The evaluation of a multi-period prehistoric site and fogou at Boden Vean, St Anthony-in-Meneage, Cornwall, 2003

JAMES GOSSIP

with contributions from CHRISTOPHER BRONK RAMSEY, SARNIA BUTCHER, GORDON COOK, VANESSA FELL, ROWENA GALE, DEREK HAMILTON, FRASER HUNTER, JULIE JONES, ANNA LAWSON-JONES, JANICE LIGHT, NEIL LINFORD, RAY McBRIDE, DAWN MCLAREN, HENRIETTA QUINNELL, RICHARD REECE, ROGER TAYLOR AND CARL THORPE.

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1 Summary

During October and November of 2003 a team from the Historic Environment Service (HES), Cornwall County Council carried out a programme of archaeological recording as part of an evaluation of a Bronze Age structure, Iron Age enclosure and fogou at Boden Vean, St Anthony-in-Meneage, Cornwall. The site is situated one kilometre to the south of the village of Manaccan on the eastern side of the Lizard Peninsula (centred on NGR SW 7685 2405). The work was funded by English Heritage.

In 1991 pipelaying by the landowner led to the discovery of a possible well shaft containing Romano-British pottery and rotary querns, and to the rediscovery of a fogou which had been documented in this area since the early nineteenth century and had been a folk memory since the early twentieth century. Geophysical survey by English Heritage in 1992 and 1993 identified a rectangular enclosure and multi-phase field system, and then in 1996 a void opened during agricultural operations, exposing a subterranean tunnel. The 2003 excavations were undertaken to better understand the fogou and its context, and to guide its future management.

In addition to partial excavation of the fogou, additional geophysical anomalies were targeted revealing a Bronze Age structure containing fragments of a huge Trevisker Ware vessel, radiocarbon-dated to between 1500-1300 cal BC (95% probability) and 1390-870 cal BC (95% probability), raising questions relating to its ritual or domestic function. The fogou and surrounding rectilinear ditched enclosure contemporary with the fogou produced radiocarbon dates suggesting construction in the Later Early Iron Age, around 400BC. The fogou and features associated with the enclosure produced an unusually large assemblage for Cornwall of pottery from this period and Romano-British pottery indicates re-use of the site
in the early centuries AD. An important collection of Post-Roman Gwithian style pottery – platters, bowls, jars – showed the site to have been in use around the sixth century AD. For the first time a radiocarbon date has been secured for this type of pottery of cal AD 590 - 670 (95% probability). An important element of the project has been the dating programme, providing early dates for both the fogou and enclosure and a date for Gwithian style ceramics.

The archaeological fieldwork provided a rare opportunity to investigate in situ deposits in a fogou which had been spared disturbance by antiquarian explorers, and to assess its context within a contemporary settlement enclosure. The work has helped guide the future management of the site and through consolidation of the void to ensure its future preservation.

“At Bodean Veor, in the Parish of St Anthony, is an artificial cave, of about thirty yards in length. It is merely an excavation of the earth, without any stone for walls or roof, four or five feet under ground. Its situation, on the highest part of the hill, suggests the idea of some military works near it – but none at present are discoverable”

Reverend Richard Polwhele, Vicar of Manaccan, 1803

2 Project Background
2.1 “An artificial cave…”
A fogou, or underground tunnel, has been documented in the area of Boden since the early nineteenth century when it was viewed and recorded by Polwhele, the vicar of Manaccan and St. Anthony. The above account was published in Polwhele’s ‘The History of Cornwall’ in 1803 at a time when he was exploring other “subterranean retreats” such as the ‘Piskey-Hall’ (Trewardeva) and Pendeen Vau. Despite apparent observations by later writers (Cornish 1906, 353-374; Henderson 1912 and 1916) it is not clear whether they actually visited the tunnel since they appear only to repeat or embellish Polwhele’s original account. The only exception to this may be Henderson, who states that “the entrance is
now covered by a large stone” (Henderson 1912). Although this may have been from a secondary source it is worth considering since when viewed from inside the void, a large, flat stone now appears to block the eastern end of the passage. It is possible that what Polwhele recorded were both the stone-lined and the earth-cut elements of the fogou.

The modern account as recorded by Margaret Hunt for the parish checklist of St Anthony-in-Meneage is that the tunnel was found whilst hedging and was seen by a local farmer whilst a boy (Cornwall Committee for Rescue Archaeology (CCRA) register 24875, 1989). Whether this refers to the earth-cut tunnel or the stone-lined fogou (see below) is unclear; the description suggests the former, although it is hard to see how this would not have been visible during the early twentieth century by eyewitnesses to the latter (see below). Either way it seems that both the earth-cut tunnel and the stone-lined fogou had been lost or deliberately ‘closed’ by the middle of the twentieth century.

2.2 Rediscovery
In the summer of 1991, the present landowner and farmer Mr Christopher Hosken was laying a water pipe alongside a hedge in a field near Boden Vean (centred on NGR SW 7685 2405; Fig 1) and discovered a loosely filled pit or ‘well’ with evidence of a poorly preserved stone lining. He cleared the well to a depth of 3.25m and recovered finds including Romano-British pottery and fragments of quernstones. The base of the feature was not reached.

Some 30m to the south of the ‘well’ Mr Hosken cut a small trench to locate the underground tunnel which had not been viewed since the early twentieth century. The memories of local residents suggested that a tunnel had last been seen some distance from the hedge 75-80 years ago when it had been exposed by the uncle (‘Uncle Richard’) of the former owner Mr Tony Williams. He had discovered the chamber with another man but did not want to enter it himself nor would he let his acquaintance do so.
This was found to be an infilled, stone-walled passage, which was examined, recorded and briefly reported on in September 1991 by Peter Rose of Cornwall Archaeological Unit (CAU) and Ann Preston-Jones, English Heritage Field Monument Warden (Rose and Preston-Jones 1991). The CAU team also recorded and reported on the structure, fill and finds from the ‘well’, described in detail below.

At the time of the CAU visit Mr Hosken and Mr Williams (the former owner) were present and related that a local resident ‘Alfie’ had seen the chamber 20-25 yards out from an apple tree planted in the hedge when he was 14 in 1935. The tree was mature at the time and it is possible that it was deliberately planted in order to locate the tunnel, probably at some point in the nineteenth century. It is unclear which section of the fogou had been visible within living memory or to what extent it had been accessible. Local anecdote suggests that this was a stony area containing voids large enough for children to enter, whilst the evidence from ‘Uncle Richard’ and his acquaintance gives the impression that the structure was just about accessible but dangerous to do so (Rose and Preston-Jones 1991, 3). It was probably for this reason that the tunnel was finally blocked, although the archaeological evidence suggests that the main fogou passage had been backfilled in antiquity.

The initial discovery of Romano-British finds in 1991 and the suspected rediscovery of the fogou led to a geophysical survey undertaken by English Heritage’s Ancient Monuments Laboratory (AML), carried out in two separate visits in March 1992 and February 1993 (Linford 1998) (Fig 2). The work incorporated rapid geophysical techniques (magnetometer and resistivity survey) with the aim of mapping the extent of fogou itself whilst also placing the monument in a wider landscape context

Whilst this proved highly successful in identifying archaeological activity surrounding the fogou, responses over the suspected location of fogou were less clear. In order to investigate this area in greater detail a geophysical technique known as microgravity survey was applied in
1993 in an attempt to define the location and extent of the fogou, including possible voided spaces. This proved successful and located the position of an extant void subsequently revealed by surface collapse during agricultural improvement in 1996. In July of that year whilst Mr Hosken was sanding the field, a hole of 0.6m in diameter opened up giving access to a voided passage. This tunnel was of 5m long cut into the rock and shillet subsoil, within one of the ‘void’ areas identified by micro-gravity survey. Just below the hole, at the base of a ramp of collapsed soil, a ‘pillar’ of stones supported the roof of the tunnel. It is clear that the ‘artificial cave’ recorded by Polwhele did not refer to the stone-lined fogou passage since it was ‘without any stone for walls or roof’ (Polwhele 1816, 129), but more probably to the earth-cut tunnel.

In addition to the fogou a wide range of anomalies detected as a result of magnetometer and resistivity survey indicated activity in the surrounding field, including the linear ditches of a prehistoric rectilinear enclosure containing curvilinear features. A landscape of considerable archaeological complexity (Linford 1998) was suggested by the survey results, and beyond the field were linear anomalies almost certainly representing field systems associated with this settlement. In addition strong magnetometer responses indicating extensive ground disturbance were reminiscent of buried earth-cut hollows that when excavated elsewhere in Cornwall have revealed Bronze Age structures.

The results of both phases of geophysical survey work have been reported by Linford (1998 and 2004) and are described in greater detail in the geophysical survey report in this report (Linford below).

In May 2002 A-level students from Truro College with CAU supervision carried out a fieldwalking exercise in the southern part of the fogou field using 20m² grid squares (see Fig 3).
2.3 Project Design

Further work at the site was initiated by a CAU (becoming HES from 2003) proposal for archaeological work, submitted to English Heritage. Following consultation the chosen option aimed to record, safeguard and seal the open fogou and to undertake a programme of evaluation trenching to investigate geophysical anomalies, in order to better understand the monument and its context. This work was also intended to guide future management of this important monument (Johns 2003 and 2003a).

A project design was produced in accordance with English Heritage’s Management of Archaeological Projects (1991), the supplementary draft document Minimum Requirements for Project Designs (1999) and Commissioned Archaeology Programme Guidance for Applicants: Release 1.2 (2002), clearly stating the scope, aims and objectives of the project (Cole 2003).

The principal objectives were to understand the overall layout of the fogou, its relation to the settlement, the degree of preservation and the archaeological potential of the site. It combined two elements of archaeological work, namely conservation works to the area of the exposed tunnel and a programme of further evaluation works and recording.

The project had four general research and conservation aims. These were to secure and safeguard the future of this monument, to better understand the monument and its context, including its archaeological potential, to enhance our knowledge of fogous and settlement in later Iron Age and Romano-British Cornwall and to guide future management. The archaeological recording was therefore guided by the following objectives: to record and make safe the remains of the open section of tunnel to prevent any further deterioration in its condition; to establish the way in which the fogou was constructed; to establish the overall layout of the fogou, its associated settlement and hinterland; to establish the relationship between the fogou and the enclosure; to establish the relationship between the known fogou and possible creeps or related subterranean structures; to establish the structure, function and, where possible, date of archaeological
features identified through the geophysical survey; and finally to characterise and establish the potential of deposits within the fogou (Cole 2003).

A further visit to the site was made in October 2003 by Neil Linford (AML) to conduct a Ground Penetrating Radar (GPR) survey prior to the excavation of the site. As well as adding complexity to an area previously identified as an area of amorphous magnetic disturbance (the Bronze Age structure in Trench 1), the application of GPR techniques corroborated the interpretation of the partially excavated stone lined passageway as a collapsed portion of a fogou prior to the excavation.

3 Location, Setting and Methodology

3.1 Topography
The site lies on a slight southerly slope below the summit of a gentle hill at a height of 70m (235 feet) above sea level (OD), some 300 metres to the west of the settlement of Boden Vean (SW 7685 2405), itself one kilometre south of Manaccan village on the Lizard peninsula (Fig 1). The surrounding landscape is one of undulating farmland and steep-sided lanes and from the field itself there are commanding views in many directions. Over Falmouth Bay to the north-east St Anthony Head is clearly visible, whilst due south-west the barrows of Goonhilly Downs can be discerned on the horizon. The land rises to the south where the Bronze Age barrow known as Roscruge Beacon sits on the summit of a hill.

3.2 Geology and soils
Sheet 359 Geological Survey of Great Britain (1975) states that the fields at Boden lie within a 300m wide east-west band of Devonian Conglomerate; on the northern side is Crush Brechia (Meneage Crush Zone) or Roseland Brechia Formation and to the south a band of Portscatho Formation conglomerate. 650km south of the site is a 1.5km wide
band of Hornblende Schist (Lizard Complex) and south of this, 2km to the south of Boden is the northern edge of the Gabbro igneous intrusion, the source of gabbroic clay.

Overlying geology comprises fine loamy soils over stony clay subsoil (weathered bedrock), known locally as ‘shillet’. The land is classified as Grade 3 agricultural land with mixed arable landuse (Cornwall and Isles of Scilly Historic Environment Record).

3.3 Historic landscape setting
The Historic Landscape Assessment carried out by the Cornwall Archaeological Unit in 1994 (Cornwall County Council 1996) characterised the landscape of Cornwall into a series of zones reflecting the historic processes that have shaped the Cornish landscape. These zones each reflect a particular set of historic processes and contain a predictable range of archaeological sites and historic features.

The fields at Boden fall within an area of Anciently Enclosed Land, defined as the agricultural heartland of Cornwall, with farming settlements documented before the seventeenth century AD and irregular field patterns with either medieval or prehistoric origins. This farmed landscape is bisected by networks of winding lanes and roads, often deeply cut by the passage of people, animals and vehicles over centuries or even thousands of years. Farming settlements typically with irregular layouts and clearly shrunken from hamlet are connected by these lanes are. Some are still hamlets, whilst churchtowns and a few larger villages are scattered through the zone (ibid, 140-142). At Boden the field boundaries comprise stone-faced hedges with earth cores and vegetation growing on the hedge tops, typically of lowland Cornish hedges. Although they are post-medieval in their current form, they are thought to preserve elements of medieval field patterns associated with the various hamlets and farms of medieval origin.

The evidence suggests that much Anciently Enclosed Land will have been enclosed and farmed since later prehistory (Later Bronze Age onwards, from c 1500 BC; ibid, 140). In the
case of Boden it can be demonstrated that the extant hedge defining the eastern edge of the field is superimposed on the bank of the Iron Age enclosure. In addition to the enclosure at Boden Vean there is another on the slope to the south at Higher Boden (described below 6.3); late prehistoric enclosures of this sort are very characteristic of Anciently Enclosed Land.

The original settlement of Boden was first recorded in the Domesday book in 1086 as Boten (Gover 1948, 542) and may possibly mean ‘dwelling of the ash-trees’ from the elements bod, meaning ‘dwelling’ and onnen meaning ‘ash trees’ (Padel 1985, 23, 174) (also later known as Boden Veor or Higher Boden) is of early medieval origin (Padel 1985, 23,174). By 1250 two settlements must be in existence since Bodennuur (Higher Boden) is recorded at this time, whilst Bodenbyghan (Lower Boden) was recorded in 1419 (Gover 1948, 542), but is is unclear which settlement was derived from the original Boden. There are some inconsistencies with the local names recorded in the documents. The fogou is presently named through association with the holding of Boden Vean (recorded as Lower Boden on the 1813 one inch OS map, 1840 Tithe map and later OS maps). All early references locate the feature at Boden Veor (Higher Boden on Tithe map and all OS maps). The relevant fields are recorded as part of Higher Boden on the 1840 Tithe map for the parish of St Anthony in Meneage.

3.4 Methodology
Excavations took place during October and November 2003, undertaken by two HES archaeologists assisted by local people, Cornwall Archaeological Society volunteers and students from Truro College (see Acknowledgements below). Anna Tyacke, the Finds Liaison Officer for Cornwall coordinated the involvement of three local schools in a field-walking programme of ploughed land immediately surrounding the site. The landowner Chris Hosken and his sons James and Edward proved themselves dedicated assistants throughout the excavations.
Geophysical survey carried out on separate occasions between 1993 and 2003 and using a variety of techniques produced intriguing and positive results identifying areas of archaeological activity (Linford below). The general methodology of the evaluation trenching as set out in the Project Design (Cole 2003, 11-12) involved the excavation of seven trenches, targeting anomalies identified by geophysical survey (Figs 2 and 3). In each of these topsoil and subsoil were stripped by a mechanical digger (JCB) under the close supervision of HES and stockpiled alongside each trench. Trenches 4 and 5 were amalgamated and will be referred to in this report as Trench 4.

When archaeological deposits were encountered, machine excavation ceased and appropriate hand excavation, sampling and recording commenced. A drawn plan (at a scale of 1:20) and photographic record was made of each evaluation trench, with layers and features allocated site-specific context numbers. Cut features are represented in the text as [ ] and deposits as ( ). Detailed section drawings (at a scale of 1:10) and written records were compiled for every context (deposit, cut or structure) thus excavated. Sherds of the large Bronze Age vessel P1 were planned at a scale of 1:10, with each sherd being allocated an identifying number. Artefacts were also retrieved by context and suitable layers sampled to recover material suitable for radiocarbon dating and plant macrofossil analysis. Artefacts recorded individually in greater detail have the prefix ‘SF’ (small find). Collection and processing of large samples for flotation followed the guidance published in *Guidelines for Environmental Archaeology* (English Heritage 2002) and advice given by Vanessa Straker (English Heritage Regional Archaeological Science Adviser). Sample numbers in this report are identified by < >. The full range of context types and phases was covered to enable the full scope of potential for further work to be identified.

