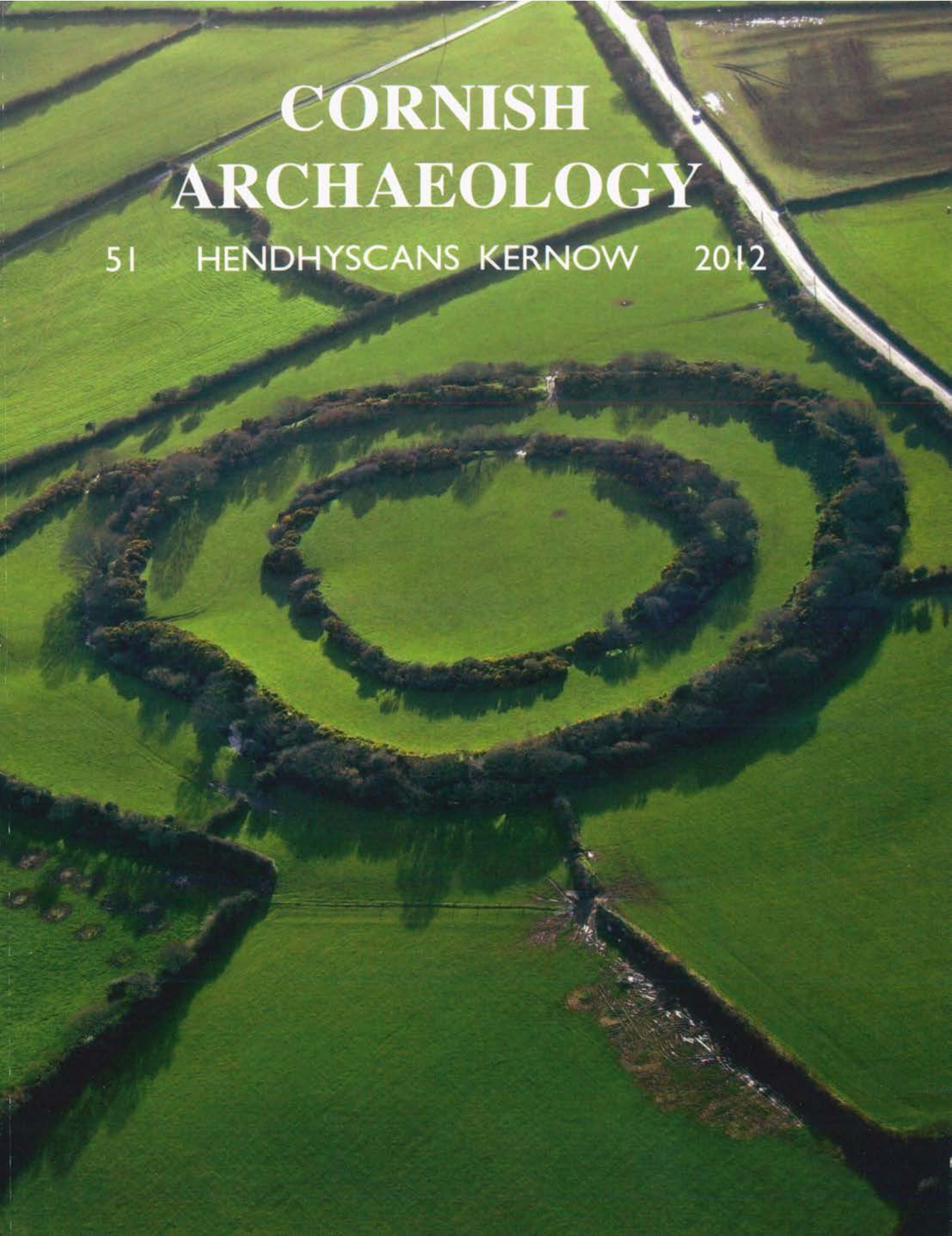

CORNISH ARCHAEOLOGY

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Front cover: Tregeare Rounds, St Kew, a multivallate enclosure of the Later Iron Age partly excavated by Sabine Baring-Gould and others in 1902. It was one of only a few late prehistoric enclosures known in the wider area around the Camel estuary prior to plotting of archaeological features from air photographs by the National Mapping Project. See Andrew Young, Prehistoric and Romano-British enclosures around the Camel estuary, Cornwall, this volume. (Photograph: Historic Environment, Cornwall Council, F75-157, March 2007.)

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A Beaker structure and other discoveries along the Sennen to Porthcurno South West Water pipeline

ANDY M JONES, SEAN TAYLOR AND JO STURGESS

with contributions from JULIE JONES, DANA CHALLINOR, ANNA LAWSON-JONES, HENRIETTA QUINNELL, ROSEMARY STEWART and ROGER TAYLOR

Archaeological recording in 2007 along the route of a new South West Water sewage transfer pipeline, between Sennen and Porthcurno in West Penwith uncovered a number of archaeological features, including a Beaker-period structure and other features dating to between c 2400 and 2100 cal BC. The structure was lightly built and may have been associated with seasonal occupation. A small cereal assemblage and stonework for specialised grain processing, suggests that cultivation was undertaken in the area. This is the first Beaker structure of third millennium cal BC date to be recorded in the south-west peninsula.

Early Bronze Age activity around a stone setting was also discovered, suggesting ritualised activity which included the deposition of stone objects around a distinctive arrangement of boulders. A scatter of Bronze Age pits and spreads of prehistoric lithics were also recorded.

In summer 2007 Cornwall County Council Historic Environment Service (now Cornwall Council Historic Environment Projects) was commissioned by South West Water to undertake a programme of archaeological recording along the 7.5 km of the Sennen to Porthcurno Sewage Treatment Scheme in west Cornwall (Fig 1). The pipeline route ran between Sennen Cove (Sennen) (SW 3505 2631) and Porthcurno (St Levan) (SW 3858 2236). The fieldwork programme followed a series of assessments of the route which identified the high archaeological potential of the area (Val Baker 2004; Taylor 2004; 2005; Taylor and Val Baker 2005; Cole 2006a; 2006b).

Along the route of the pipeline the material overlying the natural subsoil was stripped under archaeological supervision by a machine with a toothless bucket over a corridor with an average width of 10m. Where archaeological features were identified these were either immediately excavated and recorded or, if more complex, additional time for archaeological recording was negotiated with the client.

The archaeological recording along the pipeline corridor identified a large number of significant new sites, including a structure and pits associated with Beaker pottery, pits associated with Bronze Age pottery, a stone setting of megalithic proportions and lithic scatters of predominantly Neolithic and Bronze Age date. The overall results of the project have been set out in an archive report (Lawson-Jones *et al* 2009). This paper focuses on the most significant archaeological features and also reports on the pottery, lithic scatters and palaeoenvironmental evidence.

Each of the fields along the route of the pipeline was allocated a unique number starting from field 1 at the northern end near Sennen and finishing with

field 41 at the southern, Porthcurno end (Figs 2 and 3). In this report archaeological deposits and layers are identified by context numbers in round brackets – for example, (89) – and those for cut features such as pits, postholes and ditches, are shown within square brackets: [145]. Structures are shown without brackets: structure 108. Radiocarbon dating probability distributions (Table 16) have been calculated using OxCal v3.10. Except where otherwise stated, the 95 per cent level of probability is cited throughout this report.

The context

The pipeline corridor ran roughly north west – south east across the western end of the Penwith peninsula (Fig 1). The landscape through which it passes is for the most part Anciently Enclosed Land; that is, land which has been settled and farmed since the seventeenth century or earlier and associated with settlements of medieval origin; in this area much of it is likely to derive from prehistoric field systems (Cornwall County Council 1996). The current agricultural landscape is a mix of pastoral and arable and is composed of irregular fields enclosed by stone-faced Cornish hedges. There has been considerable removal of historic boundaries in some areas to create larger fields.

The earliest evidence of occupation in the general area of the pipeline is a Mesolithic flint scatter at Pedn-Men-an-Mere, south west of Porthcurno (Jacobi 1979; Berridge and Roberts 1986). Flint scatters dating to this period, comprising tools and waste flakes, were found along the route of the pipeline and are known from the wider area (Lawson-Jones, below; forthcoming). Flint scatters and stone tools of Neolithic date (*c* 4000–2500 cal BC) have also been recorded from the wider area (Lawson-Jones, below). However, the earliest securely dated monuments in the area are of the Early Bronze Age (*c* 2500–1500 cal BC); ceremonial sites, notably barrows and cairns, are found both on the hills (Weatherhill 1981; Tilley and Bennett 2001) and along the lower-lying coastal rough ground (Bonnington 1999). A number of cairns are known in the vicinity of the pipeline route and several were excavated in the nineteenth century by W C Borlase (1872, 79; 1879, 209–10). In addition to the more frequently occurring cairns, a small entrance grave, also of probable Early Bronze Age date, is situated to the east of Mayon Cliff (Herring 1986, 10; Jones and Thomas 2010).

Many of the field systems in West Penwith have their origins in the prehistoric period and metalwork recovered from some suggests that they extend back into the second millennium cal BC (Herring 2008; Yates 2007, 70; Jones and Quinnell 2011). Field survey suggests that a lynchetted boundary forming part of the field system on Mayon Cliff is overlain by, and therefore pre-dates, the rampart of Maen cliff castle, a site which is likely to date to the earlier part of the Iron Age (*c* 500 cal BC) (Herring 1986; 1994). The Coastal Rough Ground (Cornwall County Council 1996) in this area also displays evidence of use into the post-medieval period for summer grazing, turf cutting and wildfowling (Herring 1986).

Results

The following section presents the most significant discoveries from the pipeline recording project: a stone setting, Beaker structure 108, Beaker pit [661] and Early-Middle Bronze Age pit [355]. Artefacts recovered from other fields and features are discussed in the ceramic, stonework and flint reports (Quinnell, below; Lawson-Jones, below). A full catalogue and description of archaeological features and artefacts recovered appears in the project archive report (Lawson-Jones *et al* 2009).

Stone setting (field 4)

The stone setting was on the 85m contour in field 4, located on rising ground behind the coastal slope, approximately 600m south of Sennen Cove (Figs 2 and 4). This exposed site has wide views out to sea to the north and west. Field 4 also contained a number of other features and finds, including a variety of unstratified flint (Lawson-Jones, below).

In the centre of the field were a series of pits or postholes and a scatter of lithics. Most of the features lay east of a break of slope in the natural topography, running north-north-east – south-south-west. The focal point for the group of features appeared to be three closely spaced granite boulders, 47, 48, 49 (Figs 5–7), which were situated close to an area where natural granite grounders outcropped at the surface. The largest, boulder 48, was 2.4m by 1.15m and aligned north west – south east. Boulder 47 lay 0.4m to the north-east and was

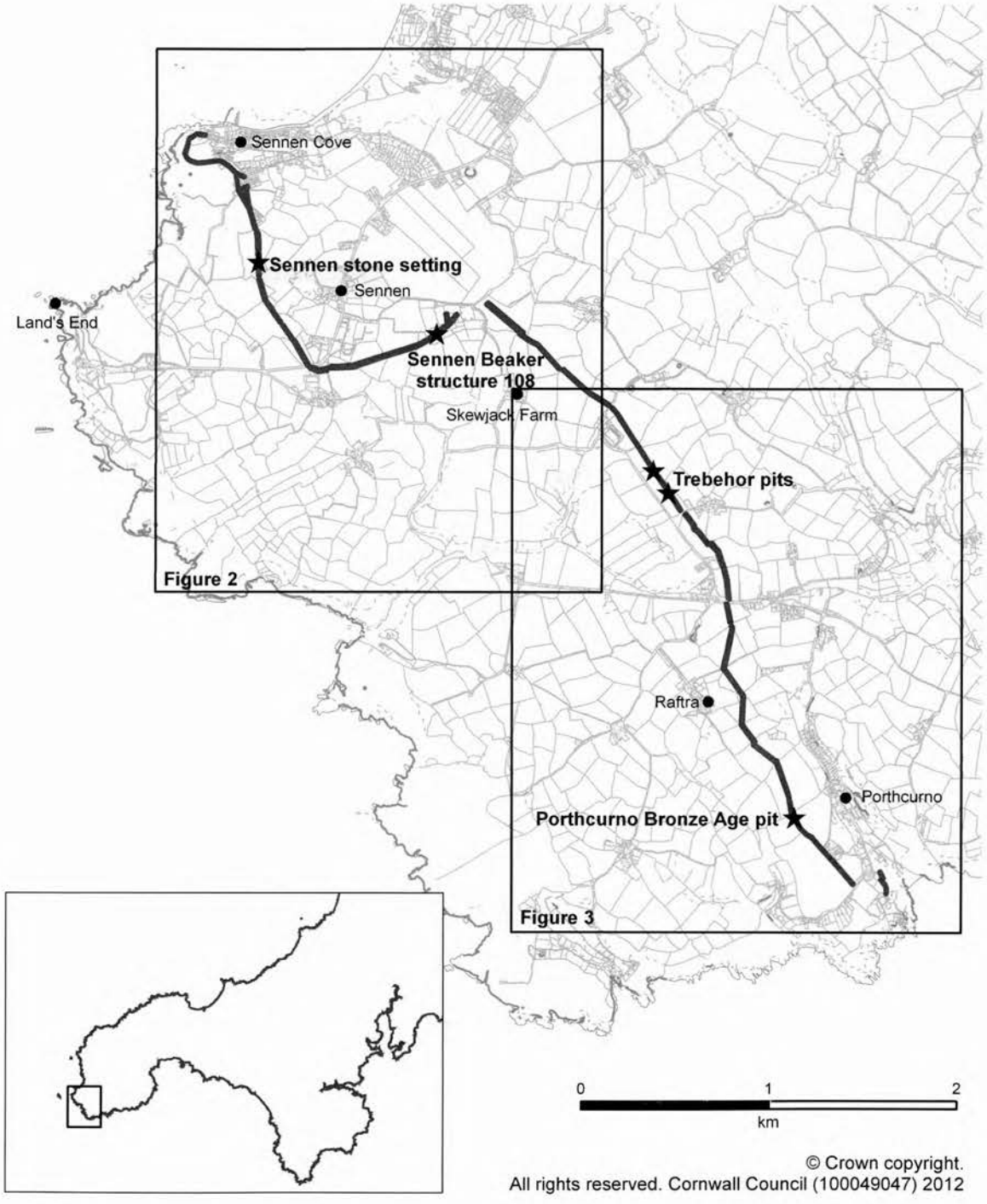

Fig 1 The Sennen – Porthcurno pipeline: location.

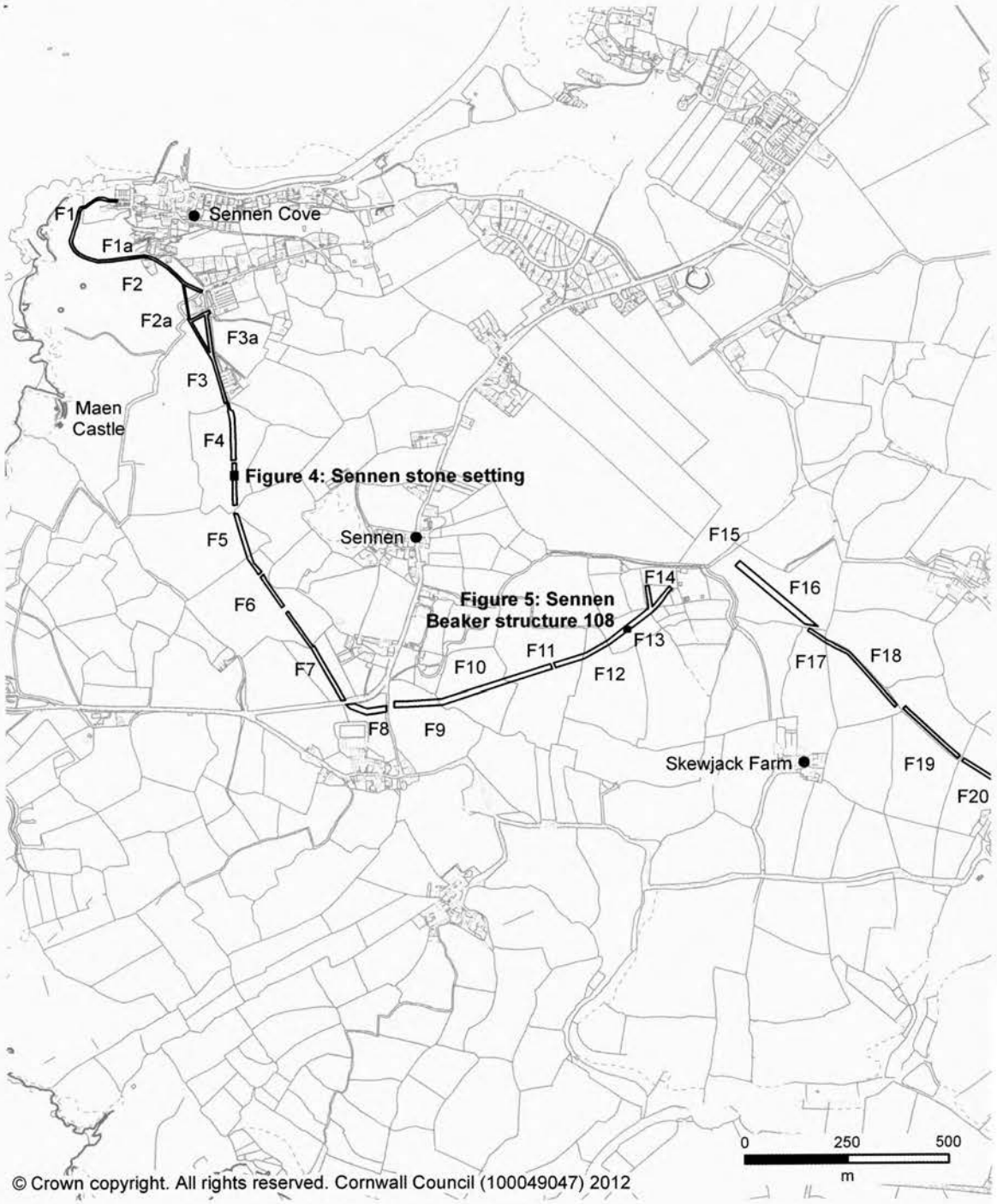

Fig 2 Fields and features in the northern part of the scheme.

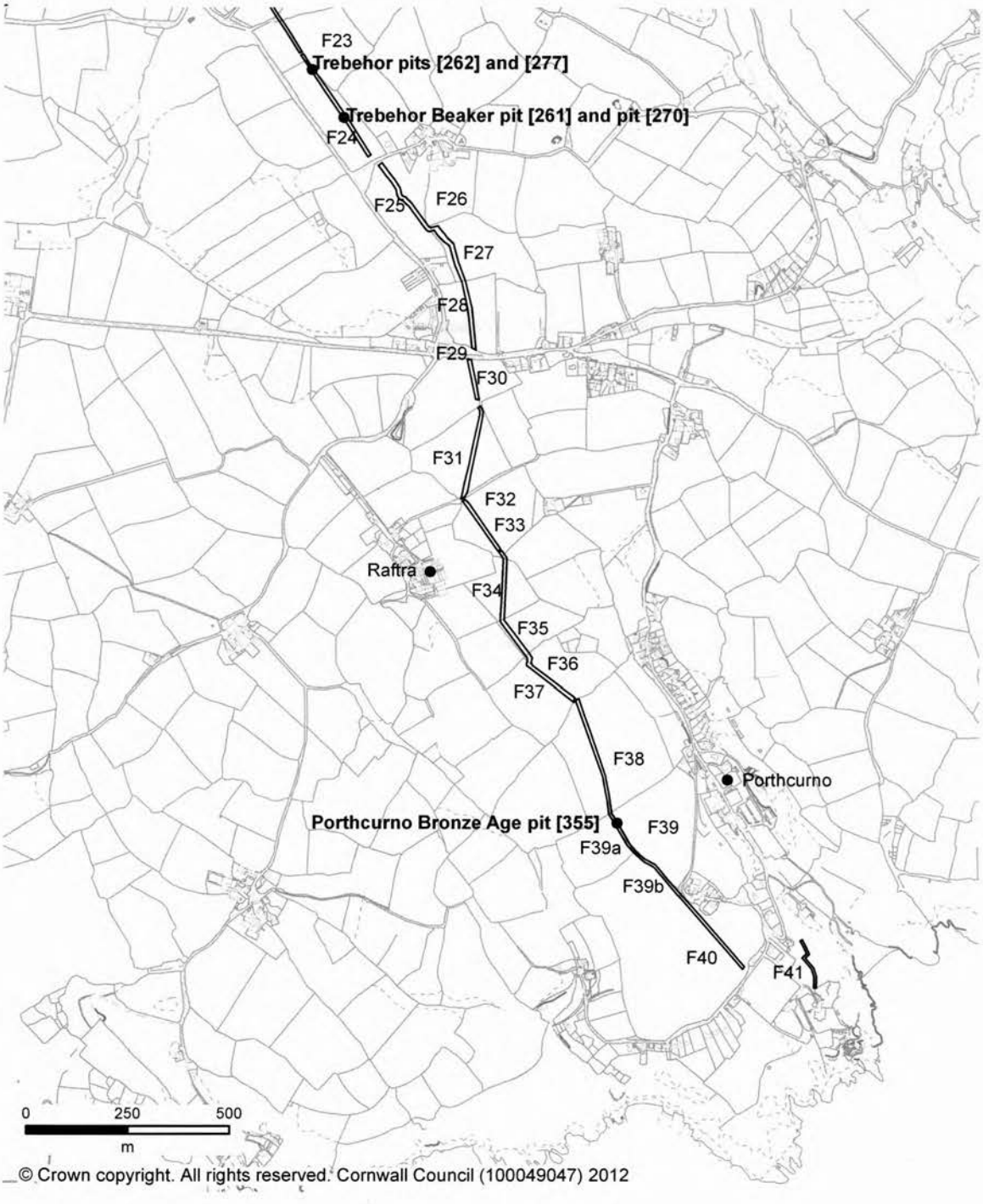

Fig 3 Fields and features in the southern part of the scheme.

Fig 4 The northern end of the Sennen - Porthcurno pipeline corridor from the south, with the backfilled and re-seeded wayleave indicating the route. Field 4, in which the Sennen stone setting was located, is the irregular field in the centre of the photograph. (Photograph: Sean Taylor.)

the most nearly round, measuring 1.5m by 1.15m. It partly lay over a sub-circular cut, pit [50], 1.4m in diameter and 0.42m deep. This pit was itself cut by a later feature, posthole or small pit [210], the fill (211) of which was a dark greyish-brown clay silt in which a small rubbing stone was found. Boulder 49 lay to the south-east of boulder 48 and was the smallest of the three, measuring 0.8m by 0.5m.

The boulders comprising the stone setting had been arranged so that they lay on top of the natural rab and also over layer (46), a mid reddish-brown clayey silt which was confined to the area around the boulders. Two abraded body sherds of prehistoric pottery (Quinnell, below) and two flints were recovered from on top of this layer, between the boulders. Cut into deposit (46), at the centre of the group of boulders, was a pit or posthole, [34], 0.35m in diameter and 0.2m deep with steep sides and a concave base. The fill (35) was a mid reddish-brown clayey silt. Quartz stones lined the edge of the cut. Sealing this feature was a deposit (41) confined by the boulders, a dark greyish-brown clayey silt 0.12m thick. This layer contained a number of pebbles and worked stones, including a possible whetstone, a small mortar and two bevelled pebbles (Quinnell, below), and a quartz crystal. Sixteen unstratified flints were also recovered from the area of the boulders.

A number of other pits and postholes were found in the area around the stone setting (Fig 5). Immediately to the south of boulder 48 was pit [21], 1.45m long and 1m wide, the fill (22) of which contained a single undiagnostic flint. Close to the northern ends of stones 47 and 48 was pit [13], 0.8m by 0.6m and 0.15m deep. Its dark grey fill (12) contained 31 flints (Lawson-Jones, below), six fragments of quartz and a piece of greensand chert. Charcoal from this fill gave a radiocarbon determination of 3315 ±30 BP, 1690–1510 cal BC (SUERC-21083).

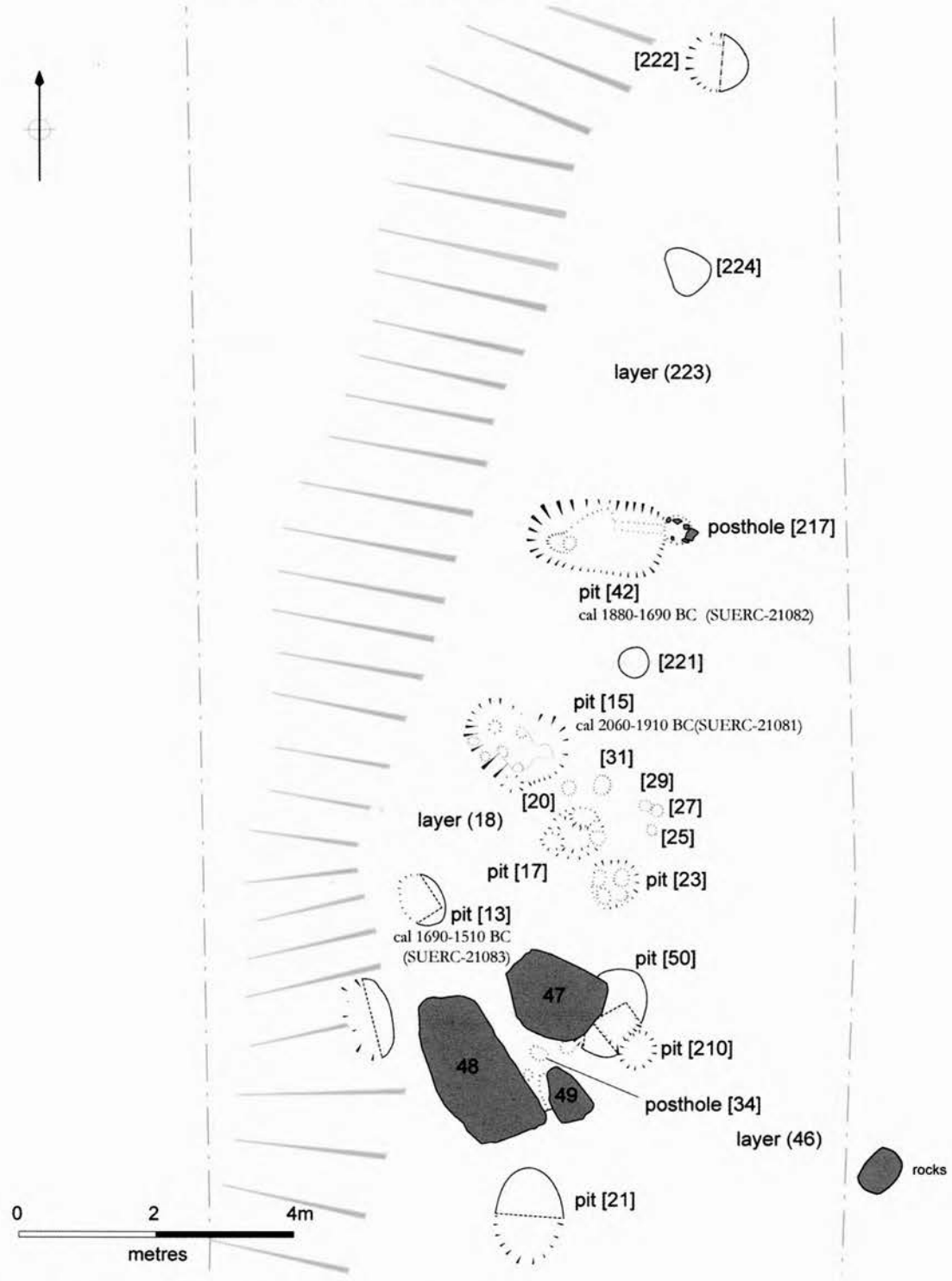

Fig 5 The stone setting and adjacent features in field 4.

Fig 6 The stone setting (boulder 48 centre) and natural outcrop (lower right) from the south west. (Photograph: Cornwall Council, Historic Environment Projects.)

North of the stone setting was a line of three pits, aligned south east – north west. Closest to boulder 47 was pit [23], 0.55–0.65m across and 0.3m deep. The base of the pit was marked by up to four circular hollows, possibly representing the bases of posts or stakes. The pit contained a single deposit (24) which contained 35 flints, two pieces of Portland chert and a single piece of quartz. To the north west, 0.16m from pit [23], lay pit [17], 1m long, 0.76m wide and 0.16m deep. The base of the pit contained three circular hollows which again may represent the bases of post or stakeholes. It contained a single deposit, fill (16), which contained 53 flints (Lawson-Jones, below), two pieces of Portland chert and six fragments of quartz. At the north-western end of the group of features was pit [15], a fairly amorphous feature 1.5m long, 1.3m wide, and 0.2m deep. Up to six circular hollows were recorded in the base of the cut, again possibly representing the bases of posts. The fill (14) contained 13 flints, a piece of greensand chert (Lawson-Jones, below), eight fragments of quartz, and a quartz crystal which may have been used as a dressing tool (Quinnell, below). Fill (14) also produced charcoal which gave a radiocarbon determination of 3640 ±30 BP, 2060–1910 cal BC (SUERC-21081) (79.5 per cent).

Between pits [15] and [17], forming an arc approximately 1.6m long to the east of [15], was a group of five postholes: [20], [25], [27], [29] and [31]. Postholes [27] and [29] were inter-cutting, although their chronological sequence could not be established. The postholes were 0.12–0.3m in diameter and up to 0.12m deep. The fills of [20] and [27] contained single flints and the fill of [31] contained three. Posthole [27] also produced 20 fragments of quartz.

All of these features cut the natural rab and an overlying layer (18), a spread of material which, although not excavated, produced 18 flints and a broken Portland chert pebble from its surface. This

layer is likely to have been an old land surface and was probably equivalent to layer (223) which was uncovered just to the north of the group of postholes and which produced a sherd of Beaker pottery (**P1**) (Quinnell, below).

A larger pit [42], lay 2.15m north east of pit [15]. It was 2m long, 1.3m wide and 0.32m deep, aligned east – west and lined with quartz set in a light yellowish-brown sandy clay layer (45) which was thicker around the northern and eastern edges of the pit. Within the pit were three fills. The lowest deposit was (212), a thin layer of compact mid-grey silty clay that contained three flints and a possible rubbing stone. Above this, was layer (44), a mid greyish-brown sandy clay that contained nine flints, a granite beach pebble and 11 fragments of quartz. Charcoal from this fill gave a radiocarbon determination of 3455 ±30 BP, 1880–1690 cal BC (SUERC-21082). The upper fill (43), was a dark greyish-brown sandy clay that contained a further nine flints (Lawson-Jones, below). Cutting the eastern end of pit [42] was a posthole, [217], 0.1m in diameter, 0.4m deep, which appeared to have stone-packing around the top of the fill.

To the north and south of this feature was the old land surface deposit (223) into which three features were cut, recorded as pits [221], [222], and [224]. These were not excavated but when trowelled over [222] produced three flints and [221] a possible stone rubber fragment.

Given the number of large granite stones in the general area (Fig 6), it could be argued that the group of boulders comprising the stone setting was a random collection of stones. However, a number of factors suggest otherwise. The assemblage of large boulders around posthole / pit [34] strongly suggests that they at least partly represent a deliberate arrangement. Furthermore, boulder 47 appeared to cover pit [50], which indicates that the site had been used before the boulders were placed there. It is possible that boulder 47 once stood in pit [50] and boulder 48 in pit [21]. However, the pits were quite shallow and it is unlikely that they would have held the stones (Fig 7).

Fig 7 Part of the Sennen stone setting from the south: boulder 48 on left, boulder 49 centre and boulder 47 right. (Photograph: Cornwall Council, Historic Environment Projects.)

Although it was not possible to scientifically date the stone setting itself, it was the focus for a number of pits and postholes which, from the results of the radiocarbon dating, appear to have been dug in a sequence extending through the first half of the second millennium cal BC. Likewise, even if largely residual, the flint assemblage from the site is again indicative of concentrated activity in the area and may hint at earlier activity stretching into the third millennium cal BC. Indeed, uncertainty over what the stone setting represented and who had built it may have contributed to the long-term importance of the site. This is discussed below.

Beaker structure 108 and adjacent features (field 13)

Beaker structure 108 and adjacent related features were identified in roughly the centre of field 13 (Fig 2). The site lay in farmland approximately 500m east of Sennen village and 450m north west of Skewjack Farm. Elsewhere in the field there was a scatter of other features of varying date, some of which included sherds of earlier prehistoric, Iron Age and Romano-British pottery; several unstratified flints were also recovered (Lawson-Jones *et al* 2009; Quinnell, below; Lawson-Jones, below).

Structure 108 was an irregular oval 4.2m by 3m aligned north east – south west; the interior was hollowed to a depth of 0.25m (Figs 8 and 9). The irregular, 'scalloped', edges of the cut suggested that the feature had been dug out with a tool of some kind and had not been formed through occupation-related 'wear and tear'. The eastern edges of the hollow sloped steeply with a gentler slope on the western side. Scattered around the base of the hollow, but not encroaching on the probable hearth area, were at least eight small postholes – [145], [147], [149], [151], [153], [155], [161] and

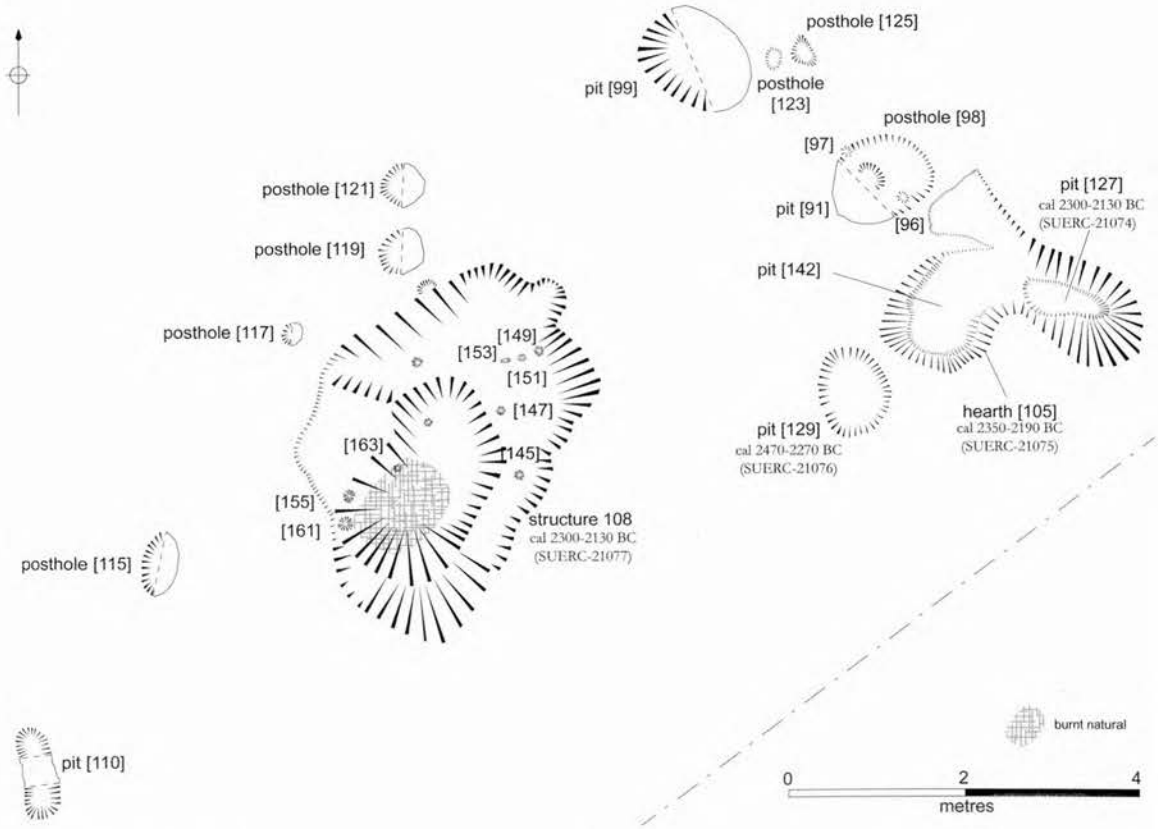

Fig 8 Sennen Beaker structure 108 and adjacent features.

[163] – and another two possible stakeholes (not numbered). The posthole diameters ranged from 0.1m to 0.2m and varied in depth between 0.08m and 0.15m.

A probable hearth took the form of an unenclosed area of burning measuring 1.1m by 0.85m located in a slight hollow in the floor in the south-western half of the structure. The position of the hearth was indicated by the discolouration of natural subsoil, which had been heavily scorched. The broad spread of the burnt area within the structure suggests that a series of fires had been lit. However, it is also possible that this area of burning was associated with abandonment of the structure rather than its use.

Overlying the area of scorched natural was a thin charcoal-rich deposit (103) up to 0.08m thick, which contained three pieces of flint debitage and some burnt clay. A single backfill deposit (89) overlay (103) and sealed the structure. Layer (89) contained many artefacts, including 13 pieces of worked stone (including **SF2, SF3, SF5, SF6, SF7, SF10, SF16, SF17, SF18** and **SF20**), 22 flints and 87 sherds of Beaker pottery from four vessels (**P2, P3, P4** and **P5**) (Quinnell, below; Lawson-Jones below), together with a dump of large, angular, fine-grained granite stones set in a silty clay soil. The backfill deposit may represent a deliberate infilling of the site. Charcoal from (89) produced a radiocarbon date of 3775 ±30 BP, 2300–2130 cal BC (SUERC-21074) (91.1 per cent).

A row of five postholes of varying depth and diameter was uncovered just outside the north-western side of structure 108, on the same north east – south west alignment as the structure. From the south-west end to the north-east end these features were as follows: pit or posthole [110] was 1m long, 0.3m wide and 0.15m deep; posthole [115] measured 0.8m by 0.55m and was 0.15m deep; posthole [117] was 0.15m in diameter, 0.05m deep, posthole [119] 0.2m in diameter, 0.18m deep; and posthole [121], which was 0.45m in diameter and 0.12m deep. No finds were recovered from any of these postholes.

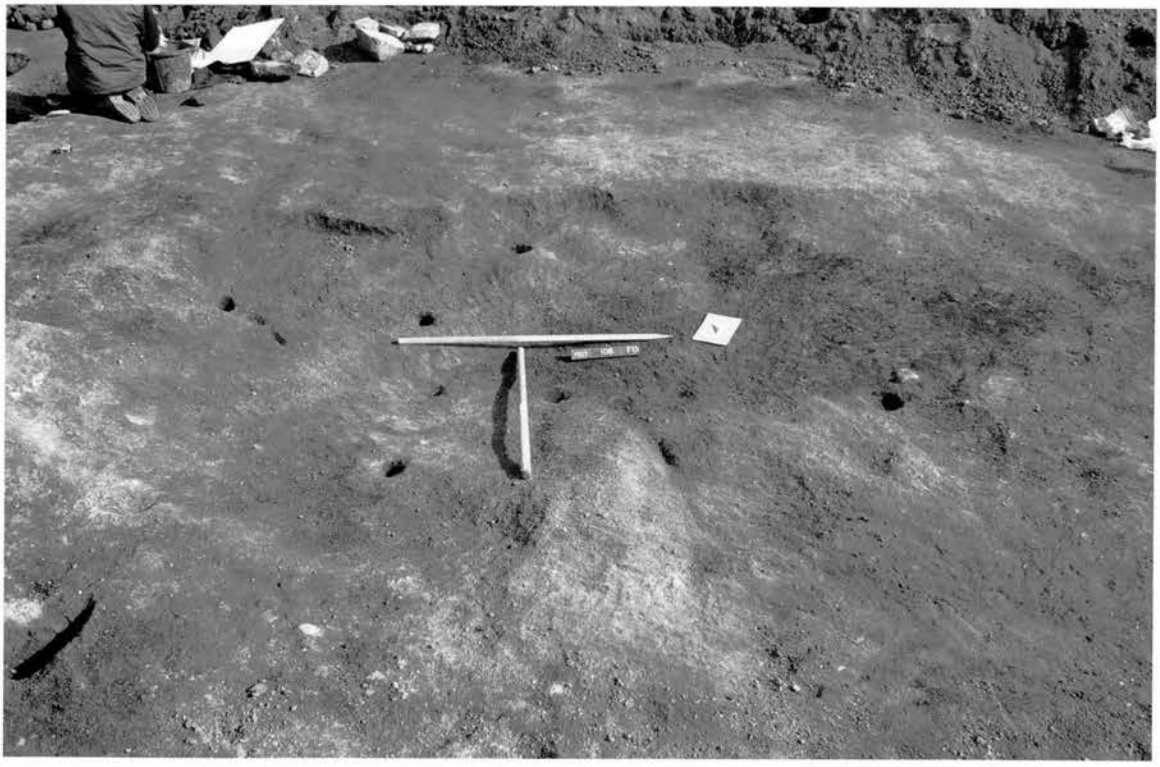

Fig 9 Sennen Beaker structure 108 from the north west.

To the north east and east of structure 108 there was a second alignment of pits and postholes set on a north west – south east alignment, at right-angles to the posthole row described above. At the north-west end was a sub-circular pit [99] 1.3m in diameter and 0.2m deep, filled by a silty clay (100) containing granite fragments but no artefacts. Immediately to the east of this pit were two small postholes, [123] and [125], both of which were approximately 0.15m in diameter and 0.12m deep; neither contained any artefacts.

South east of these was another sub-circular pit [91], 0.8m in diameter and 0.2m deep. This was filled by (90) which contained five flints and overlay another fill (95); both fills (90) and (95) contained large heat-cracked, fine-grained granite stones, which appear to have been used as packing. The pit was cut by three features: stakeholes [96] and [97] lay on either side of a centrally placed posthole [98]. These three features shared the same north west – south east alignment as the other features in this area. The fills of the two stakeholes and of posthole [98] all appeared to have been burnt.

Immediately south east of pit [91] was an irregular cut hearth [105]. This hollow was 2.6m long, up to about 2m wide and 0.22m deep. Two pits, [127] and [142], were cut into the base of hearth [105], together with a possible third [165] (not shown on plan). Pit [127] was 1.3m by 0.3m and filled by a dark brown, grey clay layer (143), which contained a rubber (**SF31**) and fragments of burnt clay. Pit [142] was approximately 1m by 0.9m and 0.06m deep. Its fill, layer (138), a reddish-brown silty clay, contained a single flint. Two burnt fills, (104) and (128), lay within the cut of hearth [105]. Deposit (104) was a dark-brown layer of silty clay which appeared to have been burnt *in situ* above pit [127]. Within it were a number of large, angular fine-grained granite stones 135, 136 and 137, some of which lay over the pits. A second similar burnt deposit (128), possibly the same as (104), overlay pit [142]. Burnt deposit (104) contained four sherds of Beaker pottery from at least two vessels (**P10** and **P11**), two stone mullers (**SF11** and **SF12**), 16 flints and three fragments of burnt clay; burnt fill (128) contained eight sherds of Beaker pottery from two vessels (**P8** and **P9**), 27 flints and seven fragments of burnt clay (Quinnell, below; Lawson-Jones, below). Charcoal from layer (128) produced a radiocarbon determination of 3775 ±30 BP, 2300–2130 cal BC (SUERC-21074) (91.1 per cent) and layer (104) a date of 3825 ±30 BP, 2350–2190 cal BC (SUERC-21075) (82.6 per cent). The top fill of the hearth, layer (101), sealed all the features. In make-up and appearance it was very similar to (89), the top fill of structure 108. Fill (101) contained sherds of Beaker pottery from at least three vessels (**P12, P13** and **P14**), 18 flints, a rubber (**SF32**) and a hammerstone or pestle (**SF33**) (Quinnell, below; Lawson-Jones, below).

South west of hearth [105] was stone-lined pit [129], 0.7m in diameter and 0.4m deep (Fig 10). The top fill, (102), was similar in consistency and content to the top fill of all the other features on the Beaker site. It contained 14 sherds of Beaker pottery from two vessels (**P6** and **P7**), flint, a piece of Portland chert, a stone rubber and a muller (**SF14, SF21–22**) (Quinnell, below). As with the majority of other features in this area, large pieces of unworked granite 140 were present below the top fill (102), forming part of the infilling episode. The primary fill (159) of [129] contained four flints and the sub-circular cut was lined with pieces of granite, 164. A radiocarbon determination of 3860 ±30 BP, 2470–2270 cal BC (SUERC-21076) (84.1 per cent) was obtained from the pit. The date and stone lining were similar to those from another pit – [261] in field 24 – which also contained Beaker pottery. It is possible that both pits were associated with ritualised activity and the consumption of food (below).

The complex of Beaker-related features in field 13 includes the first structure in Cornwall to be associated with evidence of Beaker domestic occupation (Jones and Quinnell 2006a). In common with Beaker structures elsewhere (Parker Pearson *et al* 2004, 45–9; Simpson *et al* 2006, 85–9; Lawson 2007, 172), structure 108 appears to have been of fairly flimsy construction, comprised of posts. Yet it may have been enclosed by a fence and it appears to have been abandoned with some formality. The range of stonework, number of Beaker vessels represented and the radiocarbon dating also imply that the site was more than just a temporary single-visit encampment and might suggest that successive visits were made to it over an extended period. It is quite possible that other structures lay nearby outside the pipeline corridor. The context of the site is discussed further below.

At the south-west end of field 13 was pit [131] (not illustrated), of probable Romano-British date. It measured 3.3m north-south by 2.5m east-west and was 0.26m deep. The pit was slightly irregular in plan with concave sides and a flat

Fig 10 Post-excavation photograph of stone-lined Beaker pit [129] from the north, showing in situ *stone lining on the south side.*

base; the western edge was particularly steep. A nineteenth-century pit had cut it on the north-east side. Pit [131] contained three fills. The top fill (130) contained Romano-British pottery, two flints and a small stone rubber, and fill (132) contained a second rubber. Fill (133) contained undiagnostic prehistoric pottery (Quinnell, below).

Beaker pit [261] (field 24)

Four pits – [261], [262], [270] and [277] – were identified in field 24, which lay in the central portion of the pipeline near Trebehor (Fig 3). Only one of these, pit [261], which was stone-lined, produced any diagnostic artefacts. It was located on a gently rising north-west facing slope and was sub-circular, 0.9–0.95m in diameter and 0.22m deep. The pit was cut into the natural rab subsoil but the base was formed by the underlying granite bedrock. The pit cut contained a single deposit, fill (260); a variation in the texture of the deposit might have indicated a secondary fill but the site had unfortunately been badly disturbed before controlled archaeological excavation took place and the precise nature of the stratigraphy could not be established (Lawson-Jones *et al* 2009).

The pit fill (260) contained a large number of sherds of Beaker pottery from five vessels (**P15, P16, P16a, P17** and **P18**) (Quinnell, below). In addition, seven items of worked or possibly curated stone were recovered, including a rubbing stone and a jasper pebble, together with 24 flints (Lawson-Jones, below). A radiocarbon determination of 3865±30, 2470–2270 cal BC (SUERC-21084) (87.4 per cent) was obtained from fill (260).

Two of the three remaining pits in the field were devoid of artefacts and the third contained nothing closely datable. Pit [270] was a shallow oval pit 1.1m to the west of stone-lined pit [261]. It was 0.5m by 0.42m and 0.06m deep. Pit [262] was at the north-western end of the field, approximately 100m from pit [261]. It was small and circular with a diameter of 0.55m and 0.17m deep. It contained a single fill (263), from which a single flint and a polished pebble were recovered. Pit [277] was a charcoal-rich pit, located 3.3m to the south west and was oval, 1.2m by 1m, and 0.4m deep. As with pit [261], the pit was lined with granite stones (283). The pit held two fills: the primary deposit (282) contained burnt material while the upper layer, fill (280), contained a deposit of charcoal, (281). There was no evidence for *in situ* burning, which suggests that the charcoal and burnt material had been derived from adjacent episodes of burning, with the remains of fires being swept into the open pit.

Only stone-lined pit [261] was radiocarbon dated or contained diagnostic artefacts, and there were no stratigraphic relationships between any of the features. The relationship of [261] with the other pits in the field is therefore uncertain. However, the similarity in the stone linings of pit [261] and charcoal-rich pit [277] suggests broad contemporaneity. Likewise, the flint in pit [262] is indicative of a prehistoric date and the freshness of several of the pieces suggests that the assemblage had been manufactured shortly before deposition (Lawson-Jones, below).

Small groups of pits, some of which have been found to contain Beaker pottery (Jones and Quinnell 2006a; Jones and Taylor 2010, 5), are a feature of the Early Bronze Age in Cornwall, and may well have been associated with small-scale, peripatetic settlement activity, which seems to be characteristic of this period (below).

Pit [355] (field 38)

Pit [355] was located in field 38, near Porthcurno (Fig 3). It was oval, 2.35m by 1m and 0.3m deep. It contained two fills: the primary fill (357) consisted of alternating layers of burnt material and charcoal located against the southern edge of the pit and was contained by a large upright hearth stone lying upon heat-reddened natural 'rab' subsoil. The upper fill (356) contained a large number of sherds from two plain Bronze Age vessels (**P19** and **P19a**) (Quinnell, below), a granite muller (**SF34**) and a quantity of burnt clay. The alternating bands of ash and charcoal in the lower deposit may indicate successive firing events; however, there was little evidence for *in situ* burning or of scorching of the surrounding natural subsoil, which means that the deposit may have been formed by selective sweepings from adjacent hearths or fires. Charcoal from fill (357) produced a radiocarbon determination of 3260 ±30 BP, 1620–1450 cal BC (SUERC-21085). A small number of other archaeological features were discovered in the field but none contained artefacts of the same period (Lawson-Jones *et al* 2009). Thus, although pit [355] may have been associated with a nearby settlement the wider context for its use is uncertain.

Further prehistoric finds were also recovered from field 39b, to the south. In this area flint and sherds of gabbroic pottery of Middle to later Bronze Age date were found within two ill-defined hollows or spreads, (370) and (371), measuring up to 6.5m across and 0.3m deep. It was uncertain whether these hollows or spreads were natural depressions associated with animal burrows or had been culturally produced.

Prehistoric to early medieval pottery

Henrietta Quinnell, with comments on petrography by *Roger Taylor*

Beaker sites

The Beaker assemblage consists of 201 sherds weighing 855g and came from three sites, in fields 4, 13 and 24. All sherds have been examined microscopically by Roger Taylor; detailed comment is included below for selected sherds and a full report is filed with the archive. Because of the small sherd size and in order to avoid damage to the decoration, thin-sections were not obtained. This petrological work has made it possible to indicate the probable number of vessels represented, mostly by identifying small and often undecorated sherds.

Vessel numbers and fabrics

Eighteen vessels appear to be represented: one from field 4, 12 from field 13 and five from field 24.

The fabrics fall into seven separate groups. Three different varieties suggest transport of gabbroic clays onto the granite or its aureole, with potting combining gabbroic and granitic components. The granitic **P3** appears to have been made on or very close to the granite itself. The granitic-derived fabrics have components which indicate manufacture a short distance from the granite, but need not come from the same source. The gabbroic fabrics were presumably potted in the Lizard. Variation in fabrics is a common feature in Beakers (Parker Pearson 1990, 12). For the Land's End area the fabric variety is matched by that at Boscaswell (Quinnell 2006a) but there are more gabbroic vessels here than at that site. Boscaswell did not produce fabrics made of gabbroic clays transported to West Penwith; however, several of the Boscaswell fabrics, notably fabric 3, granitic-derived with hematic and beach sand, fabric 4, granitic-derived with clay pellets, and fabric 5, granitic with mica-rich components, are not present here.

Gabbroic: field 4, **P1**; field 13, **P4a**, **P11**; field 24, **P15**. A total of four vessels.

Gabbroic with added quartz possibly from the granite: field 13, **P4b**. One vessel.

Gabbroic, mixed with granitic material from the aureole: field 13, **P14**. One vessel.

Gabbroic, mixed with granitic materials: field 24, **P18**. One vessel.

Granitic with added granitic sand, on or close to the granite: field 13, **P3**. One vessel.

Granitic derived from hornfelsed slate aureole to the north east of the granite: field 13, **P2, P5** (but without hornfels), **P6**. Three vessels.

Granitic derived: field 13, **P7–P10**, **P12**, **P13;** field 24, **P16**, **P16a**, **P17**. A total of nine vessels.

STONE SETTING (FIELD 4), SINGLE SHERD

P1 (Fig 11), layer (223). Rim sherd, 8g, with slight thickening or cordon; internal diameter approximately 150mm. Hard with smoothed surface. Decorated with long, oblique, comb-impressed lines. Oxidized 2 YR 4/8 red. Moderate abrasion.

Petrology Fine-grained, probably gabbroic. *Feldspar* – soft white altered angular grains, predominantly less than 0.5mm, rarely 1.5mm. *Quartz* – rare translucent angular grains, 0.2–0.3mm. *Mica* – muscovite, a scatter of abraded cleavage flakes, 0.1–0.2mm. *Limonite* – soft black glossy rounded grains, 0.1–0.3mm. *Matrix* – silty to finely sandy, with very fine-grained feldspar, mica and sparse quartz. *Comment:* A very fine-grained fabric, probably gabbroic, with a silty matrix. Because of the overall fine grain size, key gabbroic distinguishing minerals such as magnetite and amphibole have not been observed but the general appearance of the fabric is gabbroic rather than one more locally sourced.

Comment

The general character of the sherd is similar to **P2** and other vessels from field 13 (below). Layer (223) was the top of an old land surface, the date of which is not known. The radiocarbon determinations from excavated contexts in field 4 belong to the early second millennium cal BC (below) and are unlikely to relate to **P1**. As this sherd is abraded it is likely to represent casual loss, possibly from some site not on the direct pipeline route.

BEAKER STRUCTURE 108 AND ADJACENT PITS (FIELD 13)

P2 (Fig 11) (89), top fill of structure 108. 41 sherds, 183g, widely spread across fill; fairly fresh, from rim and body of vessel with comb-impressed decoration on a well-finished surface. Hard. Sparse inclusions. Slight cordon below rim. Oxidised 5YR 5/4 reddish brown. Internal rim diameter approximately 160mm. The decoration is untidily executed, with zones of lines around the body interspersed with oblique criss-cross patterns.

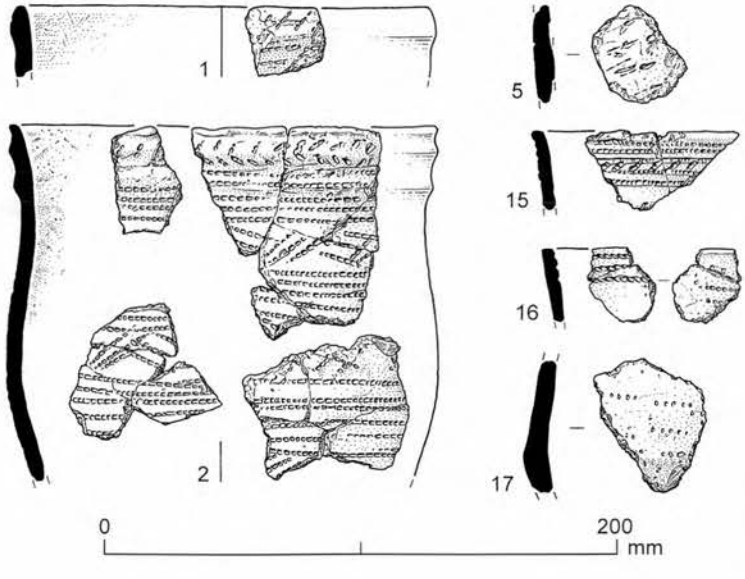

Fig 11 Beaker pottery. ***P1****, from layer (223), field 4;* ***P2*** *and* ***P5****, from (89), top fill of structure 108, field 13;* ***P15–P17****, from (260), fill of pit [261], field 13. Scale 1:3. (Drawings: Jane Read.)*

Petrology Granitic derived. *Mica* – muscovite, larger cleavage flakes abraded and contorted, 0.1–0.8mm; biotite, a scatter of brown cleavage flakes, abraded and crumpled, 0.3–0.7mm. *Quartz* – a scatter of translucent to colourless angular fine-grained aggregates, 0.3–1.5mm and some single grains, 0.5–1mm. *Rock fragments* – micaceous slate, sparse light-grey sub-angular to rounded fragments, 0.5–3mm, granite, sparse fine-grained quartz / feldspar fragments, 0.8–1mm. *Feldspar* – rare soft white altered angular grains, 0.1–0.8mm. *Limonite* – soft, dark brown glossy grains, 0.05–1.5mm. *Matrix* – generally abundantly finely micaceous with some fine-grained quartz. *Comment:* A highly micaceous fabric with indigenous mineral content. The most likely source of the clay is from the weathering of micaceous hornfelsed slate from the eastern margin of the Land's End granite some 20 km to the north east. The presence of biotite points to proximity of the granite margin.

P3 (not illustrated), (89) top fill of structure 108. 43 sherds, 212g, all considerably abraded and widely spread across fill. Generally oxidised 5YR 6/6 reddish yellow. Hard but friable. Abundant inclusions. These sherds include a rim with a slight external protrusion or cordon and a base angle; where decorated all have comb impressions, generally shallow.

Petrology Granitic. *Quartz* – transparent to translucent colourless angular grains, 0.1–1.5mm. *Feldspar* – soft white altered sub-angular grains, 0.1–0.6mm, less altered white angular grains some translucent and showing cleavage, 0.1–1.2mm, rarely 3mm. *Mica* – muscovite, cleavage flakes, 0.1–0.2mm; biotite, rare, brown cleavage flakes in feldspar 0.5mm and another flake, 0.5mm; tourmaline – sparse black vitreous sometimes striated crystalline grains, 0.1–1mm. *Matrix* – finely sandy and micaceous. *Comment:* Granite-derived fabric with tempering sand from within or very close to the granite. The surface erosion and friability probably relate to the high mineral content and sandy texture.

P4a (not illustrated), (89) top fill of structure 108. Undecorated body sherd, 6g, generally 5YR 6/6 reddish yellow.

Petrology Fine-grained gabbroic fabric with moderate inclusions.

P4b (not illustrated), (89) top fill of structure 108. Undecorated body sherd, 6g, generally 5YR 6/6 reddish yellow. Moderate inclusions.

Petrology Gabbroic with quartz possibly from granite. *Feldspar* – soft altered white angular grains, 0.05–2mm, rarely 4mm. *Quartz* – transparent colourless and translucent white angular to sub-angular grains, 0.8–2mm, one rounded pale yellowish translucent grain, 0.3mm. *Amphibole* – sparse translucent pale grey cleaved angular grains, 0.2–1.5mm. *Magnetite* – sparse black magnetic sub-angular grains, 0.1–0.3mm. *Matrix* contains fine-grained feldspar and some fine-grained quartz less than 0.05mm. *Comment:* A gabbroic fabric. The quartz is coarse and relatively abundant and could have a granitic source. This could indicate transport of gabbroic clay with quartz added more locally

P5 (Fig 11), (89) top fill of structure 108. Single sherd, 11g, with fingernail decoration, probably from just below rim. Hard, fairly fresh, 5YR 6/6 reddish yellow. Sparse inclusions.

Petrology A fine-grained, mainly granite-derived fabric, possibly with some input from the weathering of rocks from the granite aureole to the north east.

P6 (not illustrated), (102) upper fill of pit [129]. Sherd, 7g, with parallel comb-stamped impressions, 5YR 6/6 reddish yellow. Fairly fresh. Moderate inclusions.

Petrology Granitic derived, similar to **P5** but with rather coarser inclusions.

P7 (not illustrated), (102) upper fill of pit [129]. 13 sherds, 22g, include simple out-turned rim and pieces with comb-stamped and fingernail impressions, 5YR 6/6 reddish yellow. Moderate inclusions. Although no joins can be found, the sherds have the appearance of recent breakage.

Petrology Granitic derived, possibly from close to the edge of the granite.

P8 (not illustrated), (128) fill of hearth [105]. Five sherds, 48g, of thick plain vessel; vessel wall 12–15mm thick. Fairly fresh, oxidized 5YR 6/6 reddish yellow. Common inclusions.

Petrology Granitic derived with no indications as to origin.

P9 (not illustrated), (128) fill of hearth [105]. Three sherds, 6g, one comb-stamped, abraded. Common inclusions.

Petrology as **P8**.

P10 (not illustrated), (104) fill of pit [127] below (101). One sherd, 12g, fresh, 12mm thick, oxidized 5YR 6/6 reddish yellow, fresh. Moderate inclusions. A further three sherds come from (101) above (104). Two sherds have parts of fingernail impressions.

Petrology as **P8**.

P11 (not illustrated), (104) fill of pit [127] below (101). Three sherds, 2g, moderate inclusions. Sherds plain but too small to indicate that the vessel was undecorated.

Petrology gabbroic.

P12 (not illustrated), (101) fill of pit [127] above (104). Two abraded sherds, 24g, from below the rim of a thick vessel with coarse fingernail and comb-stamped impressions.

Petrology granitic derived.

P13 (not illustrated), (101) fill of pit [127] above (104). Nine sherds, 22g, some with abraded comb-stamped decoration.

Petrology granitic derived.

P14 (not illustrated), (101) fill of pit [127] above (104). Abraded rim, 3g; slight groove below the rim and decoration probably of narrow incisions. A further eight sherds, 20g, without decoration may come from this vessel.

Petrology gabbroic mixed with other material. *Feldspar* – mainly soft white altered angular grains, 0.05–1mm, rarely 3mm. *Mica* – muscovite, cleavage flakes 0.1–0.7mm; biotite, sparse brown cleavage flakes, 0.2–0.4mm. *Quartz* – sparse translucent colourless sub-angular grains, 0.2–0.5mm, and angular fine-grained aggregates, 1mm. *Amphibole* – rare light grey to pale grey translucent fibrous cleaved grains, 1mm. *Chlorite* – soft dark greenish tabular sub-rounded grains 0.2–1.2mm. *Limonite* – sparse soft dark brown glossy sub-angular grains, 0.5–1mm. *Tourmaline* – rare black vitreous angular grains, 0.2mm. *Magnetite* – rare black tabular glossy magnetic grain, 0.1mm. *Matrix* – finely silty / sandy with quartz mica and feldspar. *Comment:* A fine-grained gabbroic fabric with some mixing of granitic and other local chlorite and fine-grained quartzose sandstone fragments. The non-gabbroic component may derive from the aureole around the granite.

Comment

Pit [129] produced the earliest radiocarbon determination from this group of features, 3860 ±30 BP, 2470–2200 cal BC (SUERC-21076) (Table 16). This comes from primary fill (159) below (102) which contained **P6–7** (not illustrated). These sherds are too small to be tied with confidence to any specific Beaker style but their general character is consistent with well-finished vessels belonging to the twenty-fifth to twenty-third centuries cal BC.

Fill (128) of hearth [105] produced the next date in sequence. This was 3825 ±30 BP, 2460–2140 cal BC (SUERC-21075). Sherds of **P8** and **P9** from this context were both of the same granitic fabric, but those from **P8** appeared to be from an undecorated vessel while those of **P9** had fingernail impressions. Both of these vessels belong with the wide range of less well-decorated and finished forms found among 'domestic' Beaker assemblages (Gibson 1982, 420–1). The date suggests that 'domestic' forms were present during the twenty-third century cal BC or a little earlier. The term 'domestic' denotes a range of forms with coarse decoration originally distinguished on settlement sites in eastern England.

Pit [127], which had been cut into [105] produced **P10** and part of **P11** (not illustrated) from lower fill (104) associated with a date of 2300–2050 cal BC (4.3 per cent) (SUERC-21074). **P10** has fingernail decoration and is probably, from its thickness, to be grouped as a 'domestic' form; sherds from it were also found in the upper fill (101), indicating that the two fills are likely to be closely linked chronologically. **P11** had thin well-finished sherds and probably came from a vessel with comb-stamped decoration. The pit is likely to belong to the twenty-third or twenty-second centuries cal BC. Fill (101) above (104) contained **P12–P14** (not illustrated) which together had comb-stamped, fingernail and incised decoration.

Layer (89) covered the top of structure 108 and contained **P2–5** (Fig 11), associated with a radiocarbon date of 3785 ±30 BP, 2300–2060 cal BC (SUERC-21077). Sherds of **P2**, the vessel best represented, were widely scattered across (89). There is no way of determining whether this was casual inclusion with the infill or deliberate deposition (but see comment on the stonework below). The radiocarbon determination probably indicates a date in the twenty-third century cal BC. The vessels have both fingernail (**P5**) and comb-stamped decoration (**P2–3**). Both **P2** and **P3** have cordoned rims; cordoned rims appear to be present from the start of the Beaker tradition in Britain (Clarke 1970, 37) but are not generally present on later, long-necked forms. **P2** has an S-profile (Needham 2005) but no close parallels for it are known from Devon or Cornwall.

Overall, the most distinctive features of the vessels represented in field 13 are an S-profile shape and a range of comb-stamped decoration. These contrast with the long-necked profiles and

rather later dates of the material from Boscaswell (Jones and Quinnell 2006a).

PIT [261], TREBEHOR (FIELD 24)

P15 (Fig 11), (260) fill of [261]. Thirteen sherds, 40g. Many of the sherds have split into inner and outer surfaces. Joining rim sherds have comb-impressed decoration, horizontal lines above short diagonals, a further horizontal line and then a wide space below. There are three other non-joining body sherds and about six sherds which come from the base. 5YR 5/4 reddish brown. Moderate inclusions. Generally fresh.

Petrology gabbroic. Slight differences in the inclusions indicate that the base sherds belong to a different vessel to the rim and decorated pieces.

P16 (Fig 11), (260) fill of [261]. Two joining rim sherds, 4g. Parallel comb-impressed lines inside rim, outside less regular lines made with a different stamp. Oxidised exterior 5YR 5/6 yellowish red. Common inclusions. Fairly fresh.

Petrology granitic derived.

P16a (not illustrated), (260) fill of [261]. Scrap of rim, 2g, with heavy comb-impressed lines on interior and short vertical impressions on exterior.

Petrology granitic derived.

P17 (Fig 11), (260) fill of [261]. Approximately 35 sherds, 170g. Includes carinated body sherd with distinctive comb stamping, the points of the comb very far apart. Scraps of the probable rim with a cordon beneath. 5YR 5/6 yellowish red. Abundant inclusions. Fresh.

Petrology granitic derived.

P18 (not illustrated), (260) fill of [261]. 12 sherds, 17g, several with narrow cord-impressed lines. Moderate inclusions. 5YR 5/6 yellowish red. Fresh.

Petrology Mixed gabbroic and granitic fabric. *Feldspar* – soft white altered angular to sub-angular grains, 0.05–1mm, rarely 2–5mm, rare translucent cleaved grains, 0.2mm. *Quartz* – transparent to translucent angular to sub-angular grains, 0.1–1.1mm. *Mica* – muscovite, cleavage flakes, 0.1–0.6mm, biotite, brown cleavage flakes, 0.2–1.2mm. *Quartz grain* – sub-angular, 0.8mm with biotite flake 0.3mm. *Composite grains* – quartz, with biotite, 0.8 mm, feldspar with biotite, 1.2mm. *Magnetite* – rare black sub-angular magnetic grains, 0.2mm. *Matrix* – finely sandy / silty with much feldspar, also quartz and muscovite less than 0.05mm. *Comment:* A gabbro / granite admixture fabric. The feldspar is unusually abundant and resembles that usually associated with gabbroic fabrics, the rare occurrence of magnetite confirms some gabbroic component. The other constituents derive from granite and indicate a mixing of clays.

Comment

Pit [261] produced a determination which calibrated to 3865 ±30 BP, 2470–2200 cal BC (SUERC-21084) (87.4 per cent). This is the earliest date from Cornwall associated with Beaker material and allows the context and its artefacts to be placed in Needham's period of *Beakers as circumscribed, exclusive culture* (Needham 2005, 209). Using Needham's terminology, **P15** and the other finely decorated vessels from [261] may be described as S-profiled. **P17** belongs in the Carinated group, also appropriate for a comparatively early date. The presence of decoration inside the rim on **P16** appears to be an occasional feature of early Beaker styles, Clarke's AOC and E (Clarke 1970, 282, 287), but this has not been noted before in Devon or Cornwall, perhaps reflecting the scarcity of early Beaker assemblages in these counties. Pit [261] differs from the field 13 assemblage in that all the vessels are decorated and none are of the coarser 'domestic' type.

Other pottery

Post-Beaker prehistoric pottery

Gabbroic sherds of probable prehistoric date are restricted to field 4 and to spreads (370) and (371) in field 39b. The field 4 material is impossible to date at all closely. The date of material in spreads (370) and (371) is uncertain. The rims are very irregular, as though of very plain vertical-walled vessels, and may date either late in the Middle Bronze Age or in the Late Bronze Age. The occurrence of granitic fabric in spread (371) would be appropriate at this period. It is, in fact, probable that all the granitic sherds are later prehistoric, thus providing a broad chronological indicator for a number of small otherwise undated pits: pit [5] in field 3, pit [1] in field 4, pits [7] and [8] in field 6, pit [86] in field 11, pit [112] in field 12, and pits [156] and [131] in field 13 (Lawson-Jones *et al* 2009). It is possible to say this as granitic fabrics appear to have passed out of general use during the Roman period (Quinnell 2004, 108).

Table 1 Pottery (sherds / weight in grammes) from contexts other than Beaker features (* includes Gwithian platter P20)

Field	*Context*	*Gabbro prehistoric*	*Gabbro RB*	*Granitic*	*Totals*
Field 3	(4) fill of pit [5]		11 / 47		11 / 47
Field 4	Deposit between boulders	2 / 4			2 / 4
	South, unstratified	3 / 65			3 / 65
	(3) fill of pit [1]			1 / 96	1 / 96
Field 6	(6) fill of pit [7]			2 / 45	2 / 45
	(8) fill of pit [9]			1 / 8 rim	1 / 8
Field 11	(85) fill of pit [86]			1 / 6	1 / 6
Field 12	(106) fill of pit [107]		2 / 4		2 / 4
	(111) fill of pit [112]			1 / 6	1 / 6
Field 13	(157) fill of pit [156]			3 / 6	3 / 6
	Fill of pit [131]		2 / 34		2 / 34
	Upper fill of pit [131]		2 / 3		2 / 3
	Basal fill of pit [131]		2 / 11		2 / 11
	Unstratified			1 / 13	1 / 13
Field 20	(259) fill of hollows		1 / 3		1 / 3
	Unstratified		1 / 18* (**P20**)	2 / 7	3 / 25
Field 24	Fill of linear [304]		1 / 56		1 / 56
Field 36	Fill of pit [327]		1 / 2		1 / 2
Field 38	Fill (356) of pit [355]			47 / 1484 (**P19**, **P19a**)	47 / 1484
Field 39a	(366) fill of pit (365)		1 / 3		1 / 3
	Unstratified		2 / 17		2 / 17
Field 39b	Spread (370)	1 / 16 rim			1 / 16
	Spread (371)	6 / 192 rim		2 / 46	8 / 238
Totals		**12 / 277**	**26 / 198***	**55 / 1717**	**93 / 2192**

EARLY- MIDDLE BRONZE AGE PIT [355], PORTHCURNO (FIELD 38)

P19 (Fig 12), upper fill (356) of pit [355]. Large simple vessel in granitic fabric, flattened rim with slight bevel below, surface carefully smoothed, generally slightly reduced 5YR 5/3 reddish brown. 46 sherds, 1250g. The sherds present represent about one quarter of the original vessel with an internal rim diameter of approximately 180mm. The capacity of the vessel would have been about 10 litres.

Petrology. Quartz – colourless transparent to translucent angular grains, 0.1–2mm, rarely 4mm. *Feldspar* – off white translucent to opaque white angular grains some showing cleavage surfaces, 0.1–2mm, rarely 3–4mm. *Mica* – muscovite cleavage flakes, 0.1–0.5mm. *Tourmaline* – sparse black vitreous grains, 0.1–0.2mm. *Matrix*– silty finely micaceous clay. *Comment*: A granite-derived fabric.

P19a (Fig 12). Thin-walled bowl in granite-derived fabric, slightly pointed rim, roughly smoothed, generally reduced 5YR 4/2 dark reddish gray. 21 sherds, 230g. Internal rim diameter approximately 240mm. Petrological examination shows the fabric to be similar to **P19** but with a slightly more sandy matrix.

The primary fill (357) of [355] produced a radiocarbon date of 3260 ±30 BP, calibrating to 1610–1570 BC (23.2 per cent) and 1560–1490 BC (45 per cent) at one sigma and 1620–1450 cal BC at two sigma (SUERC-21085). There appears no reason for any significant difference in date between fills (356) and (357). The pit and **P19–19a** therefore belong to a period of transition between the Early and Middle Bronze Ages. The association in pit [355] with muller **SF34** (Fig 14) provides a broadly domestic context for the contents and puts the date of the pit very early in the sequence of domestic pottery recorded for the second millennium cal BC in Cornwall.

The date suggests that the vessels fall in the middle of the currency of Trevisker Ware but **P19** lacks both the decoration and the distinctive modelled rims of that style. It is usual to contrast the currency of decorated Trevisker Ware in south-west Britain with the simpler, normally undecorated Biconical style (for example, Parker Pearson 1990, 22), which occurs infrequently west of Dartmoor. The underlying shape of Trevisker

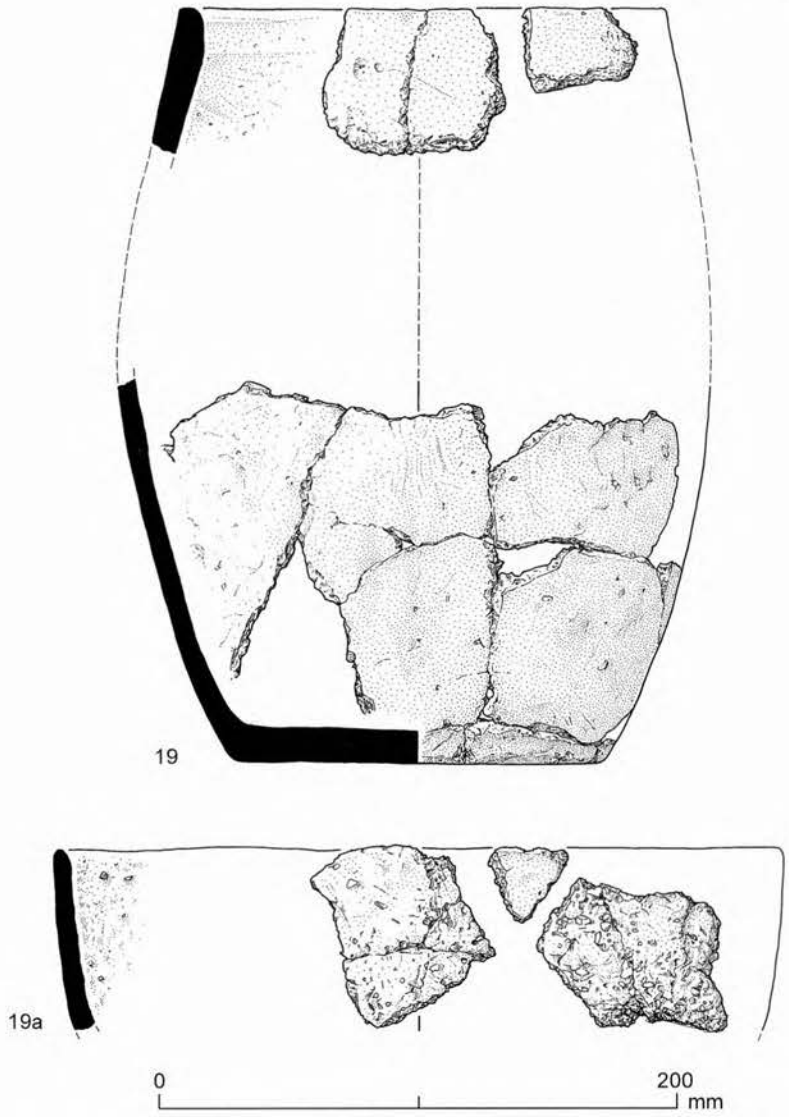

*Fig 12 Bronze Age pottery. **P19** and **P19a** from Early - Middle Bronze Age pit [355]. Scale 1:3. (Drawings: Jane Read.)*

Ware is generally biconical, although usually of more marked form and usually decorated. There is no site in Cornwall in which plain Biconical ware occurs as the predominant type, as it does for example at Shaugh Moor on the west of Dartmoor (Wainwright and Smith 1980). Recent discussion of Trevisker assemblages at Tremough (Quinnell 2007) and Scarcewater (Quinnell 2010a) have emphasised that the range of Trevisker forms is much wider than once thought, providing a repertoire from which vessels of different types could be selected for different purposes. **P19** is probably best viewed as a plain vessel broadly allied to the Trevisker series. Close parallels are hard to locate in Cornwall. The fragmentary plain vessels in granite-derived fabric from the Bosiliack entrance grave would appear to have originally been of very similar shape, and with radiocarbon determinations of 1690–1510 cal BC (SUERC-15589) and 1690–1500 cal BC (SUERC-15590), of only slightly earlier date (Quinnell 2010c). There is currently no parallel at all for the bowl **P19a**.

Granitic fabrics occur in the West Penwith area in Early Bronze Age Collared Urns, an Enlarged Food Vessel and Trevisker vessels from barrow

and burial-related contexts, although these forms are found more frequently in gabbroic fabrics (Parker Pearson 1990, *passim*). All Early Bronze Age vessel forms were coming to the end of their currency in the sixteenth century cal BC and from around 1500 cal BC all vessels from the area appear to have been broadly Trevisker and to have been of gabbroic fabric (for example, Pearce and Padley 1977). The use of a granitic-derived fabric may very well link to the date of the vessels, which were probably made just before these local clays became disused and gabbroic fabrics became general.

Roman period

During the Roman period gabbroic fabrics were rapidly made, finished and fired, producing the distinctive 'standard gabbroic fabric' (Quinnell 2004, 108) which is that referred to in Table 1. As for the later prehistoric period, there was a scattering of Roman-period pits: [5] in field 3, [107] in field 12, [131] in field 13, [327] in field 36, [365] in field 39. There was also a hollow with (259) in field 20 and linear [304] in field 24. In pits [5] and [131] there was also stonework (below). This scattering of prehistoric and Roman features across the West Penwith landscape supports the intensive use indicated by surviving field monuments (for example, Russell 1971).

Gwithian phase – early post-Roman

P20 (not illustrated), unstratified in field 20. A small sherd from the base angle of a vessel, almost certainly a low-walled platter; the upper edge is abraded and is probably a rim. Such platters are distinctive of an early phase in the Cornish post-Roman sequence, before grass-marking came into general use (Thomas 1968, 314). The best published illustrations showing the vessel type **P20** came from are from Goldherring (Guthrie 1969, fig 15). The Gwithian style is currently dated to the late fifth to the late seventh centuries AD by radiocarbon determinations from Gwithian and from Boden, St Anthony-in-Meneage (Thorpe and Thomas 2007, 45).

Petrology Gabbro and granitic mixture. Abundant inclusions. *Tourmaline* – black, vitreous, mainly angular, grains and crystalline aggregates, some striated crystalline grains, 0.1–3mm. *Feldspar* – off-white hard angular grains, some translucent cleaved grains including plagioclase and some soft altered angular grains. 0.05–3mm. *Quartz* – a scatter of translucent to transparent colourless angular to sub-angular grains, 0.4–2mm. *Mica* – muscovite, a scatter of cleavage flakes with abraded edges, 0.2–0.5 mm, biotite, sparse brown cleavage flakes 0.2mm. *Magnetite* – a scatter of black sub-angular magnetic grains, 0.4–1.2mm, rarely 1.8 mm. *Amphibole* – sparse off white translucent cleaved bladed grains 0.5–0.8mm. *Matrix* – white feldspar grains less than 0.05mm and fine muscovite flakes in a silty matrix. *Comment:* An unusual gabbroic clay / granitic admixture fabric. The granite component is predominantly angular and consists mainly of black tourmaline giving a clear indication of a granitic source. The abundance of tourmaline could indicate that it was selectively added. The quartz content is low for a granite-derived fabric. It is not possible to distinguish with certainty what proportion of the feldspar content is of gabbroic or granitic origin. The soft altered grains resemble the more highly altered gabbro-derived feldspar, while the larger angular fragments are more like granite-sourced feldspar. All Gwithian platters otherwise known appear to be of unmixed gabbroic fabrics.

Stonework

Henrietta Quinnell, with petrographic comment by *Roger Taylor*

Most of the stonework, some 24 artefacts, comes from Beaker activity in fields 13 and 24. Eight pieces are associated with aceramic Early Bronze Age features in field 4 and there is a single muller from Early - Middle Bronze Age pit [355] in field 38. Five objects came from Roman-period pits along the pipeline.

Beaker activity at Sennen (field 13)

The assemblage is by far the largest for the Beaker period in Devon or Cornwall (Figs 13 and 14). The only stonework otherwise known from this period in these counties are three artefacts from the burnt mound at Boscaswell, St Just-in-Penwith (Jones and Quinnell 2006a, 47), a hammerstone from pit [1705] at Scarcewater (Quinnell 2010b, 117) and some beach pebbles and a possible greenstone tool from the mound at Poldowrian (Harris 1979, 19). More widely, Beaker pits from presumptively domestic contexts do not generally contain

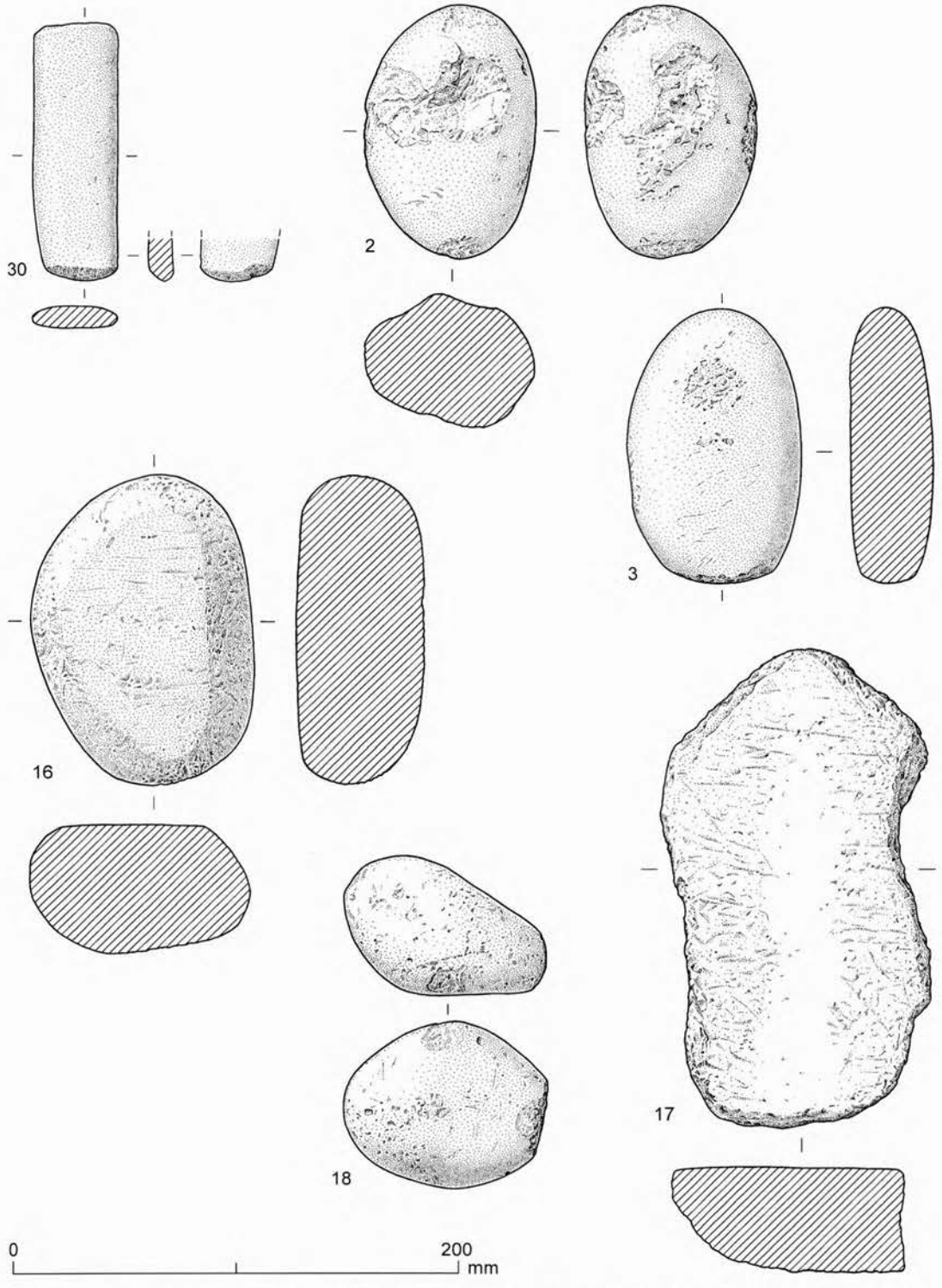

*Fig 13 Beaker-period stonework. Field 4, spread (41): **SF30** bevelled pebble. Field 13 (89): **SF2** hammerstone with worked finger grips, **SF3** rubbing stone / pestle, **SF16** rubber / muller, **SF17** muller, **SF18** rubber / pestle / hammerstone. Scale 1:3. (Drawings: Jane Read.)*

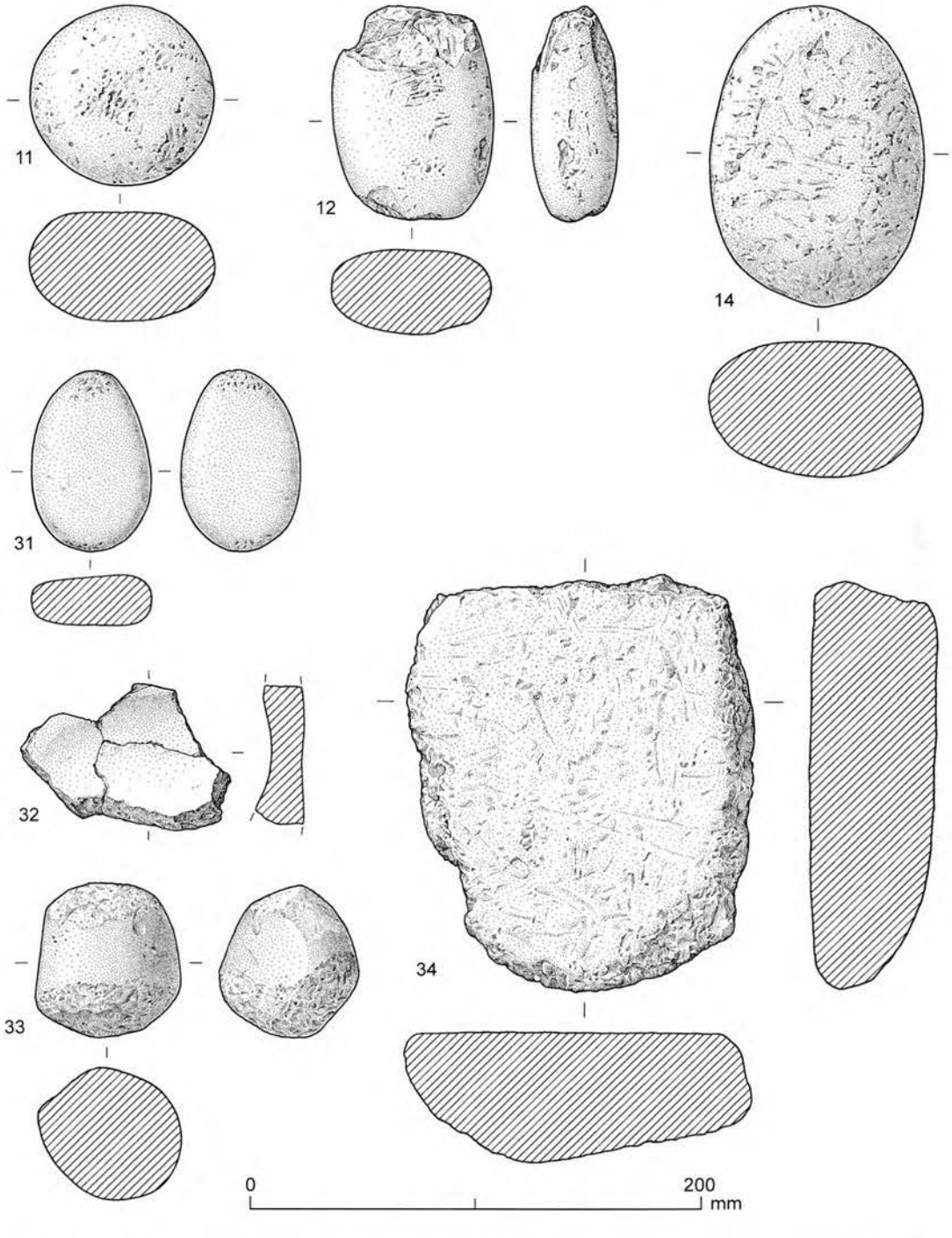

Fig 14 Beaker-period stonework. Field 13 (104): ***SF11*** *rubber,* ***SF12*** *rubber /hammerstone; (102):* ***SF14*** *rubber; (143):* ***SF31*** *rubber/hammerstone; (101):* ***SF32*** *broken mortar,* ***SF33*** *pestle/hammerstone. Field 38 (356):* ***SF34*** *Early - Middle Bronze Age muller. Scale 1:3. (Drawings: Jane Read.)*

stonework, as was the case with the extensive group recently published from Bestwall in Dorset (Ladle and Woodward 2009, 277–85). David Clarke (1970, 256) refers to 'battered stone pounders, stone slabs' as frequent finds on domestic sites, but without providing more detail. The structure at Northton on Harris produced a small number of cobble pounders (Simpson *et al* 2006, 133, 136) but unfortunately the stratigraphy at Allt Chrisal on Barra allows very little of the stone assemblage on this multi-period site to be definitely allocated to the Beaker period (Clarke 1995, 141).

The sourcing of the stonework from the pipeline is all local, most coming from beach deposits in the small coves around West Penwith, with some use of surface granite.

Pieces with worn surfaces which have previous preparation are described as mullers. There are eight, whole or fragmentary, of various sizes from field 13, none from the smaller group in field 24. The assumption behind the term 'muller' is that these tools were used on saddle querns for the grinding of grains (no saddle querns were present).

Roger Taylor comments that the preparation on the rubbers is of a kind not seen by him before and differs from the pecking seen on Middle Bronze Age and later tools throughout Cornwall, exemplified here by **SF34**. The Beaker mullers have been prepared by scratching with a hard sharp point such as crystalline quartz. Although it cannot be proved that mullers were used on cereal, this is highly probable, indicating a strong domestic component in the stonework assemblage.

'Rubbers' are tools with areas worn smooth and flat. It is likely that these tools were used on smooth materials, the most likely of which would have been leather. While woven fabrics were known in the Beaker period, evidence for them is rare (Megaw and Simpson 1979, 196), and it is likely that supple leather was still used as the main material for clothing and bed coverings; stiffer and thicker leathers would have served a wide range of purposes such as straps and containers, even boats. Rubbers were found in both fields 13 and 24.

The fragmentary double-sided mortar **SF32** from field 13 is so far without parallels and its purpose is unclear. The wear on both sides is very smooth, suggesting the use of a tool like a pebble rubber on some smooth-textured material. One likely use would have been the preparation of a pigment, perhaps the hematite suggested by a piece from pit [261] in field 24. Ground pigment material was probably mixed with fat before use and **SF32** would have been very suitable for this purpose. Clarke (1970, 567) refers to a number of instances where Beaker pottery has been found with decoration infill with a white preparation made from calcium carbonate sourced from burnt bone. Recent analyses of Scottish Beakers with white inlay have confirmed that ground-down cremated bone was indeed a constituent of the decoration (Curtis *et al* 2010). Similar white infilled decoration has also been noted on a number of Beakers from Wales (Mary Davey, pers comm) as well as several with a red hematite colour. The latter colour has recently been identified on a miniature vessel from Farway in Devon (Jones and Quinnell 2008, 32). Colourants on non-organic artefacts are unlikely to survive, particularly in the acid soils of the south west, and on organic artefacts will have disappeared altogether.

The field 13 assemblage has two other tool types, hammerstones and pestles. Hammerstones when seen under a lens have coarse, obvious impact marks, and pestles slight impact marks partly obscured by small areas of wear. It is presumed that hammerstones were used for heavy percussive impact on hard materials while pestles were used for light impact combined with some grinding action. There are four hammerstones and an additional three other tools with hammerstone use. Four pieces have pestle use, most obviously the double-ended **SF33**, but all pestles have also been used as mullers, hammerstones or rubbers.

