on Iona where over 100 small trenches were dug. However, only one area, *Tórr an Abba*, was later published by Elizabeth and Peter Fowler, and the authors of this contribution are currently working on the rest of the archive. Later, at Ardwall Isle, Charles graduated to area excavation in order to examine the early medieval chapel and cemetery and this remains his most influential excavation because of its prompt publication.

Jacqueline Nowakowski also makes a significant contribution with her analysis of research and excavations at Tintagel. She begins with the excavations of Charles's mentor, C A Ralegh Radford, in the 1930s which inspired Charles's important research on the imported pottery that led to his reassessment of the promontory as an elite settlement rather than an early Christian monastery. She then describes subsequent investigations, including Charles's role in obtaining finance for those in Tintagel churchyard, ending with a valuable taster of the rich results of her own recent excavations on the promontory itself.

Charles's keen interest in early medieval inscribed stones is indicated in a short article by Anna Tyacke on the recent discovery of a Latin-inscribed memorial stone from Sowanna Farm near Helston. Reading the inscription, probably commemorating Dohori son of Mail, was aided by Thomas Goskar's laser scanning of the monument. He further discusses this technique and 3D photogrammetry with reference to the important inscribed stone of Cunaide from Hayle and another, later refashioned as a cross, which stands in the churchyard at St Clement.

There has been considerable debate concerning the date of St Piran's Cross, a Cornish icon, sited in grass-covered dunes near the church of St Piran at Perranzabuloe. Ann Preston-Jones judiciously reassesses its significance, persuasively arguing that it is eleventh-century rather than earlier and was carved by craftsmen associated with the churches of St Petroc at Padstow and Bodmin, although it may have replaced an earlier cross mentioned in a charter of 960.

Charles also had a significant interest in the Cornish language, dialect and place-names, research on which he promoted once he became Professor of Cornish Studies at the University of Exeter in 1971 and the founding director of the Institute of Cornish Studies near Camborne. Two contributions arise from this. Firstly, in an illuminating account, Adam Sharpe describes his time at the Institute in the early 1970s on a job creation scheme. Charles himself had initiated a very ambitious project on the Cornish dialect and the author was brought in to work on this, including making sound recordings of speakers in the field. Secondly, Oliver Padel, another researcher at the Institute and an expert on Cornish place-names, examines the likely meaning of Annet, an uninhabited island in Scilly.

The rest of the contributions, some very short, are primarily reminiscences but also demonstrate the impact Charles had on individual archaeological careers and more widely. For example, Peter Fowler discusses a joint project with Charles in the Languedoc. Martin Bell indicates how his early work as Regional Environmental Archaeologist for south-west England was greatly facilitated in Cornwall by Charles and how Gwithian helped to ignite his interest in coastal archaeology. Tim Darvill demonstrates Charles's influence as the Chair of the Council for British Archaeology's Countryside Committee in the early 1980s, which initiated research on upland archaeology, while John Gould comments on his role as archaeologist on the Truro Diocesan Advisory Committee. In an interesting piece, demonstrating how much the lives and opportunities of female archaeologists have changed for the better, Mary-Ann Mountain describes the frustrations of being the only female member of staff in Archaeology in Edinburgh University when Charles was there in the early 1960s. Finally, the writer Philip Marsden reflects on Charles's library and passion for books.

The many illustrations in this volume, most in colour, are also worthy of note. In addition to the usual archaeological photographs and plans, there are many photographs of Charles himself, which include digging at Gwithian in the 1950s, Ardwall Isle in the 1960s and speaking at Crane Godrevy during his eightieth birthday celebrations in 2008. In addition, however, Charles's own watercolour illustrations punctuate the chapters and include an early self-portrait, pipe in mouth, and annual Christmas cards, sometimes annotated in his distinctive handwriting.

Therefore, the editors have, on the whole, made a fine job of putting this very diverse set of papers together and, as a result, the volume provides a fitting and readable *homage* to the man who inspired it.

Nancy Edwards
(Bangor University)