On-site assessment and sampling of the basal deposits exposed in the fogou (trench 8/9) was carried out by Gianna Ayala of English Heritage’s Centre for Archaeology and
Heather Tinsley (University of Bristol) advised and took samples for pollen analysis from the same contexts. Unfortunately the results from these analyses were negative due to poor preservation.

3.5 Consolidation of the void
Consolidation works were carried out after the excavations had taken place to make the open section of tunnel safe, following advice from English Heritage as to the most appropriate method. It was decided that the installation of a metal sheet over the open section would be the best means of preventing any further deterioration in the condition of the void, and would allow access for periodic inspection (Cole 2003, 13). Once recorded the hole into the void was therefore covered with a large (5.0m x 5.0m x 5mm) steel plate containing a 0.70m x 0.70m access hatch.

4 Excavation results
4.1 The Bronze Age Structure
Excavation of Trench 1 revealed the curved edge of a concave cut [117] in the natural weathered shillet (Fig 5). The feature measured 6.0m on its north-south axis with its remainder apparently preserved below the field to the east of the trench. The geophysical anomaly indicates the continuation of the structure, and although the exact extents are not clearly defined the anomaly suggests a feature at least 8.0m in diameter. The cut was filled by two distinct stony deposits (105) and (106) comprising fairly homogenous mid brown compact silt clays (0.24m and 0.12m thick respectively) with occasional charcoal flecks and frequent fragments of stone (weathered shillet), sealed beneath 0.6m of overburden comprising stony clay silt topsoil (Fig 5).

Excavation of the upper stony fills (105) and (106) revealed the remains of some collapsed stone walling (118), perhaps serving as a partial stone kerb around the edge of the hollow.
Fully excavated the feature comprised a concave cut [117] through the natural shillet subsoil measuring 0.46m deep to its base, containing large sherds of a highly decorated Trevisker Ware vessel (P1) and fragments from three additional vessels. These sherds were recovered from a dark greyish brown compact silt clay deposit (107) (a maximum of 0.14m thick) within which they were embedded, lying above the base of the feature and sealed by the stony deposits (105) and (106). (Figs 5, 7, 8 and 9). Deposit (107) was flecked with small fragments of charcoal. Carbonised residue adhering to vessel P1 has produced a radiocarbon determination 1370-1120 cal BC (SUERC-6170; 95% probability) and charcoal samples from (107) have provided consistent radiocarbon dates, 1430-1260 cal BC (OxA-14517; 95% probability) and 1420-1210 cal BC (SUERC-6169; 95% probability).

A shallow (0.22m deep) concave depression [115] appeared to overlie or cut through (107), and was filled with deposit (114) a loose mid brown silt clay. A fragment of saddle quern S1 and possible hammer stone S2 were recovered from sealing deposit (105). The concave base of the cut was hand cleaned to weathered shillet natural but no additional features were identified. A small assemblage of cereal grains, mostly hulled wheat was recovered from sample <1019>, deposit (107) (Jones below). Charcoal recovered from the same sample represents fuel debris consisting predominately of oak but with some hazel and gorse.

### 4.2 Early Iron Age activity

#### 4.2.1 The Enclosure and related activity

The enclosure at Boden was initially identified by geophysical survey and subsequently verified by excavation in trenches 2 (ditch [202]) and 3 (ditch [315]) during the evaluation. Trench 2 (Figs 4 and 10) was positioned in order to investigate the northern side of the enclosure ditch close to the fogou. Here the ditch (Fig 11) proved to be 3.0m wide and at least 2.5m deep; excavation was not continued to its full extent due to safety requirements. A series of well-stratified fills indicated episodes of both deliberate infill (dumping) and
erosion during the life of the enclosure and upon final abandonment. Fourteen fills were recorded comprising fairly homogenous mid brown silt clays but with enough variation of tone and frequency of stone inclusions to distinguish between deposits. The uppermost deposits (207), (200) and (208) fill almost half the depth of the excavated feature (cumulatively 0.83 deep). These fills had a sterile appearance comprising mid brown silt clays with no charcoal flecks and may indicate the later backfilling of the upper sections of the ditch through intensive ploughing episodes. Beneath these the remaining deposits are more varied and their composition suggests both erosion of the shillet edges following contruction, gradual silting, refuse dumping and deliberate backfilling. The interface between deposits (201), (212), (215) and underlying deposit (204) could suggest a re-cut of the ditch at this point although this cannot be confirmed. Bulk environmental samples (<1020>) were taken from ditch fill (203) which comprised mid greyish brown silt clay 0.14m thick and a large quantity of limpet shells.

Pottery including P17-P18 recovered from a securely stratified dump of charcoal-rich greyish brown silt clay 0.13m thick (201), sealed beneath (203), is believed to date to the fifth century BC (Later Early Iron Age - LEIA); samples of charcoal from (201) provided radiocarbon dates suggesting a *terminus ante quem* of around 400BC for the construction of the enclosure ditch (OxA-14521, 2272±28 (400-210 cal BC); SUERC-6173, 2350±35 (510-380 cal BC). A total of 26 sherds of Plain Jar Group LEIA pottery was recovered from stratigraphically secure deposits within the enclosure ditch excavated in Trench 2.

The nature of activity during this period within the enclosure is confused and complex, although the ceramic assemblage and radiocarbon determinations clearly suggest occupation at the end of the Early Iron Age. The interior of the enclosure was investigated by trenches 4/5, 6 and 7. Trenches 4/5 and 6 targetted curvilinear and linear anomalies leading south away from the suspected fogou, whilst trench 7 investigated this same linear
anomaly close to the southern boundary of the site. The linear anomaly [433], [612] and
[705] is discussed below in the trench 8/9 (fogou) results. Despite revealing a number of
enigmatic features including the curvilinear stone structure (408) and the charcoal-filled
curvilinear ditch [431]/[609] and metalled surface (442), there was no conclusive evidence
of occupation (Figs 12 -14).

Two postholes, [436] (which contained Early Iron Age pottery) and [428], were identified
in Trench 4 (Fig 14), but neither of these were associated with confirmed structures and it
is unclear what they relate to. Posthole [436] was a steep sided cut with a depth of 0.27m
and a diameter of 0.80m filled with friable mid brown silt clay with charcoal flecks (437). A
large stone, probably used as packing, rested against its eastern edge and in the centre a
0.40m deep postpipe (0.25m wide) was cut through its base. [428] was a 0.60m diameter
posthole, 0.25m deep with a steep profile and filled by deposit (427) comprising dark
greyish brown silt clay. Several large packing stones lined the edge of the cut.

A curving arc (408) comprising 13 stones, many very large (up to 0.5m long and 0.45m
wide and 0.38m high) was revealed at the western end of Trench 4 close to its junction
with Trench 3 (Figs 12 and 13). The stones appeared to have been laid directly on the
natural surface and did not retain material on either side, but it is possible that it is a
remnant of enclosure bank revetment which has survived agricultural disturbance. As with
many of the features recorded within the enclosure any confident interpretation would
require further excavation of the site. Unexplained features include stone rubble spread
(608) (Fig 12) and metalled surface (442) (Fig 13), both potentially associated with ditch
[431]/[609]. Rubble spread (608) was revealed in the western extent of trench 6 and
comprised a scatter of small broken stones up to 0.25m high and at least 1.8m long and
1.2m wide, some of which appear to have been fractured as a result of exposure to heat or
fire. Surface (442) consisted of densely packed small pebbles forming a very hard, compacted surface 0.65m wide on the eastern side of ditch [431].

Ditch [431]/[609] visible in both trenches 4 and 6 was curvilinear in plan with a steep, near vertical profile 0.6 – 0.7m deep from the top of its cut and a flat base, filled by deposits (432) and (430) (trench 4) and (606) and (610) (trench 6). Basal fills (432) and (610) (0.26 and 0.20m deep) comprised mid greyish brown silt clays with occasional charcoal flecks, and appeared to be a mixture of deliberately discarded material and erosion of the ditch edges. The upper fills (430) and (606) were very different, consisting of dark greyish brown loose silt clay 0.3 -0.4m deep with very frequent charcoal flecks, burnt roundwood pieces and small fragments of burnt bone.

The fills of curvilinear ditch [431]/[609] (Figs 12, 13 and 15; 17), including its exceptionally charcoal-rich deposit (606)/(430) produced exclusively Plain Jar Group ceramics P12-P16 and gave Early Iron Age radiocarbon determinations OxA-14520, 2459±28 (770-400 cal BC); OxA-14518, 2463±28 (770-410 cal BC) from equivalent basal deposits (432) and (610) respectively. These are not, however, statistically consistent with the other date from (610) and since deposits (610) and (432) comprise charcoal-rich material dumped into the base of the ditch then the later determination SUERC-6171 (610), 2265±35 (400-200 cal BC) is perhaps the most accurate date for the initial infilling of the ditch. Other features consistent with this date include the infilled stone-lined pit [434] (Figs 14 and 16) giving radiocarbon dating determinations of OxA-14523, 2253±28 (400-210 cal BC) and SUERC-6178, 2255±35 (400-200 cal BC) from fill (426). Other finds from ditch [609] include a ceramic disc from secondary fill (606), interpreted as a pot-lid, and worked-stone objects S12-S15; S12 and S15 possibly used as weights.

Three ceramic beads of similar design and compact gabbroic fabric were recovered from deposits (405) (SF5, sealing stone ‘arc’ (408)), (608) (SF9, stone rubble spread) and (606),
SF10, secondary charcoal-rich fill in curvilinear ditch [609]. The beads have no direct parallels in Cornwall although an unstratified example is known from Trevelgue Head. An Early Iron Age date would be somewhat earlier than dates for ceramic beads from Iron Age sites elsewhere in southern Britain (Quinnell below).

The chronological modelling (see Hamilton et al below) suggests that the use of the enclosure in the first millennium BC ended in either the middle decades of the fourth century cal BC (365-330 cal BC at 27% probability) or in the latter part of the third century cal BC (270-205 cal BC at 41%). Since South Western Decorated Ware is absent from the assemblage it is this earlier date that is the most likely (see Quinnell below).

4.2.2 The Fogou
The fogou, investigated by trenches 8 and 9 located to target the strong geophysical anomalies and the stonework initially recorded in 1991 (Rose and Preston-Jones 1991, 3-4), was a stone-built subterranean construction (Figs 18 - 24). It is likely that a deep trench had been excavated into the natural bedrock and the stone walls of the fogou built within this construction cut, although the evaluation trench did not extend far enough to reveal this. The excavated extent of the fogou comprised a structure 9.8m long with walls surviving to a maximum height of 1.5m (Figs 18, 19 and 20). To the south of this main passage an unlined and unroofed vertical sided trench extended to the south (recorded in trenches 4, 6 and 7) and probably formed an approach to the fogou (Fig 18). To the north-east of the excavated extent of the main fogou passage was the earth-cut void (Figs 18, 25 and 26). This is likely to connect to the main fogou passage somewhere between the two elements of the structure. Extents of the main fogou passage are defined to the south by the earth-cut trench (recorded in Trench 4) and at its north-eastern end by the void, so the original length is estimated to be close to this measured distance. The width at its southern end was 1.9m – this narrowed at a point where two vertical pillars 0.6m high (supporting corbelled wall stones) formed a ‘bottle-neck’ or restricted access at which point the fogou passage
narrowed to 1.2m wide (Fig 22 and 23). This northern passage was 4.5m long at which point it began to curve towards the east. This was the limit of excavation but if continued is likely to have joined the earth-cut voided section, or possible creep passage. The southern section of fogou (to the south of the restriction) was 5.4m long. In this section the walls did not survive to their full height on the eastern side and had evidently been disturbed (Fig 19). On the western side no walling was located beyond 2.5m south of the main passage, either as a result of disturbance or because a wall was never constructed in this area. It is possible that walling on this side exists further to the west of the excavated trench. Collapsed roof stones were left in situ in the southern section and the base of the fogou was not reached.

The base of the fogou where viewed in the main passage (the northern section) comprised solid weathered shillet bedrock 1.45m below the surface of the field. The uppermost surviving stones of the passage were reached below the topsoil which was 0.30m deep. These stones formed the uppermost extant remains of the corbelled walls, overhanging the base of the walls by up to 0.15m. The northern, main fogou passage had been filled with mixed mid brown clay and weathered shillet (804)/(900) 1.05m deep and devoid of any organic material for the majority of its depth, suggesting that the fogou had been deliberately backfilled in what was more or less a single event. The absence of any artefacts and the composition of this backfill (natural subsoil probably derived from the enclosure rampart) suggest that it had occurred in antiquity.

Below the backfill were layers of silty clay and stone including basal deposit (806)/(807), a very dark greyish brown silt clay with frequent flecks of charcoal and fragments of burnt bone. This deposit was a maximum of 0.1m deep and lay directly above the natural subsoil ‘floor’ of the structure. There was only limited evidence that the base of the fogou had silted-up slowly, although above (806)/(807) was (805), a dark greyish brown silt clay
0.10 m deep with charcoal flecks, which appeared to have accumulated more gradually, perhaps during the final uses of the fogou (Figs 20 and 21). The southern, wider passage contained the same backfill. These basal deposits produced exclusively Plain Jar Group ceramics including P5-P9 (all from (806)) in addition to stone finds S3, a large cobble muller; S4, part of cobble whetstone; and from (805) S5, a pebble polishing stone with a high sheen deposited against the western stone upright ‘pillar’ of wall (801). None of the artefacts are significantly fragmentated or abraded to suggest deposition during the use of the fogou and are more likely to indicate a deliberate deposit infilling above the floor of the structure prior to closure with further backfilling. The fills were relatively soft and uncompacted with little sign of erosion suggesting that they were covered with the main backfilling episode shortly after creation. This process has been recorded in a number of Scottish souterrains such as Dalladies (Watkins 1978-80, 136) and Newmill (ibid 177-179).

Two small beads, one of dark blue glass and one of amber were also recovered from ‘floor’ deposit (806); whilst not overtly diagnostic these are generally consistent with an Iron Age date (see McLaren and Hunter below).

Carbonised residues from pottery recovered from (806) gave radiocarbon dates OxA-14486, 2205±37BP (390-170 cal BC) and OxA-14514, 2261±28BP (400-200 cal BC). Determinations from charcoal samples (roundwood) from (806) are OxA-14515, 2425±29 (750-400 cal BC), OxA-14516, 2462±29BP (770-400 cal BC) and SUERC 6168, 2335±35BP (420-370 cal BC). The Bayesian chronological model suggests construction of the fogou before 420-350 cal BC (94% probability) (Hamilton et al below).

Evidence that the fogou had been capped with stone was shown by the presence of large slab-like stones lying within the backfill material of the southern, wider end of the structure (Fig 19 and 22). No covering or capping stones remained in situ over the passage. Those bridging the narrow northern passage were absent, probably removed when the fogou was
infilled and almost certainly reused as building stone. From the proximity of the surviving fogou walls to the present-day ground surface it can be assumed that the roof of the main fogou passage was visible above ground, perhaps covered by a low mound; the proximity of the northern section of passage to the enclosure ditch suggests that this section was buried beneath the bank on the inside of the ditch. Corbelling the walls of the fogou to a height above ground level and thus reducing the width of the gap would have facilitated the use of stones of shorter length.

Beyond the southern extent of the stone walls a vertical sided trench [433]/[612]/[705], excavated through the natural weathered shillet bedrock, 1.4m deep and 0.75m wide, extended southwards across the interior of the enclosure visible in trenches 4, 6 and 7 (Figs 3, 4 and 18). Fills contained within the trench are consistent with both gradual accumulation of soils, collapse of the edges and deliberate backfilling. In Trench 4 (Figs 14 and 24) the top edge of the cut of this feature was lined with stones (410) sealed by deposit (401) yielding S8, a saddle quern fragment, S9, part of a muller, and S10, a worked cobble, possibly a net sinker. The cut itself [433] was 0.65m wide within which three fills were recorded; (422), mid brown loose silt clay 0.30m deep; below this (423), a loose, stony, brown silt clay 0.37m deep; and on the base of the feature (424) 0.30m deep, comprising loose, stony silt clays. The same anomaly was recorded in trench 7 as ditch [705]. Here the profile was more concave and around 1m wide and filled with three deposits, the uppermost (702), a mid brown silt clay 0.28m deep, with occasional stones and charcoal fragments representing the final silting of the feature. Below this was (704), a very similar deposit but with a stonier composition, 0.32m deep, sealing the basal fill (703), a dark, sticky silt clay 0.18m deep, with frequent small fragments of stone.