The multi-purpose use of stone tools is sometimes found in later Bronze Age contexts in Cornwall (for example, at Scarcewater: Quinnell 2010b) but the field 13 assemblage shows a greater concentration of such tools than any later Bronze Age site. As the sites are not far from the coast and the cobbles used could not have been hard to obtain, multiple usage should indicate a preferred way of using tools, with a single tool used for two or three functions. The combination of muller and pestle use seems easily explainable: clumps of cereal could be flattened or ground with a circular motion alongside the more regular to-and-fro grinding motion. Hammerstone use on muller **SF12** may have been subsequent to grinding activity, but wear from use as rubbers and pestles seems to interlock with that as hammerstones, as in **SF18**. Such tools could have been personal items, used for several different tasks. Overall, the assemblage gives a strong impression of a tool tradition which

had evolved in an area where raw material for tool use needed to be conserved and not one likely to have developed in a coastal area.

Finger-grips are occasionally found on pestles and hammerstones from later Bronze Age contexts; for example, in the Middle Bronze Age at Scarcewater (Quinnell 2010b, 118 and fig 55). Two of the hammerstones **SF2** (Fig 13) and **SF6** and one pestle **SF5** have clearly defined finger grips. In addition, most of the cobbles selected for use as hammerstones or pestles appear to have been chosen for the way they fit into the hand. Both natural shape and worked features emphasize the importance of hand-held pounding tools. The nature of the wear suggests impact with hard surfaces but no 'anvil' stones are present (*cf* discussion on implements from the Ross Island mine: O'Brien 2004, 356–9 and pls 70–1). If portable anvils were used they were not included in the deposits excavated, although it is just possible that these were not recognized among the large number of granite blocks which occurred in the vicinity of the site. However, it is possible that use was made of the granite grounders which would have been a frequent natural occurrence in the area before millennia of clearance took place.

The purpose of so many pounding stones (grouping the hammerstones and pestles together) is uncertain. It is possible that metal-bearing ore was involved, although no definite data for its use at this date has ever been put forward. At Ross Island (*ibid*, 338–359), the hammerstones are generally much larger and have been prepared to take hafts, although a small range of hand-held tools is also present. Clarke (1970, 256) links the occurrence of 'pounding stones' to the preparation of pottery temper. It is not impossible that some of the vessels represented in field 13 were locally made, but there are no sherds which have features of wasters such as spalling. Given the close relationship between muller and pounding use (Table 2) it seems likely that some process connected with the preparation of foodstuffs was involved. The most likely of such processes would be the pounding of grain to release it from the ear, where appropriate, after parching (Hillman 1981); naked and hulled barley and emmer were all grown at this time, although evidence for cereals is limited to exceptionally small assemblages, such as that from the Portscatho pits (Jones and Reed 2006). The wider evidence quoted by Clarke (1970, 256) may indicate some widespread tradition of tool preparation in the Beaker period.

All types and features of the stonework are represented by the 13 pieces in (89), the upper fill of structure 108, except the tiny mortar **SF32**. The five pieces in pit [127] and the two in pit [129] in general have the same characteristics as those in (89), and despite slight differences in the radiocarbon determinations from the three contexts, the material can be regarded as a single group. As all stonework in structure 108 comes from the (deliberate) upper infill (89), and none was found in the lower fill (103), it seems highly probable that the artefacts were deliberately buried when the hollow of the structure was infilled and that, to some extent, they may be regarded as a form of structured deposition. Only two of the 13 pieces were broken, the remainder appear to have been buried while they retained varying amounts of potential usage. It seems highly likely that objects were related to the activities which took place in structure 108 and were buried when it was abandoned.

Beaker activity at Trebehor (field 24)

Fill (260) of Beaker pit [261], with early radiocarbon determination 3865 ±30 BP, 2470–2200 cal BC (SUERC-21084), produced four significant pieces of stonework. The two rubbers are similar to examples from Beaker context (89) and probably indicate preparation of skins. The hematite-impregnated slate some 70mm long appears to have been used with a grinding action to produce a red pigment, while the jasper pebble with a greenish tint may have been retained for decorative or magical properties.

Early Bronze Age activity at the Sennen stone setting (field 4)

No features in this field had ceramics: Beaker **P1** comes from layer (223), an old land surface. Pit [15] with a quartz crystal possibly used as a graving tool has a radiocarbon determination of 3640 ±30 BP, 2060–1910 cal BC (SUERC-21081). Pit [42] with a collection of small unused pieces and a possible rubbing stone has a radiocarbon determination of 3455 ±30 BP, 1880–1690 cal BC (SUERC-21082).

The two bevelled pebbles from spread (41) between the boulders, one illustrated (**SF30**: Fig 13), are of types common on Later Mesolithic sites (Berridge and Roberts 1986, 20), and may have

Table 2 Details of Beaker-period stonework from contexts in field 13 (illustrated SF numbers in bold)

Context	*Petrology*	*Wear*	*Function*
SF2 (89) upper fill of structure 108	Quartz beach cobble	Worked finger grips and battering at both ends	Hammerstone
SF3 (89) upper fill of structure 108	Greenstone beach cobble	Preparation pecking one side with subsequent wear, abrasion on one end	Muller also used as pestle
SF16 (89) upper fill of structure 108	Fine-grained granite beach cobble	Preparation striations and wear on one surface, pecking and initial wear on opposite surface	Muller
SF17 (89) upper fill of atructure 108	Fine-grained granite, possibly stream cobble. Shape natural.	One surface worn flat, with preparation striations beneath wear; wear as polish in centre removes striations	Muller
SF18 (89) upper fill of structure 108	Beach cobble of fine-grained granite with quartz and tourmaline	Abrasion facet on one end, battering on two corners, one flat surface polished and slightly worn	Rubber with pestle and hammerstone use
SF5 (89) upper fill of structure 108	Greenstone beach cobble	Both flat surfaces prepared, then worn, side finger grips, abrasion on both ends, some associated flaking	Muller/pestle,
SF6 (89) upper fill of structure 108	Small beach cobble, hornfels	Finger holds on both flat surfaces, a little battering on one end, the other mixed abrasion and battering; battering down both edges	Complex hammerstone, with little use
SF7 (89) upper fill of structure 108	Well-rounded granite beach cobble with small megacrysts	Slight battering on one end	Hammerstone, limited use
SF20 (89) upper fill of structure 108	Fine-grained granite fragment, angular fractures	One slightly worn surface	Rubber fragment
(89) upper fill of structure 108	Beach cobble fine-grained quartzitic sandstone	Slight use wear on one surface	Small rubber
(89) upper fill of structure 108	Fine-grained granite fragment	? some wear	? rubber
(89) upper fill of structure 108	Coarse grained granite piece	One worn surface	Small fragment of broken muller
(89) upper fill of structure 108	Flint pebble	Battered surface	Small hammerstone, making use of natural depression as grip
SF11 (104) lower fill of pit [127]	Medium grained granite beach cobble	Both surfaces dressed, one with moderate wear, one little wear over dressing	Muller
SF 12 (104) lower fill of pit [127]	Volcanic greenstone beach cobble	One surface dressed and wear, both ends severely battered	Muller with heavy use as hammer stone
SF31 (143) fill in pit [127]	Hornfels beach cobble	Both surfaces worn, slight battering on one end and on one edge	Rubber used as hammerstone
SF32 (101) upper fill of pit [127]	Very fine-grained granite, tabular fragment, part broken, in three pieces	Worn hollow on one surface, slight hollow on second surface	Double-sided tiny mortar, broken
SF33 (101) upper fill of pit [127]	Greenstone cobble, probably natural polish around girth	One end two abraded facets, other end rounded battering. Large portion of cobble removed through use	Pestle and hammerstone
SF14 (102) upper fill of pit [129]	Coarse granite beach cobble	Wear on one surface	Rubber
SF 21, 22 (102) upper fill of pit [129]	Beach cobble/small boulder, fine-grained megacrystic granite	Worn on flatter surface, possibly some grooving to flatten surface	Large muller fragment

been used in the preparation of skins (Fletcher 2005). These bevelled pebbles are the second occurrence in Cornwall in contexts later than the Mesolithic. The other example was the fill of a large Early Bronze Age pit at Portreath (Quinnell 2006b). It is now possible, with two sealed Beaker to Bronze Age find-spots, that the type had a much longer use than was previously supposed. If it did not, it is unlikely that their presence in field 4 is coincidental: either they represent usage of the area around the boulders during the Mesolithic period or they had been collected from elsewhere and

Table 3 Stonework from Beaker pit [261] in field 24

Petrology	*Wear*	*Function*
Well-rounded and polished fine-grained greenstone beach cobble, broken	Two worn facets on one edge and possible roughening for finger grip	Rubber
Slate impregnated with hematite, giving red powder; sourced from Cornish mineralized area outside W Penwith	Heavily worn striated facet on one edge, probable wear on flat surface	Piece used for producing red pigment
Jasper pebble	Unused	Decorative
Fine-grained granite, surface weathering, flat surfaces controlled by jointing	Slight wear on flat surface	Large rubber

deliberately deposited. However, given the limited evidence for Mesolithic activity (Lawson-Jones, below) and the radiocarbon dating, it seems more likely that they were deposited in the Bronze Age. The cobble with slight mortar use from (41) has very slight worn depressions.

Early-Middle Bronze Age pit [355] at Porthcurno

SF34 (Fig 14) (356) fill of pit [355] in field 38. Muller length 180mm using surface weathered coarse granite with megacrysts. One surface has been dressed by pecked grooves and then worn flat. The muller was originally much longer, had broken, and was subsequently used broken. Its date is determined by the associated vessels **P19** and **P19a** and radiocarbon determination 3260 ±30 BP, 1620–1450 cal BC (SUERC-21085). Such mullers are frequent finds on Middle Bronze Age settlements – for example, at Trethellan (Nowakowski 1991, fig 57) – but this example, with a date in the middle of the second millennium cal BC, is unusually early: settlements with dates before the fifteenth century cal BC are unusual in mainland Cornwall. Its presence suggests that pit [355] was in the vicinity of a domestic site where grain was prepared.

Roman period

The form of Roman-period stonework is common in Cornwall, and was probably associated with the preparation of grain (for example, Quinnell 2007).

Table 4 Stonework from Early Bronze Age activity around the Sennen stone setting (field 4)

Context	*Petrology*	*Wear*	*Function*
(14) fill of pit [15]	Quartz crystal prism	One end possibly abraded	Graving tool?
(211) fill of [210]	Hornfels greenstone beach pebble, possibly burnt	One surface worn, with striation	Small rubber
(221) top of unexcavated feature	Broken fragment fine-grained granite beach cobble	Possible use on flatter surface	Possible rubber fragment
(44) lower fill of pit [42]	Assorted fragments of vein quartz; fragment of quartz beach cobble; small quartz pebble	None	Small collected group
(45) lower fill of pit [42]	Fragment of fine-grained porphyritic granite	Possible use on flat surface, possibly deliberately broken	Possible rubbing stone
(41) spread between boulders: SF30 (Fig 13)	Fine-grained sandstone elongated bladed fragment, beach cobble	Two abraded facets at one end	Bevelled pebble
(41) spread between boulders	Fine-grained sandstone bladed beach cobble	Two abraded facets at one end; worn facet on one long edge	Bevelled pebble
(41) spread between boulders	Elongated greenstone sub-angular fragment	One side used as whetstone	Whetstone
(41) spread between boulders	Fine-grained sandstone cobble	Possible mortar use on both sides	Small mortar

Table 5 Stonework found in pits in association with Roman-period pottery

Context	*Petrology*	*Wear*	*Function*
Field 3, (4) fill of pit [5]	Greenstone beach cobble, probably originally lava	Some wear on flat surface, broken	Broken muller
Field 3, (4) fill of pit [5]	Vein quartz beach cobble, sub-rounded	Just possibly some use but not easily detectable.	Possibly a rubber
Field 3, (4) fill of pit [5]	Beach cobble, vein quartz	Traces of wear polish on flat surface and opposed surface	Large rubber
Field 13, (132) fill of pit [131]	Small hard sandstone beach pebble	Two facets, slight polish, worn	Small rubber
Field 13, (130) upper fill of pit [131]	Surface weathered, coarse granite with fine-grained inclusions	Flat surface slightly used	Small rubber

Flint

Anna Lawson-Jones

Archaeological fieldwork along the pipeline produced a total of 502 pieces of worked flint and chert. The vast majority of the material came from fields 4 and 13 (Fig 2), while smaller but notable concentrations were found in fields 9, 10 and 24 (Figs 2, 3) (Tables 6 and 7). The assemblage as a whole ranges in date from the Mesolithic through to the Middle to Late Bronze Age (*c* 8000 to 1000 cal BC).

Distinct pockets of diagnostic lithic activity were located along the pipeline route. Some of these were highlighted by the presence of undisturbed features and / or other types of finds, particularly pottery. The two main concentrations produced similarly dated assemblages: field 4 and field 13 were both predominantly of Early Bronze Age date, associated with distinctive Beaker pottery and confirmed by subsequent radiocarbon dating. Field 4 was associated with a series of small pit deposits set among boulders and a stone setting overlooking the coast, while the field 13 material was found in association with a Beaker structure and associated pits. The field 4 assemblage appears to include some Late Neolithic material, potentially suggesting a transitional presence at this topographically distinctive location.

Field 24 had pit [261], which accounted for all but one piece of the field's total flint assemblage and also contained Beaker pottery. Earlier in date and smaller than the two larger field assemblages was the unstratified flint found in field 9 and field 10. This was all of a Late Neolithic character and consists of a variety of different tool types; these were more frequently made on variably coloured flint than the later field 4 and field 13 assemblages.

The raw material and its working

The majority of the flint assemblage consists of locally sourced pebble flint collected from the surrounding beaches. The quality, size and frequently mottled colour of the raw material is varied and typical of Cornish pebble flint. It can form a substantial portion of any given beach, up to 50 per cent according to Rogers (1923, 45), who was an early advocate for the study of Cornish beaches and interested in the sourcing and description of available beach material. As with other pebble-based lithic industries, the limited size of beach pebbles restricted the size and probably

Table 6 Flint artefacts from the Sennen – Porthcurno pipeline by period

Field no	*Number of pieces*	*Predominant character*
Field 4 (probable links with field 3/3a)	241	Mixed Mesolithic / Late Neolithic and Bronze Age
Field 9/10 (majority unstratified)	51	Later Neolithic.
Field 13 (possible links with field 14; majority stratified)	109	Early Bronze Age - Beaker
Field 24 (all but one piece from a single feature)	25	Early Bronze Age - Beaker
Fields 3, 3a, 11, 12, 14, 15, 20, 21, 27, 30, 32, 37, 38 and 39b	< 10 (except F3a = 21 pieces, F14 = 11 pieces)	All periods

the range of pieces made. It also sometimes dictated the method of working; for example, with the use of anvils during knapping, leaving tell-tale distal damage and scarring (Knight 1991) noted on some of the pieces. The number of primary pieces (those with 50 per cent and more original cortex surviving) is partly the consequence of using small pebble cores, necessitating the use of primary and secondary flakes for finished tools (particularly with the post-Mesolithic growth in tool size), but also an indication of on-site knapping having taken place at the sites identified.

The majority of the pieces range from 20mm to 45mm (longest dimension measurements). Many retain a good portion of the original pebble profile, highlighting the necessity for careful core management, maximising the size of tool produced, but economising on wastage by not removing cortex when not required on functional grounds. The largest piece, which was 65mm long, came from field 4, fill (22) in pit [21].

In addition to the pebble material a very small number of nodular pieces have been identified from the pipeline assemblage. Of the 235 pieces that retained any original cortex, only six definite and nine probable nodular pieces were noted, although a probably small but unquantifiable number of tertiary (non-corticated) pieces may also have had a nodular origin. There are no primary sources of nodular flint in Cornwall and the identification of a nodular source is seen as indicating the deliberate movement of flint into Cornwall (Healy 1985, 18–20; 1989, 189; Saville 1981; Newberry 2002). This was particularly the case during the Neolithic when trade and exchange became more important, probably as a result of increasingly long-term settlements and territories being established (Edmonds 1987, 162). Running concurrent with this may have been an increasing desire to use specifically sourced (even coloured?) flint. Complicating this picture, however, is the washing-up on beaches of nodular material from submerged sources off the west Cornish coast. Some, but not all of this material has a thick white cortex, and as a result the recognition of imported, as opposed to off-shore sourced, flint has to be subjective on the basis of macroscopic study alone. It is possible, given the westerly location of this assemblage, that much of the thickest white corticated nodular material was locally acquired, since it would seem absurd to transport material from Devon when a good proportion of it would simply be disposed of as waste during reduction.

Regardless of date, the material as a whole has been knapped using a combination of hard and soft hammers. Much of the finer working, particularly with the Mesolithic blade-based pieces and a number of the larger, Late Neolithic to Early Bronze Age flake-based tools which required thinning and other modification, was carried out using soft hammers. On these pieces the bulbs, ripples and removal scars are less pronounced and the resultant pieces are often more streamlined and controlled in appearance. In the case of some of the larger pieces interpreted as probable blanks, a mix of hard and possibly soft hammering was used in the initial shaping. The fact that more than one such blank was identified is of interest in itself, probably reflecting intentional deposition. On pieces that did not require specific finishing, which were produced for spontaneous and short-term use, or which were never intended for use but were to be discarded as unused waste, the profile tends to be markedly different, often angular, lumpy or otherwise difficult to handle, particularly with the post-Neolithic material.

It should be noted that tools have been identified and quantified in the following short tables according to diagnostic (retouched or otherwise modified) form, and also on the basis of apparent, focused use, as interpreted from macroscopic-only examination.

A scattered Mesolithic presence

Mesolithic activity along the pipeline is indicated only by flintwork, with a scant collection of only broadly diagnostic pieces. It has not been possible to categorically apply an Early or a Later Mesolithic date to this material. The pieces identified tend to be small and blade or bladelet-based, often displaying platform modification. They are the result of a technology designed to produce composite, lightweight tools necessary for a mobile way of life.

Field 3a produced two or three small, pale, finely produced bladelets of Mesolithic date, which are at variance with the later, far more bulky, flake-based assemblage from the field. Each showed limited abrasion and, as with the remainder of the field's assemblage, was unstratified. Nearby field 4 produced a mottled grey, slightly patinated, slightly abraded, single platformed blade or bladelet core **L1** with platform preparation, of potential

Table 7 Flint artefacts from the Sennen - Porthcurno pipeline by field

Field no.	*Total*	*Pebble, Nodular, Uncertain*	*Primary, Secondary, Tertiary*	*Burnt, Fresh, Abraded*	*Retouch*	*Re-used*
Unstratified	1	P-1	P-1	-	-	-
Field 3a	21	P-11, U-10	P-7, S-4, T-10	B-3, F-18	7	-
Field 3	9	P-1, U-8	S-2, T-7	B-1, F-4	1	-
Field 4	241	P-120, U-121	P-41, S-77, T-123	B-70, F-65, A-3	18	1
Field 9	15	P-10, U-5	P-3, S-7, T-5	B-4, F-1, A-1	6	1
Field 10	36	P-24, N-2, U-10	P-9, S-15, T-12	B-4, F-2, A-4	14	3
Field 11	2	P-1, U-1	P-1, T-1	F-1	1	-
Field 12	1	P-1	S-1	-	-	-
Field 13	109	P-30, N-11, U-68	P-15, S-20, T-74	B-30, F-26, A-2	25	-
Field 14	11	P-7, U-4	P-5, S-2, T-4	-	-	1
Field 15	2	P-1, U-1	P-1, T-1	A-1	-	-
Field 20	2	U-2	T-2	-	-	-
Field 21	1	P-1	P-1	-	-	-
Field 24	25	P-10, N- 2, U-13	P-5, S-7, T-13	B-2, F-6	9	1
Field 27	1	P-1	P-1	A-1	-	1
Field 30	1	U-1	T-1	-	-	-
Field 32	1	P-1	P-1	-	-	-
Field 37	8	P-3, U-5	P-3, T-5	B-1, F-1, A-1	3	-
Field 38	11	P-7, U-4	P-3, S-4, T-4	B-1, F-1, A-1	2	-
Field 39b	4	P-2, U-2	P-2, T-2	-	1	-

Mesolithic date (Fig 15). Field 10 produced a fine, small snapped blade with worn lateral wear, closely akin to a microlith, plus a long curved flake with subsequent modification and use as a knife. Field 14 produced a single probable Mesolithic, residual piece from context (337), field 26 an undiagnostic, barely worked microlith, and field 39b a single platform (near pyramidal) blade and bladelet core from context (372). Field 39b additionally produced a small range of probable multi-period pieces.

All of these pieces were found as residual material, often in conjunction with other, later artefacts. No *in situ* Mesolithic material was identified, and no notable, single-period concentrations were recovered. There is the potential for other less diagnostic Mesolithic pieces to be present within the pipeline assemblage as a whole, but this would not significantly alter the general impression that this scattered collection of Mesolithic material indicates a widespread but unfocused presence along the route of the pipeline.

West Penwith is recognised as an area with an abundance of Mesolithic flint (Wymer 1977; Jacobi 1979, 48–93; Berridge and Roberts 1986, 7–34). Marsden (1921) alone identified 17 sites in the parishes of St Levan, St Buryan and Sennen, and many more have since been located, including most recently some substantial scatters on the nearby North Land's End pipeline (Lawson-Jones, forthcoming). There, pockets of repeated, probably seasonal, activity were identified. As with many Mesolithic sites in Cornwall, the coast appears to have acted as a magnet for activity, suggesting that coastal resources – fish, shellfish, seaweed and maritime mammals such as seals – constituted a vital part of the Mesolithic diet. In western England, a distinctive Late Mesolithic pattern of settlement along major river systems and on coastal headlands has been noted (Barton and Roberts 2004, 351). Sites located close to the coast in Cornwall include those at Trevose Head (Johnson and David 1982, 67–103), Trevelgue Head (Lawson-Jones 2011) and Poldowrian (Smith and Harris 1982, 23–62). In addition, an important cluster of some 20 sites dating to the Mesolithic period has been recorded from around the Gwithian area on the north Cornish coast (Thomas 1958, 8–9; 2007, 21–23; Jacobi 1979; Berridge and Roberts 1986; Palmer 1977, 168–78; Roberts 1987).

Later Neolithic activity in fields 9, 10 and beyond

No unquestionably Early Neolithic flint was recorded within the flint assemblage but a Middle to Late Neolithic component was present. The most significant collection, unfortunately

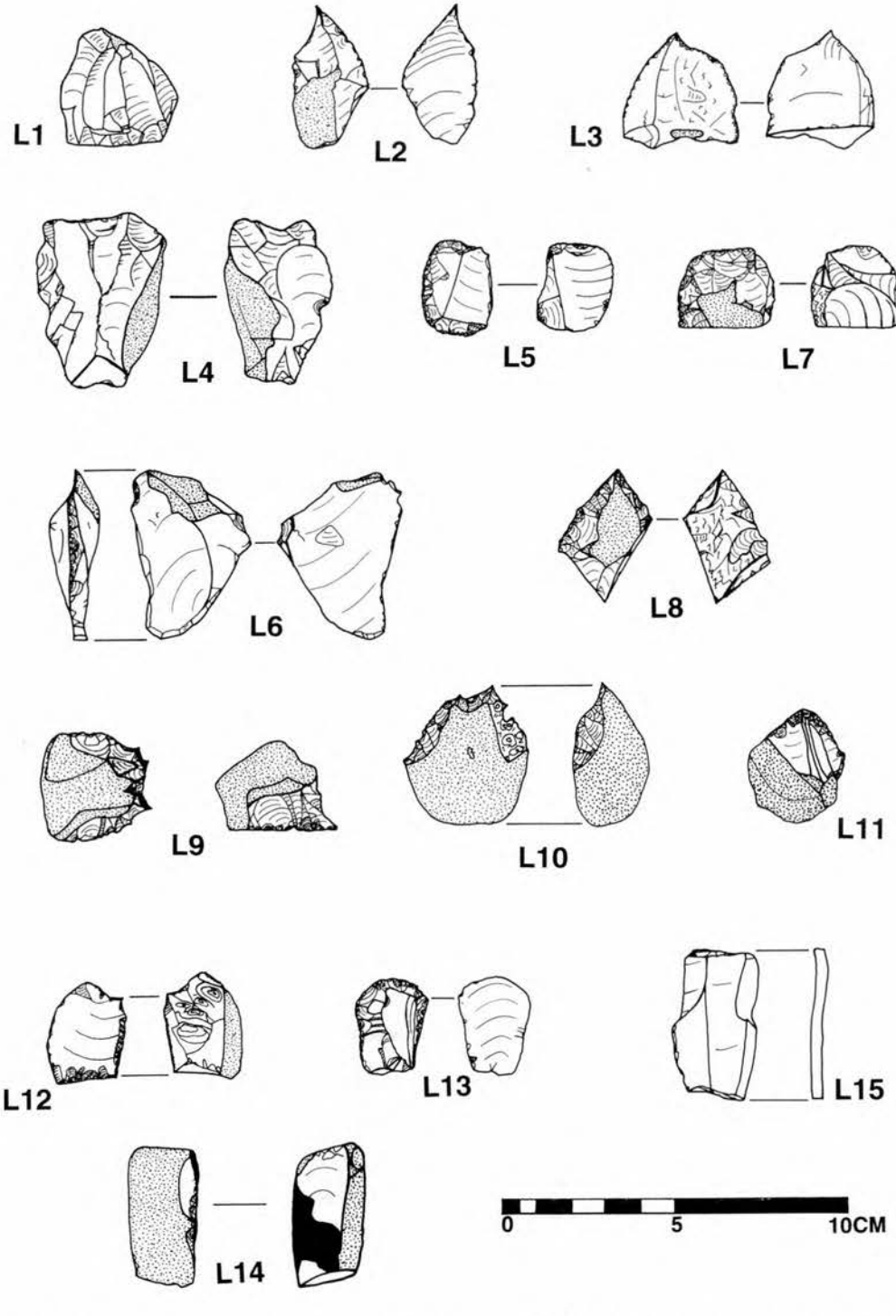

Fig 15 Flint from the Sennen – Porthcurno pipeline, ***L1–L15****. (Drawings: Anna Lawson-Jones.)*

unstratified, came from fields 9 and 10. (In field 10, flint was collected from within and beyond the confines of the pipeline corridor.) The combined collection is almost entirely based on a large flake technology and includes a varied range of tool types, a number of beautifully retouched pieces and moderately few unused or unusable pieces, unlike some of the slightly later assemblages discussed below. It also produced at least two black, nodular pieces with the thin brownish nodular cortex typical of Beer Head flint (Tingle 1998), suggestive of Neolithic exchange. Tool forms from field 9 include a near white, patinated, well-formed and still very sharp piercer **L2** and a pale grey, minimally worked, slender and snapped knife **L3**, both with macroscopically visible focused use-wear, together with an abraded multi-platform flake and an abraded, mottled blade core **L4** (Fig 15).

From field 10 came a squat but very distinctive golden honey-coloured, finely-worked knife or scraper **L5**, a coarse-grained golden brown chert knife on a large flake **L6**, the distal end of a finely retouched black nodular flint knife **L7** and a black nodular flint triangular (near kite-shaped) projectile point, with slight dorsal heat damage **L8** (Fig 15). Suggestive of a Late Neolithic date, these types of pieces can be found alongside transverse, barbed-and-tanged and leaf-shaped arrowheads (Butler 2005, 160).

The pieces in fields 9 and 10 show an apparently deliberately selected range of colour and texture, from flawless black to honey-gold. Selection of raw material on the basis of source and perhaps colour may well have had an aesthetic or symbolic significance going beyond functional necessity (for example, Boas 1955, 22; Edmonds 1987, 162). The preferential selection of specific sources for artefacts is also demonstrated in other materials; greenstone for the production of polished axes is well-documented (for example, Clough and Cummins 1988, 14–20, 143), although the existence of axe factories in Cornwall has been questioned by Berridge (1993, 47). Similarly, the preferential use of gabbroic clay from the Lizard (Parker Pearson 1990, 5–32) for the production of ceramics is apparent for over four millennia (Quinnell 1987, 7–12). The desire to use strikingly coloured, or specifically sourced flint during the Neolithic is therefore not surprising (Healy, 1985, 18–20; Saville 1981, 108). A similar pattern showing an apparent Neolithic preference for quarried or mined rather than surface-collected flint has been identified elsewhere (Barber *et al* 1999, 72).

Although only eight lithic items were found (six of which were unstratified), field 37 produced three finely produced probable Late Neolithic scrapers. Each was different in form and none shows any sign of focused, use-related wear: the ventral surfaces are pristine and undamaged. None of the three show any post-depositional abrasion or damage. One came from a small circular pit [313], fill (314), and was a finely-worked chert end-scraper, while the two unstratified pieces consisted of a round, dark, invasively retouched side scraper and a finely retouched near horseshoe form. The fresh, undamaged appearance of these pieces, found in the vicinity of a small number of pits and gullies, would suggest that the flint and pits are contemporary. The deposition of artefacts within small pits is a recognised and not uncommon component of Neolithic activity (Thomas 1991, 59; 1999, 64). The remaining, residual flint from this field is not diagnostic. It is all slightly abraded and would not be out of place in a later Neolithic or an Early to Middle Bronze Age context.

In addition to the above, an underlying Late Neolithic presence is also suspected for an assemblage from fields 3, 3a and 4, although no accompanying Neolithic pottery was found and the radiocarbon determinations are of an Early Bronze Age date (see discussion of Sennen stone setting, below). A close affinity between Early Bronze Age sites, particularly Beaker-period, and Late Neolithic flintwork has been noted elsewhere (Case 1977, 78; Edmonds 1995, 137), as, for example, at Belle Tout in East Sussex (Bradley 1970, 356–9).

Later Neolithic material (Table 8) was often in good condition, although unfortunately frequently unstratified. Late Neolithic flint assemblages do quite often contain a wider range of tool types than that found in earlier assemblages, they also often overlie earlier centres of activity; however, they have been noted to extend into new areas which may contain little or no evidence for previous activity (Thomas 1999, 21). Intriguingly, in field 37 the only specific tools found were scrapers. These are the commonest type of tool found in Late Neolithic contexts (Butler 2005, 166; Edmonds 1995, 96; Malone 2001, 226). Given the quality of scrapers found in field 37, it is possible that either selective deposition was taking place or perhaps more probably that a specialised function was being undertaken here. In the case of fields

9 and 10 a greater range of tools was identified and this too can be an indicator for many Later Neolithic flint scatters (Bradley 1987, 184; Thomas 1999, 21).

Table 8 Flint artefacts of later Neolithic date

Field 9	1 pebble, 1 core, 2 flakes, 1 blade, 1 knife, 1 scraper, 1 projectile, 4 miscellaneous tools, 3 waste
Field 10	3 split pebbles, 1 core, 1 flake, 1 blade, 1 scraper, 2 denticulates, 2 knife / scrapers, 3 projectiles, 10 miscellaneous tools, 2 multi-functional tools, 10 waste
Field 37	2 flakes, 2 scrapers, 1 knife / scraper, 1 burin, 1 miscellaneous tool, 1 waste

Late Neolithic and Bronze Age activity around the Sennen stone setting (field 4)

Field 4 contained a series of pits, positioned within and around a stone setting (above). The majority of the finds from this area were stone, primarily worked flint. A majority came from small pits, most of which did not contain any other diagnostic material. All of the flint had a Late Neolithic or Bronze Age character spanning the late third to second millennium cal BC period and extending towards the Middle Bronze Age. This suggests that this particular location was significant over a prolonged period (see discussion below).

With one exception, the flintwork is flake dominated and often in a fresh and undamaged state. The majority of the material came from undisturbed pit contexts within an area that shows no sign of recent cultivation. Contexts (12), (14) and (44), in pits [13], [15] and [42] respectively, all produced Early Bronze Age radiocarbon determinations, spanning the first half of the second millennium cal BC. Much of the material was unused or unmodified flake waste, with pit contexts (12), (14), (16) and (18) producing notable concentrations. Interestingly, there were few recognisable cores to go with this material. Pit contexts (12), (16) and (24) also produced notable amounts of fire- or heat-crazed flint, in conjunction with variable amounts of charcoal. This may indicate that flint was deliberately heated in order to improve or alter its qualities, either in terms of working or of colour. Experimental work carried out by Lee (2001, 39–44) has demonstrated that heat can be used as a means to manipulate flint by increasing its predictability during working. It was also found that heating flint had the additional effect of altering colour. This assemblage included a range of differently coloured pieces of flint which may be a consequence of heat treatment (a minority did display the crazing associated with heating).

Retouch is limited but varies from abrupt and sometimes denticulated – for example, the fluted, mottled brown scraper **L9** from (18) and the mottled grey pebble tool **L10** from (36) – to the neater, shallower retouch seen on, for example, a pale grey sharply convex, nosed scraper **L11** found unstratified on the old land surface between the granite rocks, a dark grey squat knife piece with thermal blistering **L12** from context (241), and on a unstratified pale cream projectile piece **L13** (Fig 15). This last piece could well be Late Neolithic in date and was relatively more abraded, suggesting either surface wear and tear due to exposure on the old land surface or perhaps post-depositional disturbance. A fine blade and bladelet core **L1** from pit fill context (18) would not be out of place in a Mesolithic or Early Neolithic context. Both these last two pieces were more abraded than the flint waste found in pits.

A single corticated dark mottled grey flint **L14**, from fill (44), showed marked glossing across much of its ventral surface, extending partially over its dorsal retouched working edge. Interpreted as a dual-function knife / scraper, the glossing indicates wear or polish through hafting (Keeley 1980, 49; Rots and Vermeersch 2004, 159). The presence of gloss and its extent clearly indicate that the tool was used, while its clarity, like some of the other flint sealed in pit contexts, is the result of good preservation due to a lack of post-depositional disturbance and surface exposure.

The pits, regardless of date, were dug down through an existing, potentially multi-period scattering of flint associated with a probable remnant old land surface (18) which was identified between the rocks. This old land surface produced 16 pieces of flint, much of which was undiagnostic, variably abraded or classified as waste. The pieces included a probable burin (possible blank), awaiting modification, made on a chert blade **L15** (Fig 15).

Well in excess of 50 per cent numerically of the field 4 assemblage is waste, much of it well-preserved since deposition. Given the apparent deliberate incorporation of fresh waste material in selected pits, it is likely that much of the flint and some of the pits are contemporary with on-site knapping activity. The relatively limited range

of utilised pieces would suggest that this is not a specifically domestic assemblage. However, given the range of dates indicated by the flint and pottery from this field, it is probable that the character of activity at this location varied markedly over time.

Numerically much of the more diagnostic flint from field 4 is Early Bronze Age, while the remaining material is possibly earlier, with a probable Late Neolithic date. Whether this earlier material is contemporary with the original excavation of any of the pits is uncertain. Certainly there are pits of probable later date in the field which contain flint alongside much later finds; for example, industrial waste in pit [33], fill (36), and modern pottery in pit [237], fill (238). The recovery of flint from a large pit of recent date, set slightly away from the main scatter and pit concentration, indicates that prehistoric activity did extend beyond the immediate pit and boulder concentration, although given the small number of pieces involved it is likely that this activity was less focused.

In addition to field 4, other fields along the pipeline may well include Bronze Age material of less distinctive forms, including fields 38 and 39b which produced undiagnostic material of a frequently slightly chunky, flake-based character, as well as material of earlier date.

Table 9 Flint artefacts of later Neolithic / Bronze Age date from field 4

Field 4	3 pebbles, 2 split pebbles, 2 pebble tools, 8 cores, 3 core tools, 6 flakes, 9 blades, 7 knives, 4 scrapers, 3 denticulates, 2 burins, 2 knife / scrapers, 9 knife / cutting flakes, 2 projectiles, 165 waste, 3 point / awl / piercer, 10 miscellaneous tools, 1 multi-functional tool

Beaker-associated sites at Sennen and Trebehor

Field 13

The Early Bronze Age material represents the best stratified component of the pipeline's flint assemblage. Two discrete collections of material were identified, all associated with Early Bronze Age radiocarbon determinations and variable amounts of Beaker pottery. In field 13, a collection of Beaker-associated material was recovered from structure 108 and associated pits, postholes and stakeholes; to the south in field 24, a single pit [261] produced a further range of worked flint and other stone, as well as a substantial number of Beaker sherds.

Field 13 produced 106 stratified and three unstratified pieces of flint, plus a large number of stratified Beaker sherds from a series of pit fills and deposits associated with a structure radiocarbon dated to the Early Bronze Age. Flint was found within all four of the radiocarbon dated contexts. Generally the flint from this site is chunky in appearance and heavily flake-based, with a relatively high proportion of pieces showing use. These used pieces or tools were often barely modified with a minimum of retouch (if any). They do not display any of the concerns with appearance or the rigid conformity to design that can be seen in earlier toolkits, but despite this they would have functioned well. They would have been quick to produce, instantly usable, and ultimately more disposable in terms of time expenditure.

The assemblage from field 13 included two cores, two split pebbles, one core tool, two scrapers, two denticulated flakes, three burins, one piercer / point, two multi-function tools, 19 miscellaneous tools, 12 knives, one projectile, 51 pieces of waste with no obvious scope for use and a further 11 (mostly simple flakes) with potential but no macroscopically visible use. The lack of cores indicates either that they had been discarded or deposited differently, or, perhaps more probably, that the primary reduction site was located away from the structure, minimising the danger from countless small, sharp pieces of flint.

The majority of the pieces from this assemblage were unabraded, with only two pieces displaying more generalised or all-over abrasion. Of the 12 contexts to produce flint on this site only three produced flint without other artefacts: context (90), the top fill of pit [91], the fill (138) of pit [142] cut into the base of hearth [105], and the basal fill (159) of stone-lined pit [129]. The remaining contexts which produced flint also produced pottery, daub and / or miscellaneous stone. The flint from this site should be seen as a significant and contemporary component of the 'domestic', utilitarian context.

Selected pieces have been illustrated from a number of contexts, designed to show the range and variety of flintwork (Fig 16). The pieces include two pale brown chert knife flakes, both reasonably large compared to the rest of the assemblage, one (**L16**) from context (90) with no preparatory retouch and the other (**L17**),

with a small convex area of working, recovered unstratified from the general area. A pale chert multi-platform flake core was also found in field 14 immediately to the south. Two carefully formed but unretouched pieces are represented by **L18** from context (89), an engraver tool with a burin removal which was probably hafted at the bulbar end, and **L19**, a probable blank from (102). Both were made on strikingly dark flint. **L19** displays some evidence for having been heated, suggestive of heat treatment rather than accidental alteration. Flint **L20** from (101), the upper fill of hearth [105], is a small, pale tan-coloured transverse arrowhead, a form found in both Late Neolithic and Early Bronze Age contexts (Green 1984, 34). Devaney (2005) suggests that arrowheads found in domestic rather than, for example, burial contexts, will often be smaller and less meticulously worked and, as a result, they are often less immediately diagnostic. Chert **L21**, again from (101) and pale in colour, is a borer, showing clear but delicate crushing along one ridge and slight damage or nicking on the two lateral edges. It also has a functional-looking secondary point. A short but sharp barb-like projection may also have been utilised as a piercer, making this a multi-functional tool.

Two knives, both slender, showing delicate lateral retouch and made again on distinctive black flint are also illustrated (Fig 16): **L22** from (101) and **L23** from (126). **L23**, although thin, is akin to a modern penknife in appearance, with a neatly retouched, near-straight working edge and an opposing non-sharp edge which links into the slightly broader, stepped, hand-held or hafted bulbar end of the blade.

Of the total 109 pieces from this site, 30 displayed signs of fire damage: surface crazing, chalk-like discolouration, blistering and ultimately shattering. Seven pieces came from upper fill (89) of the structure and 18 came from hearth context (128). Twenty of the 27 pieces from context (128) are unmodified, and have left no macroscopically visible use-wear, suggesting that the hearth was a focus for either knapping or the disposal of tertiary waste material that had resulted from tool manufacture. Context (104), possibly an extension of (128), shows a similarly high proportion of tertiary material, ten out of a total of 15 pieces.

Some of the altered material could potentially be the result of heat treatment, whereby the working potential and / or colour of the flint were altered or manipulated (above). The range of colours noted might suggest that either this was successfully taking place, with the production of distinctively coloured tools, or that choice of material for tool manufacture was sometimes selective and based on colour as well as raw material quality. Beaker-period flint industries appear to show some affinities with Late Neolithic assemblages (Case 1977, 78; Bradley 1970, 356–9), and this apparent concern with colour may represent one such link.

Field 24

Unlike the domestic setting and character of the flint material from field 13, field 24 produced a different, perhaps more deliberately inclusive, representative or meaningful range of material. Two contexts produced flint. A small prehistoric pit [262] contained only a single waste flake but pit [261], fill (260), produced a significant and apparently orchestrated range of different finds, including 24 pieces of worked flint and sherds of Beaker pottery (Quinnell, above). In addition, a selective range of other stonework was deposited, including two rubbing stones, a jasper pebble and a quartz crystal (Quinnell, above). The pit gave an Early Bronze Age radiocarbon date. The range of stone types, in combination with the range of functions the pieces suggest, would suggest the deliberate selection and deposition of flint, pottery and stone artefacts.

The flintwork from (260) included a range of tool types: one potentially unused flake, five knives, three scrapers, one denticulate, one knife scraper, two knife flakes, three projectiles, two miscellaneous tools and one probable arrowhead blank. There were five pieces of waste. Not all of the identified tools have necessarily been extensively retouched, with classification based on both form and unmodified or spontaneous use. This assemblage as a whole is composed of flakes, mostly 25–40mm long with one smaller and the longest (a slightly denticulated piece) 52mm long. Most of the larger pieces were the least worked. The illustrated pieces fall within the general size range and most are made on pale to mid-grey flint, frequently mottled with white or pale grey flecking. This colouration is typical of locally sourced beach flint. There are, in addition, pieces that range in colour from pale cream to jet black, which may have been more selectively collected in prehistory.

The illustrated pieces (Fig 16) are all from pit [261], fill (260), in field 24 and include a small

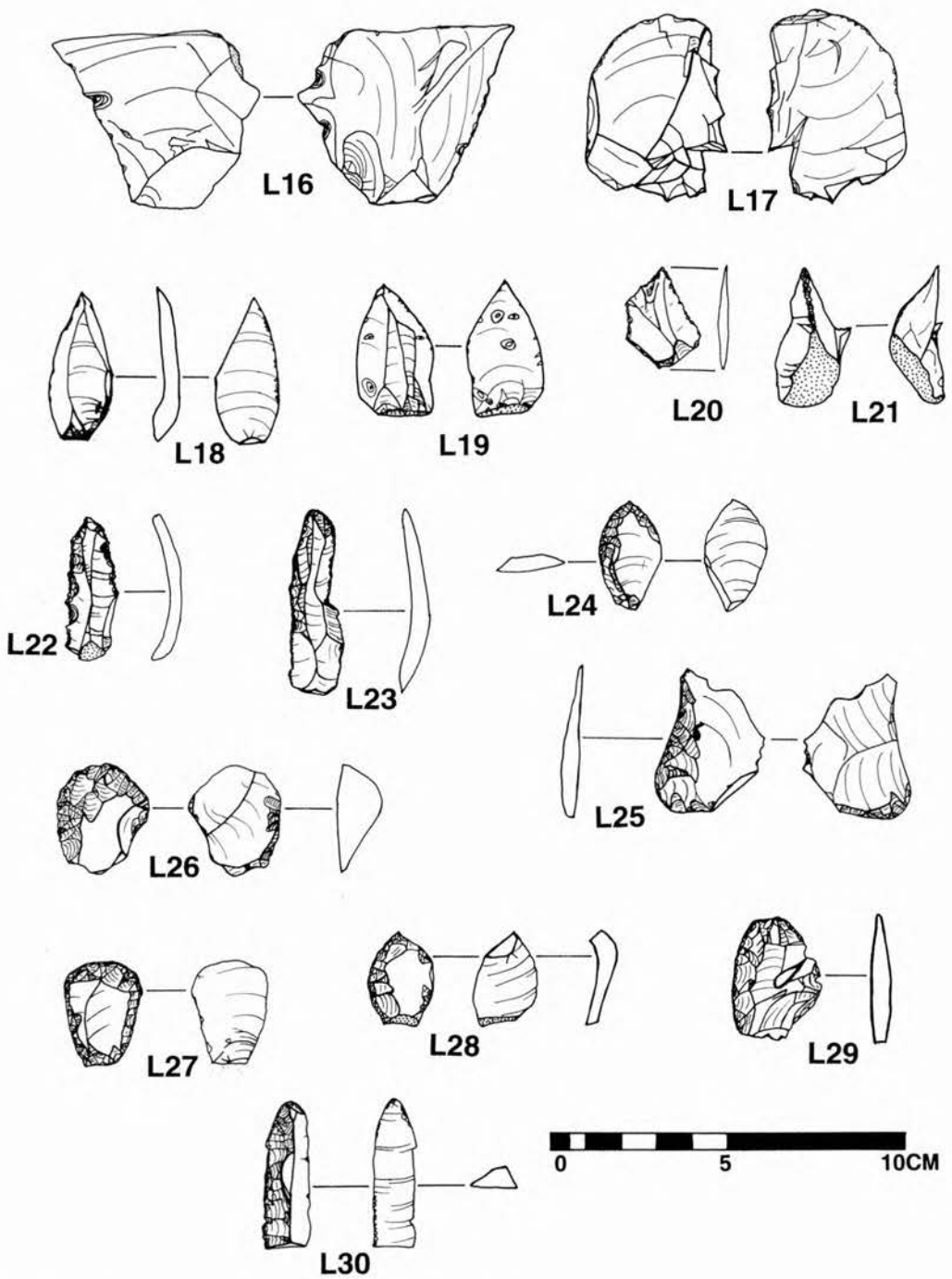

Fig 16 Flints ***L16–L30****. (Drawings: Anna Lawson-Jones.)*

pale mottled grey leaf-shaped arrowhead **L24**; a pale mottled grey transverse arrowhead **L25**; a dark mottled grey ovate knife / scraper with end and side retouch and an indent **L26**; a pale mottled grey end and double-sided scraper with evenly balanced retouch extending down both sides to the bulbar platform **L27**; a small, finely retouched, mottled grey, notably thick scraper **L28**; and a pale grey short knife, with fine lateral retouch on a flake **L29**. In addition, a very finely worked and highly distinctive knife **L30** on a jet-black, triangular-section blade was found. This piece has finely executed small flakelet removals with overlying nibbled retouch extending up one side only. The opposing side is untouched, as is the ventral face, indicating that it was barely if ever used. This pattern of pressure-flaked retouch – fine, balanced and neat – was sometimes near invasive in character and was recorded on many of the retouched tool forms. Many of the most finely-worked pieces have seen very little if any use, but instead appear to have been collected and then deposited into the pit. They may have been specifically made for inclusion. Indeed, none of the material from this pit was worn, abraded or obviously damaged, suggesting that none of it was accidentally included as residual material.

The Early Bronze Age assemblages from fields 13 and 24 are not only significant in themselves, but also in terms of their contrasting contexts and site types. Field 13 produced a domestic assemblage focused around a structure with associated Beaker pottery. These pieces are essentially utilitarian in character, with little obvious concern or effort in terms of time involved in the actual production of the simple, flake-based used pieces. With the possible exception of an interest in the colour of some pieces, this assemblage appears to have been designed for short-term, immediate use and discard. The fact that many of the pieces are fresh is the result of them having been included within pit fills. It is uncertain whether this implies that all flint was ideally discarded in a set way, that only some material was so treated or that the collection represents only a portion of what would have been a much larger assemblage. Depending on the answer, we either have here a near-total range of material, a deliberately selected group or an arbitrary and piecemeal collection. Given the inclusion of a range of other material, including Beaker sherds from a number of vessels (Quinnell, above), it is tempting to suggest that these pits include the majority of the flint used on site, representing both the systematic 'clearing up' of the residues from short-term events and the ritualised 'closing down' of the site.

Field 24, by contrast, produced a pit with an apparently orchestrated range of finds, which included a smaller but distinctively different range of pieces from those found in field 13. Again the pieces were associated with Beaker pottery and an Early Bronze Age radiocarbon date (below). Just over half the pieces showed limited use-wear, but interestingly many of the most diagnostic pieces, which had required the longest amount of time to work in terms of modification, did not show obvious signs of use, suggesting conspicuous waste and a non-utilitarian reason for their production. The material ranged from meticulously retouched, visually impressive pieces to simple, barely modified but utilised flakes. Combined they represent a near-complete range of tool forms, including arrowheads, knives and scrapers. Although the exact circumstances governing the selection of material for specific deposition in the pit is not understood, it is easy to see the more beautifully worked, sometimes pristine pieces as 'offerings' and the more rapidly produced, utilised pieces as utilitarian, possibly used during events associated with the deposition process.

Table 10 Flint artefacts from fields with Beaker-associated features

Field 13	2 split pebbles, 2 cores, 1 core tool, 11 flakes, 12 knives, 2 scrapers, 2 denticulates, 1 projectile, 1 point /piercer, 3 burin / engravers, 19 miscellaneous tools, 2 multi-functional tools, 51 waste
Field 24	1 flake, 5 knives, 3 scrapers, 1 denticulate, 1 knife / scraper, 2 knife flakes, 3 projectiles, 2 miscellaneous tools, 7 waste

The chert

Rosemary Stewart

Greensand chert

Twenty pieces of greensand chert were identified in the overall lithic assemblage from the pipeline. This represents four per cent by number of the total assemblage of 502 lithic artefacts.

Greensand chert outcrops in the deposits of Cretaceous siliceous sandstones of east Devon (Arkell 1978). However, it also erodes from bedrock occurring under the English Channel (C

D R Evans 1990), and pebbles and cobbles of this rock-type may be collected from Cornish beaches (Smith 1987). Seven of the greensand chert pieces exhibit beach pebble cortex.

The range of colour is from orange to biscuit-brown and this colour range, along with the grainy nature of the chert, is typical of material found in Cornwall. A number of pieces have been identified as tools by Lawson-Jones (above). The shape and size of the pieces is variable, ranging from the 55.3 mm long knife **L16** to a small piece of debitage 16.6 mm in length. There is no particular debitage type but there are a variety of flakes with a few blades, including a microlith from field 26. The main distribution of the greensand chert pieces within the excavated area shows no definite pattern apart from six small pieces of debitage that were associated with the pit complex around the stone setting in field 4.

The pebble cortex and chert characteristics suggest that this material was collected from local beaches and the general distribution across the site indicates functional use alongside flint. Lawson-Jones (above) has identified four chert knives and the coarser nature of greensand chert together with its toughness may have been the reason for its utilisation in the manufacture of knives. A greensand chert core from field 14 has also been identified, which suggests that this material was knapped on site. The small pieces found together in field 4 are likely to reflect the general use of greensand chert together with flint at the site rather than deliberate deposition.

Portland chert

Five pieces of Portland chert were identified at the site, one per cent by number of the total assemblage.

The pieces discovered during the fieldwork are small in comparison with the size-range of the main lithic assemblage (Lawson-Jones, above). Three are small, tertiary pieces with the appearance of thinning flakes. One is a little larger and has a tiny area of pebble cortex at the proximal end. Another is a portion of a small, broken beach pebble.

The contexts in which these pieces of Portland chert were found are of interest. A single piece was discovered in stone-lined pit [129], close to Beaker structure 108 in field 13. This pit was associated with a radiocarbon date of 3860 ±30 BP, 2470–2270 cal BC (SUERC-21076) (84.1 per cent), which suggests the movement of Portland chert around Cornwall in the second half of the third millennium cal BC. Four pieces of Portland chert were recovered from the pit complex around the stone setting in field 4. Two tiny pieces were recovered from pit [17] and another small piece with a little bit of the original surface on it was found in pit [23]. The last piece, a broken pebble, was found in association with an old land surface (18), which was adjacent to the pits and the boulders that formed the stone setting. The distribution indicates the deliberate deposition of this material in prehistory rather than accidental inclusion in the pits, a view concurred with by Richard Bradley (pers comm). Three radiocarbon determinations from pits around the stone setting gave early to middle second millennium cal BC dates, suggesting that the site was a focus for activity over several centuries.

A fifth piece of Portland chert was found within material from boundary 38 in field 30. It is probable that this piece is residual and was scraped up onto the boundary during its construction.

Very small amounts of Portland chert occur in a number of other lithic assemblages in Cornwall, for example on the Lizard, including at Poldowrian (Smith and Harris 1982; Smith 1987), at Carn Brea and Helman Tor (Saville 1981; 1997), and from sites such as Dozmary Pool on Bodmin Moor, Maker Heights at Rame, Wimalford in St Cleer, Men an Tol, Madron, and North Cliffs, near Portreath (author's research).

Rankine (1951) recognised that artefacts of Portland chert are found in prehistoric sites across the south of England, far from the raw material source, approximately 250 km to the east of Land's End in the Jurassic limestones of the Isle of Portland (Edmonds *et al* 1975). Palmer (1970) showed that Portland chert has been exploited on the Isle of Portland since the Palaeolithic period and added considerable evidence to Rankine's theory of the transport of this material away from the Isle of Portland in prehistory.

The undersea outcrops of Portland chert are concentrated off the Dorset coast (Hamblin 1992) and are far less widespread than those of the greensand chert. The movement of long-shore drift is west to east so it is unlikely that Portland chert pebbles could arrive on a Cornish beach in this way. However, Smith stated that the presence of pebble cortex on a Portland chert fragment found

at Poldowrian (Smith and Harris 1982) shows it to be a beach pebble and therefore not 'imported'. Berridge and Roberts (1986) also discuss the possibility of local beaches as the source for Portland chert in their paper on the Mesolithic period in Cornwall. The complex nature of drift deposits in the Western approaches means it cannot be ruled out that an occasional Portland chert pebble may have been found on Cornish beaches.

Summary

The pattern of deposition of a small amount of Portland chert around the stone setting site in field 4, suggests that it was regarded as a special material and was perhaps an offering. This fits well with what Anna Lawson-Jones suggests for the flint assemblage (above). The broken Portland chert beach pebble found in association with the old land surface (18) is of particular interest. Most of the Portland chert objects that have been found in Cornwall are either small secondary and tertiary flakes or finished tools. The small size of the pebble suggests that it was not collected as raw material for tool making but was carefully curated for some other purpose prior to deposition, perhaps in a similar way to some of the other artefacts, such as the flint and pottery in stone-lined pit [261] (above).

Charcoal

Dana Challinor

The analysis of charcoal recovered from samples obtained during the recording work focused on two areas identified as having the greatest interest: the Beaker-associated pits in field 13 and the prehistoric features in field 4. In addition, a further Beaker pit in field 24, a pit in field 38 which contained most of a later prehistoric vessel, and two undated (but very rich and probably contemporary) pits were also examined. Subsequent to the analysis, radiocarbon dating (below) revealed that the majority of the features were Beaker in date, with a few slightly later pits in fields 4 and 38 dating to the Early Bronze Age and Early to Middle Bronze Age.

With one exception, the samples from field 4 produced little charcoal so a detailed assessment approach was adopted to provide a broad characterisation of the assemblages. The results from 24 samples are presented in this report, including eight samples which were analysed in full. The aim was to provide a species list for the Beaker period, in particular, and explore the selection of firewood.

Methodology

The assessed samples were scanned at low magnification and a random selection of charcoal fragments was identified. The assemblages were recorded on a scale of abundance to show dominant species, where applicable. The richer samples which were analysed in full were divided, to provide an optimum count of about 100 fragments. The charcoal was fractured and sorted into groups based on the anatomical features observed in transverse section at x7 to x45 magnification. Representative fragments from each group were then selected for further examination using a Meiji incident-light microscope at up to x400 magnification. Maturity was recorded where possible. Identifications were made with reference to Schweingruber (1990), Hather (2000) and modern reference material. Classification and nomenclature follow Stace (1997).

Results

The results of the analysis by fragment count (full analysis) and scale of abundance (scanned samples) are shown in Table 11. The charcoal was generally well-preserved but often covered with sediment or the structure was soft, which made fracturing difficult. A limited range of seven taxa was identified: *Quercus* sp. (oak), *Betula* sp. (birch), *Alnus glutinosa* (alder), *Corylus avellana* (hazel), *Prunus* sp. (cherry type), Maloideae (hawthorn group) and *Cytisus / Ulex* (broom / gorse). Oak heartwood was positively identified in most samples (on the basis of presence of tyloses) and appeared to form a significant component of some assemblages. However, the identification of sapwood is less reliable since the absence of a characteristic is harder to confirm than its presence, so it is likely that sapwood is under-represented in the record. Although roundwood fragments were identified by growth ring curvature, there were no whole stems noted. The indeterminate fragments were not identifiable because of poor preservation or distorted anatomical structure but are likely to represent additional specimens of taxa positively identified.

Discussion

All of the taxa recorded are native to Britain and would have been locally available. Oak dominates the samples, followed by hawthorn group and hazel (Fig 17). This suggests that oak-hazel woodland was commonly exploited for fuel-wood, along with woodland margins, represented by blackthorn / cherry and the hawthorn group. The use of alder indicates the gathering of fuel-wood from wetland or damp areas. Birch is a light-demanding, often pioneer species. Further evidence for open areas is provided by gorse / broom, which indicates the use of heathland resources.

The results from the pits dated by radiocarbon dating to the Early Bronze Age (pit [42]) and middle second millennium cal BC (pits [13] and [355]) were not dissimilar from the Beaker assemblages, being also largely dominated by oak. This could signify consistency in woodland resources and exploitation, but the dataset is limited and biased by the derivation of the fuel-wood.

The exact origin of the charcoal is uncertain: the feature types sampled (pits and hearths) usually represent dumps of spent fuel-wood but there may be burnt structural remains as well. The overwhelming use of mature oak trees in the dataset does suggest that oak was plentiful and that potentially valuable timber trees were used for fuel as well as other potential structural uses. Evidence from a Bronze Age structure at Boden Vean (St Anthony-in-Meneage), on the Lizard, indicated that firewood consisted mainly of oak heartwood but also included hazel and gorse / broom (Gale 2005).

The results are consistent with the charcoals from other Late Neolithic and Early Bronze Age sites in Cornwall which indicate the exploitation of oak-hazel woodland, with additional evidence for heathland areas (for example, Challinor, forthcoming; Gale 2006; Cartwright 1988). Oak-hazel woodland is thought to have dominated Cornwall throughout the Neolithic period (Wilkinson and Straker 2008) and the Sennen charcoal suggests that this continued into the Beaker period.

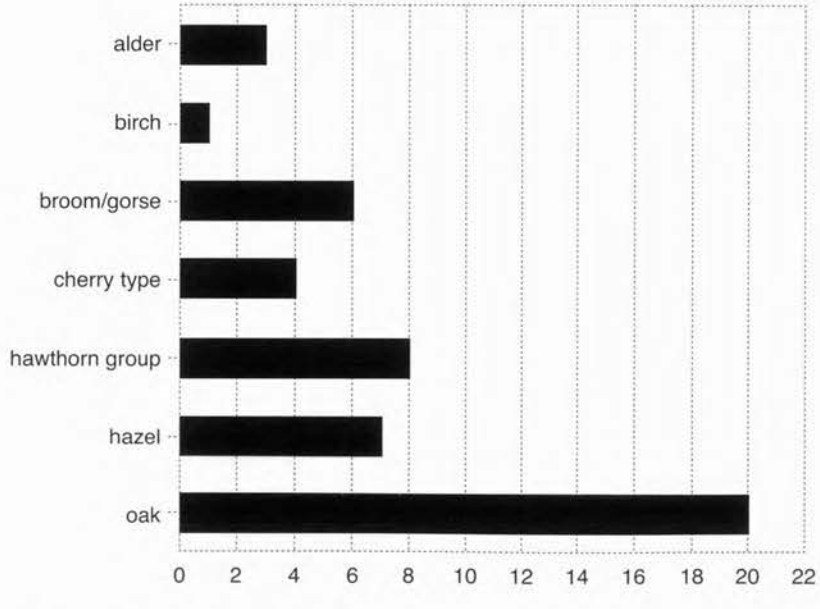

Fig 17 Frequencies of charcoal taxa from samples (see text for details).

Table 11 Results of the charcoal analysis
Key: r = roundwood; h =heartwood; + = <5; ++ = 5–25; +++ = 25–100; ++++ = >100; X = dominant

		Field 4					*Field 13*												*Field 24*			*Field 38*		
Feature		Pit [13]	Pit [15]	Pit [42]			Pit [91]		Hearth [105]			Structure 108				Pit [127]		Pit [129]	Pit [261]	Pit [277]		Pit [355]		Pit [360]
Context no.		(12)	(14)	(43)	(44)	(212)	(90)	(95)	(128)	(134)	(138)	(89)	(89)	(89)	(103)	(103)	(104)	(143)	(102)	(260)	(281)	(282)	(356)	(357)	(361)
% flot identified						100			3.13					25		25	6.25		100	100			12.5		
Quercus sp.	oak		+ r	+	+	133 hr	X	X	126 hs	X	X	X	X	83h	X	110 h	114 hs	X	30h	34h	1hr	X hr	93 h	X	X hr
Betula sp.	birch																		2						
Alnus glutinosa	alder													5		1 r				18 r					
Corylus avellana	hazel								1		+			5 r			2		12 r	4 r			4		
Alnus / *Corylus*	alder / hazel								2										11	21 r					
Prunus sp.	cherry type	+		+										1						2					
Maloideae	hawthorn / pear / apple				+	2								1			2	+	3	3 r			1		
Cytisus/Ulex	broom / gorse	+r	+r	+r	+r																		2 r	+ r	
Indeterminate						1								2		3			3	7			2		
Total		++	++	++	++	136	++	++	129	+++	+++	++	+++	97	+++	114	118	+++	61	89	1	++++	102	++++	++++

Charred plant macrofossils

Julie Jones

Thirty-seven samples for palaeoenvironmental analysis were examined under a low-powered binocular microscope and charred cereal grain and weed seeds extracted. Identifications were made with the aid of the author's reference collection and consultation with Jacomet (1989) for cereals, Cappers *et al* (2006) and Bertsch (1941) for seeds. The results are shown in Tables 12, 13 and 14. Nomenclature and habitat information is based on Stace (1997) (Table 15).

The charred plant remains

The assemblages recovered were all preserved by charring. The cereal grains were present in low concentrations and were generally in poor condition, mostly from the charring process which has caused distortion and fragmentation, often with the loss of the grain testa. The majority of the grains were wheat, which although in poor condition showed the long slim form characteristic of a glumed wheat, either emmer (*Triticum dicoccum*) or spelt (*Triticum spelta*). Barley and oat grains only occured as single examples from two features. No cereal chaff was found from any of the features along the pipeline.

Weed seeds occurred in many of the samples where cereal grain was present, generally well-preserved although overall concentrations were low. The majority of these were typical of grassland habitats, although similar assemblages frequently occur in association with charred cereal remains. Taxa present include ribwort plantain (*Plantago lanceolata*), dock (*Rumex*), pea / vetch (*Lathyrus / Vicia*) and smooth tare (*Vicia tetrasperma*), all typical of grassy habitats, which have been interpreted as intrusive elements invading cultivated land from field margins or adjacent pasture. Some samples also include tubers of onion couch (*Arrhenatherum elatius*), characteristic of coarse grassland communities, together with other unidentified charred tubers, root and stem fragments. Other species more typical of disturbed ground such as brome (*Bromus*), orache (*Atriplex*), fat-hen (*Chenopodium album*) and cleavers (*Galium aparine*) may have been growing as impurities in fields where cereal crops had been sown. Occasional finds of hazelnut (*Corylus avellana*) fragments and bramble (*Rubus* sect. *Glandulosus*) would have come from woodland edge or scrub and may have originated on wood meant for domestic use, perhaps as firewood, or represent the collection of fruit and nuts as a food source from local woodlands.

Results

THE SENNEN STONE SETTING (FIELD 4)

Ten samples from a group of pits and postholes were examined from the site in field 4 associated with the Early Bronze Age stone setting (Table 12).

Three pits, [13], [15] and [42], included small charred assemblages. The fill of pit [13] included a single hazelnut (*Corylus avellana*) fragment, with a small grassland assemblage including heath-grass (*Danthonia decumbens*), ribwort plantain (*Plantago lanceolata*) and vetch (*Lathyrus /Vicia*), with a number of indeterminate charred stem and root fragments.

The fill of pit [15] included several wheat (*Triticum*) grains, with a weed assemblage of grassland taxa similar to pit [13], with the addition of dock (*Rumex*), bugle (*Ajuga reptans*) and grasses (Poaceae). Radiocarbon dating of *Ulex* charcoal from this feature gave a date of 2140–1910 cal BC.

Three samples were examined from the primary (212), lower (44) and upper (43) fills of stone-lined pit [42]. *Ulex* charcoal from the lower fill provided a radiocarbon date of 1880–1690 cal BC. The three fills contained similar grassland assemblages with heath-grass and vetch, with one well-preserved example identified as smooth tare (*Vicia tetrasperma*), typical of rough grassy places and pasture. In addition there were examples of onion couch tubers (*Arrhenatherum elatius*) with other indeterminate tubers, root and stem fragments.

Five samples from pits [17] and [23], postholes / pits [34] and [217] and buried soil horizon (18) contained no charred plant macrofossils.

BEAKER STRUCTURE 108, SENNEN (FIELD 13)

There were 16 samples from seven features associated with the Beaker site in field 13; three of these features – pit [91], stone-lined pit [129] and posthole [97] – contained no charred plant remains.

The small sub-oval hollow-set construction contained a scorched area, possibly an internal hearth. The primary fill, layer (138) included a limited charred assemblage with several wheat grains, a single brome (*Bromus*) caryopsis and

Table 12 Charred plant remains from the Sennen stone setting

Context	Context description	Sample size (litres)	Flot size (ml)	Float description	Charred plant remains	
(12)	Fill of pit [13]	20	19	30% charcoal 70% mineral	*Corylus avellana*	1 frag
					Danthonia decumbens	1
					Lathyrus/Vicia	1
					Plantago lanceolata	1
					Poaceae	1
					Root frags	15
					Stem frags	3
(14)	Fill of pit [15]	24	14	50% charcoal 50% mineral	*Triticum* (grain)	3
					cf *Triticum* (grain)	4
					Cereal indet (grain)	1
					Ajuga reptans	1
					Arrhenatherum elatius	1 frag
					Carex	2
					Danthonia decumbens	7
					Galium aparine	1
					Lathyrus/Vicia	11 + 8 half cotyledons
					Plantago lanceolata	1
					Poaceae	2
					Rumex	6
					Stellaria media	1
					Root fragments	12
(212)	Primary fill of stone-lined pit [42]	20	8	30% charcoal 70% mineral	*Arrhenatherum elatius*	2
					Lathyrus/Vicia	2 + 7 half cotyledons
					Poaceae	1
					Vicia tetrasperma	1
					Indeterminate tubers	3
(44)	Lower fill of stone-lined pit [42]	40	13	40% charcoal 60% mineral	*Danthonia decumbens*	9
					Poaceae	3
					Root frags	2
(43)	Upper fill of stone-lined pit [42]	30	8	40% charcoal 60% mineral	cf *Arrhenatherum elatius*	1 frag
					Danthonia decumbens	19
					Lathyrus/Vicia	1
					Plantago lanceolata	2
					Poaceae	2
					Root fragments	11
					Stem fragments	1
(16)	Fill of pit [17] (cut by pit [23])	20	2	< 1% charcoal 99% mineral	None	
(24)	Fill of pit [23]	20	4	5% charcoal 5% mineral	None	
(35)	Fill of posthole [34] between boulders	6	2	< 1% charcoal 99% mineral	None	
(220)	Fill of posthole [217] at north end of pit [42]	5	1	1% charcoal 99% mineral	None	
(18)	Buried soil horizon cut by pits [15], [17] and [23]	40	< 1	< 1% charcoal 99% mineral	None	

hazelnut fragment. A further fill, layer (128), included a similar assemblage with the addition of a single oat (*Avena*) grain. Radiocarbon dating of *Corylus* charcoal from (128) gave a radiocarbon date of 2460–2140 cal BC.

There were two samples from the primary fill (103) and three from the upper fill (89) of structure 108. The primary fill included a minor concentration of charred wheat grains, with other indeterminate grain and an onion couch tuber.

Table 13 Charred plant remains from Beaker-associated structure 108 and adjacent features (field 13)

Context	*Sample*	*Context description*	*Sample size (litres)*	*Float size (ml)*	*Float description*	*Charred plant remains*	
(90)	1	Upper fill from pit [91]	Small bag	11	40% charcoal 60% mineral	None	
(95)	2	Primary fill of pit [91]	Small bag	12	5% charcoal 95% mineral	None	
(94)	3	Fill of posthole [97] cut into pit [91]	Small bag	< 1	1% charcoal 99% mineral	None	
(138)	12	Oxidised primary fill of oval hearth [105]	5	21	60% charcoal 40% mineral	*Triticum* (grain) cf *Triticum*(grain) *Bromus* *Corylus avellana*	3 3 1 1 frag
(128)	9	Fill of oval hearth [105]	10	1090	98% charcoal 2% mineral	*Avena* (grain) *Triticum* (grain) *Bromus* *Corylus avellana*	1 2 1 1 frag
(134)	13	Possibly redeposited, oxidised fill of oval hearth [105]	5	15	40% charcoal 60% mineral	None	
(103)	7	Primary fill of Beaker associated structure 108	20	230	80% charcoal 20% mineral	*Triticum* (grain) cf *Triticum* (grain) Cereal indeterminate (grain) cf *Arrhenatherum elatius* tuber Poaceae *Persicaria maculosa* Root nodule	16 3 5 1 1 1 1
(103)	16	Primary fill of Beaker associated structure 108	2	33	50% charcoal 50% mineral	*Triticum* (grain) Cereal indeterminate (grain)	1 2
(89)	4	Upper fill of Beaker associated structure 108	20	60	90% charcoal 10% mineral	*Bromus*	1
(89)	15	Upper fill of Beaker associated structure 108	2	45	80% charcoal 20% mineral	None	
(89)	17	Upper fill of Beaker associated structure 108 (NE quadrant)	0.5	4	100% charcoal	None	
(104)	8	Fill of linear stone-lined pit [127]	10	280	80% charcoal 20% mineral	*Triticum* (grain)	2
(143)	11	Fill of small cut beneath linear stone-lined pit [127]	5	37	90% charcoal 10% mineral	None	
(102)	6	Upper fill of stone-lined pit [129]	10	15	30% charcoal 70% mineral	None	
(159)	10	Primary fill of stone-lined pit [129]	10	2	10% charcoal 90% mineral	None	
(133)	5	Primary fill of pit [131] to west of Beaker site	10	3	20% charcoal 80% mineral	*Avena* (grain) *Triticum* (grain)	1 1

Corylus charcoal from one of the upper fills (sample 15) gave a radiocarbon date of 2300–2060 cal BC.

The fill (104) of linear stone-lined pit [127] only included a single wheat grain. Radiocarbon dating of Maloidae charcoal gave a radiocarbon date of 2300–2050 cal BC. Pit [131] to the west of the Beaker site had only single grains of wheat and oat.

Other features

Other features were sampled from further fields along the pipeline. The results are recorded in Table 14.

Layer (4), the fill of the isolated oval pit [5] in field 3, included a small assemblage of wheat grains, a single barley grain and further indeterminate grains.

In field 24 at Trebehor, the fill (260) of a Beaker pit [261] included a small disturbed ground assemblage including fat-hen (*Chenopodium album*), orache (*Atriplex*), redshank (*Persicaria maculosa*) and a hazelnut fragment. Radiocarbon dating of *Corylus* charcoal from this feature gave radiocarbon date of 2470 to 2200 cal BC.

In field 38 at Porthcurno, the primary fill (357) of pit [355], which contained sherds from a plain ceramic vessel, included 23 wheat grains, other poorly-preserved indeterminate grains and single examples of grass (*Poaceae*), bramble (*Rubus* sect. *Glandulosus*) and dock (*Rumex*). Radiocarbon dating of *Quercus* roundwood from this context gave a radiocarbon date of 1620 to 1450 cal BC.

Conclusion

Of the 37 samples analysed, 19 samples contained no charred plant remains and overall the density of crop remains was low, with no sample containing more than 23 grains, most samples averaging 3–4 grains. There was no cereal chaff.

The best evidence comes from the fill of structure 108 and the adjacent hearth [105], which was associated with the structure, where a small group of charred wheat grains and hazelnut fragments may relate to domestic activities. The similarly dated fill (260) of stone-lined Beaker-associated pit [261] in field 24 was found to contain weeds typical of arable cultivation such as orache and fat-hen, which may have originated from burnt crop processing waste.

By contrast, the macrofossils from the Early Bronze Age contexts associated with the stone setting are largely grassland taxa, with the exception of several wheat grains from the fill of pit [15]. In addition to other indeterminate tubers, root and stem fragments, are the fragmented remains of onion couch tubers. Onion couch is a perennial clump-forming grass, which reproduces vegetatively from bulbous fragments called corms and forms part of a community of coarse-leaved tussock grasses (MG1 *Arrhenatherum elatius* grassland) as described by Rodwell (1998, 32).

This species is interesting due to the presence of tubers in a charred form that has now been recognised from several sites in Cornwall and suggests the uprooting of this grass; this would not have been necessary as part of normal harvesting practises if they had occurred as part of a community growing amongst cereal crops. Other taxa recovered from the stone setting that occur in this community include ribwort plantain, dock and cleavers. All these species have been identified as components of turves, although they also frequently occur as part of charred arable weed assemblages, associated with cereal crops. An additional species, heath-grass (*Danthonia decumbens*) a tufted perennial grass common on moorland and rough, rather wet grazing land, is also sometimes taken as an indicator of imported turf. Hall (2003) suggests that charred evidence from these grassland taxa may represent turf used as fuel or as a component of kiln construction.

Comparisons with other sites

Charred grain-rich deposits and knowledge of crop husbandry practices from Cornwall are limited, despite the large-scale sampling and sieving programmes undertaken (for example, Jones and Taylor 2010). Although the evidence from the Bronze Age and later periods is increasing, evidence for cereal cultivation from grain, chaff and arable weeds often only occurs at low densities, making interpretations of economic value difficult. In addition, many of the contexts examined are of a secondary nature and therefore represent re-distribution of material from its original context.

However, the data obtained from pit [355] have increased knowledge of the Middle Bronze Age period (*c* 1500–1000 cal BC). At Boden Vean (St Anthony-in-Meneage), samples from the floor of a hollow thought to be part of a Middle Bronze Age roundhouse included a small assemblage of cereal grains, suggesting the utilisation of crops

Table 14 Charred plant remains from other features

Context	*Sample*	*Context description*	*Sample size (litres)*	*Float size (ml)*	*Float description*	*Charred plant remains*	
Field 11							
(85)	14	Fill of pit [86] next to ditch fill (84) - prehistoric	4	8	80% charcoal 20% mineral	None	
Field 3							
(4)	18	Fill of isolated oval pit - prehistoric	20	24	50% charcoal 50% mineral	*Hordeum* (grain) cf *Hordeum* (grain) *Triticum* (grain) cf *Triticum* (grain) Cereal indeterminate (grain)	1 2 10 12 9
Field 24							
(260)	30	Fill of Beaker pit [261]	18	40	40% charcoal 60% mineral	*Atriplex* *Chenopodium album* *Corylus avellana* *Persicaria maculosa*	1 1 1 frag 2
(281)	31	Upper fill of burnt pit [277]		150	100% charcoal	None	
(282)	32	Primary fill of burnt pit [277]	18	740	90% charcoal 10% mineral	None	
Field 37							
(320)	33	Upper fill of pit [319]	18	12	1% charcoal 99% mineral	*Arrhenatherum elatius* *Lathyrus / Vicia* *Odontites / Euphrasia*	3 + 6 frags 1 1
Field 38							
(357)	35	Burnt primary fill of pit [355]	10	350	90% charcoal 10% mineral	*Triticum* (grain) cf Triticum (grain) Cereal indeterminate (grain) Poaceae *Rumex* *Rubus* sect *Glandulosus* Stem frags	23 4 10 1 1 1 2
(356)	34	Upper fill of burnt pit [355] –	10	218	90% charcoal 10% mineral	*Triticum* (grain) 2 *Arrhenatherum elatius* 1	
(361)	36	Fill of pit [360]	5	750	99% charcoal 1% mineral	None	
Field 22							
(389)	37	Lower fill of ?natural hollow or palaeochannel	5	55	1% charcoal 99% mineral	*Arrhenatherum elatius* *Danthonia decumbens* Indeterminate tuber	1 6 1

of hulled and free-threshing wheat and barley (J Jones 2004a). Similarly, a Middle Bronze Age roundhouse at Trethellan (Straker 1991), near Newquay, showed cultivation of predominantly naked barley, with emmer and a small number of oats (either cultivated or wild), with occasional Celtic bean. As at Boden Vean, the settlement at Trethellan was adjacent to a contemporary field system so it is likely that the crops were locally cultivated.

Samples from three Middle Bronze Age hollow-set roundhouses at Scarcewater provided little direct macrofossil evidence for domestic activities within the houses. There, grassland taxa dominated the weed assemblages in association with low-density cereal crop evidence (J Jones 2010). A hollow-set Middle Bronze Age roundhouse at Trevilson, close to the north Cornwall coast, also produced sparse plant remains from a range of features (J Jones 2004b) There was, however, evidence for cultivated crops of wheat, barley, possibly oat, Celtic bean and garden pea from posthole fills, with a sample from a shallow scoop [532] producing a cache of fragmented Celtic beans, thought to have been accidentally charred as part of food preparation, all subsequently incorporated in post and stakehole fills with fuel debris.

Table 15 Key to charred plant remain

Cereal grain	*Common name*	*Habitat*
Avena sp.	Oat	#
Hordeum sp.	Barley	#
Triticum sp.	Hulled wheat	#
Weeds		
Ajuga reptans L.	Bugle	G (w), W (shady)
Arrhenatherum elatius (L.)P. Beauv. Ex J.S.& C. Presl	False-Oat-grass/onion couch	DGHs
Atriplex sp	Orache	CDn
Bromus sp.	Brome	CD
Carex spp.	Sedge	GMPRW
Chenopodium album L.	Fat-hen	CDn
Corylus avellana L.	Hazel	HSW
Danthonia decumbens (L.)DC	Heath-grass	Ew
Galium aparine L.	Cleavers	CHSo
Lathyrus/Vicia spp.	Vetch	DG
Odontites/Euphrasia sp	Bartsia/Eyebright	CD
Persicaria maculosa Gray	Redshank	Cdo
Plantago lanceolata L.	Ribwort Plantain	G
Poaceae	Grass	G
Rubus sect *Glandulosus* Wimmer & Grab	Bramble	DHSW
Rumex spp.	Dock	DG
Stellaria media (L.)Villars	Common Chickweed	CD
Vicia tetrasperma (L.)Schreber	Smooth Tare	G

Habitats:
C: cultivated / arable
D: disturbed
E: heath / moor
G: grassland
H: hedgerow
M: marsh
P: ponds, ditches; stagnant / slow-flowing water
R: rivers, streams
S: scrub
W: woodland
d: dry soils
n: nitrogen rich soils
o: open habitats
s: coastal
w: wet/damp soils
cultivated plant, of economic importance

Radiocarbon dating

Four sites contained features with suitable charcoal for radiocarbon dating: Beaker structure 108, the stone setting in field 4, Beaker pit [261] and Bronze Age pit [355]. A total of nine charcoal samples from these features was submitted for accelerator mass spectrometry (AMS) dating at the Scottish Universities Environmental Research Centre (SUERC). All the submitted samples were derived from short-lived species (Table 16).

Results

Four radiocarbon determinations were obtained from the Beaker-associated structure 108 and adjacent features. Three determinations were obtained from features around the stone setting in field 4. Single radiocarbon dates were obtained from Beaker pit [261] and pit [355] associated with Bronze Age pottery (Fig 18).

Beaker-associated dates

Five of the determinations are from features associated with Beaker pottery. The Beaker structure 108 at Sennen and the adjacent pits and hearths produced four of these. Stone-lined pit [129] appeared to be the earliest with a date of 3860 ±30 BP, 2470–2270 cal BC (SUERC-21076) (84.1 per cent). The adjacent hearth [105] is possibly slightly younger at 3825 ±30 BP, 2350–2190 cal BC (SUERC-21075) (82.6 per cent), while pit [127] and layer (89), the infill within structure 108, gave near-identical dates of 3775 ±30 BP, 2300–2130 cal BC (SUERC-21074) (91.1 per cent), and 3785 ±30 BP, 2300–2130 cal BC (SUERC-21077) (93.7 per cent).

Table 16 Results from radiocarbon dating

Feature	*Context / material*	*Lab no*	*Age years BP*	*Calendrical years (68%)*	*Calendrical years (95%)*
Beaker-associated structure 108 and adjacent features					
Pit [127]	Fill (104); charcoal *Maloideae*	SUERC-21074 (GU-17735)	3775 ±30	2280–2250 BC (16.6%) 2230–2220 BC (3.6%) 2210–2140 BC (48%)	2300–2130 BC (91.1%) 2090–2050 BC (4.3%)
Hearth [105]	Fill (128); charcoal *Corylus*	SUERC 21075 (GU-17736)	3825 ±30	2340–2320 BC (4.5%) 2310–2200 BC (63.7%)	2460–2370 BC (9.3%) 2350–2190 BC (82.6%) 2170–2140 BC (3.5%)
Pit [129]	Fill (159); charcoal *Alnus*	SUERC-21076 (GU-17737)	3860 ±30	2460–2370 BC (30.1%) 2350–2280 BC (37.4%) 2250–2240 BC (0.7%)	2470–2270 BC (84.1%) 2260–2200 BC (11.3%)
Structure 108	Layer (89); charcoal, *Corylus*	SUERC-21077 (GU-17738)	3785 ±30	2280–2190 BC (46.6%) 2180–2140 BC (21.6%)	2300–2130 BC (93.7%) 2080–2060 BC (1.7%)
Trebehor Beaker pit [261]					
Pit [261]	Fill (260); charcoal *Corylus*	SUERC-21084 (GU-17742)	3865 ±30	2460–2370 BC (32.8%) 2350–2280 BC (35.4%)	2470–2270 BC (87.4%) 2260–2200 BC (8%)
Sennen stone setting					
Pit [15]	Fill (14); charcoal *Ulex*	SUERC-21081 (GU-17739)	3640 ±30	2110–2100 BC (2%) 2040–1950 BC (66.2%)	2140–2080 BC (15.9%) 2060–1910 BC (79.5%)
Pit [42]	Fill (44), charcoal *Ulex*	SUERC-21082 (GU-17740)	3455 ±30	1880–1840 BC (19.4%) 1820–1800 BC (7.4%) 1780–1730 BC (32.3%) 1710–1690 BC (9.1%)	1880–1690 BC (95.4%)
Pit [13]	Fill (12); charcoal *Ulex*	SUERC-21083 (GU-17741)	3315 ±30	1630–1600 BC (20.1%) 1595–1530 BC (48.1%)	1690–1510 BC (95.4%)
Porthcurno Bronze Age pit [355]					
Pit [355]	Fill (357); charcoal *Quercus* roundwood	SUERC-21085 (GU-17743)	3260 ±30	1610–1570 BC (23.2%) 1560–1490 BC (45%)	1620–1450 BC (95.4%)

The dates are grouped between the twenty-fifth and twenty-first centuries cal BC, although the weight of the dating fell in the period between 2300 and 2100 cal BC. It seems probable that most of the features were broadly contemporary, although the determination from pit [129] might suggest that there was an earlier phase of activity on the site which pre-dated structure 108. The overall dating from the Sennen site is a little earlier than that from the recently excavated burnt mound site at Boscaswell, although it does fall within the broader pattern of Beaker dating that is currently available for Cornwall (Jones and Quinnell 2006a).

The final Beaker-associated radiocarbon determination was obtained from the stone-lined pit [261] in field 24. It fell in the range 3865 ±30 BP, 2470–2270 cal BC (SUERC-21084) (87.4 per cent). This is similar to the radiocarbon date obtained from stone-lined pit [129], as well as to the determinations from recently dated pits containing sherds of Beaker which have been found near Treyarnon on the north Cornish coast (Jones and Taylor 2009–10) and at Scarcewater in central Cornwall (Jones and Taylor 2010, 5). The determination from pit [261] therefore extends the pattern of small Beaker-associated pits dated to the third quarter of the third millennium cal BC.

The radiocarbon determinations from the Beaker-related features along the Sennen to Porthcurno pipeline brings the total of Beaker-associated dates from Cornwall to 16, most of which have been obtained in the last decade (Jones, forthcoming b). The determinations from the pipeline belong to the end of Needham's (2005) first period of Beaker use which he has labelled *Beaker as circumscribed, exclusive culture* (*c* 2500–2250 cal BC). They also correspond with the picture of early non-funerary Beaker use in the county and in the wider south-west region which has recently been put forward (Quinnell 2003; Jones and Quinnell 2006a; Quinnell and Taylor, forthcoming). The radiocarbon determination from structure 108 is particularly significant as it is the first Beaker-associated structure to be

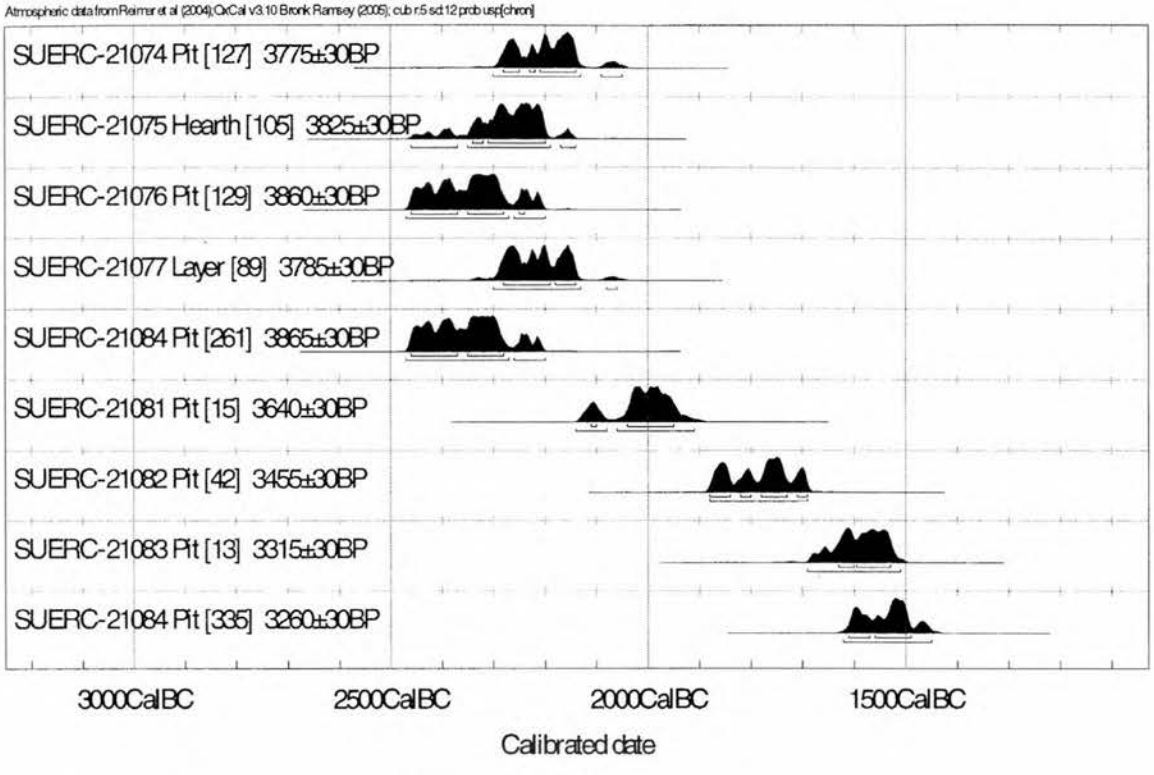

Fig 18 Sennen - Porthcurno pipeline radiocarbon determinations.

securely dated in the south west. The importance and context of this site are discussed below.

Early Bronze Age

Four radiocarbon determinations were associated with Early Bronze Age sites which were not associated with Beaker pottery. The area of activity surrounding the Sennen stone setting in field 4 produced three determinations. Pit [15] gave the earliest radiocarbon date of 3640 ±30 BP, 2060–1910 cal BC (SUERC-21081) (79.5 per cent); pit [42] gave a date of 3455 ±30 BP, 1880–1690 cal BC (SUERC-21082); pit [13] gave the youngest date at 3315 ±30 BP, 1690–1510 cal BC (SUERC-21083). The radiocarbon determinations potentially extend over a period of 400 years and suggest extended use of the area around the stone setting rather than a single phase. Unfortunately, despite environmental sampling, no material suitable for radiocarbon dating was produced from any contexts associated with the construction of this feature or from central pit [50]. However, the chronological span from the adjacent pits is comparable with radiocarbon determinations that have been have obtained from second millennium cal BC cairns associated with timber settings in other parts of Cornwall (for example, Jones 2004–5). The stone setting fits within the ceremonial monument tradition of this period. The character of this activity will be considered further below.

The determination from pit [355] of 3260 ±30 BP, 1620–1450 cal BC (SUERC-21085) dates towards the middle of the second millennium cal BC and end of the Early Bonze Age. The pit contained sherds from the remains of two plain vessels. This date is of particular interest as it is only the second to be obtained from the plain, granitic Bronze Age ceramic tradition, which is found in both ceremonial sites and settlements in west Cornwall during the second millennium cal BC (Dudley 1941; Grimes 1960; Smith 1996; Jones and Thomas 2010). Indeed, the determination is very close to two recently obtained radiocarbon

dates in the range 1690 to 1500 cal BC from the entrance grave at Bosiliack, which contained similar pottery (Jones and Thomas 2010).

Interpretation

This final discussion considers the wider context of the most significant discoveries from the pipeline under three roughly chronological themes: the flints and pits, the Beaker structure 108 and the stone setting in field 4.

Flints and pits: a scattered occupation pattern

As is fairly typical for Cornwall, much of the identifiable prehistoric settlement activity encountered along the route of the pipeline was characterised by unstratified scatters of flints and an occasional pit, typically containing charcoal, pottery and flint.

The earliest of the flints recovered from the pipeline were of Mesolithic date (*c* 10,000–4000 cal BC). However, in contrast with the results from other projects in the west of Cornwall (Smith 1987; Lawson-Jones, forthcoming), there was no clear focus for pre-Neolithic activity. Instead, there was evidence of a scattered Mesolithic presence along the route of the pipeline, which contrasts with the more focused evidence from the Later Neolithic and Bronze Age periods.

Most of the flint artefacts and all of the lithic scatters recorded were in fact of much later date, falling into the Later Neolithic and Early Bronze Age. These assemblages included pieces which indicated selection of material for tool use based on colour, as well as some finer worked pieces which at the end of their use had possibly been selected for inclusion within contexts (for example, pits and postholes) which were considered significant by the people who deposited them (Lawson-Jones, above). The selection of particular coloured materials for the manufacture of artefacts appears to be a feature of the post-Mesolithic period in Cornwall and seems to have been a widespread phenomenon across Britain (for example, Edmonds 1995; Woodward *et al* 2006).

The location of lithic finds in the landscape and the way that they were deposited is also of significance, as these can show evidence for purposeful choices over the kinds of locale favoured for particular activities and how artefacts were treated at the end of their use. Plotting of lithic scatters in the Cotswolds, for example, has revealed differences between areas which were used for settlement and ceremony (Marshall 1985). With the exception of the Lizard project (Smith 1987) and the recent work on the lithics from Clodgy Moor (Paul) (Jones *et al*, forthcoming), no similar work has been undertaken to analyse the distribution of Cornish later prehistoric flint scatters and their topographical settings. It is apparent that in the west of Cornwall activity was widespread and lithic scatters are usually multi-period (Lawson-Jones, forthcoming), and can frequently be associated with topographically distinctive landscape features. Indeed, the recovery of flints and other artefacts from close to rocky outcrops, which often subsequently became monumentalised, is a recurring feature of the Neolithic and Bronze Age periods in Cornwall (Smith 1987; Tilley 1995; Cole and Jones 2002–3). It is worth noting that a large proportion of the Late Neolithic and Early Bronze Age flints recovered from the Sennen to Porthcurno pipeline were found beside the stone setting site in field 4 (below).

Small bowl-shaped pits of broadly prehistoric date are commonly distributed across Cornwall and Devon and more widely around Britain (Cole and Jones 2002–3; Leverett and Quinnell 2010; Garrow *et al* 2005; Kenney 2008; Miket *et al* 2008). Examples have been found dating from the earliest part of the Neolithic (*c* 4000 cal BC) and morphologically similar features continued to be dug in Cornwall until the Late Bronze Age (*c* 1000 cal BC) (for example, Jones and Taylor 2010, 83). The longevity of this practice means that it is only when diagnostic artefacts or radiocarbon determinations are obtained that it is possible to be certain of pit dates. However, the meanings associated with pit digging did not necessarily remain the same throughout the period.

Although no identifiably Neolithic pits were uncovered on the Sennen – Porthcurno route, the long chronology of pit creation is highlighted by the results from the pipeline. The earliest feature of this type found – pit [261] at Trebehor – was associated with a radiocarbon date of 3865 ±30, 2470–2270 cal BC (SUERC-21084) (87.4 per cent), and contained a remarkable collection of artefacts. These included sherds of Beaker pottery from several vessels, assorted stonework and flint. Sherds from Beaker vessels have been found in a

number of cists and pits in Cornwall and Devon, especially in the West Penwith area (Jones and Quinnell 2006a). Pit [261] is fairly typical of non-funerary Beaker-related sites in the south west generally, where classic Beaker burials and their associated suite of objects, such as daggers, bracers and shale buttons (Gerloff 1975; Woodward *et al* 2006; Harding and Healy 2007, 252–3; Shepherd 2009), are rare. The site is of interest as it extends the number of securely dated middle third millennium cal BC Beaker sites in the county and the wider south-west peninsula (Quinnell 2003; Jones and Quinnell 2006a).

The character of the artefactual assemblage from pit [261] is of most significance because of the freshness of the pottery and the flint, some of which appeared to be barely worn (Quinnell, above; Lawson-Jones, above). It is evident from the analyses that neither category of artefact had been lying around in the open for very long before they were included in the pit and, in the case of the flint, that it may have been manufactured for a particular task. The absence of silting within the pit also implies that it was backfilled quickly.

It is apparent that pit [261] was constructed with some care and the stone-lining might suggest that there was an 'aesthetic' of pit construction at work (Pollard 2001). The lining meant that it would have resembled both contemporary cooking pits, related to settlement, as well as burial cists (Jones, forthcoming a). Parallels for stone-lined Beaker pits used in association with cooking or settlement activity include the burnt mound at Boscaswell, radiocarbon dated to 2220 - 1970 cal BC (Jones and Quinnell 2006a), and pit [129], found near to structure 108, which produced a nearly identical radiocarbon determination to pit [261] (below).

A small number of Beakers in Cornwall have also been associated with cists, as at Tregiffian (St Buryan), Trevedra (St Just-in-Penwith) and Harrowbarrow (Calstock) (Patchett 1953; Russell and Patchett 1954; Thomas and Hartgroves 1990). Human remains have not been found at any of these cist sites, although it is likely that the acidity of the soil would have totally destroyed any unburnt bone. However, cremated bone, as at the Try menhir cist (Russell and Pool 1964), was recovered and would therefore survive at other sites. It is possible that, instead of having a funerary purpose, many cists in the south west were constructed as 'containers' for curated pottery and other objects. Even though there was no evidence that stone-lined pit [261] had ever held a burial deposit, it is possible that it was intended to be a receptacle for heirlooms. The use of stone-lining in this way may have blended the distinctions between categories of pit: they could serve as containers for the preparation of food *or* human remains, curated heirlooms or discarded deposits. In effect, the pit as a site type may have become one of the primary mediums for a making an event at a place memorable (Thomas 1999, 72, 87) through the deposition of cultural material and as a receptacle for a range of offerings. It is interesting to note that in addition to the sherds of finely-decorated Beaker pottery, pit [261] also held two stone rubbers, a jasper pebble, which may have been retained for magical purposes, and a hematite-impregnated slate that appears to have been used to prepare a red pigment (Quinnell, above).

The second securely dated pit site, pit [355] near Porthcurno, was much later in date, producing a radiocarbon determination of 3260 ±30 BP, 1620–1450 cal BC (SUERC-21085). This site contained a large amount of charcoal, sherds from at least two ceramic vessels (**P19** and **P19a**) and a granite muller **SF34**. The charcoal had not been burnt *in situ* but appeared to have been deposited in bands. It is possible that after the pit was excavated it was rapidly backfilled with occupation debris which had been generated by settlement-related activity, including hearth debris, sherds of pottery and food preparation tools in the form of the muller. As with Beaker pit [261], the filling of pit [355] has a 'ritualised' aspect to it and, despite a gap of several centuries, there are clear parallels between the ways the material became incorporated within these sites, although pit [355] may not have been created with the same care as stone-lined pit [261].

Similar patterns of artefactual discard have been noted on other pit sites across Cornwall (for example, Cole and Jones 2002–3; Gossip and Jones 2007, 28–31), as well as in ceremonial contexts; for example, a barrow at Constantine (St Merryn), where flint was knapped and discarded on site (Jones 2009–10). Indeed, it has been argued elsewhere that because of its nature (for example, deposits in pits or ceremonial monuments such as barrows), much of what survives from the prehistoric period in Cornwall is likely to have been generated by ritualised actions that inadvertently resulted in deposits being preserved for future generations to uncover (Jones and Taylor 2010, 67). There are certainly links between the

apparently simple pits and deposition which took place on more formal ceremonial sites.

The stone-lined pit [261] at Trebehor is indicative of one connection with cists, and the artefacts themselves may represent another link between different site types. The Beaker sherds in pit [261] are from a form of pottery which was deposited into a range of different sites, including ceremonial monuments, graves and settlements. Likewise, the pot from pit [355] near Porthcurno has close parallels with – and is a very similar in date to – the vessel which accompanied the cremation in the entrance grave at Bosiliack (Madron) (Jones and Thomas 2010). This might suggest that there was a degree of 'citation' or interrelationships between the contexts in which pottery appears. In each case, rather than being simply thrown away artefacts were buried and removed from view.

However, this is not to argue that all actions in prehistory involved an overt display of ritual, but rather that ritualised action was deeply ingrained into daily life. As Richard Bradley (2005) has pointed out, there was often not a hard and fast distinction between domestic and ritualised spheres of life. In a Cornish context, the infilling of pits with certain forms of settlement waste appears to have formed part of a more widely held ideology that may have been concerned with making an appropriate offering or with the marking of a place in a particular way. Nonetheless, the actual act of pit filling may often have moved into the largely subconscious unquestioning routine of a daily practice which was often undertaken quite quickly and without much deliberation. Neither of the pits under discussion contained any evidence for silting deposits, implying that they were infilled quickly, and in common with the flint scatters they could, given the lack of indication of permanent structures, have been produced during short periods of occupation.

It may only have been under certain circumstances that pit digging and filling became a special occurrence. Pits found within ceremonial contexts, such as barrows, almost certainly represented such instances, as does, for example, the quartz lining around posthole / pit [34] in the centre of the Sennen stone setting (below). Arguably the extra time and care taken to construct the stone-lining around pit [261] may represent another, albeit on a smaller-scale. As with most other pit finds in Cornwall, the pottery and other artefacts recovered from the Sennen pipeline pits do not appear to have been deliberately 'structured' or arranged within the pits in any particular way. However, the Beaker pottery and other artefacts in pit [261] might imply 'selective deposition' of curated objects, including the sherds, which had been associated with particular events, people or places (Harris 2009). By contrast, the material from pit [355] is likely have been swept into the pit in a much more casual way, perhaps after the consumption of food or at the end of a period of occupation.

Beaker structure 108 at Sennen

If pit [261] represented a fairly widespread type of context for non-funerary Beaker-associated use in Cornwall, structure 108 at Sennen was, in the present state of knowledge, a unique site. In the south west, what could be broadly termed 'non-funerary' or 'domestic' Beaker-associated activity is characterised by small pits, as at Treyarnon (Quinnell 2003; Jones and Taylor 2009–10), or by evidence for the consumption of food, as at the recently discovered cooking pit and burnt mound at Boscaswell, St Just-in-Penwith (Jones and Quinnell 2006a). Currently, all the other Bronze Age 'domestic' structures which have been found in Cornwall have been dated to the second millennium cal BC, with the majority being roundhouses firmly belonging to the period after *c* 1500 cal BC (for example, Jones and Taylor 2010, 158–9). The exception is Gwithian structure 1642 (formerly described as the 'Beaker house') which has been radiocarbon dated to 1890–1610 cal BC, although even there a second determination 1310–1040 cal BC fell in the Middle Bronze Age (Nowakowski *et al* 2007).

Structure 108 was an irregular sub-oval hollow 4.2m by 3m which, judging by the small postholes within it, was probably covered by a light superstructure (Fig 8). It was surrounded by pits, some of which are likely to have been used for cooking. The simple utilitarian character of the flint assemblage suggested that it had been manufactured for short-term tasks within the settlement. Two lines of postholes also suggest this area of settlement-related activity was enclosed by some sort of stockade or enclosure.

The re-cutting of the features which surrounded structure 108 suggests that, although the building was only a flimsy construction, and therefore probably relatively short-lived, Beaker-associated activity in the immediate area may have occurred

over a much longer period. This is also perhaps indicated by the radiocarbon determinations from pit [129] of 3860 ±30 BP, 2470–2270 cal BC (SUERC-21076) (84.1 per cent), which was earlier than those obtained from pit [127] and layer (89), and the infill within structure 108, which gave two near identical dates of 3775 ±30 BP, 2300–2130 BC cal BC (SUERC-21074) (91.1 per cent), and 3785 ±30 BP, 2300–2130 cal BC (SUERC-21077) (93.7 per cent). It is also quite possible that additional buildings lay outside the pipeline corridor: other Beaker-using settlements found in Britain often comprised more than one building (for example, Simpson *et al* 2006). Structure 108 may then have been located in a place associated with settlement activity of an episodic nature or, at least, one where the buildings which comprised the settlement were not built to last any length of time and were frequently replaced.

Comparanda for structure 108 in the south west are scarce. An ephemeral, oval-shaped, post-built structure dating to *c* 2000–1730 cal BC was recently excavated at Higher Besore, west of Truro (Gossip, forthcoming) but, unlike structure 108, was not set in a hollow. Elsewhere, Beaker-associated settlement activity of the later third and second millennium cal BC is fairly widely distributed across Britain and Ireland (Gibson 1982; Carlin 2011) (Fig 19). This activity generally tends to take the form of simple arrangements of stake-settings or posts, pits and hearths associated with flintwork and pottery (Bamford 1982; Gibson 1982, 47; Brück 1999). Where structures are found, they typically lack much in the way of internal features or subdivisions (Bradley 1970; Simpson 1971; Darvill 1996). In fact, most southern British Beaker-associated settlements, as at Downton and Snail Down in Wiltshire, are made up of quite amorphous arrangements of post and stakeholes that are difficult to place into any kind of meaningful structural pattern (Rahtz 1962; Thomas 2005, 74).

However, amidst the pits and postholes, some identifiable structures have been recorded. A Beaker-associated structure has recently been found beneath a round barrow at High Lea Farm on Cranborne Chase in Dorset and is currently dated by Beaker pottery recovered from a pit within the building (John Gale, pers comm). This stake-built structure measured 7.25m by 4.5m. No identifiable hearth was found within it, but two internal pits contained ash and burnt wood and some flint tools and nodules. Surrounding the structure were several pits which could be of the same date but currently their chronological relationship to the structure is uncertain. The Beaker settlement at Belle Tout, Sussex (Bradley 1970), was also associated with roughly oval arrangements of postholes which appear to have formed structures, but the remains were meagre compared to later Middle Bronze Age settlements. Another site in Wiltshire at Easton Down was represented by a series of sub-oval 'pits' approximately 3m by 1.8m and 0.45m deep which were surrounded by stakeholes and associated with pits. These dimensions are not too dissimilar from structure 108. Indeed, Stone (1958, 42) suggested that the Easton Down 'hollows' were the seasonal dwellings of flint miners. However, they were entirely devoid of internal features or hearths and Simpson (1971), in his review of Beaker structures, thought that it was unlikely that they were dwellings. More recently it has again been suggested that the Easton Down 'hollows' may in fact have been associated with industrial activity (Lawson 2007, 167).

To the east of the Wessex chalk, Beaker-associated structure 93 was recorded at Hockwold-cum-Wilton in Norfolk (Bamford 1982, 9–14). Here, a sub-circular 'hut floor', with a diameter of approximately 7m, partly surrounded by stakeholes, was found in association with Beaker sherds and other occupation material, which was up to 0.2m thick. However, it was uncertain as to whether the structure had been covered by a roof. Rather than being a dwelling the site was interpreted as some kind of outdoor activity area that had been surrounded by windbreak or fencing (*ibid*, 18).

Because of the lack of evidence for substantial architecture, it has been argued that these flimsy structures found across southern England may have been associated with short-term occupation (for example, Brück 1999) and that Beaker dwellings were less permanent than those of the later Bronze Age; 'yurt'-type structures would have left relatively little trace in the archaeological record (Lawson 2007, 172). Structures such as these could have been quickly packed up and moved around the landscape. As will be discussed below, such a transitory form of architecture could have been associated with shifting settlements that were linked with a primarily pastoral economy and the seasonal movement of animals, or, as Bamford (1982, 19–20) postulated for Hockwold-

Fig 19 The principal published Beaker-associated structures referred to in the text.

cum-Wilton structure 93, with the exploitation of wild food resources. Unfortunately neither the Hockwold-cum-Wilton structure, nor any of the other Beaker-associated structures discussed above in southern England, are currently associated with radiocarbon determinations. Given the long span of Beaker use in Britain, this means that their contemporaneity with structure 108 is uncertain.

Beaker structures are also found along the western seaboard of Britain (Gibson 1982, 45; Parker Pearson *et al* 2004, 45–9), and are often better preserved than the southern British examples. These tend to be oval or U-shaped in plan, with stone walling around their perimeters; they are, in some instances, set in hollows (for example, Simpson *et al* 2006). It is also the case that many of these sites, especially those in the western Scottish isles, had been constructed in sandy environments, where substantial stone walls would have been necessary to act as a revetment to hold back the surrounding sand. This means that to withstand local environmental conditions they needed to be rather more substantial than structure 108.

The distribution of oval stone-built structures with Beaker pottery associations extends from the north-west coast of Scotland to the western tip of Brittany and beyond into Portugal, where both circular and oval buildings have also been identified (Savory 1968, 182; Cardoso 2000; Pailler *et al* 2007). Consideration of Beaker structures found in southern Europe lies beyond

the scope of this paper. In any case, these are likely to have been associated with communities that had developed from local Chalcolithic groups who, despite being situated close to sources of copper (Harrison 1985, 47; Castro 1995, 47), probably had direct links with coastal communities in southern Brittany rather than with those along the northern half of the Atlantic façade (Bradley 1997, 28–9).

South-west Britain has, however, few comparable structures, although oval, stone-lined structures 57 and possibly 181 which were uncovered at Brean Down were not dissimilar in size to structure 108. Unfortunately, neither of the Brean Down structures was closely dated and, although they might belong to a Beaker-using phase, they could instead be of a date later in the Bronze Age (Bell 1990, 34).

A few poorly-preserved Beaker-associated settlements with possibly contemporary structures have been found in coastal parts of Wales (Lynch *et al* 2000, 87); however, none are securely dated. The largest and best recorded settlement was uncovered at Stackpole Warren in Pembrokeshire, where sherds of Beaker from 45 vessels and a small hollow-set roundhouse with a diameter of approximately 5m were discovered (Benson *et al* 1990). Two radiocarbon determinations – 2140–1730 cal BC and 1880–1450 cal BC – were obtained from the destruction layer within the structure, much later than the dates from Sennen structure 108. The association of the Stackpole structure with Beaker pottery is also complicated by the fact most of the pottery came from a buried soil outside the structure and because Collared Urn sherds were also recovered from within and around the structure. It is therefore possible that the roundhouse postdates the Beaker use of the site.

A second possible Beaker-associated structure is represented by an arc of six postholes and a spread of pottery found beneath a multiple cist cairn at Newton, near Swansea. This was interpreted as representing pre-barrow Beaker settlement activity associated with a structure with a diameter of at least 7m (Savory 1972; 1980, 30). However, the plan of the structure was incomplete and no radiocarbon dates are available for the postholes.

Currently, the best evidence for oval Beaker structures comes from the northern end of the Atlantic façade in the Western Isles and sites such as Northton in Harris (Simpson *et al* 2006), Dalmore on Lewis (Sharples 2009), Allt Chrisal on Barra (Branigan and Foster 1995, 90–1) and possibly Sorrisdale on Coll (Ritchie and Crawford 1977–8). A similar structure was also found at Ardnave on Islay (Ritchie and Welfare 1983), although this was associated with Food Vessels rather than Beakers. The best preserved of these is structure 1 at Northton, which measured 8.7m by 4.7m and had walling which survived up to 1m high (Simpson *et al* 2006, 85). The structure was therefore much larger than structure 108. Two smaller buildings found near to Northton structure 1 were closer in size to Sennen structure 108; however, these buildings were not well-preserved and were devoid of internal features (*ibid*, 152), which renders their interpretation difficult.

Most of the Scottish Beaker-associated structures described above tend to be larger and much more robustly constructed than structure 108. Several of the Scottish structures may, like an oval structure on Molène, an island off the west coast of Finistère, Brittany (Pailler *et al* 2007), have been periodically re-modelled and were perhaps associated with long-term settlement activity. The building at Dalmore, for example, was initially a large structure, 9m by 5m, that was later periodically reduced in size; at one point it measured 4m by 4.5m, not dissimilar to structure 108 (Sharples 2009).

Unfortunately, as was the case with the southern English examples, there are currently very few radiocarbon determinations from the western Scottish Beaker structures. The only secure radiocarbon dating currently available from a Beaker-associated building comes from structure 1 at Northton from which two determinations were obtained falling in the period 2140–1740 cal BC (Simpson *et al* 2006, 152), rather later than structure 108. Likewise, the evidence for cultivation at Sligneach is also probably of a later date (Sharples 2009). The radiocarbon determination on human bone from a Beaker grave which had been cut through midden material beside the possible house structure at Sorrisdale on Coll (Ritchie and Crawford 1977–8) calibrates to 2480–2200 cal BC; however, this determination does not directly date the building itself. It is therefore possible that structure 108 is not contemporary with and is in fact earlier than these western Scottish buildings.

The final examples of Beaker buildings with possible analogies with structure 108 were not associated with agricultural settlements but are instead a group of stake-built structures in south-

west Ireland at Ross Island, Co Kerry, associated with a copper-working settlement that has been radiocarbon dated to the period 2400–1900 cal BC (O'Brien 2004, chapter 6). Several small sub-oval structures were identified, not altogether dissimilar in shape to structure 108, although their perimeters were defined by trenches into which stakeholes were set. One of these, structure C, was roughly similar in size to structure 108, approximately 3.15m by 1.8m, but most were much smaller. The settlement was also associated with pits, many of which had been used as furnaces. In addition to Beaker pottery, stone tools were recovered which had been used in the extraction of ore and the production of copper (*ibid*).

The possible comparisons with structure 108 are particularly interesting given the potential for both tin and copper prospecting in west Cornwall during this period and the recent suggestion of journeys in search of ores perhaps being undertaken by people considered to have 'magical' knowledge of metalworking (for example, Fitzpatrick 2009). However, no copper alloy artefacts were found, and despite a significant stonework assemblage which included a wide range of tools (Quinnell, above), there was no direct evidence for the crushing of metal ores or for smelting in the vicinity of structure 108. Indeed, most of the assemblage is likely to have been associated with the preparation of grain.

It seems probable that structure 108 and some of the adjacent features, such as hearth pit [105] and stone-lined pit [129], were abandoned with a degree of deliberation. This is indicated by the fact that both the hollow and the adjacent features were filled with distinctive deposits which contained a large assemblage of artefacts including sherds of Beaker pottery. Many of the sherds from structure 108 were not abraded (Quinnell, above), suggesting that broken ceramics were not lying around on the surface but were instead rapidly and intentionally buried soon after breakage. Similarly, the stonework assemblage from the structure also appears to have been placed into the hollow during the abandonment phase, as all of it was found within layer (89) the upper infill layer of the hollow. Only two pieces appear to have been broken (Quinnell, above), hinting that the complete pieces had been deliberately discarded as part of an abandonment process.

The infilling deposits which were found in these features also included worked stones, charcoal and charred food remains, all likely to have derived from occupation-related activity. Taken together the evidence could suggest deliberate backfilling associated with the leaving of the settlement or the ceasing of certain activities or use of particular features within it. As has been argued above for pits generally, this may have been part of a pattern of systematic ritualised clearing away and returning of objects to the ground that cut across many aspects of life, from the 'domestic' through to the overtly ceremonial, throughout the course of the third and second millennia cal BC.

This pattern of backfilling structures, especially roundhouses, with occupation-related material and more finely-worked objects reached its height during the latter half of the second millennium cal BC with the ritualised abandonment of the Middle Bronze Age hollow-set roundhouses that are found across the lowlands of Cornwall (for example, Nowakowski 1991; Jones and Taylor 2010, 70). It is possible, however, that the tradition of planned abandonment could have originated several centuries earlier and occurred at much simpler buildings such as structure 108.

The local context of structure 108 is uncertain because excavation was limited to the pipeline corridor. However, there were indications that cultivation may have taken place in the surrounding landscape: several features were found to contain small amounts of charred grain, particularly in contexts associated with structure 108, which was perhaps a place where grain was cooked and consumed (Julie Jones, above). This is also indicated by the worked stone assemblage, much of which is likely to have been associated with the processing of cereals (Quinnell, above).

Indications of Beaker-period cultivation have also been found in west Cornwall at Gwithian, where sherds of Beaker pottery may have been incorporated into the manuring of fields (Quinnell and Thorpe 2007). Stone-lined pit [261] at Trebehor (above) also contained evidence of arable weeds. Evidence for cultivation during the Beaker-using period has been found elsewhere in southern Britain, including the Marlborough Downs, Avebury and the Upper Thames Valley (Gingell 1992, 155; Whittle 1997, 7; Evans 1990; Evans *et al* 1993, 188–9; Whittle *et al* 1993, 232; Hey 1997). However, although settlements in regions such as the chalklands of southern England may have been surrounded by quite extensive zones of cultivation (Allen 2005), it

has also been suggested that agriculture during this period may have been of an episodic or short-term character; there is little evidence for the establishment of formal, bounded field systems (Thomas 1999, 200; Pollard and Reynolds 2002, 136–7). In fact, Andrew Lawson (2007, 172–3) has argued that shifting patterns of pastoralism rather than agriculture may have been the main form of subsistence on the chalk during the latter part of the third millennium cal BC.

There is also widespread evidence for agricultural activity at coastal Beaker settlements in the Scottish Western Isles, this time in the form of ard or plough-marks and the recovery of charred plant macrofossils from settlement-associated middens (Shepherd 1976; Shepherd and Tuckwell 1977; Parker Pearson *et al* 2004, 50–1). At Sligneach in South Uist ploughsoils associated with Beaker pottery have been radiocarbon dated to the period between 2200 and 1700 cal BC (Sharples 2009). In contrast with the southern English evidence, Beaker-related settlement activity in the Western Isles, where land was limited, appears to have expanded into locales which had not been exploited during the Neolithic period (*ibid*).

In addition to charred grain, hazelnut fragments were found in contexts associated with structure 108, again indicative of the consumption of food. Cooking activity at Sennen is also perhaps indicated by the presence of the hearth inside structure 108 and hearth pit [105] and stone-lined pit [129], both of which contained burnt fills, and in the case of pit [129] burnt stone. The stone-lined pit [129] may have been similar to the cooking pit found in association with the Beaker burnt mound site at Boscaswell. Although apparently lacking pits, Beaker-associated burnt mounds and midden mound sites have also been identified elsewhere in Cornwall, as at Poldowrian (St Keverne) (Harris 1979). In a Cornish context, it has been argued that these sites may have been places for formalised social feasting activity which was associated with the use of Beaker pottery (Jones and Quinnell 2006a). Outside Cornwall, Beaker-associated burnt mounds are comparatively uncommon, although broadly comparable activity has also been found in eastern Ireland (Carlin 2007) and in East Anglia, where Beakers have been recovered from burnt mound sites (for example, Healy 1996, 179; Crowson 2004).

In summary, structure 108 is probably best considered as a short-lived building which belongs within a wider tradition of ephemeral and oval-shaped Beaker-associated buildings dating to the third and second millennium cal BC. It is not certain whether any particular activity was linked to it, such as pastoralism, or whether it was sited in an area of cultivation. However, it is possible that occupation of the area was seasonal or episodic. It is also quite possible that structure 108 was erected in an area which was the focus for activity over a longer period than the life of the building.

Stone setting at Sennen (field 4)

The Sennen stone setting was an arrangement of large granite boulders surrounded by pits and postholes (Fig 6). It was situated in a relatively elevated location overlooking the sea, above an area of prehistoric settlement and coastal cairns to the north and west (Borlase 1879; Russell 1971, 24; Herring 1986). Charred plant macrofossils from the site indicate that it might have been within a grassland environment during the second millennium cal BC, although the presence of oak charcoal suggests that woodland was still present in the wider locality.

Around the stone setting and in adjacent pits were more than 100 flints and greensand chert, as well as a few pieces of Portland chert, likely to date to the later part of the Neolithic or the Early Bronze Age (*c* 3000 to 1500 cal BC). Unworked pebbles and quartz stones which had been brought to the site were also recovered.

The stone setting was also the focus for a cluster of pits, some of which probably held posts. One of these, [34], was located in the centre of the site between the boulders. Its significance was emphasized by the fact that the cut was lined with quartz, a material which is strongly associated with ceremonial sites in Cornwall (for example, Jones *et al* 2011). The majority of the flint and chert was recovered from these pits or postholes, including several pieces of Portland chert which had been obtained from Dorset (Stewart, above). Unusually for a site of Neolithic or Bronze Age date, ceramics were not recovered from any of the features.

The stones which made up the setting were three large granite boulders which had been manipulated into position but were located in an area of outcropping *in situ* granite. Assuming that the stones did not originally stand erect, the effect of this activity was to create a structure with the appearance of a large ruined construction, with

a large stone analogous to a displaced capstone. As discussed above, 'natural' places, particularly *in situ* boulders, often became the focus for ritual activity throughout the Neolithic period (Tilley 1995; Bradley 2000; Cole and Jones 2002–3) and during the Early Bronze Age monuments were often constructed over them (Jones 2005, chapter 4). By way of explanation for this phenomenon, Chris Tilley and Wayne Bennett (2001) have suggested that the distinctive outcrops of West Penwith were associated with supernatural powers, to be drawn upon and replicated in the form of chambered tombs in the Neolithic and subsequently controlled in the Early Bronze Age by the restriction of access to them.

Unfortunately, there was no suitable material with which to date the initial phase of the site, which means that the date for the construction of the stone setting is uncertain. However, if as suggested above the large stone had become displaced, the site would have possessed certain visual similarities with a diverse range of prehistoric monument in Cornwall, including propped stones, small megaliths and cists, which are briefly discussed below.

Propped stones have been found across the moors of Cornwall and beyond (Herring 1997; Blackman 2011). They are enigmatic features, comprised of large stones which have apparently been raised or 'chocked up' by one or more smaller stones. Several examples are known in Penwith, with a particularly fine example being found on Carn Galva (Zennor) (Blackman 2011; Jones, in prep). Secure dating is almost non-existent for propped stones; this is unsurprising, however, given that most of these sites were constructed on bare expanses of rock and are not associated with deposits containing organic material. It is possible that propped stones are related to the small Neolithic earth-fast quoits of south-west Wales, such as the King's Quoit in Pembrokeshire (Cummings and Whittle 2004, 165), which are believed to be of earlier Neolithic date. Support for a fourth or early third millennium cal BC date for propped stones is also suggested by Peter Herring (1997), who has argued that the example on top of Leskernick hill (Altarnun) on Bodmin Moor was, when viewed from a long mound across the valley, arranged so that the midsummer sun would have been seen to set behind the propped stone. This alignment would have been accurate during the fourth to third millennia cal BC. However, the significance of this date is dependant upon the long mound itself being of Neolithic date and the acceptance of the hypothesis that achieving a high-precision alignment was essential to the community who built the site. Ruggles (1999, 76) has suggested that more general alignments of lower accuracy are more typical of the Neolithic and Bronze Age periods.

The second possible source of comparanda for the stone setting are the small quoits found around the Atlantic façade. Small megalithic tombs found in western Wales have already been mentioned in regard to propped stones and, in common with the stone setting, these sites are often devoid of closely datable finds and are frequently found in stony, clitter-strewn areas (Barker 1992, 27; Cummings and Whittle 2004, 24–30). However, it is also a possibility that direct inspiration can be found closer to Cornwall. Sperris Quoit (Zennor) is a small megalithic structure which was excavated in the 1960s (Thomas and Wailes 1967). The site was associated with a cremation deposit, recently dated to early in the fourth millennium cal BC (Kytmannow 2008, 105). In its simplicity, Sperris Quoit has certain parallels with the Sennen stone setting, as indeed, does its location among boulders; although the location of the Sennen stone setting has of course been much more altered by enclosure and probably by subsequent clearance of boulders from the area since the nineteenth century. However, in common with the handful of other excavated chambered tombs in Cornwall, such as Zennor Quoit (Zennor), at Sperris Quoit the chamber area was the focal point for a series of depositions of human remains and other artefacts over a considerable period of time (Thomas and Wailes 1967; Jones 2005, 12), whereas, by contrast, there was no evidence of a comparable deposit within the Sennen setting.

The third tradition which may offer possible parallels with the primary phase of the stone setting are the cist graves of the later third and second millennium cal BC. Cists and flat graves are found across Cornwall and the south west, and beyond (for example, Jones *et al* 2011; Watts and Quinnell 2001; Waddell 1990). In Cornwall, these sites are often found in association with both Beaker and Trevisker Ware pottery, although there are examples which have been found to be empty and do not contain any finds at all (for example, Thomas 1975). However, the loose arrangement of the boulders which comprised the Sennen stone

setting did not form a neat box like the well-made cists which are typical of this period. The stones were also very much larger than those which are normally associated with cists.

It can be seen that there is no precise match for the site, and in common with other miscellaneous 'megaliths' in Cornwall, such as the Three Brothers of Grugith (St Keverne) (Barnatt 1982, 248; Payne and Lewsey 1999, 153–5), any attempt to pigeonhole it within a particular category of site-type is ultimately unsatisfactory. An alternative and arguably better way of considering the site would be, rather than looking for direct comparisons with other site types, to approach its interpretation from a perspective which considers the way that the people who used the site might have thought about it. It is very likely that the people who manipulated the boulders would have been aware of the broad repertoire of cultural monuments of the fourth and third millennium cal BC and this would have affected the way that they interpreted 'natural' features which resembled 'cultural' structures in the landscape around them. At the same time, the site is unlikely to have been constructed within a landscape which was devoid of meanings or one which had not been manipulated by the actions of previous generations (Ingold 2000, 186). The multi-layered character of the relationships between people, 'ancient' and new 'places', and 'cultural' and 'natural' sites is evident in many non-western societies (for example, Doring 2000) and is likely to have existed in prehistoric Europe. In other words, events at the stone setting may have been shaped by a blend of existing traditions associated with the place and localised understandings of what the site might have been.

The stone setting may have been one component of a strongly linear arrangement, reflecting the north-south ridge and leading to the groups of natural boulders which outcropped to the south. By re-arranging some of the boulders which occurred naturally at the stone setting site, the overall intention may have been to enhance a landscape feature that was already believed to be an ancient site. There is ethnographic evidence from both European and non-European societies for large stones and rocky outcrops 'being places of power' (Scarre 2009) and it may have been thought to have been the work of the ancestors (for example; Tilley 1996; but see Whitley 2002 for a critique) or other supernatural beings (Bradley 2000, 8–11). Indeed, given the widespread association between giants, natural granite outcrops and prehistoric sites in post-medieval Cornish folklore (Hunt 1865, 3–60; Bottrell 1870, 3–45), it is conceivable that comparable stories existed in the Neolithic and Bronze Age too. Using the model put forward by Tilley and Bennett (2001), this quite subtle manoeuvring of naturally outcropping boulders could be seen as either a Neolithic attempt at imitation, or as an example of Bronze Age control and manipulation of an 'ancient site'.

Examples of this kind of practice can be found with the Saami of Lapland (Mulk 1994, 128), who venerated natural features, and the peoples of the Arctic (Hallenday 2000, 94–5), who make subtly constructed stone monuments known as *Inuksuit*. In both regions, sites were the focus for acts which involved the deposition of artefacts to placate spirits and obtain favours from them. The flint and particularly the non-local Portland chert brought from the coast of Dorset found around the boulders could therefore be interpreted as votive deposits, deliberately placed into pits or scattered around the boulders. In particular, one Portland chert piece, a broken pebble, was unlikely to have been used as a tool and instead may have been a valued, exotic heirloom or amulet which was left beside the boulders. Likewise, the bevelled pebbles may also show evidence for specially selected stonework being deposited at the site (Quinnell, above). Bevelled stones are frequently associated with Mesolithic flint scatters (for example, Johnson and David 1982). However, there was little indication of Mesolithic activity around the outcrop and bevelled pebbles have also been found in later contexts, including an Early Bronze Age pit at Trenoweth (Illogan) (Reynolds 2006) and an incised example from Davidstow barrow site 25 (Christie 1988). It is therefore more likely that they were deposited during the Bronze Age with the rest of the stonework assemblage. Whether this represents a post-Mesolithic use of bevelled pebbles or the collection of older artefacts is open to question.

What can be said is that the stone setting became the focus for long-lived activity throughout the first half of the second millennium cal BC; the large number of flints indicates frequent visits to the site. The longevity is demonstrated by the three radiocarbon determinations from the adjacent pits and postholes: 3640 ±30 BP, 2060–1910 cal BC (SUERC-21081), 3455 ±30 BP, 1880–1690 cal BC (SUERC-21082), and 3315±30 BP, 1690–1510 cal

BC (SUERC-21083). They range from the Early Bronze Age to Middle Bronze Age, covering a span of approximately half a millennium. This broad dating means that it is unlikely that the dated features were contemporary with one another and could be taken to imply that pits had been dug and a series of posts erected over the course of several centuries around an older focal place in the landscape, which continued to be important.

Comparable activity has been recorded in Wales, where excavations around standing stones have produced complex evidence in the form of associated pits, postholes and small upright stones (for example, at Stackpole Warren: Benson *et al* 1990). This evidence was most recently summarised by Williams (1988, 49–51) and doubtless if approached in the light of more recent knowledge, many of these sites would produce complex biographies.

As John Barrett (1994, 14) has pointed out, 'sites' were important as 'projects' which were undertaken by communities over periods of time. In common with other monuments, the stone setting's final appearance and use may have been different from that originally intended (for example, Leary and Field 2010, 173). It may well have been important as a focus for communal activity, and, if periodic marking with posts was an important element of the site, in a strict sense it is probable that the stone setting was never actually a completed monument.

In fact, there is widespread evidence for timber posts being used to mark barrows and cairns throughout the Early Bronze Age (for example, Harding and Healy 2007, 222). Given that 'social knowledge' in the past was likely to have been based on collective memory, and therefore generational, it is probable that sites and events which took place at them moved from being historical to legendary and mythological in a comparatively short space of time. It is possible that many monuments were already viewed as ancient sites by the time that the new posts were erected beside them. Sociological study has shown that the 'past' and 'tradition' is often used to legitimise action in the present (Connerton 1989, ch 1), as they are open to re-interpretation and manipulation by the living. Indeed, excavated sites such as the Cossington barrow 1 in Leicestershire have provided indications for the manipulation of already ancient human remains (Thomas 2008, 128). Richard Bradley (2002, 112–24) has argued more broadly that mythologised archaeological sites could have been used to support actions in the contemporary 'present'.

This pattern of re-use and persistent re-marking of an important place is consistent with evidence from monuments in other parts of Cornwall demonstrating that sites were sometimes periodically modified over time throughout the second millennium cal BC (Miles 1975; Jones and Quinnell 2006b). Several monuments have been identified which were associated with post-settings which had been added as part of an ongoing sequence of modification. For example, at Caerloggas I (St Austell), on the St Austell granite, a post-ring was set into the top of the cairn-ring (Miles 1975; Jones 2005, 94); at Colliford CRIVA (St Neot) two posts were probably erected beside the barrow (Griffith 1984), and at Stannon site 2 (St Breward) a possibly sequential alignment of posts was constructed beside the cairn (Jones 2004–5). At the latter site, radiocarbon dating provided clear evidence that the posts were erected in the first half of the second millennium cal BC, several centuries after the cairn had been constructed (*ibid*). There is also a growing body of evidence for the construction of timber circles in Cornwall throughout the second millennium cal BC (Gossip and Jones 2007, 32–6).

Just as stone could have been considered to have possessed supernatural qualities, timber too may have been widely associated with spirits, ancestors or deities (Aldhouse-Green 2000). In Northern Europe, during the first millennium BC, wooden poles were associated with gods and worshipped (Kristiansen and Larsson 2005, 265); in early medieval mythology the tree Yggdrasil was believed to link the realms of Norse cosmology (Guerber 1985, 12–13). Through analogy with modern Madagascar, Parker Pearson and Ramilsonina (1998) have suggested that the timber used in post-rings in prehistoric Wessex was symbolically associated with the living or the recently dead. Any of these scenarios is possible, and it is perhaps more useful to recognise the symbolic qualities of wood as an organic 'living' material which may have made it appropriate for use in monuments (Aldhouse-Green 2000). In this light, it is perhaps also worth remembering that wood was also used in the settlements of the living, to create structures, and may therefore have been employed to impart new life into old sites by renewing them. In this way, ancient sites in the

landscape could have been brought back into the present and made into visible focal points for use by living communities.

The sites referred to above are, of course, different from the Sennen stone setting in that they were entirely culturally constructed monuments; however, if, as has been argued here, the stone setting had become 'remembered' and mythologised as an ancient site, or a place where 'important events' had occurred, then the distinction between what was 'natural' and what was 'cultural' is likely to have become blurred and unrecognisable to prehistoric communities. Activity at the stone setting may therefore be best interpreted as representative of the outcome of an ongoing spiritual attachment to place, which may have been common to many communities during the second millennium cal BC (Harding and Healy 2007, 286). At the stone setting this relationship was shaped by social memory and perpetuated by the repeated digging of pits and the periodic erection of posts.

Seen in this way, it is possible to visualise the stone setting as a place marked by posts and overlooking an area which would, judging by the remains of prehistoric field boundaries (Herring 1994), have been very suitable for settlement. It may have been one of those places in the landscape where the supernatural was believed to manifest itself. It was perhaps, a place where people walked up to sit while flint was knapped and perhaps left the chert and other pebbles as offering to the beings who were believed to dwell there. And perhaps during these visits, stories were told about the spirits or ancestors who may have inhabited the rocks or the giants who were buried beneath them.

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Prehistoric and Romano-British enclosures around the Camel estuary, Cornwall

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A systematic programme of mapping archaeological sites in Cornwall visible on aerial photographs has resulted in the discovery of a large number of enclosures, most of which are presumed to date from the late Iron Age and Romano-British period. In the area around the Camel estuary this work has led to a five-fold increase in the number of known enclosures. This paper presents a detailed typological analysis of enclosures in the Camel estuary hinterland based on their size, shape and complexity. It reviews the evidence for internal features such as round and oval houses and associated features such as field systems. It also examines the distribution of the enclosures and considers what information this provides about the pre-medieval landscape. The paper highlights other parts of Cornwall where comparable numbers of enclosures have been recorded and outlines the potential for future research.

Between 1994 and 2006 systematic mapping, recording and interpretation of archaeological sites in Cornwall from aerial photographs was carried out as part of English Heritage's National Mapping Programme (NMP). The work was undertaken by members of Cornwall Council's Historic Environment Projects team and its predecessors, Cornwall Archaeological Unit and Cornwall County Council Historic Environment Service. More than 30,000 features were mapped, including many thousands of previously unknown sites (Young 2006). One key outcome of this work was a large amount of new data relating to archaeological sites in lowland Cornwall. Of particular significance is the identification of more than 1,000 hitherto unrecorded enclosures. Many of these, by analogy with surviving earthwork monuments and excavated sites, are thought to be enclosed settlements of the later prehistoric and Roman periods of the type traditionally known in Cornwall as rounds. If this is the case, the number of known settlements has increased to the extent that previous interpretations of the extent of occupation and population in Cornwall during this period need to be reviewed.

As part of the NMP, all the enclosures now known in Cornwall have been classified according to their morphological characteristics. This classification offers the opportunity for a typological analysis and re-evaluation of Cornish enclosures which serves two important research agendas. Firstly, it allows the development of a typology of enclosures. The great diversity in size and form of Cornish enclosures was demonstrated by Johnson and Rose (1982) but no attempt at distinguishing typological variations has previously been made. Secondly, the analysis highlights enclosures which do not fit easily into the typological and chronological framework; a number of unusual and atypical enclosures (for example, three possible henge monuments) were recorded during the mapping phase of the project and detailed analysis of the database would doubtless identify more.

The research potential of the enclosure dataset can only be fully realised by an extensive programme of analysis. This article is intended to demonstrate that potential by presenting the results of NMP mapping in the area around the Camel estuary in north Cornwall (Fig 1).

The study area

The hinterland of the Camel estuary is a well-defined geographical area of north Cornwall covering approximately 300 sq km. It is bounded to the west and north by the coast and to the east by the upper reaches of the Camel and Allen valleys (Fig 1). The landmass around the estuary forms a plateau rising to 85m AOD on coastal headlands, rising in the south to the higher ground of the St Breock Downs, the highest point of which is at 215m AOD, and in the north to meet the Delabole ridge which reaches 180m AOD.

The estuary itself forms a broad expanse of water dissecting the landform. Its valley sides are shallow and gentle and are penetrated by short creeks which are often wooded. There are significant expanses of mudflats towards Wadebridge and an extensive area of sand dunes at St Enodoc. The surrounding land is drained by a number of small streams, the largest of which is the River Amble. Much of the coastline is characterised by windswept headlands punctuated by sheltered bays and coves.

The geology of the Camel estuary area is typical of that underlying much of central Cornwall and consists of Devonian slates and shales, known locally as killas. In broad terms the area north of the Camel is characterised by Tredorn slates of the Upper and Middle Devonian, and that to the south by grey slates of the Middle and Lower Devonian (Stanier 1990). The area south of the river is characterised by Denbigh series brown earths and to the north by Powys series brown rankers (Avery *et al* 1965).

The study area is predominantly agricultural, although the tourism industry is represented along the coast by numerous caravan parks. Even in this area, ploughing often takes place right up to the cliff edges. The downland ridge in the south supports a pastoral regime, although there is some forestry at its eastern end. Elsewhere, the agriculture is mixed and the landscape consists of a pattern of small- to medium-sized fields with some larger fields where boundaries have been removed in recent times. The Camel estuary hinterland is one of the few areas of Cornwall to contain Grade 2 agricultural land

Fig 1 Location: the Camel estuary hinterland study area.

(Ministry of Agriculture, Fisheries and Food 1961) and, as a result, is one of the county's main cereal-growing regions.

Much of the study area is identified in Cornwall's Historic Landscape Character Assessment (HLC) as Anciently Enclosed Land (Fig 2); this is Cornwall's agricultural heartland, based on farming settlements documented before the seventeenth century and with irregular field patterns deriving from the enclosure during the later medieval period of blocks of cultivation strips of early medieval and medieval origin (Cornwall County Council 1996; Herring 1998, 78–9; 2006). Anciently Enclosed Land was also the principal area of ancient settlement (Herring 1998) and much of the hinterland of the estuary therefore has the potential to contain traces of the settlements and fields of prehistoric and Romano-British farmers.

Along the coast is a narrow strip of Coastal Rough Ground, which has been reduced over the last century by recent enclosure. Here, large rectilinear fields separate the inland medieval pattern from the sea. The high, exposed land of the St Breock Downs is also composed of twentieth-century enclosures, characterised by large, rectilinear fields, many with modern fencing. In the south west there are military airfields at St Eval, St Merryn and St Mawgan.

A small number of prehistoric and Romano-British enclosures in the study area were known and recorded in Cornwall's Historic Environment Record (HER) prior to the mapping project. These included several rounds, a large univallate enclosure, four multiple enclosures and five cliff castles (Fig 3). Several of these sites have undergone excavation to greater or lesser extent. These include Trevisker, in St Eval, an enclosed homestead of the later Iron Age occupied into the early Roman period, built over the site of a Middle to Late Bronze Age open settlement

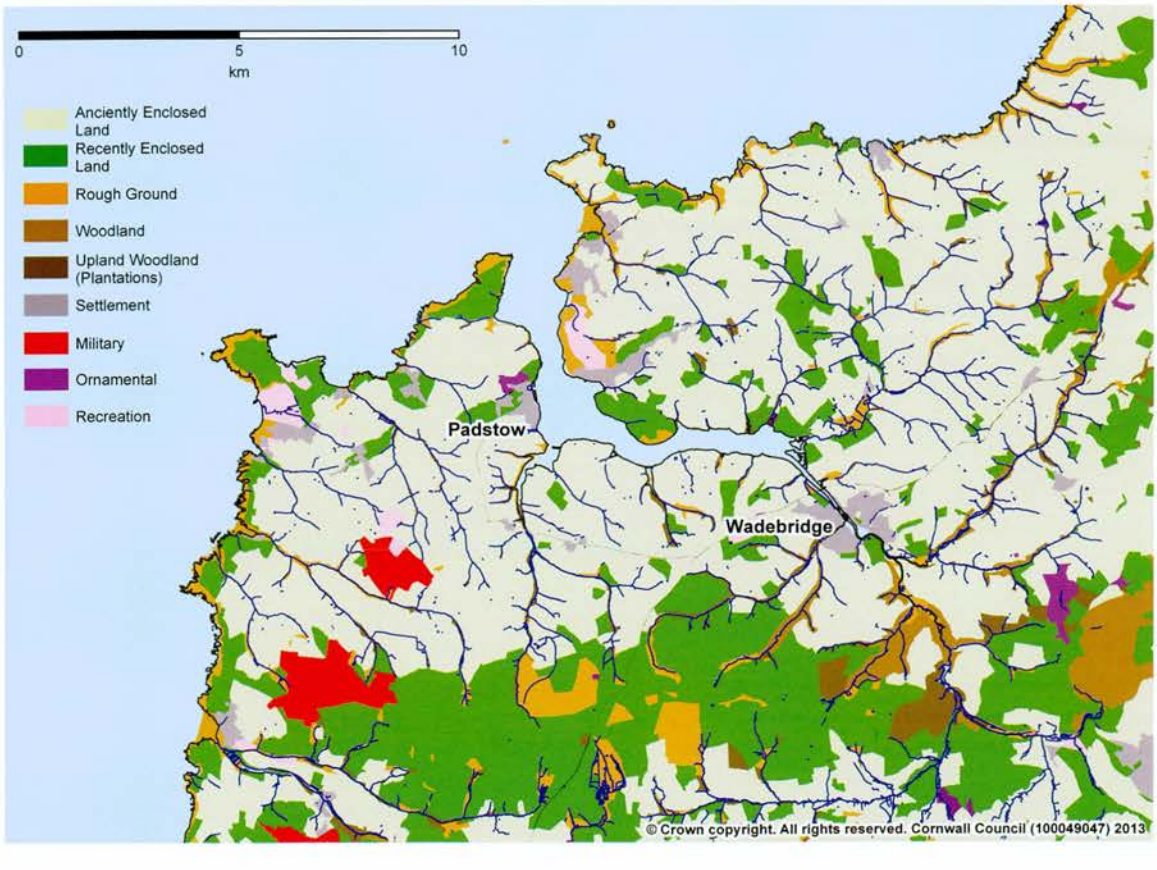

Fig 2 The study area with Historic Landscape Character mapping (Cornwall County Council 1996).

(ApSimon and Greenfield 1972); Killibury hillfort, Egloshayle, a multiple enclosure in use from the fourth century BC to the first century AD (Miles 1977); The Rumps cliff castle, St Minver, in use throughout the later Iron Age (Brooks 1974); and a large univallate enclosure at St Mawgan-in-Pydar, sometimes referred to as Carloggas, where occupation continued into the Roman period (Threipland 1956). Smaller-scale investigations at three other enclosures in the study area identified little more than broad date ranges. Tregeare Rounds is a multiple enclosure apparently occupied in the Later Iron Age but not into the Roman period (Baring-Gould *et al* 1904). An enclosure at Trevinnick, St Kew, was found to be Romano-British in origin (Fox and Ravenhill 1969) and another at Tregilders, also St Kew, may have been in use briefly during the first century BC (Trudgian 1977).

Further evidence of Iron Age occupation is provided by cemeteries at Harlyn Bay and Trevone (Whimster 1977), and of activity in the Romano-British period by finds of metalwork and pottery from the sand dunes at St Enodoc, St Minver (Trollope 1860). Recent investigations at Penmayne, near Rock, St Minver, located an unenclosed roundhouse settlement dating to the Middle Iron Age (Gossip *et al* 2012: this volume). Brief investigations by *Time Team* at Lellizzick, near Padstow, revealed an unenclosed Roman-period roundhouse settlement on a site close to the shore near the mouth of the Camel estuary. The site also produced finds indicating Middle – Late Bronze Age and post-Roman occupation (Wessex Archaeology 2008).

Previous research

Current understanding of Cornish enclosures is based on a relatively limited number of investigations, most of which have been small in scale. Enclosures feature in three earlier overviews of the Iron Age and Roman periods in Cornwall (Thomas 1966; Quinnell 1986; Todd 1987), and hillforts and multiple enclosures have been discussed by Fox (1952; 1961). Rounds have been considered recently by Quinnell (2004, 211–44) and cliff castles by Nowakowski and Quinnell (2011). However, the only comprehensive attempt to provide an overview of Cornish enclosures of all types was made more than 30 years ago (Johnson and Rose 1982). That paper identified five basic types of enclosure – tor enclosures, hillforts, multiple enclosures, cliff castles and rounds – and these are briefly summarised below.

Tor enclosures

These are irregular spaces on the summits of distinctive hills with the enclosures defined by stony banks linking natural granite outcrops. They are the earliest enclosures recorded in Cornwall, dating from the earlier fourth millennium BC (Oswald, Dyer and Barber 2001, 85–90; Mercer 2001; Jones and Quinnell 2011). Tor enclosures are interpreted as multi-functional sites serving primarily as meeting places for dispersed communities and centres for ritual, ceremony and trade (Herring 2011a; 2011b). Known sites of this type include Carn Brea, near Redruth, and Helman Tor, near Lostwithiel (Mercer 1981; 1997). Small-scale excavations have recently taken place on another probable tor enclosure at Carn Galva, Zennor (Jones, in prep).

Hillforts and multiple enclosures

Sited in conspicuous positions, usually on hilltops, hillforts have strong defences in the form of enclosing banks and ditches and are often multivallate (Johnson and Rose 1982, 155). Multiple enclosures are large enclosures with strong defences, but are differentiated from hillforts in that they are typically sited on slopes rather than hilltops.

Johnson and Rose distinguished between 'defended' sites and 'strongly defended' sites, and concluded that large multivallate enclosures, whether sited on hilltops or slopes, should be regarded as 'strongly defended'. It is perhaps more useful to differentiate between 'univallate hillforts' and 'multiple enclosure hillforts', rather than hilltop and hillslope enclosures.

In the 1960s Aileen Fox suggested that the widely-spaced enclosure banks characteristic of multiple enclosure hillforts were designed specifically for the management of livestock (Fox 1961, 46). This hypothesis has been widely accepted although it has not been tested by excavation. There is also a suggested chronological distinction between univallate and multiple enclosure hillforts. Herring (1994) proposed that in West Penwith the earliest hillforts may be the larger and more irregular

univallate enclosures on hilltops, including re-use of tor enclosures, whereas multiple enclosure hillforts were not established until the Later Iron Age, around the same time as the introduction of South Western Decorated pottery (Quinnell 2004, 214; 2011, 237). The limited evidence suggests that in Cornwall most hillforts had fallen out of use before the end of the Iron Age (Quinnell 1986, 121), although at Gear, St Martin-in-Meneage, a small farm settlement appears to have been sited in the interior of the earthwork in the later Roman period (Edwards and Kirkham 2008).

Current understanding of Cornish hillforts is hampered by a lack of excavation data but it is likely that not all hillforts were used in the same way. The evidence from Killibury (Miles 1977) and Gear (Edwards and Kirkham 2008) suggests that these sites may have housed permanent settlements, but is elsewhere less convincing (for example, Radford 1951). Some hillforts may have been linked to metalworking and ownership of metallurgical resources (J Nowakowski, pers comm). Herring (1994; 2011a, 34–5) has suggested that hillforts in west Cornwall functioned as local centres in which farming communities held counsel on issues relating to local society and economy, not least determining access to rough ground grazing, and carried out political and religious ceremonies; they were communal centres for populations who controlled their own territories and resources, rather than housing a ruling aristocracy.

Cliff castles

These are enclosures formed by the construction of one or more substantial banks and ditches enclosing a coastal headland. They are broadly contemporary with hillforts and rounds; some originated in the Early Iron Age or Late Bronze Age (Nowakowski and Quinnell 2011; Quinnell 2011), others were established in the Later Iron Age and occupation in some cases continued into the Roman period (Quinnell 1986, 115; Nowakowski and Quinnell 2011). Although houses, hearths and domestic material have been found at a few cliff castles, the inhospitable aspect of most surely precludes any suggestion that they were permanent settlements and it is likely that many, particularly the smaller and more exposed examples, were used only on an occasional or seasonal basis (Kirkham 2011). Their dramatic setting and the presence of Bronze Age barrows and cairns on many headlands enclosed by cliff castles hints at a significant ceremonial element to this use (Sharpe 1992; Herring 1994; Kirkham 2011).

Rounds

There are currently more than 2500 records for Cornish sites listed either as rounds or as prehistoric or Roman enclosures in the HER. There are a further 800 records for enclosures of uncertain date, many of which may also date from this period. Thus, there are more than 3300 records for enclosures which are potentially prehistoric or Roman in origin. More than half of these records resulted from NMP mapping.

Johnson and Rose (1982, 155) defined rounds as 'small farming settlements defended by a single bank and ditch and usually sited on hill slopes and spurs'. Some have been shown to be set within associated field systems, as at Goldherring, Sancreed (Guthrie 1969), and Penhale, Fraddon (Nowakowski 1998); excavated sites have produced cereal remains and artefacts such as spindle whorls, indicating a mixed farming regime, as, for example, at Reawla, Gwinear (Appleton-Fox 1992). Several rounds, including Reawla and Trethurgy, Treverbyn (Quinnell 2004), have also produced evidence of secondary metalworking (smithing as opposed to the production of metals).

The earliest dates for round-type enclosures are currently in the Early Iron Age (Young and Quinnell 2000–2001; Startin 2009–10; Gossip, forthcoming c), although they continued to be constructed into the Roman period. The most recent comprehensive review of rounds (Quinnell 2004, 212–4) shows that this type of settlement was widespread between at least the fourth century BC and the sixth century AD, but that they were a particularly important element of the countryside in the Roman period, particularly during the second and third centuries AD. A number of rounds have been investigated but Trethurgy remains the only one of which the interior has been completely excavated (Quinnell 2004). It provides an invaluable benchmark and point of reference but at the same time, it is not clear to what extent it can be considered 'typical' of Cornwall's small enclosures.

Rounds were first recognised as a class of field monument in the 1950s (Dudley 1958). Early definitions (for example, Fox 1964, 125; Cunliffe 1975, 188) described the round as a small, univallate, curvilinear enclosure which

could be considered a regionally distinct class of monument. Early definitions were based on those enclosures (numbering more than 300 in Cornwall) which survive in the modern landscape as earthworks. One probable reason for the good survival of rounds is the substantial nature of their banks, which often incorporated large amounts of stonework; some rounds had banks which were revetted or faced with blocks of stone, as, for example, at Penhale, Fraddon (Nowakowski 1998), and Trethurgy (Quinnell 2004). However, a large number of plough-levelled enclosures have since been recorded, mostly as cropmarks on aerial photographs, with a very great range of shape, size and form which is at variance with those early definitions.

Rather than differentiating between this variety of enclosures and the classically-defined rounds, however, there has been a tendency towards inclusion, using 'round' as a catch-all term. This is reflected in the Monument Class Description in English Heritage's Monuments Protection Programme, which lists seven types of 'round' based on their ground-plan (English Heritage 1988). These include rectilinear enclosures, multivallate enclosures with wide-spaced earthworks and enclosures with annexes.

Enclosed settlements are a widespread feature of Iron Age and Roman Britain (Bewley 1994, 114). If we accept that the good survival rate of earthwork enclosures in Cornwall might reflect regional land use history rather than local Iron Age and Romano-British traditions, a pertinent question to ask is whether a regionally distinct form of enclosure – 'round' – can be identified, as opposed to a regionally distinct use of the term 'round'.

Addressing this issue, Quinnell suggests that a round was a permanent settlement consisting of substantially built houses contained within an enclosing circuit, usually under 1 ha in extent and with ditches 2m or less in depth, the importance of which was marked by the maintenance of a working gateway (Quinnell 2004, 213). However, she also makes an important distinction between 'round' as a social term, defining a community living in an enclosed settlement, and 'round' as a field monument description, and notes that the 'disentangling of this double usage is long overdue' (*ibid*, 211). The complexity and variety of Cornish enclosures revealed by the NMP survey supports her view that 'small enclosure' is more appropriate as a field description. Quinnell has refined the terminology by proposing a revised definition of the term 'round':

> 'a permanent settlement with substantially built houses whose inhabitants merited the distinction of a formal bound or enclosure, which may have held significance for their status beyond its provision of protection or defence' (*ibid*, 213).

The need for a more considered terminology is underlined by work in Devon, where recent fieldwork has shown that some small enclosures date to the Bronze Age and medieval periods (Fitzpatrick *et al* 1999; Griffith and Quinnell 1999). This is also likely to be the case in Cornwall.

Enclosures resembling rounds at Killigrew, St Erme (Cole and Nowakowski, forthcoming), and Little Quoit Farm, St Columb Major (Lawson-Jones and Kirkham 2009–10), appear not to have been settlements but rather dedicated metalworking sites. Quinnell (2004, 214) has suggested that the term 'round' should not be used for non-settlement enclosures such as these.

Other enclosure forms

Johnson and Rose (1982, fig 16) highlighted a number of enclosures which did not fit their classification scheme. For the most part these enclosures are smaller than the generally accepted range for rounds and it was suggested that they may represent other types of settlement. A site which may offer a possible parallel for these small enclosures was excavated recently at Tremough, Penryn. This was a small open-sided curvilinear enclosure which contained a single oval building dating to the Romano-British period (Gossip and Jones 2007, 45–9; 2009–10, 20–4).

Work carried out since Johnson and Rose's 1982 study has identified other enclosure forms. Recent investigations in west Cornwall, for example, have highlighted another distinct form of hilltop enclosure (Herring 2011b). These are circular, broadly similar in size (60–75m in diameter) and defined by relatively slight stony banks. The known examples are at Bartinney, St Just (Herring 1995), and Godolphin Hill, Breage (Herring 1997, 144–6), and within the later hillforts at Caer Bran, Sancreed (Lawson-Jones and Herring 1997), and Castle-an-Dinas, Ludgvan (Weatherhill 1981, 43). None has an obvious entrance and all contain probable Early Bronze Age ring cairns, suggesting that they were perhaps ritual or sacred enclosures broadly

contemporary with the cairns (Herring 2011b). However, Jones (2010) has proposed that these sites may in fact date to the first millennium BC, as do recently excavated hengiform enclosures at St Newlyn East and Camelford (Jones, forthcoming; Jones and Taylor, forthcoming).

No enclosures attributed to the Bronze Age were included in Johnson and Rose's overview, but more recently it has become evident that some of the earliest Cornish hillforts and cliff castles may have their origins in the Late Bronze Age (Quinnell 1986, 112–3; Nowakowski and Quinnell 2011; Bishop 2011; Soutar, forthcoming). A possible hilltop enclosure dating to the Bronze Age is suggested by a substantial ditch excavated at Liskeard (Jones 1998–9), although this may in fact be a linear feature rather than an enclosure.

NMP mapping in the Camel estuary hinterland

NMP plotting of archaeological features was based on approximately 1,500 aerial photographs of the study area. The most important flights were those carried out by the National Monuments Record (NMR) in August 1983 and by Cornwall Archaeological Unit (now Historic Environment, Cornwall Council) in June 1989, during which many previously unrecorded cropmark sites were photographed.

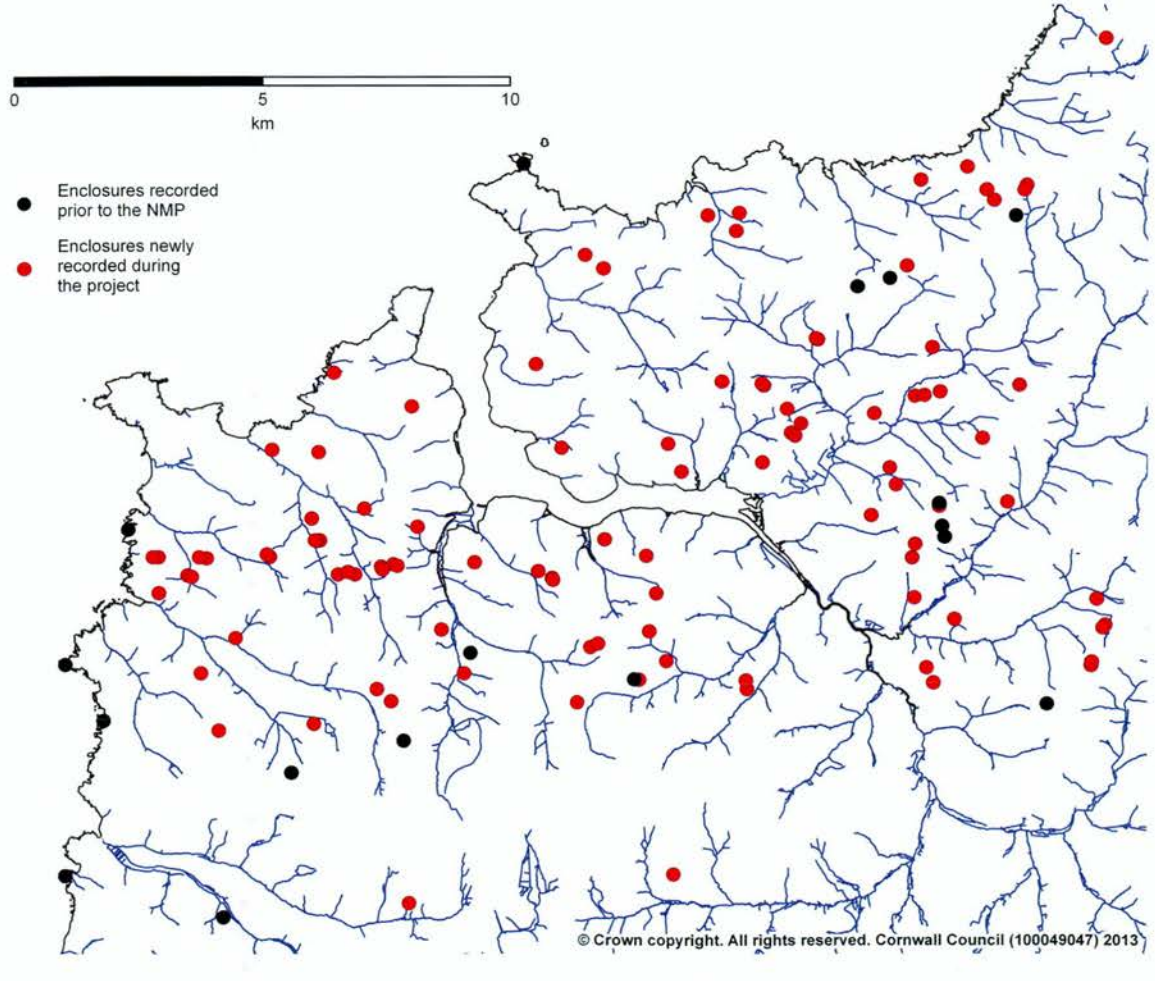

Fig 3 Enclosures known prior to Cornwall's National Mapping Project and those identified during the project.

Aerial photography has proved a particularly effective means of locating previously unrecorded enclosures in the study area. One hundred new enclosures were identified, interpreted and mapped during the NMP, a five-fold increase on the number of records held by the HER prior to the project (Fig 3). Almost all these sites are plough-levelled and visible only as cropmarks. A further 39 features were recorded as 'possible' enclosures. Uncertainty over their interpretation exists either because the features were too faintly visible to allow more confident interpretation or there was a possibility that the cropmarks represented geological rather than archaeological features. While from a historic landscape management perspective it is desirable to record 'possible' features such as these in the HER, they are excluded from the analysis presented here to prevent distortion.

Enclosures are not distributed evenly throughout the study area. Significantly, none are recorded on the high ground of the St Breock Downs. The enclosures are most numerous in a wide east - west band running through the centre of the study area. They tend to occupy ground between the 50m and 100m contours and have a close relationship with watercourses, often positioned by streams, at the head of streams or at the junction of two streams. It is worth noting that all of the enclosures identified as 'possibles' (above) also fit into this broad distribution pattern.

It should come as no surprise that a large number of new enclosures were identified from systematic examination of air photographs. Substantial enclosure ditches readily produce cropmarks, even on the shillet and slate soils of the Cornish killas which are characterised by relatively high clay content. In other respects, however, the cropmark evidence presents an incomplete picture of the below-ground archaeology. Less substantial features such as round or oval houses, pits and shallow ditches, rarely produce recognisable cropmarks and it is notable that relatively few extensive or coherent field systems associated with the enclosures were recorded.

This should not be taken as indicating the absence of fields or to imply that enclosures were not associated with agriculture. Similarly, the fact that few settlement features were identified *within* the enclosures does not preclude their interpretation as settlements. To cite two examples, field investigations carried out at Nancemere, Truro (Gossip 2005; forthcoming a), and Penhale, Fraddon (Nowakowski 1998), both revealed features which had not been visible on aerial photographs. What the mapping of cropmark enclosures does provide is an indication of the potential extent of the below-ground archaeology; the distribution shown in Figure 3 suggests that the buried landscape of the Camel estuary area is particularly rich. Additionally, despite the observations regarding Cornish cropmarks made above, one of the most important results of NMP mapping in the study area is the identification of a number of unenclosed roundhouse settlements, as, for example, at Lellizzick, Padstow (Payne 1998; Wessex Archaeology 2008).

Enclosure typology

Johnson and Rose (1982) based their overview on 290 enclosures in Cornwall for which information was then available. Thirty years later there are now plans or surveys of more than ten times this number. While the mapping of these enclosures has provided an opportunity to develop a better understanding of them, of their relationship to each other and their distribution in the landscape, it makes the task of further developing this understanding almost labyrinthine. The accumulated research into Cornish enclosures does not properly address this overwhelming complexity. 'Archaeological understanding emerges from the . . . systematic search for pattern and order', noted Whimster (1989, 2), and this is the context in which the following typological analysis should be seen. This initial framework will necessarily be refined by future research.

In outlining a morphological typology, all the various types of enclosure recorded in the Camel estuary hinterland have been considered, with the exception of cliff castles. These have been disregarded because in morphological terms they comprise linear features which create an enclosed area by cutting off a coastal headland; the greater part of the interior of cliff castles is enclosed by natural features (usually steep cliffs) rather than by earthworks.

Excluding the five cliff castles, there are 115 enclosures in the study area, not including those which are currently regarded as 'possibles' (Appendix 1). Two-thirds are simple univallate sites, originally enclosed by a single ditch or bank; the remainder are either multivallate, consisting

of two or more enclosing circuits, or they have secondary enclosures or 'annexes' appended to their circuit. In some cases annexes are appended to multivallate enclosures. An obvious starting point for typological classification is to subdivide the enclosures according to their apparent complexity.

Univallate enclosures

Simple univallate enclosures predominate in the Camel estuary hinterland but exhibit a considerable size range, from a 0.03 ha rectangular feature at Trevoyan, St Merryn (146) (Fig 4), to the substantial earthwork known as Carloggas in St Mawgan-in-Pydar (107) (Fig 5) which enclosed about 1.5 ha. Only one other site, Tregaverne, St Endellion (126) (Fig 5), encloses more than 1 ha, however, and only five of the 77 univallate enclosures exceed 0.8 ha.

These figures fall broadly within existing definitions of a Cornish round: 'These ... consist of a simple bank and ditched enclosure seldom exceeding a hectare in extent', notes Cunliffe (2005, 285). In fact, with reference to the Camel area this statement could be amended to 'seldom exceeding 0.5 ha': indeed, well under half of the enclosures are 0.3 ha or more in area (Table 1).

Analysis by size

Table 1 Univallate enclosures in the Camel estuary: analysis by size

Extent of area enclosed	*Number of enclosures*
1 ha and more	2
0.8 – 0.99 ha	3
0.5 – 0.79 ha	4
0.3 – 0.49 ha	11
0.1 – 0.29 ha	34
Less than 0.1 ha	23
Total	77

The size range of univallate enclosures is therefore strongly skewed towards the smaller end of the scale, with all but nine of the 77 examples in this group being of less than 0.5 ha; three-quarters are less than 0.3 ha.

Comparison with excavated enclosures indicates that those enclosing more than 0.1 ha might be interpreted as possible rounds. The smallest excavated enclosure which can be interpreted as a round using Quinnell's definition is Goldherring, Sancreed, where a number of roundhouses lay within a banked and ditched enclosure covering little more than 0.1 ha (Guthrie 1969).

Enclosures smaller than 0.1 ha

Twenty-three of the univallate enclosures are smaller than 0.1 ha (Fig 4) and the function of these is less clear. An enclosure dating to the Romano-British period at Tremough, Penryn (Gossip and Jones 2007, 45–9; 2009–10, 20–4), falls within this size range and may serve as a comparison for some of the smaller Camel estuary enclosures. It may initially have been a stock enclosure but a single oval house was subsequently constructed within it. It is possible, therefore, that these very small enclosures differ from larger ones in their range of uses.

Large and very large enclosures

In the context of the wider area around the Camel estuary, as well as in Cornwall as a whole, the five enclosures of more than 0.8 ha in extent are unusual (Fig 5). The only excavated enclosures of this size in Cornwall, other than hillforts, are Carloggas at St Mawgan-in-Pydar (107) and Carvossa, Probus (Douch and Beard 1970), both of which have been interpreted as high-status sites rather than rounds. At Carlidnack, Mawnan, the function of the site was not clearly established due to the limited area excavated (Harris and Johnson 1976).

Small and intermediate enclosures

Approximately 45 per cent of the univallate enclosures in the study area measure between 0.1 and 0.29 ha and enclosures in this range are the most frequently occurring type in the Camel estuary area. When enclosures up to 0.5 ha are included the proportion is almost 60 per cent of the total of univallate forms.

Some or many of these smaller enclosures may have housed settlements. Rounds within this size range have been excavated at Trethurgy (Quinnell 2004), Goldherring (Guthrie 1969), Penhale (Nowakowski 1998) and Threemilestone, Kenwyn (Schwieso 1976); that at Shortlanesend, Kenwyn (Harris 1980), was only slightly larger. Evidence for permanent settlement within other Cornish enclosures of this size is inconclusive, as, for example, at Kilhallon, Tywardreath (Carlyon 1982), Bodwen, Lanlivery (Harris 1977), and Carwarthen, St Just-in-Roseland (Opie 1939).

Between this group of smaller enclosures of less than 0.3 ha and the few sites which enclose

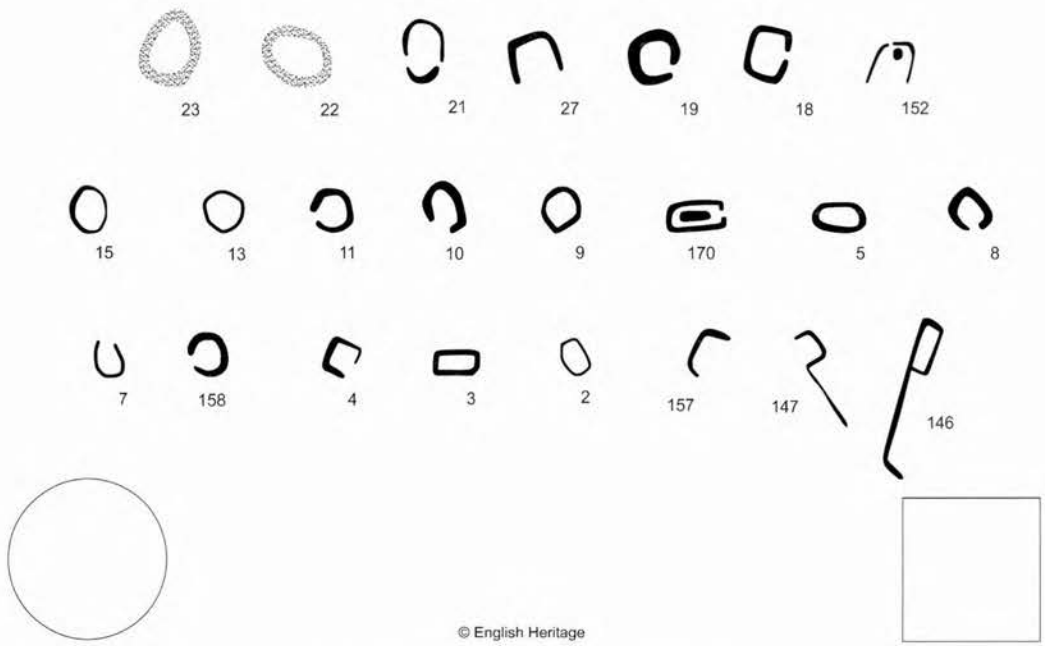

Fig 4 Very small enclosures of less than 0.1 ha. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with the sides of the square representing 100m.

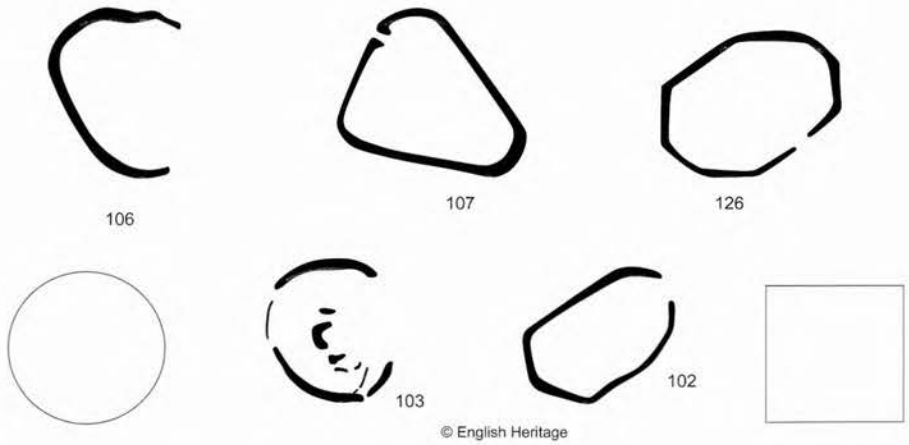

Fig 5 Large enclosures, covering between 0.8 and 1 ha (102, 103 and 106), and very large enclosures, covering more than 1 ha (107 and 126). The circle and square are equivalent to 1 ha, with the sides of the square representing 100m.

0.8 ha and more are 15 enclosures which might be described as intermediate in size. Comparable excavated sites within this intermediate range include the enclosed settlement at Porthmeor, Zennor (Hirst 1937), and the rectilinear enclosures at Grambla, Wendron (Saunders 1972), and Trevinnick, St Kew (Fox and Ravenhill 1969); Castle Gotha, St Austell (Saunders and Harris 1982), is an excavated round which fits into the larger end of the range of intermediate enclosures.

Analysis by shape

It is useful to further classify enclosures on the basis of their shape. During the NMP English Heritage's *Morph* database was used to record the shape of the enclosures identified and plotted. The aim of *Morph* is not to answer all questions about site morphology but to provide an initial step towards understanding. It was developed by the Royal Commission on the Historical Monuments of England (RCHME) in the late 1980s as a means of classifying archaeological sites visible as cropmarks (Edis *et al* 1989) and contains a series of simple categories designed to describe each site in an objective way. *Morph* defines enclosures as either curvilinear (with more curving sides than straight), or rectilinear (with more straight sides). Each of these two broad categories is broken down into a series of further options.

Table 2 Analysis of enclosures by form

Size	*Curvilinear*	*Rectilinear*	*Subtotal*
More than 1 ha	0	2	2
0.5 – 0.99 ha	3	4	7
0.3 – 0.49 ha	5	6	11
0.1 – 0.29 ha	13	21	35
Less than 0.1 ha	11	12	23
Total	**32**	**45**	**77**

Analysis of the univallate enclosures indicates that almost 60 per cent of them are broadly rectilinear in form. However, an inherent weakness of categorisation into 'curvilinear' and 'rectilinear' is illustrated by 13 of the enclosures which combine both straight and curving sides, weakening the distinction between the two forms. Most of these 'mixed' enclosures are small or very small, with only one, at Scarrabine, St Endellion (102), significantly larger, enclosing 0.8 ha (Fig 6).

In some instances the circuits of enclosures clearly follow contours and their shapes were probably designed primarily to fit into the local

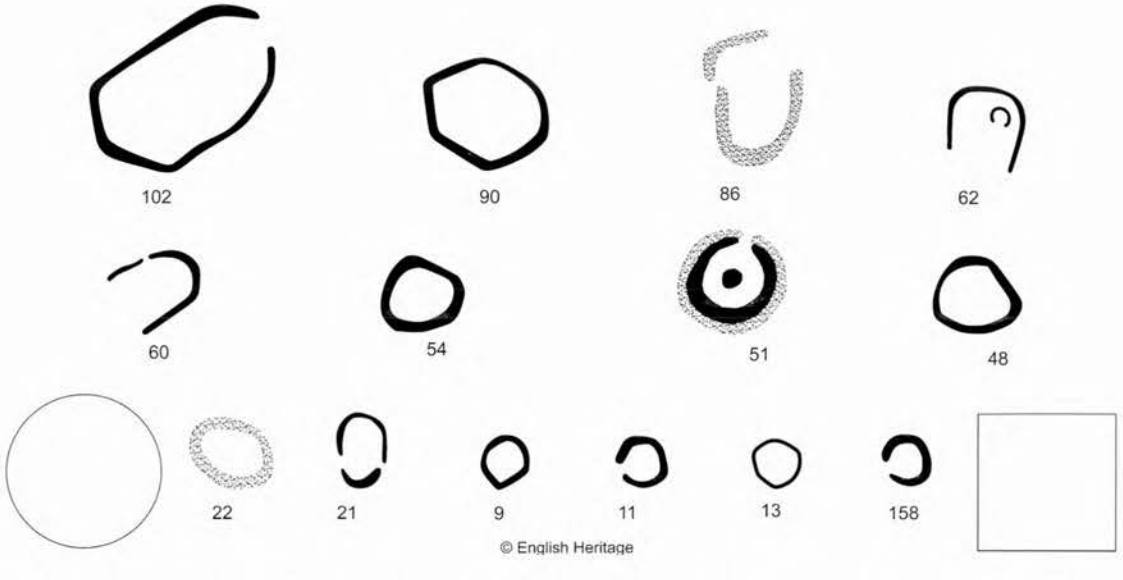

Fig 6 Enclosures formed by both straight and curving sides. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with the sides of the square representing 100m.

topography. On the other hand, a significant proportion of them have quite distinctive shapes and their layouts were clearly deliberately designed. Many of the rectilinear enclosures are highly rectilinear; that is to say they are rectangular or sub-rectangular, polygonal with four sides, or sub-square. Highly rectilinear types make up a substantial group which includes a third of the predominant small enclosure group (Fig 7) and all of the intermediate enclosures (Fig 8).

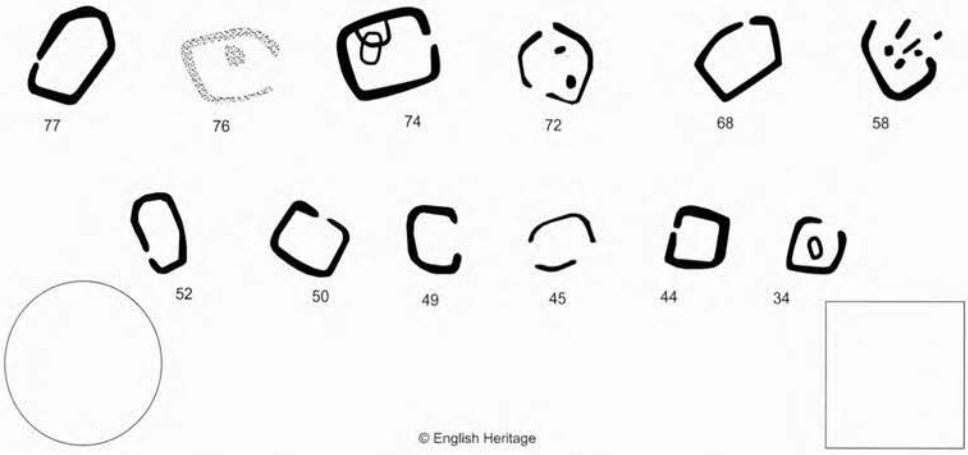

Fig 7 Small rectangular, sub-rectangular and four-sided polygonal enclosures within the 0.1–0.29 ha size range. Solid lines represent ditches, stipple indicates banks. The square in the lower right corner of the illustration is equivalent to 1 ha, with each side representing 100m.

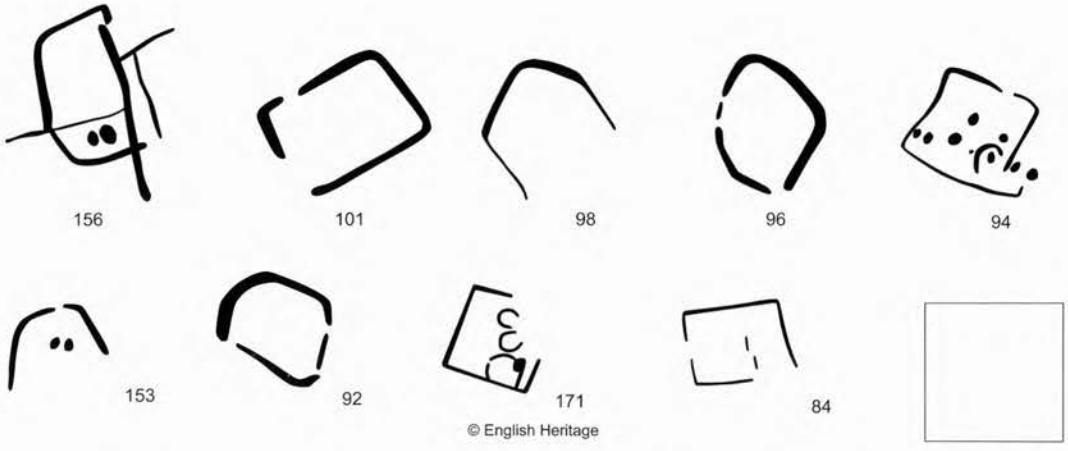

Fig 8 Rectangular, sub-rectangular, square and polygonal enclosures within the 0.3–0.79 ha intermediate size range (lower line: 0.3–0.49 ha; upper line 0.5–0.79 ha). Solid lines represent ditches, stipple represents banks. The square in the lower right corner of the illustration is equivalent to 1 ha, with each side representing 100m.

Curvilinear forms are more difficult to define. None of the enclosures can be described as circular (in *Morph* this term is used only for perfect circles, such as the ring ditches of Bronze Age round barrows) and only two are sub-circular (almost perfect circles). There are ten oval enclosures and this is the most frequently occurring curvilinear form: three of these are less than 0.1 ha but the other seven enclose between 0.1 and 0.49 ha (Fig 9).

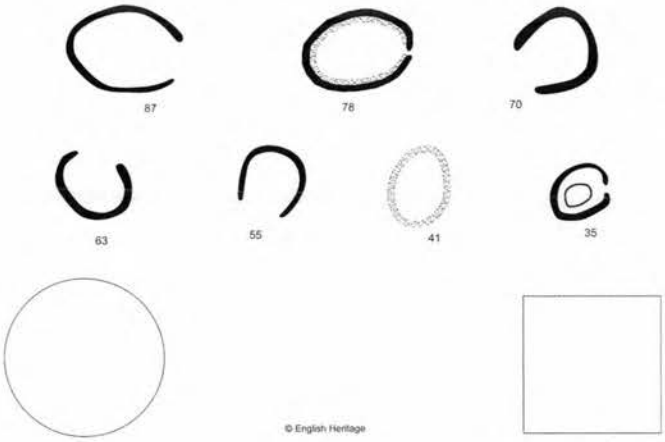

Fig 9 Oval enclosures in the 0.1–0.49 ha size range. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with each side of the square measuring 100 m.

Fig 10 A symmetrical curvilinear enclosure at Tredannick, Egloshayle (85). (Photograph: Historic Environment, Cornwall Council, F49–70; 25 July 1996.)

The remaining curvilinear enclosures are defined as either 'asymmetric' or 'regular'. Regular forms are those which are symmetric (with at least one axis of symmetry) but are not circular, sub-circular or oval (Fig 10). Asymmetric enclosures are those with no axis of symmetry and include a range of irregular forms (Fig 11). Fourteen enclosures are classed as asymmetric and seven as regular.

The majority of curvilinear enclosures are within the 0.1–0.49 ha size range, but it is of interest that three large sites enclosing between 0.8 ha and 1 ha are also all curvilinear (Fig 5).

Open-sided enclosures

Poor definition in some cropmarks in the Camel estuary area poses the question of the extent to which enclosures are completely visible. In at least 26 cases enclosing ditches do not appear to form complete circuits: a number of rectilinear enclosures have only three sides and there are curvilinear enclosures which are horseshoe- or crescent-shaped. In some of these instances there are hints that more of the enclosing ditches do exist but are not fully visible; in others the cropmarks are partially obscured by geological features or pockets of soil build-up. Here we can reasonably

Fig 11 An asymmetric curvilinear enclosure at Dinham's Bridge, St Kew (59). (Photograph: Historic Environment, Cornwall Council, F37–56; 7 July 1992.)

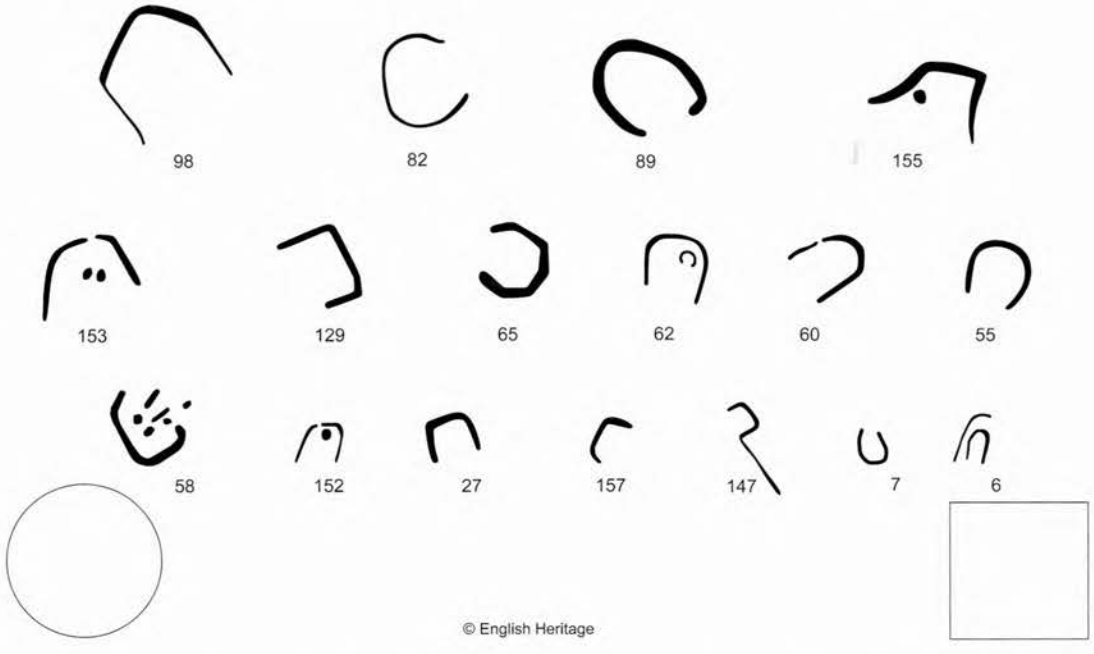

Fig 12 Open-sided enclosures. The circle and square are equivalent to 1 ha, with each side of the square representing 100m.

conclude that the cropmark shows only part of the enclosure and that more might survive below ground. The same can be said of enclosures which are truncated by later field boundaries or other recent disturbance. There are 15 enclosures, however, which may be three-sided or open-sided in design (Fig 12).

All but one of these open-sided enclosures are univallate; the exception is the very small example at Trevilgus, St Issey (6). Apart from the polygonal enclosure at Hay, St Breock (98), which is larger than 0.5 ha, almost all are small. Eight fall within the 0.1–0.29 ha size range. Six are smaller than 0.1 ha, including the multivallate Trevilgus enclosure. A possible parallel for these enclosures is the open-sided Roman-period enclosure at Tremough referred to earlier, which is of similar size (Gossip and Jones 2007, 45–9; 2009–19, 20–4).

Analysis by topographical aspect

The *Morph* database also records the topographical position of enclosures in the landscape. Analysis of the data shows that five of the univallate enclosures are located on hill tops or plateaux, four are on ridges and one is sited on a promontory.

Table 3 Topographical location of univallate enclosures

Size	*Slope facing*								*Other*
	N	*NE*	*NW*	*W*	*SW*	*S*	*SE*	*E*	
More than 1 ha	0	1	0	1	0	0	0	0	0
0.5 – 0.99 ha	0	1	1	0	3	0	0	1	1
0.3 – 0.49 ha	1	2	2	0	1	2	2	0	3
0.1 – 0.29 ha	3	5	10	5	4	2	0	0	2
Less than 0.1 ha	1	1	5	2	3	5	1	1	4
Total	**5**	**10**	**18**	**8**	**11**	**9**	**4**	**2**	**10**

The remaining 67 enclosures are located on hill slopes.

Univallate enclosures were most frequently sited on slopes facing north west – 18 enclosures in total – and there is a clear trend for enclosures to be sited with a westerly or northerly aspect: 37 enclosures have a westerly aspect (west, north west or south west) and 33 have a northerly aspect (north, north west or north east) (Table 3). Only 24 have a southerly aspect (south, south west or south east) and just 16 easterly (east, south east or north east); only two enclosures are sited on east-facing slopes. These findings are somewhat surprising in that shelter from prevailing north-westerly weather streams does not appear to have been a significant factor in the siting of enclosures.

Univallate enclosures: summary

Of the univallate enclosures in the Camel estuary, we can say that the largest group is of those enclosing between 0.1 and 0.49 ha, most of which are of less than 0.3 ha. They are often sited on hill slopes, most often with a western or northerly aspect. The largest typological group is formed by those which are rectilinear in form although a significant number are defined by a mixture of straight and curving sides. Of the curvilinear enclosures those which are oval occur more frequently than other forms. Most of the enclosures were completely circled by a ditch (and presumably originally a bank) but up to 20 per cent may have had one side open.

Roughly one third of the enclosures are very small, enclosing less than 0.1 ha and, while these may have differed in use from the enclosures in the 0.1–0.49 ha range, there is not sufficient excavation evidence to interpret their function with any certainty. At the other end of the scale are a handful of much larger enclosures, the size of which suggests that we should consider them as an entirely different type of site from the predominant 0.1–0.49 ha group.

Complex enclosures

The more complex enclosures in the study area fall into three broad categories: double-ditched enclosures, multivallate enclosures and enclosures with annexes.

Double-ditched enclosures

Fourteen enclosures (12 per cent of the total) in the Camel hinterland are double-ditched. They are essentially a variant of univallate enclosures in that they enclose a single, defined space, but with two ditches rather than one. They differ significantly from multivallate enclosures in which where there is an extensive intervallate area (below).

In all but one of the double-ditched enclosures, one of the ditches does not run the complete circuit (Fig 13); in some cases one ditch is slighter than the other. In these instances the less complete or slighter ditch might represent repair and maintenance of the primary enclosure or, alternatively, was designed to increase its security or to enhance its appearance. An example of the latter is Penhale round, where a shallower outer ditch and bank were added to an earlier univallate enclosure; in places the outer bank face was revetted with colourful stones which may have been selected for their decorative effect (Nowakowski 1998, 47).

The double-ditched enclosures parallel the size range of the univallate enclosures, except that none encloses less than 0.1 ha. Nine are between 0.1 and 0.29 ha, four are within the intermediate range of 0.3 to 0.79 ha, and only one, at Gutt Bridge, St Kew (120), exceeds 0.8 ha. The actual size of this enclosure is uncertain because the cropmark of the site is only partially visible, but it measures at least 0.8 ha in area and is unusual on the basis of its large size. A polygonal enclosure at Trevinnick, St Kew (119), is somewhat enigmatic. Traces of an inner ditch are visible on aerial photographs taken in 1996 (Historic Environment, Cornwall Council, F50–58, 59) but were not detected by magnetometer surveys carried out at the site, although the results of these surveys were described as not 'archaeologically satisfactory' (Fox and Ravenhill 1969, 91). Conversely, there is no sign on the photographs of the east-facing entrance found during excavations at the site (*ibid.*).

As with the univallate enclosures, there are more rectilinear enclosures than curvilinear: seven of the nine enclosures of 0.1–0.29 ha are rectilinear, as are the four between 0.3 and 0.79 ha. The actual shape of two rectilinear enclosures cannot be defined because they are only partially visible but most are four-sided and highly rectilinear. One of the two enclosures at Kerketh, St Merryn (115), unusually, is triangular.