It is possible that this trench connected with the stone-walled elements of the fogou and provided an open approach towards the southern entrance into the enclosure. An
alternative interpretation is that this trench had been lined and covered with timber; timber-lined souterrains having been identified in Ireland (Clinton 2001, 10,11) and Scotland (Watkins 1978-80, 135,141), or that it represents an unfinished extension of the fogou. Two sherds of Early Iron Age pottery and whetstones S6 and S7 were recovered from a deeply stratified backfill deposit (423) within ditch [433].

It seems the most likely that the stone-built elements of the fogou thus recorded were constructed in a single phase. The ‘approach’ trench to the south and the earth-cut ‘void’ passage beyond the north-eastern end were either built at the same time or during the life and use of the fogou. The compacted stony silt clays (806), (805), (807) in the base of the fogou suggest that these accumulated towards the end use of the fogou; finds from these deposits and the simple stratigraphy indicating that the deposits were built up over a relatively short period of time. It is likely perhaps that earlier floor deposits within the structure had been swept clean, and that these represent the final stages in the use of the structure.

Following this the fogou was filled in what was more or less a single, deliberate event. At this point the capping stones may have been levered from the roof of the fogou or collapsed within it, and a homogenous soil (804)/(900), perhaps material from the enclosure bank, tipped inside to fill the space between the walls.

Despite missing stones as a result of disturbance on the side walls of the fogou, particularly at its southern (perhaps entrance) end, there was no evidence to support the argument for additional voids or creeps leading from the main passage. However, the section between its northern end and the earth-cut void passage itself remains unexplored, so potentially the presence of additional elements to the fogou cannot be dismissed. This possibility is supported by high amplitude reflector anomalies produced by the third phase of geophysical survey (Linford 2004a) consisting of Ground Penetrating Radar. This survey
augmented the results of initial resistivity and microgravity surveys (Linford 1998) undertaken with the purpose of locating subterranean voids following the initial discovery by the landowner Chris Hosken in 1991. These results indicate a connection between the northern curving passage of the fogou and the earth-cut void, and may suggest further voids as yet unexplored.

Although the main structural components of the fogou were revealed and recorded the extent of the excavation was limited and some questions therefore remain unanswered. It is assumed that the stone walling of the fogou was constructed within a trench and the ‘space’ behind the stones backfilled with excavated material. However, a construction cut for this trench was not recorded since the excavation did not extend this far on either side of the stone walling. At the southern end of the southern passage disturbance of the walls revealed the large size of stones used. Clearly these had been selected and possibly shaped in order to provide the best fit. Corbelling was not pronounced, with only slight overhang for each successive course, providing optimum stability for the walls. Strength was obviously required to support the massive stones used to span the roof of the southern passage, some of which were found lying within the infill in this section. Evidence of a stone-capped roof is missing from the northern section of the fogou passage, either as a result of these stones being ‘robbed’ prior to the infilling of the structure, or because a timber roof had been in place (not uncommon in the later Irish souterrains; Clinton 2001, 10) and has left no trace. The proximity of the fogou passage to the enclosure ditch shows that part of the roof of the northern passage would have been hidden from view, buried beneath the enclosure ditch bank.

The trench construction technique has been identified at both Carn Euny (Christie 1978, 314 - 323) and Halliggye (Startin forthcoming), and it is reasonably safe to assume that the same method was employed at Boden. The confluence between the stone-walled northern
passage and the earth-cut tunnel has not been exposed, but it is likely that at some point (either as part of the original phase or at a later date) a type of stone doorway existed to join the two elements. Lintelled ‘doorways’ can be seen at Boleigh and Treveneague (Cooke 1993, 82-89; 142-147) connecting stone passages to earth or rab-cut sections.

The fogou building stone was not locally available to the field, but was imported from nearby, presumably from a source that was not too hard to exploit, such as a rocky outcrop. The nearest available building stone would have been from the valley floor below although this has not been chosen for the majority of the fogou walling. Although stones differ in appearance the basic rock type is gabbro (an igneous rock), the main exposure of which is on Crousas Downs. The nearest source to Boden is approximately 2km to the south and would have been relatively easy to obtain from boulders lying on the surface (Peter Ealey, Cornwall Regionally Important Geological/Geomorphological Sites (RIGS) pers comm). This stone was clearly selected for its attributes which are likely to have been both practical (its size and shape) and aesthetic (its shape and colour). Since alternative building stone is available closer to the site it seems therefore as though in this instance stone was chosen primarily for its appearance. The walls have beguiling visual, textural and haptic qualities which perhaps suggest that utilitarian function was not the only motive behind construction.

4.2.3 The void, earth-cut tunnel or ‘creep passage’

The void comprised the remains of an earth cut subterranean passage, traceable for approximately 4.0m in a south-easterly direction. Like the trench constructed for the stone section of the fogou the void is cut through the natural bedrock (shillet). Today the void has a variable height of between 0.4 - 1.0m and a width of around 0.8m (Fig 25) but the much of the structure has been filled with collapsed subsoil (weathered shillet), and it is likely that in its original form it connected with the stone-built elements of the fogou a few metres to its south and west. Local anecdotal evidence suggests that the tunnel ran as far as
the modern field boundary (Cornish hedge) within living memory, but had been blocked by a farmer at the time to prevent access by children. The present day ‘hole’ through which the void was first discovered (Fig 26) is obviously not its original entrance, and it is indeed possible that the tunnel once extended as far as the enclosure ditch on its eastern side, the location of which has been verified by geophysical survey as just to the east of the hedge. A high amplitude reflector anomaly apparently marking the location of the void indicates that it may also extend to the north-west. If this is the case, then the earth-cut passage may also have connected with the open enclosure ditch to the north of the fogou.

Once recorded the hole into the void was covered with a large (5.0m x 5.0m x 5mm) steel plate containing a 0.7m x 0.7m access hatch, thereby making safe the remains of the open section of tunnel to prevent any further deterioration in its condition, and allowing access for periodic inspection.

4.2.4 The 1991 ‘well’
The well, pit or shaft is located 30m to the north-north-east of the original exploratory trench excavated to find the fogou (Rose and Preston-Jones 1991, 3), and therefore 15-20m outside the enclosure, 7m from the extant hedge defining the eastern boundary of the field (Fig 3). The feature was later identified by a magnetometer anomaly m2 (Linford 1998, 191). Another strong geophysical anomaly G1, just to the north of the enclosure ditch and suggestive of an air-filled or loosely backfilled void (Fig 3; see Linford below) may indicate a similar pit or well-like feature.

Although not visible today the well was covered with a concrete slab which should be fairly easy to find if required in the future. The account that follows is adapted from Preston-Jones and Rose 1991 with finds information from Quinnell, below.

The ‘well’ (SW 76846 24077) was discovered in the course of cutting a north-south water-pipe trench, 0.4m wide and 0.75m deep. At the time of the visit on September 20th it had
been emptied by Mr Hosken to a depth of 2.4m below the level of the field surface. Mr Hosken said that it was a very obvious feature when cut through because the fill consisted mostly of stones. The feature was later excavated to a total of 3.25m below field level, although it was seen to extend at least 1m below this through other voids and stones, ie a minimum depth of 4.25m below the field surface.

The upper 0.75m had been destroyed to the north and south by the insertion of the pipe trench. The feature appeared circular, with vertical sides. At the top, at the junction of the subsoil and topsoil (0.3 – 0.35m thick) a stretch of corbelled walling survived on its western face; there was a slight trace of a remnant of this on its eastern side and it is likely to have been faced with corbelled stone around the whole perimeter. The fragment on the western side survived as two to three courses of thin local stones (different to stones within the fill), 0.15m thick overall. The upper course corbelled out as much as 0.2m from the face of the shaft. Below this the pit was unlined and cut through the shillet subsoil and bed-rock. At 0.25m below the corbelling the shaft had a diameter of 1m, widening out to a diameter of 1.2m at a depth of 1m below the corbelling, at which point the sides descended vertically.

The upper part of the fill was a mix of soil and stones and the lower part consisted increasingly just of stones, with little soil. Finds were collected during the emptying of the feature and subsequently from the spoil; these comprised 53 sherds consisting of a mixture of second phase Cordoned Ware and Romano-British sherds. These include P26 and P27 P28 P29 P30, P31, probably belonging to second phase Cordoned Ware, considered on balance to be deposited in the later 2nd century (despite the presence of P31 for which comparisons are limited). The assemblage also included an amphora sherd thought to be either Dressel 1A/1B (130 BC – end of the first century BC) or Dressel 2-4 (later first century BC - mid second century AD). The later, post-conquest date seems most likely,
making the occurrence of this amphora form (Dressel 2-4) unusual in a non-military and non-urban context (Rose and Preston-Jones 1991, 2; Quinnell below, McBride below).

An interesting suite of stone objects was recovered from the ‘well’, all indicating deliberate breakage. These comprised S17 and S18, parts of upper rotary querns; S19, part of lower rotary quern; S20, part of saddle quern or mortar; S21, a cobble whetstone; and S22, a gabbro cobble, with wear suggesting use as a hammer stone. On the basis of these forms and their comparanda, Quinnell (below) suggests deposition of the finds as a group in the mid-late second century AD.

The pottery was said to come from various levels in the fill from 4ft (1.2m) downwards, and the stone objects were at various levels in the lower part of the fill. Stones from the fill had been piled around the hole; they included large stones eg 0.4m x 0.2m, and also smaller stones eg 0.1m x 0.1m. The stones are not the same as the local bedrock, though Mr Hosken said that similar stone is found on his land at Lannarth to the north (one stone was kept for study, BDN 91 find 9). The loose fill of the well was a brown clay with numerous flecks of charcoal.

It is possible that the original function of the feature was to exploit a water-source. Since there is currently no idea of its total depth this remains to be verified. Once the pit had gone out of use, or it no longer fulfilled its primary function it had been backfilled. At first glance it would seem from the composition of the assemblage that the backfill deposits have a ‘structured’ nature; that is to say that material deposited within the pit was deliberately selected for this purpose, perhaps for a variety of reasons, one of which could be ritual deposition (see below, *Structured deposition in the Bronze Age and after*).

### 4.3 Romano-British activity

There were clear disuse deposits indicated by dumped material which included Romano-British pottery in the fills of the enclosure ditch, other ditches and layers, and charcoal
deposits representing burnt firewood and food remains (see Gale and Jones below), suggesting that some form of permanent or semi-permanent occupation of the enclosure took place during the Late Early Iron Age and during the Romano-British period. Unfortunately the limited nature of the excavation leaves many questions relating to activity during this period unanswered.

The presence or continued use of field systems is indicated by ditch [120] (Fig 4), a shallow concave cut 0.35m deep and 1.6m wide, recorded in Trench 1, and filled by (112) a dark brown silt clay which produced pottery P19 probably belonging to one of the first two Cordoned Ware phases and consistent with late Iron Age or early Romano-British activity to the mid second century AD.

The location of Trench 3 (Fig 12) was chosen with the specific aim of investigating a possible entrance on the western side of the enclosure indicated by geophysical survey. Here the enclosure ditch [315] was 4.0m wide. Stratigraphy was more complex in this trench, and consequently only the later ditch deposits were sampled by excavation. These included spreads of stone (316), probably derived from collapse of the enclosure bank, and backfill and erosion deposits (310), (312) and (313) relating to the final uses of the enclosure as well as disturbance by post-medieval ploughing. These dark brown silts represented the latest deposits infilling the ditch and contained pottery consistent with both a Late Iron Age and Romano-British date, although some of the Roman material is likely to be residual as it occurs alongside fragments of Post-Roman Gwithian Style platter. A possible posthole [308] was also recorded just outside the enclosure ditch and was 0.35m deep and 0.82m in diameter containing fill (309), a dark brown silt clay with large packing stones. The fill contained second phase Cordoned Ware, first to mid second century AD.

An entrance to the ditch was not located in this trench, but this may be due to the limited nature of the excavation rather than confirming its absence. Deposits excavated in Trench
3 (Fig 12) produced a range of Late Iron Age and Romano-British pottery with some residual Iron Age material. The small linear ditch [305], 1.2m wide and 0.4m deep just outside and parallel to the enclosure ditch contained a single dark greyish brown silt clay fill and produced sherds of Type C, D, J and G jars (P20-P24) consistent with a date from the first century BC until some time around the mid first century AD. This feature also contained S16, a small pebble burnisher. Pottery recovered from the latest fills of the enclosure ditch [315] was a mixed assemblage comprising material with date ranges from the mid second to possibly fifth centuries AD (P32-P34) and included a sherd of Bronze Age pottery. The sherds have a generally well-abraded appearance and it is likely that these backfill contexts contain mixed redeposited material derived from disturbed deposits.

Amphora sherds from the 1991 ‘well’, the latest fill of enclosure ditch (200), and a subsoil deposit (607) are all likely to be Roman in date (although that from the ‘well’ could be late Iron Age (see McBride below)) and attest to continued use of the site during the Roman period.

Beyond the enclosure to the north and north east are numerous geophysical anomalies including pits, curvilinear ditches and possibly a trackway which could indicate more extensive Romano-British settlement. Approximately 20m to the north of the enclosure ditch in the field to the east of the site is an oval or possibly circular anomaly m8 (Linford 1998, 193) measuring approximately 9m x 7.5m, which could represent a structure, possibly a roundhouse, of Romano-British date.

The presence of three Roman coins retrieved by metal detectorists outside the enclosure supports the concept of Romano-British occupation on the site. The coins comprised a Sesterius, AD 96 – 160; As, AD 43 - 160 and a Barbarous radiate, AD 275 – 290 (see Reece below) indicating Roman influence on the communities between the first and third centuries AD.
4.4 Post-Roman activity

Post-Roman activity within the enclosure is illustrated by the recovery of sherds of Gwithian Style ceramics, the most distinctive form of which is the platter (P35-49), in the latest fills of the enclosure ditch (314) (Trench 3) and deposits in Trench 4 probably associated with a curvilinear alignment of stones (408). The extent of Post-Roman activity is poorly understood however, principally due to limited excavation.

The presence of pottery dating to this period suggests that the ditch was still open and the enclosure was a viable structure within which to settle, if only on a short term, perhaps seasonal basis.

A late fill from the enclosure ditch ((314), Trench 3), provided two statistically inconsistent radiocarbon measurements. The earlier of these (OxA-14519, 400-210 cal BC; 95% confidence) from charcoal, is clearly residual, relating to the initial use of the enclosure. The other, a carbonised residue adhering to the interior surface of a Gwithian Style platter, provided a radiocarbon date of OxA-14560, 1417±29 (cal AD 590-670 - 95% confidence). Based on present evidence the style appears to have been in use broadly in the sixth century and early seventh centuries AD, suggesting activity within the enclosure during this time (Quinnell below).

At least twenty two Gwithian Style vessels are present. These ceramics were first identified at Gwithian during the 1950s (Thomas 1958, 21; 1968) and are currently being revisited as part of the programme for full publication of that site. The style is restricted to Western Cornwall but more precise dating, and understanding of the Style as whole, awaits the full publication of the Gwithian excavations.

4.5 Stratigraphic Comparison between trenches

Excavation of the seven trenches revealed relatively simple stratigraphy across the interior of the enclosure and in the area of the Bronze Age structure (Trench 1). Excavated
features were on the whole discrete cuts into the natural subsoil (weathered shillet bedrock) filled with one or more deposits either as a result of natural erosion, deliberate backfilling, or both. Overburden consisted of topsoil nearest to the surface, ranging from 0.15m – 0.30m deep, sealing a stony clay silt up to 0.30m deep. This deposit represents what is probably a relict ploughsoil lying directly above the weathered natural subsoil, and appears to seal all archaeological features, including those in Trench 1 where the final deposit (105) sealed the Bronze Age structure. Beyond the identification of these two plough-disturbed layers (the topsoil and underlying ploughsoil) the identification of common horizons between trenches is problematic. Deposits (421) (Trench 4) and (605) Trench 6, both sealed by the buried ploughsoil do appear to represent the same deposit, apparently an accumulated soil above the backfilled trench [433]/[609] to the south of the fogou passage. This layer is represented to the west as (429) but was not recorded in Trench 3, where it had probably become incorporated into (303) above the latest fills of the enclosure ditch. The final latest enclosure ditch deposits recorded in Trench 2 are also sealed by (206), the buried ploughsoil. There is no evidence for the survival of an internal bank, and it can be assumed that remnants of this were incorporated into this ploughsoil material. The composition of the bank must have been material excavated from the ditch itself, and it is this material which appears to comprise the infill of the fogou main passage (804)/(900). Deposits (805), (800) and (807) and (904) represent similar material at the base of the fogou, overlying deposit (806). The interface between the overlying deposits and (806) was not clearly defined, and it is likely that all of these represent disturbed final use deposits of the structure.

4.5.1 Summary of the enclosure, and relationship between enclosure and fogou
The geophysical survey shows that the enclosure was rectangular in shape, although slightly wider at its southern end, approximately 50m wide and 75m long, enclosing an area of 0.4 hectares (0.98 acres). The width of the ditch verified in trenches 2 and 3 ranges between
3m - 4m and it was at least 2.5m deep. The linear anomaly representing the enclosure ditch on its eastern side runs parallel and immediately adjacent to the present hedge, and it would appear that this hedge, and that forming the southern extent of the field, has been built above the remains of the enclosure rampart or bank. The main fogou passage is situated almost centrally at the northern end of the enclosure, very close to the enclosure ditch, with the earth-cut tunnel running away to the east. Comparison of the site survey with the geophysical survey suggests that the northern end of the main passage and part of the earth-cut tunnel would have run beneath the enclosure ditch rampart. If, as seems likely, the earth-cut tunnel extended further to the east then it may have continued beneath the enclosure ditch rampart on the eastern side (where the hedge is today) and opened out into the ditch. The fogou approach trench runs southwards from the fogou to the southern extents of the enclosure (the hedge forming the southern end of the field), effectively dividing the enclosure in two.

5 Specialist Reports

5.1 Copper Alloy objects

*Vanessa Fell, Sarnia Butcher and Henrietta Quinnell*

This section is supported by a detailed archive report prepared by the first author. The seven items (Table 1) were X-rayed prior to assessment and subsequently investigated principally to clarify their identity. One item was analysed by X-ray fluorescence (XRF) and X-ray diffraction (XRD). None of the copper alloy artefacts are illustrated. See also ‘Copper alloy rod fragments’ in McLaren and Hunter below, section 5.5.

<table>
<thead>
<tr>
<th>No.</th>
<th>Identity</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(606) SF11</td>
<td>Tapering curved strip</td>
<td>With bone and charcoal</td>
</tr>
<tr>
<td>(606) SF12</td>
<td>1 piece of curved wire</td>
<td>With charcoal in the attached soil</td>
</tr>
<tr>
<td>(606) 1012</td>
<td>4 pieces of curved wire</td>
<td></td>
</tr>
</tbody>
</table>
(606) - 1 piece of curved wire

(606) <1012> Two copper alloy rod fragments

Tr 3 unstratified Waste metal Analysed by XRF and XRD
Tr 8 (804) Sheet fragment
(405) Tiny fragments

(606) SF11 from Early Iron Age gulley/ditch [609] Tapering curved strip, length 22mm, plus detached fragments of corrosion products, and small fragments of bone and charcoal. Rectangular section, 5.5 x 2.5mm. The copper alloy is well-patinated. Initially recorded as a brooch.

It is difficult to suggest what sort of object this piece may belong to. Although the main strip might be seen as part of a brooch the shape of the (broken) curved end seems to rule this out. If it were the ‘head’ it could not hold or form part of a spring, nor join any usual type of crossbar; and, if it were the ‘foot’, it could not function as part of a catch for a pin.

(606) from Sample <1012>, Early Iron Age gulley/ditch [609] Four pieces of curved wire, with diameter $c$ 2.3 – 2.4mm. Well-patinated but corroded at the ends. Presumably these joined together, with the other two pieces from this context, to make a ring or loop.

Put together the fragments form an incomplete ring whose diameter would be very approximately 35 mm. Two of the pieces have ends which, although obscured by corrosion, might possibly show the beginnings of a knobbled or curved terminal. Although there is therefore a suggestion that the object may be a penannular brooch this is unlikely due to the early date of this deposit, apparently in the fourth or third centuries BC (see Hamilton et al, Radiocarbon dating below). Penannular brooches occur in British contexts from the first century BC onwards; types with simple wire rings are particularly common in the first century AD. Mount Batten (Cunliffe 1988) has the largest collection of first millennium BC copper alloy artifacts in Devon and Cornwall and gives some indication of the forms likely to be in circulation in the Early Iron Age.
(606) SF 12 from Early Iron Age gulley/ditch [609] Single piece of curved wire, diameter 2.3mm, well-patinated. May join (606) 1012.

(606) from Early Iron Age gulley/ditch [609] Single piece of curved wire, diameter c 2.0 – 2.8mm, flattened oval section but very corroded. Presumably this joined with SF12 and 1012, above.

Tr 3 unstratified Fragment of waste metal of knobbly appearance, length 24.4mm. The surface layers are powdery black with green beneath. One surface has traces of a vesicular deposit. Analysis of the corroded surface by X-ray fluorescence indicated only copper. Analysis of the black deposit on the surface by X-ray diffraction determined tenorite (CuO) and some cassiterite (SnO₂).

The appearance suggests that this is waste metal from manufacture, or a melted artefact which has some fuel ash slag attached. Analysis of the corroded surface layers (and therefore not a precise result) suggests this was a copper alloy. The tenorite is a high temperature oxidation product (rather than a corrosion product) which supports the suggestion for manufacturing waste or a remelting artefact.

Given the range of finds from Trench 3 this fragment could be of any date from the Early Iron Age onward.

Tr 8 (804) Upper fill in fogou Fragment of sheet, bent. A complete fragment, 51.5 x 33.0 x 1.0 mm. There are traces of mineralised plant macrofossils in the corrosion layers.

Thin metal plate with parallel edges which, if the object is complete, give the width of 33mm. One end is diagonal and the other rectangular but both appear to be broken; the maximum existing length is 51.5 mm. It is irregularly bent and the surface shows faint patterns apparently due to corrosion.
Presumably this was part of a ?decorative plate attached to leather or some other support as it seems insufficiently robust to form a complete object.

*(405) layer sealing stones (408) SF4*  *Probably associated with Gwithian Style ceramics*  Several tiny fragments, totally corroded.

*Sample <1012>, context (606), fill of rock-cut ditch [431].* Copper alloy rod fragments. Two small circular-sectioned rod fragments, probably from a pin. Two ?brooch fragments are recorded from this ditch fill, and these may be further pieces of the same item. The alloy type was determined (by surface X-ray fluorescence) to be bronze with a trace of arsenic.

(1) Length 3.5mm, width 2.3mm, thickness 2mm; (2) length 2mm, width 1.5mm, thickness 1.5mm.

### 5.2 The Roman Coins

*Richard Reece*

Three coins were found by metal detectorists, working in transects across the field surrounding the fogou. The identifiers of the coins representing the site code and the fieldwalking grid square they were recovered are represented thus: *<BF03 N10>* (Fig 3). The coins have been identified but no further analysis has been undertaken.

**Sesterius, AD 96 - 160**

A sestertius of the period AD 96 to 160. The portrait is probably that of Hadrian, 117 to 138. The reverse shows a standing figure facing left but is otherwise uncertain.<BF03 N10>.

**As, AD 43 - 160**

Although this coin, is very heavily corroded, there is a head showing. It is an As (middle denomination) with a date between AD 43 to 160. The reverse may be an ordinary
standing figure, perhaps with an altar beside her (Domitian or Hadrian, AD 81 to 138). The other way up it could be seen as a typical Minerva with spear and shield which would make it a copy of a coin of Claudius I (AD 43-64) which would help to account for the very thin and irregular flan. <BF03 D7>.

**Barbarous radiate, AD 275 - 290**

A barbarous radiate struck between AD 275 and 290 probably copying a regular coin of Victorinus or Tetricus I (268-273). The reverse is corroded and uncertain. <BF03 M8>.

### 5.3 The Pottery

*Henrietta Quinnell* with assistance from *Carl Thorpe* and petrographic comment by *Roger Taylor*

**5.3.1 Summary**

The structure in Trench 1 produced Trevisker ceramics of the Middle Bronze Age with, just possibly, a redeposited Early Neolithic vessel. Fogou contexts contained only Early Iron Age material while those in the enclosure contained Early Iron Age, Late Iron Age Cordoned Ware, some Romano-British ceramics and a distinctive group of Post-Roman Gwithian Style material.

**5.3.2 Abrasion**

The following system, broadly based on that set out by Sorenson (1996) is used.

- **Very fresh** 1; freshly broken
- **Fresh** 1/2; colour of core slightly patinated but unaltered surface with sharp corners and edges
- **Moderate abrasion** 2; core colour patinated, some definition in the sharpness of corners lost
Abraded  2/3; core colour patinated, slight rounding of corners and very slight erosion of surfaces

High abrasion  3; core colour patinated, rounding of corners and of sherd outline, surfaces somewhat eroded

### 5.3.3 Middle Bronze Age Trevisker

**Table 2 Middle Bronze Age Trevisker**

<table>
<thead>
<tr>
<th>Context</th>
<th>Vessel</th>
<th>Gabbroic</th>
<th>Gabbroic Admixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>(102) silt in top of structure</td>
<td>Not assignable</td>
<td>5s 24g abrasion 2/3</td>
<td>1s 7g abrasion 3</td>
</tr>
<tr>
<td>(106) clay lens in structure</td>
<td>P2 (part)</td>
<td>-</td>
<td>1s 119g abrasion 2/3</td>
</tr>
<tr>
<td>(107) silt in structure</td>
<td>P1</td>
<td>-</td>
<td>128s 30,679g</td>
</tr>
<tr>
<td>(107) silt in structure</td>
<td>P2 (part)</td>
<td>-</td>
<td>2s 620g</td>
</tr>
<tr>
<td>(107) silt in structure</td>
<td>P3</td>
<td>1s 30g abrasion 1/2</td>
<td>-</td>
</tr>
<tr>
<td>(107) silt in structure</td>
<td>P4</td>
<td>-</td>
<td>1s 15g abrasion 2/3</td>
</tr>
<tr>
<td>(107) silt in structure</td>
<td>Not assignable</td>
<td>-</td>
<td>4s 60g</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>6s 54g</td>
<td>137s 31,500g</td>
</tr>
</tbody>
</table>

**Descriptions of vessels, with comparanda (Table 2)**

Four vessels were present in deposits (106) and (107), silts within the Bronze Age structure [117], with a few unassignable sherds; the majority of the sherds belonged to P1. Only part of the structure was excavated so further sherds of vessels, especially of P1, may be present, and possibly sherds from additional vessels.

**P1 (107) silt in structure (Fig 27).**

*Description*
Internal rim diameter ĉ 530mm and as reconstructed 920mm high. Sherds present
represent about an eighth of the vessel which would originally have weighed perhaps 240
kg and had a capacity of some 218 litres or 57 gallons. While these dimensions are
approximate, it is certainly the largest Trevisker vessel known.

Gabbroic admixture containing crushed gabbroic rock. Exterior surface smoothed, interior
surface very rough. Exterior oxidized 5 YR 5/6 reddish yellow, also interior but core
reduced 5 YR 6/1 grey.

Simple everted rim, curved biconical body but with vessel wall almost vertical above base
angle. Paired strap handles above girth; one is present and the extent of joining sherds
leaves no possibility of more than two handles. Cord impressed zigzags on inner rim bevel.
Incised chevrons on the exterior beneath the rim, immediately above cord impressed zone
of bordered zigzags. Plain band above a second zone of cord impressed bordered zigzags.
Second plain band above a more complex third decorated bordered zone, around the girth,
with two runs of chevrons, the upper composed of four or five lines of impressions. The
handles were set in the top of this zone and had a mixture of deeply incised straight lines
and cord impression. The cord impression was all parallel twist, usually in lines of three but
in much of the borders impressions overlap to form groups of four. The cord impressions
are unusually fine but also untidy. The irregular detail of execution suggests that much, if
not all, of the decoration was produced using single cord.

Several horizontal breaks across the vessel appear to follow the positions of coil joins and
in places diagonal coil joins in the wall are visible in breaks. The base angles show that the
side of the wall was worked down over the edge of the base and then the internal angle
strengthened by an additional clay band. The rim has been clearly added to the top of the
coiled wall. Its shape indicates that the pot may have been oval when viewed in plan, rather
than circular. While some abrasion has occurred in the ground, the surfaces are generally very fresh and exhibit no signs of wear on the vessel.

**Contextual details**

All P1 sherds were retrieved from (107) a dark silt lying on the base of [117], the cut of the Bronze Age structure.

**Comparanda**

The vessel, while unusually large, belongs in Parker-Pearson’s (1990) Style 1, broadly equivalent to ApSimon’s and Greenfield (1972) style 1 and Patchett’s (1946) Groups B and F. While the diameter is at the larger end of the range for Parker-Pearson Style 1 vessels, none of the vessels recorded by him (ibid, fig 1) are much over 500mm in height. The Type 1 vessels would have been used for storage. The use of incision and cord impression together has not so far been recorded nor have the three complex decorative zones separated by plain bands. The closest comparanda are provided by the vessels from barrows at Bosvargus (Patchett 1946, fig 10, F10) and Chapel Carn Brea (Patchett 1950, fig 2, D2). Both these barrows, in St Just in Penwith, were the sites of early excavations but recent reviews of radiocarbon dating indicate that Cornish barrow deposits generally were confined to the Early Bronze Age before around 1500 BC (Jones 2005, 37). Both the Bosvargus and the Chapel Carn Brea vessels are roughly half the size of P1 and their decoration is simpler, although arranged in zones, and in the case of Chapel Carn Brea, combines impressed cord with impressions. Nothing comparable is recorded from a domestic context although it is possible that some sherds from the hut circles at Kynance Gate on the Lizard (Thomas 1960) may come from vessels approaching P1 in size. A sherd from probably the largest Trevisker vessel otherwise recorded comes from the hut circle at Poldowrian (Smith & Harris 1982, fig 23, No 92), with an internal diameter of 450mm and external cord impressed cordons. It would be reasonable for very large gabbroic storage
jars to occur on the Lizard, close to the sources of gabbroic clay. The similarities with the Early Bronze Age vessels from Bosvargus and Chapel Carn Brea can be explained on the assumption that Trevisker ceramics were made in much the same styles in both the Early and Middle Bronze Ages, a view generally supported by recent studies (Parker-Pearson 1990; Woodward & Cane 1991).

**P2 (106)** clay lens and (107) silt in structure (Fig 29).

*Description*

Simple everted rim, internal diameter 370mm, Gabbroic admixture fabric with crushed serpentinite. Oxidised throughout 5YR 6/6 reddish yellow. Well smoothed surface. Row of large regular finger tip/nail depressions around neck with below two incised zigzags in alternate directions and a double row of smaller finger impressions below these.

*Contextual details*

One rim sherd came from (106) and one and a body sherd from (107). These had very abraded edges (2-2/3) although the surfaces were fresher. It is possible that they were redeposited with the material infilling the structure, rather than forming part of the structured deposit with P1.

*Comparanda*

No comparanda for this vessel or its decoration are known from barrows but vessels with a similar profile which combine incised and finger tip decoration occur on settlement sites (Trevisker, ApSimon & Greenfield 1972, fig 15, No 15; Trethellan Farm, Woodward & Cane 1991, fig 43, P19, fig 44, P22, fig 46, P36) although no precise parallel for the arrangement of the decoration is known.

**P3 (107)** silt in structure (Fig 29).

*Description*
Simple vessel with curved wall, internal diameter 85mm. Gabbroic without additions. Surface roughly smoothed. Reduced throughout 5YR 4/1 dark grey. One small circular boss survives; there could have been two, three or four originally.

Contextual details

One side of the sherd and edges are fresh 1/2 but the other is abrasion 2. Recovered from (107) silt in Bronze Age structure.

Comparanda

For the Bronze Age the vessel may be considered as a miniature, smaller than the range of Trevisker vessels (Parker-Pearson 1990, fig 1). The closest comparanda are vessels KK and LL from Trelowthas barrow, Probus (Quinnell forthcoming a). These have paired bosses, straight sides and flat bottoms and are respectively 75mm and 100mm in internal diameter. They were deposited in a cist within a barrow with an associated radiocarbon date AA-29734 which calibrates to 1895 – 1630 BC at two sigma. All miniature vessels known from Cornwall belong to the Early as opposed to the Middle Bronze Age. The curved vessel wall of P3 however suggests that the base was round bottomed. It is just possible that it represents a small Early Neolithic simple bossed cup (eg Carn Brea, figs 69, 70, Smith 1981). The fabric compares much better with much of the Carn Brea gabbroic material than Trevisker gabbroic wares and, importantly, although the outer surface is not obviously burnished a black area survives, comparable to that of ‘black paint’ on some of the Carn Brea vessels (ibid, 170) and such paint is not known from Trevisker vessels. If P3 is Early Neolithic, it may either derive from a pit of that date in the immediate vicinity of the structure, a possibility which the lithic assemblage allows, or it may have been brought in
from elsewhere, as a find of some recognised antiquity, for inclusion in the structured
deposit ‘closing’ the feature.