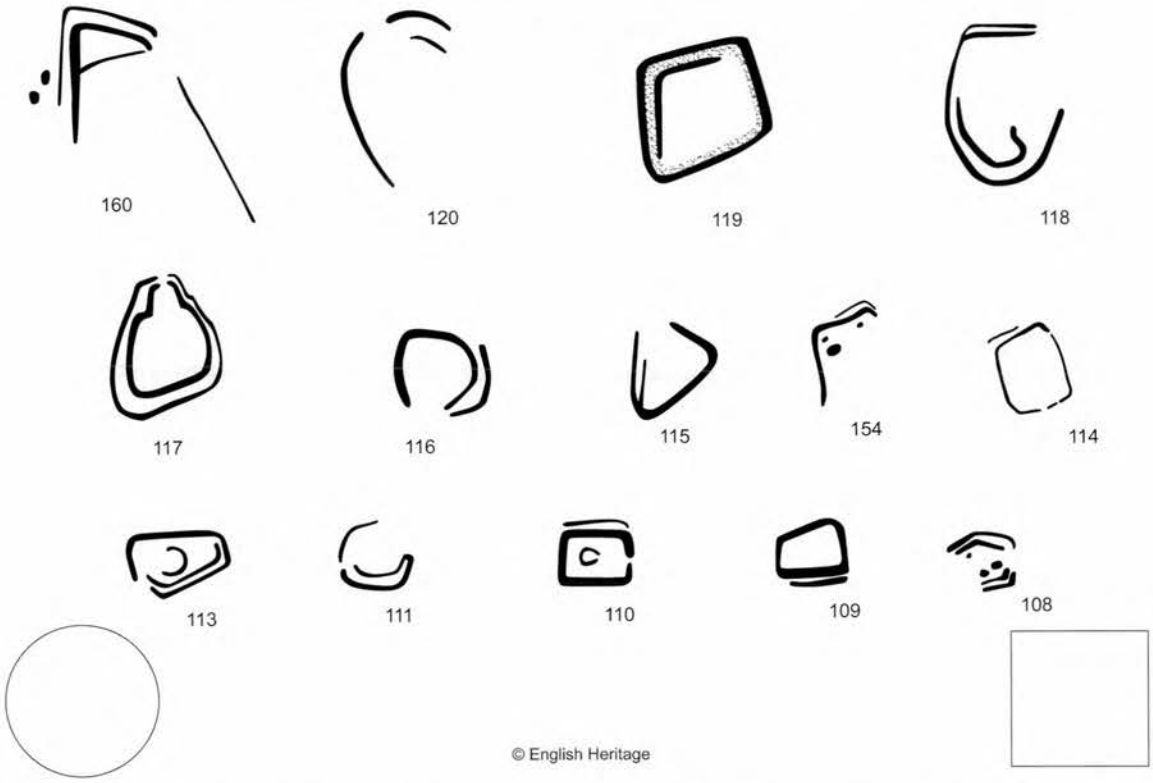

Fig 13 Double-ditched enclosures. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with each side of the square representing 100m.

The topographical locations of double-ditched enclosures are similar to those of univallate enclosures, with 11 of the 14 enclosures located on slopes; the remaining three were on hill tops. The most favoured aspect, however, is southerly, with six of the enclosures with views to the south west, south or south east.

Enclosures with annexes

Nine enclosures have secondary enclosures or annexes appended to their circuits (Fig 14). These can be further subdivided into those in which the annexe is broadly comparable in size to the primary enclosure, those in which the annexe is much smaller than the primary enclosure, and one example, at Three Holes Cross, Egloshayle (149), where the primary enclosure is contained within the annexe.

Five enclosures have annexes apparently of approximately similar size (Fig 14, lower line), although there is uncertainty over two of these: the precise form of the enclosure at Tresawl, St Minver (12), is difficult to define because it is not clear how much of the feature is visible, and the annexe appended to the enclosure at Porthilly, St Minver (79), might be part of a not fully visible field system. However, the other three enclosures all clearly have large annexes appended; in the case of Trescowe, Egloshayle (134), and Carhart, St Breock (135), the annexe is larger than the primary enclosure. It is uncertain whether the annexes at Higher Hendra, St Teath (136), Carhart and Porthilly are, in fact, open-sided or whether further lengths of ditch completing the circuits existed but are not visible on the photographs. In the absence of excavated sites in Cornwall which might provide analogies, the reasons why annexes of this size were appended to enclosures can only be guessed at.

The primary enclosures at Trescowe, Carhart and Higher Hendra are all curvilinear in form and

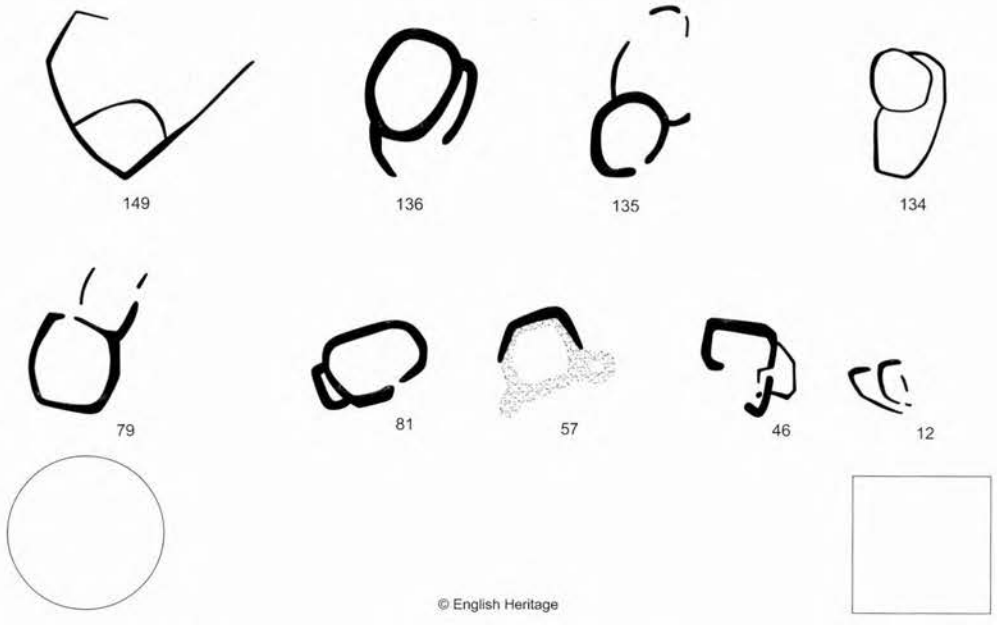

Fig 14 Enclosures with annexes. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with each side of the square representing 100m.

all are within the size range for small enclosures (the largest encloses roughly 0.3 ha). The enclosure at Tresawl differs in that it is very small, enclosing only about 420 sq m; the Porthilly enclosure (measuring 0.3 ha in extent) is polygonal rather than curvilinear.

Three enclosures have annexes much smaller than the primary enclosure. Again, two of these present difficulties of interpretation. It is not clear whether the enclosure at Burgois, St Issey (46), was sub-rectangular (enclosing approximately 0.13 ha) or whether the length of ditch to the south east returns north westwards to form a larger polygonal enclosure of approximately 0.25 ha. It is possible that there are several phases at this site.

The enclosure at Tregilders, St Kew (57), has been subject to magnetometer survey and small-scale excavation (Trudgian 1977). The NMP plot of the site, mapped from Ordnance Survey aerial photographs of 1972 (OS 72103/459–460), is significantly different from the previously published plans. It seems likely that this enclosure is more complex than existing evidence suggests, but on aerial photographs a small sub-square annexe appears to be appended to its south-east corner, and a second possible annexe to the south-west corner. The Tregwarmond, St Minver (81), enclosure is much clearer; here a small (30m by 10m) annexe is appended to a polygonal enclosure measuring 0.32 ha.

These small annexes are most likely to be ancillary enclosures which served, perhaps, as pens for livestock or as areas set aside and enclosed for specific activities such as metalworking, but given the limited excavation evidence available we can only speculate as to the functions of small annexes. All three enclosures with small annexes are rectilinear; those at Tregilders (57) and Burgois (46) are within the predominant 0.1–0.29 ha size range for enclosures in the Camel estuary area, with Tregwarmond (81) slightly larger at just over 0.3 ha.

The Three Holes Cross enclosure (149) is unusual and more problematic. It encloses 0.32 ha and is set into the south-west corner of a much larger enclosure (covering approximately 1 ha). This larger enclosure might be part of a field system but the extent of visible cropmarks is not sufficient to allow a more certain interpretation. Current evidence indicates that this is an unusual site.

The Tregwarmond enclosure is sited unusually on a hilltop but the others are all located on sloping ground and, like the univallate enclosures, favour a north-westerly aspect.

Multivallate enclosures

Multivallate enclosures are defined here as those with two or more enclosing ditches in which the outer ditch encloses an area roughly twice the size or greater than the inner. Fifteen of the Camel estuary enclosures fall into this category (Fig 15). There is a great variety of forms among them and no distinct pattern can be readily identified.

That said, a number of observations can be made about multivallate enclosures when considering their inner and outer circuits separately. Two-thirds of the enclosures have inner circuits within the size range for small univallate enclosures, between 0.1 and 0.29 ha. Unlike the univallate enclosures, however, a majority are curvilinear in form; some are near circular, such as that at Higher Treworder, Egloshayle (130).

It is, however, the size of the outer enclosures which is most striking: eight of these are four times larger than the inner enclosure and of these four are more than five times the size. Eight enclose more than 0.8 ha and seven of these more than 1 ha; two enclose more than 2 ha. Another six outer enclosures are comparable with the 'intermediate' range of univallate enclosures, lying between 0.3 and 0.79 ha. In other words, many of the outer enclosures are unusually large by comparison with the more frequently occurring univallate enclosures. They are also more often curvilinear in form.

Beyond these general characteristics the multivallate enclosures are notably individual in their form. Four have been classed as 'multiple enclosures' and these are shown on the top line of Figure 15. Those at Killibury, Egloshayle (139), Tregeare Rounds, St Kew (140), and Trenance, St Issey (138), sometimes referred to as Tredinnick, are all characterised by large inner enclosures; Killibury and Tregeare Rounds have outer enclosures exceeding 2 ha. Tregeare Rounds

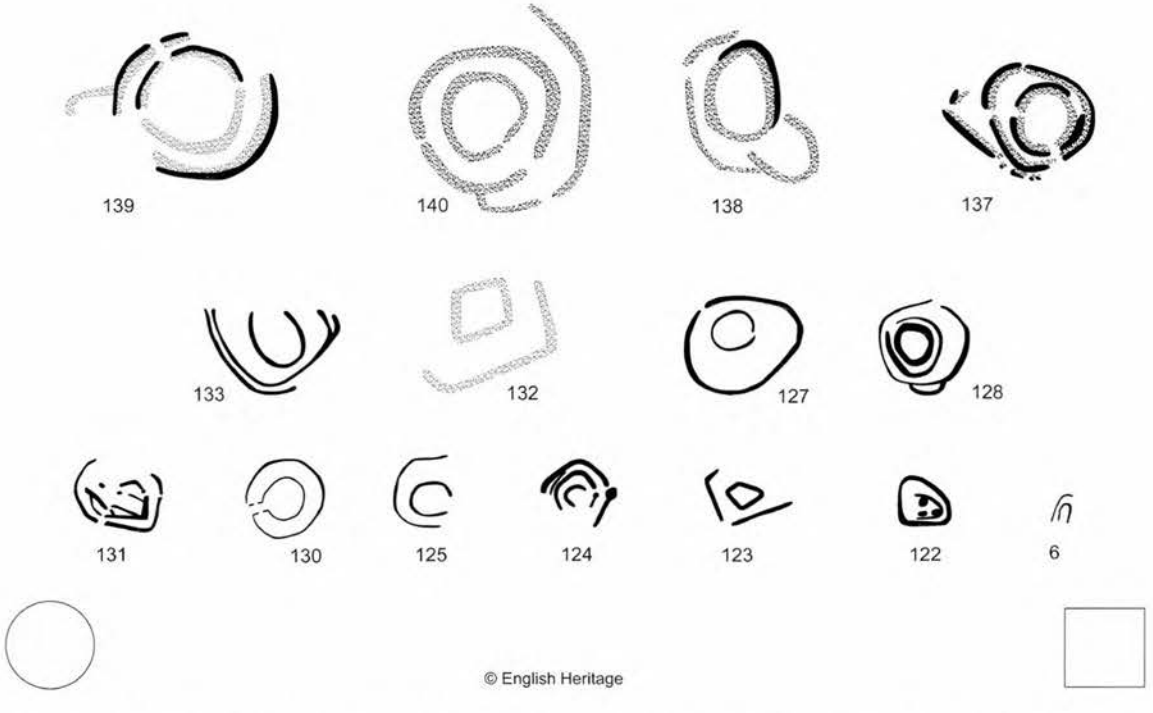

Fig 15 Multivallate enclosures. Solid lines represent ditches, stipple represents banks. The circle and square are equivalent to 1 ha, with each side of the square representing 100m.

Table 4 Analysis of multivallate enclosures

Site no	*Inner enclosure*		*Middle enclosure*		*Outer enclosure*	
	Size (ha)	*Shape*	*Size (ha)*	*Shape*	*Size (ha)*	*Shape*
139*	0.95	curv			2.3	curv
140*	0.7	curv			2.3	curv
138*	0.6	curv			1.1	curv
133	0.34	curv			1.4	curv
137*	0.32	curv			1.3	curv
131	0.21	rect			0.7	mixed
132	0.27	rect			1.5	rect
127	0.2	curv			1.2	curv
130	0.19	curv			0.7	curv
128*	0.16	curv	0.39	curv	0.95	curv
125	0.15	curv			0.55	curv
123	0.1	rect			0.45	rect
122	0.1	rect			0.4	rect
124	0.06	rect	0.2	rect	0.49	rect
6	0.04	rect			0.06	rect

*These enclosures have annexes.

has a partial third circuit, interpreted here as an annexe. Trenance, while having a less substantial outer enclosure, has a large annexe enclosing 0.38 ha. The fourth multiple enclosure, Pencarrow Rings (137), is considerably smaller than the others but is sited within extensive outworks (only partly shown on Fig 15). At the other end of the scale, the enclosure at Trevilgus (6) is tiny, the outer circuit probably enclosing no more than 650 sq m.

A fundamental question to be asked of multivallate enclosures is whether they were deliberately designed as such or whether the two (or more) circuits, while apparently respecting each other, were not contemporary but rather resulted from different phases of occupation and are perhaps indicative of expansion or contraction of occupation activity.

The likelihood that Killibury and Tregeare Rounds were deliberately designed is suggested by the concentric nature of their circuits and by the corresponding position of the entrances in both inner and outer circuits, which provides a sense of coherence to each site. At Pencarrow the position of the entrances provides the same coherence, whereas the complex of enclosures at Trenance (138) has a more accreted appearance.

Some of the other multivallate enclosures can be described as 'concentric' and, of these, the enclosure at Trequite, St Kew (133), might be considered a new multiple enclosure hillfort on the basis of its size. This enclosure is unique in that its outer circuit is at least partly double-ditched. The most concentric of the enclosures is that at Higher Treworder, Egloshayle (130); there, the importance of the intervallate area is highlighted by the entrances leading into it on either side of the enclosure's main entrance.

The polygonal enclosures at Bogee, St Issey (132), and Hayle Farm, St Kew (123), while very different in size, appear to be similar in shape and concentric in form, although in neither case is the complete circuit visible. Ordnance Survey fieldwork at Bogee failed to find any trace of an enclosing ditch or entrance (HER PRN 26543). The siting of a round barrow immediately outside the enclosure (HER 26494), together with Charles Henderson's (1916) report of a mound within it, suggests that the enclosure may have had a ceremonial function. Intriguingly, NMP mapping also recorded a cropmark ring ditch, possibly a barrow, outside the northern side of the Hayle Farm enclosure.

The polygonal enclosures at Middle Amble, St Kew (124), and Chapel Amble, St Kew (131), both have coherent layouts in that the position of the entrances in their outer circuits corresponds to those in the inner enclosures. While corresponding entrance positions do not prove that these sites were deliberately designed with more than one circuit, it does suggest that during one phase of use they operated as multivallate enclosures.

In contrast, excavation has demonstrated that the inner enclosure ditch at Trevisker, St Eval

(127), was levelled before the outer enclosure was constructed (ApSimon and Greenfield 1972). A similar sequence was identified at the enclosure at Reawla, Gwinear (Appleton-Fox 1992). Analogous sequences may have taken place at Penpont, St Kew (125), and Trenouth, St Ervan (128), where the outer circuits are not notably concentric and there is no evidence of corresponding entrance positions. The inner two circuits at Trenouth might be considered to form a double-ditched enclosure, and it is of interest that a small annexe is appended to the outer enclosure.

The Killibury and Middle Amble enclosures are on hilltops but, as with some other enclosure types in the Camel estuary hinterland, the majority of multivallate enclosures are again sited on hill slopes and have a predominantly westerly or northerly aspect.

Entrances and internal features

There is a relative paucity of evidence from the study area enclosures for internal features such as houses and other permanent structures, and for clearly defined entrances. Less than half the enclosures have identifiable entrances and only 20 per cent have visible internal features. In part this can be attributed to incomplete formation of cropmarks in the predominant soil types in the study area. This probably accounts for the scarcity of internal features, most of which will be in the form of insubstantial ditches. The lack of entrances is more problematic. In many cases the cropmarks are not sufficiently distinct for entrances to be identified with certainty; in others the complete circuit of the enclosing ditch is not visible and entrances might be located in sections of ditch masked by geological features or pockets of soil build-up. Some enclosures, however, have produced very clear cropmarks and still no entrance can be identified. It is possible that here the position of the entrance has been changed at some point in the lifetime of the enclosure. Creating a new entrance would involve filling in a section of ditch to allow new access and closing off an obsolete entrance would require a new section of ditch to be dug through the old causeway. The resulting cropmark would show an uninterrupted ditch circuit. Evidence for remodelling of the entrances in enclosures has come from Penhale (Nowakowski 1998) and Nancemere (Gossip 2005; forthcoming a).

Entrances

Some conclusions can be drawn about those enclosures which have discernible entrances. Firstly, the majority have single entrance ways; only five of the enclosures have more than one. Secondly, almost all entrances are defined by simple gaps in the ditch circuit: only six could be described as having elaboration (Fig 16). Many entrances have a westerly aspect (that is, facing west, south west or north west), and a significant proportion are southerly (facing south, south west or south east); few face east or north east.

Where there is more than one entrance (Fig 16), these are sometimes arranged along one side of the enclosure, as at Carruan, St Minver (92), or along opposing sides, as at Chapel Amble, St Kew (131), where entrances face east and south west.

Killibury multiple enclosure hillfort (139) has the most complex entrances. Those in the east and west both appear to have had small rectilinear annexes appended (only the western annexe is shown in Figs 15 and 16; a different interpretation, based on drawings published by the nineteenth-century historian Sir John MacLean in 1873, is shown in Miles 1977, fig 33). There is possibly a similar arrangement at the small enclosure at Burgois, St Issey (46), where an annexe surrounds an apparent entrance gap in the eastern circuit of the enclosure. The St Mawgan-in-Pydar enclosure (107) has an inturned entrance. At the multivallate enclosure at Higher Treworder, Egloshayle (130), elaboration takes the form of well-defined entrances to the intervallate area leading off the main entranceway (Figs 16 and 26). At Hay, St Breock (94), the cropmark evidence suggests an elaborate entrance in the south-east corner of the enclosure in addition to a simple entrance to the north east. The most unusual entrance is found in the hilltop enclosure at Kerketh, St Merryn (117). This double-ditched enclosure is shaped like a bottle or flask and the entrance leads into a narrow passage or 'neck' which then opens out into the main body of the enclosure.

Internal features

Visible internal features within enclosures include ring ditches, pits and hollows of various sizes and linear features which might be tracks, drainage gullies or internal divisions (Fig 17).

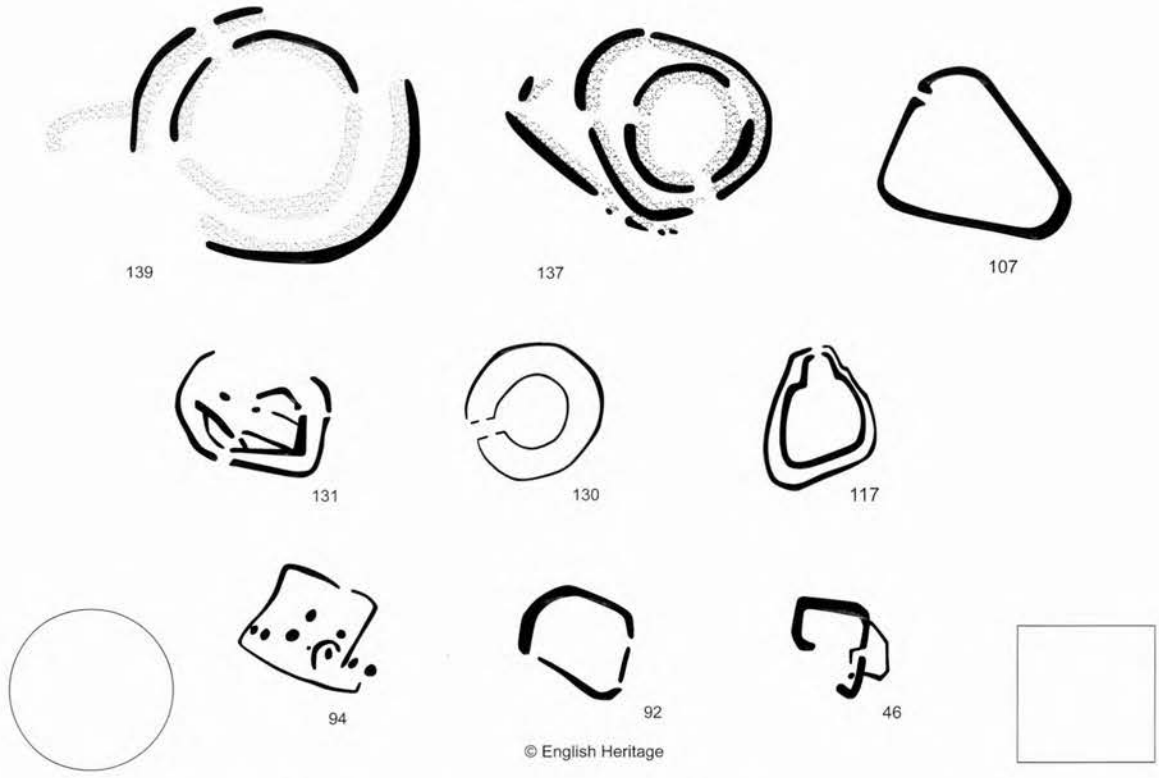

Fig 16 Enclosures with more than one entrance or with elaborate entrances. Solid lines represent ditches, stipple represents banks. The circle and square in the lower corners of the illustration represent 1 ha, with each side of the square representing 100m.

Nine enclosures, ranging from the 0.1 ha site at Kivells, St Kew (34), to the 0.8 ha enclosure at Tregolds, St Issey (103), contain ring ditches (Fig 17). The ring ditches at Hay, St Breock (94), Tregolds, St Issey (103), Trescowe, St Mabyn (62), Carruan, St Minver (171), and Tregirls, Padstow (113), are horseshoe-shaped. These may have been open-ended in form or, alternatively, may be only partially visible on the photographs. If the latter then the ring ditches at Tregolds, Tregirls and Trescowe are likely to be sub-circular, while those at Hay and Carruan may be oval in shape. The ring ditches at Carnevas (35) and Porthcothan (110), both St Merryn, are certainly oval, whereas those at Kivells, St Kew (34), and Pawton, St Breock (74), appear to be sub-rectangular. At both Carruan and Pawton ring ditches are located against the side of the enclosure.

Some or all of these ring ditch features may represent houses or other buildings. Round and oval houses represented by foundation ditches have been excavated, albeit in a non-enclosure context, at Higher Besore, Truro (Gossip, forthcoming b), and horseshoe-shaped ditches representing the drainage gullies of roundhouses are known from Threemilestone round, Kenwyn (Schwieso 1976), and from outside the enclosure at Penhale, Fraddon (Nowakowski 1998). Oval houses and sub-rectangular structures are known from several Cornish enclosures, including Trethurgy (Quinnell 2004) and Grambla (Saunders 1972). The size range of the Camel hinterland oval and sub-rectangular ring ditches is consistent with those of excavated oval buildings; the largest, at Pawton, measures approximately 18m by 10m.

The positioning of ring ditches within enclosures is also of interest. Whereas the placing of buildings around the perimeter of the enclosure at Trescowe (62) and possibly Pawton (74) is consistent with what has been found at rounds such as Trethurgy,

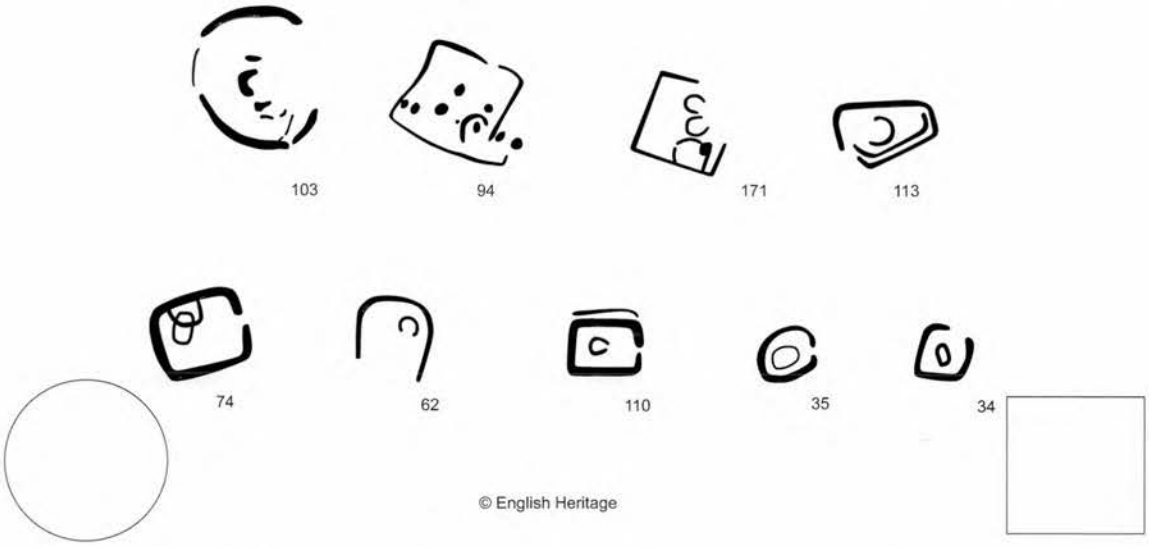

Fig 17 Enclosures with internal ring ditches and other features. The circle and square in the lower corners of the illustration represent 1 ha.

Goldherring and Penhale, the arrangement at Porthcothan (110), Carnevas (35), Kivells (34) and Tregirls (113) is very different, with the visible buildings on these sites centrally placed.

At Carruan (171) it is uncertain whether the ring ditches are actually associated with the enclosure. Further ring ditches (which may be Bronze Age barrows rather than roundhouses) occur outside the enclosure and in this instance it is uncertain whether the enclosure is actually a later feature superimposed on the ring ditches.

Thirteen enclosures contain features loosely interpreted as pits (Fig 18). These may have fulfilled a range of functions, including working hollows and the sites of lean-to structures or workshops. Some are likely to be shallow scoops in the bedrock and the largest of these, such as that at Trembleathe, St Ervan (76), and those set against the perimeter of the inner enclosure at Trevilgus, St Issey (122) might be interpreted as hollows for roofed buildings. Buildings whose structural remains consist of shallow hollows have been excavated at Reawla (Appleton-Fox 1992), Shortlanesend (Harris 1980) and Castle Gotha (Saunders and Harris 1982). A series of hollows in the iron-working enclosure at Little Quoit Farm functioned as working areas, with minimal evidence of associated structures (Lawson-Jones and Kirkham 2009–10).

Linear features will also have served a range of functions (Fig 18). Those in the Penpont enclosure, St Kew (84), appear to form an internal division and there are also suggestions of an internal partition in the square enclosure at Carruan, St Minver (171) (Fig 17). It is difficult to see how the linear features at Chapel Amble, St Kew (131), relate to the inner enclosure, suggesting that they may not be contemporary or associated. The same can be said for the Carnevas enclosure, St Merryn (58), where the linear features appear to extend beyond the enclosed area, and this is also true of the enclosure at Trevear, St Issey (156).

Associated field systems

Eighty-three field systems interpreted as prehistoric or Romano-British have been recorded in the wider area around the Camel estuary. Two-thirds are associated with enclosures; the remaining third (an important result of NMP mapping) offer a more complete picture of the extent of prehistoric and Roman activity than the enclosures alone provide. They demonstrate that in some areas where no enclosures are visible the landscape was nonetheless still being used.

The dating of these 'isolated' field systems is based primarily on comparison of their form

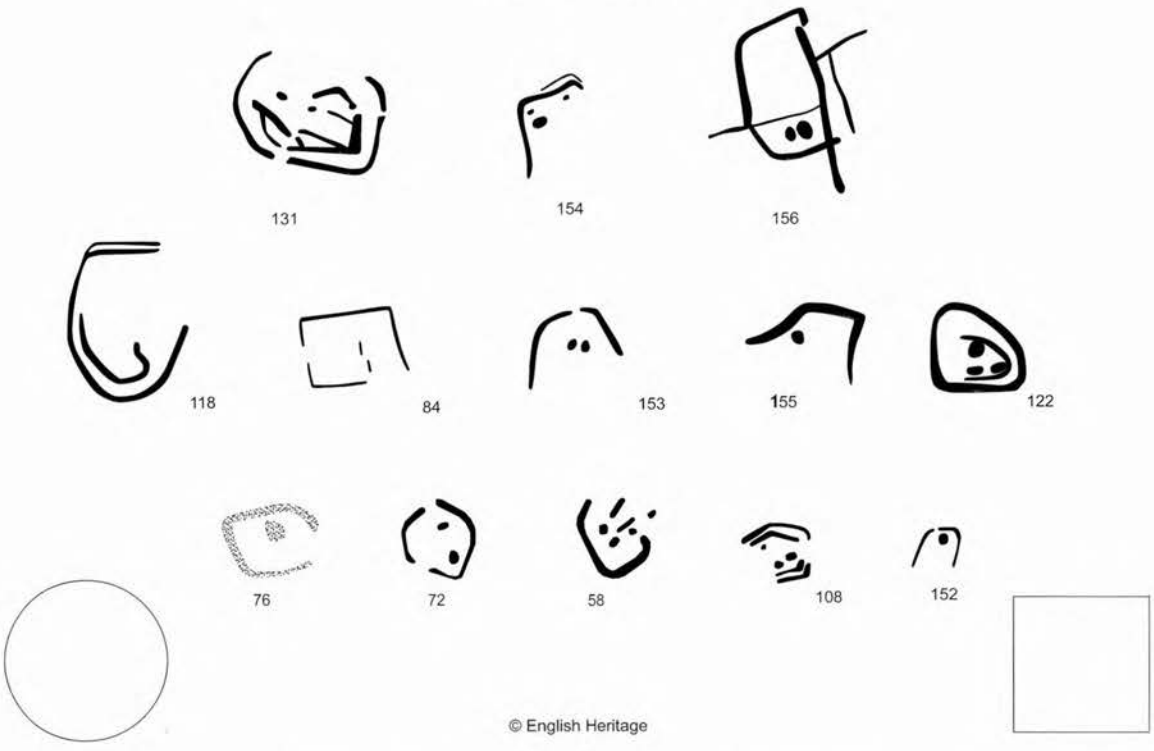

Fig 18 Enclosures with internal pits and linear features. Solid lines represent ditches, stipple represents banks. The circle and square in the lower corners of the illustration represent 1 ha. Some of the enclosures in Figure 17 also contain pits and linear features.

with that of field systems clearly associated with enclosures. Invariably these latter fields are on different alignments to the present day field pattern, which, for the most part, is derived from the late medieval enclosure of open fields (Herring 1998; 2006). Survival of the earlier field systems is fragmentary and some consist of just a few boundaries. Almost all are visible as cropmark ditches and appear to define quite large rectangular fields.

The Camel estuary fields differ significantly in character from the late prehistoric and Romano-British field systems in West Penwith, which survive as small block-shaped fields defined by substantial lynchetted boundaries rather than by ditches. They are much larger than the rectilinear fields defined by ditches which have been detected in other parts of lowland Cornwall; examples include those at Higher Besore, Threemilestone, west of Truro (Gossip, forthcoming b), Tremough, Penryn (Gossip and Jones 2007; 2009–10) and Scarcewater tip (Pennance), St Stephen-in-Brannel (Jones and Taylor 2010).

On a superficial level the field boundaries at, for instance, Trevilgus (Fig 20) or Smeathers (Fig 21) appear to resemble more closely the coaxial fields found in places on the Cornish uplands, which are thought to have been laid out during the Middle Bronze Age (Herring 2008; 2011, 31–2). It is possible that in these instances only the major boundaries are visible; less substantial ditches subdividing the apparent coaxial systems to form the characteristic small block-shaped fields may not generally produce cropmarks. If this was not the case it is difficult to suggest ways in which these large fields might have been used. The single field or enclosure mapped at Tregonce (Fig 23) was clearly associated with livestock farming.

Few of the Camel estuary field systems are curvilinear in form; of those that are the most extensive is that at Tredannick, St Minver (85) (Fig 22).

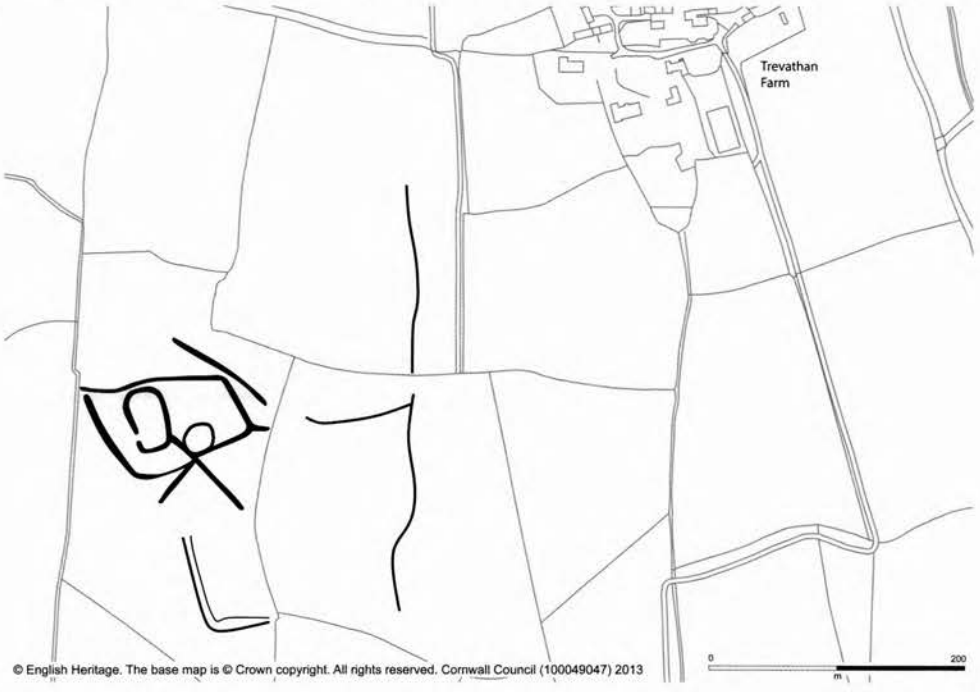

Fig 19 Fragmentary survival of fields associated with enclosures at Trevathan, St Endellion (52 and 9).

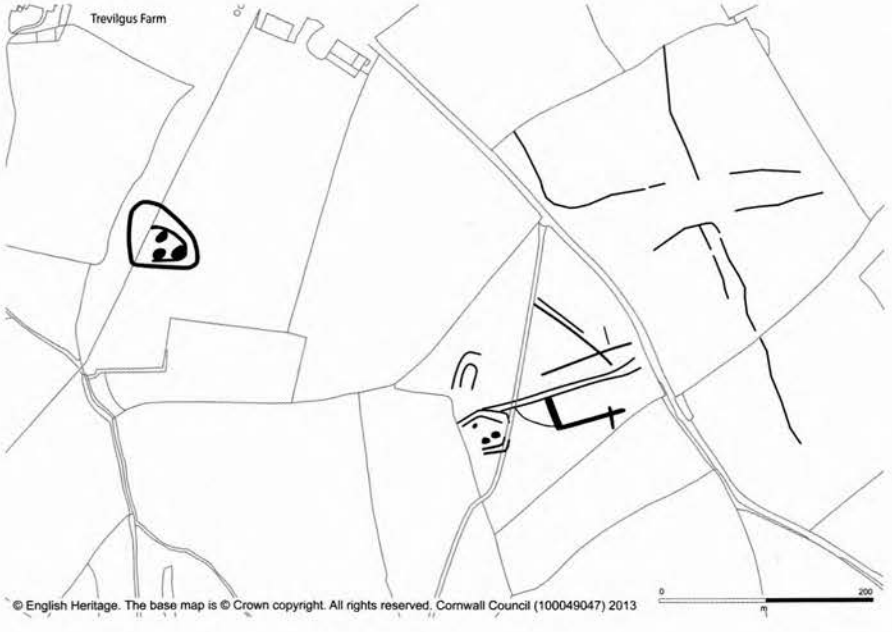

Fig 20 The multivallate enclosure at Trevilgus, St Issey (122) with further enclosures (6 and 108) to the south east. These are associated with the fragmentary remains of a rectilinear field system, and a possible droveway running east-west.

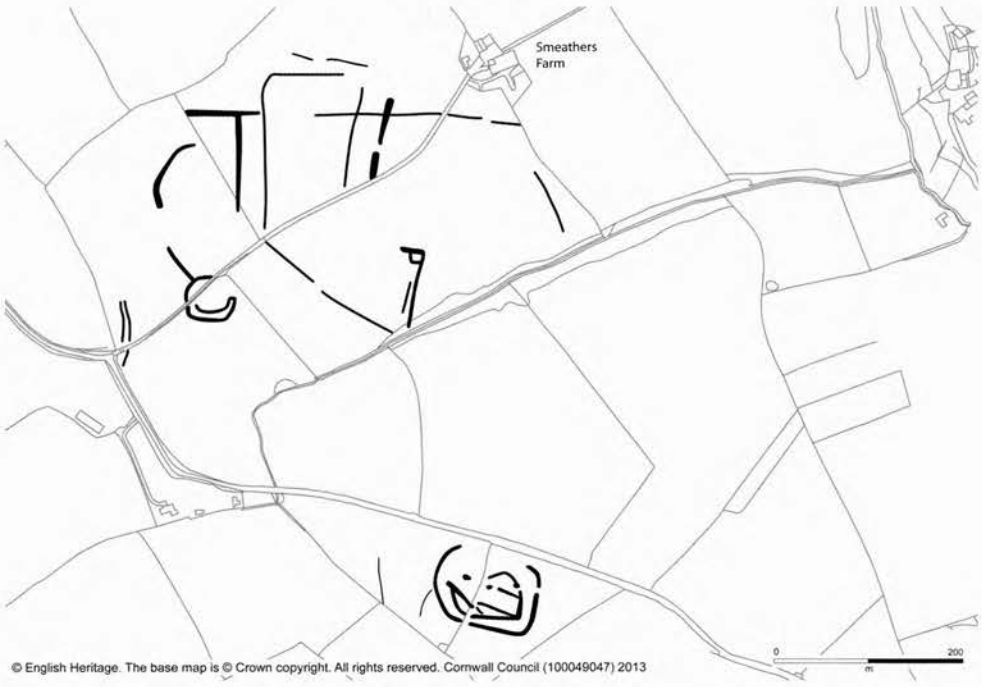

Fig 21 A rectilinear field system at Smeathers, St Endellion associated with a double-ditched enclosure (111). The multivallate Chapel Amble, St Kew, enclosure (131) is to the south east.

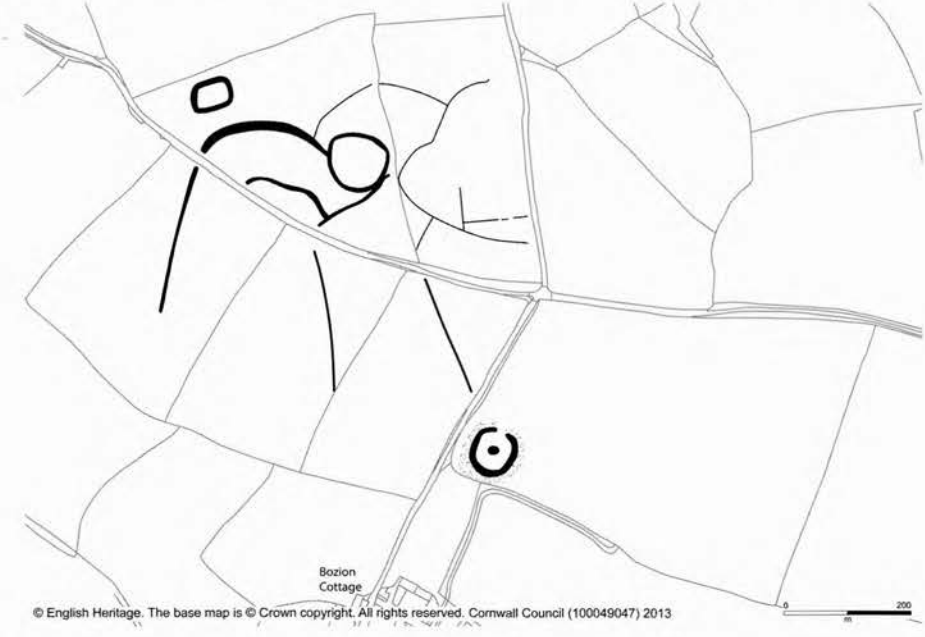

Fig 22 Curvilinear fields associated with the enclosure at Tredannick, St Minver (85). To the immediate north west is a possible rectilinear enclosure (37), and to the south east is a small enclosure at Bozion (51) which has been interpreted as a possible henge monument.

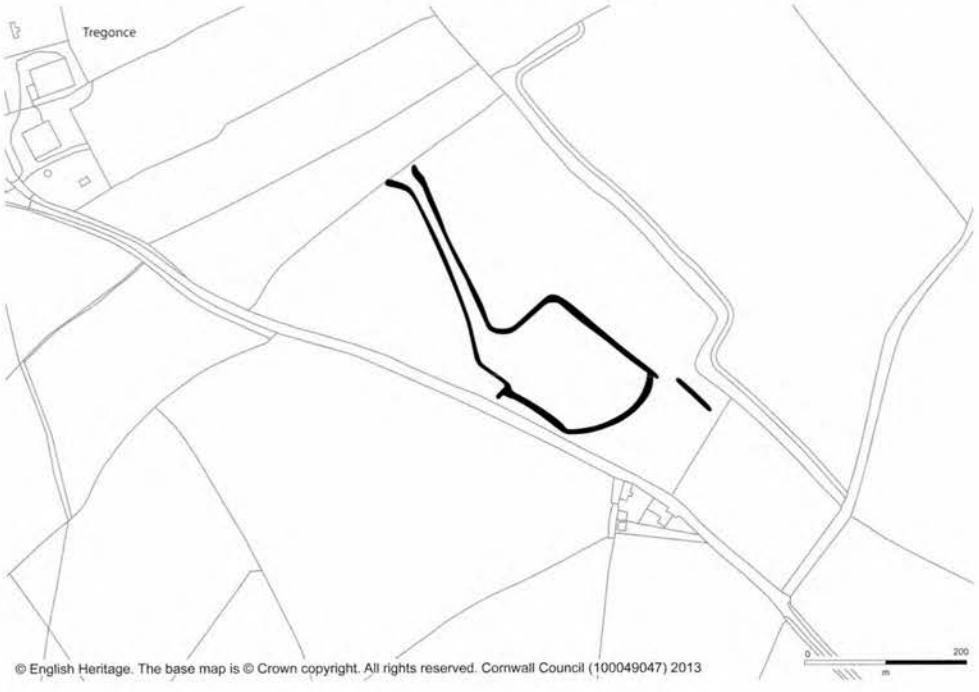

Fig 23 A possible drove way leading to a rectilinear field at Tregonce, St Issey. This field is on a completely different alignment to the current field pattern which fossilises former medieval strip fields.

Interpretation and chronology

Multiple enclosure hillforts

Johnson and Rose (1982, 157) concluded that further investigation of apparently simple univallate enclosures would reveal that some are, in fact, multivallate, with outer ditches, and that they might be reclassified as multiple enclosures. Within the Camel estuary there are at least four multiple enclosure hillforts; Trequite, St Kew (133), could reasonably be interpreted as a possible fifth. This is the only multivallate enclosure the scale of which approaches that of the multiple enclosure hillforts such as Killibury (139) or Pencarrow Rings (137) (Fig 15).

Whether we take the view that multiple enclosure hillforts were the bases from which an aristocratic elite controlled a surrounding territory or were communal centres for populations who controlled their own territories and resources (above), they must have been important places in the later Iron Age landscape. In some areas, most clearly West Penwith (Herring 1994), the spacing of hillforts has been interpreted as reflecting their role as centres within postulated surrounding 'territories'. In the Camel estuary hinterland as a whole there is no clear comparable distribution, but if the Trequite enclosure is included a pattern emerges in the eastern part of the study area (Fig 25). There, the multiple enclosures at Pencarrow, Killibury, Trequite and Tregeare Rounds are very evenly placed, between 3 and 4 km apart, in a line running roughly north to south.

Very small enclosures

There are 22 enclosures covering less than 0.1 ha in extent. About two-thirds of them are adjacent to more substantial enclosures and may have served ancillary functions such as pens for livestock. Some are appended to field boundaries, such as those at Trevoyan (146) and Trehemborne, St Merryn (147), and Trevathan, St Endellion (9) (Figs 4 and 19), and these might also have been livestock enclosures or directly associated with agriculture in some way. Others might have had specific industrial functions, as with the inner enclosure of

Fig 24 The possible multiple enclosure hillfort at Trequite (133). (Photograph: NMR MAL/67066 148; 9 July 1967. © Crown copyright. Reproduced by permission of English Heritage.)

the bivallate site at Killigrew, St Erme (Cole and Nowakowski, forthcoming). A possible candidate is a very small enclosure at Longcarrow Cove, near Crugmeer, Padstow (5) (Fig 4); it is close to Tregudder Gorge where copper, lead and silver were mined in the second half of the nineteenth century, and its proximity to these possible outcropping coastal mineral deposits suggests it could have been associated with metal processing.

Although only one very small enclosure, at Tregella, Padstow (152) (Fig 18), contains any visible features which could be interpreted as settlement evidence, it is possible that some of this group were small settlements, possibly single farmsteads. One analogy is the Romano-British settlement at Porth Godrevy, although the nature of the enclosure there is ill-defined (Fowler 1962). Another possible model is the very small open-sided Romano-British enclosure at Tremough referred to above, in which an oval house was sited (Gossip and Jones 2007; 2009–10).

Enclosures of atypical form

Among the wide range of forms characterising the enclosures in the Camel estuary a handful are noteworthy on account of the high degree of regularity incorporated into their design. This care over design suggests a very different approach to the planning and laying out of these enclosures and probably a different attitude towards them on the part of the people who built them. In general, the enclosures in the study area are somewhat irregular in form; this is particularly the case with the curvilinear enclosures but is true even of the small rectilinear enclosures (Fig 7). The overriding need appears to have been for an area to be enclosed and, while variations in shape may represent differences in function, changing fashions over time or simply personal preferences, the act of enclosure itself was paramount and the precise design of the enclosure of secondary importance. Highly regular enclosures, on the other hand, may

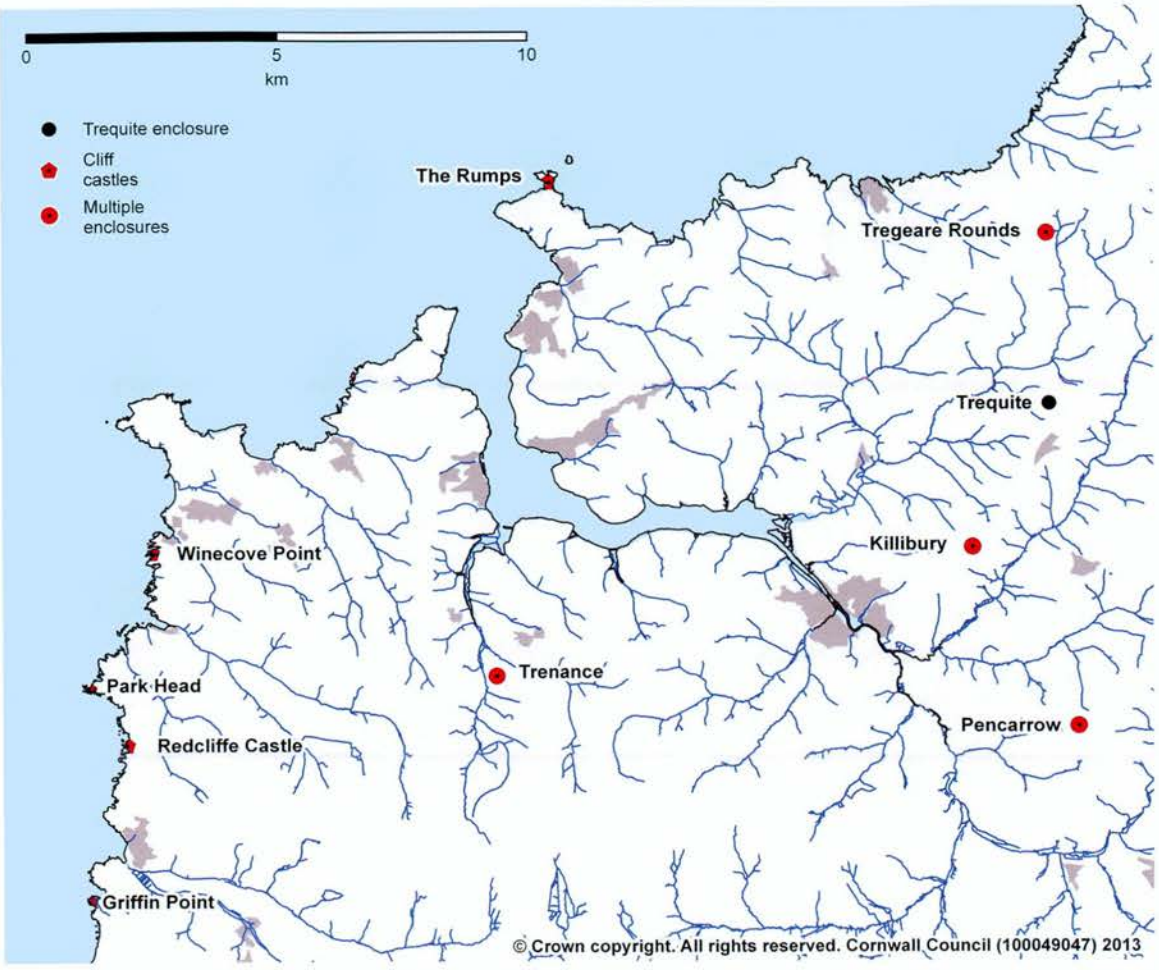

Fig 25 The distribution of cliff castles and multiple enclosure hillforts, including the multivallate enclosure at Trequite, St Kew.

have been conceived as special sites in which the shape of the enclosed area was as significant as the act of enclosure.

Two uncharacteristically regular enclosures are Carruan, St Minver (171) (Fig 17), and Penpont, St Kew (84) (Fig 18). They are similar in size, enclosing 0.34 and 0.35 ha respectively, both are rectangular and both have sharply angled (rather than curved) corners; they are the only two enclosures identified in the Camel estuary study area where this is the case. Another unusual feature common to both is that they appear to have internal partitioning ditches. The Carruan enclosure is in an untypical location in that it is on a hilltop. An enclosure dated to the Later Iron Age, slightly smaller at about 0.25 ha but similarly regular in shape and with sharp right-angled corners, was excavated at Blackhorse on the route of the A30 in east Devon. A roundhouse was found in the interior and two others lay outside the enclosure (Fitzpatrick *et al* 1999, I, 160–93).

The sub-circular concentric enclosure at Higher Treworder, Egloshayle (130) (Fig 26), has been mentioned above. Unusually among the Camel estuary enclosures, its ditches are precisely concentric, and the elaborate nature of its entrance indicates that access to the enclosed area was invested with particular significance, possibly hinting at a ceremonial function. The enclosure occupies a prominent position in the landscape on

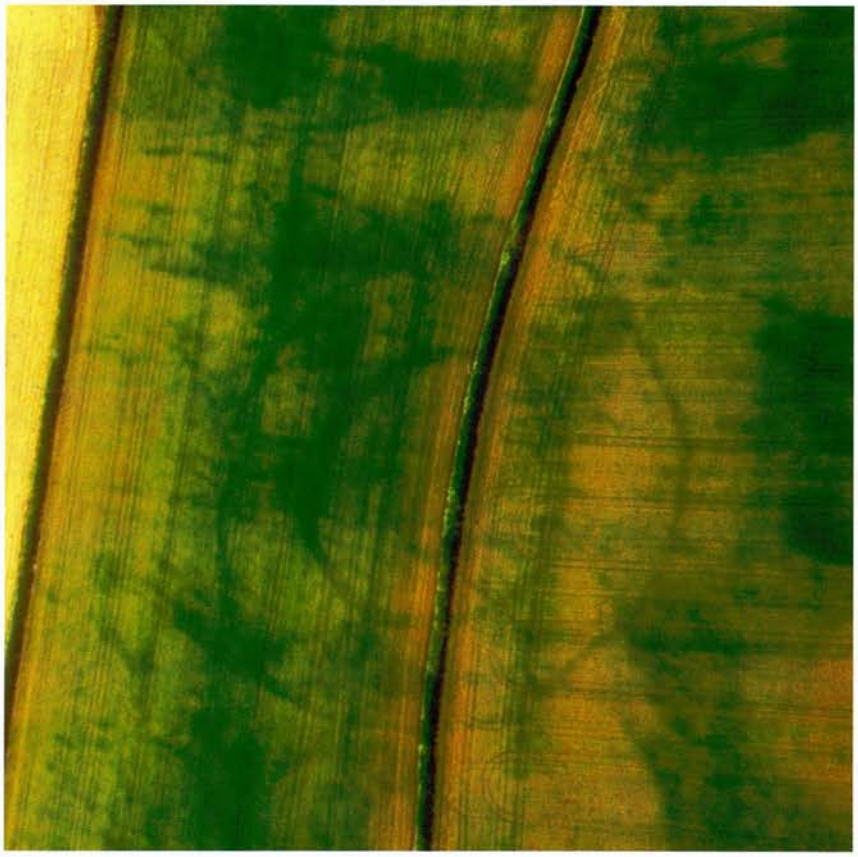

Fig 26 The concentric multivallate enclosure at Higher Treworder, Egloshayle (130). (Photograph: Historic Environment, Cornwall Council, ACS 3441; 7 July 1992.)

a south-west-facing slope overlooking the Camel at Egloshayle, with its entrance opening down the slope. An alternative interpretation is offered by an almost exact – although geographically distant – analogy provided by the site known as South Rings at Mucking, Essex. This concentric enclosure is sited on a gravel terrace overlooking the Thames, with its entrance facing downslope, and is almost identical in size (Collis 1977). The Mucking site has been interpreted as a 'mini hillfort' of the Late Bronze Age (Parker Pearson 1993, 121). The enclosure at Higher Treworder is situated just downslope from the multiple enclosure at Killibury and could perhaps be an earlier hillfort.

Another concentric enclosure of unusual form is the double-ditched enclosure at Kerketh (117) (Fig 16). Its unique shape and elaborate entrance are clearly deliberately designed, suggesting that this enclosure accommodated specific types of activities, or was in some way (perhaps socially or economically) different from the majority of enclosures.

There are grounds for interpreting some of the enclosures as possible ceremonial or ritual monuments of the late third and earlier second millennium BC. The polygonal concentric enclosure at Bogee, St Issey (132), and the much smaller but morphologically similar enclosure at Hayle Farm, St Kew (123), and their possible associations with nearby Bronze Age round barrows, have been referred to above. If these enclosures were ceremonial in function then, notwithstanding significant differences in morphology and topographical location, they may be comparable to the circular hilltop enclosures of west Cornwall suggested to be late Neolithic or Early Bronze Age in date (Herring 2011b; but *cf* Jones 2010).

Two enclosures have been tentatively interpreted as Neolithic or Early Bronze Age ceremonial monuments. The first is a small enclosure at Bozion, St Minver (51) (Fig22), which contains a central pit and is sited on a prominent north-west-facing ridge. The enclosure is visible as a

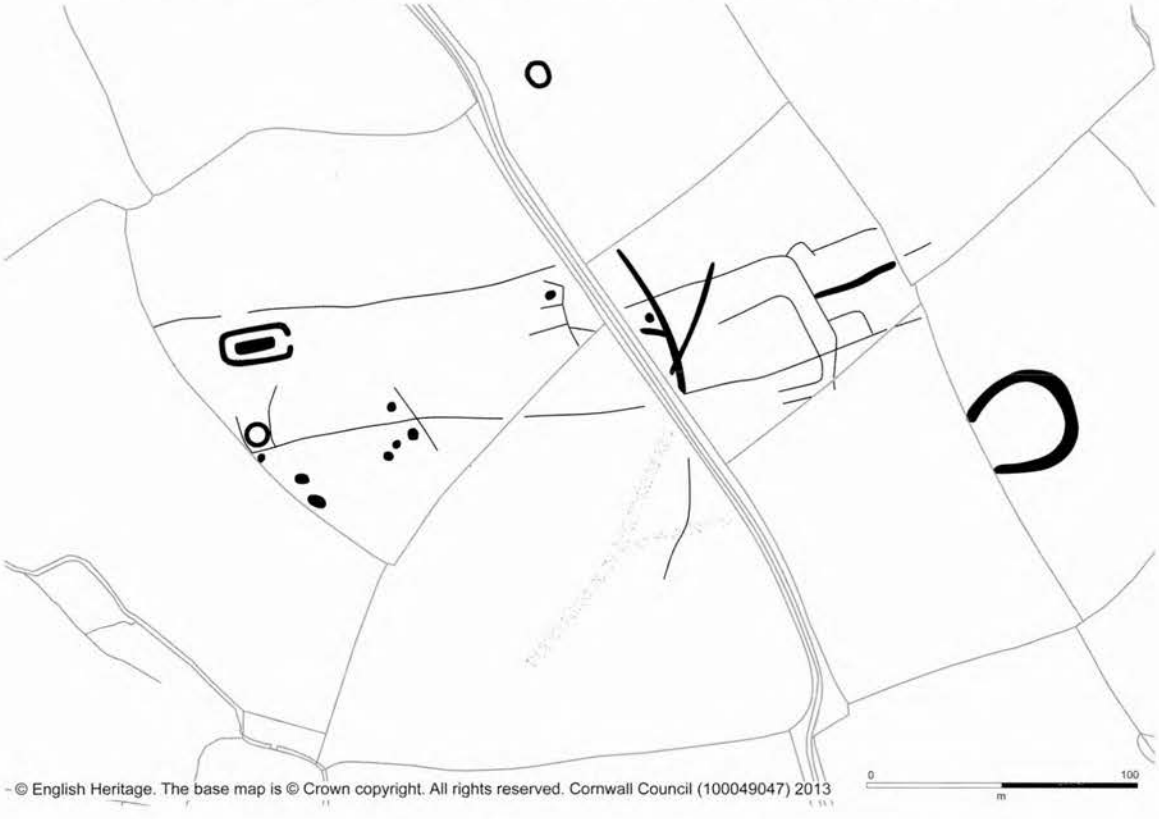

Fig 27 The possible long barrow or mortuary enclosure (170), linear features and round barrows at Tregavone, St Ervan. To the immediate east are a rectilinear open-ended enclosure (129) and curvilinear enclosure (70).

soilmark and the enclosing bank appears to lie outside the ditch. This suggests the site may be a henge monument, although in shape it is somewhat rectilinear; however, the enclosure is situated in the corner of a present-day field and it is possible that continued ploughing has distorted the outline of the enclosure bank.

The small sub-rectangular enclosure at Tregavone, St Ervan (170) (Fig 27), is tentatively interpreted as a possible long barrow or mortuary enclosure of Neolithic date by analogy with examples elsewhere in the country (Kinnes 1992; Fitzpatrick *et al* 1999, I, 213–6). It measures 35m by 18m, contains an internal rectangular pit or scoop, and has an east-facing entrance (unusual among the Camel estuary area enclosures). It is sited on a north-facing ridge and is accompanied by a variety of other cropmark features, including linear ditches (some of which are probably later field boundaries), pits and two ring ditches which may be round barrows.

Enclosed settlements

On current knowledge, many of the remaining 80 or so enclosures can be reasonably interpreted as Iron Age or Romano-British settlements, despite the relative lack of evidence for settlement features. Further research may, of course, reveal some of the enclosures to have had other functions or to be of other periods.

While the vast majority can be described as relatively simple discrete enclosures (notwithstanding the double-ditched or multivallate examples), some contain hints of greater complexity. The rectilinear enclosure at Trevear, St Issey (156) (Fig 8), is a case in point. The enclosure is formed by a series of inter-related ditches rather

than a continuous circuit and there appears to be an internal partition. Possible settlement evidence takes the form of two oval pits or scoops, the larger of which measures 10.5m x 9m; this is consistent with the dimensions of oval houses recorded in Cornwall (Quinnell 2004). Other enclosures visible as incomplete cropmarks may also be more complex than is currently apparent, such as the double-ditched feature at West Park, St Issey (160) (Fig 13), of which only a fragment is visible, or the apparently unusual enclosure at Trevinnick, St Endellion (155) (Fig 12).

The size disparity among the mapped enclosures must reflect differences in use but it is unclear what the character and extent of these differences are. Purely in terms of size, the large enclosures, especially those exceeding 1 ha, represent a different kind of social unit from the much more frequent smaller enclosures. The labour involved in the construction of earthworks on this scale would have required considerable manpower and organisation, implying a degree of communal control, and the exercising of this control would doubtless have been vested with social status. Variation in status and function of enclosures has been illustrated by the excavation of the large univallate enclosure at Carloggas, St Mawgan-in-Pydar (107). This site is interpreted as a high-status settlement because of the massive scale of the enclosure ditch, its elaborate inturned entrance and the rich assemblage of finds it produced (Threipland 1956; Quinnell 1986, 118). It appears to have played a specific role in metal exchange in the locality and the enhanced nature of the enclosure may reflect its increased local significance; current evidence suggests that its period of use, from the first century BC until the mid second century AD, coincided with the decline of nearby Trevelgue (Nowakowski and Quinnell 2011, 355).

The only other univallate enclosure comparable in size to that at St Mawgan-in-Pydar is the six-sided enclosure at Tregaverne, St Endellion (126), but the curvilinear enclosures at Scarrabine, St Endellion (102), Tregolds, St Issey (103), and Portquin, St Endellion (106), all of which exceed 0.8 ha in extent, can also perhaps be considered as potentially high-status enclosures on the basis of their size (Fig 5). These large enclosures are generally fairly evenly spaced close to the western seaboard (Fig 28). Those at Scarrabine and Portquin are close to each other and it is possible that they represent different phases of activity.

The cropmark ditches of the Portquin and Scarrabine enclosures appear to be relatively slight, however, so, while both enclosures cover large areas, it is debatable whether they should be considered to be high-status settlements. Indeed it is probably over-simplistic to make a direct correlation between size and status without due regard to other factors. The outer circuits of some multivallate enclosures, such as Trevisker, St Eval (127), and Trenouth, St Ervan (128), might qualify as high-status enclosures on the basis of their size if we accept these outer circuits as representing separate phases of occupation. However, excavation at Trevisker produced no direct evidence for the outer enclosure having been a high-status site in the same way as St Mawgan-in-Pydar. To a lesser extent, the intermediate enclosures covering between 0.3 and 0.79 ha may have differed in function or status from the small enclosures, possibly housing kinship groups or wider communities rather than family groups. Without more evidence from excavations to provide clarification, however, the reasons for size disparity among Cornish enclosures remain poorly understood.

The factors behind the construction of multivallate enclosures have not been explored to any great degree by excavation. Similarly there are currently no clues to explain why large annexes were appended to some enclosures. The only two multivallate enclosures in Cornwall to have undergone anything more than small-scale excavation are Trevisker (ApSimon and Greenfield 1972) and Reawla (Appleton-Fox 1992). In neither case was a substantial portion of the intervallate area investigated. At Trevisker the discovery of roundhouses was interpreted as evidence that the outer enclosure was needed to accommodate population expansion, but at Reawla no features were found in a trench put through the intervallate area and the large outer circuit was taken to reflect the status of the occupants. In neither case are these conclusions altogether convincing; the most significant aspect of each site is that the very large outer enclosures were constructed after the inner ditches had been infilled and therefore suggest a radical change in the use and occupation of the sites.

Chronology

Linking the morphology of Cornish enclosures to their chronology is complicated in general terms by the limited amount of excavated or other dating

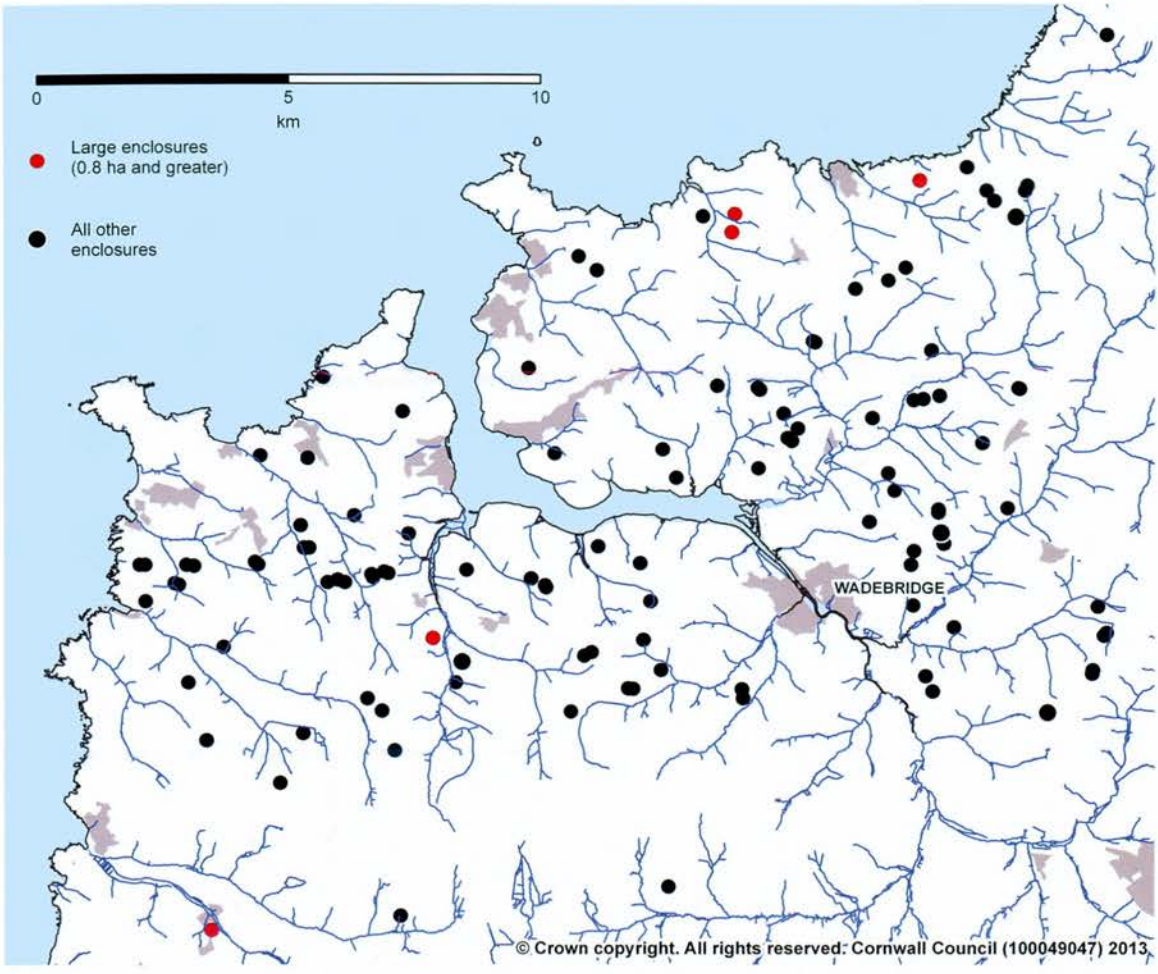

Fig 28 The distribution of large and very large enclosures.

evidence. We can say that multiple enclosure hillforts date from the Later Iron Age, perhaps beginning around 400 BC, and had fallen out of use by the first century AD (Quinnell 1986, 121; 2004, 214; 2011, 237). Herring (1994) has suggested that in west Cornwall simple irregularly shaped univallate hillforts sited in prominent positions in the landscape are likely to date to the Early Iron Age. However, none of the enclosures in the Camel estuary can reasonably be considered to be this type of hillfort.

Quinnell (2004, 216) has suggested that during the Roman period there may have been a network of administrative centres based in large univallate enclosures such as St Mawgan-in-Pydar (107). The polygonal enclosure at Tregaverne, St Endellion (126), has been compared above to St Mawgan-in-Pydar in terms of its size and unusual form. It may possibly have been comparable in status and function. Such a claim, although speculative, is not contradicted by the geographical position of these enclosures; administrative centres in Quinnell's model would have been established at some distance from each other and St Mawgan-in-Pydar is located in the extreme south west of the study area whereas Tregaverne is near Port Isaac in the north east. If these sites were similar in function we might expect them to be similar in date, in use from the first century BC to the early second century AD.

The outer enclosure at Trevisker broadly dates occupation of the site from the second century BC

to the second century AD (Quinnell 2004, 212) and the outer enclosure at Reawla was built in the second century AD (Appleton-Fox 1992). Perhaps we can postulate that the outer circuits of other multivallate enclosures may have accommodated some expansion during the Roman-British period on sites with earlier origins. There is also limited evidence from the two examples excavated so far, at Tremough (Gossip and Jones 2007) and Porth Godrevy (Fowler 1962), that at least some very small enclosures may be Roman in date. However, a very small open-sided curvilinear enclosure containing a roundhouse at Patteson's Cross, near Honiton in east Devon, dated to the Middle Bronze Age (Fitzpatrick *et al* 1999, I, 69–90).

Some double-ditched enclosures are certainly of the Roman period. At Penhale round, Fraddon, the outer circuit was added in the late third century AD (Nowakowski 1998). The main phase of use of the double-ditched metalworking enclosure at Killigrew, St Erme, was from the second to fourth centuries AD, although some Iron Age material was also found (Cole and Nowakowski, forthcoming). On the other hand, occupation within the double-ditched enclosure at Threemilestone was exclusively Iron Age (Quinnell 2004, 212).

There is some evidence that sub-rectangular and four-sided polygonal enclosures are also potentially likely to be Romano-British in date. The sub-rectangular enclosure at Grambla, Wendron, was in use from the second to the sixth century AD, and the polygonal enclosures at Kilhallon, Tywardreath, and Shortlanesend, Kenwyn, were also established in the second century AD (*ibid*). However, the polygonal enclosures at Tregilders (57) and Trevinnick (119), both in St Kew, may date from the end of the Iron Age; both were in use in the first century AD (*ibid*). At Boden, St Anthony-in-Meneage, Iron Age pottery of the fourth century BC was found as well as Romano-British material, although there appears to have been a period of abandonment between the two phases (Gossip, forthcoming c).

Similarly, curvilinear forms are not chronologically diagnostic. While the enclosures at Bodwen and Threemilestone and the inner enclosure at Trevisker are among the earliest enclosed settlements excavated in Cornwall, occupation at Penhale round continued into the fourth century AD, and the curvilinear enclosures at Reawla, Goldherring and Carlidnack were established during the Roman period (Quinnell 2004, 212).

Uniquely in Britain, Cornish houses dating from the Roman period are oval in shape (Quinnell 1986, 125; 2004, 183). Iron Age house plans are, as elsewhere, generally circular. Examples include those excavated at Trevisker 1 and Castle Dore (Quinnell 1986, 116). It is very likely, however, that the tradition of oval houses has its origins in the late Iron Age, as evidenced by oval features at Threemilestone, Kenwyn (Schwieso, 1976). At nearby Higher Besore, late Iron Age oval structures appear side by side with contemporary roundhouses (Gossip, forthcoming b).

Oval or sub-rectangular ring ditches interpreted as buildings are visible in four of the Camel estuary enclosures: the sub-rectangular enclosures at Kivells, St Kew (34), and Pawton, St Breock (74), the sub-rectangular double-ditched enclosure at Porthcothan, St Merryn (110), and the oval enclosure at Carnevas, St Merryn (35). All of these enclosures are between 0.1 and 0.29 ha in extent. Four ring ditches are crescentic; the shape of that in the large curvilinear enclosure at Tregolds, St Issey (103), cannot be determined, those in the double-ditched polygonal enclosure at Tregirls, Padstow (113), and the enclosure with both straight and curving sides at Trescowe, St Mabyn (62), appear to be circular, and that in the rectangular enclosure at Hay, St Breock (94), is probably oval. The rectangular enclosure at Carruan, St Minver (171), appears to contain a large circular ring ditch, two smaller oval ones and a sub-rectangular structure. Some or all of these features, however, may predate the enclosures.

Three enclosures contain features broadly classed as pits which might be interpreted as building hollows or unroofed working hollows (Fig 18). These are the four-sided polygonal enclosure at Trembleathe, St Ervan (76), the unusual rectilinear enclosure at Trevear, St Issey (156), and the multivallate triangular enclosure at Trevilgus, St Issey (122). These possible building hollows are all oval in shape, suggesting a Roman date. It is of interest that these apparent Romano-British building forms all occur within highly rectilinear or oval enclosures.

No unequivocal chronological patterns emerge from this limited and sometimes contradictory range of data. The majority of excavated sub-rectangular and four-sided polygonal enclosures were in use, or established, during the Roman

period but some have their origins in the Iron Age. Some double-ditched enclosures are Roman in date but others are again earlier. Oval enclosures appear to be Roman, whereas other curvilinear forms are just as likely to have been established during the Iron Age (but an early date should not be assumed as the Roman date for enclosures such as Carlidnack demonstrates). With our current understanding of the chronology of Cornish enclosures the safest conclusion to draw is that without firm dating evidence from excavation we cannot generally differentiate morphologically between enclosures of the Iron Age and those of the Romano-British period.

The enclosures in the landscape

Enclosures and Historic Landscape Character

If it is assumed that many if not most of the enclosures are settlement sites, their distribution clearly underscores our understanding of Cornwall's Historic Landscape Character (HLC). From analysis of present-day field patterns the area of medieval and pre-medieval farmland (and therefore settlement) has been identified through HLC and classed as a specific landscape Type known as Anciently Enclosed Land or Farmland: medieval (Cornwall County Council 1996; Herring 1998). With few exceptions the enclosures in the Camel estuary study area are located within Anciently Enclosed land.

Land identified as being enclosed during the late post-medieval period or in the twentieth century is classed as Recently Enclosed Land. This was former rough ground and during the medieval and pre-medieval periods it would have been open downland or heath. In West Penwith, where the layout of the prehistoric farmland is fossilised in today's field pattern, the relationship between the farmland and rough ground is clear (Dudley 2011). Rough ground played an important role in the prehistoric economy. It provided summer grazing for livestock and a source of fuel and allowed the farming community to make the fullest use of its seasonally available resources.

Similar organisation and use of the landscape in the Camel estuary hinterland is evident from the distribution of enclosures in relation to HLC zones. The main area of Recently Enclosed Land is the high ridge of St Breock Downs; here there are no enclosures and no evidence of medieval or pre-medieval fields (Figs 29, 30). The downs would have formed an extensive area of upland summer grazing for the prehistoric and Romano-British communities whose permanent settlements lay in the farming heartland around the estuary. The same can be said for the narrow strip of coastal rough ground fringing the study area. Only one enclosure, a very small site enclosing approximately 700 sq m at Longcarrow Cove, near Crugmeer, Padstow (5), has been identified in coastal rough ground.

The absence of settlements and fields on the St Breock Downs is to be expected: other areas of Recently Enclosed Land in Cornwall are similarly characterised by small numbers of later prehistoric and Roman-period settlement features, although this landscape Type more often incorporates earlier ceremonial and settlement remains (Herring 1998, 86–90).

The density of enclosures in the east and north east of the study area is generally lower than in the central area. This can be attributed to local topography: the eastern edge is dissected by the steep wooded valley of the river Allen and in the north east the land rises sharply towards the Delabole ridge. There are, however, other notable gaps in the enclosure distribution, and these are even more pronounced when the location of prehistoric or Romano-British field systems is included in the distribution pattern (Fig 30).

Two of these, in the northern part of the study area, are of particular interest. The first is the area north of St Merryn; the second forms a 1–2 km wide transect running south west to north east through St Minver Highlands and St Endellion. Both areas contain substantial tracts of Anciently Enclosed Land and we might expect the numbers of enclosures here to be comparable with those recorded elsewhere, as in the densely occupied area around Chapel Amble, for example. It is possible that in these apparently 'blank' areas cropmarks do not form as readily as elsewhere. The fact that a notional line marking the southern edge of both blank areas is remarkably straight, running north eastwards from Trevarnon in the west, across the estuary to St Endellion and beyond, suggests that the distribution pattern reflects a fault line or some similarly abrupt geological change. Significantly, however, this is not the case; the underlying geology and soil types here are no different from those in other parts of the study area where large numbers of enclosures have been identified. Neither does

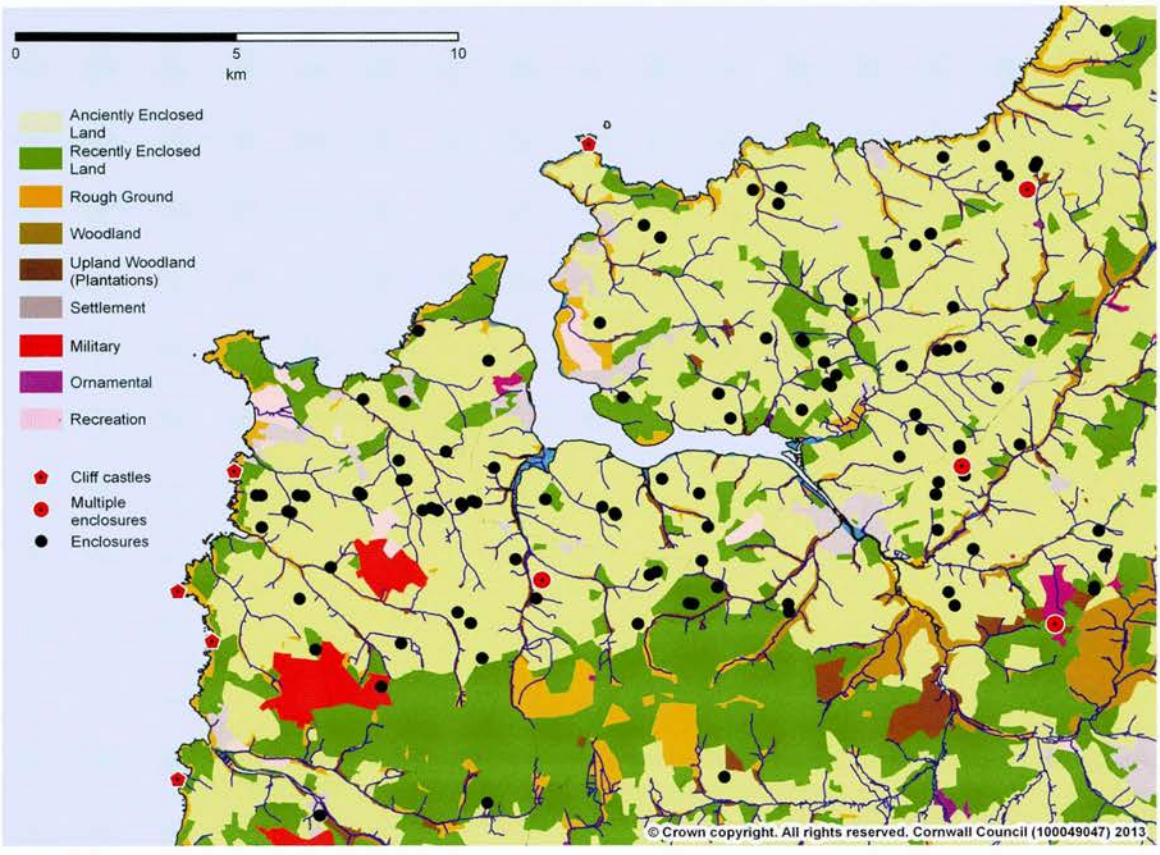

Fig 29 The distribution of enclosures in the Camel estuary in relation to Historic Landscape Character (Cornwall County Council 1996).

Agricultural Land Classification indicate that the land quality here differs from elsewhere.

To some extent, then, the gaps in distribution in the northern part of the study area are real and can be assumed to reflect historic factors. An obvious possible interpretation is that in the prehistoric and Romano-British periods these gaps were tracts of unenclosed commons used for summer grazing by the enclosure-dwellers based to the south, or perhaps areas of woodland (*cf* Lawson-Jones and Kirkham 2009–10, 221–2). There is some tentative evidence for differences in character between the distribution of enclosures to the north and south of the St Minver 'gap'. To the north only one enclosure, that at Trenant, St Minver (72), is within the most frequently occurring 0.1–0.29 ha size range; two others, Trewint (27) and Tresawl (12), are very small enclosures of less than 0.1 ha, the second of which has an annexe. Two of the three large enclosures, however, those at Scarrabine, St Endellion (102), and Portquin, St Endellion (106), are located here, with the very large enclosure at Tregaverne (126) lying immediately to the east. Thus there appears to be a preponderance of larger enclosures north of the St Minver 'blank' area, and an apparent paucity of the otherwise predominant small enclosures. The implication is that the gap did indeed form some sort of cultural boundary, a possibility that can only be tested by examination of more data than are currently available. A similar comparison with the area to the north of St Merryn is inappropriate because that is a much smaller landscape and is largely coastal in character. It housed only very small enclosures and open settlements.

The interpretation of gaps in the distribution of enclosures as evidence for areas of former rough ground and common grazing or of woodland can

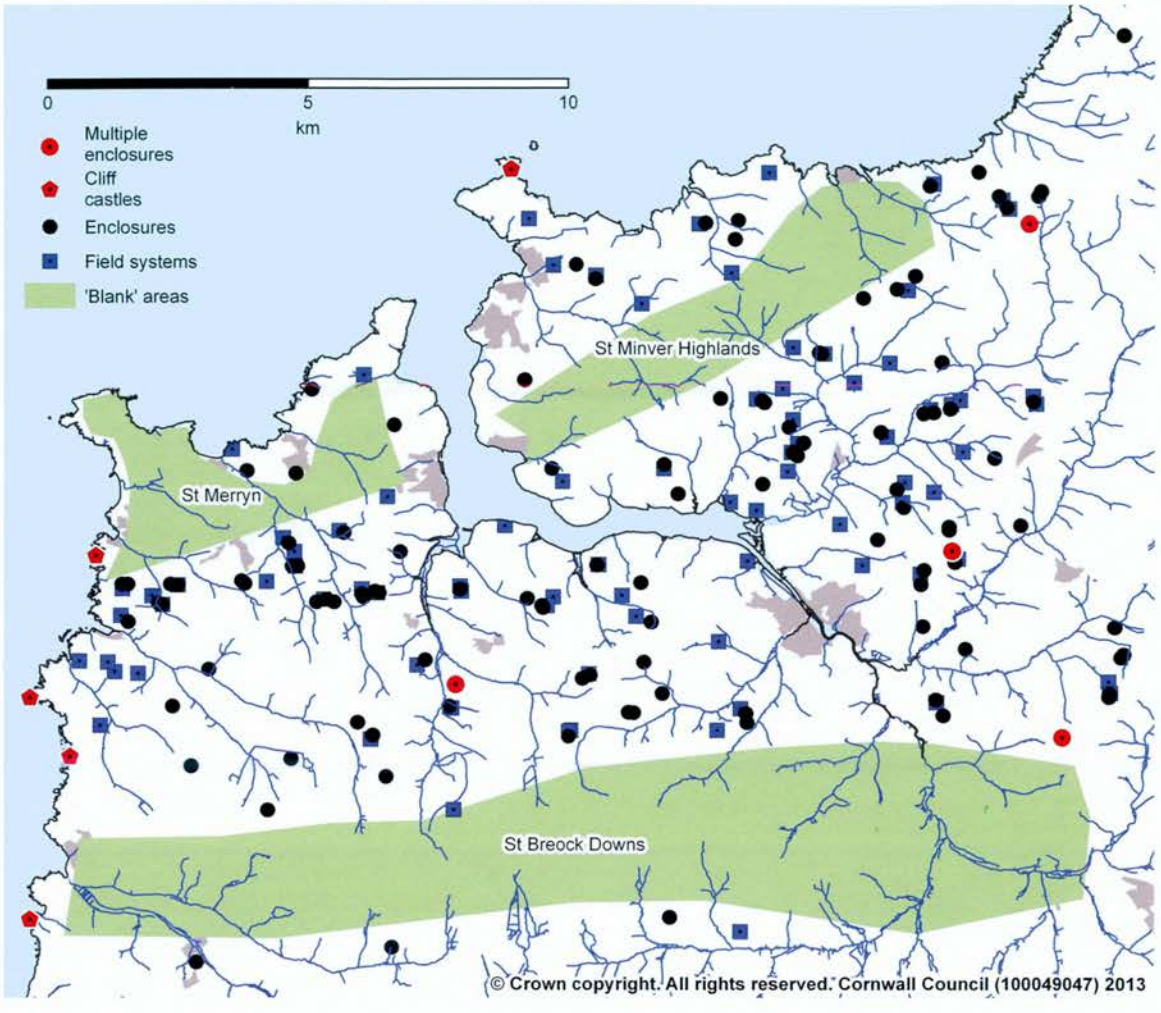

Fig 30 The distribution of enclosures and prehistoric – Roman-period field systems in the Camel estuary showing the main areas of low site density.

also be tested by considering the distribution of early medieval settlements. The identity of these settlements is derived from place-name evidence: those with the elements *tre, bod and ker* (or variants such as *bos* and *car*) are post-Roman in origin and, especially when qualified by names of people, might refer to Romano-British settlements which lasted beyond the fifth century (Padel 1985). The generally accepted model for the abandonment of enclosures and the establishing of unenclosed hamlets in the early medieval period is one of continuation of settlement with some retraction. Although some early medieval settlements moved away from higher ground, in the main it appears that new settlements were established near abandoned enclosures or that settlements continued at the same location as enclosures (Rose and Preston-Jones 1995). In other words, some Romano-British enclosures are likely to be overlain by early medieval settlements and their medieval and modern successors. It has been estimated that as many as 2500 prehistoric settlement sites may be perpetuated in this way (Johnson 1998). Within the Camel estuary study area there are 60 more early medieval settlements than there are known Iron Age or Romano-British enclosures (Fig 31). In a number of places early medieval settlements are close to abandoned enclosures (the proportion

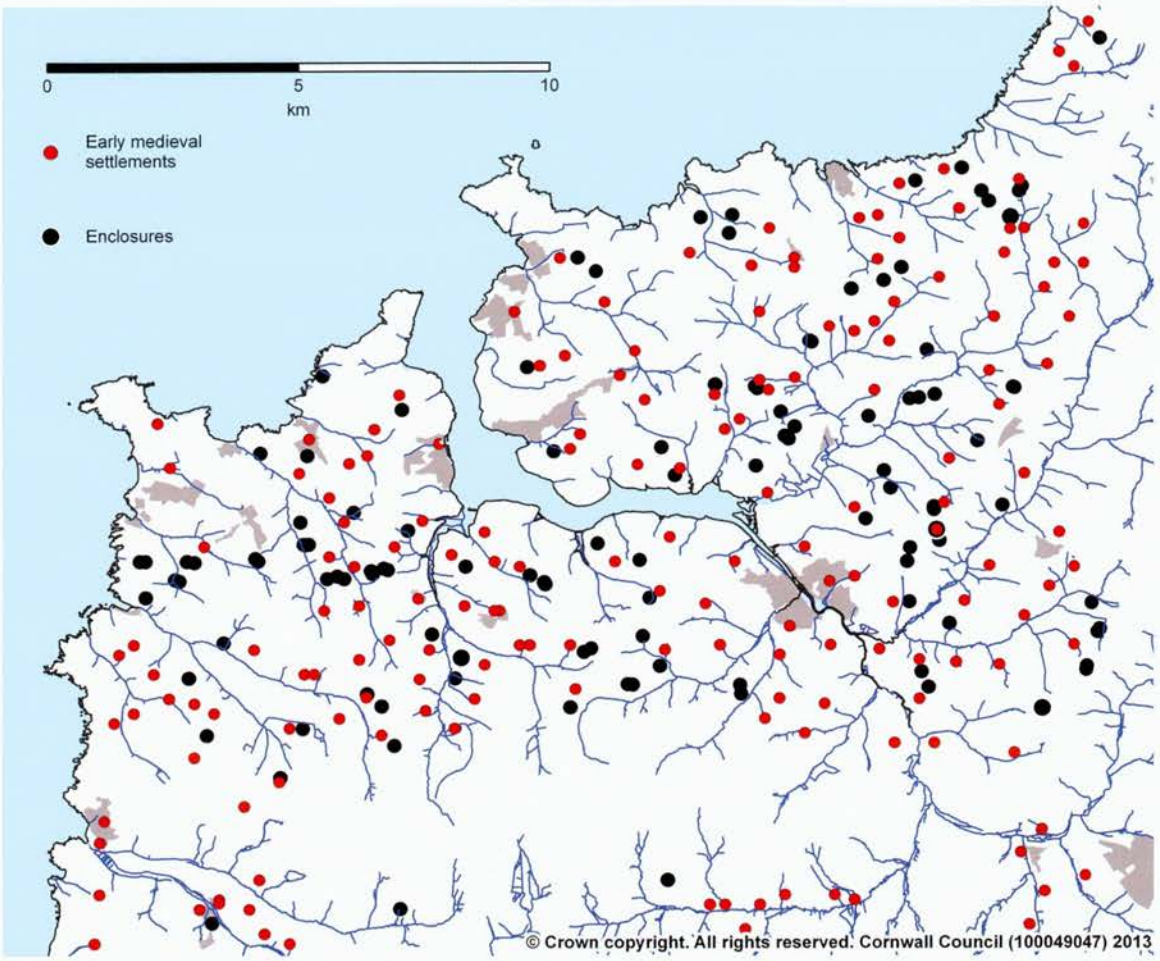

Fig 31 The distribution of prehistoric and Romano-British enclosures compared with the distribution of early medieval settlements

of *tre-* names for the locations of the enclosures listed in Appendix 1 makes this very clear). This is consistent with the Rose and Preston-Jones model (1995) and there is no reason to suppose that others are not overlying abandoned enclosures.

While there are no early medieval settlements on the St Breock Downs, the other gaps in the prehistoric and Roman settlement pattern indicated by mapping enclosures and field systems are, to varying degrees, filled by *tre-* and *bod-* settlements (Fig 31). This is clearest in the area around Wadebridge, where the settlement distribution is very even, and in parts of the eastern edge of the study area. The apparent gaps in the pattern of enclosures around St Merryn and St Minver Highlands are far less convincing if we accept that *tre* and *bod* settlements may be overlying earlier enclosures.

On the other hand, the greater number of early medieval settlements – 175 as opposed to 115 enclosures – could suggest an increasing post-Roman population; although more Romano-British settlements doubtless remain to be discovered, we can be reasonably confident from the evidence from excavated sites that not all the 115 known enclosures are likely to have been occupied at the end of the Roman period. (Parts of the landscape, of course, could have been farmed from as yet undetected open settlements.) While in broad terms the area of medieval farmland in Cornwall

as a whole appears to perpetuate that of prehistoric and Roman farmland, on a local level increasing demand for land may have led to areas which had been rough ground in the prehistoric and Roman periods (as, for example, perhaps, St Minver Highlands) being newly colonized and taken into cultivation in the early medieval period.

The uneven distribution of enclosures

The ratio of early medieval settlements to those of the prehistoric and Roman periods is roughly 3:2. The early medieval settlements are fairly evenly spread throughout the study area (Fig 31). By contrast, enclosures are often found close to each other in small groups or clusters; within a 2 km radius of Killibury, for instance, there are 11 enclosures and three possible enclosures. A further probable enclosure has recently been identified a short distance to the west of the group of features at Porthilly shown in Figure 36 (Gossip 2012: this volume). This uneven distribution pattern suggests that there were localised areas of intense prehistoric activity interspersed with others that were empty of settlements and fields.

On the other hand, the overall impression gained from NMP mapping is that aerial photographs provide only a partial view of the prehistoric and Romano-British landscape. The enclosure clusters may reflect 'hotspots' in the landscape where local soil conditions are especially conducive to the production of cropmarks. Frequently a complex range of below-ground features can be seen in considerable detail within the hotspots: field boundaries, pits, ring ditches and other features hinting at intensive use of the landscape. Nowhere are these features visible over a wide area but it seems more than likely that apparently 'empty' areas of landscape between the hotspots contain similar features which are not visible on aerial photographs.