**P4 (107)** silt in structure (Fig 29).

*Description*

Body sherd from large vessel with lines of three and four parallel twist cord impressed lines
respectively. Gabbroic admixture with crushed gabbroic rock. Smoothed exterior surface
5YR 3/4 reddish brown, interior surface 5YR 6/1 grey and very worn. Exterior fresh but
interior may be broken through across whole of sherd. It is just possible that P4 is a
fragment of P1 but the pattern of its cord impressions makes it more likely to be a separate
vessel.

*Fabric*

P1, P2 and P4 were of gabbroic admixture fabric, a distinctive fabric used for Trevisker
pottery in which materials of non-gabbroic character were added to gabbroic clay (Parker-
Pearson 1990; Quinnell 1998-9). The additional material in P1 and P4 was crushed
gabbroic rock, in P2 crushed serpentinite. P3 was gabbroic without admixture (see
Petrography below). The components of all the vessels derive from the area of the Lizard
gabbro. There has been discussion in the past about the likelihood of clay being
transported from the Lizard for potting (eg ApSimon & Greenfield 1972, 355) but Parker-
Pearson stated clearly (1990, 19) on the evidence then available that all the components
known at that time in gabbroic admixtures occurred in the immediate vicinity of gabbroic
clay. Recently however part of a Trevisker assemblage from Tremough has been shown to
contain hornfels from the immediate locality of the site, material which does not occur in
the area of the gabbro: this appears to demonstrate the transport of gabbro clay over at
least 15km and its mixing with local inclusions (Quinnell forthcoming d). In addition
recent assessment of the Trevisker assemblage from Gwithian (Quinnell 2004a) has shown
the presence on this site of unfired gabbroic clay probably brought in for local potting, adding an extra strand of complexity. These comments are relevant because the extraordinary c240kg weight of P1, and its soft fabric, would be appropriate for on-site local potting. It is quite possible that clay, perhaps with gabbro rock fragments already mixed in, was transported to be manufactured close to the site where it was presumably used and finally deposited.

**Dating**

Details of relevant radiocarbon dates are discussed elsewhere. There were some problems with the two determinations from residue on P1. Overall the posterior density modelling indicates that P1 was last used 1400 – 1190 cal BC (95% probability) and this dating would be broadly appropriate for the end of use of the structure. Modelling for the deposit containing the pottery, and associated with the end of the structure, indicates a date between 1500-1300 cal BC (95% probability) and 1390-870 cal BC (95% probability). This means that the structure is broadly contemporary with the other two houses in Cornwall with multiple dates, Trethellan, Newquay, fifteenth to thirteenth centuries BC (Nowkowski 1991, 101) and Trevilson near Mitchell (Jones & Taylor 2004, 92), where a roundhouse was built during the fourteenth or thirteenth centuries BC and abandoned by the eleventh.

**The deposition of P1 sherds (Fig 28)**

*with Carl Thorpe*

The sherds were deposited in a compact group, only partly excavated, with none occurring to the north of the cross baulk (Fig 5). They were buried in a deposit of clay which contained concentrations of charcoal flecks which in places adhered to sherd surfaces. Sherd condition varies greatly. Sides buried uppermost and edges where not protected are
generally abraded whereas undersides are fresh, the difference due to percolating ground
water and bioturbation. Where protected, edges appear as though freshly broken, but
some unprotected edges had become so worn that breaks will no longer join. Overall about
one eighth of the vessel is present but there are significant differences in representation of
the upper, decorated, and lower, plain, parts. Approximately a quarter of the former is
present with about half the circumference of the rim, but only about a sixteenth of the
lower plain parts and base angle. There were no sherds of the base, as opposed to base
angle, present.

Close study of large scale site plans and photographs provides a good understanding of the
way in which sherds were deposited and the vessel broken. On Fig 28 the positions of
significant joining sherds are marked with their recorded numbers. Most of the joining
sherds appear to have broken up in the ground and to have been deposited initially as large
sherds, described as sherd blocks. These sherd blocks were set in two distinct layers which
have become squashed together and covered about 1m of ground, slightly larger than the
size of the original vessel. The arrangement of the sherds in these layers replicated their
arrangement in the vessel. The cracking up of the sherd blocks, with considerable
displacement around the stones in the infill, suggests pressure caused by heavy trampling,
perhaps dancing, immediately after the sherds were covered.

The large rim sherd block in the upper layer, including 60 to 75, 13, 14, 16, and 12, had
been deposited with the rim due north. The greatest depth of the pot is represented on the
left of the block, running down well into the plain zone and covering about 500cm on the
ground. The break on the left represents one of the original breaks on the vessel. A scatter
of plain sherds occurs across the next 0.5m, all apparently buried surface uppermost. The
plain sherds ended with part of the base angle, sherds 36/49 deposited as a sherd block
with the exterior upwards. Beyond these was a single stray decorated sherd 40.
The lower level consisted of a block of sherds 10, 11, 44, 45-8, deposited with the rim to the west, at 90 degrees to the upper group. The right hand edge of this block is the other side of the major pot break present in the upper group. It is probable that this block represents two big sherds, broken before deposition but set back in situ. The first block runs up to the rim (53 – 10), the second block only contains girth sherds; the vertical break comes between 45 and 46. The west end of the sherd block with rim 10 overlay sherd 53. 53 had been broken off from the lower edge of the block, from 44, and placed upside down beneath the edge of the rim, so that the decoration, now on the under side, runs directly in an eastward direction. A further four sherds, two decorated and two plain, were also deposited upside down in the level around the main sherd block. To the south was a block of base angle sherds 64/65 placed interior upwards. These base sherds which form the south end of the layer are placed with top to the north, unlike the rim sherd block.

Lugs were probably represented in both layers. Sherd 3 with a lug scar was placed in the top layer, in the north east of the deposit; actual lug sherds may survive beyond the baulk. Joining sherds of a lug 55/73, were found in the lower block. Sherds 3 and 55/73 do not join.

Both layers therefore contained rims, decorated sherds, plain body sherds and base angles placed in their sequence around the vessel, and both probably contained parts of lugs. The decorated sherds in the lower level were placed at 90° to those in the upper, facing north rather than west. The lower level also contained at its base selected sherds placed with decoration down and a base angle block inner side up. These distinctive aspects of sherd deposition, together with uneven representation of different vessel parts, demonstrate that the deposit is deliberate and structured and can not result from any form of accidental deposition or dumping.
Joining sherds in sherd blocks indicate that some half of the perimeter of the vessel is present. The two main sherd blocks are separated by a heavy line on Fig 28 which represents the apparent initial line of breakage. If so the whole vessel may initially have been broken into four segments and this may have included the base. The base angle breaks indicate that the base was broken across still joined to the angle sherds and subsequently broken away. On one group of base angle sherds the adjoining section of base was snapped by being pushed upwards but the other group show force exerted in the opposite direction. Along both sides of the major break lines sherds show refiring by oxidization along the broken edges (dotted on Fig 28). It is possible that this may have related to the use of fire and water in initial breakage; there are no detectable impact marks from the use of hammer stones. However the oxidization across the breaks is on average 5mm deep and suggests that the large pieces were placed in a fire after breakage. The interior shows patchy areas of reduction and blackening, some of which may be due to refiring. The major sherd blocks were subsequently broken along the lines of coil joins – the horizontal breaks indicated on Fig 28. Many of these breaks may have happened through pressure after deposition. However the break between 10/11 and 44/48 appears to have occurred before deposition, with sherds placed in the ground in position after breakage and the removal of the rim beyond sherd 10; it is difficult to envisage any other process which would have removed the rim about 46/48. Today sherds can be easily broken, with as much pressure as is needed to break a thick biscuit, but some of the vessel softness is due to long burial in damp conditions.

Comment
The comparanda both for the large and decorated P1 and the miniature P3, if this is not redeposited Neolithic, come from barrow contexts which can be assigned to the Early Bronze Age and where deposition is undeniably related to ceremonial activity. Barrow deposition does not appear to survive in Cornwall into the Middle Bronze Age nor do
roundhouses appear to be constructed before this period. The choice of vessels deposited at Boden may represent an extreme example of the selection of vessels for structured deposits linked to acts of closure, using vessels of types previously considered appropriate for barrow deposition.

With regard to the understanding of Trevisker ceramics, there have now been some three decades of debate about typological development (summarised Woodward & Cane 1991, 122-7) in which the chronological relevance of modes of decoration, incision and cord impression, have been pivotal. Cord impression was initially regarded as later than incision but the general current view (Parker-Pearson 1995) is that decorative style and shape of vessel related to function and probably changed little during the currency of Trevisker wares during the second millennium BC. At Boden there are unusual links between the two principal decorative modes, both on the same vessel P1 and on vessels within the same context which supports the synchronicity of decorative styles. It is quite definite that the parts of the unusually large P1 were deliberately deposited, probably after deliberate breakage, and this deposition forms one of the clearest acts of structured deposition so far known for the Cornish Bronze Age. P1 must have functioned as a storage vessel – its poor manufacture made it unsuitable for holding liquids and grain is the most likely stored commodity; there was no residue indicating cooking. Is its breakage and deposition linked to that of saddle quern fragment S1 also found in deposits over the structure and do the two together point to the importance of grain for the subsistence of those using the structure?

5.3.4 Fabrics – Early Iron Age to Gwithian Style

Ga.1 Gabbroic, Early Iron Age. Generally open and poorly made, with smoothed rather than burnished surfaces on both interior and exterior. Mostly reduced 5YR 4/1 dark grey but some sherds oxidized generally 5YR 6/6 reddish yellow.
Ga.2 Well-made gabbroic. Later Iron Age until second century AD. Compact well made fabric frequently with burnish on exterior. Mixture of oxidized 5 YR 5/6 yellowish red and reduced 5 YR 4/1 dark grey.

Ga.3 Standard gabbroic. Roman period, but can not be clearly distinguished in body sherds. Smoothed surfaces, general trend towards oxidization 5 YR 5/6 yellowish red.

Ga.4 Gwithian Style gabbroic Poorly made with smoothed surfaces but distinctively highly fired. Generally oxidized but 5YR 5/6 yellowish red.


Comment Extensive petrographic study (see below) including thin-sections confirmed that the gabbroic fabrics were sourced from Lizard clay but failed to find any differences that could be related to chronology. The Granitic Derived fabric was sourced to weathered granite deposits, most probably from around the edge of the Carnmenellis Granite.

5.3.5 Early Iron Age  (Figs 30-31)

Table 3 Early Iron Age pottery: ¹ includes disc 606; ² not included amphora sherd 67g 2 abrasion; ³ not included P52 intrusive Gwithian platter; ⁴ includes WMG sherd 1g 2 abrasion : not included non-local sherd 18g 2/3 abrasion (see McBride below)

<table>
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<tr>
<th>Context</th>
<th>Ga.1</th>
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<tbody>
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<td>(806) on fogou floor</td>
<td>29</td>
<td>362</td>
</tr>
<tr>
<td>(805) fill above (806) in fogou P5-8</td>
<td>47</td>
<td>844</td>
</tr>
<tr>
<td>(807) fill above (806) in fogou P9</td>
<td>5</td>
<td>101</td>
</tr>
<tr>
<td>(900) upper fogou fill</td>
<td>4</td>
<td>53</td>
</tr>
<tr>
<td>Fogou unstratified</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>(610) on base of gulley [609]</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>(606) above (610) in gulley [609] P10-11 ¹</td>
<td>39</td>
<td>1080</td>
</tr>
<tr>
<td>(605) over gulley [609]</td>
<td>14</td>
<td>665</td>
</tr>
</tbody>
</table>
### Form

A minimum of 23 vessels appear to be represented. The most common form is a jar with a carinated shoulder which occurs in variety of sizes. The neck is shallow and concave with the rim either out-turned or vertical. Such carinated jars occur on a number of Cornish sites, Carn Euny (Elsdon 1978 Type Po.2), Gurnard’s Head (Gordon 1940), Halliggye fogou (Elsdon & Quinnell forthcoming), Bodrifty (Dudley 1956), Trevelgue Head...
(Quinnell forthcoming b) and Trenowah (Quinnell in Johns forthcoming). All these sites appear to continue in use until the Middle Iron Age and therefore the form is likely to have been present in the preceding end of the Early Iron Age. In the recent study of material from Trevelgue Head (Quinnell forthcoming b), Iron Age ceramics have been classified by an extension of the system introduced for the major collection from Danebury in Hampshire (Cunliffe 1984; Cunliffe and Poole 1991) and now being extended for other sites such as South Cadbury (Woodward 2000). The carinated jars are the enumerated variety JB2.4: where J indicates the class, jars; B indicates the type of jar; 2 indicates the broad form, and 4 the variety. The JB2.4 classification is used here, but with the clear understanding that the variety may need further subdivision when more examples are available for study. There are twelve examples of JB2.4 at Boden (P7, P8, P10, P11, P12-14, and P16; Fig 30), of which P10 is in Granitic Derived fabric and the remainder gabbroic, Ga.1; internal neck diameters range from 70mm to 170mm.

There is a single example of a large jar with everted rim (P5) (Fig 30), and five examples of smaller jars with simple everted rims (P6) of which two are Granitic Derived. These jars occur in association with the JB2.4 form at Carn Euny (Types Po.1, Po.1a, Po.3), Halliggye and Trevelgue, and alone at St Michael’s Mount (Quinnell 2000) and Boleigh (Quinnell 2000-1). They have not yet been included in the overall ceramic classification because here at Boden, at Trevelgue and Halliggye they are insufficiently complete.

In the study of the Trevelgue material it is proposed that assemblages with JB2.4 jars and jars similar to Boden P5 and P6 and to the Carn Euny range should be referred to the ‘Plain Jar Group’ (PJG). It is hoped that this term will come into general use for assemblages which are now becoming distinctively recognizable and which appear to immediately precede South Western Decorated (SWD) material of the Middle Iron Age.
The use of this term precludes the necessity of including ‘Early Iron Age’ in the description. All the sites refer to above have assemblages which contain PJG forms.

The handled jar P17 (Fig 31) has no close parallels but No 7, fig 8 from Gurnard’s Head (Gordon 1940) may come from a broadly similar vessel. The handle P9 (Fig 30) probably also should be placed within PJG. Similar handles occur in the Formative Phase of South Western Decorated Ware at Trevelgue Head (Quinnell forthcoming b) where the argument is made that handles generally are a feature of the end of PJG and of this earliest Phase of SWD.

The decoration on P8 may link it to the ‘Transitional’ Phase at the end of PJG (Quinnell forthcoming b) with broad parallels at Carn Euny and Gurnard’s Head. Finally the scrap of protruding vessel foot from (437), not illustrated, has broad parallels with P32 from Midden 2, Formative SWD at Trevelgue Head, with fig 55, No 46 from Carn Euny (Elsdon 1978) and with P67 at Halliggye (Elsdon & Quinnell forthcoming). Overall these features of the Boden assemblage place it at the end of PJG at a time when some features found in the Formative Style in SWD were already in use.

**Fabric**

Most of the PJG material, 246 sherds, 92% on sherds but 96.5% on weight, was gabbroic and Ga.1; only 21 sherds, 8% on sherds but 3.5% on weight, were Granitic Derived. Ga.1 was a poorly finished gabbroic fabric, matched by much of the material used at Halliggye.

All the identifiable gabbroic vessels were in this fabric, and well-made gabbroic occurred only as a single sherd in (200); at Trevelgue well-made gabbroic fabric was used for 10% of the assemblage of this date. Halliggye and Boden together indicate a tendency to use poorly made fabrics close to the source of gabbroic material, a tendency demonstrated in the subsequent Middle Iron Age enclosures at Gear and Caer Vallack in the Helford River area (Quinnell forthcoming e). At neither Halliggye nor Boden was the coarse Early Iron
Age gabbroic fabric, distinguished by inclusions up to 3mm in size, used both in PJG and earlier groups at Trevelgue, identified.

On the limited data currently available, granitic fabrics were more extensively used with PJG assemblages than at other times during the first millennium BC, accounting for 30% of the vessels identified at Trevelgue and 85% at Carn Euny (data summarized in Quinnell forthcoming b). However none of the PJG group at Halliggye appears to have been other than gabbroic although a few sherds of Middle Iron Age South Western Decorated were granitic (Elsdon & Quinnell forthcoming). The choice of fabrics used was obviously a complex factor, governed by practices and traditions not now retrievable.

**Dating**

Consideration of chronology must take into account the absence of South Western Decorated Ware. Recent work on the assemblage at Trevelgue Head cliff castle, supported by a series of radiocarbon determinations and posterior density modeling, indicates that the earliest form of this Ware, the Formative Style, came into use during the fourth century BC, and that the subsequent Accomplished and Standard Styles, which together mark the general prevalence of South Western Decorated Ware in Cornwall, were present from around 320-270 cal BC (Quinnell forthcoming b). This dating is in broad accord with other recent work in Cornwall. The general currency of South Western Decorated Ware is likely to have been from around 300 BC, rather than the fourth century dating previously suggested (Quinnell 1986, 113). Occurrences of the fourth century Formative Style are comparatively uncommon.

Posterior density modeling for the Boden dates indicates a *terminus ante quem* for the digging of the enclosure ditch of around 400 cal BC. The curvilinear ditch [431]/[609] is placed at
400-340 cal BC (51% probability) or 320-220 cal BC (44% probability). The earlier range must be considered more likely. The dated sequence of features in Trench 4 provides a date for the earliest [416] of 420-350 cal BC (95% probability), with the subsequent [412] dating to the fourth century BC and the latest [425] to the third. This latest date appears problematic, unless of course the site continued in use with no pottery deposited. The construction of the fogou is dated to before 420-350 cal BC (94% probability); the 280-260 cal BC (1% probability) can be safely discounted. Activity in the enclosure began 470-370 cal BC (5% probability), most probably in the decades around 400 BC, 425-390 cal BC (68% probability). However an alternative model allows the start to be set at around 530-400 cal BC (95% probability). The use of the enclosure ended during the Iron Age, for which samples were dated, either 365-330 cal BC (27% probability) or 270-205 cal BC (41% probability). The lack of South Western Decorated Ware suggests that the later, and higher, probability can be discounted. The models also suggest that the enclosure was used either for two to three generations in the fourth century BC (30-80 years 26% probability) or for 175 years covering the fourth and third centuries BC (135-220 years 42% probability); the latter possibility may however relate to the statistical scatter of the determinations, a possibility which again the absence of South Western Decorated Ware supports. Overall the modeling would support a fourth century BC date for Early Iron Age use of the site and for the related ceramics described above as the ‘Plain Jar Group’ (PJG).

The only site with determinations related to PJG ceramics and so with similarities to Boden is Trenowah, a group of fields and enclosures near St Austell (Johns forthcoming). Here a group of dates provide a broad band of 800-400 BC (95% probability). Detailed consideration of these dates is not yet available, and they may not be suitable for posterior density modeling. At present they suggest that ceramics linked to the JB2.4 type have a long time span, at the end of which Boden falls. There are no determinations from Trevelgue Head from contexts with JB2.4 vessels but these are almost certainly present in
Midden 1 there with a date which, subjected to posterior density modeling, calibrates to 480-400 BC (Quinnell forthcoming b) and which may be related to a ‘Transitional’ phase in the development of South Western Decorated Ware. The context immediately below Midden 1 at Trevelgue contains definite JB2.4 vessels but could not supply a date.

**The fogou**

Contexts (806) (805) (807) and (900) produced PJG material and this was the only ceramic style present. (806) (805) and (900) each produced sherds from an additional JB2.4 jar to those illustrated.

*Illustrated sherds (Fig 30)*

**P5 (805)** fill above (806) in fogou. Ga.1. Everted rim with slight internal groove from large vessel, internal neck diameter 390mm.

**P6 (805)** fill above (806) in fogou. Ga.1. Simple everted rim from small jar, internal neck diameter 150mm.

**P7 (805)** fill above (806) in fogou. Ga.1. Unusually upright rim from JB2.4 jar, internal neck diameter 140mm.

**P8 (805)** fill above (806) in fogou. Ga.1. Paired small finger tip impressions on either side of carinated shoulder of JB2.4 jar.

**P9 (807)** fill above (806) in fogou. Ga.1. Handle with vertical perforation from jar shoulder.

**Contexts in Trench 6**
(610) and (606) in gulley [609] produced only PJG material as did (605) over the gulley; (606) contained two small slightly everted rims in Gra and one in Ga.1 in addition to those illustrated. (607) over stone spread (608) contained only sherds of this broad date with the exception of an amphora sherd (McBride below).

*Illustrated sherds (Fig 30)*

**P10 (606)** above (610) in gulley [609]. Gra. Neck and shoulder from small JB2.4 jar, internal neck diameter 100mm.

**P11 (606)** above (610) in gulley [609]. Ga.1. Neck and shoulder from large JB2.4 jar, internal neck diameter 240mm.

**P12 (605)** over gulley [609]. Gra. Neck and shoulder from JB2.4 jar, internal neck diameter 210mm.

**P13 (605)** over gulley [609]. Ga.1. Neck and shoulder from JB2.4 jar, internal neck diameter 250mm.

**P14 (605)** over gulley [609]. Ga.1. Rim and shoulder from JB2.4 jar, internal neck diameter 160mm.

**P15 (605)** over gulley [609]. Ga.1. Everted rim with perforation made before firing.

*Contexts in Trench 4*

Most contexts in Trench 4 produced sherds of PJG type (Table 3). (418) and (432) both contained simple small everted rims, and (437) a base with protruding foot in addition to illustrated P16. There were then no dateable sherds until the Gwithian Style, which occurred in (430) (405) (403)/(409) and surface layers; platter sherd P52 has been assumed to be intrusive in (430) because a number of Ga.1 sherds in the same context were fresh, but this can not be certain.

*Illustrated sherds (Fig 30)*
**P16 (430)** in gulley [431] = [609]. Ga.1. Rim and shoulder from JB2.4 jar, internal neck diameter 145mm.

**The enclosure ditch in Trench 2**

All ceramics from the fill of the ditch in Trench 2 appear to have been PJG except for an amphora sherd (below) and possibly the well-made gabbroic sherd in (200) in the ditch top. While there is a sherd of this date from the same ditch in Trench 3 (Table 3), the presence of both Roman and Gwithian Style vessels indicates that the narrative here was different to that on the North side.

*Illustrated sherds (Fig 31)*

**P17 (204)**, deeply stratified in enclosure ditch [202]. Ga.1. Jar neck, internal diameter 210mm, with slight external cordon on which was set a small vertical handle with vertical perforation.

**P18 (204)** in enclosure ditch [202]. Ga.1. Base from large jar.

### 5.3.6 Cordoned Ware and Romano-British (Figs 30 and 31)

**Table 4** Cordoned ware and Romano-British pottery; some residual Early Iron Age ware: ¹ not included possible amphora rim 22g abrasion 2/3; ² not included gabbroic admixture sherd 21g abrasion 3.

<table>
<thead>
<tr>
<th>Context</th>
<th>Ga.1 Early Iron Age</th>
<th>Ga.2 well-made</th>
<th>Ga.3 standard</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Wt</td>
<td>Abrasion</td>
</tr>
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<td>(119) fill of field ditch P19</td>
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<td>1</td>
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<tr>
<td>(202) Tr unstratified P19</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>(309) posthole [308]</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>(311) in ditch P20-24</td>
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<td>0</td>
<td>139</td>
</tr>
<tr>
<td>(602) in ditch P25</td>
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</tbody>
</table>

58
1991 'well'  

P26-31  

(310) upper enclosure ditch  

P32-34  

(301) cleaning Tr 3 unstratified  

Tr 6 unstratified Field to N of fogou  

Totals

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<td>Tr 6</td>
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<td>0</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>unstratified</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Field to N of fogou</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Form and dating**

Probably some 40 vessels are represented of which the group of 15 in (311) is most probably Late Iron Age. Cordoned Ware vessels may still be appropriately described using the alphabetic classification put forward by Threipland (1956) and Romano-British material by the numeric classification set out in the publication of Trethurgy (Quinnell 2004) which also amplifies and updates Threipland’s system.

Cordoned Ware may be divided into two broad chronological groups. The first is pre-Roman Late Iron Age and is distinguished by the presence of bowls Type F and G (P21).

In the second Types F & G disappear but a range of new forms appear, including Type P (P26). This second phase covers the first century of the Roman occupation until the mid-second century AD, at which time forms more generally linked to Roman ceramics in Britain but made in local gabbroic fabrics come into manufacture. Some cordonned ware vessels continue to be made but in a distinct style; this cordonned ware may be described as third phase. In the comments on the dating of individual contexts below, details are supported by data in the Trethurgy report (Quinnell 2004).
If it is correctly suggested that the group in (311) was deposited in the fourth or fifth centuries AD but contained redeposited sherds from the second century onward, then the contexts should exist on the site with material throughout the Roman period.

**Fabric**

Well-made gabbroic fabric with good burnish, Ga.2, was in general used for first phase, Late Iron Age, Cordoned Ware and continued in use through the second phase. Its gradual disappearance, together with the distinctive burnished finish, takes place around the end of the second phase in the later second century AD, to be replaced with a more poorly made and unburnished fabric, Ga.3. This fabric frequently has a ‘wiped’ appearance and may be described as ‘standard’ for Roman Cornwall.

**(119) in field ditch [120]**

The burnished Ga.2 fabric of lid P19 strongly indicates that this belongs to one of the first two Cordoned Ware phases. Lids are present at St Mawgan-in-Pydar, the site on which Threipland’s typology is based (1956, fig 30), and occur at other sites such as Carvossa (Carlyon 1987, fig 3, No 101, fig 4, No 140).

*Illustrated sherds (Fig 32)*

**P19 (119)** fill of field ditch [120]. Ga.2. Lid with raised edge, with possible swelling indicating presence of a handle.

**(311) in ditch [305]**

(311) contains parts of six Type C bowls without handles, of two Type D jars, two Type J jars and several cordoned girth sherds, in addition to the illustrated vessels. The presence of the JB2.4 jar P20 indicates some residuality but the remainder of the group is of first phase Cordoned Ware Types of which majority appear fresh. This could date any where
through the first century BC until a date some time around the mid-first century AD. The presence of P21, part of a Type G bowl, is the distinctive factor in dating.

*Illustrated sherds (Fig 32)*

**P20 (311)** in ditch [305]. Ga.2. Neck and shoulder of JB2.4 jar, internal neck diameter 105mm, residual.

**P21 (311)** in ditch [305]. Ga.2. Lower body of Type G vessel.

**P22 (311)** in ditch [305]. Ga.2. Type C bowl, internal rim diameter 135mm, one vertically perforated handle set on rim survives with scar of second opposite.

**P23 (311)** in ditch [305]. Ga.2. Upper part of Type H jar, internal rim diameter 160mm.

**P24 (311)** in ditch [305]. Ga.2. Neck and shoulder of Type J jar, internal neck diameter 210mm.

*(309) in posthole [308]*

This contains two small Type O rims in well-made Ga.2 fabric. Type O is one of the distinctive vessel forms of second phase Cordoned Ware.

*(602) in ditch [612]*

The only distinctive piece P25 has no precise parallels, no other examples of a Type H jar with a handle being known. The use of standard gabbroic fabric Ga.3 means the date is not closely definable. This context is the only one in Trench 6 for which the ceramics are not Early Iron Age.

*Illustrated sherds (Fig 32)*

**P25 (602)** in ditch [612]. Ga.3. Part of Type H rim with stub of rectangular handle.

1991 ‘well’
This feature contained a mixture of second phase Cordoned Ware and Romano-British sherds. P26, Type P, and P27, Type C, are in well-made gabbroic fabric and are likely to belong to the earlier group. P28, Type H/Type 12, in standard gabbroic Ga.3, could date anywhere from the mid-second century onward (Quinnell 2004, 118). P29, Type 11 in Ga.3, probably dates from the mid-second to the mid-third century AD (ibid, 118). P30, the double-handled jar Type 26 in Ga.3, has its best comparanda in a range from Carvossa (Carlyon 1987, fig 3, No 91, fig 6, Nos171, 172, 175) which extend from the late first to the late third century; the fabric of P30 probably indicates a date after the mid-second century. For P31, Type 9 in Ga.3, the limited comparisons available (Quinnell 2004, 117) provide comparanda from the third and fourth centuries. All these enumerated vessels were abrasion 2. If it is assumed that they were deposited as a group, or at much the same period, this is most likely to be sometime in the mid- to late second century to account for the use of well-made gabbroic fabric in P26 and P27 but this assumes that P31 has a longer date range than previously demonstrable.

**Illustrated sherds (33)**

**P26 1991 ‘well’.** Ga.2. Rim of Type P jar, slight external grooving, internal rim diameter 210mm.

**P27 1991 ‘well’.** Ga.2. Rim of Type C bowl with horizontal perforated handle.

**P28 1991 ‘well’.** Ga.3. Rim of Type H jar, internal neck diameter 225mm.

**P29 1991 ‘well’.** Ga.3. Rim of Type 11 jar, internal neck diameter 180mm.

**P30 1991 ‘well’.** Ga.3. Rim and neck of Type 26 jar, internal neck diameter 160mm.

**P31 1991 ‘well’.** Ga.3. Upper part of Type 9 jar, internal neck diameter 210mm.

*(310) in enclosure ditch [315]*
(310) contained a mixture of material including an example of a JB2.4 jar (as P13) and a sherd of Bronze Age gabbroic admixture. Romano-British sherds, apart from those illustrated, comprised parts of rims from three Type 4 jars, mid-second to fifth centuries, a Type 16 girth sherd from a storage jar, third to fifth centuries, a small upright rim and two rod handles which can not be closely date. P32, Type 8 but a very small example so not typical, should be third or fourth century, P33, Type 19 but a small fragment, should date to the later second century (Quinnell 2004, 121) while P34, Type 21, is likely to be third or fourth century. The enumerated vessels are abrasion 2 but many of the other pieces are 2/3 or 3. Given the wide range of dates including Bronze Age and Early Iron Age, the deposit has the appearance of redeposition, with material collected and dumped, an event, which from the latest material it contains, should be fourth or even fifth centuries.

Illustrated sherds (Fig 33)

P32 (310) in upper part of enclosure ditch. Ga.3. Small Type 8 bowl, internal rim diameter 100mm.

P33 (310) in upper part of enclosure ditch. Ga.3. Small piece of Type 19 bowl rim, internal diameter 190mm.

P34 (310) in upper part of enclosure ditch. Ga.3. Upper part of Type 21 bowl, internal diameter 120mm.

5.3.7 Post-Roman Gwithian Style (Fig 34).

Table 5 Post-Roman Gwithian Style pottery. \(^1\) grass marked sherd

<table>
<thead>
<tr>
<th>Context</th>
<th>Ga.2 well-made</th>
<th>Ga.3 standard</th>
<th>Ga.4 Gwithian Style</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sherds</td>
<td>Wt</td>
<td>Abrasion</td>
</tr>
<tr>
<td>(314) in upper enclosure ditch P35-49</td>
<td>0</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>(303) in top</td>
<td>1</td>
<td>19</td>
<td>3</td>
</tr>
</tbody>
</table>
of enclosure
ditch P50-51
(430) in 0 0 0 0 1 34 1/2
[431] gulley intrusive P52
(405) soil 0 0 28 347 2 1 13 2
over stones
(408) P53
(403)/(409) over (408) 0 0 0 0 21 128 2.3
P54
(420) ploughsoil
Tr unstratified P55
(600) topsoil 1 0 0 0 0 1 14 2
Totals 1 19 94 1099 114 1510

**Form**

Boden is the first site for which a group of Gwithian Style ceramics is published. At least twenty two vessels are present. Gwithian Style ceramics were identified at Gwithian during the 1950s (Thomas 1958, 21-23; 1968) and are currently being revisited as part of the assessment of that site archive (Quinnell 2004a). In a recent review in advance of this publication, Thomas (2005) has identified a further four sites with ceramics of this Style and initial scanning of the assemblages at Carngoon Bank (McAvoy 1980) and Goldherring (Guthrie 1969) suggest that quite a range of material is present. Definitive comment will have to await the full publication of Gwithian but it is becoming apparent that a wide range of forms may be involved.

The most distinctive form is the platter (P35-41, 52, 53, 55) (Fig 34) which, unlike later examples, is not grass-marked. There are a total of twelve platters, two not illustrated. Compared to later grass-marked platters, these tend to be small, here between 150mm and 300mm in diameter. A number of the bases are sanded, with impressions showing that these had been left to dry on sanded surfaces. This appears to be very typical of Gwithian
Style platters. The low side walls may be wavy-topped because of finger tipping on the rim and may have finger tip or other impressions on their exteriors. These platters have so far been identified at Gwithian, at Goldherring (Guthrie 1969, fig 15, Nos 5-8), Carngoon Bank (McAvoy 1980, fig 18, Nos 49-50, 52-4) and probably Halliggye (Elsdon & Quinnell forthcoming).