The landscape around Porthcothan and Carnevas, St Merryn (Fig 32), illustrates this. A multi-phase complex of features has been mapped just north of

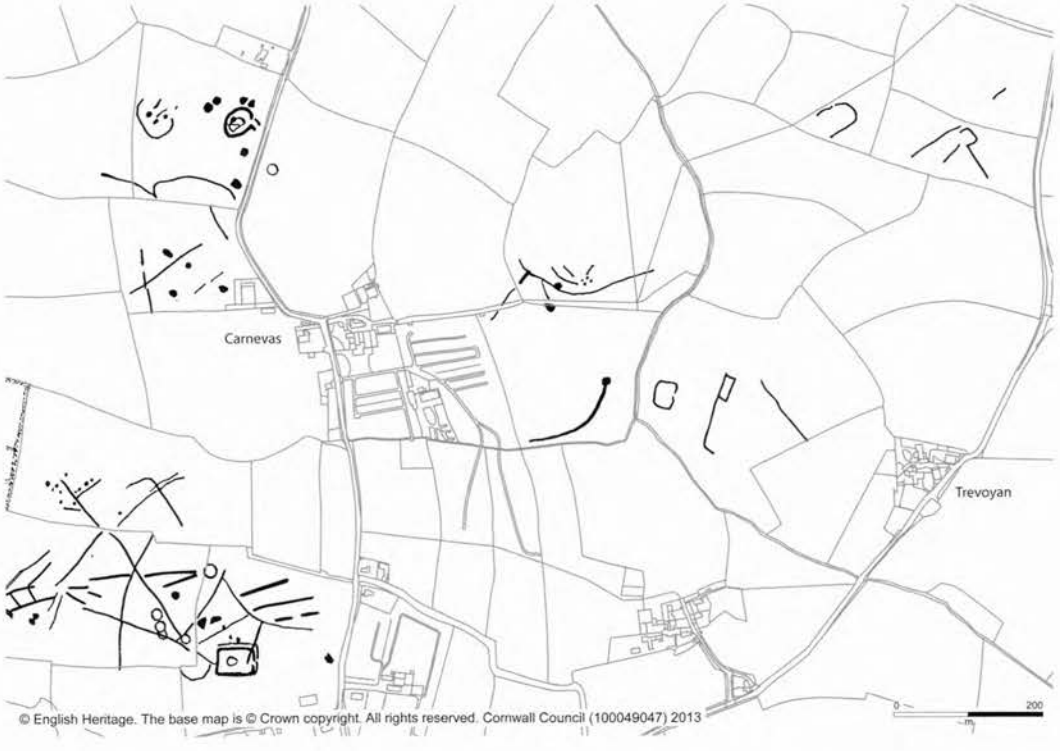

Fig 32 Enclosures and associated features visible as cropmarks in the area around Porthcothan and Carnevas, St Merryn.

Porthcothan. The main feature (bottom left in Fig 32) is a sub-rectangular double-ditched enclosure (110) containing a central oval ring ditch. To the west of the enclosure are a series of sub-circular ring ditches (possibly roundhouses), a rectilinear field system arranged with its main axis running south east to north west – some elements of this system are clearly not contemporary with either the enclosure or with the southernmost ring ditch – and several pits or hollows. In the field to the west of Carnevas, 240m north of enclosure (110), there is a very obvious curve in the southern boundary. This could be fossilising the bank of a very large enclosure, although no cropmark or other evidence for this was visible on aerial photographs examined during the project. The curve describes an arc which would form part of a feature with a diameter of approximately 150m; from this the projected area covered by the enclosure would have been approximately 1.7 ha, larger than any other univallate enclosure in the study area. The antiquarian Richard Polwhele (1816, I, 108) mentioned an earthwork enclosure at Carnevas, hinting that it was in some way significant by saying that it 'must attract observation' but giving no further details. It is unclear whether he was referring to the hypothetical large enclosure, to (110) or to one of the others in the vicinity.

A further range of features has been mapped to the north west of Carnevas. These include a small oval enclosure (35), a rectilinear (possibly open-sided) enclosure (58), and a range of linear features and pits, including the fragmentary remains of a possible rectilinear field system arranged with one axis on a south west to north east alignment. To the east of the road is a circular ring ditch which may be a round house.

Less than 200m to the east of Carnevas are further linear features (most probably field boundaries) and pits, and to the south east, near Trevoyan, are two very small rectilinear enclosures (18 and 146). To the north east, at Trehemborne, are two open-sided enclosures (147 and 60).

The common theme in this buried landscape is the alignment of field boundaries which all run south east to north west (and south west to north east), whether at Porthcothan, Carnevas, or (albeit in very fragmentary form) at Trevoyan and Trehemborne. It takes no great leap of faith to argue that a field system on this alignment extends throughout much of the area in Figure 32 and that more of it probably survives but is not visible on the photographs. The proximity of all these features (within an area of little more than 1 sq km) suggests that it is more probable that they are part of an integrated and coherent landscape than that they are a collection of isolated enclosures, each with its own discrete group of associated features.

In the Porthcothan – Carnevas area a range of site types occurs: small enclosures (both rectilinear and curvilinear), a double-ditched enclosure, very small enclosures, unenclosed roundhouses and a possible very large enclosure are all represented within a relatively small area. This is characteristic of the distribution of enclosures and related features throughout the study area but the combination of site types making up each hotspot varies: there is no recognisable pattern. At Tresallyn, St Minver (Fig 33), for example, a curvilinear enclosure in the south covering 0.2 ha (71) appears to be overlying or is overlain by a smaller polygonal enclosure (38). To the east is a very small rectilinear enclosure (3) and between the enclosures is a series of parallel field boundaries of unknown date (but possibly contemporary with enclosure (71). To the north is a mixture of rectilinear and curvilinear field boundaries, beyond which is a group of eight ring ditches (possible roundhouses) and an intermediate enclosure (91) covering 0.42 ha. This enclosure is sited on a north-west facing ridge and its irregular shape was probably determined by the contours.

At Higher Trevisker, Padstow (Fig 34), is a multi-phase complex of features centred on a large double-ditched enclosure (118) approximately 0.7 ha in extent, located south east of the modern settlement. There are a range of very small enclosures in the immediate vicinity and one to the east (11). Half a kilometre to the west of Higher Trevisker is another hotspot at Tregavone. Here there is a rectilinear open-sided enclosure (129), a curvilinear enclosure (70), field boundaries and possible ceremonial features (*cf* Fig 27). It is possible that the two complexes are linked by a field system orientated east-west which is partially visible at each complex.

Although the combination of enclosure types at these hotspots is different in each case, there are some shared aspects which are of interest in the wider context of the organisation of the prehistoric and Roman landscape. First is the fact that in each example the features clearly represent more than one phase of activity, be it the relationship of the rectilinear field system and enclosure (110) at

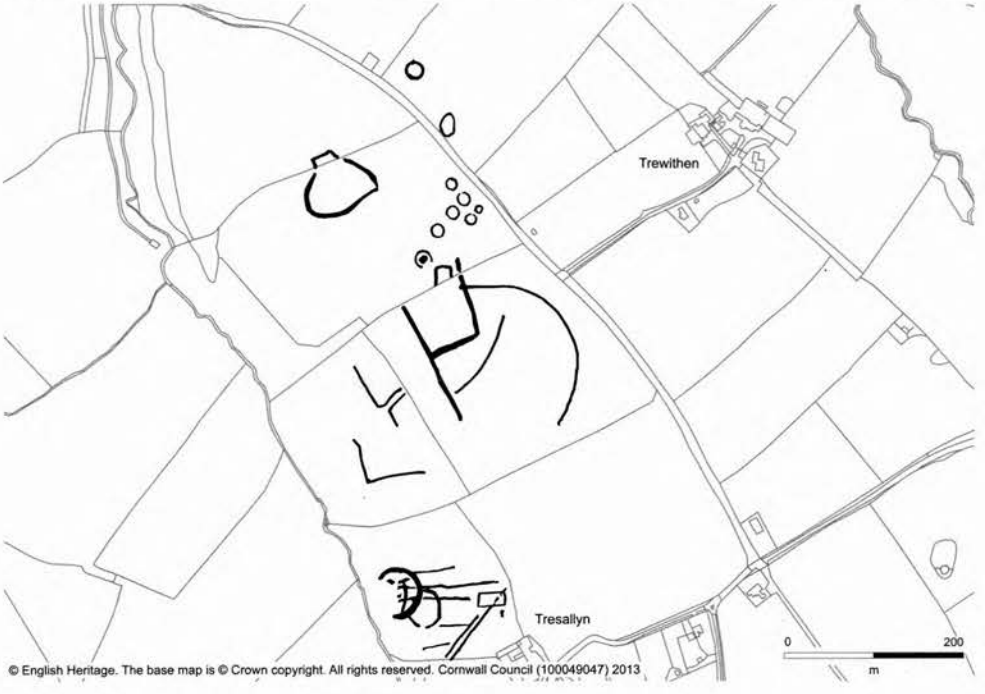

Fig 33 Enclosures and associated features at Trewithen and Tresallyn, St Minver.

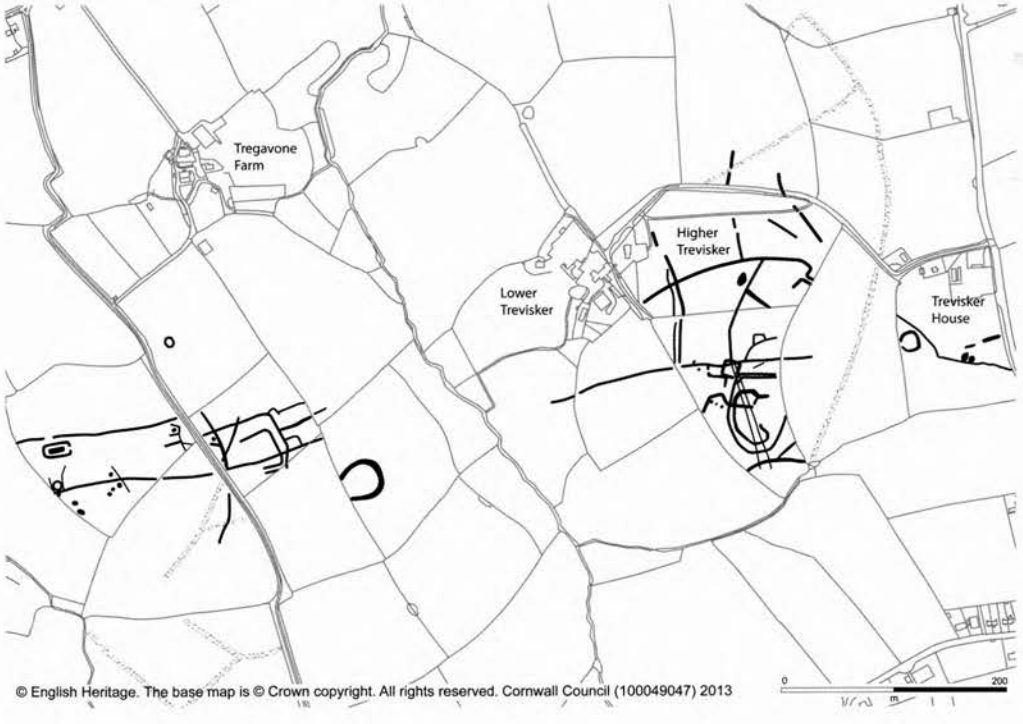

Fig 34 Cropmark hotspots at Higher Trevisker, Padstow and Tregavone, St Ervan.

Porthcothan (Fig 32), of enclosures (71) and (38) at Tresallyn (Fig 33), between field boundaries and enclosure (129) at Tregavone (Figs 27, 34) or that of the field boundaries and enclosure (118) at Higher Trevisker (Fig 34). The multi-phase nature of the cropmark evidence demonstrates continuity of activity and settlement at each site. This is consistent with excavation evidence from elsewhere in lowland Cornwall; the landscape around Penhale round, for instance, was in more or less continuous use from at least the fourth millennium BC (Nowakowski 1998).

The second point is highlighted by the position of the two enclosures (35 and 58) to the north-west of Carnevas, which are sited only 70m apart (Fig 32), and those (129 and 70) at Tregavone which are 90m apart (Figs 27, 34). Johnson and Rose (1982 172) commented on the frequency with which enclosures are sited adjacent to each other and this observation is certainly true of those in the Camel estuary study area. The siting of enclosures within 100m of each other is a significant factor in their distribution and applies to perhaps a third of the enclosures. Although Johnson and Rose posed the question more than 30 years ago, there have been no investigations since to clarify whether the adjacent siting of enclosures reflects a social hierarchy, abandonment and shift, is evidence of expanding occupation resulting from population growth, or enclosures with different functions.

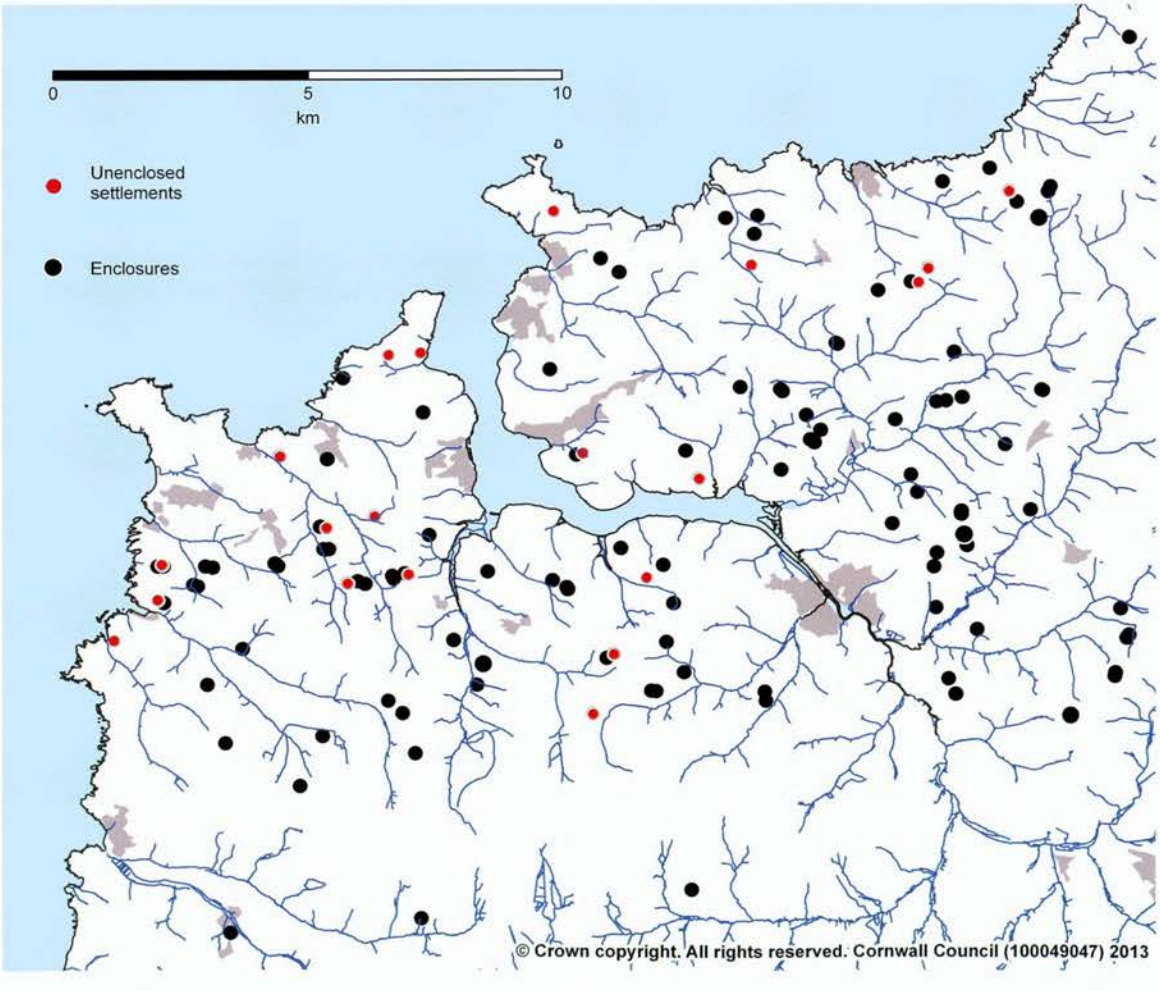

Fig 35 The distribution of unenclosed settlements and enclosures.

A third aspect is the presence of possible unenclosed roundhouse settlements. These appear in the vicinity of enclosures at Porthcothan (110) and Carnevas (35) (Fig 32) and at Trewithen (91) (Fig 33). NMP mapping has identified 20 possible open settlements in the Camel estuary study area, 14 of which are sited close to enclosures (Fig 35). Roundhouses situated outside enclosures are known elsewhere in Cornwall, including Penhale (Nowakowski 1998), Carvossa, Probus (Douch and Beard 1970), Carwarthen, St Just-in-Roseland (Opie 1939), and Higher Besore (Gossip, forthcoming b). The presence of roundhouses at Porthcothan, Carnevas and Trewithen, and at other sites such as Porthilly, St Minver (79) (Fig 36), raises questions similar to those posed by adjacent enclosures. Were the roundhouses antecedent to the enclosures? Or, if the roundhouses and enclosures were contemporary, are they evidence of social differentiation?

That a high proportion of the possible roundhouses identified by NMP are adjacent to enclosures may be of archaeological significance, but it is more likely that it reflects the inherent difficulty in identifying unenclosed settlements from aerial photographs. The initial attention of both the aerial photographer and the photo interpreter is drawn to an enclosure and only closer examination reveals the far less obvious cropmarks of the roundhouses. Difficulty in identifying unenclosed settlement is not a specifically Cornish phenomenon; it has been recognised elsewhere on geology far more conducive to cropmark formation (for example, Palmer 1984, 54). The fact that a significant number of unenclosed settlements has been mapped in the Camel estuary hinterland despite these difficulties, strongly suggests that a large number of others remain undiscovered.

Fig 36 A polygonal enclosure with possible annexe (79) accompanied by a fragmentary field system, pits and round house ring ditches at Porthilly, St Minver. A further probable enclosure has recently been identified immediately to the west of this group (Gossip 2012: this volume).

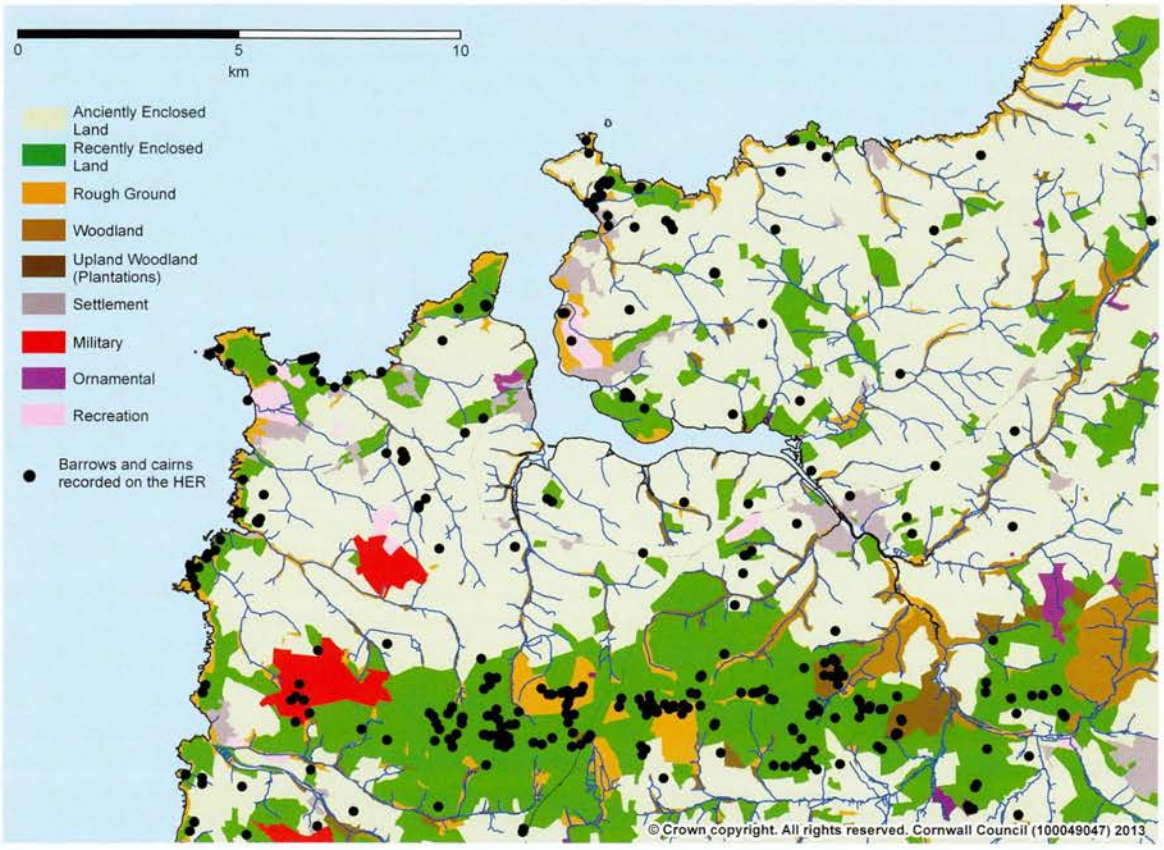

Fig 37 The distribution of recorded round barrows and cairns (data from Cornwall and Scilly HER) in the study area in relation to Historic Landscape Character (Cornwall County Council 1996).

The cropmark complexes at Tregavone and Higher Trevisker also raise questions about the relationship between domestic and ceremonial sites (Fig 34). In the Camel estuary area a superficial distinction can be drawn between sacred and secular landscapes over a longer period of prehistory by comparing the distributions of enclosures and of round barrows (Figures 3 and 37).

The two distribution patterns are apparently diametrically opposed, with most of the barrows located on the St Breock Downs and the coastal rough ground strip, areas which are almost completely devoid of enclosures. However, some barrows have been recorded in Anciently Enclosed Land and it is clear that the same issues over cropmark production that influence the visibility of unenclosed roundhouses also affect the identification of round barrows in intensively ploughed lowland areas. The majority of barrows in Anciently Enclosed Land have been identified as ring ditches on aerial photographs, whereas those on the Downs and in coastal rough ground generally survive as upstanding earthen mounds. We should keep an open mind as to whether the below-ground remains of many more barrows and other ceremonial monuments might survive alongside settlement sites in the farming heartland. The tentative identification of a henge monument at Bozion, St Minver (51) (Fig 22), and a long barrow or mortuary enclosure at Tregavone, St Ervan (70) (Figs 27 and 34), both of which are in close proximity to later enclosed settlements and field boundaries, only underlines this.

The currently known distribution of Bronze Age barrows and their density in the Camel estuary hinterland suggests extensive Early Bronze Age activity in the area. However, at present only

two Middle Bronze Age settlements are known: at Trevisker, St Eval, and Pawton, St Breock (ApSimon and Greenfield 1972; Gould *et al* 2003–2004). It is highly probable that Anciently Enclosed Land in the Camel estuary study area was in fact being farmed widely in the Bronze Age and that some unenclosed roundhouse settlements are of this date, as at Trethellan, near Newquay (Nowakowski 1991), and Scarcewater tip, St Stephen-in-Brannel (Jones and Taylor 2010; *cf* Gossip and Jones 2008).

The presence of Bronze Age settlement and activity emphasises the long continuity of occupation of Anciently Enclosed Land. Virtually all the enclosures are located here, as are early medieval settlements. This corroborates previous understanding of historic land use in Cornwall in that what was enclosed farmland in the medieval period was used in largely the same way in late prehistory; the zone of medieval settlement is, to a large extent, the zone of settlement from the Bronze Age onwards (Johnson 1998).

Conclusions

NMP mapping has proved an effective means of identifying and recording cropmark enclosures and in so doing has added significantly to our knowledge of the prehistoric and Romano-British landscape in the area around the Camel estuary. Many new enclosures have been identified, not least a possible new multiple enclosure at Trequite, St Kew. In addition to the large number of probable settlement enclosures, a possible henge monument has been mapped at Bozion, St Minver, and a possible long barrow at Tregavone, St Ervan. One of the principal aims of this analysis of the Camel estuary enclosures was to develop a typological framework for small enclosures in Cornwall. This has been successful to an extent but a significant qualification is that by no means every enclosure can be classified in a meaningful way. In particular, the form of some enclosures cannot be described more closely than 'curvilinear'. On the other hand, some generalised descriptions which appear frequently in the archaeological literature can now be challenged. For instance, the statement that enclosures 'tend to be oval or almost circular in shape, although rectilinear forms are not uncommon' (Quinnell 2004, 211) does not appropriately describe the enclosures in the Camel area: more than half of these are rectilinear, almost circular forms are unusual and there are more sub-rectangular enclosures than there are oval.

The shape of some of the enclosures is significant in that it shows they were carefully laid out to a specific design. The most frequently occurring of these designs are sub-rectangular, four-sided polygonal (trapezoidal) and oval. Roughly 40 per cent of the enclosures fall into these three shape categories. Another significant group of enclosures does not appear to have a complete ditch circuit but, so far, little investigation of these open-sided enclosures has been carried out in Cornwall.

There is a considerable size range among the enclosures, but this is another area where general descriptions may now be refined. For example, '[S]uch enclosures are usually under 1 ha in size' (Quinnell 2004, 211). In fact, most of the Camel estuary enclosures are much smaller than this; if the inner circuits of multivallate enclosures are included then 70 per cent of the enclosures are 0.3 ha or less in size; 20 per cent of the enclosures are smaller than 0.1 ha. These very small enclosures may have been used in a variety of ways: as stock enclosures, metalworking areas, workshops or perhaps as single-unit settlements.

Although few internal features such as roundhouses have been recorded, many of the enclosures can reasonably be interpreted as settlements. Roughly 70 per cent are univallate and a further 12 per cent are double-ditched. These are probably a variant of univallate enclosures; they have a similar size range and, like the univallate enclosures, the majority are rectilinear.

Multivallate enclosures are of particular interest because, whether they represent two phases of enclosure or were originally designed with more than one circuit, they differ significantly from the typical univallate and double-ditched enclosures. The outer circuits are frequently much larger than the predominant small enclosures of the area, some enclosing more than 1 ha. In some cases it is likely that the inner enclosing ditch was infilled before the outer ditch was constructed. More research is needed into the reasons for such radical rebuilding. Similarly it is not clear why large annexes were sometimes added to otherwise typical univallate enclosures.

Increase in status or in local or regional significance may be a factor behind the expansion of multivallate enclosures and the addition of annexes; population growth offers another possible

factor, as do changing or added functions. There is currently no evidence for the contraction of enclosures. Increasing numbers of enclosures were being built during the Roman period (Quinnell 2004, 212) and there are substantially more settlements with early medieval place-names than there are abandoned enclosures. When considering all these factors the overall impression is of population expansion during the Roman and post-Roman period.

The focus for enclosed settlement appears to have been in the fertile lowlands around the Camel estuary; the high ground of St Breock Downs was not colonised and may have been used as unenclosed grazing. This reinforces the argument that HLC can be reliably used in Cornwall as a predictive model for areas of settlement and cultivation. Further research may refine the HLC model; gaps in the distribution of enclosures and associated fields, particularly in St Minver Highlands, may also have been open commons, although it is possible that prehistoric and Roman settlements did exist there but are now buried beneath today's farms.

Although evidence for pre-medieval fields is patchy there are suggestions that in places, at least, there were extensive field systems. The landscape clearly underwent a major re-organisation in the early medieval and medieval periods with the development of cultivation strips and open fields. As a consequence there is little or no above-ground survival of the prehistoric field pattern.

Although the settlement pattern consisted predominantly of enclosures, unenclosed roundhouses have been recorded and the morphology of some (large ring ditches, some of which are oval in shape) suggests that they may be late Iron Age or Romano-British in date and therefore contemporary with the enclosures. The fact that many of the unenclosed settlements have

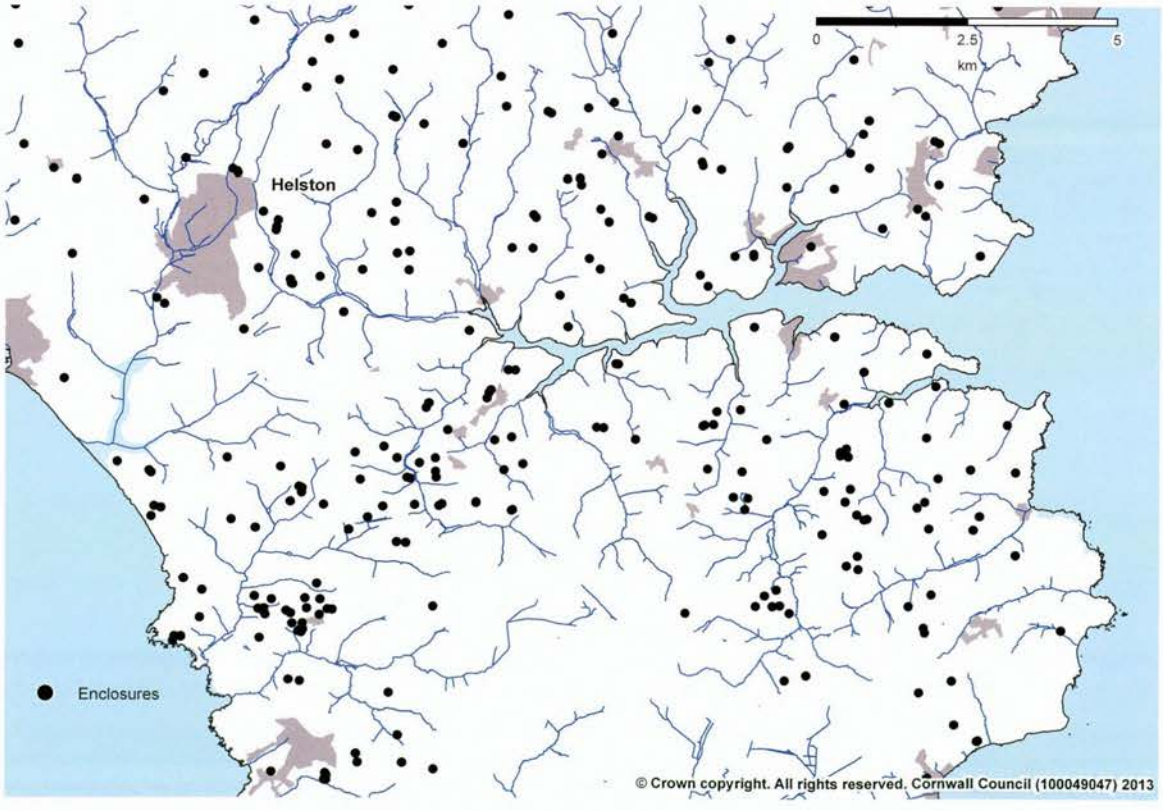

Fig 38 The distribution of recorded enclosures in the area around the Helford estuary (data from Cornwall and Scilly HER).

been found in the vicinity of enclosures (which are far more easily visible on aerial photographs) suggests that more remain to be discovered. We should conclude from this that the extent and distribution of unenclosed settlement is at present poorly understood, as is their relationship with enclosed settlements.

The wider picture in Cornwall

To what extent is the character of the prehistoric and Roman settlement of the Camel estuary area typical of other parts of lowland Cornwall?

There are a number of other areas where a similar density of enclosures has been recorded, including the Helford estuary (Fig 38), the Roseland peninsula, the area between Truro and Newquay and around Gwinear, between Hayle and Camborne. Fewer sites have been recorded in east Cornwall, particularly the south east.

In the area to the south of the Helford (Fig 38) there appears to be a distribution pattern comparable to that of the Camel estuary hinterland, with clusters of enclosures, whereas to the north of the river there is a more evenly-spaced pattern (*cf* Edwards and Kirkham 2008, fig 2). No enclosures have been recorded from the Upland Rough Ground of Goonhilly Downs, in the southern portion of the area depicted. Gaps in the distribution along the river estuary itself can be attributed to the heavily wooded nature of the landscape, and gaps in the area south of Helston to the presence of former rough ground. There are, however, significant apparent gaps in the Anciently Enclosed Land along the east coast.

The broad character of enclosures in other areas shows similarities with those recorded in the Camel estuary hinterland. At Goonhoskyn, St Enoder, for example, there are at least seven prehistoric or Romano-British enclosures (and two possible enclosures), the majority of which

Fig 39 NMP mapping of enclosures and associated features in the vicinity of Goonhoskyn, St Enoder.

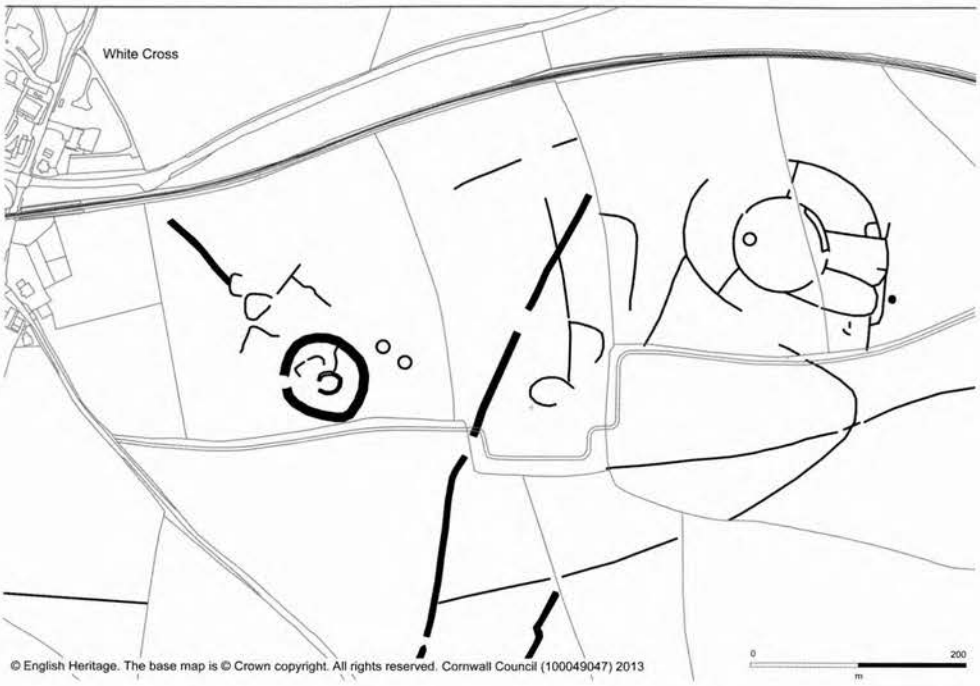

Fig 40 NMP mapping of enclosures and associated features at White Cross, St Enoder.

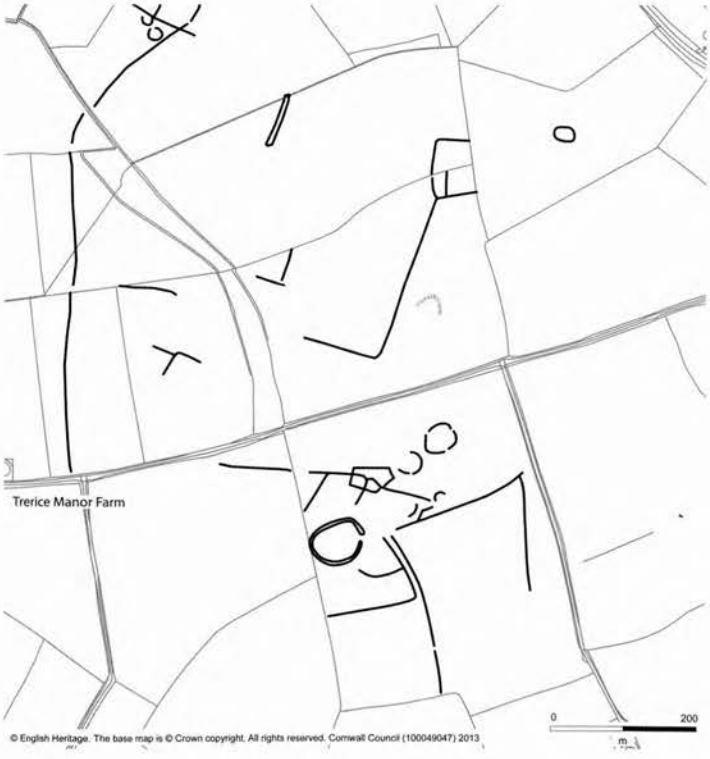

Fig 41 NMP mapping of enclosures and field system at Tresillian Barton, St Newlyn East.

Fig 42 NMP mapping of enclosures and fields at Roseworthy, Gwinear-Gwithian.

are rectilinear, within an area of little over 1 sq km (Fig 39). There are also similar cropmark hotspots, as at White Cross, also in St Enoder (Fig 40). The main feature there is an unusually circular multivallate enclosure in which the intervallate area is subdivided into a number of smaller enclosures or cells, one of which contains a small ring ditch. To the west is a more typical univallate enclosure containing a centrally-placed ring ditch and other internal features. Outside this enclosure to the east are two probable roundhouses and to the north west two very small enclosures. Two more very small enclosures are visible between the two larger enclosures, and there is also a multi-phase field system, some of which is clearly on a different alignment to the present field pattern.

Fragments of a more extensive field system have been mapped at Tresillian Barton, St Newlyn East (Fig 41). The main part of this field system runs northwards from a group of four enclosures within a few hundred metres of one another (in the lower part of the figure). A rectilinear enclosure to the north of this group is clearly associated with the field ditches.

The field boundaries mapped at Tresillian Barton and White Cross are on different alignments to the

present field patterns and this is also consistent with the prehistoric and Romano-British fields recorded from the Camel estuary area. Clearly these fields were abandoned and reorganised at some point during the post-Roman period.

Further west the evidence for this type of widespread abandonment and change is more ambiguous; in places it is possible that the prehistoric and Roman field pattern was perpetuated. At Roseworthy, Gwinear-Gwithian, for example (Fig 42), there is a dense pattern of enclosures in the landscape and the field divisions which were probably associated with these appear to fit, for the most part, into the present field pattern.

The potential for further research

A number of questions concerning enclosures in Cornwall are raised by this analysis of the results of the National Mapping Programme in the Camel estuary hinterland.

1. Can morphological typology be used in conjunction with further investigation to produce a more closely defined chronology for enclosures?
2. What is the nature and date of the very small enclosures?
3. Are there differences in function or status between the predominant small enclosures and those significantly larger, and what is the relationship between them?
4. Why were large annexes appended to some otherwise apparently typical enclosures?
5. Do multivallate enclosures provide evidence of specialised activity, of increasing or changing significance of the site within the locality or region, or of multi-phase activity representing possible population expansion?
6. What is the date and function of enclosures highlighted as unusual in form?

Well-targeted programmes of geophysical survey might go some way towards answering questions 1 to 5. It has been noted above that oval houses visible on aerial photographs occur in sub-rectangular enclosures (or those referred to here as 'highly rectilinear'), suggesting that a Roman date may be attributed to these enclosures. There is a high likelihood that geophysical survey would identify roundhouses and oval houses in some enclosures where none are visible on the photographs, thereby providing a larger sample from which to test this suggestion. The identification of houses in very small enclosures might confirm that they are settlement sites. Geophysical survey would be the ideal tool to search for features within annexes and in the intervallate areas of multivallate enclosures, which may shed some light on their function.

Analysis of aerial photo evidence and targeted geophysical survey provide only so much evidence, however, and ultimately questions of function and chronology can only be answered by research-orientated excavation. The analysis offered here, followed up by geophysical survey, can be used to formulate excavation policy by providing pointers to features or parts of enclosures which are likely to be key areas for small-scale excavations (perhaps following field inspection and systematic field walking).

Quite apart from questions about the function and chronology of the enclosures themselves, the analysis highlights several other issues about the prehistoric and Roman settlement pattern which are worthy of further research.

1. To what extent do cropmark 'hotspots' genuinely reflect the former settlement pattern?
2. If this pattern of clusters of settlements and fields with blank areas between is real, how were the empty parts of the landscape used?
3. What were the chronological and social relationships between the various sites forming the hotspots, in particular the relationships between unenclosed roundhouses and enclosures, between the various forms of enclosure, and between adjacent enclosures?
4. What is the extent of overlap between the later 'secular' and earlier 'sacred' landscapes? To what degree were they separate or intermingled?

In answering these latter questions geophysical survey would again play an important role. It would be an essential element in establishing whether apparently blank areas actually housed settlements, fields and other features not visible on aerial photographs. We should expect geophysical survey to show that the fragmentary field systems visible on the photographs are, in fact, more extensive and coherent and to shed light on the extent of the distribution of unenclosed settlement and plough-levelled round barrows in lowland areas. But, as

before, questions about chronological and social relationships can only be answered by excavation.

Analysis of the enclosures in the Camel estuary hinterland provides information relevant to four key research agendas.

1. The character of settlement and exploitation of the landscape from the later prehistoric period to the early medieval;
2. The transition from the Iron Age to the Roman period;
3. Historic Landscape Characterisation;
4. The transition from Roman to post-Roman and early medieval.

Extensive programmes of geophysical survey followed by targeted excavation would represent a significant forward step with regard to these agenda. Some of the unenclosed roundhouses identified by the NMP might be shown to be Bronze Age in origin (although these would be more likely to show as hollows or large pits: Gossip and Jones 2008), as might some of the more irregular or unusual enclosures. Geophysical survey can be expected to identify more of these features.

The National Mapping Programme in Cornwall has demonstrated that in broad terms HLC can be reliably used as a predictive model for identifying areas of prehistoric settlement: the enclosures are largely confined to Anciently Enclosed Land. More detailed investigation in areas like the Camel estuary hinterland might enable deepening and refining HLC. For example, were tracts of Anciently Enclosed Land where no enclosures have been recorded not in fact settled and perhaps used as rough ground or woodland in prehistory? Might division of Anciently Enclosed Land into more closely defined sub-types provide a more accurate predictive model?

One of the most important aspects of NMP mapping in the Camel estuary was the recording of later prehistoric and Romano-British field systems. Although their visible remains are not extensive it is nonetheless clear that they are for the most part on different alignments to the present early medieval and medieval-derived field pattern. It is also worth noting that enclosures are often dissected and overlain by present field boundaries. The current field pattern represents enclosure of the medieval open field system and clearly this paid no heed to the way the landscape was organised at the end of the Romano-British period. Why the Romano-British fields were abandoned and why the landscape was subsequently radically re-organised is a pressing question, as are the reasons behind the move from enclosed settlements to unenclosed hamlets. Further investigations (geophysical survey and excavation) around *tre-* and *bod-* settlements might provide more information on this poorly understood transition.

It is highly probable that future opportunities will arise for archaeological investigations in response to proposed developments in various parts of lowland Cornwall and the ten questions and four research themes listed above will serve as a research framework for such investigations. The framework should also inform the response to proposals and assist in the prioritisation of work where necessary. Reactive fieldwork of this sort has provided much important information in recent years on the prehistoric and Romano-British landscape in lowland Cornwall. By its nature, however, this sort of investigation is somewhat random; the sites are investigated because they are under threat, not because they might provide answers to key research questions. The results of the National Mapping Programme make a strong case for a far-reaching research-led programme of fieldwork aimed at elucidating the nature and extent of the prehistoric and Romano-British archaeological resource in lowland Cornwall.

Appendix 1: Enclosures in the Camel estuary hinterland

Very small enclosures (less than 0.1 ha)

Site no	*Site name*	*Grid reference*	*HER PRN no.*
2	Trescowe	SX 0486 7086	50156
3	Tresallyn	SW 8929 7335	50402
4	Higher Trevisker	SW 9053 7281	52103
5	Longcarrow Cove	SW 8957 7679	50295
7	Trescowe	SX 0513 7161	51995
8	Tregwarmond	SW 9825 7653	52061
9	Trevathan	SW 9934 7748	52068
10	Kivells	SX 0130 7632	50346
11	Trevisker	SW 9078 7286	52120
13	Middle Amble	SW 9880 7556	52095
15	Pawton	SW 9575 7049	52090
18	Trevoyan	SW 8661 7263	52183
19	Higher Hendra	SX 0355 8066	50330
21	Carclaze	SX 0048 7956	50438
22	Rosedinnick	SW 9111 6592	50515
23	Great Treburrick	SW 8689 7062	50372
27	Trewint	SW 9365 7697	50999
146	Trevoyan	SW 8670 7260	50420
147	Trehemborne	SW 8700 7298	52178
152	Tregella	SW 9018 7400	52114
157	St Cadoc Farm	SW 8832 7521	50289
158	Trevisker	SW 9078 7286	52120
170	Tregavone	SW 8966 7265	50386

Univallate enclosures

Site no	*Site name*	*Grid reference*	*HER PRN no*
Small enclosures (0.1 – 0.19 ha)			
32	Treglyn	SW 9741 7661	50991
34	Kivells	SX 0149 7634	50435
35	Carnevas	SW 8603 7300	50422
38	Tresallyn	SW 8921 7333	50404
41	Trevio	SW 8759 7134	50391
42	Tredrustron	SW 9630 7086	50487
44	Cransworth	SW 9645 6650	50567
45	Bodellick	SW 9505 7337	50997
48	St Kew	SX 0181 7641	50434
49	Tregilders	SX 0178 7405	50179
50	Blakes Keiro	SW 9634 7534	50994
51	Bozion	SX 0168 7044	50149
52	Trevathan	SW 9930 7750	52067
53	St Eval	SW 8725 6945	50503
54	Trevathan	SX 0014 7857	17941
55	Trescowe	SX 0495 7216	50165
58	Carnevas	SW 8592 7300	50423
59	Dinham's Bridge	SX 0316 7415	50182
60	Trehemborne	SW 8685 7300	50413
63	Hendra Cottage	SX 0266 7546	50439
65	Tredinnick	SW 9221 7062	50449
Site no	*Site name*	*Grid reference*	*HER PRN no*
Small enclosures (0.2 – 0.29 ha)			
62	Trescowe	SX 0508 7157	51993
68	Trevone	SW 8926 7517	52186
70	Tregavone	SW 9000 7265	50383
71	Tresallyn	SW 9819 7335	50401
72	Trenant	SW 9465 7921	50313
73	Treore	SX 0289 8035	50328
74	Pawton	SW 9565 7050	26225
76	Trembleathe	SW 8919 6959	50511
77	Killibury	SX 0190 7343	26021
78	Treore	SX 0235 8103	50324
82	Trescowe	SX 0493 7092	50156
129	Tregavone	SW 8986 7270	50387
155	Trevinnick	SX 0115 7900	51985
Intermediate enclosures (0.3 – 0.49 ha)			
153	Treore	SX 0275 8056	51992
171	Carruan	SW 9533 7922	72348
84	Penpont	SX 0090 7449	50173
85	Tredannick	SX 0154 7075	52003
86	Whitecross	SW 9609 7227	50486
87	Tregardock	SX 0514 8366	50334
89	Hal's Grave	SW 9595 7147	50485
90	Lower Treworder	SX 0129 7218	52006
91	Trewithen	SW 8912 7381	50395
92	Carruan	SW 9500 7894	52056
94	Hay	SW 9790 7049	50492
Intermediate enclosures (0.5 – 0.79 ha)			
96	Trevear	SW 9476 7116	50986
98	Hay	SW 9794 7033	50493
101	Lower Croan	SX 0210 7174	50152
156	Trevear	SW 9491 7125	50450
Large enclosures (0.8 – 0.99 ha)			
102	Scarrabine	SW 9769 7970	50338
103	Tregolds	SW 9175 7152	52126
106	Portquin	SW 9775 8010	50281
Very large enclosures (1 ha and more)			
107	St Mawgan-in-Pydar	SW 8735 6562	22061
126	Tregaverne	SX 0142 8076	50320

Double-ditched enclosures

Site no	*Site name*	*Grid reference*	*HER PRN no*
108	Trevilgus	SW 9400 7253	52109
109	Trerethern	SW 9126 7365	50446
110	Porthcothan	SW 8603 7227	50418
111	Smeathers	SW 9872 7605	52058
113	Tregirls	SW 9115 7610	52164
114	Tregorden	SX 0041 7386	50191
115	Kerketh	SW 8821 7303	50407
116	Trenouth	SW 9045 7030	50623
117	Kerketh	SW 8829 7300	50406
118	Higher Trevisker	SW 9056 7275	50461
119	Trevinnick	SX 0080 7875	17933

120	Gutt Bridge	SW 9824 7495	50998
154	Tregenna	SW 9661 7475	50591
160	West Park	SW 9456 7003	52139

Multivallate enclosures

Site no	*Site name*	*Grid reference*	*HER PRN no*
6	Trevilgus	SW 9398 7258	52112
122	Trevilgus	SW 9370 7273	52113
123	Hayle Farm	SX 0165 7732	50429
124	Middle Amble	SW 9889 7550	52094
125	Penpont	SX 0080 7484	50169
127	Trevisker	SW 8872 6859	22062
128	Trenouth	SW 9074 7005	52123
130	Higher Treworder	SX 0124 7300	50187
131	Chapel Amble	SW 9897 7574	50344
132	Bogee	SW 9099 6928	26543
133	Trequite	SX 0339 7655	50440
137	Pencarrow Rings	SX 0396 6999	26028
138	Trenance	SW 9234 7104	26437
139	Killibury	SX 0185 7365	17991
140	Tregeare Rounds	SX 0333 8003	17894

Enclosures with annexes

Site no	*Site name*	*Grid reference*	*HER PRN no*
12	Tresawl	SW9711 8002	52091
134	Trescowe	SX 0485 7082	50155
135	Carhart	SW 9589 7303	50598
136	Higher Hendra	SX 0350 8056	50331
46	Burgois	SW 9242 7290	52130
57	Tregilders	SX 0179 7412	17992
79	Porthilly	SW 9417 7525	50309
81	Tregwarmond	SW 9821 7658	50992
149	Three Holes Cross	SX 0131 7328	50184

Cliff castles

Site no	*Site name*	*Grid reference*	*HER PRN no*
141	The Rumps	SW 9340 8108	26312
142	Redcliff Castle	SW 8492 6965	21931
143	Park Head	SW 8415 7080	21781
144	Griffins Point	SW 8415 6647	21942
145	Winecove Point	SW 8542 7357	21790

Possible enclosures

Site no	*Site name*	*Grid reference*	*HER PRN no*
Very small enclosures (less than 0.1 ha)			
1	Middle Amble	SW 9877 7558	52097
14	Tregella	SW 9022 7403	52116
16	Killibury	SX 0173 7371	52009
17	Penhale	SW 9573 7242	52084
20	Three Holes Cross	SX 0078 7350	50194
24	Grafton	SW 8620 7146	50368
25	Bodieve	SW 9980 7408	50469
Small enclosures (0.1 – 0.19 ha)			
26	Great Treburrick	SW 8686 7072	50371
28	Penpont	SX 0061 7469	50170
29	Tregaverne	SX 0142 8082	50319
30	Trevarner	SX 0050 7257	50154
31	Quin Cross	SW 9659 7925	50989
33	Trevornick	SW 9242 6515	50520
36	Tregorden	SX 0035 7389	50190
37	Tredannick	SX 0139 7082	52005
39	Carhart	SW 9583 7302	52049
40	Polzeath	SW 9341 7849	52158
43	Tregorden	SX 0030 7391	50189
47	Trelights	SW 9834 7933	50339
56	Lellizzick	SW 9058 7743	50302
Small enclosures (0.2 – 0.29 ha)			
61	Burrow Park	SW 9780 7905	52055
64	Penpont	SX 0083 7452	50172
66	Ball	SX 0013 7337	50192
67	Treore	SX 0241 8105	50325
69	Porthmissen	SW 8922 7612	50293
75	Trescowe	SX 0509 7190	50164
80	Tredower	SW 9723 7550	50990
83	Efflins	SW 8540 7022	50376
148	Penpont	SX 0090 7460	50171
Intermediate enclosures (0.3 – 0.49 ha)			
88	Treburrick	SW 8598 7043	50374
Intermediate enclosures (0.5 – 0.79 ha)			
93	Three Holes Cross	SX 0070 7365	50193
95	Tregonce	SW 9314 7395	50456
97	Treleigh	SW 9035 7067	26473
99	Bodellick	SW 9511 7305	50467
100	Trewithen	SW 8920 7410	50393
Very large enclosures (more than 1 ha)			
104	Higher Hendra	SX 0309 8057	50327
105	Pinkson	SW 9488 7340	26479
Double-ditched enclosures			
112	Carclaze	SX 0016 7607	51983
121	Bozion	SX 0190 7038	52002

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Excavations of a Roman and post-Roman site at Penlee House, Tregony: a cremation burial and other burning issues

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with contributions by SUE ANDERSON, WENDY CARRUTHERS, ROWENA GALE, HENRIETTA QUINNELL, ROGER TAYLOR and CARL THORPE

During April 2005 Cornwall County Council's Historic Environment Service undertook a programme of excavation in the grounds of Penlee House, Tregony, prior to development.

A geophysical survey showed the presence of a rectilinear ditched enclosure and various pit-type anomalies. Excavation revealed a possible funerary enclosure of the Romano-British period. Two pottery vessels containing cremated human remains were recovered. Subsequent analysis showed that they belonged to a single individual, an elderly female, who had lived and died in the second century AD. This was the first modern excavation of a Roman-period cremation from Cornwall.

Pits within and adjacent to the enclosure were found to contain evidence of burning, charcoal and large quantities of charred cereal grains, and are interpreted as corn dryers. A post-Roman radiocarbon date was obtained from grain within one of the pits.

A programme of archaeological recording at Penlee House, Tregony, required as part of the planning consent for development, was undertaken in April 2005 by Cornwall County Council Historic Environment Service projects team. The work followed an archaeological assessment (Lawson-Jones 2004) and a geophysical survey of the site (GSB Prospection 2004). This paper reports on the investigations and subsequent analyses and sets the results from the site in their wider context.

Location and historic setting

Penlee House is located within the historic settlement of Tregony at NGR SW 9265 4488 (Fig 1). The underlying geology of the area is that of interbedded sandstones, siltstones, and slates, part of the Portscatho Formation of the Gramscatho Group of sedimentary rocks laid down in the Upper Devonian (Bristow 1999). These rocks have weathered to form loamy soils over weathered shale rubble of the Denbigh 2 type (National Soil Resources Institute 2004).

A number of small streams drain into the River Fal immediately to the west of Tregony. These tributaries have alluvium-filled valley bottoms and some were probably formerly tidal creeks. The Fal itself was tidal to Tregony until the end of the medieval period and prior to the silting of the river caused by tin streaming in the Fal catchment Tregony was an important port (Sheppard 1980, 27). The site itself lies on the eastern side of a broad flat-topped ridge, the western end of which

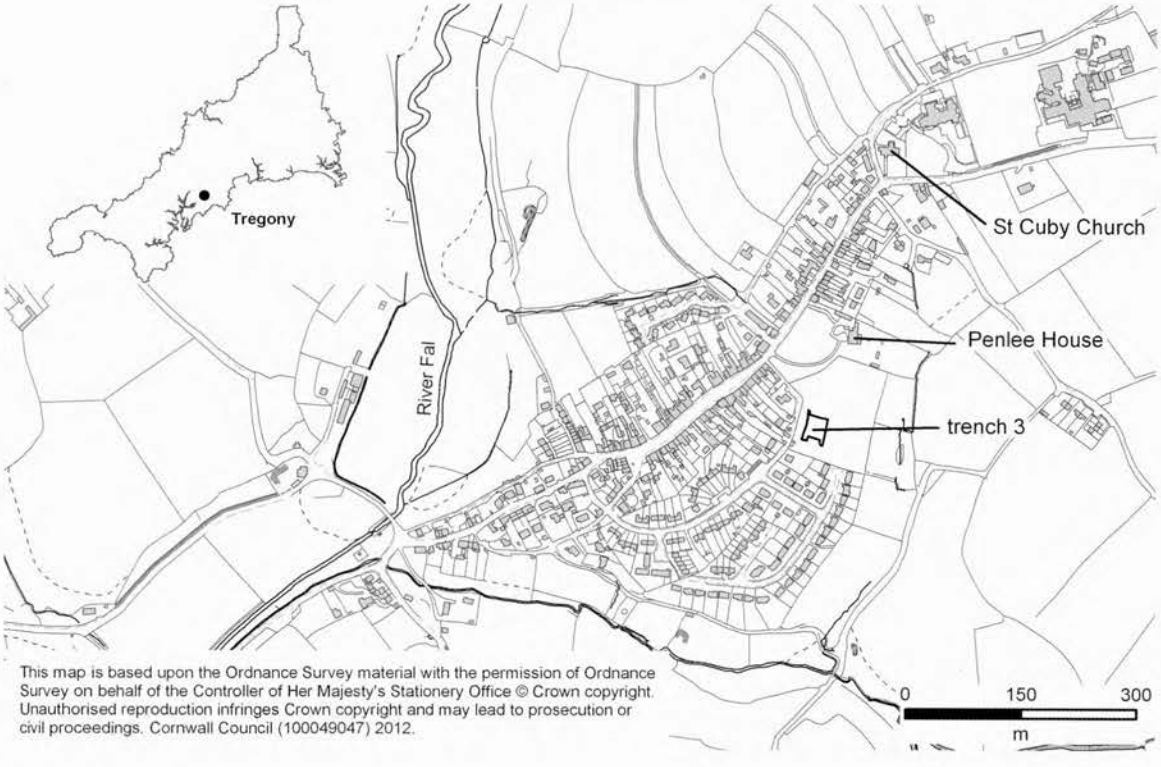

Fig 1 Location.

(formerly the site of a Norman castle) overlooks what was in the earlier historic period probably the highest tidal point on the Fal and subsequently the lowest bridging point (*ibid*) Immediately to the east of the site lies a small stream valley fed by a number of springs.

The archaeological assessment of the Penlee site (Lawson-Jones 2004), which in total covered 3.25ha, identified an ornamental landscape comprising the nineteenth-century Penlee House (Listed Grade II) and associated garden features. The central and western part of the survey area, a field to the south of the house, retained its character as Anciently Enclosed Land (Cornwall County Council 1996). It was within this latter part of the site that the majority of archaeological features and anomalies were identified.

The investigations

A gradiometer geophysical survey was commissioned and undertaken by GSB Prospection (2004) as part of the assessment of the site. This identified a number of anomalies indicating archaeological features, including an enclosure, another possible enclosure, removed boundaries and a possible track, ditched features, and two pits (Figs 2 and 3).

The first phase of archaeological work consisted of machine removal of topsoil and subsoil under archaeological supervision in the area of a rectilinear enclosure and linear and pit-type anomalies identified by the geophysical survey (Trench 3). The soil was stripped cleanly with a toothless bucket to a level at which archaeological features or layers were visible. A requirement not to disturb mature trees, subject to Tree Preservation Orders, growing along the western side of the site, limited the area which could be excavated. On completion of the soil strip there was a rapid review of requirements for further archaeological recording, resulting in a programme of full excavation.

Two other evaluation trenches (1 and 2) were also opened (Fig 2) but yielded little of interest (S R Taylor 2006).

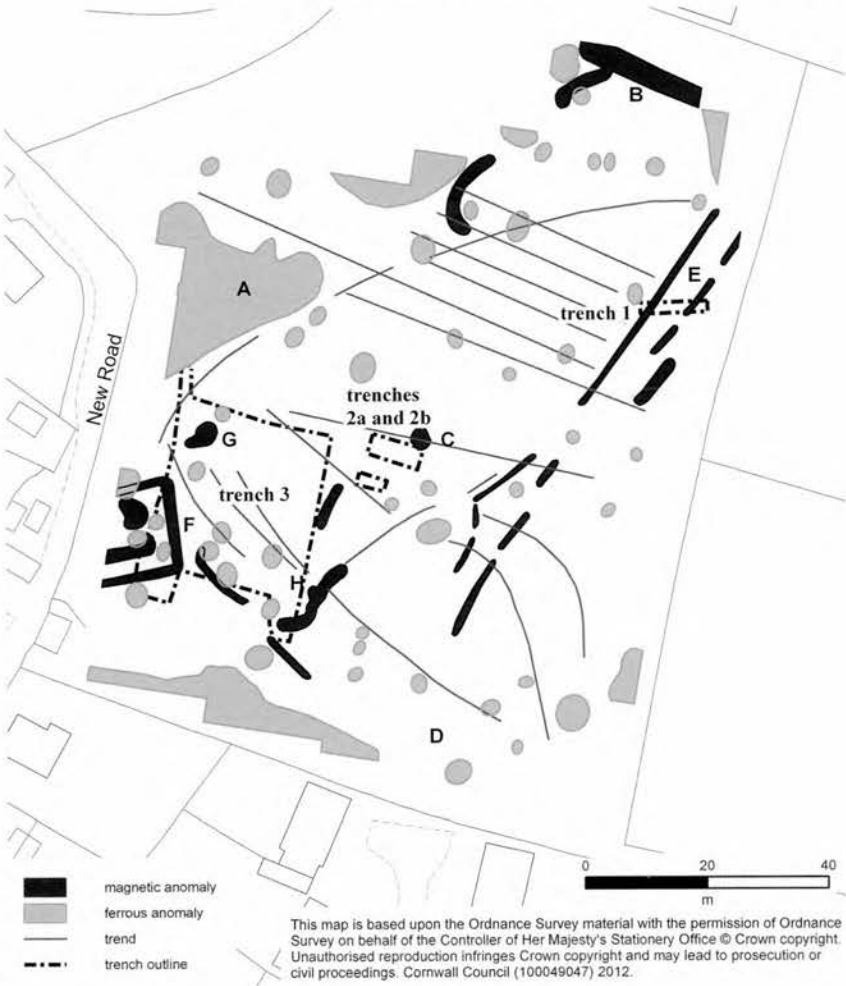

Fig 2 Features identified by geophysical survey and the location of trenches.

Excavated features

Throughout the text of this report, archaeological deposits and layers are presented in round brackets, (301), and cut features – pits, postholes, and ditches, for example – within square brackets, [333]. Radiocarbon dates are expressed at the 95 per cent confidence level unless otherwise stated.

Trench 3

This consisted of a large open area of 784 sq m at the western end of the field. The trench was positioned to investigate a rectilinear anomaly (F) revealed by the geophysical survey, a large pit-type anomaly nearby (G) and linear anomalies to the south east of the rectilinear feature (Figs 2 and 3).

Excavation of the topsoil (300), ploughsoil (301), and subsoil (302), revealed, at a depth of approximately 0.9m, a clean natural surface, predominately of fractured mudstone, but interspersed with patches of weathered clay. A number of features cut this surface, including sections of a ditch, [308] and [331], which corresponded to the rectilinear geophysical anomaly (F) and formed an enclosure, 305, only the eastern half of which was exposed by the trench (Figs 3 and 4). Within this enclosure were several pits and short linear features.

Another pit, [333] / [335], to the north of the enclosure, corresponded to anomaly G (Figs 3 and 7). The only other feature revealed within trench 3 was a narrow linear ditch, [397], following a west-north-west – east-south-east alignment (Fig 3).

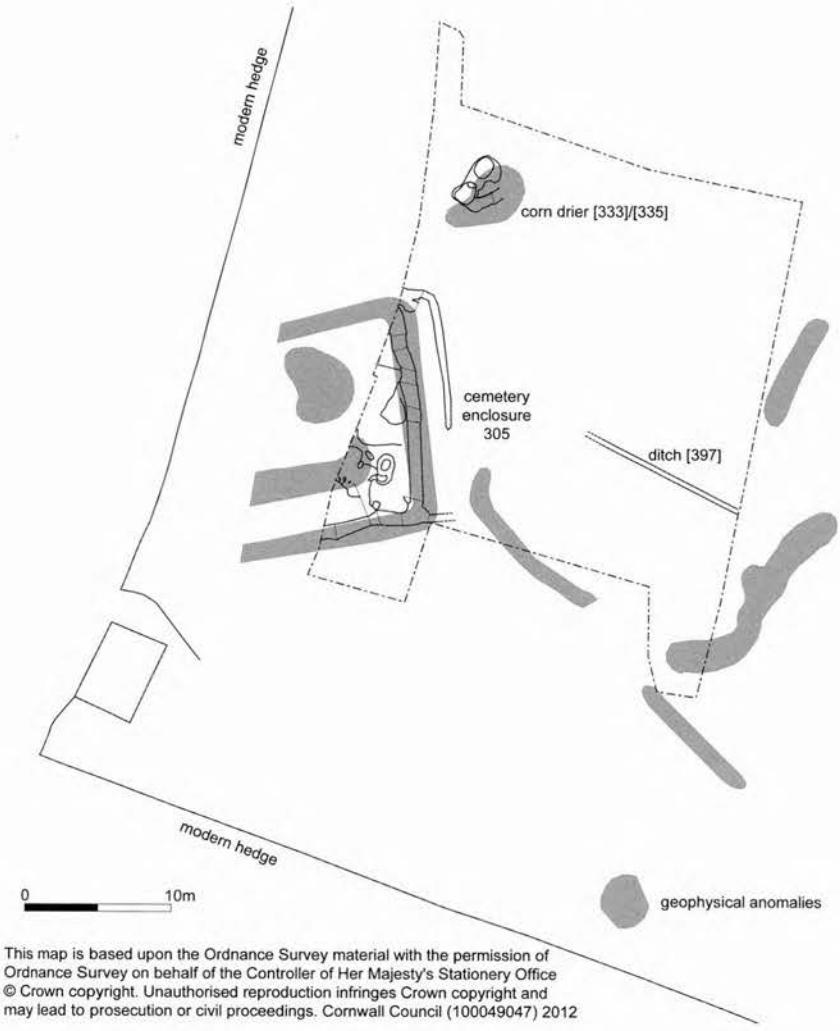

Fig 3 Trench 3 plan with details of geophysical survey.

The linear anomalies indicated by the geophysical survey to the south east of enclosure 305 were not located.

ENCLOSURE 305

This rectilinear enclosure was formed by a shallow ditch with the two sides revealed by the excavation almost aligned with the cardinal points of the compass (they are oriented 8 degrees anti-clockwise of these points). The extent of the enclosure revealed by excavation measured 13m by 7.5m but the geophysical survey indicates that it extends westwards for at least another 4m (Figs 2 and 3). It is possible that the current hedge boundary marks its north-western extent.

Excavating and interpreting the enclosure was rendered more difficult than it might have been by the presence of large numbers of gullies and scarps within it, representing root runs, tree bowls and possibly animal burrows.

Ditches [308] and [331]

The ditches forming the enclosure, [308] and [331], were of similar dimensions (Figs 4 and 5). Ditch [308], running north-south, was 1.2m wide and 0.35m deep and was exposed over a length of

almost 15m. The sides were stepped and the base was flat. Ditch [331], revealed over a distance of 7.3m, formed the east-west section of the enclosure ditch and was 1m wide and 0.2m deep. It had straight sides and an irregular concave base. Both sections of ditch contained a single fill (309) / (332).

There was no break between the two ditch sections and no relationship could be observed between the two identical fills in section, indicating that they were contemporary and that the ditch was one continuous feature. Both fills were sealed by subsoil layer (302).

The enclosure ditch was not entirely excavated: three slots were dug from [308] and two from [331] and the intersection between the two was also excavated. One find, a fragment of *tegula* with two surfaces (**T3**; Quinnell below), was recovered from fill (309) in ditch [308].

Features [343], [345], [347] and [349]

Immediately to the north of enclosure 305, a gully emerged from under the western baulk (Figs 4 and 5). Prior to excavation it appeared that this was

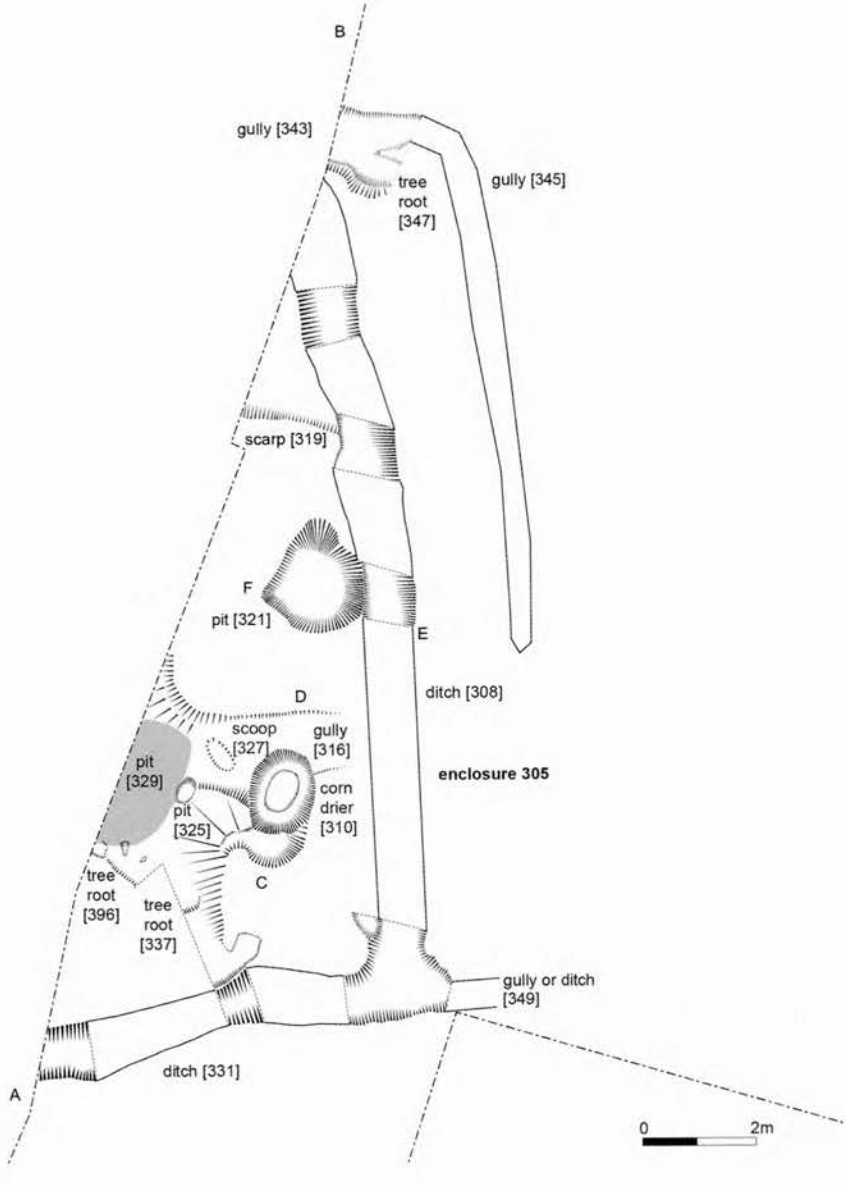

Fig 4 Enclosure 305 and other excavated features in trench 3.

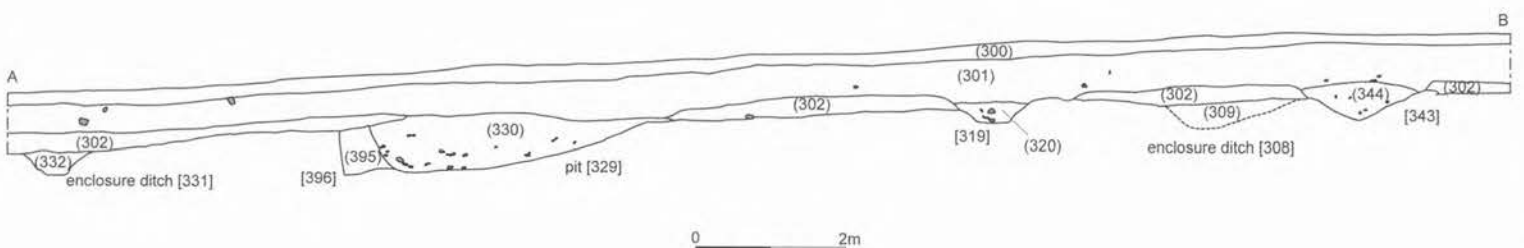

Fig 5 Enclosure 305, section.

a single ditch, [345], which turned south to run parallel to the line of enclosure ditch [308] 1.7m to the east. However, excavation of a slot against the western trench edge revealed that the linear feature diverged into two distinct features, [343] and [347]. The irregularity of the base and sides of [347] suggests that it was a natural feature, probably a tree bowl (below). Feature [343] was the continuation of [345] to the west. Although not linked stratigraphically it seems probable that [343] / [345] and [308] / [331] were associated. The fact that [343] could be seen to cut subsoil (302), while ditch [331] lay beneath it and was therefore earlier, suggests that [343] followed a bank that remained extant long after [331] had silted up and layer (302) had formed.

Running east from the south-eastern intersection of ditches [308] and [331] was a section of unexcavated ditch, [349]. Although it appeared to peter out it is possible that it curved to the north to link with [345]. No stratigraphical relationship between the fills of [308] / [331] and [349] was observed and they are assumed to be contemporary.

Pit [321]

Pit [321] lay within the enclosure, adjacent to, and cutting, ditch [308] (Fig 8, middle). It was circular at the top and measured 1.6m in diameter. It was 0.75m deep with the base more oval in shape. The sides ranged from near vertical to steep and were often irregular. The pit contained two fills, neither of which contained finds or significant amounts of charcoal.

Pits [325] and [329]

Pit [329] was partially excavated. It lay against the western edge of the trench and was revealed as a roughly semi-circular feature extending 1.3m into the trench with a maximum north-south diameter of just under 4m (Figs 3, 4, and 5). Gully [316], up to 1.3m wide and 0.2m deep, ran into the pit with no discernible change in fills. Another scarp (unnumbered) ran from the south-east corner of the feature, again with no apparent change in fills. The sides of pit [329] ranged from steep to gradual and the base was irregular and contained numerous hollows that were interpreted as root holes. It contained a single fill, (330), from which a piece of worked flint was recovered.

Initial interpretation of pit [329] was that it represented a very large tree bowl, with the associated gullies deriving from radiating roots. Comparison of the planned feature with the geophysical survey (Figs 2 and 3), however, suggests that it may have formed the eastern end of a linear feature that ran beyond the western edge of trench 3 for a further 6m. In either case it appears to have been modified subsequently by a tree or trees growing within it.

Cut into the eastern side of [329] was a small pit, [325]. This contained two complete pottery vessels. The pit was oval in plan, measuring 0.45m by 0.3m and was 0.3m deep. Although the vessels protruded above the level of the observable cut into fill (330), cut [325] was not seen in this deposit.

The larger vessel, **P1**, is a jar (Figs 6, 9 and 17) probably of late second century AD date. It is of a gabbroic-type fabric and contained fragments of cremated human bone, the remains of an elderly woman (Quinnell, below; Anderson, below). A radiocarbon determination of 1679 ±34 BP, cal AD 256–429 (95 per cent probability) (Wk-19958), was obtained on cremated bone from vessel **P1**.

The second vessel, **P2**, was recovered whole from the same feature. This was a small jug with a strap handle (Figs 6, 9 and 18) resembling South-East Dorset black-burnished ware but made of gabbroic clay from the Lizard. It is also likely to be of late second century AD date. The vessel was also found to contain cremated human bone, additional remains of the same elderly woman found in **P1** (Quinnell, below; Anderson, below).

Miscellaneous cut features

Within enclosure 305 a number of cut features were identified that were not easily interpreted or were of natural origin.

A short length of a linear ditched feature, [319], was half sectioned at the northern corner of enclosure 305. It ran from the edge of enclosure ditch [308], which it appeared to respect, to the edge of the trench 1.9m to the west. It was 0.9m wide with a straight side to the south and a concave base and had a maximum depth of 0.18m. However, it appeared to cut through subsoil (302) and thus was later than enclosure ditch [308] whose fill, (309), lay beneath this deposit.

Two features – [337] and [396] – at the southern edge of pit [329] were identified in section but their amorphous shape and root-pocked bases suggested that they were large tree bowls. A shallow oval scoop [327] lay in the bottom of pit [329] and was interpreted as the base of an animal burrow (not shown).

*Fig 6 Cremation vessels **P1** and **P2** during excavation.*

PITS WITH CHARRED GRAIN

Three large pits, each containing burnt primary deposits which included substantial amounts of charred cereal grains, were also excavated within trench 3. One of these, pit [310], lay within enclosure 305 (Fig 4). The other two, [333] and [335], lay adjacent to each other 8m to the north east of the enclosure (Fig 3). The geophysical signatures of these two groups of features were similar to a further anomaly recorded within the enclosure but outside the excavated area (Fig 3).

Pit [310]

Towards the south-east corner of enclosure 305 was a large sub-oval pit, [310] (Figs 4, 8 and 19), 2.1m by 1.1m, with an asymmetric profile. The southern end of the feature was relatively shallow, with a stepped side. The northern end was much deeper and became more circular. At a depth of 0.63m the sides appeared to have levelled off to form a flat base, cut into which was a smaller oval depression of the same phase as the pit but numbered separately, [318], which was 0.8m by 0.5m and 0.05m deep. It was filled by a burnt deposit (315) which contained abundant charcoal and charred cereal grains, predominantly oats (Carruthers, below), and one piece of abraded gabbroic pottery, possibly prehistoric (Quinnell, below). This deposit lay over an area of burnt natural (323) in the base of the cut that had become reddened as a result of oxidisation through heating. Above this, pit [310] contained two fills: a layer of re-deposited natural (314) and a deeper upper fill (311). This upper deposit appeared to be cut by a slightly angled pit or posthole [312], 0.85m wide, which was itself filled by a silty clay (313) that was much stonier than the surrounding deposit. The pit or posthole [312] was only observed in section.

On the northern side of the pit a small gully, [316] ran east-west and was observed in section to cut the upper fill, (311). This gully ran into pit [329] (see above).

Pits [333] and [335]

This group of two pits lay 8m north of the north-east corner of enclosure 305. They were shown as one large anomaly by the geophysical survey (Figs 2 and 3) but on cleaning the feature it became apparent that it comprised two intercutting pits, [333] to the north and [335] to the south, and a

gully, [340], running north east from the eastern side of [335] (Fig 7).

Pit [335] was cut by [333] and was therefore earlier. It consisted of an oval cut 1.6m long, 1.3m wide and 0.7m deep, with near vertical sides and a slightly concave base (Fig 8). There was a hint of a recut within the upper fill, (303), although this was very insubstantial and the possible cut (represented by fill (336)) was not given a separate context number. Fill (336) produced two items of stone, a water-rounded pebble of metamorphosed quartz and a piece of burnt granite. Fills (303) and (336) were near-identical and both sealed a burnt deposit (339) in the base of the pit. The deposit contained abundant charcoal, a large number of charred cereal grains, predominantly barley (Carruthers, below), and a small piece of burnt clay. Beneath deposit (339), at the base of cut [335], the natural had been reddened by oxidisation caused by heat from a fire.

Running into the south-eastern side of the pit was a steep-sided asymmetric gully, [340], stepped to the north, and irregular to the south, which was 0.82m wide, 0.5m deep and excavated over a length of about 1.2m; the unexcavated section of the gully continued to the north east. The gully contained a single fill, (341), which contained three flints, two of which were scrapers. These were all found at the base of the deposit. Since they were found together this could indicate that the gully is prehistoric. However, it is possible that the gully cut fill (303) of pit [335] (its fill represented by fill (336) in the section) and that it therefore postdates pit [335]. As the datable finds recovered from pits [333] and [335] were of Romano-British date it is likely that an earlier feature was disturbed in the cutting of the gully, re-depositing the flints at its base.

Pit [333] was oval, 2.5m long, 1.5m wide and 0.48m deep. It had steep, regular sides and a concave base and cut the upper fill of the adjacent pit [335] (Fig 8). The upper fill (334) of [333] contained occasional lumps of re-deposited natural clay. Finds from (334) included a piece of curved *imbrex* tile (**T2**) and an obtuse-angled tile fragment, **T1,** possibly from a box flue, with an incised irregular 'scribble-mark' on one outer surface (Figs 10 and 11); Quinnell, below). A body sherd (**P4**),

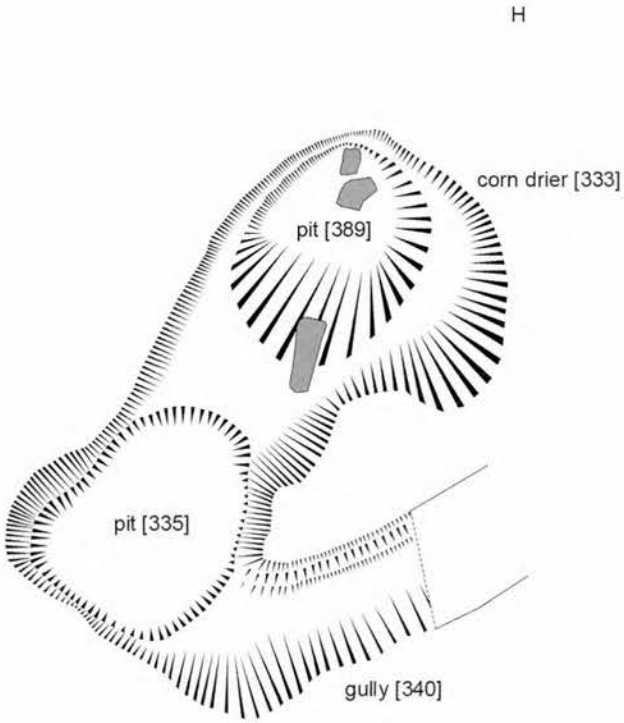

Fig 7 Plan of pits [333] and [335].

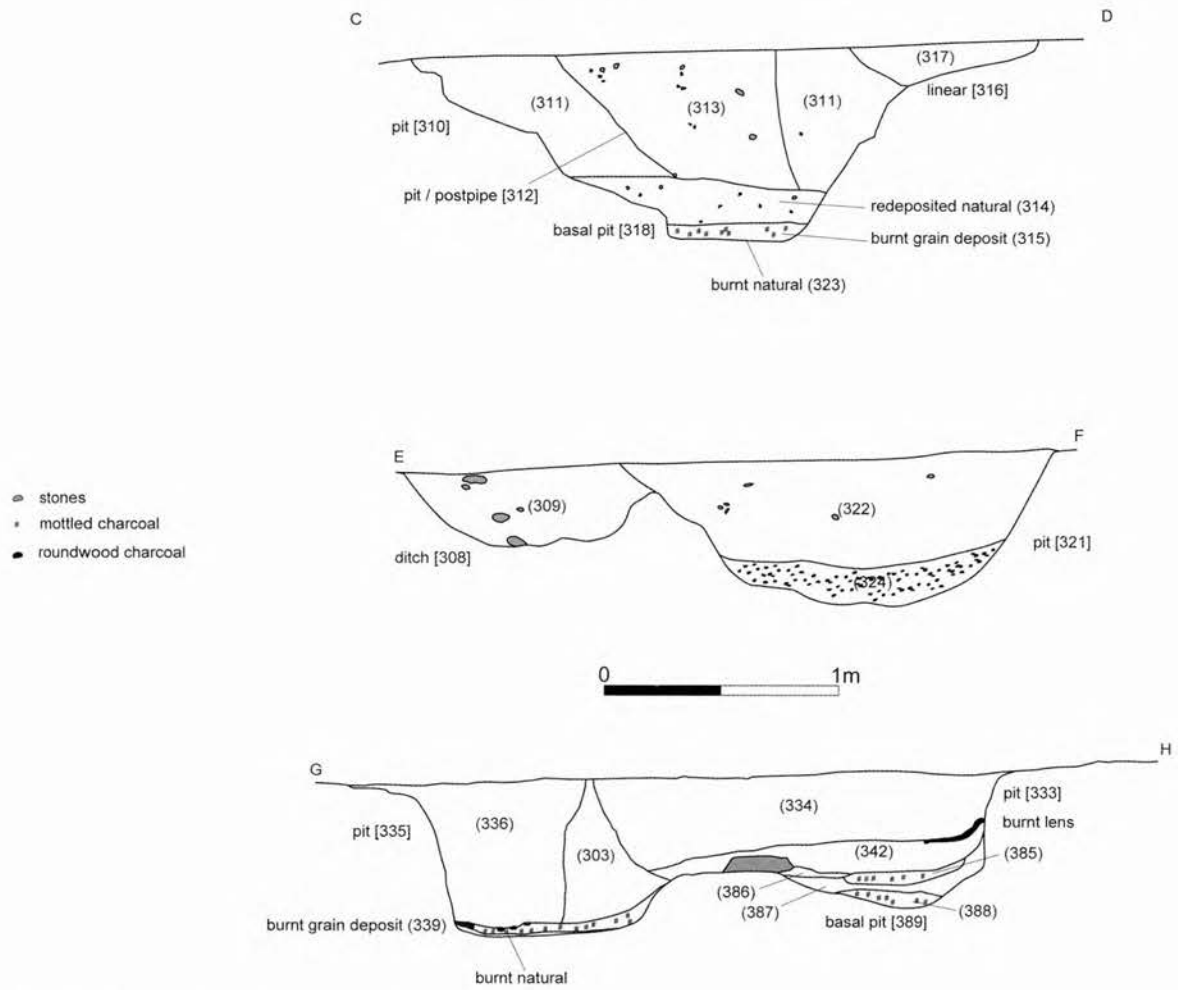

Fig 8 Section through pits containing charred grain.

possibly from a Gaulish amphora of the late first or second century AD, was also recovered, together with a gabbroic upper body sherd with incised linear and zigzag decoration, **P3** (Fig 9), of a type in use between the mid-second and fifth century AD (Quinnell, below). In addition, an incomplete circular slate disc with perforated centre was found (Fig 10) (Quinnell, below).

Below this layer, the interface of which was marked by a thin charcoal lens at the northern end of the pit, was deposit (342). This contained a large angular slate and three large igneous, possibly granitic, rocks.

Below deposit (334) a burnt layer (385) and ashy fill (386) appeared to form the upper fills of a depression (separately numbered [389]) in the base of [333] (Figs 7 and 8). This depression was oval, 1.45m long, 1.1m wide and 0.16m deep. It had slightly convex sides and a concave base.

Burnt deposit (385) was a very dark brown silty clay that contained abundant pieces of roundwood charcoal, fragments of burnt clay and a large quantity of charred cereal grains. Ashy deposit (386) was a dark yellowish-brown silty clay containing some charcoal. Below these deposits lay another ashy fill (387), a brown silty clay

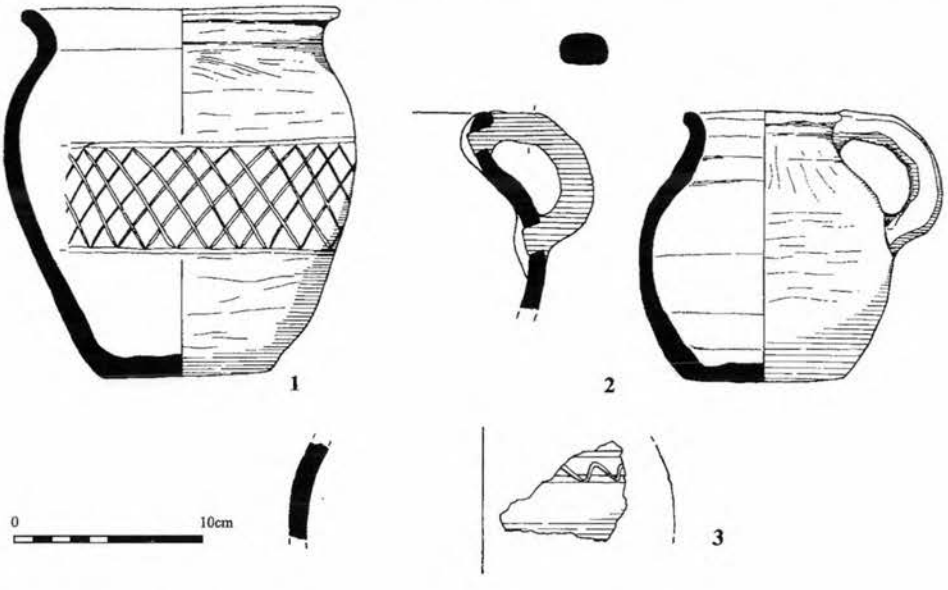

*Fig 9 Pottery from Penlee House. **P1**, **P2** and **P3**. Scale 1:4. (Drawings: Carl Thorpe.)*

containing frequent charcoal. The primary fill of the pit was another burnt deposit, [388], a very dark brown silty clay containing abundant charcoal (Gale, below).

A radiocarbon date of 1605 ±35 BP, cal AD 385–545 (95 per cent probability) (Wk 19959) was obtained on a sample of burnt grain from (385).

Summary of the excavated evidence

The principal excavated feature identified by the geophysical survey was the ditched rectangular enclosure 305. The excavation and geophysical results together indicate that the eastern side of the enclosure, represented by ditch [308], bounded an internal area measuring 13m from north to south. Assuming a square enclosure (although there is no evidence that this was the case), this would give an internal area of about 170 sq m.

Within the enclosure the geophysical survey identified two features: a large sub-circular pit-type anomaly approximately 5.5m by 3.9m, comparable in size and shape to pit group [333] / [335] lying to the north of the enclosure. South of this, following

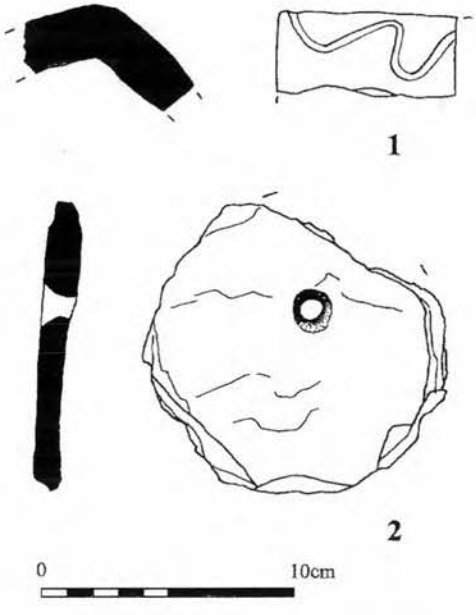

Fig 10 Tile fragment (1) and slate 'pot lid' (2). Scale: 1:3. (Drawings: Carl Thorpe.)

an east-west alignment, was a linear anomaly more than 8m long and 2m wide. The latter widened to the east, coinciding with the location of pit [329], suggesting that the pit lay at the eastern end of a wide linear cut feature.

Few stratigraphic relationships were observed within the enclosure. The section along the western side of trench 3 (Fig 5) showed that subsoil deposit (302) sealed the enclosure ditch fills (309) and (332) but was cut by pit [329], indicating that the pit was later than construction of the enclosure. Deposit (302) does partially overlie the fill of [329] but this may be the result of trampling over deposit (302). The fill of gully [316] could not be differentiated from that of [329] and their chronological relationship is therefore unclear. The gully cut the upper fill (311) of pit [310]. The stratigraphy therefore suggests that gully [316], and possibly pit [329], are later than pit [310]. However, the dating evidence obtained from the external pits [333] and [335], which pit [310] resembles, and the cremation burial cut into [329], suggests that this interpretation is erroneous. A possible order of events is as follows: pit [329] was created; pit [325] was cut into the side of it; a tree, possibly planted, grew in [329] and created [316] which cut the fill of [310]. This sequence would explain the fills of [329] and [316] being similar in that both formed after the tree and roots decayed.

Pit [310] had a pit or large posthole [312] cut into the fill.

Prehistoric and Romano-British finds

Henrietta Quinnell, with petrographic comment by Roger Taylor

This report examines the ceramic finds from the excavation, including the two whole pottery vessels.

Prehistoric pottery

(a) *Not illustrated.* (302) subsoil in trench 3. Simple rim, 15g, battered and abraded, in a distinctive hard gabbroic admixture fabric. Roger Taylor confirms the identification of the fabric and points out the unusual nature of the admixture inclusions: angular to sub-angular rock fragments, probably foliated greenstone, with dark green amphibole and white altered feldspar, 1–6mm. The fabric is of the general type used in Middle Bronze Age Trevisker vessels (Parker-Pearson 1990) and the rim is appropriate in type for this period.

(b) *Not illustrated.* Trench 3 unstratified. Two joining body sherds 13mm thick, 69g, soft, only slightly abraded. Roger Taylor confirms the fabric as gabbroic. Its general appearance and finish suggest it is not Roman but it is otherwise not closely datable within the prehistoric period.

(c) *Not illustrated.* (315) in pit [318]. Soft abraded gabbroic fragment 2g, not closely datable.

Roman-period pottery

P1 (Figs 6, 9 and 17) (326) in pit [325]. Cooking pot 198mm high and 187mm wide at girth, which is slightly wider than the rim. Weight 1454g after conservation. Cubic capacity below neck approximately 2.4 litres. Found complete and containing cremation. Handmade from a stream or estuarine clay with few distinctive inclusions, from a source which could be local to the site (R Taylor), but visually similar to gabbroic fabric. Generally oxidised 5YR 6/4 light reddish brown throughout but with some reduced patches, 5YR 4/2 dark reddish grey, on neck and shoulder and inside neck. The vessel has been finished by rough burnishing and its girth incised with a zone of incised lattice in a right-angle pattern. This pattern of incisions was largely functional, providing grip around the girth. It is a poorly-made vessel that gives no indication of any use before deposition with the cremation. Its lower outer wall displays 'spalling', the cracking away of the outer surface, due to poor manufacture, which may have occurred during the firing process. The vessel may be regarded as a 'second'. Inside, the vessel is coated with a black residue around the girth. In places this contains one or two small pieces of cremated bone. This residue appears to be related to the deposition of the cremation: if this had resulted from a cooking accident residue would be expected to occur across the base. It is quite possible that a poorly-made vessel, judged too friable for durable domestic use and with its surface damaged, was chosen to contain the cremation.

The use of local clays for potting is very unusual in the Roman period in Cornwall, as most non-imports are made from gabbroic clays from the Lizard (Quinnell 2004, 5.6). Single vessels or very small quantities of local, non-gabbroic fabrics have

only been recognised so far on three other sites. A Type 20 bowl (P101) in GR.5 fabric from the St Austell granite was found at Trevelgue (Quinnell 2011, 191). Sherds, likely to be second or third century AD, come from Shortlanesend round near Truro (Williams 1980, 71), and others, possibly late third or early fourth century, from the enclosure at Little Quoit Farm, St Columb Major (Quinnell 2009–10a); in both the latter cases sources of clay close to the sites are suggested. In all three instances, as with **P1,** they are visually similar to gabbroic fabric. However, all four examples have been demonstrated to be non-gabbroic through microscopic petrographic study and it is probable that more non-gabbroic fabrics of the Roman period exist in other assemblages which have not been so studied.

The form and decoration of the vessel are very similar to South-East Dorset black-burnished vessels of the second century AD from the Poole Harbour area of Dorset; right-angle lattice occurs for a few decades at the end of this century (Holbrook and Bidwell 1991, 96). South-East Dorset wares appear in Cornwall in small quantities, as do pieces of the other principal black-burnished fabric, South-Western Dorset, which as yet has no specific source of manufacture located (Quinnell 2004, 105). The radiocarbon date (Wk-19958) from cremated bone contained within **P1** calibrates to AD 256–429 at 95 per cent probability, which is far later than the suggested parallels for the jar indicate. Certainly, if **P1** is accepted as a copy of a South-East Dorset black-burnished jar, its prototype is likely to have been later second century and its condition indicates that it was unlikely to have been in circulation long.

P2 (Figs 6, 9 and 18) (326) in pit [325]. This is of a type generally described as a jug, although, as with most Romano-British examples, it lacks a lip. Height 145mm, maximum girth 132mm, weight after conservation 852g. Cubic capacity below neck about 0.75 litres. The single handle, of rounded rectangular cross-section, springs from the rim and its bottom end has been inserted into the vessel girth with a 'mortice and tenon joint', both joining points forming slight protrusions. The vessel has been made from Lizard gabbroic clays (R Taylor), and is similar in fabric to the vast majority of domestic pottery from Cornwall. It has been roughly burnished, except around the handle. Patchy mixture of surface oxidisation and reduction, 5YR 5/4 reddish brown to 5YR 4/1 dark grey but oxidised throughout body. Small areas of wear and chipping around the rim indicate that it was used prior to its use as a cremation container. A hole, 40mm by 40mm, has been knocked in the vessel wall directly opposite the handle; slight cracks are present on the corners of the missing area reflecting the force of the removal blow. Such acts of potentially ritual 'decommissioning' occur in some Romano-British vessels, and are occasionally found in those used for cremation burials (Fulford and Timby 2001a), but have not previously been noted in Cornwall. There is no residue on its interior. It is probable that the cremated bone was put in a bag before insertion in the vessel to prevent its spilling out through the hole.

The form of the jug is similar to examples in a range of South-East Dorset Poole Harbour black-burnished ware vessels found from the late first and second centuries (Wallace and Webster 1989; Woodward *et al* 1993, Type 29, 235). A close comparandum from Greyhound Yard in Dorchester is no 226, deposited in the late second century (*ibid,* fig 144 and 264). Wallace and Webster (1989) point out that all decorated examples known to them have acute-angle lattice, the use of which ends during the late second century: they also emphasise that the dating for jugs is at present far from adequate. No black-burnished ware jugs are so far known from Cornwall, or indeed Devon, and **P2** does not have a decorated body, but the similarity of shape makes the link almost certain. **P2** lacks the pinched lip that many but not all of the black-burnished jugs have (*ibid*). A small range of handled vessels is known in gabbroic ware and almost all the forms can be traced back to black-burnished ware prototypes (Quinnell 2004, Type 26), with the main period during which imported forms were copied being the late first and second centuries. Probably the most similar piece in gabbroic fabric is an unpublished handle from Carvossa (Carlyon 1995, no 208, 39). Overall, a late second century date – which would conform to that suggested on typological grounds for **P1** – appears acceptable.

P3 (Fig 9) (334) in pit [333]. Standard Roman-period gabbroic fabric confirmed by Roger Taylor. Sherd 42g and fairly fresh, from girth of Type 4 jar (Quinnell 2004, fig 54, no 48; fig 55, no 59). The incised wavy line between two horizontal grooves occurs occasionally on such vessels and may be more a device to assist grip on the pot than a decoration. Examples at Trethurgy and

elsewhere (*ibid*, 114) suggest that such incision occurs throughout the currency of Type 4 jars, from the mid-second century AD until the fifth century. A radiocarbon date from (385), below (334) in pit [333], calibrates to AD 385–545 at 95 per cent probability (Wk-19959).

P4 *Not illustrated*. (334) in pit [333]. Body sherd, 10g, moderately abraded, of fine oxidised fabric, interior 5YR 6/8 reddish yellow, exterior 7.5YR 7/4 pink. Paul Bidwell comments: 'The sherd does not match any of the flagon fabrics ocurring commonly at Exeter. There is a much better match with the fabric of Gaulish amphora types, which are fairly common in the south west; there is a possible Gauloise 4 from Trethurgy (Quinnell 2004, 5.3.10) and **P4** could represent another example of this type. The sherd is quite thin for an amphora, but the Gaulish amphorae could be quite small and thin-walled. The dating is later first century, after *c* AD 60, and second century; Gaulish amphorae do not seem to have continued very far into the third century. Even if this identification is in error and the sherd is from a flagon, it is most unlikely to be any later than the range of dates given above. Oxidised, unslipped flagons are very much of that period. Later ones are in grey ware or are colour-coated.

Roman tile

T1 (Figs 10 and 11). (334) in pit [333]. Edge of tile, forming 105° angle, 150g. Deep incised scribble mark on one side. Soft fired, 5YR 5/8 yellowish red. Roger Taylor identifies the fabric as gabbroic with feldspar, amphibole, magnetite, quartz and some fine muscovite flakes; moderate inclusions up to 5mm in size. As angled ridge tiles are completely unknown in the Roman world (Brodribb 1987, 27), the tile is probably an irregular box flue tile with the scribble mark intended, as is frequent on such tiles, to form a keying for plaster. The use of gabbroic clay for tile has only otherwise been identified at the Magor 'villa' (Quinnell 2009–10b), where forms include apparent box-flue tiles.

T2 *Not illustrated*. (334) in pit [333]. Fragment of curved *imbrex*, 45g. Soft fired. 2.5YR 5/8 red. Roger Taylor describes the fabric as a fine smooth clay body with pale buff to white pellets and streaks and a scatter of red pellets and sparse quartz and mica; he considers it similar to the Roman tile fabric from Hatherleigh in Devon (Wheeler and Laing-Trengrove 2006).

T3 *Not illustrated*. (309) in fill of rectangular enclosure ditch [308], 38g. Hard fired, 2.5 YR 5/6 red, probably part of *tegula*. Roger Taylor describes this as a fine smooth clay body with pale buff streaks and pellets and sparse quartz and a few sub-angular vein quartz fragments 1–5mm, and weathered feldspar; the base is sanded with coarse quartz grains and patchy sanding on the upper surface. He considers this generally similar to the harder variants of the Hatherleigh Roman tile fabric (*ibid*).

T4 *Not illusrated*. Trench 3 unstratified. Edge of *tegula*, 24g. Soft fired 5YR 6/8 reddish yellow. Roger Taylor describes the fabric as containing fine sub-angular to sub-rounded quartz sand less than 0.1mm with some larger rounded grains; also soft buff sub-angular altered aplite fragments, soft red fragments and a scatter of fine muscovite flakes. The inclusion of aplite indicates a source area containing igneous material and **T4** may be from the same area as a piece from Little Quoit Farm (below).

T5 *Not illustrated*. Trench 3, unstratified. Edge of *tegula*, 19g. Soft fired, 2.5 YR 5/8 red. Roger Taylor describes the fabric as similar to **T4** but with more larger quartz grains, many well rounded and slightly polished, but lacking aplite fragments; no useful comparanda are known and no specific source can be suggested.

T6 *Not illustrated*. Trench 3, unstratified. Chunk of tile or brick, 46g. Hard fired 5YR 6/8 reddish yellow. Roger Taylor describes the fabric as having abundant angular to sub-angular, fine-grained quartz, a scatter of larger angular quartz grains and a few flakes of muscovite. The fabric has a higher sand content than tiles 4 and 5 and is of a slightly different general fabric. Both he and John Allan (pers comm) consider that this may be post-medieval.

Comment on Roman tile and the dates of enclosure 305 and pit [333]

Roman tile has previously been found in Cornwall only at Magor 'villa' (O'Neil 1933) and at the enclosure at Little Quoit Farm, St Columb Major (Lawson-Jones 2009–10). The date range of Magor is not entirely clear but the excavator considered the construction phases belonged to *c* AD 150 to 230/40 (O'Neil 1933, 128–9). A rapid examination of some of the surviving Magor tile was carried out in 2003, which confirmed the large 'native'

Fig 11 Roman-period tile fragment ***T1****. (Photograph: Historic Environment Projects, Cornwall Council.)*

component identified by the excavator as gabbroic (Quinnell 2009–10b). This examination also showed some of the 'typically Roman' component to contain quartz sand and aplite. Quartz sand and aplite also distinguished one of the two fragments from Little Quoit Farm, which Roger Taylor considered as probably from the same source as the Magor pieces; no source can be suggested for the second Little Quoit Farm piece. **T4** from Penlee House may well come from the same source as the Magor and Little Quoit Farm material. Indeed, given the probable estuarine clay used for the tiles from these three sites, **T5** could also come from the same general source, its lack of aplite only reflecting variation in components of estuarine silts. This estuarine source with aplite cannot be located in Cornwall with any precision and could potentially lie across the Channel.

The similarity of **T2** and **T3** to examples from the recently identified tile source at Hatherleigh in mid-Devon is unexpected. It is stressed that the source of **T2** and **T3** as Hatherleigh cannot be proven: other pockets of similar clays to those at Hatherleigh exist in Devon and Cornwall and John Allan comments that some Cornish sources were used for ceramics in the post-medieval period. Hatherleigh, however, is a definite production site with wasters and with geophysical evidence for kiln sites (Wheeler and Laing-Trengrove 2006, 61). Its products have been identified with reasonable certainty at Okehampton, North Tawton and Bury Barton. It is suggested (R Taylor 2006) that Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) analysis would prove helpful and it is to be hoped that the Penlee House finds could be included in any future research programme. Unfortunately Hatherleigh is not dated, and the context of finds elsewhere is so far unhelpful chronologically, but there is circumstantial evidence to suggest a date in the first or second centuries AD.

It is apparent that there were several production sources for Roman tile in Devon and Cornwall, even if these were short-lived. Apart from Exeter with its military-period tilery and range of other fabrics (Holbrook and Bidwell 1991, 281), the work on the Hatherleigh site has identified four other groups sourced to broad areas in Devon (R

Taylor 2006). To these, for Cornwall, can now be added Lizard gabbro at Magor and Penlee House, estuarine clay with aplite (Magor, Little Quoit Farm and Penlee House), and at least two unknown sources, from Magor and Penlee House respectively (Quinnell 2009–10b). Except for the gabbroic fabrics, however, continental imports into Cornwall cannot be entirely ruled out.

The scatter of tile fragments at Penlee House indicates a structure using tile somewhere in the vicinity, although the small quantity present does not suggest this building was anywhere on the excavated site. In Devon there was a major move away from using roofing tiles (*tegulae)* in the third and fourth centuries (Holbrook and Bidwell 1991, 282) and it seems probable that most tile was manufactured before the later third century. This would accord with the broad late second to early third century dating for Magor. It is therefore probable that the scatter of tile at Penlee House pre-dates the late third century; this is in broad accord with the typological dating of pottery from the site. The date of cal AD 380–550 at 95 per cent probability (Wk-19959) from pit [335] appears far too late both for the pottery and for the gabbroic and probable Hatherleigh tile fragments and it may be suggested that both tile and ceramics are re-deposited from material already on the site. The date cal AD 250–430 at 95 per cent probability (Wk-19958) from **P1** again appears too late for both the pottery associated with the cremation burial and the tile in enclosure ditch [308], assuming the two are related. Ceramics and tile together suggest a late second to early third century date for the cremation burial, for contemporary on-site activity and for the structure in the vicinity from which the tiles of different fabrics may have come.

Roman-period stonework

Henrietta Quinnell, with petrographic comment by Roger Taylor

S2 (Fig 10). (334) in pit [335]. Roughly-trimmed slate disc, probably broken. Approximately 110mm across and 10mm thick. Straight perforation bored from one side with slight breakout fracture on the other. Roger Taylor confirms this slate as local, from the Devonian Portscatho group. This object is a type usually interpreted as a lid or cover for a jar. They are not particularly common during the Roman period in Cornwall, parts of only seven being found at the excavation of Trethurgy round where the local ceramic assemblage exceeded 450 vessels (Quinnell 2004, 6.5). There is some limited evidence that may indicate a greater frequency of use in the earlier (pre-AD 200) as opposed to the later Roman periods. An alternative interpretation to a pot lid would be as a worked-down piece of slate used in roofing; such slates, well known in Exeter (Holbrook and Bidwell 1991, 282), have only been found in Cornwall at the Magor 'villa' (O'Neil 1933).

Cremated bone

Sue Anderson

This report examines the cremated bone from two Roman vessels which were interred in a single pit, context [325].

Methodology

The pots were lifted with their contents and submitted to a conservator for excavation. The fills of both were excavated in spits approximately 3cm deep (Fig 12), the soil was sieved and the bone was extracted and washed.

The individual spits from each vessel were sorted into six categories: skull, axial, upper limb, lower limb, unidentified long bone, and unidentified. All fragments in the first five categories were counted and weighed to the nearest tenth of a gram, those in the sixth were weighed only. This allowed an average fragment weight to be calculated. Measurements of maximum skull and long bone fragment sizes were also recorded. These data are listed in the archive report, appendix 1 (S R Taylor 2006). Observations were made, where possible, concerning bone colour, age, sex, dental remains and pathology. Identifiable fragments were noted. Methods used follow the Workshop of European Anthropologists (1980) and McKinley (1994; 2004). Table 1 presents a catalogue of the cremated bone.

Quantification, identification, collection and survival

Table 1 shows the bone weights, percentages of identified bone from each burial and the

Fig 12 Cremated bone in vessel ***P1*** *during excavation. (Photograph: Sue Anderson.)*

Table 1 Percentages of identified fragments out of total identified to area of skeleton

Vessel	*Total wt (g)*	*% identified*	*% Skull*	*% Axial*	*% U limb*	*% L limb*
*Expected**			*18.2*	*20.6*	*23.1*	*38.1*
390	931.2	63.6	26.9	21.2	20.8	31.1
391	170.1	74.1	18.9	50.0	5.6	25.6
Total	**1101.3**	**65.3**	**25.5**	**26.2**	**18.1**	**30.1**

proportions of bone identified from the four areas of the skeleton (skull, axial, upper limb, lower limb). Expected proportions are provided in the first row, derived from McKinley (1994, 6).

The data in Table 1 show that skull and axial fragments are over-represented among the identifiable material, and that other areas of the skeleton are under-represented. It has been suggested that 'it should be possible to recognise any bias in the collection of certain areas of the body after cremation' (*ibid*). However, there is also some bias inherent in the identification of elements. McKinley notes the ease with which even tiny fragments of skull can be recognised and, conversely, the difficulty of identifying long bone fragments. The same is true of small fragments of rib and vertebra. These figures can therefore provide only a rough guide to what was originally collected.

Mays (1998, table 11.2) notes that the combusted weight of an adult skeleton has a mean of around 1500g for females and 2300g for males. The largest proportion of bone in this assemblage came from vessel **P1**, but it appears to represent only around half of the combusted weight of an average adult skeleton. The total weight from both vessels would represent approximately 73 per cent of an average female skeleton.

The cremation burial

No duplication was observed amongst the fragments from each vessel and it is likely that the two vessels contained the remains of a single individual (Table 1). The homogenous appearance and size of the bones seem to corroborate this.

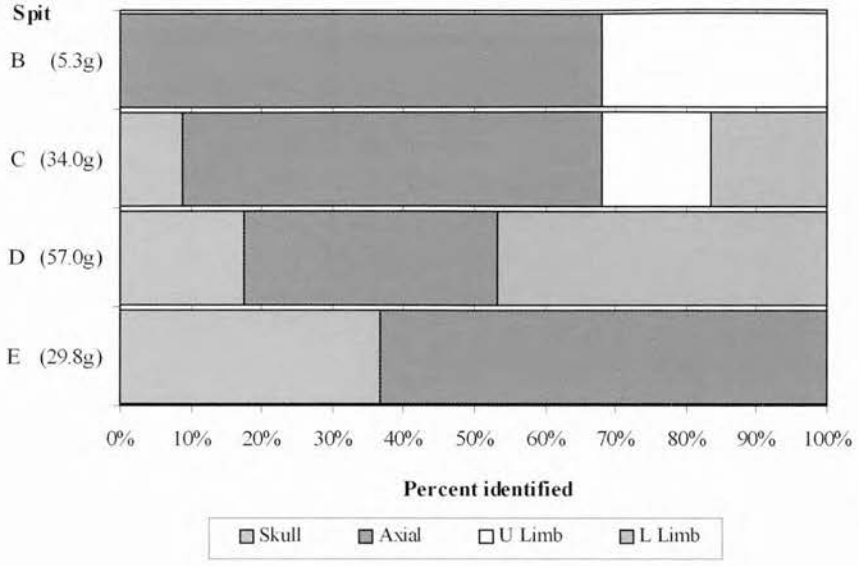

*Fig 13 Proportions of skeletal area by spit in cremation vessel **P1**.*

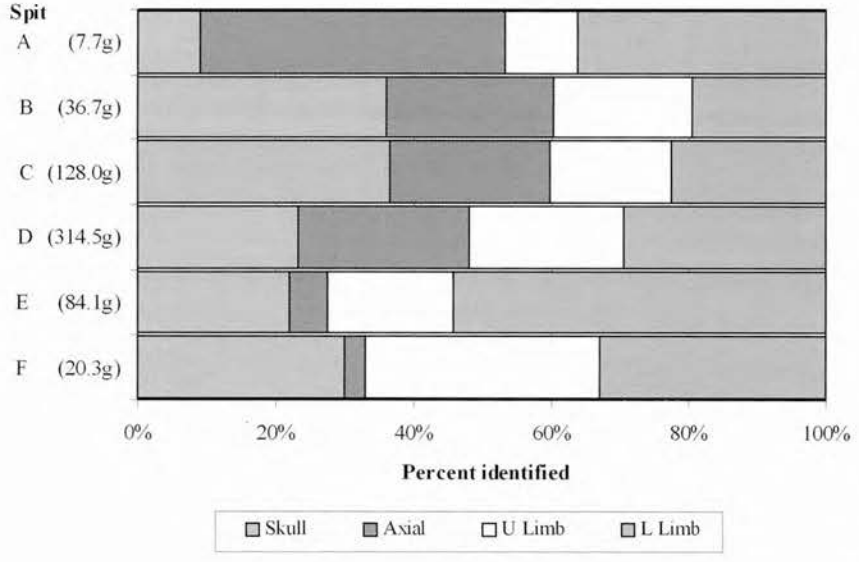

*Fig 14 Proportions of skeletal area by spit in cremation vessel **P2**.*

Based on combined evidence from both vessels, the cremated remains are those of a mature adult female. Sexing was based on the sciatic notch – largely intact in the left innominate fragment contained within vessel **P2** – and also the general size and gracility of the bones. Epiphyseal fusion had been completed well before death and there was some evidence for ligamentous ossification which may indicate an older individual. The anterior edges of the surviving vertebrae were unaffected by osteophytosis, although the rib facets appeared to have minor new bone growth at the margins. The few fragments of dental remains showed no evidence for disease and no other osseous pathological changes were noted.

The vessels were excavated in spits, which allows for the relative proportions of the four main skeletal areas to be compared. Figures 13 and 14

show the results of this (based on percentages of identified fragments by weight) for those spits containing more than 5g of identifiable bone.

Elements from all parts of the body are represented throughout vessel **P1**, suggesting that the pattern of collection was more likely to be due to convenience than to any ritual requirements. However, it is interesting to note that the proportion of axial skeleton increases from the bottom to the top of the larger pot **P1** and is almost overwhelming in the smaller vessel **P2**, perhaps indicating that the latter was used when the larger one was filled, and that the axial skeleton was being focused upon at that point. It also contained fragments from the back of the skull, whereas **P1** contained fragments from the front and the face area. There was markedly less limb bone present in the smaller **P2**, although those fragments which were present were relatively large.

The degree of fragmentation, based on average fragment weight, can also be compared between the spits in these two vessels. In **P1** the largest fragments were located in the central spits (C-E) of the vessel, while in **P2** they were closer to the bottom. The much greater weight of bone in the larger vessel may have crushed some of the underlying fragments, as it might be expected that bigger pieces of bone would be more noticeable amongst the ashes of the pyre and consequently picked up first. Some evidence for this can be seen in inverted vessel cremation burials of Bronze Age date, where the largest, most intact fragments are often located at the top; that is, within the vessel base.

The majority of bone in this group was fully oxidised and cream to white in colour, although a few fragments from the back of the spine were blue-grey, indicating incomplete oxidation. The presence of a high proportion of white bone indicates firing temperatures in excess of about 600 degrees Centigrade (McKinley 2004, 11). Mays (1999, 159) noted that the uniformity of colour in the surviving bone at Ardleigh in Essex may have been due to poor survival of less well cremated bone. This may be one reason for only three-quarters of the skeleton surviving here. Another factor to consider is that poorly cremated black and blue-grey bone may have appeared very similar to charcoal fragments amongst the ashes and perhaps would not have been picked out as a result.

Summary and discussion

The two vessels from pit [325] contained a minimum of one mature adult female. No evidence was observed for the inclusion of other individuals or animal remains. There was little evidence for pathology in this skeleton, beyond the typical slight degeneration in the joints of the spine which is a common finding in older adults.

The total weight of bone from the two vessels suggests that the entire skeleton was not present in the burial. This may be due to incomplete collection, poor preservation of incompletely cremated material following burial, or possibly retention of some fragments as a *momento mori*. It has been suggested that fragments were sometimes kept back for burial with another family member and that this is one reason for the appearance of a few fragments of additional individuals in some cremation burials. No evidence of such a practice was found in this burial, however.

Some insight into the cremation ritual can be gained based on the evidence provided by excavation of the vessel fills in spits, the colour of the bone and the degree of fragmentation. Study of the spits suggests that collection of bone following cremation was fairly random in this case and also that the original pot was not big enough. Another had to be brought in, apparently continuing from the point where the first had reached capacity. Most of the bone indicates that firing reached the high temperatures normally associated with cremation. Cremations of Roman date are commonly found to be less intact and more crushed than those of the Bronze Age, and this has been attributed to the use of professional 'crematoria'. However, this is more likely to be the case in urban centres and the Tregony burial is noteworthy for containing much larger fragments of bone than its contemporaries in towns such as Colchester.

Plant macrofossils

Wendy Carruthers

The excavations revealed a number of pits, some of which contained substantial deposits of charred plant remains. Samples from the grain-rich pits and a few other features were examined for this report.

Methodology

Soil samples were taken during the excavations for the recovery of environmental information. The samples were processed by Historic Environment Service staff using standard methods of flotation. The flots were recovered on a mesh of 250 microns.

The flots from 11 samples were sent for microscopic sorting. Three flots produced only charcoal and modern seeds, four produced small numbers of charred plant remains and four were very rich in charred cereal remains. Two of the rich samples – from deposits (315) in pit [318] and (385) in [pit 389] (both within pit [335] / [333]) – had to be sub-sampled because they were too large to be fully analysed (Table 3).

Results

The results of the charred plant macrofossil analysis are presented in Table 3. Nomenclature and most of the habitat information follow Stace (1997). Other texts consulted for identification, ecological and economic information include Beijerinck (1947), Cappers *et al* (2006), Jacomet (1987), Ellenburg (1988), Mabey (1972) and Lust (1974).

Some notes on identification

Wheat

Almost all of the wheat grains appeared to be flat-backed, rounded, bread-type wheat (*Triticum aestivum*-type). Only a few grains were a little more hump-backed and elongated, suggesting that hulled wheats such as spelt wheat could be present. However, grain morphology is notoriously variable (Jacomet 1987), so chaff fragments are usually used to confirm species. Wheat chaff was very scarce in general, again suggesting that free-threshing wheat was dominant in the deposits, since a much cleaner threshed crop is obtained in comparison with the hulled wheats, emmer, and spelt, with very few chaff contaminants. On the basis of identifications of the wheat chaff fragments, the cultivation of bread-type wheat was confirmed, with possibly a trace of spelt wheat (*T. spelta*) grown as a minor or fodder crop. Spelt was the principal wheat grown during the Romano-British period in most parts of southern Britain, but bread-type wheat rapidly replaced it during the early medieval period. Small amounts of spelt wheat have been radiocarbon dated to the Saxon period (Carruthers 2009), showing that hulled wheat may have continued in use on a minor scale for a period after the Roman withdrawal from Britain.

Barley

Although surface erosion meant that many of the barley grains could not be identified beyond barley (*Hordeum* sp.), the presence of many hulled grains and several twisted grains confirmed the presence of hulled six-row barley (*Hordeum vulgare*). It is possible, but not confirmed amongst the chaff fragments, that some two-row barley was present. It was not considered worthwhile looking at straight to twisted grain ratios, as crop processing changes the ratios and twisted grains are not always easy to differentiate. It is also possible that some naked barley was grown (*H. vulgare* subsp. *nudum*), since a few grains with indented apices and transversely wrinkled surfaces were observed (Jacomet 1987). However, naked grains arise naturally within a crop from a single mutated gene, so the approximately two per cent incidence of naked grains in the sample from deposit (385) in pit [333] could simply be from a naturally genetically variable hulled barley crop. Pure assemblages of naked barley have only been found up to the Middle Bronze Age in southern Britain (for example, Rowden, Dorset: Carruthers 1990).

Oats

Where floret bases were preserved, it was possible to determine that both wild (*Avena fatua*) and cultivated (*A. sativa*) oats were present. Wild oat floret bases were more common in the predominantly barley sample from context (385) (89 per cent barley, 6 per cent oats). Cultivated oats were confirmed amongst the large oat deposit in layer (315) in pit [318], (96 per cent oats, 3 per cent barley).

Other useful plants

No rye grains or chaff were observed and no leguminous crops such as peas or beans were found. It is, of course, possible that other crops were grown, perhaps on a garden scale, but that the evidence did not become preserved by charring. This is particularly likely for food plants that do not require heat during processing; for example, fruits, nuts, leafy vegetables, herbs, spices, legumes, fibre crops, dye plants, medicinal plants and fodder crops. Of the non-cereal charred remains recovered in small numbers from the samples,

the following taxa have some food or other uses: hazelnuts, elderberries (food, dye, medicinal), fat hen, persicaria and orache (leaf vegetables), hemp nettle and plantain (medicinal).

Discussion

The state of preservation and distribution of charred cereal remains

Most of the charred cereal remains were reasonably well preserved, although surface erosion of many of the barley grains meant that it was difficult to determine whether they had originally been hulled or naked. The survival of oat floret bases in samples from (342) and (385) indicated that these concentrated charred assemblages (both approximately 300–400 fragments per litre) had probably been either burnt *in situ* or only re-deposited once (perhaps shovelled out of an oven or hearth); that is, they had not spent some time exposed to the elements in a midden-type deposit before being dumped in the bottom of the pits.

Although the fuel wood was not identified, the charcoal from the primary fills of pits [310] and [333] consisted primarly of fast burning species, namely gorse and hazel. The primary fill of [335] contrasted with these pits by being dominated by charcoal of alder and oak, slower burning species, perhaps indicating variation in function.

Evidence from the type of and mix of grains being grown also points to a post-Roman date (Carruthers, above). The predominance of barley and oats and, conversely, the absence of wheat, are strongly indicative of an early medieval date (*cf* Sparey-Green 1996, 137–8).

Barley-rich deposits came from pit [333], pit [389] cut into the base of [333], and pit [335], all located to the north of enclosure 305. The fourth pit, [318], situated inside the enclosure, contained an oat-rich deposit. Four sparse assemblages came from other pits and modern features in trenches 1 and 3. All three barley-rich samples were fairly similar in composition, particularly the two samples from contexts (339) and (342) (Table 2). This suggests a common origin. The deposit from (385) was slightly richer in barley and poorer in oats than the other two samples. It also contained a wider range of weed taxa and the most chaff fragments of the four richer samples.

The range of crops represented

As noted above, the only crops confirmed in these samples were cultivated oats (*Avena sativa*), six-row hulled barley (*Hordeum vulgare*) and bread-type wheat (*Triticum aestivum*-type). Table 2 shows the percentages of each cereal in the four rich samples.

Barley and oats may have been grown together as a mixed crop, drage, in some or all of the samples. Drage was commonly grown in the early and later medieval periods as a way to 'hedge your bets' against crop failure. In wet years oats may have fared better than the barley on poorly drained land, whilst barley may have performed better on dry soils, and was a more highly valued crop that could be used for a variety of purposes, both human and animal. A stored crop of drage preserved in a burned-down sixteenth-century barn at Wharram Percy (Carruthers, 2010) consisted of oats and barley in ratios ranging from 1:1 to 1:5.

Table 2 Percentages of identified cereal grains from four soil samples

Sample number and context	*375 Pit [318] in [310]*	*377 Pit [335]*	*378 Pit [333]*	*380 Pit [389] in [333]*
% oats	96	20	18	6
% barley	3	79	73	89
% bread-type wheat	<1	1	9	5
total identified cereal grains	2602	876	380	4002
oat to barley ratio, O : B	32 : 1	1 : 4	1 : 4	1 : 15
number of chess caryopses (standardised to per 1000 cereal grains)	360	2	5	1
number of stinking chamomile seeds (standardised to per 1000 cereal grains)	50	0	0	0
number of scentless mayweed seeds (standardised to per 1000 cereal grains)	+	0	16	45
concentration of charred fragments per litre soil processed (fpl)	312	28	17	483
grain to chaff to weed seed ratio (G:Ch:W) (+ = <0.1, trace)	2:+:1	14:+:1	7:+:1	7:+:1

Table 3 Quantities of identified cereal grains from soil samples

Sample no.	*175*	*176*	*381*	*382*	*375*	*377*	*378*	*380*
Context	*(101)*	*(103)*	*(330)*	*(309)*	*(315)*	*(339)*	*(342)*	*(385)*
Feature no	*Pit [100]*	*Pit [102]*			*Pit [318]*	*Pit [335]*	*Pit [333]*	*Pit [389]*
Triticum aestivum-type (bread-type free threshing wheat grain)	1				4	12	9	193
Triticum sp. (spelt/bread-type wheat grain)							3	12
Triticum sp. (wheat grain)				1			21	
Hordeum vulgare (hulled barley grain)	1		1		50	134	46	1652
Hordeum vulgare cf *ssp. nudum* (*cf* naked barley grain)								41
Hordeum sp. (barley grain)	1				29	556	233	1868
Avena sativa L. (cultivated oat grain + floret base)					24			
A. fatua L. (wild oat grain + floret base)					2			23
Avena sp.(wild/cultivated oat grain)	2	cf.2			2495	174	68	236
Avena/Bromus sp. (oat/chess grain)					143		41	
Indeterminate cereals	3	3	1		197	153	157	1531+
Chaff								
T. spelta (spelt glume base)								1
T. dicoccum/spelta (emmer/spelt spikelet fork)								3
Triticum aestivum-type (bread-type wheat rachis frag.)								1
Triticum aestivum/turgidum (free-threshing wheat rachis frag.)							1	7
Hordeum sp. (barley rachis frag.)						1	2	32
Avena sp.(undeveloped oat floret)					12			
Avena sp. (oat awn frags)					+++			+
Weeds etc.								
Corylus avellana L. (hazelnut shell frag.)								2
Chenopodium album L. (fat-hen seed)					143	13	13	34
Atriplex patula/prostrata (orache seed)					19	17	8	56
Chenopodiaceae embryo					31	4	18	49
Spergula arvensis L. (corn spurrey seed)								1
Persicaria lapathifolia (L.) Gray (pale persicaria achene)					2		1	38
P. maculosa/lapathifolia (redshank/pale persicaria achene)					19	2	12	158
Fallopia convolvulus (L.) A.Love (black bindweed achene)			1		49	6	2	79
Polygonum aviculare (knotgrass achene)			1	1	1			
Rumex sp. (dock achene)				1	5	2	1	51
Raphanus raphanistrum ssp. *raphanistrum* (wild radish mericarp)					32		2	18
Raphanus raphanistrum ssp. *raphanistrum* (wild radish seed)								2
Potentilla sp. (cinquefoil achene)								1
Galeopsis tetrahit L. (common hemp-nettle nutlet)					8			2
Plantago lanceolata L.(ribwort plantain seed)					2		2	11
Sambucus nigra L. (elder seed)					2			
Lapsana communis L. (nipplewort achene)					3			9
Anthemis cotula L. (stinking chamomile achene)					130			
Chrysanthemum segetum L. (corn marigold achene)					2			
Tripleurospermum inodorum (L.) Sch.Bip. (scentless mayweed achene)	24				1		6	178
Asteraceae NFI (unidentifiable embryos)								2

Sample no.	*175*	*176*	*381*	*382*	*375*	*377*	*378*	*380*
Context	*(101)*	*(103)*	*(330)*	*(309)*	*(315)*	*(339)*	*(342)*	*(385)*
Feature no	*Pit [100]*	*Pit [102]*			*Pit [318]*	*Pit [335]*	*Pit [333]*	*Pit [389]*
Carex sp. (trigonous sedge nutlet)	1						1	
Bromus sect. *Bromus* (chess caryopsis)					942	2	2f	5
Danthonia decumbens (L.) DC (heath-grass caryopsis)			*cf* 2					
Poaceae (various grass caryopses) CDG	7		1		8	19	7	49
Poaceae *Lolium perenne/rigidum*-type (rye-grass type)					16	7	5	17
cf *Conopodium majus* (Gouan) Loret (*cf* pignut tuber)			*cf* 1					
Indeterminate tubers			2					
TOTAL	**40**	**5**	**10**	**3**	**4371**	**1102**	**659**	**4831**
Sample volume (litres)	40	40	40	40	approx 14	40	40	approx 10
% of flot sorted	100%	100%	100%	100%	47%	100%	100%	32%
Charred frags per litre (fpl)	1	0.1	0.3	0.1	approx 312	28	17	approx 483

These are comparable with some of the Tregony sample ratios listed above.

Because a relatively small number of samples were available for analysis it is possible that crops that do not come into contact with fire during processing, such as legumes, might have been grown but were not preserved by charring. Legumes and fibre crops are commonly recovered from early medieval sites, particularly where mineralised and waterlogged preservation occurs in addition to charring.

The composition of the samples and their possible origin

Very few chaff fragments were recovered from any of the samples, but this is commonly found in a period when free-threshing wheat, oats and hulled barley were the main crops grown. These cereals do not require parching to remove the grains from the ear, although barley and oats may have been parched and 'hummeled' prior to cooking in order to remove the husks if they were being used for human consumption (Hillman 1981). The highest ratio of grain to chaff to weed seeds was in the sample from deposit (385), G:Ch:W = 126:1:17, and this was mainly due to a few small fragments of barley rachis being present as contaminants.

The highest weed to grain ratio was found in the oat-rich sample from (315). This was mostly due to the very high incidence of chess caryopses in this sample (942 grains). It is possible that chess was tolerated as a weed in this crop because oats were being used primarily for fodder. Oat is a high energy fodder crop that is particularly valuable for draft animals. Stinking chamomile (*Anthemis cotula*) seeds were also frequent in this sample, but were not present in the barley-rich samples. Stinking chamomile is a weed of heavy, damp clayey soils and is said to be replaced by scentless mayweed (*Tripleurospermum inodorum*) where soils become lighter (Kay 1971). Scentless mayweed was frequent in the barley-rich sample from (385) (178 seeds), suggesting that oats were being grown on heavier, damper soils and barley in areas where the soils were lighter and better drained. The increased occurrence of acid soil indicators such as wild radish (*Raphanus raphanistrum*) and corn marigold (*Chrysanthemum segetum*) seeds in the oat-rich sample also relates to the ability of oats to cope with acidic soils better than barley. The cultivation of particular crops to suit the local soil conditions suggests that the acquisition of a decent yield each year was more important to the occupants of the site than market prices.

The G:Ch:W ratios were indicative of processed grain, some of which may have been

destined to be used as fodder but most of which had probably become charred while being parched for human consumption. Parching would have been used to help to remove the husks from the barley (by 'hummeling' or pounding the parched grain), and to prepare moist grains such as oats and wheat for milling into flour. In the damp Cornish climate, oats and possibly wheat would have been harvested in a slightly under-ripe state, in order to prevent sprouting and shedding from the ear. Under-ripe grains would need to be parched in order to prevent spoilage during storage and to make them suitable for milling. These large deposits of charred grain, therefore, were probably the product of parching accidents. The lining of pits with charred grain could have been a deliberate attempt to create a dry, sterile lining to the pits if they had been used for short-term grain storage. Alternatively, the deposits may simply represent discarded waste. It is possible that the pits were associated with corn-drying kilns like post-Roman examples at Poundbury, Dorset (Monk 1983). Two of the four Poundbury kilns produced primarily barley and oats, with just a little bread-type wheat. Monk suggested that the kilns had been used to dry a variety of crops, possibly including drage, prior to de-husking, storage or, in the case of oats, the production of groats.

As only one of the four samples – that from (385) – had a grain submitted for radiocarbon dating it is uncertain whether the pit fills were all contemporary or whether the oat : barley differences related to changes through time. However, the four samples showed more similarities to early-medieval samples in south-west Britain than to Romano-British assemblages. The scarcity of hulled wheat and the abundance of both barley and oats was mirrored in Dark Age samples from Tintagel (Straker 1997) and Duckpool, Morwenstow (Straker 1995). On both of these sites oats were the dominant cereal but hulled barley was also common. An assessment of Dark Age occupation deposits at Mothecombe Beach, Devon (Carruthers 2001), also produced abundant oats with frequent barley and occasional bread-type wheat grains. On slightly earlier sites such as third- to fourth-century AD Reawla, in Gwinear (Straker 1992), barley was common but emmer and spelt wheat were more frequent and bread wheat was not confirmed. In most other parts of southern Britain spelt wheat remained dominant until the early medieval period, when barley and bread wheat became the main cereals grown for human consumption.

Charred plant remains in the four sparse assemblages

Scattered cereal grains and weed seeds were present of the same range of taxa as in the rich samples. The only additional taxa were possible heath-grass caryopses, a grass of sandy or peaty acid heaths and grasslands. Heath-grass can also grow as an arable weed in these types of soils. Also, a few tuberous fragments were found, including a possible pignut (*cf Conopodium majus*) tuber. Pignut is an edible tuber that tastes of hazelnuts. It has been used as a food source in the past, and is characteristic of poor, acidic grasslands and hedgerows. The sparse charred remains in these samples probably represent low-level background waste, such as might accumulate on dwelling floors or distributed around a settlement.

Conclusion

As grain-rich charred deposits are rare in this area of the country, the samples from Tregony (albeit limited in number) provide valuable information about the post-Roman and early medieval arable economy. The results are comparable to the few other sites in Cornwall that have produced charred plant remains, demonstrating that poor, acidic soils and damp climate were very much controlling factors during this period. What are needed now, to see whether there was more variety to the diet than the charred evidence suggests, are environmental samples from waterlogged and mineralised faecal deposits. Urban waterfronts, wells and cess pits in back yards at levels close to the water-table are the most likely features to provide this type of information.

Charcoal

Rowena Gale

This section presents the analysis of seven samples of charcoal. These came from pits from trench 3, many of which were of interest since they contained unusually high concentrations of charred cereal grain and charcoal.

Methodology

Bulk soil samples were processed by flotation and sieving and the resulting flots and residues were scanned under low magnification and the charcoal separated from plant macrofossils. Intact segments of narrow roundwood were particularly frequent in the sample from the fill (385) of pit [389] cut into the base of [333]. Charcoal fragments measuring >2mm in radial cross-section were considered for species identification. The charcoal-rich samples from (315) and (339) were 25 per cent and 50 per cent subsampled prior to identification. The sample from (385) was 30 per cent subsampled. The charcoal was mostly firm and well-preserved, although in rather small quantities in the samples from fill (103) of pit [102], fill (326) from pit [325] and fill (330) from pit or tree bowl [329].

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 and contextual information 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*) and Leguminosae (*Ulex* and *Cytisus*). 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:

Betulaceae. *Alnus glutinosa* (L.) Gaertner, European alder; *Betula* sp., birch

Corylaceae. *Corylus avellana* L., hazel

Fagaceae. *Quercus* sp., oak

Leguminosae. *Cytisus scoparius* (L.) Link, broom and *Ulex* sp., gorse. These genera are anatomically similar.

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.

In trench 3, a number of pits were sited within enclosure 305. The charcoal from context (330) in pit or tree bowl [329] consisted of oak (*Quercus* sp.) heartwood and sapwood. The small pit [325] in which the cremated remains of a mature female had been interred was cut into the side of pit [329]. Small fragments of charcoal recovered from its fill (326) were identified as oak (*Quercus* sp.), hazel (*Corylus avellana*) and the hawthorn / *Sorbus*

Table 4 Identified charcoal (Key: h = heartwood; r = roundwood (diameter <30mm); s = sapwood (diameter unknown). The number of fragments identified is indicated.)

Sample	*Context*	*Description*	*Alnus*	*Betula*	*Corylus*	*Pomoideae*	*Prunus*	*Quercus*	*Ulex/ Cytisus*
375	315	Burnt fill of posthole/ pit/ hearth [318], in base of pit [310]	–	–	8	4	2	1h	86r
376	326	Fill of pit [325]; associated with cremation. Cut into side of [329]	–	–	2	1	–	1s	–
377	339	Primary fill of pit [335], adjacent to [333]	65	–	4	1	–	31h,1r,3s	1r
378	342	Fill of pit [333], cuts [335]	–	6	38	5	–	4h,2s	1r
379		Piece of burnt roundwood from pit [333]	–	–	1r	–	–	–	–
380	385	Upper fill of pit [389], beneath [333]	–	–	38r	31r	–	1h,72s	6r
381	330	Fill of pit/ tree bowl [329]	–	–	–	–	–	3h, 1r	–

group (Pomoideae). The charcoal was extremely sparse but may have originated from pyre fuel deposited in the pit with the urns, although, since no charcoal appears to have been contained within the urns, it is also possible that this charcoal was residual in backfill material.

Pit [310] was also located within enclosure 305 and had a small oval cut [318] in its base, the base of which was scorched. The charcoal-rich primary fill (315) also included abundant charred grain. The large quantity of charcoal, which consisted predominantly of narrow roundwood, was 25 per cent subsampled. If from firewood burnt in the small pit, the use of smaller wood would, perhaps, have been easier to manipulate in the confined space. The charcoal consisted predominantly of narrow stems of gorse (*Ulex* sp.) / broom (*Cytisus scoparius*), up to about 10mm in diameter (when charred). Small amounts of hazel (*Corylus avellana*), oak (*Quercus* sp.), the hawthorn/*Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*) were also present. Gorse burns with great intensity and leaves little ash. In the past it has been particularly valued for ovens and kilns (Edlin 1949; Mabey 1996).

Intercutting pits [333] and [335] were located north east of enclosure 305. Scorched natural formed the base of pit [335]. The primary fill (339) of [335], presumably residues from the fire, included a large quantity of charred grain and charcoal. The charcoal was 50 per cent subsampled. Alder (*Alnus glutinosa*) and oak (*Quercus* sp.) were the dominant taxa; other species included the hawthorn / *Sorbus* group (Pomoideae), hazel (*Corylus avellana*) and gorse (*Ulex* sp.) / broom (*Cytisus scoparius*).

Charcoal from fill (342) of pit [333] formed a thin lens at the northern end of the pit (Fig 8). This comprised mostly hazel (*Corylus avellana*) but also included birch (*Betula* sp.), oak (*Quercus* sp.), the hawthorn / *Sorbus* group (Pomoideae) and gorse (*Ulex* sp.) / broom (*Cytisus scoparius*). A large piece of (fragmented) hazel (*Corylus avellana*) roundwood was recovered from the same context.

Burnt layer (385), the upper fill of pit [389] in the base of pit [333], included a large deposit of charred cereal grain and charcoal. The latter consisted predominantly of narrow roundwood up to about 35mm in diameter. This included oak (*Quercus* sp.), hazel (*Corylus avellana*), hawthorn / *Sorbus* group (Pomoideae) and gorse (*Ulex* sp.) / broom (*Cytisus scoparius*). The morphology and fast growth noted in some fragments of hazel were consistent with coppice growth; an oblique toolmark was recorded at one end of a short section of hazel stem. Overall, however, the age range and stem diameters were very variable. Some of the oak also appeared to be moderately fast-grown.

Discussion

The cremation burial occurred in a small pit, [325]. Small fragments of charcoal from its fill (326) included oak, hazel and the hawthorn group but no charcoal was recorded from the fills of the urns. The origin of the charcoal is therefore unclear and, although it might be pyre debris, it could also represent residual charcoal deposited with the backfill (especially given the tiny quantity present). The function of the associated pit [329] is also uncertain; the small quantity of oak charcoal from its fill (330) probably represents fuel debris.

Unusually large quantities of charred grain and charcoal were recorded in pit [318], cut into the base of pit [310], and pits [333] and [335] (trench 3). The function of pit [318] is uncertain but the scorched base suggests that it is likely to have been a hearth. The charcoal consisted almost entirely of narrow roundwood, predominantly gorse / broom. This would have quickly produced a very hot fire; gorse was traditionally particularly favoured to fuel ovens and kilns since it burns fast and leaves little ash (Edlin 1949; Mabey 1996). However, the abundance of charcoal remaining in the pit feature suggests that the final firing event in this feature did not burn away completely. It could, of course, represent the accumulation of numerous firings (it is probably unlikely that the pit would have been completely cleared out between firing events).

The lower fills of pits [333] and [335] included substantial amounts of charred grain and charcoal. The base of pit [335] was burnt. The nature of the activities undertaken here is not clear but the possibilities are discussed below. Fuel debris from the earliest pit [335] consisted almost entirely of alder and oak, although hazel, the hawthorn group and gorse / broom were also present (Table 4). Unless well seasoned, alder wood burns slowly and produces comparatively little heat (Porter 1990). It is conceivable that a fairly cool fire was required, although the inclusion of oak heartwood (a high calorie fuel) probably compensated to some extent. It is possible that this combination was determined by supply rather than selection,

although alder was not identified from any of the other features examined. The damp soils associated with the valleys of nearby streams and the River Fal may have encouraged the widespread growth of alder, making it readily available as firewood and for other uses. Another explanation may lie in the recycling of artefactual waste as firewood; for example, alder hurdles or wattle.

The adjacent and overlying pit [333] may have been roughly contemporary with pit [335]. A lens of charcoal from the northern end of the pit consisted predominantly of hazel and included a large piece of roundwood (hand collected during excavation). The latter had unfortunately fragmented prior to examination and it was not possible to assess its age or origin (whether, for example, it derived from a coppiced source).

Pit [389] lay in the base of pit [333]. A deposit of burnt material in the upper layer (385) included a large deposit of charred grain and charcoal. The charcoal consisted mainly of narrow roundwood from hazel, the hawthorn group and oak – the oak was rather fragmented but the sapwood identified almost certainly originated from roundwood – and gorse. The roundwood appears to have been obtained from coppiced woodland: evidence of cropping was indicated by an oblique tool-mark on a short section of hazel stem.

Overall, although multiple species were recorded from each pit, there is some evidence to suggest differential selection of species for firewood: alder (*Alnus glutinosa*) in pit [335], gorse (*Ulex* sp.) / broom (*Cytisus scoparius*) in pit [318] and oak (*Quercus* sp.) in pit [333].

Environmental evidence

In most ancient Cornish woodlands the thin soils are dominated by sessile oak, usually stunted in growth (Marren 1992). Only well-sheltered hillsides such as those of humid creek and river valleys offer more favourable conditions for growth. Charcoal deposits at Penlee House consistently included oak (*Quercus* sp.) and the moderately fast growth rates recorded in, for example, pit [389] suggest that some firewood at least was probably collected from the sheltered banks of the River Fal and its tributary brooks. Hazel (*Corylus avellana*) may have been a constituent of oak woodland. Alder (*Alnus glutinosa*) is more likely to have grown on the lower slopes of the valleys, whereas birch (*Betula* sp.) prefers upper hillsides. Gorse (*Ulex* sp.) / broom (*Cytisus scoparius*), ubiquitous on open acidic soils, probably formed scrubland in more exposed areas, perhaps in association with hawthorn (*Crataegus* sp.).

Evidence from the charcoal suggests that during the post-Roman period some areas of woodland were coppiced, although the age ranges in the material examined were too variable to assess possible cycles of rotation. It is possible that cropping occurred on a fairly random or *ad hoc* basis rather than in organized compartments of woodland management.

Radiocarbon dating

The primary aims of the dating strategy were to confirm that the cremation was of Romano-British date and to ascertain whether there was a temporal relationship between the cremation and the pits containing burnt grain. The comparatively low number of stratigraphical relationships between features meant that a better understanding of the site's chronology was reliant upon obtaining a reliable set of radiocarbon determinations, taken from sealed contexts.

Accordingly, a piece of cremated human bone found within vessel **P1** and burnt grain recovered from layer (385) within pit [333] were submitted for accelerator mass spectrometry dating (AMS) at the University of Waikato, New Zealand. This method of dating can be carried out on very small amounts of material and gives a high precision date.

The determinations from the two samples are shown in Table 5 and Figure 15.

Table 5 Results from the Penlee House radiocarbon dating

Feature	*Lab. no*	*Material*	*Age BP years*	*Calendrical years 95%*
Pit [325]	Wk-19958	Cremated bone	1679 ±34 BP	AD 256–429
Pit [333]	Wk-19959	Burnt grain	1605 ±35 BP	AD 385–545

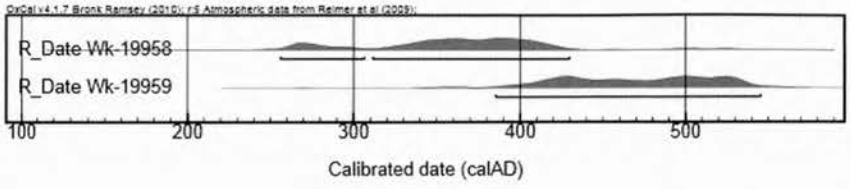

Fig 15 Radiocarbon determinations from Penlee House.

Discussion

The following discussion is divided into two sections: first, the possible funerary enclosure and the burial itself, and secondly the pits containing burnt deposits. Parallels are sought for each and an attempt is made to link the features within the existing framework of Romano-British and early medieval archaeology for Cornwall and more widely.

The enclosure and cremation burial

The enclosure at Tregony consisted of a shallow rectilinear ditch which, if the feature was approximately square, would have enclosed an area of approximately 170 sq m. About a third was excavated. Within the enclosure were a number of pits, one of which contained a cremation burial within two pottery vessels, the typology of which dated the burial to the late second century AD (Quinnell, above). There was no stratigraphical relationship between the pit and the enclosure ditch but one piece of *tegula* plausibly dated to the same period was recovered from the ditch fill.

Rectilinear funerary enclosures occur in northern Gaul and northern and eastern Britain during the Early and Middle Iron Age (for example, Menez 1996, 80–2; Murray and Ralston 1997; Stead 1991) and in south-east Britain in the Late pre-Roman Iron Age (Woodward 1992, 86; Collis 1977, 26). Following the Claudian invasion of AD 43, these features became more widespread and examples are known from across Roman Britain. Several instances have been recorded in the north west, including two adjacent to extramural settlements associated with Roman forts at Lancaster and Tebay. The ditched enclosure at Lancaster was 14m square and all of the cremations associated with it came from the ditch fill, indicating that the enclosure pre-dated the deposition of the cremations. The profile of the ditch varied along its perimeter, perhaps indicating a series of re-cutting episodes, and stakeholes suggested a fence set into the edges of the ditch. The cremations were both urned and unurned and some were associated with charcoal and nails, suggesting either pyre debris or perhaps deposition within a wooden box rather than a pot (Town 2001, 12–13). The cemetery associated with the fort at Lower Borrowbridge near Tebay in Cumbria was much larger and the earliest phase, dating to prior to the mid-third century AD, consisted of 17 ditched enclosures, containing both large pits assumed to be inhumations and a number of cremations. A later phase, following a flooding episode dated to the mid-third century, consisted entirely of cremation deposits, the majority cut into the ditches of the enclosures or within the enclosures themselves. Three of the enclosures displayed evidence of an entrance, the remainder defined a central island. Although no evidence of barrow mounds was observed, it is suggested that ploughing may have destroyed these and any inhumations that may have been placed on the ground surface beneath them (Hair and Howard-Davis 1996).

Closer to home, a rectilinear trench at Topsham near Exeter contained within it some shallow cut features, one of which held the base of a cinerary urn of the late third century AD containing the remains of a young adult (Jarvis and Maxfield, 1975, 227). The description of the trench as a soil mark and the limited survival of the urn suggests that a good deal of truncation had occurred on this site and although it was described as a possible tomb it seems more likely that the feature excavated, approximately 4m-5m square, was an enclosure of a similar type to that at Tregony and elsewhere.

Other late Roman rectilinear ditched enclosures are associated with inhumations. A group of three was identified in the large cemetery at Poundbury, outside Dorchester. Each contained a single central inhumation and two of the enclosure ditches contained post- or root-holes within their fills that could be interpreted as evidence for a fence or hedge (Farwell and Molleson 1993). The burials were all aligned roughly east-west, although

given that this applied to the vast majority of the surrounding unenclosed burials this does not indicate conclusively that the enclosed burials were Christian. Five rectilinear ditched enclosures were identified in a late Roman – early post-Roman cemetery excavated at Kenn, near Exeter, four of which contained a single inhumation, the fifth, three inhumations (Weddell 2000). Although neither the burials within the enclosures or the enclosures themselves could be dated, three unenclosed burials within the cemetery were radiocarbon dated to the fifth to eighth centuries AD. However, the cemetery was also associated with a late Roman pottery assemblage, suggesting that its origins may have lain within this period, and the ditched enclosures may have been the earliest features on the site (*ibid*, 117). The burials, including those within the enclosures, were all aligned east-west.

Roman-period funerary enclosures of comparable form are previously unknown in Cornwall but there are some possible instances of urned cremations. W C Borlase (1872, 228–9) reported an urn described as 'sepulchral' which had been found 'many years ago at or near Penquite, on the Fowey river'. The Borlase illustration (Fig 16) suggests that it may have been similar to urn **P1** from Tregony. There are two settlements bearing the name Penquite in the wider vicinity of the Fowey but the more probable candidate is the large country house and estate of this name near Golant; the house has views over the river and was clearly well known in the later nineteenth century. (The other Penquite was a minor farm settlement on high ground just north of Lostwithiel and is less likely to be the one to which Borlase was referring, although its location only 700m from the recently confirmed Roman fort at Restormel (Hartgroves and Smith 2008; Historic Environment Record PRN 6693) makes this an interesting possibility.) Penquite, Golant, is in a broadly similar position to Tregony, overlooking the higher reaches of a tidal river, as the Fal would also have been in the Roman period.

Other possible urned cremations dating to the Roman period in Cornwall have been recorded at Kerris Vean in Paul, West Penwith (HER PRN 28780), at Calvadnack in Wendron, allegedly found with Roman coins dating to the middle of the second century AD (HER PRN 35232), and from close to the coast at Tywardreath Bay (HER PRN 60046). None of these survive.

Intriguing finds of carbonised human bone were made during recent excavations at Duckpool, Morwenstow, and at Tintagel Castle. Two conjoining pieces of mandible from an occupation spread at Duckpool were found in a deposit tightly dated by Roman coins to the 340s-360s AD (Ratcliffe 1995). It was unclear whether these re-deposited remains were the result of cremation or accidental burning of the material in a hearth. At Tintagel the fragments came from three separate contexts, one of which has been radiocarbon dated (although not on the burnt bone) to cal AD 410–535 (UB-3883); mathematical modelling of this determination gave an estimated date range of cal AD 395–460 (95 per cent confidence) (Barrowman *et al* 2007, 52; 54, 55). Scientific study of the bone suggests that the fragments represent deliberate cremation rather than accidental burning.

The remains from Tintagel and Duckpool may represent examples of late Roman or early post-Roman cremation in Cornwall, although the evidence is far from conclusive. These instances may, however, fit within a wider if sporadic pattern of cremations extending well into the fourth century AD, particularly in western regions of Britain and in Ireland (*ibid*, 312, 329).

Fig 16 The 'Penquite urn' (Borlase 1872, 229).

Examples of urned cremations are scarce elsewhere in western Britain, although several are known from *Isca Dumnoniorum* (Exeter), albeit in a military context (Salvatore 2001) and there is the example from Topsham noted above (Jarvis and Maxfield 1975, 227). The paucity of such finds is emphasised by the fact that burials associated with the important Roman town of *Moridunum* (Carmarthen) have only been discovered relatively recently (Crane 2001; Research Framework for the Archaeology of Wales: South-west Wales – Roman, key sites, 2003). The separation of mortuary sites from settlements at this period may be a factor in the relative scarcity of these sites in the archaeological record.

Recent work in Cornwall has revealed some limited evidence for burials in the Romano-British period. Two *in situ* burials, one in a stone-lined cist, the other an inhumation with grave goods, were identified during investigations at Pennance (Scarcewater tip), St Stephen-in-Brannel (Jones and Taylor 2010, 89–92). These were located some distance from the presumed focus of contemporary settlement and lay just inside the perimeter of an enclosed field system. Re-deposited human bone, possibly from an Iron Age or Romano-British inhumation, was recovered from a Romano-British context at Atlantic Road, Newquay (Reynolds, forthcoming).

A cemetery at Trevone consisted of unlined graves aligned north-south below a series of slate-lined graves aligned east-west (Anon 1849; Trollope 1860). A third- or fourth-century AD brooch came from one of the earlier graves and a piece of samian was found nearby. An Iron Age cist burial is known from the vicinity (Dudley and Jope 1965), suggesting possible continuing use of the site from the Later Iron Age through the Roman period and perhaps beyond.

Romano-British burials and cemetery enclosures elsewhere in Britain were, following Roman custom, usually situated outside settlements, often alongside roads or tracks (Collingwood and Richmond 1969) or alongside field boundaries (*cf* Pennance). A recently discovered Romano-British settlement in Devon has two roadside burial plots associated with it (Anon 2011, 261). If practice in Cornwall followed this wider custom, the presence of the cremation at Tregony may indicate a settlement somewhere nearby; the tile fragments (and perhaps also the holed slate) recovered during the excavation could have come from a substantial and probably high-status building in the vicinity. No physical evidence of a Romano-British settlement has been reported in the area but several antiquarian authors proposed Tregony as a potential location for the towns of *Cenio* and *Voluba* recorded in classical sources (for example, Lysons 1814, 227; Polsue 1870, 281–2). Several enclosures of probable Iron Age or Romano-British date are known in the surrounding area, including one a little over 400m to the south east (HER PRN 50980) and another just over 1 km to the north east at Tregonhayne (HER PRN 50673). Three Roman coins, two of which dated to the second century AD, have been found about 500m north east of the Penlee House site (HER PRN 163738). The large enclosed site of Carvossa, in Probus parish, lies 3.5km to the north up the Fal. This may have begun in the first century BC but appears to have grown more affluent following the Roman conquest and may have had a period of military occupation. Excavation revealed evidence of trade in the form of amphorae, samian ware and non-local pottery, together with indications of apparently extensive iron working (Carlyon 1987; Quinnell 1986, 122; 2004, 216; 2009–10c).

Cremation rites

Cremation of the dead became prevalent in south-east Britain in the Late Pre-Roman Iron Age. These cremations, belonging to what has been referred to as the 'Aylesford Culture', were contained in ceramic vessels and buried in flat graves, in some cases within small cemetery enclosures; many of these cremation burials are accompanied by elaborate grave goods and must represent a social elite (Whimster 1981, I, ch 6). After the Roman invasion of AD 43 the practise of cremation became widespread throughout Britain and was prevalent through the first and much of the second centuries AD (Taylor 2001, 87). The burials were frequently accompanied by grave goods, often in the form of sustenance for the dead and perfumed substances such as flowers or herbs (Woodward 1992, 86). From the later second century the number of inhumations grows, replacing cremation as the typical rite by the end of the third century AD (Collingwood and Richmond 1969), although later examples of cremation are known and it is clear that there was considerable regional variation in funerary practises (Taylor 2001, 94–5). This chronology broadly fits the dating to the later

second century AD of the prototypes for the pottery vessels from Tregony (Quinnell, above).

It has been remarked that the poorest dead were often cremated, placed in an urn, and buried with one other vessel intended to hold food for the journey ahead (Wacher 1998, 271). Cremated remains were taken from a pyre and usually placed in a pottery vessel, often a domestic type. This was typically accompanied by other vessels containing or symbolically providing food or drink for the dead. Often the remains were washed in wine before being placed in the vessel (Salway 1993, 519). A group of of urned cremation burials accompanied by pottery flagons was excavated at Neatham in Hampshire (Millet and Graham 1986).

In what seems to have been a departure from the usual earlier Roman-period tradition, the accompanying vessel in the Tregony cremation, **P2**, contained burnt bone from the same cremation. This may be due to inefficient cremation practice, perhaps by people not used to the procedure, leading to the need for additional space for the burnt bone. The use of the smaller vessel after the main vessel had been filled is supported by the distribution of bone fragments between the two containers (Anderson, above). The handled vessel

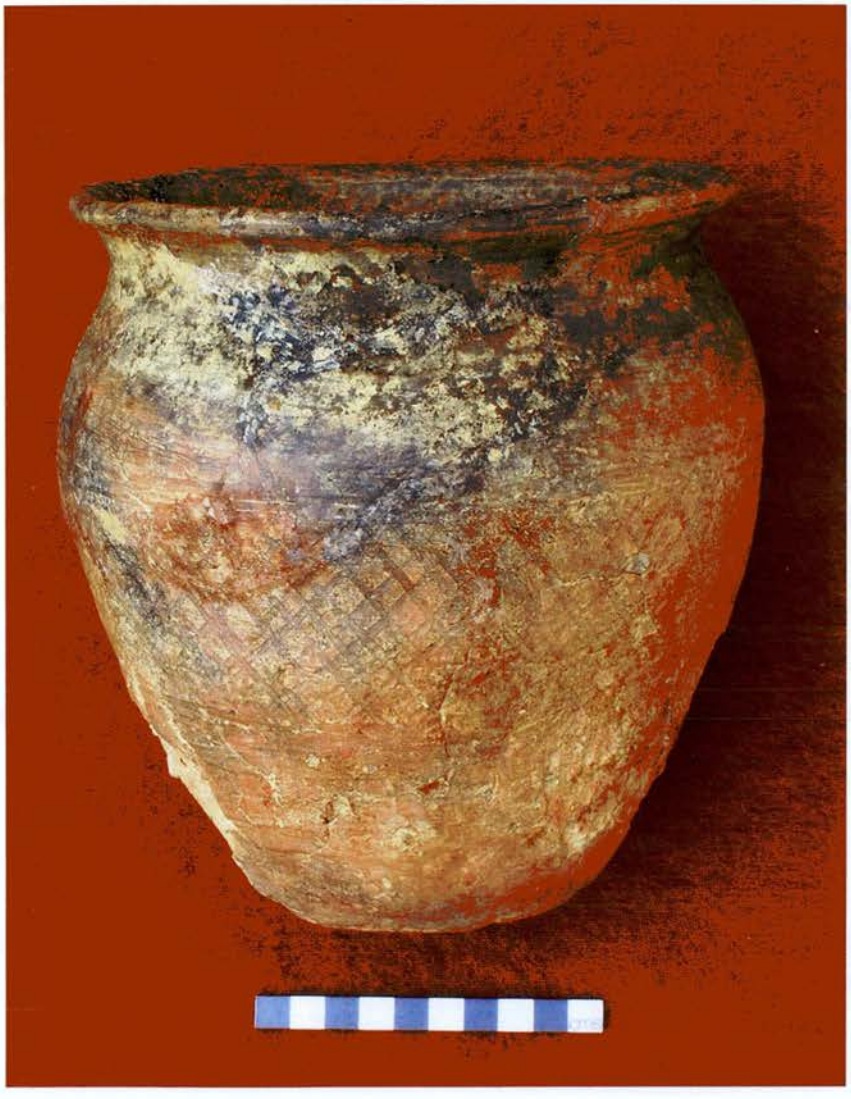

*Fig 17 Cremation vessel **P1**. (Photograph: Historic Environment Projects, Cornwall Council.)*

had been deliberately holed in antiquity, an aspect of Romano-British practice that occurs widely in both funerary and non-funerary contexts (Fulford and Timby 2001b; Taylor 2001, 102).

Recent work on the use of household ceramics in which to dispose of the dead has emphasised that the use of vessels to contain remains was a 'cultural and social choice' (Williams 2004, 418) and not one born of necessity or 'common sense'. The use of household ceramics may have been connected with the use of food and drink in the ritual of the funeral, both for the mourners and the dead, and parallels can be drawn between these customs and the modern 'wake' as well as the common modern practice of placing cremated remains in an urn before scattering, burial or display.

The Tregony cremation may have been an attempt to imitate the 'least elaborate Roman-period cremation burial rite' (Taylor 2001, 102). Aspects of the cremation that support this view include the following:

- An apparent knowledge of (if not familiarity with) the idea of cremation and of burial of cremated remains in a vessel with an accompanying vessel. The 'overspill' of cremated remains into

Fig 18 Cremation vessel ***P2****. (Photograph: Historic Environment Projects, Cornwall Council.)*

a second pot may suggest unfamiliarity with the actual practise of cremation and what is required. Was it a practise known from hearsay rather than actual experience?

- The use of the second pot to contain cremated remains which could not be accommodated in the larger vessel precluded its symbolic or practical use as a container for liquids accompanying the funerary process or food to accompany the dead (Williams 2004). Could this suggest unfamiliarity with the details of rituals associated with cremation; that is, were they 'going through the motions' without full understanding of the tradition? Or was it a practical *ad hoc* response by a 'priest' to the problem of lack of space in the first jar, made possible by the lack of knowledge of the participants in the ceremony?
- There is an apparent familiarity with the idea of funerary enclosures and the form of them.
- There is an apparent ability of those carrying out the burial to physically create (or to commission others to create) vessels based on Roman-period forms. This presumably implies access to actual vessels (or at least memories of them) as prototypes, but these were poorly made, clumsy local imitations of Roman forms – presumably 'real' Roman pots of this kind were not available.
- There is an apparent awareness of the use of intentionally holed vessels in Roman rites. This suggests some familiarity with details of such rites or access to individuals with such knowledge.

It is possible that the Tregony cremation is a local attempt at 'being Roman' within the context of a culture which had in many respects not become Romanised. Alternatively, it could have been a Romanised individual or group attempting to follow Roman forms and practises but without the resources to do so, with no 'real' Roman pottery and no accomplished cremation practitioners.

The date of the cremation

The radiocarbon determination of cal AD 256–429 (Wk-19958) from the cremated bone presents a number of problems. Firstly, the vessel **P1** within which part of the cremated bone was found falls within a well understood and fairly tightly dated pottery sequence and the pot can be dated confidently to the late second century AD. The condition and nature of the vessel renders its circulation into the latter half of the third century and beyond highly unlikely. Pots used as grave goods for inhumations at Butt Road, Colchester, were found to be up to 200 years older than the burials they accompanied but this was determined to be due to the re-use of cinerary containers by professional undertakers (Taylor 2001, 126–7). However, there is no evidence to suggest that the enclosure at Tregony is anything other than an isolated feature of limited time-depth. Secondly, the use of cremation as a means of disposal of the dead in Roman Britain appears to diminish sharply in the the third century AD and beyond, as inhumation becomes more widely used (1991). Cremations are known to continue sporadically elsewhere, however, and given the very limited current knowledge of Roman-period mortuary practices in Cornwall (above) this cannot be taken as a decisive indicator. A cinerary container from what was described as a square tomb at Topsham near Exeter was a black burnished jar dated to the later third century (Jarvis and Maxfield 1975, 227).

It is possible that the Tregony cremation was a deliberate attempt to re-enact an historic rite, using curated or discarded vessels as models, and employing an outdated and only partially remembered ritual. On balance, however, the evidence points towards the radiocarbon determination being too young and the cremation having taken place in about the later second century AD.

The finds assemblage

In addition to the pottery vessels containing the cremation, a small assemblage of other Romano-British ceramics was recovered from the site (Quinnell, above). These included a sherd of a possible late first – second century amphora, perhaps offering a hint of a site of some status in the area. This possibility is buttressed by the recovery of five pieces of Roman tile, one of which lay within the fill of the enclosure ditch (two others were from the early medieval pits (below) and two from unstratified deposits). The tile may have come from a Roman-period building, perhaps of the late second to early third century AD. The location of this building is unknown and no reports of Roman masonry or of other tiles are known from the Tregony area. The only currently known building displaying such a degree of Roman influence in

Cornwall is the 'villa' at Magor, Camborne (O' Neil 1933). Of course, the Magor building may not be unique and something similar may remain to be found, or have been destroyed, in or near Tregony. However, the large assemblage of tile recovered from Magor suggests that the visibility of such remains, particularly close to a settlement such as Tregony, would be much higher.

Alternatively, it is possible that tiles were used in a token fashion, to represent some degree of status or 'Romanization', and rather than a complete roof, for instance, tiles were incorporated into prominent parts of a native structure. Another explanation may lie in the use of Roman tile in burials. Fragments of three *tegulae*, an *imbrex* and a box flue were identified in the assemblage from Penlee. All of these types of ceramics were used to line Roman burial chambers or cists, admittedly predominantly in urban contexts (Toynbee 1971, 101–2; Philpott 1991, 10–11). Given the tiny assemblage of Roman tile, part of it of Cornish gabbroic clays, it might represent use within a funerary context rather than indicating the presence nearby of a completely Roman structure.

A third possibility is that the tiles from Penlee may have been associated with industrial activities on or around the site. Other than that from Magor, the only other Roman tile currently known from Cornwall is from an enclosure at Little Quoit Farm, St Columb Major, where it occurred in association with extensive evidence of iron smithing (Lawson-Jones and Kirkham 2009–10). Two of the Penlee tile fragments were recovered from pits apparently used for the heat-processing of grain and it may be that they had been incorporated into the fabric of accompanying structures because of their heat-resistant qualities. In this context pieces of tile could have come from the locality but, if they were regarded as specially useful for particular purposes could as easily have been scavenged from a source further away.

The recently reported large Romano-British site in south Devon has produced a quantity of Roman roof tile from as yet limited excavation (Anon 2011, 261) and it is to be hoped that further investigation of this site may yield answers with regard to the function of such material on native, somewhat Romanised, settlements.

The pits

The radiocarbon determination of cal AD 385–545 (Wk-19959) from burnt grain in pit [333] just overlaps the end of the Roman period, with the majority of the range falling within the post-Roman – early medieval period. The similarity in form and fills of pit [310] suggest that it is probably broadly contemporary, as may be another unexcavated anomaly nearby within enclosure 305. The excavated pits showed evidence of burning around the bases and contained fills incorporating quantities of charcoal and charred grain. They almost certainly represent examples of what have been termed 'corn driers' (although 'grain driers' might be a more appropriate term), used to remove moisture from grain prior to threshing and subsequent milling or storage (Carruthers, above; Crane 2004, 17–18; Herring 1994). Some structures of this kind may have functioned as part of the process of malting grain for use in brewing (Reynolds and Langley 1979). Corn driers are found widely across Roman Britain, some with evidence of relatively elaborate structures (Morris 1979, ch 1). They are also known from upland medieval sites, including several deserted settlements on Bodmin Moor (Herring 1994).

Pits broadly similar in size and form to those at Penlee, showing evidence of burning and containing deposits of charcoal and charred grain, have been excavated on a settlement site at Nancemere, Truro, with radiocarbon dates extending from the mid-second to the late fourth century cal AD (Higgins 2009). Elongated charcoal-filled pits with traces of stone and clay linings have also been investigated at St Blazey Gate (St Blazey), at Ruthvoes and Black Cross (both St Columb Major) (Lawson-Jones 2012: this volume; Nowakowski and Johns, forthcoming), and at Trevithick Manor, Newquay (Taylor 2011). The St Blazey Gate pit is likely to be late Roman or early post Roman in date while those at Ruthvoes and Black Cross provided post-Roman – early medieval radiocarbon dates. The St Blazey Gate pit showed no evidence of charred grain but that at Ruthvoes contained barley and smaller quantities of wheat and oats and the fill of the Black Cross pit incorporated charred oats (Lawson-Jones 2012: this volume). The site at Trevithick Manor comprised a deep stone-lined pit filled with charred grain set within a large sunken circular hollow. The site remains undated, although provisional analysis of pottery associated with the site suggests a late prehistoric or Roman date.

A number of comparable features with post-Roman and early medieval radiocarbon dates have been excavated recently in south-west Wales

Fig 19 Charred grain pit [310], facing north. (Photograph: Historic Environment Projects, Cornwall Council.)

(Crane 2004, 2006a, 2006b, 2006c). Some of these were interpreted as cooking pits but others as corn driers or pits associated with the malting of grains; some may have been multi-functional (Crane 2006c). A two-chambered drier at Llanstadwell (similar to pits [333] / [335] at Tregony) may represent a drying chamber linked to a stoke hole where a fire would have burned. (Crane 2004); the drying chamber could have held a wicker tray to contain the grain and it is interesting to note in this context the presence of large amounts of hazel charcoal above the heat source in pit [333].

Pits identified as corn driers have also been excavated at Poundbury, Dorset, intriguingly also associated with a Romano-British cemetery. As at Tregony, the association was both spatial and temporal. The pits cut into the earlier Romano-British deposits and were dated both stratigraphically and by radiocarbon dating to the post-Roman – early-medieval period. As with the pits at Tregony, the corn dryers at Poundbury tended to be wider and deeper at one end and similarly had charred grain in the primary fills (Sparey-Green 1987, 90–1). It is interesting to note that, in the opinion of the excavator, various components of the earlier cemetery would have remained visible into the period of use of the corn driers (*ibid*).

The types of and mix of grains recovered from the Penlee pits, particularly the predominance of barley and oats and, conversely, the relative paucity of hulled wheat, are comparable with assemblages

recovered from post-Roman – early medieval sites elsewhere (Carruthers, above). Some variation in function of the pits may be indicated by the differences in the charcoal recovered from their primary fills (Gale, above): the deposits from pits [310] and [333] consisted primarly of fast-burning species, namely gorse and hazel, whereas that from [335] was dominated by alder and oak.

The context for the siting of the pits at Penlee remains obscure. The very limited contemporary evidence from Cornwall offers no indication that such burnt pits were sited within settlements (Lawson-Jones 2012: this volume) and it is possible that both the cremation burial and the later burnt pits were on the margins of or even at some distance from the farm or farms with which they were associated. However, the possible presence nearby of a settlement of some status during the Roman period is hinted at by the finds of an amphora sherd and fragments of Roman tile (Quinnell, above). Tregony itself is a planted town of the medieval period (Sheppard 1980, 27–30) and there is no known evidence of earlier occupation on the site. However, early-medieval settlement is implied by the element *tre* in the place-name (Padel 1985; 1987, 166) and a post-Roman inscribed stone is incorporated into the fabric of Cuby church, less than 400m north of the Penlee site. The stone is unlikely to have moved far from its original location and again hints at the presence of a settlement of some status in the vicinity. It is dated on typological grounds to the later sixth century (Thomas 1994, 283–4), perhaps just overlapping with the end of the range for the radiocarbon date on grain from pit [333], and is a memorial to the three children, one female, of an individual named *Ercilingus*. This suggests that the context for the creation of the memorial was secular rather than religious but also indicates that there was a settlement nearby with inhabitants with access to and respect for literacy, perhaps maintaining some form of Roman-derived culture (*cf* Dark 2002).

Conclusion

As with many archaeological discoveries, the site at Tregony, while opening a window on a largely unknown aspect of Romano-British life (or death) in Cornwall, raises yet more questions. Key among these are the apparent discrepancy between the radiocarbon date and the artefactual evidence, the idiosyncratic nature of the use of two vessels to hold the cremated remains of one individual, and the degree to which the cremation rite indicates the Romanisation of the community in which the deceased lived.

The pits containing charred grain represent a site type of which only a few examples have previously been excavated in Cornwall. The dataset will be enhanced by publication of some of the other identified sites (Lawson-Jones 2012: this volume; Nowakowski and Johns, forthcoming). They can be compared with similar sites of the same period in west Wales and Dorset, and the evidence from the grain firmly ties agriculture in Cornwall at that time to practices prevailing across southern Britain in the early medieval period.

Both types of feature encountered at Tregony may have been deliberately located away from the main settlement focus. At the moment it is not possible to say whether this lay on or near the present site of Tregony, perhaps associated with waterborne trade on the Fal, or may be represented by one of the round-type enclosures in the vicinity. It is to be hoped that future work in the area will address these issues.

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Early Neolithic activity and an Iron Age settlement at Penmayne, Rock, St Minver

JAMES GOSSIP, ANDY M JONES and HENRIETTA QUINNELL

with contributions from DANA CHALLINOR, JULIE JONES, and ROGER TAYLOR

A geophysical survey in advance of development at Penmayne, Rock, identified a series of curvilinear anomalies thought to represent late prehistoric settlement. Targeted evaluation trenching revealed three ring-gullies associated with roundhouses of probable Middle Iron Age date. Three smaller structures, superimposed upon the ring-gullies indicated a later phase of Iron Age settlement.

The work also discovered an Early Neolithic pit, associated with sherds of carinated bowl pottery and providing two radiocarbon dates in the mid-fourth millennium cal BC. The investigation has added further information about the character of Early Neolithic occupation in north Cornwall and is particularly important for providing close dating for carinated bowl pottery in the south west.

A third determination of 380–190 cal BC came from a hearth associated with a small assemblage of broadly Middle Iron Age pottery. The archaeological recording has provided another late prehistoric unenclosed settlement site for comparison with others in lowland Cornwall and increases the number of open settlements dating to the Iron Age.

Historic Environment Projects, Cornwall Council, was commissioned by Cornwall Rural Housing Association Ltd to undertake a programme of evaluation trenching at Penmayne, Rock, in advance of a proposed housing development.

Geophysical survey of the development area by GSB Prospection in October 2009 revealed several circular anomalies, suggesting a possible settlement of late prehistoric date (GSB 2009). In December 2009 the Historic Environment Projects team undertook a programme of archaeological evaluation which confirmed that the geophysical survey anomalies represented at least three prehistoric roundhouses and other cut features. As a result, an additional programme of mitigation trenching was agreed to further characterise the nature of these archaeological deposits and recover material suitable for radiocarbon dating.

Location and background

The site (centred on SW 94780 76182) is located at a height of 50m OD on a west-facing slope on former agricultural land between the historic settlements of Penmayne and Higher Penmayne, now absorbed into the village of Rock in the parish of St Minver (Fig 1). Recent housing development borders the site to the west and farmland to the north, south and east.

Bedrock geology comprises slaty mudstones of the Harbour Cove Slate Formation (British Geological Survey Sheet EW 335–336, 2004). Soil cover consists of shallow well-drained loams of the Powys Series over weathered shale (locally known as 'shillet') (National Soil Resources Institute, Soil Systems Group, 2004). Bare weathered rock was exposed in places after the topsoil was removed.

The settlement of Penmayne was first recorded in 1223 (Gover 1948, 128) and the area of the proposed development falls into a historic landscape character zone classified as Anciently Enclosed Land (Cornwall County Council 1996). This is land which has been settled and farmed since at least the medieval period and which often contains buried archaeological remains dating from prehistoric to the medieval period.

No archaeological sites were known within the development area but the Cornwall Historic Environment Record (HER) documents a number of apparently prehistoric cropmark sites in the wider vicinity. These include a complex group

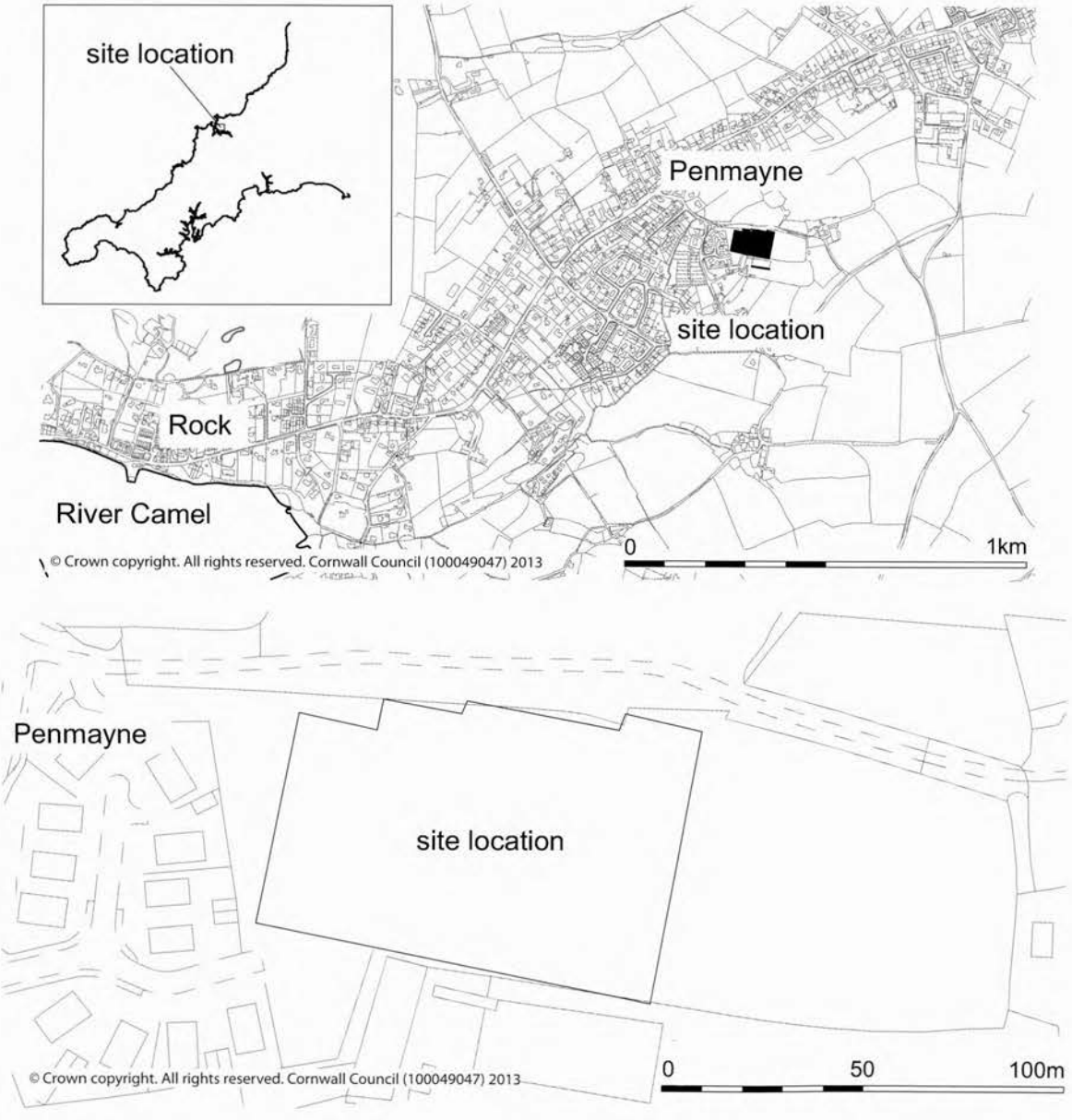

Fig 1 Penmayne location.

of features about 1km to the south of Penmayne, including enclosures and field systems probably of Iron Age or Romano-British date (MCOs 3356–3357, 8392, 21313, 21767–21768), together with a group of circular features which may represent Bronze Age barrows or, perhaps more probably, an unenclosed later prehistoric roundhouse settlement (MCOs 3352–3358, 29956). The presence of an enclosed settlement of late prehistoric date has recently been verified at Porthilly, approximately 1.5km to the south west (MCO 8391) (Gossip 2012: this volume). A possible late prehistoric enclosure is suggested by the fieldname 'Round Meadow' at Splatt, 300m to the north west of the Penmayne site (MCO 8490). The broader hinterland of the Camel estuary in which Penmayne lies is known for the high density of cropmarks representing late prehistoric settlement (Young 2012: this volume).

The excavations

The geophysical survey (Fig 2) revealed anomalies in the form of ring-gullies and associated features consistent with settlement of late prehistoric date (GSB 2009). The anomalies appeared to overlap, suggesting multi-phase activity, and were targeted by the initial evaluation trenching.

Initially three trenches (1–3) were set out to examine the geophysical anomalies, focusing on both discrete and apparently overlapping ring-gullies. In the light of the results from these trenches a further mitigation stage was agreed and another three trenches (4–6) extended these to help characterise the nature of settlement and the level of preservation (Fig 2). All areas of archaeological investigation were machine stripped under archaeological supervision to a level at which archaeological features or layers

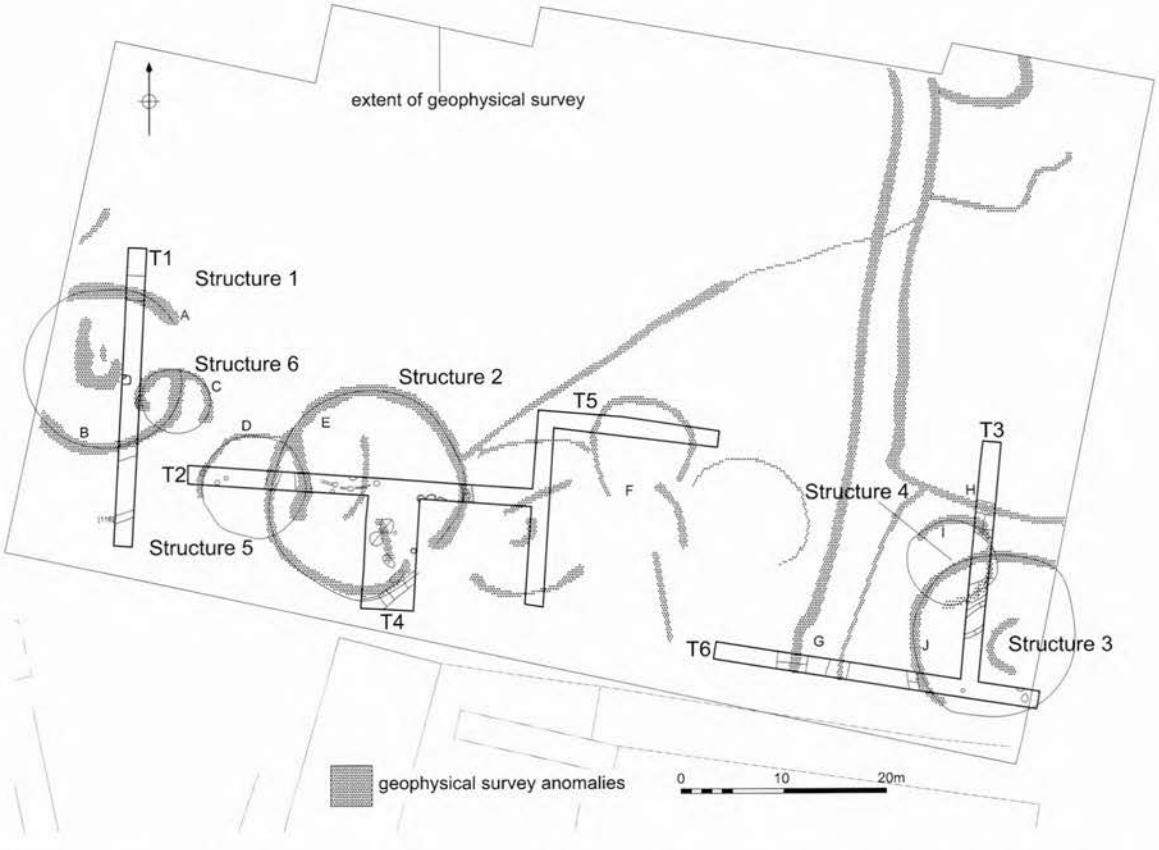

Fig 2 Archaeological recording at Penmayne, showing geophysical anomalies, trench locations and conjectural extents of roundhouses.

were revealed at the top of the 'natural' subsoil. Identified archaeological deposits were cleaned by hand and sample excavated.

The Early Neolithic pits

Trench 4

Trench 4 was designed to further characterise the large curvilinear geophysical anomaly (E) recorded as structure 2 in trench 2 (below), and specifically to target weaker anomalies thought to represent activity within the structure. The trench measured 10m long and 5m wide (Figs 2 and 3). The topsoil (400) was dark brown silty clay loam, 0.25m deep, above subsoil (401), a reddish-brown silty clay, 0.15m-0.25m deep. This sealed all archaeological features, which were cut into natural subsoil (402) from a depth of approximately 0.5m-0.6m below surface. Five pits – [403], [409], [407], [416] and [405] – were recorded in the trench (Fig 3).

Pit [403] was 1.8m long, 1.1m wide and 0.15m deep. The sides of the cut were concave and it had an irregular base. It was filled by (404), a mid brown silty clay with occasional stone and charcoal. It contained 52 sherds of Early Neolithic pottery, four flints and hazelnut shells (Quinnell, below; Challinor, below). Two hazelnut shells from this deposit have been radiocarbon dated to 4770 ±30BP, 3640–3510 cal BC (SUERC-315182) and 4775 ±30BP, 3650–3510 cal BC (SUERC-315183). Above this, the pit was sealed by a homogenous, dark brown silty clay spread (411), 0.05m deep from which a single sherd of gabbroic pottery was recovered.

Adjacent to the north was oval pit [405], 1.5m long, 0.8m wide and 0.25m deep, with steep concave sides and a flat base. Its fill (406) comprised mid brown silty clay with occasional charcoal. A smaller pit or posthole [416] nearby (cut by Iron Age feature [415]; Fig 5) was 0.5m in diameter and 0.2m deep with steep concave sides and a rounded base. Fill (414) was a friable mid brown silty clay with large quantities of weathered shillet fragments.

To the north-west, pit [407] was 1m in diameter and 0.25m deep with gradual concave sides and an irregular base. It was filled by (408), a sticky greyish brown silty clay with a very large quantity of angular weathered shillet. Adjacent to this was pit [409], a 0.2m deep cut with gradual concave sides and an irregular base. It was filled by (410), a greyish brown silty clay with a very large quantity of angular weathered shillet similar to (408). The relationship between the two pits was obscured by an area of apparent bioturbation. Both deposits were sealed by (417), a reddish-brown silty clay 0.05m deep.

Pits [409], [407], [416] and [405] may all have been of the same Early Neolithic date as pit [403]; they were all rather irregular concave pits with single backfill deposits. However, none of these features contained any artefacts, so it remains a possibility that they were part of Middle Iron Age structure 2.

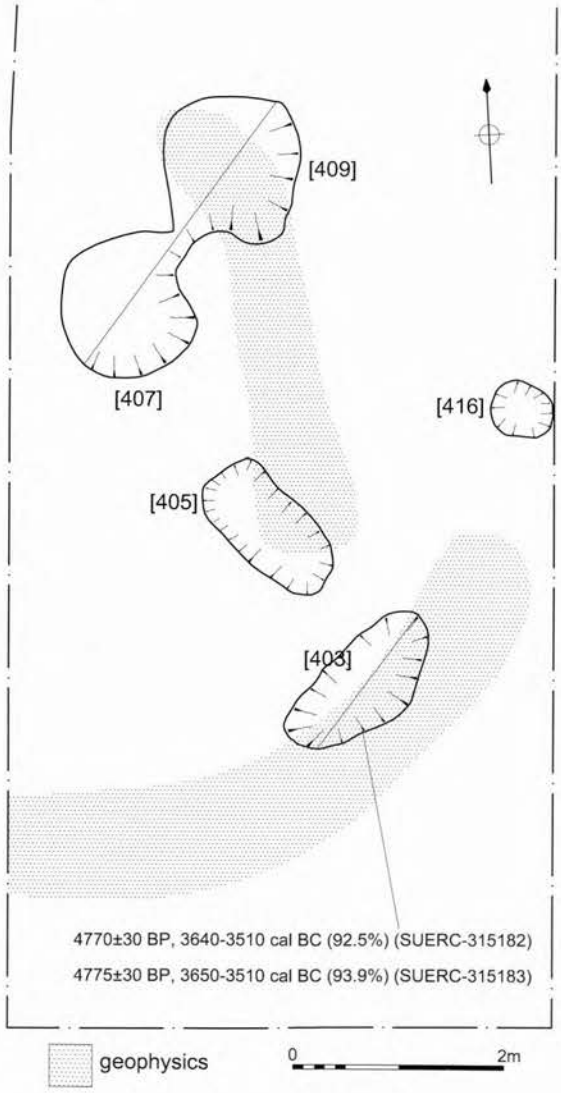

Fig 3 Trench 4: Early Neolithic pit [403] and possible contemporary features.