There are a series of seven different bowls in addition to P42, an abraded example of a third to fifth century Romano-British Type 22. P43 and P45 are lumpy and irregular versions of Type 22, possibly paralleled by Nos 62-3 at Carngoon Bank (McAvoy, 1980, fig 18). P44 has a distinctive wide everted rim; a possible parallel occurs at Goldherring (Guthrie 1969, fig 13, No 18). P46 is a simple bowl with out-turned rim paralleled at Goldherring (ibid, fig 13, No 26). P47 with grooving below the rim has no identified comparanda. P50 is a simple large bowl with a rounded rim, broadly similar to Nos 65, 66, fig 18 from Carngoon Bank. P54 is a very simple shape.

P48 and P51 are jars. P48 is thick and lumpy with a simple out-turned rim. P50 has a flat-topped rim, probably paralleled by No 26, fig 16 at Carngoon Bank. The lid P49 has not so far been identified in the Gwithian Style but suggests that the use of lids continued a practice which had commenced at the end of the Early Iron Age.

Forms from the Gwithian Style not present are jars with concave rims which appear to be frequent at Gwithian (Nowakowski 2004, Appendix 6) and occur at Halliggye (Elsdon & Quinnell forthcoming). There are no examples of stamps which have been identified at Gwithian, Halliggye and Carngoon Bank (Thomas 2005).

The platters appear to represent a complete break with earlier ceramics styles and to be a local invention. Their introduction is surely linked to a change in eating and cooking practices. The other forms represent a mixture of survivals from the Late Roman repertoire and introductions, some of which may have been influenced by Post-Roman
imported wares. The potential range of forms is quite considerable, indicating a period of ceramic experimentation between the continuation of Late Roman forms – basically the Type 22 bowl, the Type 4 cooking pot and Type 16 storage jars – and the restricted range of straight-sided cooking pot and platter which becomes standard with the introduction of grass-marked ceramics, probably during the seventh century.

**Dating**

A single radiocarbon determination was obtained from residue on platter P41 OxA-14560 cal AD 590 - 670 (95% probability). A series of three initial dates from Layer C at Gwithian, in which the Gwithian Style was the predominant ceramic, provided rather earlier dates. OxA-14528, from a sanded base appropriate to the Style, calibrated to AD 550 – 650, OxA-14529 to AD 420 – 600 and SUERC-6158 to AD 540 – 660. Thomas’s (2005) most recent assessment of dating for the Style is that it was present in West Penwith and Kerrier by AD 500 and continued until AD 600 or a little later; this is based on a broad consideration of associations with Post-Roman import wares. The Style is restricted to Western Cornwall, not occurring at Tintagel or at Trethurgy, both sites likely to have been occupied into the sixth century and, in the latter case, still using simple Romano-British ceramic forms (Quinnell 2004, 240). More precise dating, and understanding of the Style as a whole, awaits the full publication of Gwithian. At present it appears reasonable to suggest that the Style was broadly sixth and early seventh centuries.

**Fabrics**

The gabbroic fabric Ga.4, characteristically highly fired but otherwise poorly made, was used for all the forms, although it is less pronounced among the platters. It is very similar to the highly fired fabrics noted at Gwithian (Nowakowski 2004, Appendix 6) and at Halliggye. All Gwithian Style material identified so far is of gabbroic fabric although it is possible that granitic vessels remain to be identified in Scilly (Thomas 2005).
(314) upper fill of enclosure ditch [315]

(314) contains sherds from another two platters apart from those illustrated and some residual Ga.3 pieces, generally abrasion 2/3, including a Type O and two Type D rims. This assemblage is the largest Gwithian Style group on the site with a minimum of 16 vessels. The residual second century AD material and P42, the late Roman Type 22 bowl abrasion 2/3, make it possible that (314) is a second layer, in addition to (310) but from a different source, which was derived from clearing deposits from the interior and using them to infill the ditch.

Illustrated sherds (Fig 34)

P35 (314) in upper enclosure ditch [315]. Ga.4. Platter with finger tip depressions on exterior vessel wall. Sanded base. External basal diameter 240mm.


P37 (314) in upper enclosure ditch [315]. Ga.4. Platter with finger tip depressions on exterior vessel wall. Sanded base. External basal diameter 240mm.

P38 (314) in upper enclosure ditch [315]. Ga.4. Platter with finger tip depressions on exterior vessel wall. Sanded base. External basal diameter 300mm.

P39 (314) in upper enclosure ditch [315]. Ga.4. Platter with finger tip depressions on exterior vessel wall. External basal diameter 150mm.

P40 (314) in upper enclosure ditch [315]. Ga.4. Platter with top of rim modeled to produce wavy vessel wall on which paired circular impressions central to higher points. External basal diameter 225mm.

P41 (314) in upper enclosure ditch [315]. Ga.4. Plain platter. External basal diameter 200mm. OxA-14560 cal AD 590 - 670 (95% probability) on residue.
**P42 (314)** in upper enclosure ditch [315]. Ga.3. Rim of Type 22 bowl, abrasion 2/3. Internal rim diameter 210mm.

**P43 (314)** in upper enclosure ditch [315]. Ga.4. Thick and lumpy version of Type 22 bowl with slight interior groove. Internal rim diameter 220mm.

**P44 (314)** in upper enclosure ditch [315]. Ga.4. Bowl with wide out-turned rim, internal diameter 210mm. Noticeably high-fired, good burnish survives beneath rim. Another sherd in (303).

**P45 (314)** in upper enclosure ditch [315]. Ga.4. Lumpy, poorly modeled bowl, internal rim diameter 180mm; everted rim of triangular section with broad groove beneath.

**P46 (314)** in upper enclosure ditch [315]. Ga.4. Simple bowl, internal rim diameter 270mm, short rim sharply everted.


**P48 (314)** in upper enclosure ditch [315]. Ga.4. Thick jar rim, everted and rounded, internal diameter 180mm.

**P49 (314)** in upper enclosure ditch [315]. Ga.4. Simple lid, diameter 150mm.

**(303) in top of enclosure ditch [315]**

(303) contains part of a Late Iron Age Type C vessel in well-made Ga.2 fabric, abrasion 3 in addition to the pieces illustrated.

_Illustrated sherds (Fig 34)_

**P50 (303)** in top of enclosure ditch [315]. Ga.4. Vertical rounded rim from simple straight-sided bowl, internal diameter 210mm.
**P51** (303) in top of enclosure ditch [315]. Ga.4. Flat-topped rim with external expansion, rim top burnished.

*(430) in gulley [431]*

This feature also contains Early Iron Age PJG material and although P52 is tentatively considered intrusive, relationships may be reversed and the feature may be of Gwithian Style date.

*Illustrated sherd (Fig 34)*

**P52** (430) intrusive in gulley [431]. Ga.4. Platter with finger-tip or finger nail impressions around rim top giving wavy outline to vessel wall. External basal diameter 270mm.

*(405) and (403)/(409) over stones (408)*

The ascription of the featureless sherds to a period is very uncertain and all could be of Gwithian Style date.

*Illustrated sherd (Fig 34)*

**P53** (405) soil over stones (408). Ga.4. Plain platter. External basal diameter 165mm.

*(420) ploughsoil*

*Illustrated sherd (Fig 34)*

**P54** (420) ploughsoil. Ga.4. Small jar with curved sides. Highly fired. Exterior reduced and burnished with reduction spreading over interior of rim. Internal rim diameter 120mm.

*Trench 4 unstratified*

*Illustrated sherd (Fig 34)*

**P55 Tr 4 unstratified.** Ga.4. Platter, finger-tip impressions around rim top giving wavy outline to vessel wall; single circular stamp surviving on the exterior probably one of series on each protrusion on vessel wall. External base diameter 250mm.
5.3.8 Early Medieval Grass marked sherd
A single gabbroic body sherd from (600) topsoil has grass marking on the exterior and some plant grass inclusions in the fabric (R Taylor microscopic examination).

5.3.9 Petrography
Roger Taylor

Trevisker
Sherds from the four Trevisker vessels P1-4 were examined under the binocular microscope and a sample from each thin-sectioned (TS1-4). The results from thin-section examination confirmed binocular study. Each vessel comprised gabbroic fabric; to this crushed gabbroic rock was added to P1 (TS1) and P4 (TS4), and crushed serpentinite to P3 (TS3). The description of P1 TS1 is given below, the others are included in the archive. The components in all the samples examined come from the Lizard gabbro or its immediate vicinity.

*Trevisker P1 TS1* 
**Feldspar** – plagioclase, calcic andesine, sub-angular variably sericitised grains, 0.1-2.75mm. **Amphibole** – grayish green in sherd, grains variable in thin-section from brown to grayish green and some colourless fibrous aggregates; angular to sub-angular commonly elongated grains 0.1-2mm, up to 3.5mm in gabbroic fragments. **Rock fragments** – gabbroic fragments of slightly altered plagioclase, and greenish brown amphibole with remnants of pyroxene, sub-angular fragments, 4-5mm. **Quartz** – some angular grains 0.1-0.3mm, one fine-grained sutured quartzitic grain 0.5mm. **Magnetite** – black sub-angular grains, 0.05-0.25mm; also present in some of the gabbroic fragments. **Matrix** – all the mineral components are common in the matrix in grains sizes less than 0.1mm together with a few muscovite laths.

**Comment** A gabbroic admixture fabric with coarse gabbroic rock fragments in which the feldspar is relatively unaltered, an added component of the temper. A microscopic scan of other sherds of this vessel detected no other additions than gabbroic rock.
Early Iron Age to Gwithian Style

Granitic Derived A selection of Early Iron Age sherds were examined under the binocular microscope and two were thin-sectioned (TS7-8). All samples showed similar petrography with components derived from granite. The fabric may be described as granitic derived as the amounts of minerals present did not correspond to those in the parent granite, quartz especially being poorly represented. The immediate source was probably clayey weathered granite or head within or very close to the margins of granite, for which the Carnmenellis Granite, 5km to the north across the Helford River, is the most likely source. The description of TS7 is given below.

Early Iron Age Granitic Derived TS 7 (606) Feldspar – perthitic orthoclase, angular ragged grains containing many inclusions, a few fragments show Carlsbad twinning; the feldspar is probably weathered, grain sizes 0.1-2.75mm. Quartz – angular grains, some composite, some slightly strained, 0.1-3.5mm. Tourmaline – golden yellow/blue to colourless pleochroic angular grains, 0.1-1mm. Rock fragments - angular fragments of fine-grained granite and tourmaline aplite with an internal grain size of c 0.2mm, fragments 0.5 -3mm: some composite quartz/feldspar grains are derived from coarser granite. Mica – very weakly pleochroic pale brown laths probably originally biotite bleached by weathering, 0.1-1.2mm: a few grains 0.2-1.5mm are pleochroic very dark brown to mid-brown, some are partially bleached. Matrix – the matrix contains abundant angular grains less than 0.1mm of all the larger components: muscovite laths are particularly common.

Gabbroic - A selection of sherds of Early Iron Age Ga.1, Late Iron Age to Early Roman well-made Ga.2, standard Roman Ga.3 and the gabbroic used for the Gwithian Style Ga.4 were examined under the binocular microscope and two representative sherds of each thin-sectioned (TS5-6, 9-14). This study was intended to demonstrate any chronological differences in gabbroic fabrics. All were consistent in their components and no useful variation over time could be detected. All are likely to have originated on the Lizard
gabbro. TS5 Early Iron Age is given below as a typical description. Some others contained limonite, from surface deposits over gabbro, and occasional small gabbroic rock fragments: no chronological pattern could be discerned from these additional inclusions.

_Early Iron Age Gabbro Ga.1 TS5 (805)_  
_Feldspar_ – plagioclase, mainly heavily altered/sericitised, some less altered grains showing twinning 0.1-3mm. _Amphibole_ – colourless and grayish green aggregates and single grains, 0.1-2.1mm. _Magnetite_ – black angular grains, 0.1-0.3mm. _Quartz_ – sparse angular grains, 0.1-0.2mm. _Matrix_ – the main mineral components are present in the matrix in grain sizes less than 0.1mm.

5.3.10 Amphora and non-local sherds

Ray McBride

1991 ‘Well’ Handle sherd; 20g. Worn handle sherd of an amphora of Italian origin. Green augite is clearly visible under x20 magnification, which is a distinctive inclusion within the fabric of wine amphorae manufactured in the Campanian, Latium and Etruria regions of Italy. The sherd seems to have been from the end of a handle, close to where it joins with the base of the neck, but it is too small to be assigned to a type. There are three common types in this fabric which reached Britain: Dressel 1A and 1B (Peacock & Williams, Classes 3 and 4), which date from c130 BC until the end of the first century BC, and Dressel 2-4 (Peacock & Williams, Class 10), which dates from the later first century BC to the mid-second century (Peacock and Williams 1991). If a pre-conquest date is excluded, then this sherd represents an unusual occurrence of a Dressel 2-4, a type of amphora generally found on Roman military sites or in the larger urban settlements.

(200) _in top of enclosure ditch [202]_. Body sherd; 18g. A non-diagnostic, worn body sherd of a coarse ware vessel probably of Roman date. Probably a sherd from near the base of a storage jar of uncertain origin.
Body sherd; 67g. A much worn amphora sherd of Spanish origin. The fabric compares well with a sample of Peacock & Williams Class 17 amphora, produced in the Cadiz region of Spain from the late first century BC to the early second century AD.

5.3.11 Ceramic beads (Fig 35)
There are three beads all made of compact gabbroic fabric; SF5 and 9 have a noticeably asymmetrical profile, the flatter face possibly caused by compression against the surface on which they were dried. SF9 and SF 10 are from Early Iron Age contexts and the similarity of SF5 to these suggests that it was residual in a context with Gwithian Style ceramics. The only other example known from Cornwall is ‘501 unstratified’ from Trevelgue Head (Quinnell forthcoming b); this has a similar slightly flattened shape and smoothed surface, weighs 30g and is 35mm in diameter. Ceramic beads are occasional finds on Iron Age sites in Southern Britain, and comparable spherical beads occur, for example, from Phases 2 and 3 from the third century BC onward at Gussage All Saints (Wainwright 1979, 101-3 & figs 77-8), and at South Cadbury (Poole 2000). However these occasional finds all appear to be of Middle Iron Age date, as do those from Danebury (Cunliffe 1984, 398). Ceramic beads in general appear rare in Southern Britain and examples that are clearly of Early Iron Age date are otherwise unknown except at Boden.

SF5 (405) over stones (408). 30mm across, 22mm high, perforation 3mm in diameter made while clay wet, 19g. Smoothed surface abraded in places.

SF9 (608) stone feature. 30mm across, 22mm high, perforation 4mm in diameter made while clay wet, 23g. Smoothed surface abraded in places and some wear around perforation.

SF10 (606) above (610) in gulley [619] (Fig 37). 32mm across, 22mm high, perforation 4mm in diameter made while clay wet, 19g. Smoothed surface abraded in places.
5.3.12 Ceramic ‘pot lid’ (Fig 37)

Disc chipped from pot base, 83mm diameter, 10mm thick. Both the fabric and the context indicate that this artifact is Early Iron Age in date. Discs made of both stone and pottery, of sizes appropriate to have been used as pot lids are regular if not frequent finds on Cornish Middle Iron Age sites, for example at Castle Dore (Radford 1951, 75). This example appears to be the first to be clearly tied to a context of Early Iron Age date.

5.3.13 ‘Loom weight’ (not illus)

A single fragment of coarse gabbroic fabric with a single, flattish, surviving surface, 56g, probably came from a shaped object traditionally described as a loom weight. However these artifacts appear generally now to be interpreted as hearth or kiln furniture (C Poole in Barrett et al 2000, 213).

5.4 The Stonework

Henrietta Quinnell with assistance from Carl Thorpe and petrographic comment from Roger Taylor

5.4.1 Sources (Figs 42 and 43)

The stone used suggests knowledge of available materials over a distance of some 15km. Weathered pieces dug from the surface of the gabbro outcrop 3km or more to the south of the site were used in the Middle Bronze Age (S1, Fig 36; S2). S8, the third surface gabbro piece, from Early Iron Age context (410) could, from its context, have been of this date and re-used. Early Iron Age contexts include S3, a cobble of Tregonning greisen probably from a beach on the west of the Lizard, and S6, hornfels from the same broad area. Contexts of this date have beach cobbles of greywacke sandstone from within about 3km of the site (S4, S7, S10, S11, S13) and S14 surface greywacke sandstone from within a similar distance. S5 in the fogou is radiolarian chert, most probably from a beach on the west of the Lizard. S9 is surface greisen from the Wendron area of Carnmenellis some
10km to the north west. S12 and S15 are of surface fragments of volcanic material local to the site. S16, from Late Iron Age (305), is from a raised beach deposit from the local coast.