The Iron Age settlement

A linear alignment of three large circular structures (1, 2 and 3) was suggested by the geophysical survey and verified by the evaluation trenching (Figs 2, 4–6). An additional three structures, possibly relating to another phase of settlement, were suggested both by geophysical anomalies and excavated features (structures 4, 5 and 6). A radiocarbon determination from a feature within structure 2 provided a Middle Iron Age date for the settlement and this is supported by a small number of pottery sherds.

Structures 1 and 6

Trench 1 (Fig 4) was aligned north-south and positioned over a large circular geophysical

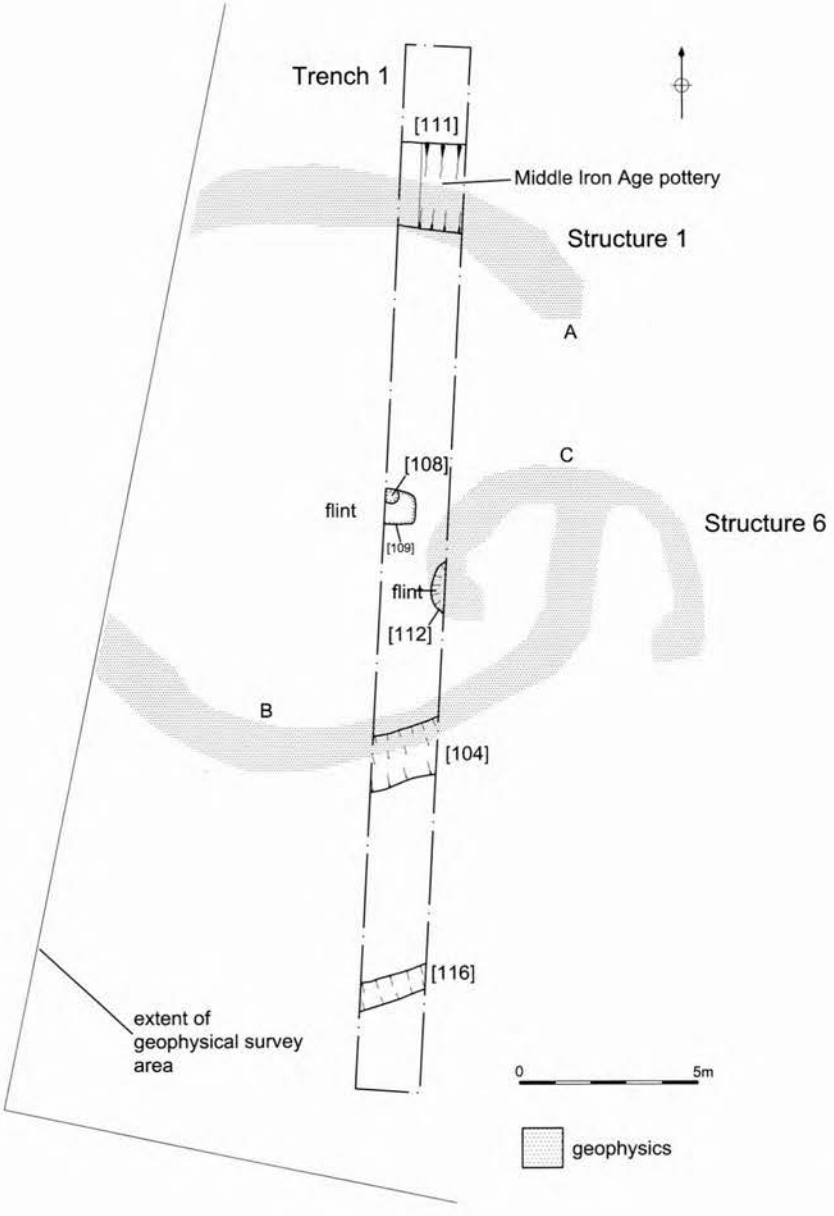

Fig 4 Trench 1: structures 1 and 6.

survey anomaly close to the western extent of the development area (structure 1). A second anomaly (C), possibly representing a smaller structure (structure 6), overlapped the eastern side of structure 1.

The topsoil layer (100) was a mid brown silty clay loam 0.05m deep, mostly scoured away by more recent development. This sealed (105), a light reddish-brown friable silty clay up to 0.35m deep, probably representing an earlier ploughsoil. (This was recorded in trench 2 as (235), in trench 3 as (301), in trench 4 as (401) and trench 6 as (601), and sealed all archaeological features.) All features were cut into natural subsoil (114) from a depth of approximately 0.3m to 0.4m below surface.

Results from the trenching revealed that structure 1 was represented by two lengths of curvilinear ditch or ring-gully, [111] and [104]. At the northern end of the trench curvilinear ditch [111] was 1.5m wide and 0.45m deep and had steep concave sides and a rounded base. The cut was filled by basal layer (110) and secondary fill (101). Deposit (110) was a mid reddish-brown silty clay with grey lenses; it was 0.2m deep and contained occasional small fragments of angular shillet. Fill (101), was a mid reddish-brown silty clay containing very frequent angular stone and was 0.25m deep. Six sherds of Middle Iron Age pottery were recovered from this deposit. This represented the northern arc of the curvilinear ditch forming structure 1.

The southern arc of structure 1 was represented by [104], a curvilinear ditch 1.6m wide and 0.3m deep with a steep-sided northern edge and a stepped southern edge and rounded base, filled by deposit (106), a light reddish-brown friable silty clay with occasional shillet fragments 0.3m deep below (105).

Within structure 1 and against the western baulk of the trench was cut [109], a square pit measuring 0.85m long and 0.75m wide cut into the natural clay subsoil. This had steep, almost vertical sides 0.2m deep and a flat base filled by (102), a light reddish-brown silty clay with a moderate amount of shillet with occasional inclusions of an unidentified non-slate rock type. This deposit incorporated a core preparation flake (Quinnell, below). It was cut by posthole [108], which was filled by (107), a reddish-brown silty clay. The posthole was circular, 0.27m in diameter and 0.15m deep, with vertical sides and a flat base.

The trench revealed features corresponding to the geophysical anomaly, suggesting that structure 1 measured approximately 14m in diameter, although its western side lay beyond the geophysical survey area. The geophysical survey also suggested an entrance measuring roughly 2.6m wide on the eastern side of the structure, although it is also possible that it lay to the west.

The evidence for structure 6 was less conclusive. Just to the south of pit [109] was a bowl-shaped feature [112] protruding from the east side of the trench; this was 1.45m wide and 0.4m deep with steep concave sides cut into the natural subsoil. This feature appeared to coincide with the western end of a smaller geophysical anomaly C and may possibly have been the ditch or ring-gully terminal of structure 6 identified by the geophysical survey, or alternatively a feature associated with the entrance to structure 1. The cut contained basal fill (113), a grey silty clay 0.15m deep, sealed by secondary fill (103), a light reddish-brown silty clay 0.3m deep. This contained frequent shillet fragments, occasional rock, charcoal and a flint core. The curvilinear anomaly revealed by the geophysical survey suggested a possible structure measuring approximately 6m in diameter.

Outside structure 1, at the southern end of the trench was gully [116], a shallow, steep, concave-sided cut in natural bedrock. This was 0.1m deep and 0.4m wide and ran parallel to (or concentric with) [104]. It was filled by (115), a reddish-brown silty clay. The gully was not revealed by the geophysical survey but could represent either an additional structure or part of a field system (below).

Structures 2 and 5

Trench 2 (Fig 5) was located over two curvilinear geophysical anomalies (D and E) which appeared to represent intersecting structures (structures 2 and 5). Trench 4 was subsequently extended to the south to explore anomalies inside structure 2 (above).

The topsoil (200) / (236) was a mid brown silty clay loam 0.1m deep above subsoil (235), a light reddish-brown friable silty clay 0.3–0.45m deep which sealed all archaeological deposits. All features were cut into natural subsoil (201) from a depth of approximately 0.4–0.55m below surface.

Structure 2 was comprised of ditches or ring-gullies [202], [226] and [421]. The easternmost feature recorded was [202], a curvilinear cut 0.3m wide with a flat base 0.1m wide and stepped on its

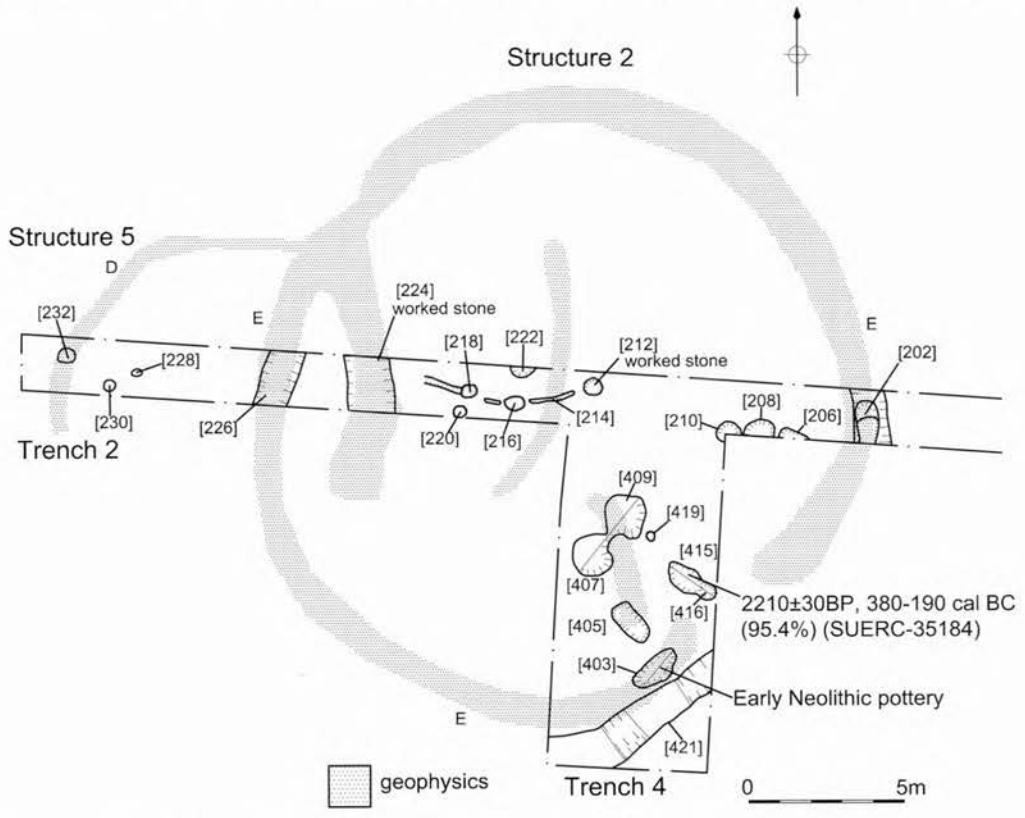

Fig 5 Trenches 2 and 4: structures 2 and 5.

eastern edge, with a break of slope into a deeper slot in the base of the cut up to 0.4m deep and a near-vertical western edge (Fig 5). This feature formed the eastern side of structure 2. The gully was filled by basal deposit (204), a reddish-brown friable silty clay, which was sealed by (205), a mid brown friable silty clay containing frequent shillet fragments.

Cut [226] was a curvilinear ditch or gully aligned north-north-east – south-south-west. It formed the western side of structure 2 and, as with [202], corresponded with the large geophysical survey anomaly E. It measured 0.9m wide by 0.14m deep and had steep concave sides and a flat base. It was filled by (227), a friable dark brown silty clay. Cut [421] was a curvilinear ditch revealed at the southern end of trench 4, extended to the south of trench 2. The ditch measured 1.5m wide and 0.2m deep, with a rounded, concave profile. Fill (420) comprised mid brown silty clay with frequent angular stone, occasional charcoal and a pottery sherd of Neolithic date (Quinnell, below). A break in the geophysical anomaly suggested an entrance to the structure on the south-east side, and this may have been located just outside the trench to the east.

Within the eastern part of structure 2 was a group of three irregular cuts, [206], [208] and [210], which extended into trench 2 from the south. They were cut into natural subsoil (201) and filled by homogenous deposits (207), (209) and (211) respectively, comprising mid brown silty clays with few inclusions. These possible pits or hollows each measured 0.1m in depth and were 0.4–0.8m in length with widths of 0.45m (although they were not exposed in their entirety).

Between the centre and the western edge of structure 2 was a series of features connected by short lengths of a shallow gully. Cut [212] was a circular posthole with vertical sides and a flat base, measuring 0.4m diameter and 0.24m deep. It was filled by (213), a friable mid brown silty clay

which contained a number of angular stones with signs of heating. A smooth cobble, probably used as a rubbing stone, was retrieved from this context (Quinnell, below), as was a charred wheat grain (J Jones, below). A steep-sided curvilinear gully [214] measuring 0.1m deep and 0.05–0.1m wide, filled by deposit (215), a friable dark greyish brown silty clay, formed an arc extending from posthole [212] towards posthole [216]. The latter was a circular posthole 0.35m in diameter and 0.15m deep with vertical sides and a flat base. It was filled by (217), a friable mid brown silty clay.

Gully [214] continued in an arc to the west where it connected with [218]. This was another vertically-sided posthole 0.3m in diameter and 0.15m deep with a flat base. It was filled by (219), a friable mid brown silty clay. Just to the south of this, against the side of the trench, was [220], a similar posthole 0.25m deep filled by (221), a mid brown silty clay with occasional charcoal flecks. The postholes are undated but they may have formed part of an internal arrangement around the south side of hearth [222]. Within the arc of gully [214] and extending into the trench from the northern baulk was [222], a possible hearth-pit. This was 0.55m in diameter with concave sides and a rounded base. It was filled by (223), a mid brown silty clay 0.2m deep containing frequent burnt stones and occasional charcoal flecks and fragments; this sealed the basal fill (237), a layer of red clay 0.1m deep, possibly the result of burning.

Trench 2 was extended to the south by trench 4 (above) to investigate apparent internal features identified by the geophysical survey. Features [405], [407], [409] and [416] have been described above and may be Neolithic in date, as with adjacent pit [403], or be of Iron Age date and associated with structure 2. On the east side of this pit group was cut [415], a sub-circular bowl-shaped pit 0.95m in diameter and 0.2m deep. The basal fill (413) was a friable red clay with very frequent charcoal flecks and included a charred wheat grain (J Jones, below). Above this was fill (412), a compacted mid brown silty clay with large quantities of burnt stone. Hazel charcoal from this context gave the radiocarbon date 2210 ±30BP, 380–190 cal BC (SUERC-35184). The feature may have been an internal hearth pit, although its location so close to the ring-gully of structure 2 is surprising. Pit [415] cut deposit (414), the fill of a smaller pit or posthole, [416], of probable Neolithic date (above). Another posthole, [419], was recorded just to the south east of pit [409]. It was 0.3m in diameter and 0.15m deep with vertical sides and a flat base, and was filled by (418), a mid brown silty clay. This may have also have been part of structure 2.

Although most of the excavated features could not be dated, the trenching confirmed the results from the geophysical survey. Structure 2 was found to consist of a circular ditch or ring-gully approximately 18m in diameter, and a pit within it was dated to the Iron Age.

A possible smaller circular structure (structure 5) was identified to the west of structure 2. This was represented by a ditch or ring-gully [224] located to the east of ditch [226] within trench 2. It was aligned north-south, with shallow concave sides and a rounded base 1.6m wide and 0.28m deep cut into bedrock. Cut [224] was filled by (225), a friable dark brownish-grey silty clay which contained a worked pebble (S1), probably used as a whetstone (Fig 9), and was sealed by subsoil (235). Cut [224] corresponded with the geophysical survey anomaly D and may have been part of another curvilinear feature, structure 5, which intersected with structure 2 (anomaly E), although the relationship between the two structures was not revealed. Anomaly D suggested that structure 5 had a diameter of approximately 8.5m.

A group of three postholes were revealed at the western end of the trench. These were each 0.1m in diameter and comprised [228], 0.15m deep, [230], 0.3m deep, and [232], 0.3m deep. All three had vertical sides and flat bases and were filled by brown silty clays (229), (231) and (233) respectively. Deposit (231) was notable for an abundance of charcoal flecks and fragments. Posthole [232] fell on the line of geophysical anomaly D but this was not apparent as a linear feature in the trench.

Structures 3 and 4

Trench 3 was located over curvilinear geophysical anomalies J (structure 3) and I (structure 4) at the eastern end of the site, with trench 6 extending east and west from its southern end (Fig 6).

Topsoil layer (300) was a dark brown silty clay loam 0.35m deep above subsoil (301), a reddish-brown silty clay up to 0.22m deep. This sealed all archaeological features. All features were cut into natural subsoil (315) from a depth of approximately 0.5–0.6m below surface.

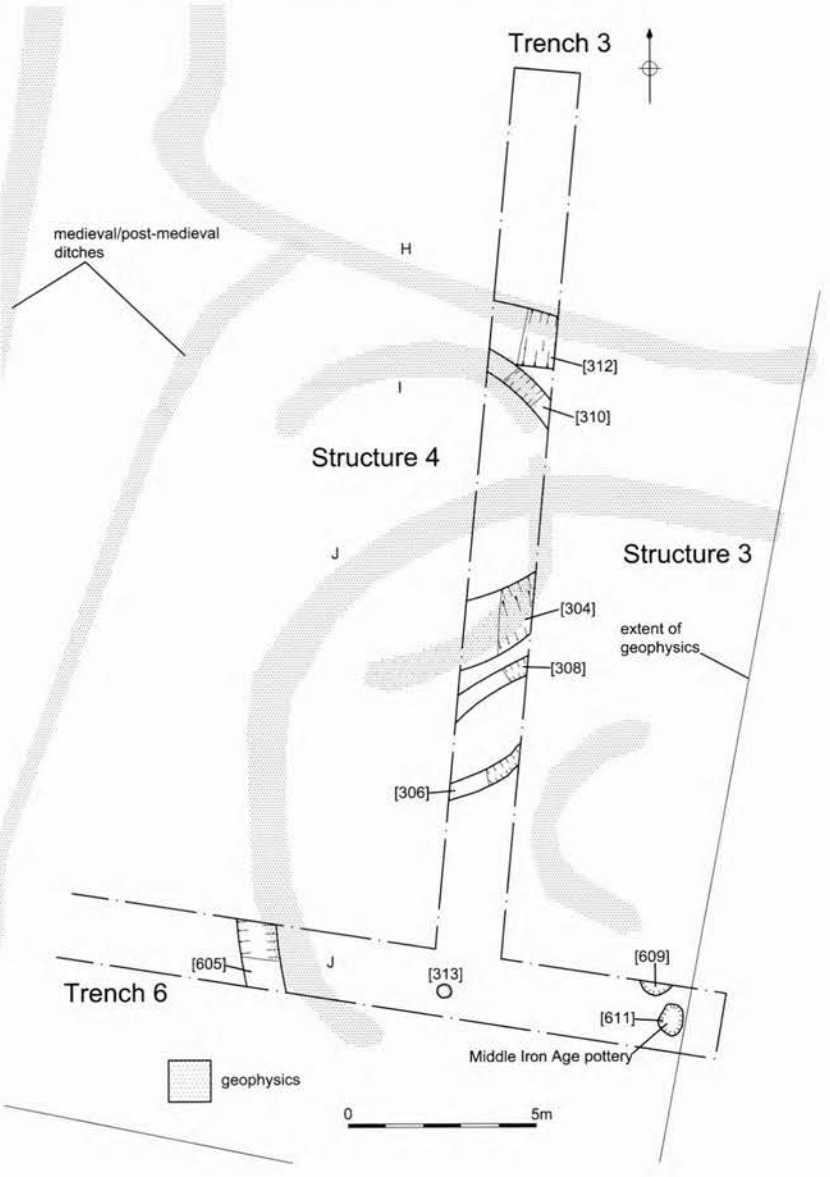

Fig 6 Trenches 3 and 6: structures 3 and 4.

Evidence for the ring-gully associated with structure 3 was revealed in trench 6. Curvilinear gully [605], 0.7m wide at the top of the cut and 0.3m deep with steep sides and a concave base, corresponded with the south-western arc of geophysical anomaly J and formed the south-western side of structure 3. Fill (604) was a compact mid brown silty clay with occasional shillet fragments. The northern arc of anomaly J, suggested by the geophysical survey to intersect with anomaly I, was not apparent in trench 3. This may have been a result of truncation or potentially the trench coincided with the location of the entrance into the structure. Anomaly J suggests that structure 3 had an approximate overall diameter of 15m.

At the eastern end of trench 6, extending into its northern side, was cut [609], a concave, bowl-shaped pit or posthole 0.15m diameter and 0.15m deep. This was filled by (608), a compact mid brown silty clay with occasional charcoal flecks. Immediately to the south was [611], a similar but

oval bowl-shaped pit or posthole measuring 0.7m by 0.5m and 0.2m deep cut into natural shillet subsoil. The feature was filled by (610), a mid brown, compact silty clay containing occasional charcoal flecks and shillet fragments. Three sherds of prehistoric pottery were recovered from this fill. At the southern end of trench 3 was posthole [313]. This was 0.15m in diameter and 0.25m deep with vertical sides and a flat base. It was filled by (314), a mid brown silty clay. Features [609], [611] and [313] fall within the conjectured arc of the structure 3 ring-gully and may have been structural postholes.

Structure 4 comprised ditches [304] and [310], both of which were located in trench 3. Curvilinear ditch [304] corresponded with the southern arc of geophysical anomaly I and formed the southern side of structure 4. It measured 1.3m wide and 0.4m deep and was filled by friable dark reddish-brown silty clay (302), 0.3m deep, which overlay (303), a mid brown sticky silty clay 0.1m deep containing large amounts of fragmented stone. The northern side of structure 4 was defined by cut [310], a curvilinear gully measuring 0.5m wide and 0.1m deep with steep concave sides and a rounded base filled by light reddish brown silty clay (309). This was aligned with the north-east side of anomaly I. Gully [310] was cut by medieval or post-medieval ditch [312]. The results from the geophysical survey and the trenching indicate that structure 4 measured approximately 7m in diameter.

Parallel to ditch [304] was gully [308], 0.4m wide and 0.1m deep with concave sides and a rounded base. This was filled by (307), a mid reddish-brown silty clay. A second curvilinear gully, [306] was located to the south of [304]. It was 0.5m wide and 0.1m deep with gradual concave sides (steeper on the northern edge) and a flat base. It was filled by (305), a mid brown compact silty clay with few inclusions. Neither of these gullies corresponded with anomalies identified by geophysical survey. It is therefore uncertain whether they were associated with further Iron Age structures, or are of an entirely different date.

Field systems

Further features were recorded in trenches 3 and 6 which represented parts of a field system with medieval or post-medieval origins (Figs 2, 6 and 7). At the northern end of trench 3 was linear ditch [312], with steep sides 0.3m deep and 1.2m wide and a flat base, filled by (311), a friable, dark reddish brown silty clay. This feature corresponded with geophysical anomaly H and cut curvilinear gully [310], part of Middle Iron Age structure 4. The north-south portion of anomaly H appears to coincide with a boundary shown on the St Minver tithe map of *c* 1840 and the Ordnance Survey 1st edition 25in: 1 mile map of *c* 1880. Neither show features which might coincide with the excavated portion of [312], however. (A footpath shown on the Ordnance Survey map may indicate the origin of the north east – south west linear anomaly shown on Fig 2.)

Other linear features were identified in trench 6 sealed below topsoil (600) and subsoil (601) at a depth of 0.55m below the surface of the field. At the western end of the trench was [602], the cut of a north-south linear ditch cut into shillet, with stepped (but irregular) edges and a flat base, 0.3m deep and 2.5m wide. This was filled by (603), a mid brown silty clay containing occasional shillet fragments. Two sherds of medieval coarseware (thirteenth to fourteenth century), a sherd of post-medieval earthenware (seventeenth or eighteenth century) and a residual prehistoric flint flake were recovered from this deposit.

Parallel and adjacent to this was [607], part of a linear ditch 1.8m wide and 0.25m deep with gradual concave edges and a rounded base cut into the weathered bedrock natural. The ditch was filled by deposit (606), a mid brown compact silty clay. Both [602] and [607] correspond with geophysical anomalies and appear to represent a removed Cornish hedge, the below-ground evidence of which is often two parallel shallow ditches. Ditch [312] is likely to be part of the same field system.

Weak geophysical anomalies

Trench 5 was located in order to target weak geophysical anomalies (F) to the east of those investigated in trenches 2 and 4, thought to represent further settlement evidence. However, no archaeological features were identified within the trench.

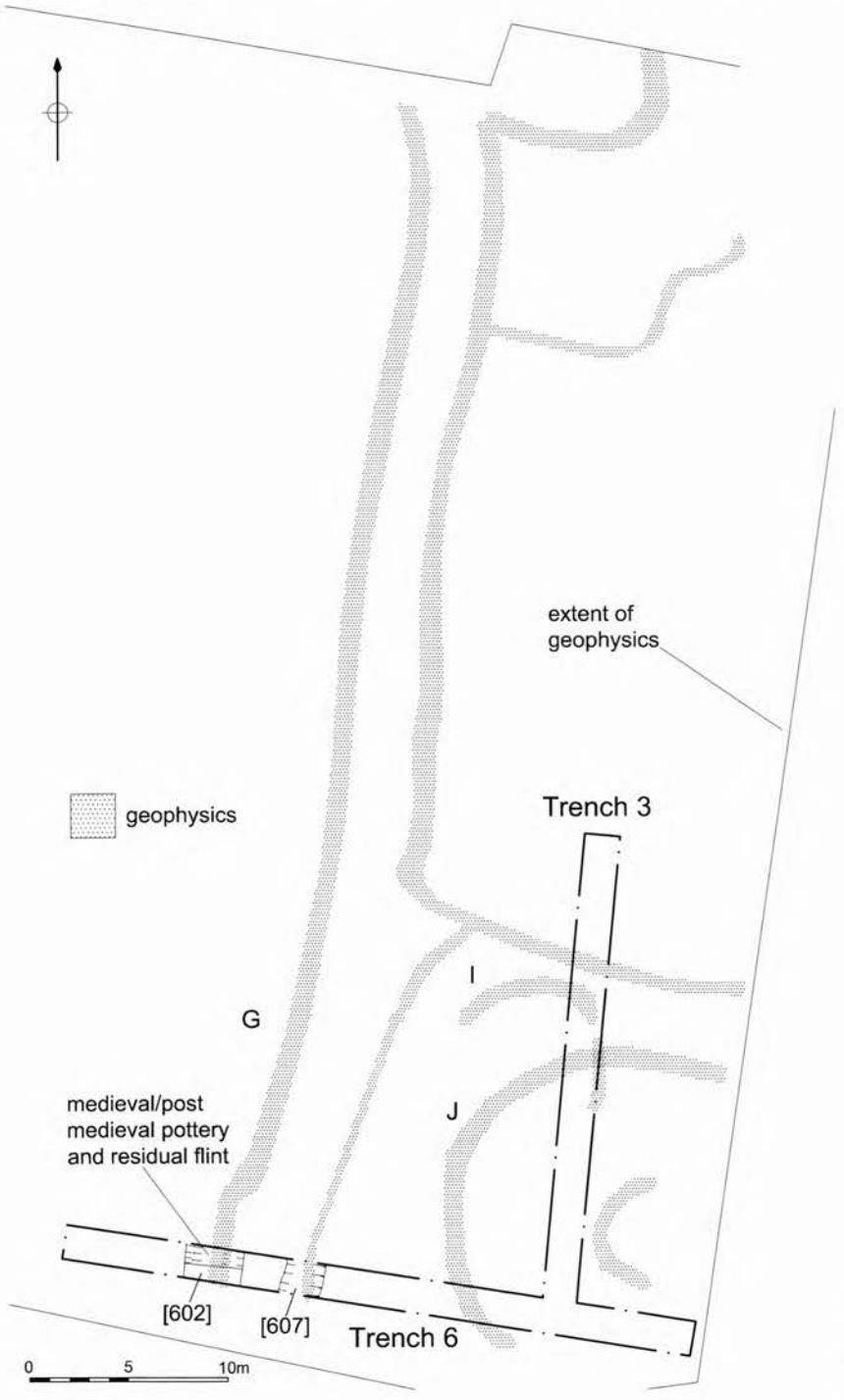

Fig 7 Trench 6: the medieval or post-medieval field system.

The pottery

Henrietta Quinnell, with petrological comment by *Roger Taylor*

Table 1 Details of pottery by fabric, sherd numbers and weight (g)

Context	*Description*	*Neolithic gabbroic*	*Bronze Age gabbroic*	*Middle Iron Age granitic derived*	*Totals (sherds/g)*
(404)	Fill of pit [403]	52/185			52/185
(411)	Spread sealing pit [403]	1/26			1/26
(420)	Residual in gully [421]	1/10			1/10
(101)	Top fill gully [111], structure 1			6/4	6/4
Trench 2	Unstratified area of structure 2			1/4	1/4
(610)	Fill pit [611] area of structure 3			3/4	3/4
Unstratified			2/15		2/15
Totals		**54/221**	**2/15**	**10/12**	**66/248**

Fabrics

Neolithic gabbroic with vein quartz

Well-made gabbroic fabric, oxidised 5YR 6/6 reddish yellow. Most sherds thin, approximately 5mm thick, but some about 10mm thick; the latter have interiors reduced 5YR 3/1 very dark gray. Sparse to moderate inclusions principally of crushed vein quartz added to the gabbroic clay. The thickness of sherds increases down each vessel from the rim. The surfaces, internal and external, have been burnished below the rim and, in one vessel (not illustrated), the burnish appears to extend externally down below the girth of a carinated bowl. All sherds are reasonably fresh. The outer surfaces of thicker sherds, from low down on bowls, are considerably abraded with protruding grits. This is probably due to heat damage to their surfaces, rendering these areas more susceptible to groundwater damage.

Roger Taylor has examined sherds microscopically and confirms their petrology as of gabbroic clay with added vein quartz. White vein quartz is a frequent addition to Early Neolithic fabrics of various kinds. Gabbroic clay mixed with basalt and vein quartz was identified in a pit group at Portscatho (Quinnell and Taylor 2006, 5), while much of the coarse category of gabbroic fabric found at Carn Brea contained angular quartz inclusions (Smith 1981, 162; pers comm author). Vein quartz is not found in the immediate gabbro area on the Lizard but occurs widely across Cornwall. The source of the vein quartz and the place of the potting of the Neolithic vessels from Penmayne cannot therefore be established.

Bronze Age gabbroic admixture

Generally oxidised 5YR 5/6 yellowish red. Sherds up to 12mm thick. Roger Taylor has examined these sherds microscopically and identified sparse igneous rock inclusions from a non-gabbroic source added to Lizard gabbroic clay. These sherds indicate that gabbroic clay was being transported away from the Lizard and then mixed with igneous rock inclusions. There are now numerous examples of gabbroic fabrics from Middle Bronze Age sites at which gabbroic clay has been transported and then potted with either filler or local clay mixed in. A good summary of the evidence to date is given in the report on the pottery from the Middle Bronze Age roundhouse at Carnon Gate, where the use of gabbroic clays appears to have been particularly complex (Quinnell 2008).

Iron Age granitic derived

Reduced 5YR 3/1 very dark grey, burnished outer surface, generally thin-walled sherds approximately 6mm thick, sparse coarse inclusions including water-worn quartz. Roger Taylor examined sherds microscopically. The only inclusions identifiable because of the dark reduction are quartz and little feldspar and mica; he describes the fabric as granitic derived and sourced anywhere along the rivers and streams flowing off Bodmin Moor. The fabric is broadly comparable to fabric GR.1 from Trevelgue Head cliff castle, used there during the Early and the Middle Iron Age (Quinnell and Taylor 2011a, 148).

Early Neolithic

The sherds could all belong to the four illustrated vessels. The thicker sherds could come from the curved base of any of the four. Two joining sherds, extremely well-finished, come from the carination of a carinated bowl: it is possible that they represent a third definite carinated bowl, rather than belong to **P1** or **P2**. A small rim sherd with a pronounced eversion may belong to an irregularity on the rim of **P3** or to a separate vessel.

Illustrated vessels from pit [403] (Fig 8)

P1 Three joining sherds, rim slightly flattened, come from the upper part of a carinated bowl, internal diameter approximately 280mm. Both interior and exterior are well burnished

P2 Two joining sherds, rim slightly pointed, from the upper part of a carinated bowl. Both surfaces burnished

P3 Open bowl, rim flattened with slight external expansion. The slight change in curve at the base of the sherd indicates that it may come from a carinated bowl. Both surfaces burnished.

P4 Slightly pointed rim from vessel with neutral shape, just possibly from a carinated bowl. Exterior burnished.

Comment on the Early Neolithic assemblage

Penmayne belongs in the South Western style of Early Neolithic pottery, sometimes referred to as Hembury Ware. Carinated bowls, the distinctive feature of which is the slightly concave curve in the neck above the carination, are not a major component of this style. In Cornwall, on the evidence currently available, carinated bowls occur throughout the currency of this style which was in use from the 38th until the 34th centuries cal BC (Bayliss *et al* 2011, fig 14.101). The significance of the assemblage and the results from the radiocarbon dating are discussed below.

Bronze Age

The two abraded sherds of gabbroic admixture fabric are typical of Trevisker pottery which occurs in both the Early and the Middle Bronze Age. One sherd has cord impressions, made with three close-set lines with a parallel twist (see Woodward and Cane 1991, fig 46, no 31, for an example of this decoration). The presence of these two sherds indicates activity involving Trevisker pottery somewhere in the close vicinity. Finds of Trevisker pottery in the Early Bronze Age are virtually confined to those associated with funerary ritual, while those from the Middle Bronze Age usually have links to domestic activity. It seems likely that the Penmayne sherds indicate Middle Bronze Age settlement somewhere nearby.

Middle Iron Age

The radiocarbon date of 2210 ±30 calibrating to 380–190 cal BC (95.4 per cent) (SUERC-35184) from (413), the fill of pit [415], indicates a broadly Middle Iron Age date which may apply to the ring-gully structures and so to the reduced granitic derived ceramics. The reduction, the amount of inclusions and the general appearance of this fabric are appropriate for the Middle Iron Age and for the South Western Decorated ware of this period. It is unusual for a site of this period to have so little pottery.

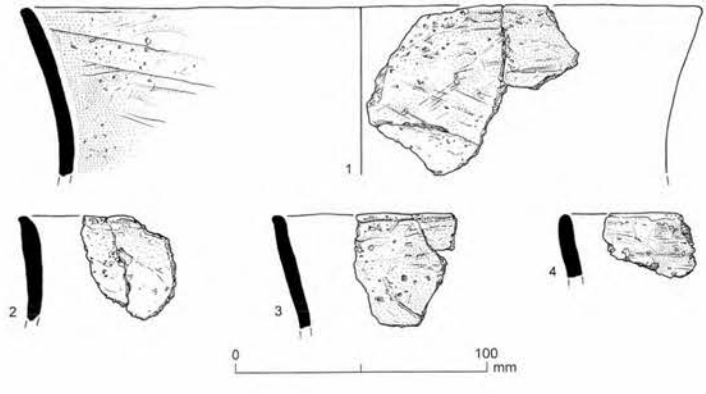

*Fig 8 Neolithic pottery (**P1**, **P2**, **P3** and **P4**). (Drawing: Jane Read.)*

Stonework

Henrietta Quinnell with petrological comment by *Roger Taylor*

The stonework comes from contexts in structure 2 which, on the basis of the radiocarbon date (SUERC-35184) and the granitic derived pottery, are assumed to be Middle Iron Age. The closest Middle Iron Age excavated settlement, that at the cliff castle at the Rumps (St Minver) some 5km to the north, has a large assemblage of stone tools making use of locally-sourced cobbles (Brooks 1974, figs 33–34).

S1 (Fig 9) (225) fill of gully [224] in structure 2. Part of a bladed cobble, one side worn flat and almost polished, almost certainly through use as a whetstone. 105mm+ x 47mm x 18mm. Most parts of the surface, including that flattened by use, have blocks of small striations with a range of different directions: the cause of these is not known. The used surface is slightly spalled, apparently through heat damage. Roger Taylor identifies this as a Devonian fine-grained micaceous sandstone bladed local beach cobble.

S2 Not illustrated. (213) fill of posthole [212] in structure 2. Cobble rubbing stone with distinct smooth worn patch on one face. Has spalled and broken through heat: the three fragments recovered represent most of the artefact. Surviving dimensions 112mm x 58mm+ x 37mm. Roger Taylor identifies this as a beach cobble of basic fine-grained igneous rock which was probably local sourced.

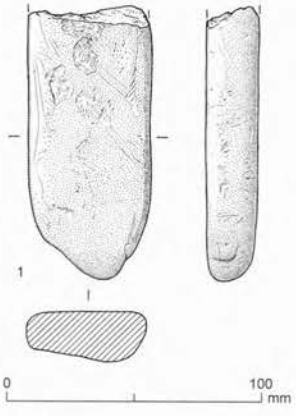

*Fig 9 Middle Iron Age stonework (**S1**). (Drawing: Jane Read.)*

S3 Not illustrated. (102) fill of pit [109] within structure 1. Quartz crystal, 37mm long, the tip of which shows signs of wear. Crystals with similar wear traces were found in Middle Iron Age contexts at Higher Besore (Quinnell, forthcoming). They were also identified at Trevelgue Head cliff castle near Newquay but here the worn tips were compared with examples from the beach and it was concluded that the wear on these was due to water action (Quinnell and Taylor 2011b, 260).

Lithics

Henrietta Quinnell

There are six pieces of worked flint. Both pebble flint and flint with a slightly waterworn cortex was present; this flint is similar to that found in secondary deposits in Devon, especially that at Orleigh Court near Bideford (Newberry 2002, 19).

Four pieces from context (404), the fill of pit [403], are of similar grey flint; two have pebble cortex. One piece is a shattered fragment from a thick core preparation flake, the second and third flakes from core preparation, one cortical. The fourth is a blade, 45mm in length, struck from a small blade core. These pieces are consistent with the lithic technology current in the Early Neolithic and show that flint was being worked in the vicinity of pit [403].

Two contexts with lithics are close together in the centre of structure 1. Context (103), the fill of gully [112], has a core fragment of pebble flint, broken through heat. Context (102), the fill of pit [109], has a thick core preparation flake using mottled grey flint with cortex only slightly water-worn. Similar flint to that in pit [109], with a slightly water-worn cortex, was used in a flake from (603), the fill of post-medieval ditch [602]; this was a thick piece from core preparation. These pieces are difficult to date but are likely to belong late in the use of flint and may be contemporary with the Trevisker Bronze Age sherds.

The charred plant remains

Julie Jones

The flots obtained from the 13 samples were all very small, most either 1ml or less in volume.

Most of these included some modern root material with occasional modern seeds and many had small assemblages of land snails, dominating the flots from contexts (213), (217), (223), (233) and (413). These snail assemblages have not been analysed but a high proportion were recognised as the blind snail (*Cecilioides acicula*), a subterranean species, likely to be a modern intrusion. Up to five other species of land snail were noted. There was also occasional charcoal in many samples, mostly highly fragmented with few pieces of sufficient size to enable species to be identified.

Charred plant remains occurred in only three samples (Table 2). Single-hulled wheat grains were found in posthole [212], fill (213), and pit [415], fill (413), with weed seeds of black bindweed (*Fallopia convolvulus*) and ribwort plantain (*Plantago major*). Three hazelnut shell fragments (*Corylus avellana*) came from pit [403], layer (404).

The paucity of charred remains means that interpretation is not possible, apart from stating that hulled wheat was available to the settlement at Penmayne, but it is not possible to say whether this crop was grown or processed locally.

Table 2 Charred plant macrofossil identifications

Context	*Fill of*	*Flot size (ml)*	*Sample composition*	*Charred plant remains*
(211)	Pit? [210]	<1	Predominantly modern roots, occasional charcoal flecks. Approximately 20 land snails, mostly *Cecilioides acicula*.	None
(229)	Posthole [228]	<1	Occasional modern roots and leaves.	None
(231)	Posthole [230]	1	Predominantly modern roots occ charcoal fragments, all <1mm. Approximately 25 *Cecilioides acicula* plus 25 other land snails (6 species).	None
(233)	Posthole [232]	2	Predominantly snails and broken shell; approximately 70 *Cecilioides acicula* plus 20 other land snails (3 species). Occasional modern roots. Occasional charcoal fragments, all <1mm.	None
(213)	Posthole [212]	1	Predominantly snails and broken shell. Approximately 150 *Cecilioides acicula* plus 30 other land snails (3 species). Occasional charcoal fragments, all <1mm.	*Triticum* (hulled wheat grain) 1 *Carex* (sedge) 1
(217)	Posthole [216]	<1	Predominantly Snails. 10 *Cecilioides acicula* plus 20 other land snails (4 species). 1 charcoal fragment.	None
(219)	Posthole [218]	<1	Few tiny charcoal flecks. 8 *Cecilioides acicula* and 1 other land snail. 1 modern seed.	None
(223)	Hearth [222]	1	Mineral and modern roots. Many snails and broken shell; approximately 100 *Cecilioides acicula* plus 25 other land snails (4 species). Occasional charcoal fragments.	None
(610)	Pit [611]	1	Predoninantly modern roots and 1 modern seed. Occasional charcoal fragments, all <1mm. Approximately 20 *Cecilioides acicula* plus 25 other land snails (5 species).	None
(608)	Pit [609]	1	Predominantly modern roots and 1 modern seed. 10 highly fired charcoal fragments and occasional flecks. Approximately 20 *Cecilioides acicula* plus 20 other land snails (4 species).	None
(404)	Pit [403]	15	50% charcoal / 50% woody roots. 7 *Cecilioides acicula* and 20 other land snails (3 species). Occasional modern seeds.	*Corylus avellana* 3 (hazel nut fragments)
(413)	Pit [415]	7	Predominantly snails and broken shell; approximately 200 *Cecilioides acicula* and 20 other land snails (3 species). 18 charcoal fragments >2mm and occasional smaller fragments. Occasional modern seeds.	*Triticum* (hulled wheat grain) 1 *Fallopia convolvulus* 2 (black bindweed) *Plantago major* 1 (ribwort plantain)
(406)	Pit? [405]	9	70% charcoal / 30 % soil. 20 charcoal fragments >2mm and occasional smaller fragments.	None

The wood charcoal

Dana Challinor

The flots were notably poor in archaeological material (J Jones, above). One sample from context (608) produced some unidentified charred vesicular material, possibly parenchyma. While most flots contained small fragments of charcoal, identifiable material was only recorded from four contexts (Table 3). Two taxa were identified; *Quercus* sp. (oak) and *Corylus avellana* (hazel). Some of the *Quercus* charcoal exhibited tyloses, indicating the presence of heartwood, and some immature roundwood fragments were also noted. Suitable dating material was selected from three samples, including context (403) which contained *Corylus avellana* (hazel) nutshell fragments. No other non-charcoal charred plant material was noted, although the finer fractions were only examined cursorily.

Given the disappointing levels of preservation in the samples, little interpretation can be made. Charcoal was only present in low quantities, indicating that the assemblages are more likely to have derived from dispersed fuel rather than deliberate single-event dumps of domestic or other waste. The taxonomic list is too limited to provide much environmental reconstruction, but the results are consistent with the predominance of oak-hazel woodland in south-west England throughout early prehistory (Wilkinson and Straker 2008).

Radiocarbon dating

Three samples from charred macrofossils (two hazelnut shells and a fragment of hazel wood) were submitted for accelerator mass spectrometry dating (AMS) at the Scottish Universities' Environmental Research Centre (SUERC) (Table 4). The hazelnuts were both derived from deposit (404), the basal fill of pit [403], and provided the determinations 4770 ±30BP, 3640–3510 cal BC (92.5 per cent) (SUERC-315182) and 4775 ±30BP, 3650–3510 cal BC (93.9 per cent) (SUERC-315183), confirming this feature as Early Neolithic in date,.

Charred hazel wood from pit [415] produced the determination 2210 ±30BP, 380–190 cal BC (95.4 per cent) (SUERC-35184), indicating a Middle Iron Age phase of settlement. The results from the radiocarbon dating are discussed below.

The probability distributions (Tables 4 and 5) were calculated using OxCal (v3.10). Unless stated otherwise, the 95 per cent level of probability has been used throughout this report; calibrated determinations in the text may therefore differ from other published sources.

Discussion

Although finds were scarce and the excavation limited in extent, the investigations at Penmayne revealed two distinct episodes of activity, with hints of a third. The earliest activity was associated with an Early Neolithic pit, possibly part of a larger grouping.

Two abraded sherds of Trevisker pottery of Bronze Age date were recovered from unstratified contexts. It is likely that these were associated with Middle Bronze Age settlement activity in the vicinity. However, no features of this period were recorded within the trenches and none of the geophysical anomalies could obviously be assigned to this period, which means that the character of the Bronze Age activity is uncertain.

The main period of settlement activity occurred during the Iron Age, with a group of three large roundhouses defined by ring-gullies and three smaller ring-gullied structures. The geophysical survey and the excavated features suggest that the smaller ring-gullies may represent a different period of occupation from the larger structures, but it was not possible to establish which of these were the earliest.

Table 3 Charcoal identifications and radiocarbon dating (C^{14}) selections

Context	*Cut*	*Feature type*	*Quantity*	*Identifications*	*C^{14}*
(231)	[230]	Posthole	+	*Quercus*	n/a
(404)	[403]	Hollow	++	*Quercus* (hw)	*Corylus avellana* nutshell x 3
(413)	[415]	Pit	++	*Quercus*, *Corylus avellana* (rw)	*Corylus avellana* rw x 1
(406)	[405]	Pit?	+	*Quercus* (rw)	*Quercus* sp. rw x1

+=up to 5 frags; ++=up to 25 fragments; rw=roundwood; hw=heartwood

The following discussion focuses on the Neolithic and Iron Age settlement-related activity.

Neolithic pits and carinated pottery

The Early Neolithic pits

Pit [403], in trench 4, produced 52 sherds of pottery and two radiocarbon determinations: 4770 ±30BP, 3640–3510 cal BC (92.5 per cent) (SUERC-315182) and 4775 ±30BP, 3650–3510 cal BC (93.9 per cent) (SUERC-315183). These determinations place the pit towards the middle of the fourth millennium cal BC, during the latter part of the Early Neolithic period. The radiocarbon dates are the first to be obtained from Early Neolithic pits on the north Cornish coast and are significant because they provide close dating for carinated bowl pottery.

It is not absolutely certain whether pit [403] was situated within a group or was a single feature. Neolithic pits are usually found in groups in Cornwall and beyond (Cole and Jones 2002–3; Jones and Reed 2006; Leverett and Quinnell 2010; Garrow *et al* 2005), and it is possible that the four pits adjacent to [403], [405], [407], [409] and [416], which were devoid of artefacts, also date to the Early Neolithic period. Pits without artefacts have been radiocarbon dated to the Early Neolithic period in Cornwall, as for example at Tremough (Penryn) (Gossip and Jones 2007, 6). However, it is possible that, given their location within roundhouses, some or all of the undated pits at Penmayne may have belonged to the Middle Iron Age settlement phase (below).

The phenomenon of pit digging has been recognised at a number of sites in Cornwall and found to span the entire Neolithic period (*c* 3900–2500 cal BC). Small pits containing structured deposits of pottery, flint and food remains have been revealed at Portscatho (Gerrans) (Jones and Reed 2006), Metha (St Newlyn East) (Jones and Taylor 2004, 43), Poldowrian (St Keverne) (Smith and Harris 1982), Trenowah (St Austell) (Johns 2008) and Helston (Helston) (Hood 2009). A larger pit group with a similar time-span 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, from 3790 cal BC to 3370 cal BC (*ibid*, 134).

Late Neolithic pits have also been recorded across the county, as, for example, at Tremough (Gossip and Jones 2007 6–8), and these show a similar pattern of selection of material for burial. Radiocarbon determinations for Early Neolithic pits in Cornwall are presented in Table 4. As noted above, pits without artefacts have also been recorded: pit [21] at Tremough, for example, was devoid of artefacts but included charred plant macrofossils and burnt stones and produced an Early Neolithic determination of 4850 ±55 BP, 3770–3510 cal BC (AA-44601) (Gossip and Jones 2007, 112).

Table 4 Cornish Early Neolithic pit radiocarbon determinations

Site	*Context*	*Lab. no*	*Material*	*Age BP years*	*Calendrical years 95%*
Penmayne	Pit [403] (404)	SUERC-315182	Hazelnut shell	4770 ±30	3640–3510 BC
Penmayne	Pit [403] (404)	SUERC-315183	Hazelnut shell	4775 ±30	3650–3510 BC
Poldowrian	Pit [106]	HAR-4323	Bulked charcoal	5180 ±150	4350–3650 BC
Poldowrian	Hearth pit [150]	HAR-4052	Charcoal, Oak	4870 ±130	4000–3350 BC
Poldowrian	Layer [2]	HAR-4568	Hazelnut shells from mixed Mesolithic/Neolithic deposits	6450 ±110	5620–5210 BC
Portscatho	Pit [512]	Wk-13259	Charcoal, Hazel	4713 ±45	3640–3370 BC
Portscatho	Pit [504]	Wk-13257	Charcoal, Hazel	4805 ±51	3700–3380 BC
Portscatho	Pit [502]	Wk-13256	Charcoal, Hazel	4818 ±48	3710–3380 BC
Portscatho	Pit [505]	Wk-13258	Charcoal, Hazel	4952 ±45	3920–3640 BC
Tregarrick	Pit [40]	Wk-14916	Charcoal, Hazel	4914 ±40	3780–3640 BC
Tregarrick	Pit [48]	Wk-14918	Charcoal, Hawthorn	4908 ±47	3790–3630 BC
Tregarrick	Pit [19]	Wk-14913	Hazelnut shell	4839 ±42	3710–3520 BC
Tregarrick	Pit [45]	Wk-14917	Hazelnut shell	4768 ±43	3650–3370 BC
Tregarrick	Pit [21]	Wk-14914	Hazelnut shell	4775 ±44	3650–3380 BC
Tregarrick	Pit [27]	Wk-14915	Hazelnut shell	4776 ±44	3650–3380 BC
Tremough PAC	Pit [102] (100)	SUERC-29387	Charcoal, Hazel	4750 ±40	3640–3490 BC
Tremough PAC	Pit [105] (103)	SUERC-29383	Charcoal, Hazel	4750 ±40	3640–3490 BC
Tremough	Pit [21]	AA-44601	Charcoal, Hazel	4850 +55	3770–3510 BC

The form of the Penmayne pits (assuming all are Neolithic) differs somewhat from the comparanda listed above. In general, most recorded Neolithic pits in the south west are shallow and bowl-shaped (Cole and Jones 2002–3), although tree-throws were also sometimes used to hold deposits (Leverett and Quinnell 2010). By contrast, the pits at Penmayne were elongated with concave profiles. However, the character of their fills is similar to that of Early Neolithic pits identified elsewhere and suggests that they were backfilled rapidly in a single episode, perhaps soon after they had been dug. The pits were discrete, and although [407] and [409] lie immediately adjacent to each other, none were intercutting, suggesting either a single episode of digging or the respecting of each backfilled pit as each new one was dug. This absence of intercutting can also be seen at Poldowrian, Tregarrick Farm and Tremough (Smith and Harris 1982; Cole and Jones 2002–3; Gossip and Jones 2007, 7).

Pit [403] contained pottery and flint, objects frequently selected for deliberate inclusion in Neolithic pits, and paralleled by features at Portscatho, Tregarrick Farm, and the Tremough Performing Arts Centre (PAC) site (Jones and Reed 2006; Cole and Jones 2002–3; Jones and Taylor 2004; Gossip, forthcoming a), all of which show careful selection of artefacts for deposition. The incorporation of 52 sherds from a small number of carinated bowls within pit [403] implies that there was process of deliberate selection, with sherds from a particular form of vessel being chosen for inclusion. The reasonably fresh condition of the sherds also suggests that these had not been in circulation as sherds for any length of time before their deposition, and it is possible that the vessels were associated with activities on the site occurring shortly before their burial. The hazelnut fragments from within the pit also demonstrate collection and consumption of a wild food resource; significantly no charred grain was recovered although it survived within Iron Age features (J Jones, above). Again, these are commonly included within pits of this period. Taken together, these artefacts could suggest a visit to the site which included the working of flint and the sharing of food, which was then followed by the digging of pit [403] and deposition of items within it.

The impetus for Neolithic pit digging is not fully understood, but in the south-west peninsula it appears to be part of a wider set of ritualised practices which were prevalent in the British Neolithic (Thomas 1999, 64–74; Allen *et al* 2004, Noble 2006, 66–8). Interpretations have been explored around the idea that the practice was a new Neolithic ritualised expression utilised for the discard of objects otherwise associated with settlement (Jones and Reed 2006). It is possible that communities saw the ritualised deposition of treasured or specially selected items in a certain place as a way of acquiring symbolic ownership, fixing a community to the land on which the pits were dug (Pollard 2001; Thomas 1999, 72, 87; Jones, forthcoming), or that deposition was a symbolic reciprocal return of artefactual and subsistence items to a location which had been exploited by the group making the deposit to provide shelter, subsistence and other resources. Alternatively, pits may have been associated with a wider ceremonial landscape destroyed by subsequent agriculture (Cole and Jones 2002–3, 134). Elsewhere in the south west, tree throws may have fulfilled a similar role to dug pits (Leverett and Quinnell 2010). At the Tremough PAC site, pits were associated with tree throws which also contained similar artefact groups, and perhaps were linked to the acquisition of new land for agriculture and settlement following woodland clearance (Gossip, forthcoming a) or with the marking of clearances in the woodland (Leverett and Quinnell 2010).

Carinated pottery in the south-west peninsula

The selection of a pottery form which is generally uncommon within Early Neolithic ceramic assemblages in the south west, and the association with a comparatively late date within the early phase of the Neolithic, makes the assemblage from Penmayne – the fifth published site in Cornwall with carinated bowls – worthy of further discussion.

P1 and **P2** and a possible third example are carinated bowls; **P3** and **P4** may belong to bowls of this type. Pit [403], from which these came, produced two nearly identical radiocarbon dates on charred hazelnut shells, 4770 ±30BP, 3640–3510 cal BC (92.5 per cent) (SUERC-315182), and 4775 ±30BP, 3650–3510 cal BC (93.9 per cent) (SUERC-315183). These firmly situate the pit and its contents in the later 37th or 36th centuries cal BC, well into the currency of the South Western style of Early Neolithic pottery (Quinnell, above).

The other Cornish assemblages that include carinated bowls are those from pits at Portscatho and at Tregarrick Farm, Roche, the tor enclosures of Carn Brea (Carn Brea) and Helman Tor (Lanlivery), and structure 3229 at Penhale (St Enoder). The pit sites both have radiocarbon determinations which are closely associated with carinated bowls (Table 5). Pit [512] at Portscatho produced carinated bowl P1 with a date calibrating to 3640–3370 cal BC (Wk-13259) (Jones and Reed 2006, 17) and pit [45] (Wk-14917) at Tregarrick Farm produced carinated bowl P6 calibrating to 3790–3630 cal BC (Cole and Jones 2002–3, 133).

Recent work on the dating of Neolithic sites suggests that the tor enclosures at Helman Tor and at Carn Brea, both of which have carinated bowls in their assemblages, started around 3700 cal BC, with Carn Brea a little later than Helman Tor, and that both may have been in use for a century or two (Whittle *et al* 2011, 509). There are considerable complexities in the detailed dating for these sites and it is not possible to be more precise. However, two of the new determinations from Helman Tor were on residue from a carinated bowl (Mercer 1997, vessel P1; Whittle *et al* 2011, 500). These calibrate to 3640–3370 cal BC (Gr-31319) and 3710–3530 cal BC (OxA-15631). The determinations are broadly similar to those from pit sites such as Penmayne and reflect contemporaneity between tor enclosures, pit digging and the use of carinated bowl pottery.

A sixth site, currently awaiting full publication, is structure 3229 at Penhale (Whittle *et al* 2011, 514). This also produced carinated bowls and is associated with radiocarbon determinations of 3960–3700 cal BC (Wk-9839) and 3950–3630 cal BC (Wk-9840), making them the earliest dates to be associated with carinated bowl pottery in the south west.

Carinated bowls have also been recorded from several sites in Devon. By contrast with Cornwall, most of these find-spots are associated with Neolithic enclosures, including Haldon (Willock 1936, vessel, pl LXVII, vessel P41(a); Gent and Quinnell 1999a), Hembury (Liddell 1932, pl XXXVIII, vessel P328 ; Liddell 1935, pl XVIII, vessels P232 and P255), High Peak (Pollard 1966, fig 9, vessels 3 and 4) and Raddon (Gent and Quinnell 1999b, vessel P15), or, as in the case of Hazard Hill, with possibly unenclosed distinctive hills (Houlder 1963, fig 7,

Table 5 Early Neolithic carinated bowl pottery with closely associated radiocarbon determinations

Site	*Context/association*	*Lab. no*	*Age BP years*	*Calendrical years 95%*
Cornwall				
Penmayne	Pit [403], hazelnut shell found in pit with carinated bowl sherds (this paper).	SUERC-315182	4770 ±30	3640–3510 BC
Penmayne	Pit [403], hazelnut shell found in pit with carinated bowl sherds (this paper).	SUERC-315183	4775 ±30	3650–3510 BC
Portscatho	Pit [512], hazel charcoal found in pit with carinated bowl P1 (Jones and Read 2006).	Wk-13259	4713 ±45	3640–3370 BC
Tregarrick	Pit [40], hazel charcoal found with carinated bowl P6 (Cole and Jones 2002–3).	Wk-14917	4768 ±43	3650–3370 BC
Penhale	Pit 254 within structure 3299, charred cereal grains (Whittle *et al* 2011, 514)	Wk-9839	5001 ±75	3960–3700 BC
Penhale	Posthole 3221 within structure 3299, hazel charcoal (Whittle *et al* 2011, 514).	Wk-9840	4951 ±61	3950–3630 BC
Helman Tor	Residue from carinated vessel P14 (Mercer 1997; Whittle *et al* 2011, 514).	Gr-31319	4705 ±35	3640–3370 BC
Helman Tor	Residue from carinated vessel P14 (Mercer 1997; Whittle *et al* 2011, 514).	OxA-15631	4851 ±33	3710–3530 BC
Devon				
Broadsands	Human bone, single individual from chamber, above the paving slab (Sheridan *et al* 2008).	OxA-17979	5029 ±30	3950–3710 BC
Broadsands	Human bone, single individual from chamber, above the paving slab (Sheridan *et al* 2008).	OxA-12739	4912 ±36	3770–3640 BC
Broadsands	Human bone, single individual from chamber, below paving slab, (Sheridan *et al* 2008).	OxA-17164	4982 ±24	3910–3620 BC
Broadsands	Human bone, single individual from chamber, below paving slab, (Sheridan *et al* 2008).	OxA-17165	4999 ±31	3940–3700 BC

vessel P1). In addition to these enclosure-related findspots, carinated bowl pottery has also been identified in association with the passage tomb at Broadsands (Sheridan *et al* 2008, fig 4, vessels, 1 and 2) and within a pit at Long Range, near Honiton (Fitzpatrick *et al* 1999, 140).

Unfortunately, despite the quite large number of assemblages with carinated bowl pottery, most of the radiocarbon determinations from the Devon sites are either on old bulked samples with large standard deviations or from contexts that are not closely identified with the identified sherds. This means that the Devon carinated bowl assemblages are generally less well dated than those from Cornwall. However, recent radiocarbon dating from Neolithic enclosure sites broadly places activity associated with carinated bowl pottery in Devon after *c* 3800 cal BC, and within the first half of the fourth millennium cal BC (Whittle *et al* 2011). In addition, the small passage tomb at Broadsands in south Devon has radiocarbon determinations which are on human bone (Sheridan *et al* 2008). The radiocarbon dating from Broadsands suggests that the tomb was in use during the Early Neolithic period *c* 3900–3650 cal BC or as modelled by the authors 3845–3726 cal BC (Sheridan *et al* 2008). However, there, the carinated pottery was located in the body of the mound and outside the chamber, rather than within it and may therefore not strictly be dated by the determinations from the human bones.

Carinated bowls have long been argued to form the earliest vessels within the Early Neolithic in much of Britain (Sheridan 2004; 2007; Sheridan *et al* 2008, 18–19). It has been suggested that, together with the adoption of agriculture and the construction of funerary monuments, Carinated bowls were closely associated with contacts with the Continent and the transition to the Neolithic in the first centuries of the fourth millennium cal BC (Sheridan 2009; 2011). It is now clear that this is true for parts of the south east (Bayliss *et al* 2011, 759). However, the recent work on dating of Neolithic enclosure sites now shows that overall Neolithic activities started rather earlier in south-east Britain than in the south west (Bayliss *et al* 2011, fig 14.177). This work on Early Neolithic dating makes it clear that there may be considerable differences of date for the start of Neolithic traditions in different parts of Britain

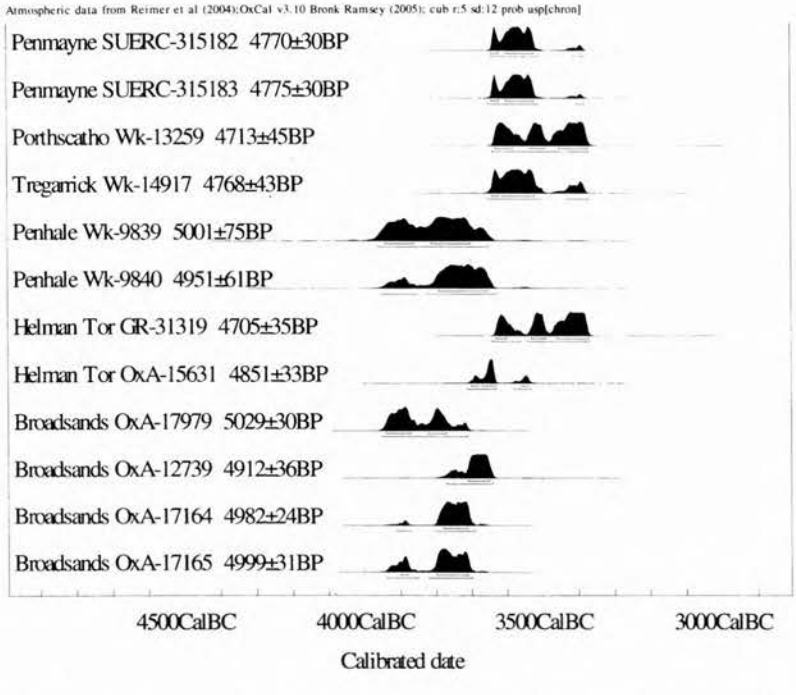

Fig 10 Radiocarbon determinations associated with carinated ware in south-west England.

and in their character, and that what constituted the 'Early Neolithic' is likely to have varied regionally (Cummings 2009). For example, in Cornwall, the earliest part of the Neolithic seems to have been associated with the digging of pits and South Western style pottery, followed by tor enclosures and perhaps simple chambered tombs and portal dolmens. All of these site types may include carinated bowls (Jones and Quinnell 2011a). These contrasts between regions may have arisen through differential contacts with the Continent (Sheridan 2011), although given the scarcity of imported artefacts in Cornwall, the precise nature of any such links with communities in mainland Europe is uncertain (Jones and Quinnell 2011a).

In the wider south-west region it appears that although some vessels belonging to the carinated bowl tradition, such as those from Broadsands or Penhale, may belong in the first centuries of the fourth millennium cal BC, radiocarbon determinations from sites such as Penmayne indicates that the tradition persisted for several centuries and that vessels of this type were being manufactured at a much later date, towards the middle of the fourth millennium cal BC (Table 5; Fig 10). In other words, there are indications that the carinated bowl form in the south-west peninsula is likely to have been a long-lived tradition and form a part of the South Western Early Neolithic ceramic style. An early date, even for assemblages which solely comprise carinated bowls, cannot be assumed in the south west without supporting radiocarbon dating.

The Iron Age settlement

The Iron Age is currently thought to have started around 800 cal BC (Needham 2007) and continued until the start of the Romano-British period in AD 43. Iron Age society in Cornwall was shaped by local and long-standing traditions which were reflected in house construction, farming and defence.

At Penmayne the remains of at least three large ring-gullied structures (structures 1, 2 and 3) and three smaller ones (4, 5 and 6) associated with a roundhouse settlement were identified. Dating evidence is limited to a hearth associated with structure 2 which provided a radiocarbon determination of 2210 ±30 BP, 380–190 cal BC (SUERC-35184), and a few sherds of pottery which are likely to be of a similar date. This is interesting in itself, since sites of this date usually produce more artefactual material. However, it should be remembered that only a limited sample of the structures were investigated and artefact-rich deposits may have been located beyond the area of the trenches. It is also possible that shallower features and artefacts may have disappeared through truncation of the site by later agricultural activity. The limited evidence suggests that the settlement was occupied during the Middle Iron Age, probably in the second or third centuries cal BC, although the origins and length of occupation on the site remain unknown.

Environmental reconstruction is also difficult due to the paucity of charred plant macrofossils or charcoal from the structures. Analysis of the charcoal assemblage suggests that it is wood-fuel waste (Challinor, above). There was occasional charcoal in many samples, but mostly highly fragmented, with few pieces of sufficient size to allow the species to be determined. Charred plant macrofossils were recovered from structure 2. Features [212], fill (213), and [415], fill (413), included hulled wheat within them, but it is uncertain whether the crop was grown or processed locally (J Jones, above).

All six structures took the form of penannular, circular gullies with some internal features. The three largest, structures 1, 2 and 3, were all substantial, between 14m and 18m in diameter. The suggestion of other phases of occupation is indicated by structures 4, 5 and 6, which ranged from 6m to 8.5m in diameter, which intersected with the larger structures. Unfortunately relationships between the structures were not revealed by the trenching and much of the discussion of the possible form of the structures relies upon the accuracy of the results from the geophysical survey.

The roundhouse settlement seems to have been aligned east-west, although there is no obvious reason for this. The smaller structures also share this alignment, overlapping with the larger roundhouses. Entrances into the roundhouses suggested by the geophysical survey (GSB 2009) seem to be to the east or south east; however, none were verified through excavation.

The investigated ring-gullies were shallow, possibly truncated by subsequent agricultural activity, with fill deposits that suggested fairly rapid infilling derived from the surrounding soils combined with organic material from the settlement. Traditionally it was thought that the

purpose of ring-gullies was to provide drainage of rainwater away from the walls of structures. However, work on reconstructed roundhouses has revealed that drip-gullies are not needed to perform this function (Reynolds 1982, 197). More recent interpretation has suggested that ring-gullies may in fact have been structural features – ring grooves – dug to hold the bases of vertically-set timbers forming the walls of roundhouses (Manning and Quinnell 2009). Such ring-groove roundhouses are widespread in southern Britain (Cunliffe 2005, 273). Examples have been identified at Blackhorse in east Devon, where stakeholes were identified in the base of the encircling gullies (Fitzpatrick *et al* 1999, 163–6). Large Middle Iron Age roundhouses with ring-gullies of similar diameters to those at Penmayne were also identified at Long Range in east Devon (*ibid*, 138–24). Although not identified as such by the excavators, a recent discussion of ring-grooved roundhouses in Devon has suggested them as possible structures of this type (Manning and Quinnell 2009). If the larger Penmayne roundhouses were also ring-grooved buildings they would have been substantial and imposing structures.

Aside from the ring-gullies which marked the perimeter of the structures, structural features were hard to identify. One hearth pit with charcoal-rich fill and scorched edges was identified in structure 2, and a square pit [109] of unknown function cut by a later posthole was recorded close to the centre of structure 1. Other cut features – potential postholes and shallow pits and hollows – were also recorded; however, preservation was fairly poor and internal features hard to define, although a series of structural postholes cut into the weathered bedrock and associated with a shallow gully were revealed within structure 2. The appearance of the roundhouses remains difficult to establish due to the limited nature of the excavation; the lack of datable material and diagnostic artefacts means that it is difficult to date features to a particular structural phase.

However, despite being both poorly preserved and only partially investigated, the form of the Penmayne structures, which include ring-gullies, postholes, pits and hearths, does conform with the range of features that have been recorded within Iron Age roundhouses elsewhere in Cornwall at sites such as Higher Besore and Threemilestone (Kenwyn) (Gossip, forthcoming c; Schwieso 1976) and is a form recognised – with local variations – throughout the British Iron Age (Guilbert 1982, 67–88; Reynolds 1982, 173–98).

Penmayne adds to the number of excavated Iron Age settlements in Cornwall. Initially these were only known within enclosed sites, including hillforts, cliff castles and rounds (Quinnell 1986). These date from the later centuries of the first millennium cal BC and, in the case of rounds, the first few centuries AD (Johnson and Rose 1982; Young 2012: this volume). Excavated examples include Threemilestone round, occupied during the Late Iron Age, where a complex of intercutting ring-gullies suggested a multi-phase settlement (Schwieso 1976, 51–67). The nearest known Middle Iron Age site to Penmayne is the Rumps cliff castle, where an excavated structure bore some similarities with the Penmayne roundhouses. Seven hut circles were identified within the interior of the cliff castle, one of which comprised two concentric rock-cut gullies, the inner of which was 6.4m in diameter. A probable entrance was identified on the north-eastern side and within the area enclosed by the ring-gully were more than 50 postholes. There was no clear pattern to most of these but a possible internal posthole ring was arranged around a central hearth pit (Brooks 1974, 28).

Until recently, known unenclosed settlements in Cornwall were limited to a handful of sites, including Carn Euny (Sancreed), where roundhouses of Iron Age date pre-dated the courtyard house settlement (Christie 1978, 333), and Bodrifty (Madron) (Dudley 1956); at the latter, however, most of these structures may actually have been Bronze Age roundhouses re-used in the Iron Age (Jones and Quinnell 2011b). In recent years several other unenclosed occupation sites have been identified and excavated across lowland Cornwall, including examples at Penryn College (Penryn) (Gossip, forthcoming b) and Sir James Smith's School, Camelford (Lanteglos-by-Camelford), where a large ring-gullied structure was uncovered (Jones and Taylor, forthcoming). The most extensive of these unenclosed settlements was at Higher Besore, Threemilestone (Gossip, forthcoming c), where 12 structures were identified defined by both circular and oval gullies, most of which contained postholes for supporting thatched roofs. The principal domestic structures measured 8–10m in diameter and, although smaller than structures 1, 2 and 3 at Penmayne, share some broad similarities. Radiocarbon determinations from the

structures at Higher Besore are a little later than those at Penmayne, suggesting occupation during the last two centuries cal BC.

Recent plotting of archaeological features from aerial photographs carried out by the National Mapping Programme identified a number of other unenclosed roundhouse settlements of probable Iron Age date, especially in the hinterland of the Camel estuary, with ring-ditches or gullies identified from crop-marks at Lelizzick (Padstow) and at Trewithen (St Merryn) (Young 2012: this volume). A further cluster of circular features, some of them intercutting, is known at Pentireglaze (St Minver) and may represent another unenclosed later prehistoric settlement. Excavations at Lelizzick revealed traces of roundhouses with surrounding ring-gullies (Wessex Archaeology 2008). The discovery of the Middle Iron Age settlement at Penmayne bolsters this evidence and it is now clear that unenclosed settlement in Cornwall during the late prehistoric period may have been considerably more prevalent than once thought.

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A 'burnt pit' and other discoveries at St Blazey Gate, Cornwall

ANNA LAWSON-JONES

with contributions from ROWENA GALE and GRAEME KIRKHAM

Archaeological investigation on the route of a china clay pipeline identified evidence of a former field system, mining remains, a scatter of worked flint and an elongated burnt pit packed with charcoal. The latter feature produced late Roman – early post-Roman radiocarbon determinations. The report discusses other similar features recently identified in Cornwall and the wider range of evidence for settlement and occupation in the late Roman – early medieval period.

In 2001 Cornwall County Council Historic Environment Service was commissioned by Imerys Ltd to conduct an archaeological watching brief along the route of a new 5 km china-clay pipeline close to St Austell, linking the Trebal refinery at the northern end (NGR SX 03944 55860) to Par Harbour china clay dries (SX 07525 52511). A corridor 10m wide was stripped of topsoil and a pipe trench excavated, 1m wide and up to 1.5m deep; 26 boundaries were breached.

The aim of the project was to record the character and development of the historic landscape through which the pipeline passed. Four main objectives were addressed: the identification and recording of archaeological features; the identification and collection of artefact scatters; the recording of breached boundaries; and the sampling of any potentially significant or informative deposits. The work was guided by an assessment (Jones 2001) and a geophysical survey (Barker and Mercer 2000).

The fieldwork involved two areas of controlled topsoil stripping, systematic recording of all pre-modern boundaries breached and an archaeological watching brief which monitored all ground works to record, describe and interpret deposits visible within the corridor. The location of all finds scatters were recorded by field (numbered 1 to 39) or context.

This report describes archaeological features identified in one field along the pipeline. The full results of the project are reported in Lawson-Jones (2002).

Archaeological deposits and layers are identified by round brackets, for example (301), and cut features – pits, postholes and ditches, for example – within square brackets, [333]. Radiocarbon dates have been re-calibrated with Ox-Cal v3.10 and are expressed at the 95 per cent confidence level unless otherwise stated.

Field 29

Field 29 (centred on SX 0555 5355), close to St Blazey Gate, was by far the most significant area uncovered on the pipeline in terms of the variety and density of archaeology. It lies to the north of the modern A390 on a long south-facing slope, overlooking lower-lying land behind the coast (Figs 1 and 2). The St Blazey tithe survey of *c* 1840 shows the field divided into several

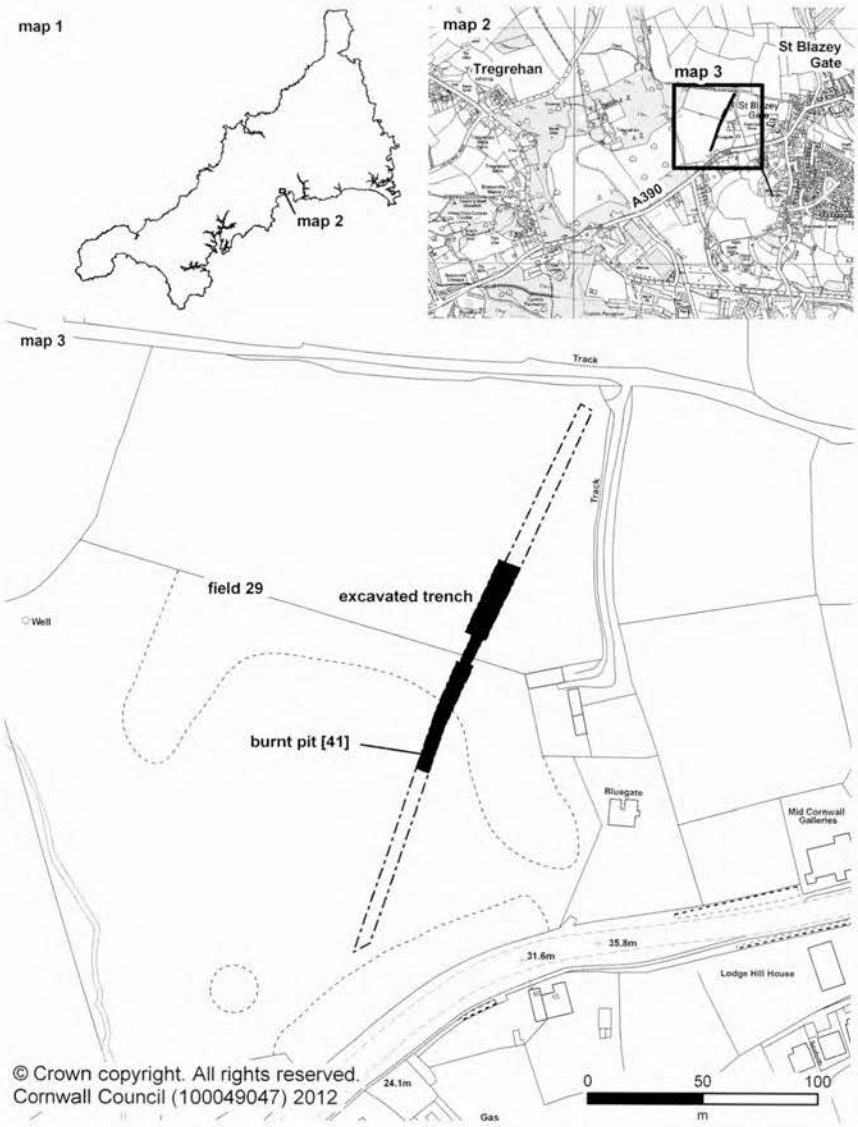

Fig 1 Location.

enclosures, the sinuous boundaries indicating their derivation from parcels of medieval cultivation strips (Herring 2000, 49). In the mid nineteenth century most of these boundaries were removed and field 29 became part of the ornamental landscape associated with Tregrehan House (*ibid*, 9), now listed Grade II* in the English Heritage Register of Historic Parks and Gardens. The field therefore falls within the historic landscape character type termed Ornamental. Historically, however, it would have been Anciently Enclosed Land (AEL), defined as Cornwall's 'agricultural heartland, with farming settlements documented before the seventeenth century AD and irregular field patterns with either medieval or prehistoric origins' (Cornwall County Council 1996, 140; Herring 1998, 77). This landscape type has been the primary focus for settlement and agriculture over the past three millennia and more and its archaeological potential for buried remains of past occupation is therefore high.

A variety of archaeological features were identified within the pipeline trench (Fig 2). In the northern part of the field was a cluster of

miscellaneously aligned prospecting pits. These were broadly rectangular and of varying dimensions up to 2.6m long and 1.5m wide; they were not excavated to base but the appearance of the sides suggested that after excavation they had been left open and allowed to infill naturally, presumably during a period when the fields were out of use or, at least, not used intensively. The pipeline trench also exposed part of an adit or tunnel [63] approximately 2m deep nearby but this was not further investigated. These features are likely to be post medieval in date, probably associated with the Blue Gate mining sett which was recorded in this vicinity on a late nineteenth-century map of Wheal Eliza Consols (Cornwall Record Office MRO/2789/2; also Dines 1988, II, 558).

Several boundary features were revealed within the field. Partly removed bank [52] and a parallel ridge of standing natural [53] coincided with a boundary shown on the 2nd edition Ordnance Survey 25in: 1 mile map of *c* 1907, itself perhaps the successor to a tree belt recorded by the 1839 tithe survey on a boundary dividing the former medieval field system. Some trees from this former boundary were evidently retained as part of the ornamental parkland landscape and survive to the west of the pipeline trench. The ridge [53] had a rounded terminal suggesting the former location of an entrance, although this was not mirrored by [52].

Lynchet [66], found towards the northern end of the field, was aligned west-south-west – east-north-east. It was not visible as a surface feature but appeared as a clearly defined south-facing scarp 1.3m wide sealed beneath the topsoil. Ditch [45], 70m to the south, was 0.6m deep, 0.8m wide and followed a slightly irregular course on a similar alignment to lynchet [66]; it had somewhat ephemeral remains of a bank on its downhill side which was also slightly lynchetted (Fig 2; bank not shown). A further lynchet, similar to [66] and on the same alignment as ditch [45], was observed approximately 20m south of the latter. The similarity in the alignments of these features suggests that they were contemporary. They do not appear on historic maps, however, and do not conform to the orientation of the medieval field system and are therefore likely to be earlier. Four sherds of later prehistoric or Romano-British pottery were recovered from within field 29 and could plausibly have derived from manuring within the fields bounded by these features.

In the southern part of field 29, south of [52] and [53], a subsoil layer (40) up to 0.8m thick sealed earlier features. A stone rubber or quern fragment was recovered from within (40), as were a number of flints (below). Sealed by (40) was a fragmentary old land surface (47), which produced two Bronze Age sherds and a medieval sherd from its disturbed northern end. Cutting through layer [47] but sealed by [40] was a burnt-out tree bowl [49].

Burnt pit [41]

The most significant feature in field 29 was a charcoal-rich pit [41], located immediately to the south of ditch [45] and also sealed by subsoil layer [40]. This had an elongated 'tear-shaped' plan, with its long axis aligned south west – north east, and was 2.8m long, 0.45–0.7m wide and 0.1–0.15m deep (Fig 3). It was positioned towards the foot of a south-facing slope with its narrower, shallower end downhill. The cut had a clay lining (43), 0.1m thick, which ran along its sides and around the ends but did not extend across the base. The clay had been burnt a deep red-orange, as had parts of the bedrock, and there was evidence of several repairs to the lining with fresher clay, suggesting some period of use. The outer edge of (43) adhered to context (44), a mix of burnt clay and shillet, loam and occasional stones around the periphery of the cut. The largest stones were positioned on the east-north-east edge of the cut, although the presence of two other stone holes suggests that originally stones extended around the perimeter of the pit. These may represent the remains of a stone base for some form of superstructure.

Within the clay-lined pit was fill (42), which consisted almost entirely of charcoal lying on the exposed bedrock base and against the clay lining. Large pieces of carefully packed charcoal ran lengthways along the base of the pit and up the sides, while the central area was filled with what appeared to be a less organised mix of fragmentary charcoal twigs and ash. There were no finds specifically associated with the feature's use.

Flint

The assemblage of 25 pieces of worked flint from field 29 was the largest to come from a single field along the pipeline. The material derived for the most part from pebble flint. Few if any

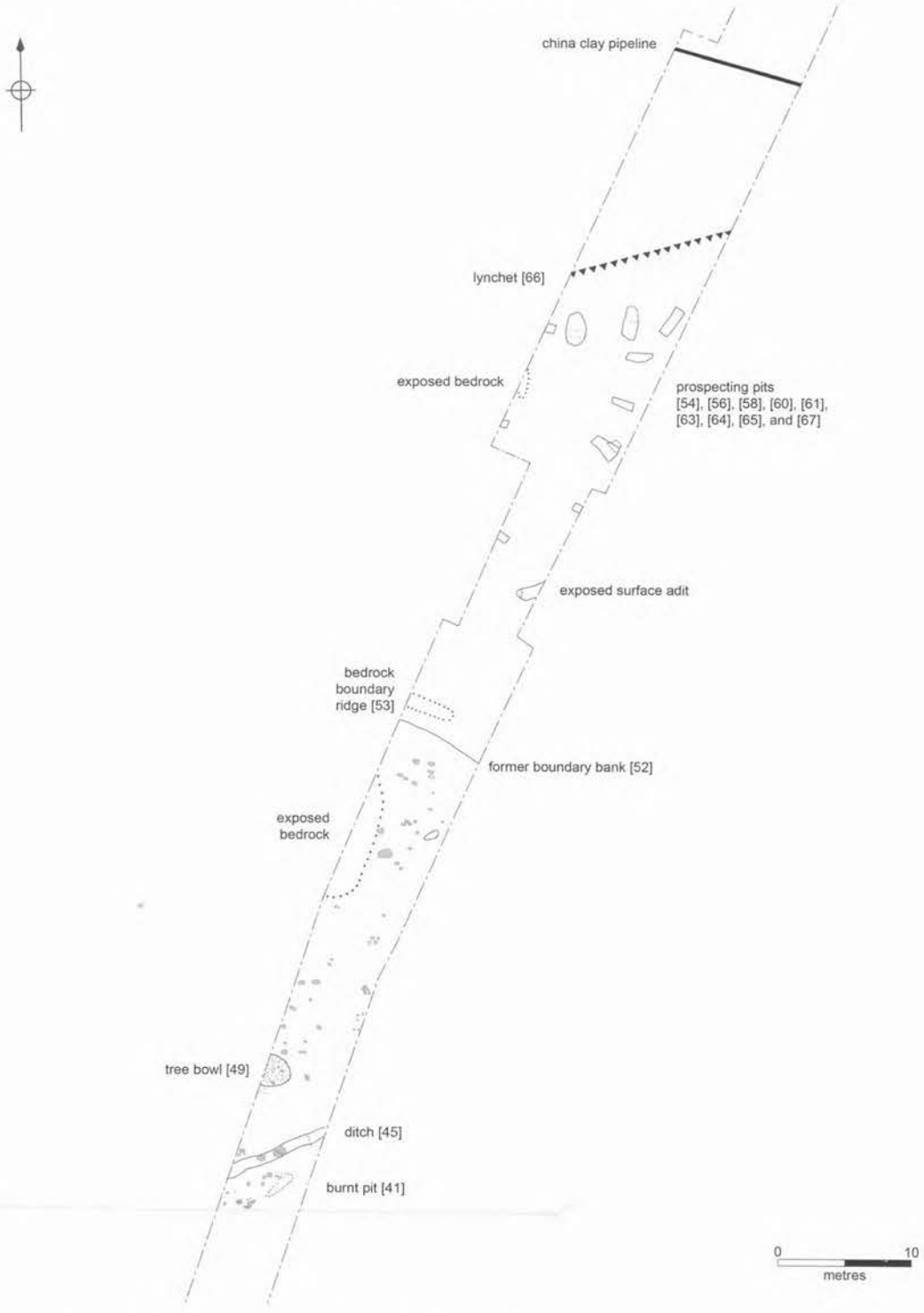

Fig 2 The area of controlled topsoil stripping in field 29.

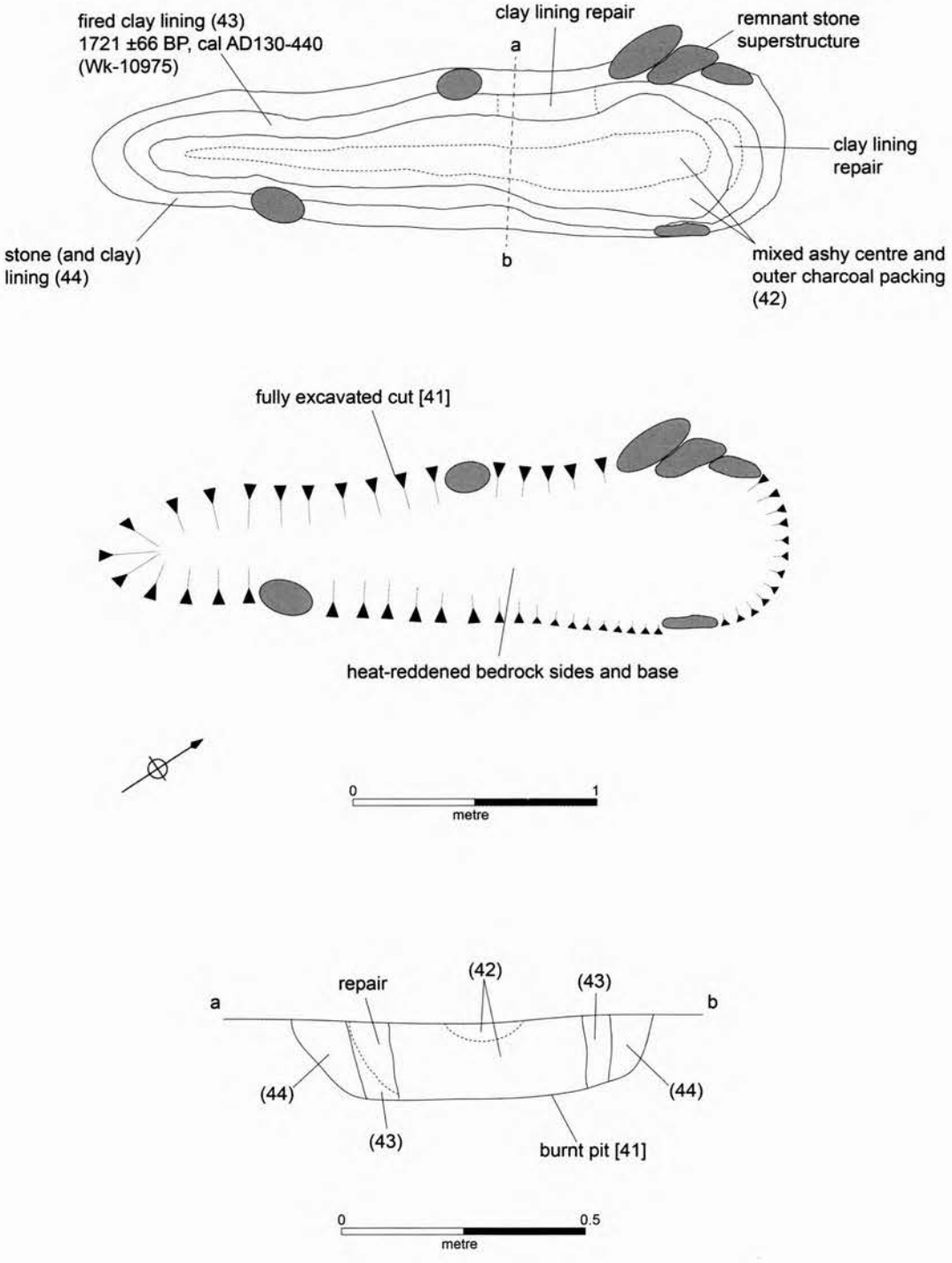

Fig 3 Burnt pit [41].

of the tertiary pieces exhibit the characteristic dark, uniform coloration (and occasional larger flake size) which might be attributed to a nodular source (*cf*, for example, Tingle 1998). The Cornish coastline is an abundant source for flint and the majority of the raw material for the assemblage is likely to have been collected from local beaches. Most of the material is not closely diagnostic in terms of date and, taken as a whole, spans some 4000 years (approximately 5000–1000 cal BC). Of the 25 pieces of worked flint from field 29, ten were probably late Neolithic. The remaining 15 pieces were broadly Neolithic to Bronze Age, consisting predominantly of well-formed flakes or modified blanks, following predetermined patterns in the production of diagnostic tool forms, particularly scrapers (Butler 2005).

Flint scatters in comparable locations on gentle slopes, particularly south and south-east facing, have been recorded elsewhere in Cornwall (for example, Lawson-Jones 2001). Some at least of the field 29 flint assemblage was the result of the downslope movement of soil, however, and as such the material is essentially residual in nature. Although described as a scatter, the material cannot be used to pinpoint a specific focus for contemporary prehistoric activity.

The assemblage consists of the following: a blade core and a core tool (engraver), a variety of scrapers (including sub-circular, circular, end and end-side forms), a retouched flake, a blade, a bladelet, two flakes, two knife fragments, an awl, miscellaneously retouched pieces and waste. None of these pieces would be out of character in a settlement-related scatter. The material indicates a variety of activities including primary knapping and tool production. The tool forms suggest the processing and working of a variety of materials, including hides, bone and wood. Four of the pieces of flint were burnt, probably reflecting general domestic activity around a hearth. Alternatively, later activity such as the use of burnt pit [41] or the burning out of tree bowl [49] could have been responsible for the heating of residual flint.

Charcoal

Rowena Gale

Charcoal from burnt pit [41] was identified to species to select suitable material for radiocarbon dating and to indicate the character of the fuel debris and provide environmental evidence. Bulk soil samples from fills (42) and (43) from the charcoal filled feature [41] were processed by flotation and sieving.

A sample from fill (42) contained a high percentage of narrow roundwood, mainly from hazel (*Corylus avellana*) and holly (*Ilex aquifolium*). Hazel stems varied in diameter and contained from nine to 17 growth rings. The growth rates appeared to be moderate and although none included the wide growth rings consistent with coppice stems, the straight, rod-like morphology of these short segments of stem was characteristic of coppice growth. Although not proven, the use of stems from coppiced or managed woodland cannot be ruled out since the slow growth rates could reflect edaphic conditions or vegetal competition or shading.

The holly was more fragmented but was also probably from stems, with moderate to fairly fast growth rates. The base of one stem 40mm in length was scarred, slightly knotty and curved, suggesting a possible coppice or pollard origin. The alder (*Alnus glutinosa*) and willow (*Salix* sp.) or poplar (*Populus* sp.) may have derived from stems of similar dimensions to the hazel and holly but the charcoal was too fragmented to assess. Oak (*Quercus* sp.) was also common, although rather fragmented, but the abundance of heartwood suggested that it represented fairly wide roundwood, trunk or cordwood, some of which was slow grown.

The charcoal in the samples from fill (43) was very sparse and comminuted. The range of species identified was similar to that from fill (42) except for the absence of willow (*Salix* sp.) or poplar (*Populus* sp.) and the addition of gorse (*Ulex* sp.) or broom (*Cytisus* sp.).

Discussion

The function of feature [41] is not certainly known but it was clearly the location of *in situ* burning and the charcoal recovered from the fills almost certainly represents fuel debris. Evidence from the charcoal analysis indicated that the firewood consisted of narrow roundwood mostly from hazel (*Corylus avellana*) and holly (*Ilex aquifolium*), but also included alder (*Alnus glutinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.) and gorse (*Ulex* sp.) or broom (*Cytisus* sp.). Oak (*Quercus* sp.) was also

an important component of the fuel and although the charred remains were rather fragmented, the frequency of heartwood suggested that this element of the firewood derived from wider roundwood, poles or cordwood.

Apart from alder and willow or poplar, the species named would have provided high-calorie firewood, especially when seasoned (Edlin 1949; Porter 1990). Narrow roundwood burns fiercely and its application to a flagging fire can rapidly boost the overall temperature. Oak heartwood, on the other hand, burns more slowly and steadily, thereby providing a long-lasting heat source. The selection of fuel seems to have focused on both narrow roundwood and wider logs, mostly from hazel, holly and oak. Both gorse and broom make excellent firewood and have historically been important fuel woods in regions where other wood was sparse.

Although holly makes good firewood and burns well when green (unseasoned) (Edlin 1949), its paucity as a fuel wood in the archaeological record suggests that it was not popular. This could imply either a sparser distribution in the past environment or a reluctance to use the wood, perhaps because it was difficult to cut and work or for superstitious reasons; holly has had long-standing and strong ritual and religious associations (Grigson 1958). The frequency of holly in fuel deposits within pit [41] may therefore be significant for the function of the pit. Alternatively, its use may simply indicate the ready availability of the wood and an appreciation of its properties as firewood.

Firewood used in the pit would almost certainly have been gathered from local resources and the analysis of the charred remains suggests that oak (*Quercus* sp.), hazel *Corylus avellana*), holly (*Ilex aquifolium*), alder (*Alnus glutinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.) and gorse (*Ulex* sp.) or broom (*Cytisus* sp.) grew at or near the site. However, these taxa are unlikely to be representative of the full range of trees and shrubs which grew in the immediate vicinity. The selection of fuel would have been biased in favour of preferred species. The taxa identified suggest a landscape which included oak woodland, perhaps with hazel and holly as understorey or growing on more exposed or open ground with gorse or broom; and patches of damper soils supporting alder, willow and / or poplar.

The evidence for managed woodland was ambiguous and although the morphology of the hazel stems was typical of coppiced rods, the growth rates and wood structure were not (although, the latter would not necessarily negate coppiced origins). If from regularly coppiced stools, the age range of the stems (maximum 17 years) implies a long rotation (perhaps to allow for the relatively slow growth).

The full report on charcoal is held with the project archive.

Radiocarbon dating

Two samples from the securely sealed feature [41] were submitted for both conventional (radiometric) and accelerator mass spectrometry (AMS) radiocarbon dating. The samples were processed at the University of Waikato, New Zealand, and the details and determinations in Table 1 are drawn from the radiocarbon dating certificates.

Uncalibrated ages are quoted in conventional years BP (before AD 1950). The calibrated age ranges were determined using OxCal v3.10 and are shown at both the one- and two-sigma levels of confidence.

Discussion

Anna Lawson-Jones and Graeme Kirkham

A variety of evidence of past human activity was identified in field 29. A small quantity of flint included diagnostic pieces dating from the late

Table 1 Radiocarbon determinations from pit [41]

Context and species	*C14 dating method and laboratory reference*	*Age BP years*	*Calendar years 65% (1σ)*	*Calendar years 95% (2σ)*
Pit [41], fills (43)/(44) *Ilex*	Accelerator Wk-10975	1721 ±66 BP (Romano-British period)	AD 240–400	AD 130–440
Pit [41], fill (42) *Corylus avellana*	Radiometric Wk-10974	1575 ±62 BP (Romano-British - early medieval)	AD 410–550	AD 340–620

Mesolithic to the Bronze Age and incorporating a clear later Neolithic element. A fragment of a stone rubber or quern and a small quantity of Bronze Age pottery were also recovered (Lawson-Jones 2002). Two lynchetted boundaries are likely to precede the former medieval field system on the site. Traces of past mining activity were also revealed, almost certainly post medieval although the limited investigation of these features did not recover any specific dating evidence. Such discoveries offer further confirmation of the long history of Anciently Enclosed Land as a focus for past human activity in Cornwall (Cornwall County Council 1996).

The most significant feature identified during the project was burnt pit [41]. It was initially interpreted as a cooking pit of possibly prehistoric date, primarily because of the lack of directly associated finds such as pottery, industrial slag or burnt grain which might suggest an alternative function. Two radiocarbon determinations were obtained on samples from the charcoal-rich fills. The AMS date suggested use of the pit in the second to mid-fifth centuries AD; the conventional radiometric determination (now regarded as rather less accurate than AMS) falls somewhat later, between the mid-fourth and early seventh centuries AD. A late-Roman or early post-Roman date therefore seems probable for the feature.

Several sites in mid Cornwall have revealed broad parallels for this feature. Two adjacent elongated pits on a settlement site at Nancemere, Truro, showed evidence of burning and contained deposits of mature oak charcoal. One may have had a clay lining and collapsed clay superstructure and the fill of this pit also incorporated charred spelt wheat and emmer (Higgins 2009). The pit produced a radiocarbon date extending from the mid-second to the late fourth century cal AD, although the description of the dating sample as 'large roundwood' offers the possibility that the actual date of use may have been somewhat later than indicated by the radiocarbon date). A burnt pit recorded during a watching brief near Ruthvoes (NGR SW 93004 60374), St Columb Major, was only seen in section but showed as an elongated cut more than 2m long, up to 1.3m wide and 0.44m deep. There was heavy burning and heat discolouration of the sides and base of the cut, burnt deposits from which produced charred partially hulled barley and smaller quantities of wheat and oats. Radiocarbon dating gave a determination of 1530 ±40 BP, cal AD 420–610 (AA-36499) (Lawson-Jones 2001; Quinnell 2004, 269). An apparently similar elongated and partly stone-lined pit encountered at Black Cross, St Columb Major (NGR SW 9100 6098), only part of which was excavated, was 1.65m wide and 0.85m deep (Lawson-Jones 1998). The fills incorporated quantities of charcoal, interpreted as probable fuel debris, and charred oats (Straker 1998). Two samples were radiocarbon dated and produced determinations of 1490 ±57 BP, cal AD 430–660 (Wk-9848) and 1496 ±57 BP, cal AD 430–650 (Wk-9849).

Pits with evidence of burning and deposits of charcoal and charred grain have also been discovered at Penlee House, Tregony; a radiocarbon date of 1605 ±35 BP, cal AD 380–550 (Wk 19959) was obtained on a sample of burnt grain from one of these (Taylor 2012: this volume). Linear charcoal-filled features at Gwithian were broadly dated to the fifth to eighth centuries AD and may have been associated with adjacent industrial activity (Nowakowski *et al* 2007, 40, 43, fig 12).

The chance discoveries of these burnt pits at St Blazey Gate, Nancemere, Ruthvoes, Black Cross and Tregony, together with those identified in association with the post-Roman craft complex at Gwithian, suggest that such features were of relatively frequent occurrence in Cornwall in the later Roman – early medieval period. However, only at Nancemere and Gwithian was there evidence for associated occupation in the form of structures and contemporary artefact spreads. It may be that the potential of such features as fire hazards more often prompted their location away from settlement sites.

The recovery of charred grain from the fills of the Nancemere, Tregony, Ruthvoes and Black Cross pits suggests that they formed part of structures used for drying harvested grain prior to milling or storage. 'Corn-dryers' were widespread in Roman Britain and burnt features broadly similar to those noted above and dated to the post-Roman – early medieval period have been identified elsewhere in southern Britain, including at Poundbury in Dorset and in south-west Wales (discussion in Taylor 2012). No charred grain was recovered from the St Blazey Gate pit, however, and it is possible that it had some other function, such as cooking (*cf* Wood 2003, 98–101).

Evidence of settlement and other activity during the Roman period is widespread in Cornwall

(Quinnell 1986; 2004; Nowakowski 2011) and in recent years several important sites showing evidence of a varied range of forms of occupation continuing beyond the end of the Roman period have been identified. Notable examples include Trethurgy, in Treverbyn parish (Quinnell 2004), Duckpool, Morwenstow (Ratcliffe 1995), Tintagel (Barrowman *et al* 2007) and Gwithian (Nowakowski *et al* 2007). Activity in the post-Roman period has also been noted on a number of less prominent sites. Pottery finds from the infilled ditch of the enclosure within which the Iron Age fogou at Halligye, Mawgan-in-Meneage, is located indicate that activity on the site continued into the fifth and sixth centuries AD (Startin 2009–10; Quinnell and Elsdon 2009–10). Post-Roman occupation of an enclosure at Nancemere, Truro, is suggested by a single sherd of E-ware recovered from material eroded from the rampart (Gossip, forthcoming). Quinnell has also noted post-Roman activity in a round at Grambla, Wendron, and the possibility of continuing activity at several others (Quinnell 2004, table 12.1). High-status pottery and glassware dating to the post-Roman period have also been recovered from a re-occupied Early Iron Age enclosure at Hay Close, St Newlyn East (Jones, forthcoming).

Examples of post-Roman activity on unenclosed sites include two intercutting curvilinear gullies identified during a watching brief at Lanhainsworth (NGR SW 92079 63770), St Columb Major, possibly representing wall slots or drip gullies for domestic structures (Lawson-Jones 2001). These produced radiocarbon dates of 1530 ±45 BP, cal AD 420–620 (AA-36500) and 1575 ±45 BP, cal AD 390–590 (AA-36501). A structure at Stencoose, St Agnes (Jones 2000–1), showed evidence of apparently sporadic use from the fifth to the seventh century AD; adjacent hearth and other pits, not demonstrably associated with the structure, produced radiocarbon dates in the period AD 800–1300. It was concluded that the remains could derive from transhumance or other semi-seasonal use of the structure and its immediate vicinity. Sub-rectangular structures associated with transhumance have been widely found on Bodmin Moor and the wider distribution of the practice in Cornwall is strongly suggested by place-name evidence (Johnson and Rose 1994, 80–83; Herring 2009; 2011).

Finally, a different form of occupation on the margins is suggested by a radiocarbon date of 1640 ±40 BP, cal AD 330–540 (93.1 per cent confidence level) (AA-39954), obtained on cattle bone from a midden-rich soil on an exposed, sand-blown site at Atlantic Road, Newquay (Reynolds, forthcoming).

Together, these examples hint at a wide distribution and diversity in forms of occupation during the post-Roman period, although at the moment this appears much less distinct in terms of its archaeological footprint than in the preceding period and is consequently less well understood. The variety of this evidence makes it clear that there is still much to learn about the range of forms of settlement and other occupation activity found in the late Roman – early medieval period (Herring 2011). While knowledge of the later phases of activity within enclosures such as Trethurgy (Quinnell 2004) and of activity on high-status sites such as Tintagel (Barrowman *et al* 2007) is increasing, the significance and prevalence of more ephemeral forms of occupation, including 'burnt pits', remain largely obscure.

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Monuments and images: new views of well-known sites

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Much of the way in which we visualise details of excavated sites relates to published images. We need to revisit excavation reports from time to time to revitalise our visualisation. Of course, much of this comes from drawings, plans and sections, fleshed out by the accompanying written descriptions. But pictures play a major part in the formation of our perceptions. For many decades now detailed photographic archives have formed part of excavation records; from the 1960s these regularly included colour images. It has not been practical to publish colour photographs of excavations until recently and excavation reports have usually been restricted to a few selected images. We have been prompted to this short paper by the discovery of black and white photographs taken of the Try menhir and cairn excavation in 1958 and 1962 by the late Charles Woolf and have also revisited the colour archive collection of barrow excavations on the St Austell granite by Henrietta Quinnell (Miles). For both sites we have selected images which have helped us with new insights and which we hope will refresh readers' perceptions of these sites.

The Try menhir and cairn

The Try menhir, in the parish of Gulval, West Penwith, was excavated by Vivian Russell and P A S Pool over two seasons in 1958 and 1962. The results subsequently appeared in *Cornish Archaeology* (Russell and Pool 1964). As with most excavations published in the journal in the 1960s, illustrations were limited to line drawings, and in the case of the Try publication the site plan and section were composite drawings showing the key elements of the site (Russell and Pool 1964, figure 5). However, the drawings are schematic and all the elements could not be shown in the single phase plan.

Recently the authors became aware that many of the early excavations undertaken by the Society had been photographed by the late Charles Woolf and that his collection had been deposited at the Royal Institution of Cornwall. A search of the collection was made on behalf of the authors by Adrian Rodda and three photographs of the Try menhir excavation were identified. Two of these photographs are published here for the first time and described below.

Site description

The site at Try had three components: a standing stone, to the east of which was a cist and pit covered by a cairn; to the east of the cairn was a shallow depression or pit. The complex appears to have developed in a linear manner from west to east. The earliest element was the standing stone, although this part of the site was undated, followed by construction of the cist. The cist contained a handled Beaker and, lying nearby, two unburnt bones which could not be identified. The cist was then deliberately filled with soil containing fragments of cremated human bone, haematite, small water-worn pebbles, charcoal and sherds from a second and possibly a third Beaker and of Trevisker Ware.

The cist was also associated with a pit which lay to the south west. It was infilled with charcoal, soil

Fig 1 Charles Woolf's photograph of the Try menhir and cist from the south. (Photograph: Charles Woolf. Royal Institution of Cornwall photograph catalogue number 1976/125/145. Scale in feet. Reproduced with the kind permission of the Royal Institution of Cornwall.)

Fig 2 The Try menhir cist under excavation viewed from the north, showing the handled Beaker in the south-west corner. (Photograph: Charles Woolf. Royal Institution of Cornwall photograph catalogue number 1976/125/144. Reproduced with the kind permission of the Royal Institution of Cornwall.)

and three sherds of Beaker, and partially covered by a stone slab. The cist and pit were later covered by a cairn. A deposit of charcoal, water-worn stones and sherds of Trevisker Ware was found in the top of the cairn. A disturbance of Roman date, with horse bones and a coin of *Gallienus* (AD 259–268), had removed earlier stratigraphy on the west side of the standing stone (*ibid,* 15).

A second pit or depression was recorded in the excavation report as a layer (*ibid*, 16). It contained fragments from several Trevisker vessels, cremated human bone and several flints. The excavators interpreted this material as deriving from the cairn; however, both the plan and section drawings show what appears to be a shallow pit (*ibid*, 17) and it has subsequently been suggested that the Trevisker Ware had been deliberately placed within the pit (Jones and Quinnell 2006). More recently, cremated bone from the cist has produced a radiocarbon determination of 3410 ±50 BP, 1880–1600 cal BC (95%) (GrA-30170) (*ibid*).

The photographs

Three photographs relating to the Try menhir were found within the Woolf Collection at the Royal Institution for Cornwall. Two show the excavations in progress and a third is of the handled Beaker. The two site photographs are discussed here.

Figure 1

This photograph shows the emptied cist and the menhir or standing stone, as viewed from the south of the excavation area. The picture demonstrates the proximity of the cist to the menhir and also reveals the fairly limited extent of the excavation area. The section appears to show that there was a some depth of soil covering the cist, which was rather less stony on the edge of the excavation than was suggested by the section drawing. This implies that the cairn was localised in extent. In the background, within the ploughed field are two large stones, one of which was presumably the capstone that covered the cist. The Roman-period disturbance shows to the left (west) of the menhir.

Figure 2

The second photograph is a close up of the cist from the north. It shows the handled Beaker in the south-west corner of the cist. The vessel is shown within the matrix of the cist and it had clearly been laid on its side. Few Beaker-associated cists have been recorded with any detail in the south west. However, the placing of a Beaker in this manner has parallels with a Beaker-associated cist at Chagford on Dartmoor, where a Beaker vessel was placed on its side at the southern end of a cist, in the south-east corner (Worth 1897). It is also worth noting that the photograph shows that the southern end stone of the cist was shorter than the others and a line of stones appears to have been added to make the end flush with the other sides.

'Yellow clay': some evidence from photographs of the St Austell granite barrows

In the early 1970s six barrows were excavated on the St Austell granite by Henrietta Quinnell and the results were published in *Cornish Archaeology* (Miles 1975). The plates were reproduced in black and white. During a recent trawl through the colour slide archive from the excavations the authors came across several images which showed the distinctive 'yellow clay' deposits. The opportunity has been taken to publish four of these photographs in colour for the first time.

Cornish barrows and 'yellow clay'

What has been described as 'yellow clay' has been recorded as a component of Cornish barrow sites since at least the first half of the eighteenth century. The antiquary Stephen Williams (1739) reported that 'adventitious or foreign Earth', yellow in colour, had been used in the construction of several barrows on St Austell Downs, and that it was 'known to be the natural Soil of a Hill a Mile distant from them'. Fifteen years later, however, the great Cornish antiquarian William Borlase argued that although yellow clay had been recorded at barrow sites, he felt that in most cases local soils had been used, as to import earth from elsewhere would have 'contributed nothing to the grandeur of the work; the colour, distance or richness of the Mould, were things too minute to have any place in such designs' (Borlase 1754, 201). Despite Borlase's reservations, the term has become established since the time of his descendant W C Borlase (1872, 185) and has recently featured in theoretical discussions of symbolism at barrow sites (Owoc 2001; Jones 2005).

Fig 3 Watch Hill showing the whole barrow with 'yellow clay' ring appearing; view from north. (© Henrietta Quinnell.)

Deposits of 'yellow clay' have been recorded at a number of barrows on the St Austell granite. These include all three of the excavated Caerloggas sites (St Austell), Watch Hill (St Stephen-in-Brannel), Trenance Downs (St Austell) and Cocksbarrow (St Stephen-in-Brannel) (Miles 1975), and, more recently, Littlejohns barrow (Roche) (Johns and Herring 1994). Elsewhere, 'yellow clay' was deployed at sites on Davidstow Moor (Davidstow), at Treligga 7 (Tintagel) and on barrows on St Austell or Gwallon Downs (St Austell) (Christie 1988; 1985; Miles 1975; Williams 1739; Borlase 1872, 185–8).

At some sites the clay may be entirely local. At Davidstow site 8, for example, the 'yellow clay' from the natural subsoil in the bank was described as being 'mixed' with 'biggish patches' of the turf (Christie 1988, 62). However, at Watch Hill, the clay was largely kaolinised and could not have originated from the barrow ditch. The source of the clay is uncertain but may have been taken from stream beds in the area and transported to the site (Miles 1975; Jones and Quinnell 2006).

It has been suggested that the clay imbued with colour-associated symbolism (Owoc 2002) may have been regarded as having the liminal properties associated with running water or have referred to celestial events involving the movement of the sun and its association with the human life cycle (Owoc 2001). However, although it is likely that the clay was perceived to possess symbolic properties and to have had cosmological and metaphorical associations, it is also evident that it was deployed in a variety of contrasting ways. For example, in the case of the St Austell granite barrows, it was used to cover mounds and banks and to mark entrances (Jones 2005, 98). It is also notable that in each case the clay was added to an established site. It may therefore have been employed to distinguish the site in a particularly dangerous or liminal phase, or have acted as a marker to guide movement into sites and ensure that entranceways were respected. The clay may, at least at some stages on some sites, have been used to assist visual identification from a distance, from other sites or from significant places in the local landscape.

In addition to contrasts in deployment, it is also possible that what is termed 'yellow clay' varies significantly between sites: there may have been a range of colouration, from bright yellow to orangey-red (Figs 3–6). A range of colours, including pink clays and white quartz, are recorded from Cornish barrows (Borlase 1872, 245; Christie 1985), and yellow was probably only part of a spectrum of colours which were deployed symbolically at such sites. In no case is it possible to determine any patterning in the colour of the clay as it survives on any one site. However, it is possible that exposure to the air and weathering could have led to changes in the appearance of the clay so that it turned from an initial bright yellow to a duller colour. This colour change was observed to a limited extent over the limited period, around six weeks, taken to excavate the sites on the St Austell granite. Any change through exposure might have indicated to the barrow builders that the site had entered a new stage.

The photographs

Four photographs relating to the deployment of 'yellow clay' at the St Austell granite barrows (Miles 1975) have been selected to highlight the contrast use and the variation in colour, which can be seen in the differences in the colour of the clays used at the three monuments illustrated.

Figure 3

This photograph of the Watch Hill barrow, taken from the north, shows the ring of 'yellow clay' emerging after the removal of the top of the mound. The band of clay has an orangey aspect to it and forms a visually contrasting barrier with the turf mound beneath it and the cairn ring which it sealed. The clay formed a band around the site and the dominant metaphors could have been 'keep out' and / or the sun. It was subsequently sealed beneath dark earth placed on top of the barrow mound, possibly to cover the clay as a final act of closure. Parts of the ditch, infilled before the mound was constructed, were also highlighted by yellow clay (Miles 1975, figure 4).

Figure 4

This detailed photograph shows the 'yellow clay' in sectional view over the stones of the cairn ring. The image reveals the range of colour within the clay, which can be seen to vary from bright yellow at the base of the section, through to a much more fiery reddish colour at the top. It was not apparent during excavation that the clay was added in stages but this photograph, and others, certainly indicates

that this may have been possible. If so, the development of the monument may have followed an even more complex pattern than was determined during excavation. If the clay had been added in stages or had weathered from light yellow to a duller colour, there may have been a perceivable visual change as it lost its initial brightness. Such a change could have had metaphorical associations – for example, a change from the rising to the setting sun – but could also have acted as a trigger for the mounding of the site.

Figure 5

This photograph, taken from the south east, shows the entrance (the dark area in the centre of the image) through the 'yellow clay' bank into the centre of Caerloggas I, where an outcrop was located. The 'yellow clay' had itself been built up over an earlier bank. Post sockets, which would have held a post-ring, are visible in the top of the bank. The clay in this case appears to have been a bright yellow, forming a 'halo' around a small stony tor. In this case the ring of clay could have acted to define movement through a prescribed entrance, and would have helped to highlight the presence of the tor and mark it off from the surrounding landscape. The centre of the site was later infilled with turves mixed with artefacts.

Figure 6

The final photograph shows Caerloggas III from the south. The picture was taken when much of the central turf mound had been removed from the central area, within the subsequent yellow clay ring: close examination of what is in effect a horizontal section reveals the mottled colouring caused by individual turves within the mound. Further, it illustrates the relationship between the underlying turf mound, the clay mound capping and the later dark soil mound which covered the site. In other words, it reveals that the 'yellow clay' was again an addition to an established site. This photograph shows the clear break in the clay which may have signalled an access point onto the mound. The break is made particularly distinctive by the use of bright yellow clay against the dark colour of the mound. From the top of the mound there would have been a view towards Caerloggas barrows I and II, which lay to the north west.

Afterword

Apart from the new light on the sites concerned, this exercise reminds us of the enduring value of excavation archives, something which too often tends to be overlooked. We should always remember, when dealing with matters involving the

Fig 4 Photograph of the east side of the Watch Hill barrow, clay over cairn ring; view from north east. (© Henrietta Quinnell.)

Fig 5 Photograph of the entrance into Caerloggas I; view from south west. (© Henrietta Quinnell.)

Fig 6 Entrance through 'yellow clay' onto Caerloggas III; view from south. (© Henrietta Quinnell.)

excavation of archaeological sites, that knowledge is transferred from sites to archives and that those archives deserve the best of attention, finance and maintenance.

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Archaeological recording along the Porthilly pipeline, St Minver

JAMES GOSSIP

During March and April 2010 Cornwall Council Historic Environment Projects was commissioned by South West Water to carry out an archaeological watching brief during the excavation of a 440m-long replacement sewer pipe trench at Porthilly, near Rock, in the parish of St Minver (Fig 1). Recent archaeological excavations to the north east, close to Rock, revealed evidence for an Iron Age roundhouse settlement (Gossip *et al* 2012: this volume) and enclosures shown as cropmarks on air photographs are known to the east of the pipeline (Young 2012, fig 36: this volume). Porthilly is first recorded in AD 1284 when two place-names are documented, *Porthylligres* (Middle Porthilly, now Porthilly Greys) and *Porthillieglos* (Porthilly church) (Gover 1948). There was therefore significant potential for buried archaeology to survive within the pipeline corridor.

The pipeline started at SW 93751 75195, running north east and then east across undulating fields to the west of a caravan park south of Porthilly Farm (Fig 1). It then followed an existing road before turning west and passing to the north of Porthilly Farm. From there the route crossed the sand and pebble beach of Porthilly Cove to connect with an existing pumping station at SW 93676 75501. To the north is the modern village of Rock and to the west the tidal waters of the Camel estuary.

A wide curvilinear stone-faced earth bank forms the northern and north-eastern edge of the field enclosing the caravan park. The present road follows the outside of this boundary, as it did at the time of the St Minver tithe survey in 1838. The boundary almost certainly represents a fossilisation of the bank of a Late Iron Age – Romano-British enclosure. It is likely to have had an external ditch which now lies under the road. At the northern end of the field (at SW 93804 75292) the pipe trench revealed a U-shaped cut in the natural bedrock 5.6m wide at the top and 0.85m deep, with a rounded base 1.4m below the modern surface. The basal deposit was a dark brown silty clay from which three sherds of Iron Age or Romano-British pottery were recovered.

The scale and shape of the ditch are comparable with ditches associated with later prehistoric and Romano-British enclosures that have been excavated across Cornwall; for example, at Trethurgy (Treverbyn), Nancemere (St Clement, Truro) and Reawla (Gwinear) (Quinnell 2004; Gossip 2005, forthcoming; Appleton-Fox 1992). Combined with the evidence of the pottery, it is highly probable that the site represents an enclosure of Iron Age or Romano-British date. This had previously been suggested by the historic field name 'Round Meadow' recorded by the tithe survey and by the surviving curvilinear field boundary on the northern and north-eastern edges of that field. The excavated ditch and curvilinear field boundary together suggest a sub-circular enclosure approximately 100m long and 90m wide. The size is again commensurate with an enclosure of later prehistoric or Romano-British date; indeed, it is at the larger end of the range found in the wider area around the Camel estuary (Young 2012: this volume).

The confirmation of the enclosure adds to the body of evidence for late prehistoric settlement in Cornwall. Enclosed sites are recognised as the dominant late prehistoric settlement type,

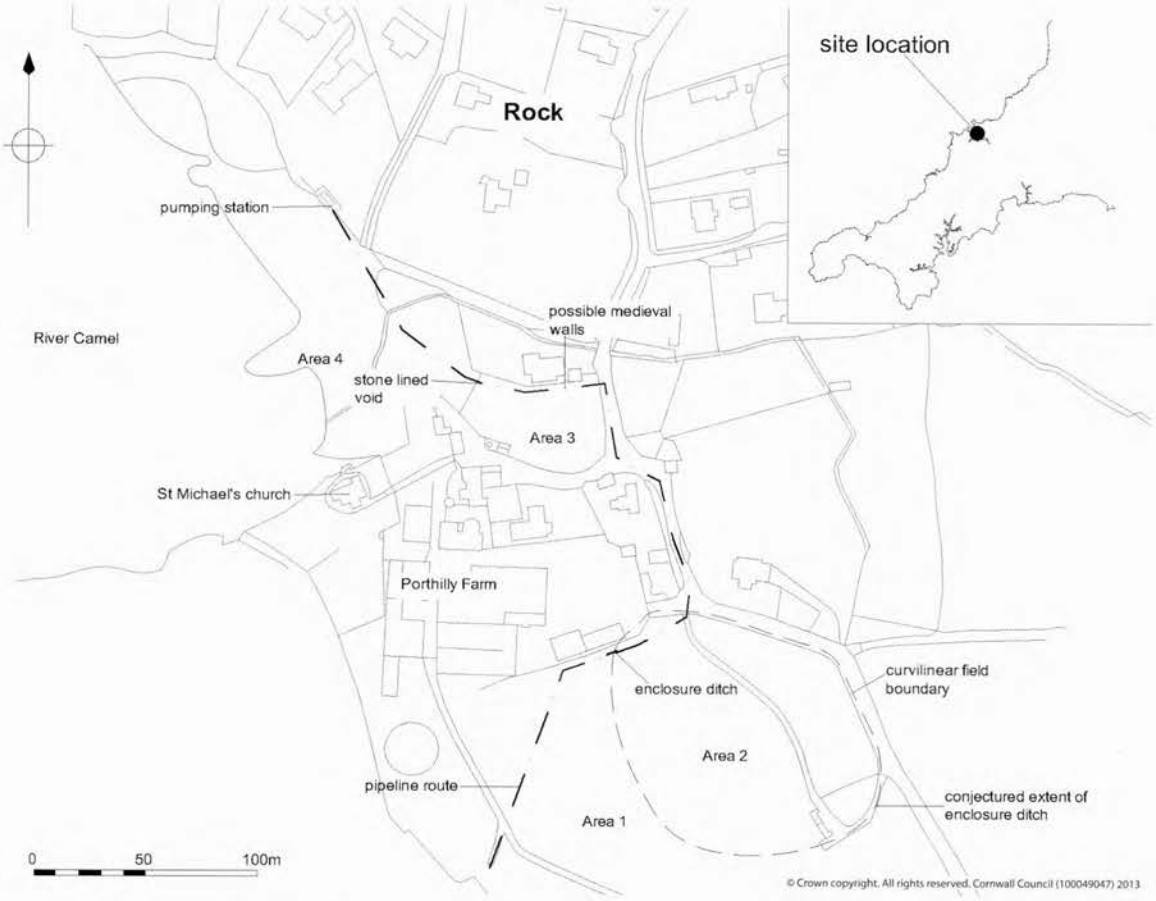

Fig 1 Location map. Reproduced from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Cornwall Council 100049047, 2009

with particularly large numbers in areas around the Camel and Helford estuaries (Young 2012: this volume). Unfortunately the absence of charred residues adhering to the ceramics from the enclosure ditch meant that dates could not be further defined through radiocarbon dating.

The pipe trench crossed a flat pasture field to the north of Porthilly Farm (Fig 1) and was excavated through various lenses of sand containing pottery sherds ranging in date from the thirteenth to the eighteenth centuries, including medieval and post-medieval coarsewares. Three walls built of unmortared slate blocks and aligned north-south were recorded crossing the trench at SW 93780 75414; the central wall was flanked by one 3.5m to the east and another 2.5m to the west. Each was found 0.9m below the current ground surface and stood up to 0.45m high, with sand accumulated above and to either side. They were built on a waterlogged grey clay containing large quantities of shell at a depth of 1.35m. This deposit produced a sherd of Cornish medieval coarseware of thirteenth- to fourteenth-century date. Two conjoining handle sherds of Cornish late medieval coarseware of fifteenth- to sixteenth-century date were also recovered from the west side of the westernmost wall. A possible additional wall running perpendicular to the walls crossing the trench was indicated by an area of collapsed rubble in the side of the trench.

The structure or structures represented by the walls revealed in the pipe trench are not shown on historic mapping, suggesting that they date to at least the early nineteenth century, probably earlier. The retrieval of late medieval pottery from the layer on which the walls appear to have been constructed could suggest a late medieval to early post-medieval origin for a building which may have been abandoned as a result of sand accumulation. However, since the pottery derives from a context that may have been disturbed, this date is insecure. The walls may have been associated with the nearby historic settlement of Porthilly.

Close to the edge of the beach a void was recorded measuring 0.7m wide and 0.9m high and extending 0.7m into the side of the trench (SW 93745 75417). The top of the void was approximately 1m below surface. Its westernmost edge was lined with upright slate slabs 0.2m thick with fragments of slate slab above this forming a partial capping. The feature had been previously truncated by a service trench, causing disturbance. The slate lining of this feature resembles that of burial cists and its location fits well with the known distribution of both short cist graves of the Iron Age and Roman period and of early medieval and medieval long cists (Preston-Jones 1984). However, the height of the void at Porthilly is greater than that of any known cist of these periods and some other function is more probable.

An archive report provides full details of the archaeological recording (Gossip 2010).

The small number of artefacts from the project and the paper archive will be deposited with the Royal Cornwall Museum. The HE project number is 2010021.

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Recent work in Cornwall, 2010–11

Historic Environment Projects, Cornwall Council

2009–10

Academy for Innovation and Research (AIR) building and car park 4, Tremough, Penryn

Two phases of archaeological excavation in advance of development at Tremough revealed areas of activity dating from the Middle Bronze Age (*c* 1500–1000 cal BC) to the Late Bronze Age – Early Iron Age (*c* 1000–600 cal BC). On the site of the AIR building a small circular post-built structure was revealed, thought to represent occupation dating to the second half of the second millennium BC. The site of the new car park revealed a Middle Bronze Age roundhouse within which was a collection of stone metal-casting moulds. Nearby was a curvilinear enclosure ditch surrounding numerous pits and postholes containing large quantities of burnt stone, worked stones and pottery dating to the Late Bronze Age to Early Iron Age. The tip of a clay sword mould was recovered from this enclosure.

- Project officer: James Gossip.

Manor Tannery, Grampound

An archaeological assessment and geophysical survey of land at Manor Tannery, Grampound, was carried out in advance of proposed residential development. A number of features were identified, most of which were historic boundaries.

- Project officer: Francis Shepherd.

Walled gardens at Restormel Manor, Lostwithiel

An archaeological survey was carried out in advance of works to renovate a former summer house within the walled gardens at Restormel Manor. Structural evidence revealed that the summer house had been added to an earlier garden wall. The architectural style and materials suggest an eighteenth-century origin and historic mapping of 1787 indicates that the whole garden layout was in existence by that date. The majority of the walling surrounding the garden survives. The former summer house was a ruinous brick-built building in the upper part of the walled gardens. It was of two storeys with heated rooms on both floors, served by fireplaces in the north wall.

- Project officers: Eric Berry and Nigel Thomas.

Water supply, Antony House

An archaeological watching brief was carried out on 90m of a trench for a water pipeline dug by machine at Antony House. In general the ground directly affected by the works showed few significant traces of past human activity. However, a stone surfacing appeared to be a significant archaeological feature, possibly a drive or approach

linking the area of the stable yard with the open park in front of the house.
- Project officer: Cathy Parkes.

Newquay sewer pipeline

South West Water commissioned a project for archaeological monitoring during the excavation of a sewer pipeline at Newquay Golf Course. The works did not lead to the discovery of any new archaeological sites but did reveal buried soils overlain by deposits of windblown sand. Most of these deposits were homogenous and could represent single events but two layers of sand showed evidence of short-term dune stabilisation before further inundation. Several abraded sherds of prehistoric pottery were recovered from the upper buried soil.
- Project officer: Sean Taylor.

Parknoweth Close, St Newlyn East

Archaeological investigations were undertaken during construction of an affordable housing development. The investigations revealed relatively few archaeological features although they did lead to the discovery of a curvilinear ditch, perhaps part of a stock enclosure or pound of possible prehistoric or medieval date. A section through a pit or ditch was also exposed during the construction of foundations in the south-east part of the site but the date and function of the feature were uncertain.
- Project officer: Megan Val Baker.

Chyverton, Mawnan Smith

Two watching briefs were undertaken at Chyverton. The works monitored encountered few features or artefacts, but did reveal a possible charcoal burning platform.
- Project officer: Cathy Parkes.

Carveth Farm household waste recycling centre, Mabe

A programme of archaeological monitoring was carried out at Carveth Farm. An assessment of the development site had identified potential for buried remains relating to a suspected late prehistoric enclosure in the area. However, no significant archaeological features were revealed.
- Project officers: James Gossip, Megan Val Baker.

Bennett's Cottages, Penryn

An archaeological watching brief was undertaken during construction of two new student housing blocks in a former burgage plot. The archaeological recording revealed a series of garden soils spanning the period from the medieval (*c* 1400) to the present.
- Project officer: Anna Lawson-Jones.

Halt Road, St Newlyn East

Archaeological investigations were undertaken ahead of the construction of 15 dwellings. The investigations revealed comparatively few archaeological features although it did reveal two removed east-west field boundaries shown on the 1st edition Ordnance Survey 25in: 1 mile map of *c* 1880, one of which was single-ditched and the other double-ditched and probably the remains of a traditional Cornish hedge. A north east – south west ditch was also uncovered. This was undated but does not correspond with boundaries shown on historic mapping.
- Project officer: Megan Val Baker.

Ford Farm, St Ive

Archaeological monitoring was undertaken in advance of the construction of 20 affordable dwellings. Prior to the archaeological fieldwork, a geophysical survey of the area had been carried out which showed three ditches crossing the study area. The fieldwork identified these as relatively shallow, originally field boundaries. No dating evidence was obtained but it is probable that they formed part of the medieval field system associated with the settlement of St Ive.
- Project officer: Carl Thorpe.

Carne Hill, Trewoon

A watching brief was carried out on soil stripping in advance of a housing development. The site of the St Mewan parish poor house, first documented in 1831 and demolished after 1851, was partly excavated, revealing part of its plan and aspects of its construction, including two hearths roughly cut into a smoothed clay floor. A small assemblage of nineteenth-century artefactual material was recovered.

The project also identified a number of removed field boundaries, one group of which pre-dated the field pattern documented by historic maps. A number of ditches containing well-built stone drains were investigated (Fig 1), some of which were clearly linked to boundaries associated with post-medieval smallholdings.

- Project officer: Graeme Kirkham.

Mount's Bay School, Penzance

An archaeological watching brief was undertaken during groundwork in advance of the construction of new sports pitches at Mount's Bay School. A scatter of some 30 Neolithic flints was recorded together with two parallel ditches representing a removed field boundary depicted on the 1st edition Ordnance Survey 25in: 1 mile map of *c* 1880 and probably of post-medieval origin.

- Project officer: Carl Thorpe.

Pendennis Place, Penzance

Archaeological recording was undertaken prior to the construction of three dwellings at Pendennis Place, Penzance, adjacent to Lescudjack hillfort. No archaeological deposits were encountered.

- Project officer: Francis Shepherd.

Lanhydrock water main

A watching brief was carried out during trenching works for replacement of a water main at Lanhydrock House. The majority of features identified related to medieval and post-medieval field systems and several former trackways of post-medieval date were also located. Part of a granite window hood mould dating to the sixteenth or seventeenth century was retrieved from a boundary associated with a track.

- Project officer: Jo Sturgess.

Carnkie, Carn Brea

During highway works at Carnkie, a backfilled tramway tunnel which formerly served the Basset Mines was opened up for inspection and repairs. Historic Environment Projects was commissioned to produce a drawn and photographic record of this historic feature, the entrance to which was closed off again following the road strengthening works.

- Project officer: Adam Sharpe.

Geevor underground, St Just

As a part of the Cornish Mining World Heritage Site's *Discover the Extraordinary* project, works

Fig 1 The capping stones on part of a well-constructed post-medieval stone drain recorded during a watching brief at Carne Hill, Trewoon. (Photograph: Historic Environment Projects, Cornwall Council.)

were undertaken to extend and enhance the existing Geevor Mine underground visitor tour, utilising a number of shallow and relatively early mine tunnels which had first been revealed, cleared and made safe during the mid-1990s. The clearance of further sections of the early adit system resulted in an extended visitor tour, including a section of partly backfilled early stoping (an area of the mine where tin ore had been extracted). Visitors can also now see examples of hand-drilled tunnels and further examples of the geologically significant relationship between the granite and the overlying country rock.

- Project officer: Adam Sharpe.

Caradon Hill Area Heritage Project

Historic Environment Projects undertook site consultancy and recording as part of the Caradon Hill Area Heritage Project. Works started at the non-Scheduled West Caradon Mine pumping and winding engine houses and continued at Edmonds rotary engine house at Craddock Moor Mine. The project also conserved the New Phoenix rotary engine house, a rare 'in house' beam engine visible from the nearby Hurlers stone circles at Minions.

- Project manager: Colin Buck.

Trengwainton Carn, Madron

The disease *Phytopthera ramorum*, also known as Sudden Oak Death, has infected rhododendrons across Cornwall, including those at Trengwainton Carn, near Madron. In order to remove a significant reservoir of the fungal spores and attempt to limit the spread of the disease to other areas of West Penwith, Natural England oversaw a project to bring about removal of rhododendron from this site, with the aim of restoring it to an appropriate mixture of heathland and upland grassland. An initial assessment suggested that the site might be rich in archaeological features dating from prehistory through to the medieval period. However, given that the area was covered in dense scrub, only fragmentary glimpses of what lay beneath the rhododendron were possible. The assessment was followed by a three-year watching brief during the clearance programme, during which a series of intriguing stone alignments began to emerge. While some clearly represent medieval and post-medieval upland field boundaries (Fig 2), others may be elements of prehistoric field systems, with hints of associated incorporated roundhouses. Unexpectedly, given its prominence within the local landscape, there were no clear indications that Trengwainton Carn itself had been used as a ceremonial site, although further detailed survey is required to confirm this.

- Project officer: Anna Lawson-Jones.

Piggery, Godolphin House, Breage

A building survey and archaeological watching brief on a former piggery were carried out for the National Trust in advance of conversion to use for visitor reception. The building dated from at least the eighteenth century and was converted into a piggery during the nineteenth century. Before this it had been a small mill used for processing animal fodder and was probably a two-storey structure.

Reduction of ground levels revealed a nearly complete piggery floor comprising cobbled and paved surfaces divided by slate partitions. The layout consisted of six pens with a feeding passage on the north side and a swill kitchen at the east end. Three areas of cobbled surface, a stone-lined drain and a possible drainage gully were identified on the exterior.

- Project officer: Jo Sturgess.

The 'shell seat' in Gyllyngdune Gardens, Falmouth

The shell seat is an ornamental garden feature first recorded in a photograph taken in 1908 but probably constructed in the mid nineteenth century. Plans to renovate it prompted a drawn and photographic record to assist conservation works. It comprises a semi-circular open fronted space (later divided by a partition) overlooking a garden constructed in a former quarry and with a view to the sea beyond. Fieldwork revealed that the structure had at least four construction and alteration phases.

- Project officer: Jo Sturgess.

Tregew, Feock

Building recording was carried out on a former barn, horse-engine house and probable calf-house at Tregew prior to proposed conversion to residential use. The barn and calf-house are of early nineteenth-century date and were shown on the 1840 tithe map. The barn appears to have originally been a stable and cow-house with lofts and threshing floor above. The stable seems to have

Fig 2 An unusual post-medieval boundary of granite orthostats revealed by rhododendron clearance at Trengwainton, Madron, in west Cornwall. The boundary was first mapped on the 1st edition Ordnance Survey 25in: 1 mile map of 1878. It enclosed a small mixed plantation which formed part of the wider planted landscape around the Trengwainton estate, and was probably created to keep animals grazing on the adjacent rough ground away from the young trees. The stones are likely to have been shaped from surface stone cleared from the site. (Photograph: Historic Environment Projects, Cornwall Council.)

been replaced or supplemented by the addition of another by the later nineteenth century. The horse-engine house, although found to be in poor condition, is a distinctive vernacular structure with granite piers and scantle slate roofing.

- Project officer: Nigel Thomas.

Isles of Scilly

A second season of fieldwork for the English Heritage-funded Lyonesse Project, studying the coastal and marine environment of Scilly, was again successful in identifying, mapping and sampling intertidal and submerged organic sediments.

- Project officer: Charles Johns.

Three unusual small vessels, possibly lamps or crucibles but made of very coarse pottery resembling briquetage, were found during a watching brief at Sampson Cottage, Bryher, for the Duchy of Cornwall. (A report on these vessels will be published in a forthcoming volume of *Cornish Archaeology*.)

- Project manager: Charles Johns. Project officers: Francis Shepherd and Katherine Sawyer.

Archaeological recording during a second phase of affordable housing construction at Higher Town, St Agnes, for the Cornwall Rural Housing Association (CHRA) revealed the remains of a Late Bronze Age roundhouse and a group of Roman-period pits, one of which contained a Colchester-type copper alloy brooch and another an almost complete pot. (A report on this site will appear in a forthcoming volume of *Cornish Archaeology*.)

- Project officers: Sean Taylor and Charles Johns.

Watching briefs during construction of affordable housing on St Martin's and Bryher, also for CHRA, and on a private development at Hillcrest, Bryher, were unproductive. A programme of assessment, evaluation and building recording was carried out for Kier Western at the new Five Islands School site at Carn Gwaval, St Mary's. Although it was considered an area of high potential there were no significant archaeological deposits, feature or finds.

Scheduled Monument Management: Conserving Cornwall's Past

2010 saw the culmination of a two-year project funded principally by English Heritage, the

Heritage Lottery Fund, Cornwall Heritage Trust and Cornwall Council. This featured conservation work to a number of Scheduled Monuments at Risk. One of the key aspects of the project was involving local communities in the conservation of their heritage, the most successful element of which was the establishment on the Lizard of a new group of volunteers dedicated to managing and monitoring local monuments.

- Project manager: Ann Preston-Jones.

A selection of other project highlights are described below.

Condolden barrow, Tintagel

This barrow stands on high ground in Tintagel parish, with outstanding views over the north Cornish coast. It had been subject to stock erosion, with the result that by 2008, the trig point on the top of the barrow had started to lean. Preliminary recording indicated that erosion was affecting about one third of the barrow's surface and that in the eroded areas the ground had been lowered by as much as 0.4m. The barrow was fenced and repaired by teams of volunteers from the British Trust for Volunteers in April 2008, under the supervision of archaeologists from Historic Environment Projects.

Falmouth Jewish and Congregationalist cemeteries

Falmouth's Jewish and Congregationalist cemeteries lie in a neglected, scrubby area on the edge of the urban area and surrounded by retail development and busy roads. The main use of the cemeteries spans approximately 100 years, from 1780 to 1880. Both were in seriously deteriorating condition, suffering from vandalism, stonework collapse and uncontrolled tree and scrub growth. *Conserving Cornwall's Past* carried out an archaeological assessment of the site to enhance understanding and appreciation of the cemeteries and provide guidelines for action as a first step to undertaking work to reverse their decline, repair and stabilise the remains and improve management. Local volunteers have subsequently continued the restoration and recording work in the cemeteries.

Kennall Vale gunpowder works

The deep wooded valley at Kennall Vale, Ponsanooth, managed as a nature reserve by Cornwall Wildlife Trust (CWT), holds the well-preserved remains of an early nineteenth-century gunpowder works, comprising a remarkable complex of mills, leats, trackways, bridges, blast walls and ancillary buildings. Despite its interest and beauty, Kennall Vale is a high-risk Scheduled Monument, threatened by deteriorating stonework, vandalism, tree damage and the uncontrolled flow of water through leats and buildings.

In liaison with CWT, *Conserving Cornwall's Past* carried out a range of works at Kennall Vale, including conservation work to two vandalised structures, the felling of particularly dangerous trees and re-surfacing of the main access track to the site. Groups of volunteers helped with work in the reserve, including vegetation clearance and a photographic survey to enable monitoring of the condition of the buildings. An interpretation board and leaflet were also produced.

Paul churchyard cross-head and shaft

Standing on a boulder built into the churchyard wall and a prominent feature in the village of Paul, is the head of a large four-holed cross, of tenth- or eleventh-century date. In recent years it had become apparent that the cement and ironwork holding the cross-head to the boulder and the churchyard wall was deteriorating, putting the monument at risk of damage. The cross-head was removed from the churchyard wall and the old, rusting iron pin which had been holding it in place was replaced with one of stainless steel. The cross-head was lifted back into place and the joint repointed in lime mortar.

Trethevey Roman inscribed stone

At Trethevey, Tintagel, is a rare Roman inscribed stone commemorating the third-century AD emperors Gallus and Volusianus. It was found in 1919 in use as a gatepost and moved into the garden of St Piran's House. Deterioration of the gate fittings and rust staining made the stone difficult to interpret; its location in a private garden also made access difficult. In partnership with the owner, a project was developed to remove the gate fittings, move the stone to a public location, secure it on a new base and interpret the inscription.

2011

Lanyon Farm, Madron

The study focused on the farm's two large areas of rough ground. Two of Penwith's best known

prehistoric monuments, Men-an-Tol and Lanyon Quoit, lie within the study area, and it includes some of Penwith's best preserved multi-period historic landscape, with diverse features ranging in date from the Neolithic to World War II. Much of the northern area of rough ground is in a mining landscape of international importance. The assessment included a desk top-study followed by site visits to record the condition and sensitivity of features and produce and prioritise management recommendations.

- Project officer: Cathy Parkes.

Lansallos to Polruan electricity supply trenching

The National Trust commissioned a watching brief along the route of a new electricity supply cable between Lansallos and Polruan. Buried layers and features of probable Late Neolithic – Early Bronze Age date were discovered in a field where there may formerly have been a group of standing stones. Artefacts recovered include a barbed-and-tanged arrowhead, worked stone tools and a small pottery assemblage; a small holed stone is thought to be a toggle. A ditch and lynchet nearby were associated with Middle Bronze Age pottery.

A substantial ditch, possibly of late prehistoric or Romano-British date but of unknown function, was recorded over several hundred metres. Overlying and partly cut into a section of the ditch, was a stone-walled, slate-floored sunken structure. The slate floor of the structure had been laid over a charcoal-rich deposit which included marine shells and quartz pebbles, but the purpose and significance of this arrangement are unknown. Early medieval potsherds and an animal tooth were found within the structure, which appears to date to the ninth to eleventh centuries AD.

- Project officer: Sean Taylor.

Bosiliack, Madron

As part of the Scheduled Monument Management Programme, Historic Environment Projects, in partnership with Cornwall Archaeological Society, was funded by English Heritage to undertake an excavation to gain further information about the Bronze Age settlement at Bosiliack and to ascertain the effects of bracken rhizomes upon buried archaeological deposits. During the fieldwork, eight 1m square test pits and a small roundhouse were excavated. The excavation revealed that the roundhouse was of Bronze Age date but had been reused in the Iron Age. Bracken rhizomes were found to have damaged the structure and the stratigraphy within it. The results from the test-pitting confirmed that rhizomes were also having a large impact on the stratigraphy within the prehistoric field system associated with the settlement. (A report on the project will appear in a future volume of *Cornish Archaeology*.)

- Project manager: Andy Jones.

Wacker Quay trail, Antony

The project focused on the site of the late nineteenth-century military railway from Wacker Quay, which served – via inclines – both Scraesdon and Tregantle Forts. Part of the former route was to be used for a new footpath which would give public access to Antony via a scenic and interesting route. Among the archaeological remains identified were the inclines and the turntables which served them, the sites of a winding engine house, a water tank, sidings and the base of the engine shed.

- Project officer: Colin Buck.

Siblyback reservoir, St Cleer

A programme of archaeological recording was carried out ahead of the redevelopment of the recreational centre at Siblyback. Several linear ditches were recorded. Artefacts recovered included medieval pottery and a small number of flints.

- Project officer: Francis Shepherd.

Higher Bal, St Agnes

Hyder Consulting Ltd, on behalf of South West Water, commissioned a programme of archaeological recording ahead of the construction of a 640m long sewerage pipeline. Archaeological deposits revealed were limited to spreads of mining waste.

- Project officer: Anna Lawson-Jones.

Moorswater, Liskeard

Archaeological recording took place at Moorswater in advance of the construction of a new dwelling. The site was adjacent to a Listed limekiln. A large culvert was revealed running from the corner of the kiln which had formerly drained water that served

an overshot waterwheel on the eastern side. The waterwheel had powered an incline and tramway which carried coal and lime to the top of the kiln and to another to the south which is no longer extant.
- Project officer: Sean Taylor.

Pengersick Castle, Breage

Problems of damp in the basement of Pengersick Castle prompted investigation of the drainage system around the castle tower. A series of test pits revealed that the ground on the west side of the former courtyard south of the tower had been built up with rubble and topsoil during the twentieth century. The medieval ground level was not uncovered.
- Project officer: Nigel Thomas.

Parkyn's Shop, Newquay airport

Archaeological recording was undertaken ahead of the construction of a southern access route to Newquay Cornwall Airport. Ditches associated with field boundaries were recorded in one part of the site and cobbled and flagstone surfaces in another. The latter are likely to have been associated with post-medieval buildings in the area of Parkyn's Shop.
- Project officer: Francis Shepherd.

Higher Trencreek, Newquay

Archaeological monitoring during groundwork was undertaken in advance of the construction of affordable dwellings. The main features found on the site were a removed field boundary consisting of two ditches and a spread of post-medieval butchered animal bone.
- Project officer: Anna Lawson-Jones.

Penare to Hemmick pipeline, St Goran

The National Trust commissioned a watching brief during works to renew a water supply at Penare. The results were limited to relatively modern deposits and features: nothing earlier than the nineteenth century was identified, with the exception of two fragments of seventeenth- or eighteenth-century roofing tile.
- Project officer: Sean Taylor.

St Stephen's Hill, Newport, Launceston

Archaeological monitoring was carried out in advance of the construction of a new dwelling. Two walls were uncovered, one probably belonging to a post-medieval outbuilding, the second was possibly part of a post-medieval boundary which itself fossilised a medieval burgage plot boundary.
- Project officer: Jo Sturgess.

Lower Bodiniel, Bodmin

Archaeological evaluation trenching was undertaken ahead of the construction of a solar farm. Anomalies revealed by geophysical survey were targeted, the most interesting of which were curvilinear and linear anomalies which appeared to represent late prehistoric settlement and associated fields. The evaluation trenching, however, showed that archaeological deposits were scarce and it seems probable that the complex geophysical anomalies indicated by the survey were largely the result of unusual geological trends across the area.
- Project officer: James Gossip.

Pentewan, St Austell

A watching brief and a programme of photographic recording were undertaken during a flood defence upgrade scheme for the Environment Agency at Pentewan. A section of the harbour wall was removed and a channel for a new culvert cut across to the White River. This revealed a sequence of features and deposits, including parts of the rail goods yard that formerly stood on the site. The fragmented nosecone of a Second World War bomb was recovered from just behind the harbour wall. Study of police records from the period show that Pentewan suffered two bombing raids, in 1940 and 1941, and the bomb fragment is presumed to date to one of these two attacks.
- Project officer: Sean Taylor.

Stratton School, Bude

Evaluation trenching was carried out in advance of building work on anomalies revealed by geophysical survey, some of which suggested a late prehistoric settlement. The project area also fell within the Civil War battlefield site of Stamford Hill, with potential for the recovery of associated

artefacts. The evaluation trenching revealed that the geophysical anomalies were in fact parts of former fields or garden features associated with the early twentieth-century school.

- Project officer: James Gossip, Francis Shepherd.

Electricity supply, Lanhydrock

The National Trust commissioned a watching brief along the route of a new electricity supply cable at Lanhydrock House. Several features were recorded. In the park, a concentration of artefacts was found, including a small quantity of pottery of the fourteenth to sixteenth centuries likely to have derived from the settlement from which Lanhydrock was farmed before the development of the later estate. A later prehistoric granite hammerstone was recovered from the topsoil. Features exposed in the park included a stone roadway and a probable ditch associated with one of the medieval field boundaries visible on the surface. A buried soil with occupation debris was found in the base of the trench in front of the house.

- Project officer: Cathy Parkes.

Clodgy Moor, Paul

Historic Environment Projects, in partnership with the Portable Antiquities Scheme and Cornwall Archaeological Society, was funded by English Heritage to undertake the cataloguing and digitising of nearly 8,000 prehistoric artefacts recovered by fieldwalker Graham Hill from ploughed fields across the area known as Clodgy Moor. The project demonstrated that some places within the project area were occupied throughout the Mesolithic and Neolithic periods. The results also shed light on the production of greenstone axes, widely exchanged around Britain during the Neolithic, and suggest why, despite large numbers of artefact finds, no 'axe factory' site has so far been found close to the probable sources of greenstone. A report on the project will appear in the *Archaeological Journal* and further information is available online from the Portable Antiquities Scheme website and the Archaeology Data Service.

- Project manager: Andy Jones. Flint specialist: Anna Lawson-Jones. Portable Antiquities Scheme Finds Liaison Officer: Anna Tyacke.

Codda farmhouse, Altarnun

Codda farmhouse on Bodmin Moor is a longhouse. It has been in decline since the farmstead ceased to be an active farm in the late 1980s and the lower end of the building has been roofless for over a decade. The farmstead was the subject of a detailed study in the late 1990s when a measured and descriptive survey was carried out. Listed Building consent was granted to rebuild and re-roof the lower end, and to restore and convert associated outbuildings to residential use. A further photographic study, as well as an archaeological watching brief on below-ground elements, was required as part of a planning condition. The photographic survey of the house provided the opportunity to update information from the previous study and to record further architectural features.

- Project officer: Nigel Thomas.

Tuckingmill weir, Warbstow

Tuckingmill weir, near Canworthy Water on the River Ottery, was shown on the 1st edition Ordnance Survey 25in: 1 mile map of *c* 1880. Proposals by the Environment Agency to create a new fish pass necessitated a historic building record of the weir and an associated fish trap prior to structural alterations, together with a watching brief during groundworks. The present concrete weir and fish trap at Tuckingmill were constructed at the same time, probably during the late 1960s or early 1970s. It seems likely that much of the earlier weir was re-engineered during construction of the fish trap but it is possible that some of the original structure remains below the concrete.

- Project officer: Francis Shepherd.

Caradon Hill Area Heritage Project

Ongoing work for the Caradon Hill Area Heritage Project focused on the conservation of the significant industrial archaeological remains of the Scheduled South Caradon Mine, one of the most significant mine complexes in Cornwall. Works started at Kittow's Shaft pumping and man-engine site, and continued at Holman's and Rule's pumping engine houses.

- Project officer: Colin Buck.

Trewavas, Breage

The National Trust acquired Trewavas Cliff, Breage, in 2008 and has since carried out extensive conservation works on the mining-related structures on the site. In 2011, Historic Environment Projects developed a Conservation Management Plan for the property, bringing together data on the archaeological and historic components of the site and its biodiversity, and guiding and prioritising future management works. The site falls within the Cornish Mining World Heritage Site and the mining complex is a Scheduled Monument. The dramatically sited engine houses and stacks on the coastal slope form the most visible element of the site's archaeology but other important features include flint scatters exposed by erosion on the coast path, a Bronze Age kerbed cairn and cist (Fig 3) and another possible cairn, ploughed down lynchets of a possible prehistoric field system, a series of historic grazing boundaries on the coastal rough ground and the remains of a World War II Chain Home Low radar station. One of the key future management activities will be a staged programme of scrub and bracken reduction.

- Project officer: Adam Sharpe.

Farm outbuildings, Gwills, Gunwalloe

Gwills was first recorded in 1327. Proposals to convert outbuildings to residential use prompted an historic building recording project. This revealed that three of the outbuildings were originally houses or cottages containing substantial fireplaces. Date stones incorporated into some of the buildings provided evidence to suggest that parts of them dated to the early seventeenth, eighteenth and early nineteenth centuries. The evidence indicated several phases of reorganisation and adaptation of buildings, much of this having been undertaken during a 125-year period between 1747 and 1872 during which the farm was held by the Hendy family. A further substantial reorganisation of the farm occurred immediately following the end of this period, with a new north yard range being added around 1873.

- Project officer: Adam Sharpe.

Duchy Palace, Lostwithiel

Renovation of the Duchy Palace on behalf of the Prince's Regeneration Trust and Cornwall Buildings Preservation Trust prompted an historic building record and watching brief during conversion of the former Convocation Hall, a Grade I Listed Building. Archaeological work was undertaken to satisfy conditions of the Listed Building consent. The investigation work comprised analysis and recording of the historic building fabric and a watching brief was carried out within the undercroft and during groundworks in the rear yard of the adjoining property. The

Fig 3 The remains of a much disturbed clifftop kerbed cairn and cist on the National Trust Trewavas property, Breage. (Photograph: Historic Environment Projects, Cornwall Council.)

Duchy Palace was never a residential site but is the popular name applied to the remains of the medieval administrative centre for the earldom of Cornwall. The Convocation Hall is located at the northern end of the 'palace', on the corner of Quay Street and Fore Street. It is part of the medieval complex but fieldwork undertaken as part of this study has proved that it was constructed as an extension sometime later than the Great Hall. Although there is no direct dating evidence for construction of the extension, it appears likely that it was built within a century of the Great Hall, perhaps during the fourteenth century.

- Project manager: Nigel Thomas. Project officers: Jo Sturgess, Carl Thorpe.

Isles of Scilly

An Archaeological Skills and Training Project was carried out, sponsored by the Isles of Scilly Area of Outstanding Natural Beauty (AONB) Sustainable Development Fund. The main legacy of the project was the establishment of a database and list of volunteers for monitoring archaeological sites threatened by coastal erosion.

- Project officer: Charles Johns.

A pilot fieldwork project was carried out for the Isles of Scilly Area of Outstanding Natural Beauty (AONB) Partnership to characterise field boundaries on the five inhabited islands and assess their condition, as a basis for future conservation management. The project, which followed an earlier desk-based feasibility study, also brought together a range of historical evidence on field boundaries on Scilly.

- Project manager: Charles Johns. Project officers: Graeme Kirkham and Francis Shepherd.

Scheduled Monument Management

- Project manager: Ann Preston-Jones.

Holed stone, Kenidjack Common, St Just in Penwith

One of the holed stones in the group of five, located on gently sloping heathland below the rocky granite tor of Carn Kenidjack in St Just, was repaired in 2011. First recorded in the nineteenth century, protected through Scheduling in the early twentieth century, recumbent for most of the twentieth century but restored in the 1980s, this stone fell and broke again in 2010. The 1980s restoration of the holed stone had involved cementing it together and standing it upright on the ground. A more permanent repair was made by pinning the two halves of the stone together with stainless steel pins and mounting on a base.

Cross at Kerris, Paul

A medieval granite wayside cross at Kerris was repaired in late summer 2011. The main element of the work was to replace an internal iron pin, which had been holding the head to the shaft, with one of stainless steel, and to remove the stub ends of iron staples from the face of the shaft. The work proved timely since it was found that the old iron pin, which was originally one inch (25mm) in diameter, had rusted to less than half an inch (12mm) at the centre where it was open to rainwater penetration.

Bristol and Region Archaeological Services

2 and 4 Fore Street, Copperhouse, Hayle

(SW 56772 37924)

Trenches were excavated to locate the walls of an infilled dock basin associated with Copperhouse Dock and built about 1769. It was possible to establish the exact location and the alignment of the walls of the basin and the position of its south-east corner. Two cobbled surfaces associated with the dock basin were observed during a watching brief. The dock basin has been preserved beneath the car park of the shop development.

The late eighteenth-century building known as 2 and 4 Fore Street comprised two ranges running north - south. That to the west was of two storeys and had an entrance door decorated with vermiculated stucco in its west elevation. It appears to have been used as offices and, perhaps, a shop. The eastern range was used as a warehouse which was initially open to the roof. Both ranges were extended to the north during the nineteenth century and a first floor was inserted in the warehouse. During the mid to late twentieth century major structural alterations were carried out to provide space for a supermarket on the ground floor. The external west and south walls of the eighteenth-century building have been incorporated in the new shop.

- Project officer: R Jackson.

Trevaster Farm, Porth Kea, Kea

(SW 8358 4267)
Building recording and an archaeological watching brief were carried out in advance of proposed redevelopment. The earliest feature was a shallow pit sealed by the walls of the house and therefore clearly pre-dating its construction. It contained a single sherd of medieval pottery of the late thirteenth century or later. The first house on the site was built of local stone and cob and was of 'cross passage' design with a single room on either side of the opposing doorways in the front and back walls and an outshot to the rear. Three post-holes which formed part of a timber partition to the north of the cross passage were noted during the watching brief. The building appears to have been of two storeys and, as such, is of a 'developed' cross passage type which, together with the presence of the outshot, suggests that it was constructed in the later seventeenth century. A single storey extension, built of cob on a stone plinth, was added to the north end of the house and a sherd of pottery from the cob wall dates to the seventeenth or early eighteenth century. However, the date of this extension is not known other than that it postdates the main house and is probably not much later than the early eighteenth century. A two-storey stone-built extension was added to the south end of the house, probably during the eighteenth or early nineteenth century.
• Project officer: R Jackson.

Greylake Barns, Camelford

(SX 11964 83603)
Building recording was carried out before conversion of derelict barns for housing. The 1st edition Ordnance Survey 25in: 1 mile map of *c* 1881 recorded a complex of farm buildings built around four sides of a rectangular courtyard. It is probable that the east range of buildings was the first to be constructed as it was built using different materials from the other ranges and was cut by the construction of buildings forming the north range and the southern part of the east range, both of which were laid out on a slightly different orientation. The buildings on the south, west, north and the southern part of the east sides of the courtyard were all built of the same materials and were probably constructed at approximately the same time.
• Project officer: R Jackson.

Ford Farm, St Ive

(Centred on SX 31260 66506)
A desk-based assessment and geophysical survey were carried out on the site of a proposed solar farm. The survey revealed a number of features including enclosure ditches with entrances and a possible trackway leading away from one of the enclosures. These are likely to form part of a prehistoric settlement, most probably an Iron Age - Romano-British 'round'. Other features are possible field boundaries which appear to pre-date the existing field pattern. These boundaries may be medieval in origin or could be associated with the prehistoric settlement.
• Project officer: R Jackson.

Trefinnick Farm, Bray Shop, Callington

(Centred on SX 33584 74010)
A desk-based assessment and geophysical survey were carried out on the site of a proposed solar farm. The survey revealed a number of possible ditches which do not appear to relate to field boundaries shown on the tithe map and early Ordnance Survey plans. These ditches may define the boundaries of earlier fields with medieval or prehistoric origins. Some are close together, perhaps suggesting boundaries of more than one period, or possibly indicating another function. Other ditches may represent the boundaries of strip fields.
• Project officer: R Jackson.

West Ditchen Farm, North Tamerton

(Centred on SX 30311 94269).
A desk-based assessment was undertaken in connection with a proposed solar array. Historical and archaeological research and a magnetic survey revealed no specific archaeological features. There was no evidence of occupation, enclosures or buildings, and the only features of certain archaeological interest were the traditional Cornish hedgebanks enclosing the fields.
• Project officer: R Jackson.

Poldory View, Carharrack

(Centred on SW 73449 41375)
A watching brief was carried out during ground reduction work prior to the construction of 16 houses on land at Poldory View. No features

or deposits of archaeological significance were observed.

- Project officer: T Longman.

Cotswold Archaeology

Harvey's Foundry, Hayle

(SW 5579 3710)

A watching brief recorded surfaces or bedding layers within the Pattern and Plantation Stores, and the foundations of both buildings were partially exposed. The Pattern and Plantation Stores, two derelict parts of the mid nineteenth-century buildings of Harvey's Foundry, were recorded and alterations to the fabric of both buildings over time noted. Both buildings suffered serious arson attacks in 2000. The Plantation Store still retains elements of the interior pre-dating the attacks but has a new roof. The Pattern Store was, at the time of recording, a roofless shell with no interior structures.

- Peter Davenport, Senior Historic Buildings Consultant.

Tregunnel Hill, Newquay

(SW 8050 6125)

An excavation examined six areas (Areas A–F). A concurrent watching brief was also undertaken. The site lies close to the Middle Bronze Age settlement and Iron Age cemetery site at Trethellan Farm. A geophysical survey and a subsequent evaluation identified numerous Neolithic, Bronze Age and Iron Age features across the site and formed the basis for the excavation.

Area A included a lynchet cut by a small number of postholes and pits. These features, the lynchet and some adjacent pits or postholes were overlain by two sandy deposits.

Area B included significant archaeological deposits dating from the Late Neolithic to the Roman periods.

The earliest activity within Area B comprised a hollow in the south-eastern part of the area (Fig 4). The hollow measured 16.5m by 12m, was up to 0.5m deep, and had a metalled base overlain by gleyed deposits containing Neolithic pottery and flints, including two Late Neolithic – Early Bronze Age arrowheads.

In the south-western part of the area, a ring ditch was exposed. It had an internal diameter of 17m and two worked flints were recovered from its fills.

Two curvilinear ditches were found along the central western edge of Area B. One yielded flint nodules and a flint core whilst the other contained small quantities of Neolithic and Early to Middle Bronze Age pottery. Both were sealed by a buried soil which survived in patches across Area B. Overlying one of these buried soil patches in the north-western part of the area was a slighted stone bank, probably relating to stone clearance within a field. A smaller stone bank at right angles to this probably marked another field. Lynchet soils had accumulated against these banks and included late prehistoric pottery and abundant marine mollusc shells. On the lea side of the banks, wind-blown sand, probably from Fistral Beach, had accumulated.

A large number of postholes and pits post-dating the buried soil were also present. The finds from these mostly date to the late prehistoric period and include fragments of a rare Early Iron Age 'knobbed' bracelet. A semi-circular post-built structure was identified within the central northern part of Area B. This measured approximately 11m in diameter and many of its postholes were substantial and included stone packing.

In the western part of the area, three ring gullies, representing at least two phases of construction, were present. Associated stone surfaces were overlain by a midden deposit containing Iron Age pottery, animal teeth/bones and mussel and limpet shells. Two parallel rows of postholes containing Iron Age pottery may have been associated with these features. Beneath the surfaces was a hollow or pit lined with stone which may have been a working area.

Six inhumations and ten cremations were identified within Area B, all but one close to the field bank in the north-western corner. The cremations were un-urned, although one was capped by a slate, and all are currently undated. The inhumations included crouched and flexed burials, and one included a sherd of prehistoric pottery. A further flexed burial, found to the north of Area B during the watching brief, was of a teenager buried with two copper-alloy brooches dateable to the mid to late first - early second centuries AD.

Area C included a small number of undated ditches and postholes.

In **Area D** the earliest feature was a rectangular pit, the base of which was covered by a an ashy

Fig 4 Tregunnel Hill, Newquay: Late Neolithic – Early Bronze Age hollow in Area B, looking south-east (2m scales). (Photograph: Cotswold Archaeology.)

Fig 5 Pit containing Early Neolithic finds in Area D at Tregunnel Hill. (Photograph: Cotswold Archaeology.)

layer onto which fragmented Early Neolithic pottery vessels, flint tools, flint nodules and cores, a greenstone axe, possible grinding stones, pebbles and animal bone had been placed (Fig 5). This fill was sealed by a layer of stones, itself overlain by further backfills containing Early Neolithic pottery and flints. The pit was sealed by a buried soil and an overlying stone rubble layer.

A few metres to the north was a smaller pit with scorched edges, indicating use as a fire pit. It was flanked by two large postholes, and further postholes were present in the immediate vicinity, possibly forming an associated structure. One of these postholes contained a large number of flint blades and flakes; numerous flints were also recovered from a nearby buried soil. Further small postholes and stakeholes and an area of scorched substrate were present nearby.

A pit containing the truncated base of a probably Bronze Age pot was excavated within the northern

part of Area D. Further south, more pits and postholes were present, some containing late prehistoric pottery and worked flints. Two lynchets within the northern part of the area also contained small quantities of late prehistoric pottery.

Area E contained three post-medieval/modern ditches, two undated pits and an undated possible ditch.

Area F contained two large areas of scorched substrate cut by pits and postholes. These features seem to represent industrial activity, and although the nature of this has yet to be determined, the absence of metallurgical residues and the presence of large quantities of pottery, mainly Early to Middle Bronze Age Trevisker Ware, may be significant, as might a piece of burnt clay retaining the impression of a pottery vessel. Some of the postholes/stake-holes may have formed windbreaks, superstructures or buildings associated with this industrial activity. Also in this area was a ring gully with an internal diameter of 4m, possibly the remains of a small roundhouse or small barrow.

John Moore Heritage Services

Alexander House, 6 College Ope, Penryn

An archaeological evaluation was conducted on land next to Alexander House (SW 7856 3421). The site lies within the overlapping boundaries of the Scheduled Monument of Glasney College and the Penryn Conservation Area. The College was founded by Walter Bronescombe, Bishop of Exeter, *c* 1265.

One machine-dug trench 6.4m long was excavated. A layer of demolition rubble containing fragments of medieval floor tile was identified below the 0.5m - 0.6m thick topsoil. The demolition layer was sample excavated by hand and was seen to be at least 0.3m thick. This layer masked what was probably a robber trench overlying the footings of a large stone wall. It is likely that the demolition deposit and the stone footings are associated with the collegiate church of Glasney College, demolished in the sixteenth century. Previous work on the site generated a tentative ground plan of the collegiate church (Cole, forthcoming). This suggests that the wall footings found during this project could have been part of the north transept of the medieval church, which may have extended several metres further north than previously thought.

The evaluation results and consultation with English Heritage allowed the design of the proposed development to be altered so that impact levels were kept within the topsoil and the remains could be preserved *in situ*.

- Project manager: David Gilbert. Project officer: Adrian Chadwick.

Tregolls Road, Truro,

The site was situated on sloping ground on the north-eastern edge of Truro (SW 83609 45227). The first stage of a strip, map and record investigation was undertaken. Below the topsoil the overburden consisted of silty colluvium that was only some 0.1m thick at the south of the site, but increased to up to 1.3m towards the north. This colluvium contained worked flint, medieval and post-medieval – early modern ceramics and one sherd of older coarse pottery. The natural subsoil was sandy silt, becoming more clayey and alluvial in nature in palaeochannel deposits at the eastern edge of the excavation area.

The features identified on site included a small post-built structure (structure 1) with a central stone-lined hearth, and a series of associated pits and postholes backfilled with large quantities of charcoal, ash and burnt stone. One corner posthole contained a stone rotary quern fragment reused as post packing, while an upper fill of a double posthole contained one Middle Bronze Age sherd of a 'gabbroic admixture' fabric. Stakehole alignments seemed to mark windbreaks and fence lines for what was probably an open sided, lean-to structure.

Just a few metres to the south of structure 1 were two intercutting features, either two pits or possibly a pit cutting a ditch terminal. These two features were backfilled with considerable quantities of ash, charcoal and burnt stone. There was no sign of *in situ* burning, however, and the material from within these two features might well have been derived from the hearth in structure 1. To the north and west of this structure there were rough lines of oval, bowl-shaped pits with evidence for slight scorching on the sides whose purpose is uncertain, although initial flotation of some soil samples seems to indicate large quantities of charred plant remains in at least some of these features.

To the east, several intercutting ditches were dug into underlying palaeochannel alluvial deposits. The ditches probably had rather active fluvial

regimes, as evidenced by erosion on their sides. One of these ditches produced three sherds of a Late Iron Age – Early Roman Trethurgy Type 1 jar from its upper fill. The complex of features and the palaeochannel were only 5–10m from the course of a modern stream, so flowing water may once have been a prerequisite of the activities at the site. No obvious industrial residues were present; however, the site does not seem to have been 'domestic' in nature, and the location of any contemporary occupation is unknown.

- Project Manager: David Gilbert. Project Officer: Adrian Chadwick.

Reference

Cole, D, forthcoming. Excavations at Glasney College, Penryn, *Cornish Archaeol*

Cornish Archaeology 51, 2012, 229–234

Obituary

TONY BLACKMAN

1942–2012

In February 2012 the Society lost its long-serving President (elected in 2007), and Cornwall lost a fine, highly active and tenacious archaeologist. Tony Blackman was born in Hayle during the Second World War, but spent much of his childhood and later life in and around Perranporth. He attended the town's primary school and then went to Truro School before training to be a teacher at St Mary's College, Twickenham. He taught at Bosvigo School in Truro before serving for 20 years as Headmaster of St Newlyn East School. All the while his interest in Cornish history and his collection of Cornish books grew.

Early retirement provided Tony with the opportunity to devote himself to investigating Cornwall's history, landscape and archaeology, all with the aim of establishing to his own satisfaction how past people made and changed our part of the world. He disseminated his broad knowledge less through publication (although he did issue a number of papers, including two in the Golden Jubilee volume of this journal) and more through field presentation and other activities.

Tony explored his world with his wife Dot and their dog Harry, and with groups of other enthusiasts. He had a particular gift for enthusing people, whether adults who wanted to understand Cornwall and the Cornish or children finding out about this peculiar place they would always regard as home. Tony set up the Cornwall Young Archaeologists Club (YAC) in 1993 and ran it until 2010. Numerous YAC members, inspired by their many adventures with him, have gone on to study archaeology or related subjects at university and those that didn't retain a fondness for the past, for Cornwall and for Tony that will endure. He taught

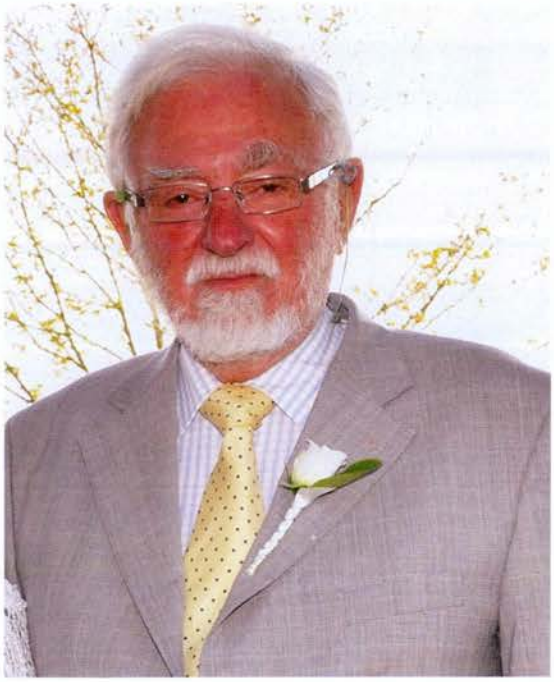

Fig 1 Tony Blackman, April 2011. (Photograph © Bill Dyson.)

generosity as well as archaeology, insisting that whenever a YAC member found a feature (and most did) that it be personalised by their name: 'Tansy's Stone' stands high and proud on Roughtor (Blackman 2011a, 44). He also became the friendly purveyor of avuncular advice. Daniel Rose-Jones recalls Tony at one of the Christmas gatherings sending members on their way, perhaps after a session playing with his collection of vintage board games, with the wish that their presents include 'a little of what you want and a little of what you deserve'.

Through YAC Tony became a Trustee and then an Honorary Vice-President of the Council for British Archaeology and helped organise and host the CBA's annual weekend when that came to Cornwall in October 2010. He was also closely involved in the Cornwall Heritage Trust, working as a particularly active trustee, encouraging proactive management of their sites and extending their work to supporting initiatives like the Scheduled Monument Management project that has seen numerous archaeological sites repaired and restored throughout Cornwall. He also joined and encouraged their heritage campaigning, writing many a controversial editorial in its newsletters, and finally becoming the Trust's widely respected Chairman.

He encouraged the children in his charge (his two sons, the schoolchildren he taught, and then those who joined the YAC) to use and trust their own eyes, which he would say were not only closer to the ground than those of lumbering adults, but were also faster and sharper and linked to active minds not clouded by that certainty got through learnt or fixed knowledge. He valued these qualities, the child-like openness to see and question the world anew whenever it was encountered, so much that he cultivated them in himself and thereby developed a particular way of being an intelligent and successful field archaeologist. His method and his strong personality inspired a new generation of enthusiasts, many of whom he drew into the Cornwall Archaeological Society, especially in his last four years when he was proud to be the Society's first non-academic and non-professional President.

As President he ensured that the Society continued to be as active as he was: digging, surveying, undertaking geophysical survey, pursuing Civil War campaigns, recording the under-regarded remains of our past, such as stiles and postboxes, and monitoring the condition of Cornwall's monuments, notably those on Bodmin Moor. He was so proud that St Newlyn East, where he had taught for almost his entire career,

Fig 2 Tony Blackman (second right) overseeing the experimental erection of a standing stone on Manor Common, Blisland, by children from the parish school. Tony's friend Graham Lawrence (right) assists in the use of, first, rollers to trundle the stone into position and then simple shear legs to raise it up. (Photograph © James Gossip.)

was the site for CAS's first summer excavation for many years. Under his leadership, and with help from Peter Cornall, he brought the Society's Area Representatives back to a virtually full complement, identifying each representative with a batch of parishes, those blocks of Cornwall that Tony knew are still the worlds in which most Cornish people move. 'Monument Watch across Cornwall' was established to encourage Area Representatives to adopt and visit local Scheduled Monuments, reporting to English Heritage and the Cornwall and Scilly HER on their condition.

Tony worked with the journal's principal editor, Graeme Kirkham, encouraging the catching up of the backlog both had inherited, and admiring the effectiveness of Graeme's innovations. He was also determined that the Jubilee volume, guest-edited by Peter Rose, should not only celebrate a remarkable half-century for the Society, but also appeal to professional and enthusiast alike. The Society's newsletter also continued to develop under Konstanze Rahn and Adrian Rodda, becoming less a fount from which knowledge was drawn and more a *lavoir* where all members mash their laundry together and feel comfortable contributing to planning and recording activities.

He also ensured close working relationships between the Society and English Heritage, Cornwall Heritage Trust, Cornwall Council's Historic Environment service, Cornwall's museums and many other bodies and individuals, all with the aim of ensuring strong protection, good management and enthusiastic celebration of all aspects of Cornish archaeology. As he saw historic Cornwall as of interest and value to everyone he saw no reason to expect that sympathy and support for campaigns would be confined to those in what might be loosely termed the historic environment sector. He was a community archaeologist before many realised there was such a thing. In all he did, Tony was determined and focused to the point of being relentless; when he was working on something people might expect to be called several times a day, to be prompted and persuaded, always in a friendly supportive way.

Tony's work at Castle-an-Dinas, a prominent hill in St Columb Major managed by the Cornwall Heritage Trust, exemplifies the ways that he used all available opportunities to draw numerous people into integrated projects for the benefit of the historic environment. The Scheduled Iron Age hillfort and the Bronze Age cairns within had become overgrown, so several projects were designed in liaison with Ann Preston-Jones of English Heritage to reduce the scrub and make the earthworks visible again. Sharon Soutar and Elaine

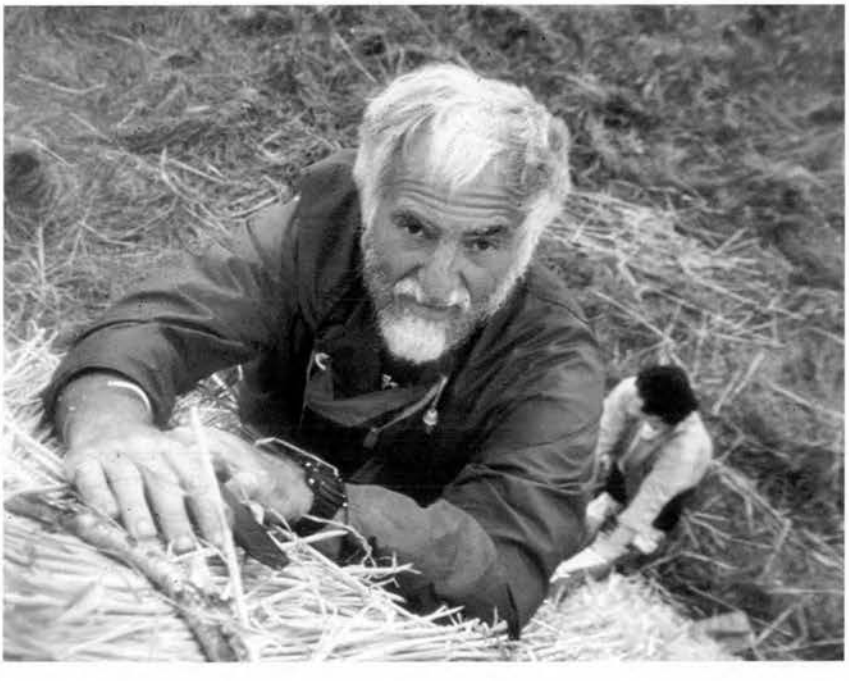

Fig 3 On the thatched roof of the first reconstructed round house at Trewortha, North Hill, mid 1990s. (Photograph © Steve Hartgroves.)

Jamieson of English Heritage's Archaeological Survey and Investigation team in Swindon prepared a measured analytical survey that enabled a more nuanced interpretation of the site to be prepared (Soutar, forthcoming), and Jane Stanley prepared a series of paintings showing key moments in the place's history. These included one showing a smiling Tony lifting a turf to be placed on one of the cairns (Fig 4).

One of the last services Tony gave to the Society was at the Launceston symposium of the Cornwall and Devon Archaeological Societies in November 2011. Already quite poorly, he stood tall to cast the voice that always commanded attention and as our President warmly welcomed members of the Devon Society to both Cornwall and its Archaeological Society. The previous month Tony had kept his promise to lead a walk across his beloved Moors near Roughtor and explained his involvement with and personal discoveries around Stannon Circle. As at all meetings, he was thrilled to welcome new members there for the start of the winter season.

In his own work as an archaeologist, Tony was the discoverer, often with Dot and Harry, and the YAC, of numerous previously unrecognised sites, notably the propped stones on Bodmin Moor and elsewhere that appear to be around 5000 or 6000 years old and will be the subject of continued study (Blackman 2011a). He also noticed, again often with Dot, previously unappreciated relationships between sites, such as the alignment of Dartmoor's Merrivale stone rows with the great monuments of south-eastern Bodmin Moor, Stowe's Pound and Rillaton Barrow, skylined to their west (Blackman 2011a, 44). And he pursued the activities and stories behind field remains that had long intrigued archaeologists, most notably the sites of relatively recent granite splitting and turf cutting and ricking. His work on the cutting and saving of turf for fuel on Bodmin Moor is perhaps his greatest contribution to our understanding of modern Cornwall (Blackman 2011b; Herring 2008: this was based in large part on oral evidence gathered by Tony).

Tony was an actively social archaeologist too; if he felt someone might help him interpret and understand a subject that intrigued him, he phoned or knocked on their door and talked to them for as long as was needed. Those he questioned were sometimes other archaeologists, like myself, lucky enough to be paid to do what Tony did in his own time and with his own resources. Or they were those with other forms of knowledge or experience, like miners, smelters, flint knappers, granite workers, potters, weavers, builders and farmers. As a result, Tony had many friends and acquaintances, reflected by the numbers attending his memorial service at St Newlyn East church on what would have been his seventieth birthday and taking part in a commemorative walk on Bodmin Moor the following day.

He was elected a Bard of the Cornish Gorsedd in 1997 in recognition of his contribution to education, archaeology and heritage, and he was distinctively Cornish in the ways he joked, complained and cajoled. Tony was a Cornish captain, a master-man, the confident, sometimes impatient king of any group – and these included the Cornwall Archaeological Society – always determined that people got on with doing things.

Many will recall that Tony was active in another way: if he felt that probing an interpretation might be improved by replication or re-enactment he poured hours, days, weeks of his time into organising and then doing that, usually to great effect (Blackman 2011c). When he could, he drew others into the excitement, getting up before dawn to watch the midsummer solstice sun rise behind Roughtor from Stannon and staying up late to watch it set behind Leskernick's propped stone from the slopes of the Beacon (Blackman 2011a, 41–2).

With Graham and Lizzie Lawrence, and the YAC, he replicated at Trewortha a small group of Bronze Age roundhouses, using Bodmin Moor excavation evidence as a guide (2011a; 2011b). Hundreds stepped, with a welcoming gesture and word from Tony, out of the moorland elements and into the dark peace contained within these wonderfully spacious structures. At Trewortha, in and among the roundhouses, he enabled many children to experience a range of prehistoric activities; Cornish schoolchildren, YAC members from Cornwall and those from throughout Britain who stayed at Trewortha on annual holidays. Here they, and numerous adults too, learnt to knap flint so well they could fashion arrowheads, added to ever-lengthening woven cloths, shaped and fired pots, querned grain, cooked prehistoric foods, minted coins or crouched around an open fire, pumping on leathery bellows until tin and copper became liquid and could be poured into a stone mould to become a bronze axe or even a bronze sword.

In all of this he showed himself and those he involved in his activities that aspects of the past could be experienced as well as read or heard about. Through it, he and they better understood that the future (like the past) might take many forms, and that we all have a share and a responsibility in shaping it. His belief that archaeology was for everyone showed itself in the special interest he took in leading walks for visually impaired people, in which he was generously supported by his friends from Cornwall Outdoors.

His interest in experimental archaeology found Tony in Truro Museum building a replica of the huge Bronze Age pot excavated at Boden as a contribution to the CBA Festival of Archaeology, for which he always planned and led walks over his favourite sites. His interest in the Cornish Civil War battlefields, especially his knowledge, research and outreach work concerning the Lostwithiel campaign, led Tony to create links with metal detectorists in the area and to institute the Battlefields Project supported by the CAS survey team, under Peter Nicholas and Les Dodd, and historians led by Roger Smith.

Perhaps the greatest of all Tony's achievements lay in persuading the people of central Bodmin Moor, and the Draynes Valley (the Fowey south of Bolventor) in particular, to talk freely about their lives on the Moor (Blackman 2011b). Here he encountered and became friends with the late Jack Parkyn of Wimalford, whom he persuaded to talk in great detail about many remarkable things, among them all aspects of cutting, saving and using turf as the principal household fuel. What turned this part of Tony's life into something extraordinary was when he persuaded Jack to unearth his old turf iron and go down to the marsh to cut turf again. In the following weeks Tony, Jack and the whole Parkyn family, as well as other friends, turned the rows of turves to dry them, drew them home and stacked

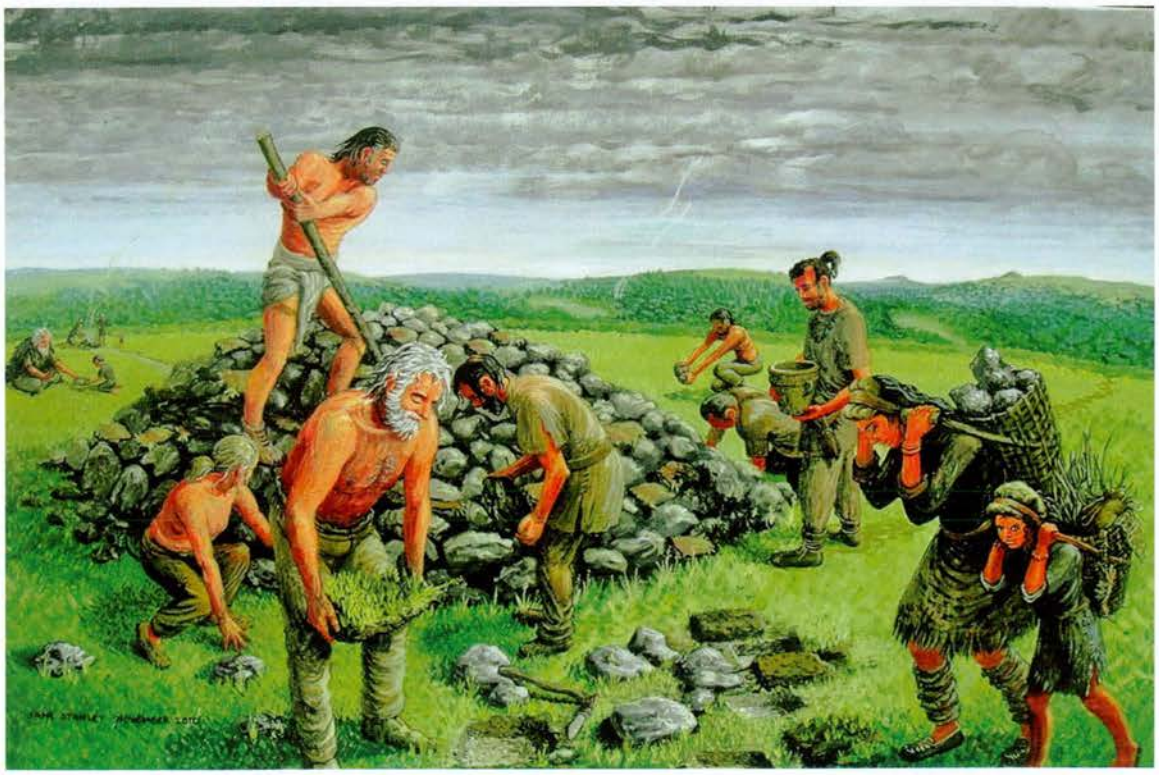

Fig 4 One of a series of paintings by Jane Stanley showing key moments in the history of Castle an Dinas, St Columb Major; a smiling Tony lifts a turf to be placed on one of the Bronze Age cairns on the hilltop. (© Jane Stanley.)

them. Jack thatched the rick with rushes scythed from the marsh, and then secured the thatch with long turf vags pinned with short hand-cut pegs. The culmination was bringing the turves indoors to heat the parlour and fuel the kitchen's Rayburn in order to bake pasties and boil kettles for numerous cups of good strong tea, perfect for encouraging further talk.

Tony and Jack made us all appreciate that not only would moorland life without turf have been barely viable before the middle of the twentieth century, but that life without turf has transformed modern moorland society's relationship with its land and place.

Few archaeologists have come close to Tony as a presenter of the past. Here he used his other genius, that of the teacher and speaker, to show people former Cornwalls, lost Cornwalls, and to encourage people to find and see these for themselves and make them feel real and relevant again. The same applies to Tony himself; some find it hard to believe he's not still with us, the ringing of a phone at a certain time of the evening presaging his particular form of cheery greeting: 'Hello my handsome.'

(I am grateful for contributions to this appreciation made by Dot Blackman, Adrian Rodda, Roger Smith, Cathy Parkes, Ann Preston-Jones, Daniel Rose-Jones, Pete Rose and Graeme Kirkham.)

Peter Herring

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