The collection from the late second century 1991 well infill has S17 and S19 of Tregonning Hill greisen which was regularly used for querns during the Roman period (Quinnell & Watts 2004). The third rotary quern fragment S18 is greisen from Carnmenellis; use of this greisen source during the Roman period has now been demonstrated by artefacts from Tremough (Quinnell forthcoming c). S20 is granite from Carnmenellis, 5km away across the Helford river. The other artefacts from the ‘well’ were S21 of greywacke sandstone and S22, a gabbro beach cobble which could have sourced within a few kilometres. The two artefacts which may relate to Gwithian Style ceramics S23 and S24 are both greywacke beach cobbles.

5.4.2 Artefact types
Middle Bronze Age S1 is a fragment of saddle quern of a type well known from sites such as Trethellan (Nowakowski 1991, figs 59-60); S8, if the suggestion of redeposition is accepted, may also represent a quern of this date. Saddle querns continued through the Early Iron Age, although no published comparanda is available from Cornwall; rotary querns do not appear to have been introduced until the Middle Iron Age in South West Britain (Watts 2003 and for South Cadbury in Somerset, Bellamy 2000). They subsequently were used alongside rotary querns until at least the sixth century AD (Quinnell & Watts 2004) which explains S20 from the later second century ‘well’ deposit in association with rotary fragments S17-19. The rocks selected, gabbro for S1 and S8, granite for S20 and greisens for rotary querns S17-19, have textures which provide some ‘bite’ on the grinding surface which is necessary for efficient working, and were obviously sought out over some distance. The mullers used with saddle querns are represented by S3 and S9 from Early Iron Age contexts and demonstrate the selection of similar rock to the querns, as both are of greisen. The third muller S24 associated with Gwithian Style pottery is assumed to be of
the same date as the ceramics; it makes use of a greywacke beach cobble which is naturally flawed to produce a surface with ‘bite’ and has been worn down until it was virtually unusable.

Upper rotary quern fragments S17 and S18 at ε 300mm in diameter are small in size. The majority of Cornish rotary querns vary in diameter from between 290mm and 480mm (Watts 2003). Smaller diameter querns have been found, for example, at Carn Euny (ε 300mm, Christie 1978, 389, fig.49.8), Castle Gotha (ε 320mm, Saunders & Harris 1982, fig 9, No 4) and Carngoon Bank (ε 300mm, McAvoy 1980, fig 24, No 5). These are Iron Age or Roman period in date. The tendency was for querns to become larger in diameter in the Roman period so the small size may indicate a tradition stretching back into the Iron Age. However S17 in particular appears to have had a long use before its suggested deposition in the later second century AD and could easily have originated in the Later Iron Age. S17 and S18 basically conform to Curwen’s (1937) Wessex type quern, with a hopper and handle hole in the side; the persistence of Iron Age forms of quern into the Roman period appears to be well demonstrated in Cornwall (Watts 2003).

Whetstones S4, S7, S21 and S23 make use of local greywacke beach cobbles while S6 is a hornfels cobble from the west side of the Lizard; these come from Early Iron Age, second century AD and Gwithian Style contexts. The last of these, S23, is notable for its heavy use, almost square cross-section and the presence of grooves. Whetstones such as S23 are a major feature of the artefact assemblages from Layers C to A at Gwithian, associated with Gwithian Style through to bar-lug ceramics (Nowakowski 2004, Appendix 4) and also at Mawgan Porth (Bruce-Mitford 1997, 84) associated with bar-lug. The two rubbing stones S5 and S16 make use of very fine-grained rock and had probably been used on soft materials such as leather; they might better be described as slickstones. Coarser rubbing stones which form a regular feature on Cornish sites from the Middle Bronze Age onward
are not present, but this may be because of small assemblage size. S11, S12 and S15, from Early Iron Age contexts, have all been perforated and may have served as weights; S12 and S15 make use of surface fragments of soft volcanic rock. S11 is of greywacke sandstone and has also been rough-trimmed to serve as a ‘potlid’. The larger ‘potlid’ S13 is also of greywacke sandstone. Worked stone pot-lids occur regularly but not frequently in Iron Age contexts (Quinnell 2004, 6.5). S22, a gabbro rock cobble found in the ‘well’ has been used as a pestle. Finally S10, a greywacke sandstone cobble with a notch worked in its side from an Early Iron Age context, may be a net sinker or other fishing weight. This interpretation relies on recent use of similar artefacts from Cornwall observed by Carl Thorpe (pers comm) and from Brittany by the author (Quinnell 2004, 142); a range of North American material was published by Rau (1884). The connection with fishing, if correct, serves as a reminder that the site, little over a kilometre from Gillan Harbour, may have made substantial use of marine resources.

5.4.3 Breakage and deposition
Careful study of the artefacts has established that some appear to have been deliberately broken as their fractures do not relate to weaknesses in the rock which would have occasioned breakage during use. Deliberate breakage occurs only on items related to cereal processing. The absence of impact fractures, which would have occurred had objects been broken up by bashing with large hammer stones, suggests that much of this breakage may have been brought about by hurling against hard surfaces. Some breakage could have occurred accidentally if objects were dropped from a height, but rock quality indicates that the force necessary for breakage was greater than casual dropping produces. S1, the Middle Bronze Age saddle quern fragment, is of soft rock which could have been accidentally broken. The Early Iron Age muller S3 and saddle quern S8 have deliberate fractures and come from the fogou and the fogou approach. The remaining stone artefacts are from the ‘well’, rotary quern fragments S17-19, saddle quern S20 and pestle S22.
It may be presumed that items deliberately broken were also deliberately deposited. This presumption is supported by the artefacts from the ‘well’, five out of six of these were deliberately broken and deposited in conjunction with larger-than-average sherds. It may be significant that the other two deliberately broken items were deposited within the fogou and the fogou approach, contexts on which ritualised behaviour may have focussed. The most notable item of structured deposition was found complete, the small polishing stone S5 of shiny black radiolarian chert found placed against one of the fogou uprights.

Recent studies are beginning to focus on the symbolic meaning of querns and cereal processing equipment for production, consumption and life cycles among later prehistoric communities and the consequent ways in which these artefacts may have been deliberately broken and deposited (Hill 1995, 131; Poole 1995, 262; Bellamy 2000, 314). These ideas are currently being developed by Sue Watts in Doctoral Research at the University of Exeter to whom I am indebted for discussion on the Boden material, especially the querns.

5.4.4 Descriptions of artefacts

**Middle Bronze Age Structure**

**S1 (105) SF1 stony fill in structure (Fig 36).**

Fragment of saddle quern, 60mm thick, surviving dimensions 85 x 80mm, upper surface worn slightly concave, possible trimming around edge. Gabbro rock, weathered so not a beach cobble but probably taken from the surface of the gabbro outcrop. The soft condition due to weathering means it is not possible to say whether the object has been deliberately broken.

**S2 (105) SF2 stony fill in structure (not illus).**

Part of large rounded weathered fragment of gabbro rock, somewhat foliated, possibly used as hammer stone, surviving dimensions 180 x 135 x 100mm. Excavated from surface of gabbro outcrop area.
**Fogou infill, Early Iron Age**

S3 (806) primary fill (Fig 37).

End of large cobble muller, one side worn flat and very slightly convex, surviving dimensions 130 x 130mm x 63mm thick; impact marks from use have formed flattening of edges. The cobble is of Tregonning greisen probably collected from a beach on the north west of the Lizard. The rock is tough, suggesting that the object has been deliberately broken.

S4 (806) primary fill (not illus).

Part of cobble whetstone, surviving dimensions 100 x 45 x 23mm. Fine grained greywacke sandstone, Gramscatho Formation. Broken on plane of natural weakness.

S5 (805) SF15 fill above (806) resting against one of the uprights (Fig 37).

Pebble polishing stone, 67 x 50 x 18mm, surface naturally glossy but made more so by use on the broader long edge. Beach pebble of black radiolarian chert with narrow quartz veins. Cherts of this kind are associated with the pillow lavas of Mullion Island on the west side of the Lizard although there may be similar cherts at Nelly’s Cove near Porthallow on the east.

**Fogou approach trench [433], Early Iron Age**

S6 (423) main fill of [433] (Fig 37).

Whetstone using elongated cobble, 130 x 27 x 15mm, two adjacent facets worn smooth and glossy on one face, upper end (as illustrated) has patch of abrasion. Fine grained metasedimentary rock with quartz and some orientated chlorite/biotite, possibly a hornfels derived from the margins of the Tregonning-Godolphin Granite.
S7 (423) main fill of (433) (not illus).

Slightly water worn cobble, 110 x 67 x 23mm, one surface worn flat from use as whetstone with slight grooves in different directions. Fine grained greywacke sandstone Gramscatho Formation.

S8 (410) SF15 linear setting of stones (Fig 37).

Fragment of saddle quern, one surface worn and slightly concave, minimum surviving dimensions 130 x 100 x 80mm thick. Of gabbro rock, with moderate weathering which has affected the survival of the worked surface. Rock dug out from gabbro outcrop area and sufficiently tough to have been deliberately broken.

S9 (401) linear setting of stones (Fig 37).

Part of muller using greisen surface fragment, one surface worn flat and slightly convex, no indications of dressing, surviving dimensions 80 x 65 x 58mm thick. Quartz mica tourmaline greisen from the surface on the east side of the Carnmenellis granite.

S10 (401) linear setting of stones (Fig 37).

Tabular cobble with notch rough worked in one side, 88 x 54 x 8mm thick. Net sinker? Medium grained greywacke Gramscatho Formation sandstone.

Cut [412], Early Iron Age

S11 (411) fill in [412] (Fig 37).

Weight, possibly re-used as pot lid. Tabular cobble with irregular hole worked through from both sides; marks of small point clearly visible around outer edges of hole, but inner side much worn. Coarse dressing around outside has not been worn. Fine grained greywacke sandstone, Gramscatho Formation.
**Ditch [609], Early Iron Age**

S12 (606) main fill of [609] (Fig 37).

?Weight with irregular hour-glass perforation, broken, surviving dimensions 60 x 26 x 12mm. Possible subsequent damage on end. Tabular, surface volcanic fragment, probably from a source local to the site.

S13 (606) main fill of [609] (Fig 37).

Tabular cobble rough trimmed as a pot lid, discoidal in form before damage. 145 x 125 x 15mm. Fine grained, cleaved, greywacke sandstone, Gramscatho Formation.

S14 (606) main fill of [609] (not illus).

Flat block roughly thinned and trimmed around oval perimeter producing a slightly waisted shape, 195 x 150 x 30mm. Surface piece of fine grained cleaved greywacke sandstone, Gramscatho Formation.

S15 (605) upper fill of [609] (not illus).

Surface fragment, 45 x 35 x 13mm maximum dimensions, with part of straight-bored hole 14mm across to form possible small weight. Volcanic fragment from a source local to the site.

**Ditch [305], Cordon ware, 1st century BC to mid-1st century AD**

S16 (311) fill of [305] (Fig 37).

Small pebble burnisher with high gloss on both faces, 35 x 30 x 17mm. Chert pebble, possible raised beach source suggested by ferruginous coating; raised beaches occur locally along the coast.

1991 ‘well’
If pottery dates assigned by specialist examination are correct, this group was deposited in the later second century AD. All artefacts show signs of deliberately breakage, and, in addition to those listed, there is a sharply broken flake from a cobble SF16.

**S17** SF10 from fill (Fig 38).

Part of upper rotary quern c 300mm diameter and 105mm high. Greisen of Tregonning type most probably sourced from Tregonning Hill. Depression forms hopper around eye which has a slight surviving angle which may be connected with a rynd. Extensive use of the grinding surface has worn through about half of the handle socket; the stone was originally, therefore, much thicker, perhaps by about 40mm, and consequently would have been larger in diameter, about 340mm. It is unlikely that the worn-through handle-hole could have been used and another complete handle-hole in the missing part of the quern is likely.

The quern may have been deliberately broken up, as there are no weaknesses within the rock; there is only one possible impact fracture so breakage by throwing is a possibility. S17 and S18, as far as the surviving fragments indicate, are small versions of Trethurgy S44 and S45 (Quinnell & Watts 2004) which have large shallow tops serving as hoppers. Several of the Trethurgy querns including S44 have large sub-rectangular eyes comparable to that on S17 and may have held some local alternative for holding a pivot. If the parallels are valid, some local tradition still apparent at Trethurgy in the fourth and fifth centuries is already evident here in the second. The amount of wear indicates that S17 could have been several generations old before breakage and deposition.

**S18** SF13 from fill (Fig 38).

Part of upper rotary quern c 300mm diameter and 75mm high. Quartz mica tourmaline greisen from the Carnmenellis granite. Has a less marked depression forming hopper than
S17. Grinding surface comparatively little worn. Again apparently deliberately broken but only a single possible impact fracture present.

S19 SF11 from fill (Fig 39).

Central part of lower rotary quern, broken up so that only part of central spindle hole remains and nothing of surfaces. Greisen from Tregonning Hill. Spindle hole joins with socket on underside, which potentially allows the upper stone to be tentered by means of a spindle projecting down to a movable lever beneath the lower stone as S48 from Trethurgy (Quinnell and Watts 2004). Breakage probably deliberate although there are no impact fractures; one side shows a possible joint surface which may have assisted in the disintegration of the object.

S20 SF12 from fill (Fig 39).

Edge of saddle quern or mortar using thin surface fragment of small megacrystic granite from Carnmenellis. A little dressing of the edges. Grinding surface very worn. Maximum surviving dimensions 90 x 90 x 55mm thick. Sharp edges may indicate deliberate breakage by dropping or throwing.

S21 SF15 from fill (Fig 39).

Cobble with a facet used as a whetstone; one end has an impact fracture from use as hammer but other damage is recent. Fine grained greywacke sandstone in which thin quartz veins cause facets, Gramscatho Formation. 170+ x 55 x 37mm.

S22 SF14 from fill (Fig 39).

Elongated cobble of striking black and white colouring; abraded end indicates use as a pestle or hammer stone. Deliberate sharp fracture across centre. Sheared gabbro cobble from beaches around Lizard. Surviving dimensions 125 x 68 x 50mm.

Associated with Gwithian Style ceramics in upper ditch
S23 in ditch layer (314) (Fig 39).

Whetstone using slightly waterworn elongated cobble; facets worn smooth and glossy on all sides, especially along edge. Groups of deep grooves from sharpening of points. Fine grained greywacke sandstone, Gramscatho Formation. Sharply broken across, also blow has caused damage to one end. Surviving maximum dimensions 154 x 48 x 24mm.

S24 SF6 from (303) soil in entrance (Fig 39).

Flake from large cobble heavily used as muller with convex surface, apparent scratches due to deformation flaws in rock. Hard fine grained greywacke sandstone Gramscatho Formation. 150 x 142 x 42mm.

5.4.5 ‘Slingstones’ and unused pebbles/cobbles
A total of 24 pebbles between 30 and 50mm but generally about 40mm in length may have been slingstones (Table 6). Their average weight is 45g. The groups of two or three from specific contexts appear to have been found close together. However there are a few pebbles both smaller and larger in size, some from the same contexts as the suggested slingstones. Overall, together with the beach pebbles/cobbles described above, they indicate considerable use of seaside deposits which occur some 2 km east of the site.

Table 6 Findspots and numbers of possible slingstones

<table>
<thead>
<tr>
<th>Context</th>
<th>Date</th>
<th>Nos</th>
<th>Context</th>
<th>Date</th>
<th>Nos</th>
</tr>
</thead>
<tbody>
<tr>
<td>(200) top of enclosure</td>
<td>Early Iron Age</td>
<td>1</td>
<td>430 in gulley [431]</td>
<td>Early Iron Age</td>
<td>1</td>
</tr>
<tr>
<td>ditch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trench 2 unstratified</td>
<td>-</td>
<td>1</td>
<td>Trench 4 unstratified</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>(306) in gulley [307]</td>
<td>Uncertain</td>
<td>1</td>
<td>(606) in gulley [609]</td>
<td>Early Iron Age</td>
<td>2</td>
</tr>
<tr>
<td>Trench 3 unstratified</td>
<td>-</td>
<td>1</td>
<td>(610) in gulley [609]</td>
<td>Early Iron Age</td>
<td>1</td>
</tr>
<tr>
<td>(403) over stones (408)</td>
<td>Gwithian Style</td>
<td>3</td>
<td>(804) fogou infill</td>
<td>Early Iron Age</td>
<td>2</td>
</tr>
</tbody>
</table>
5.5 Non-ceramic Beads and other items

Dawn McLaren & Fraser Hunter

(NB none of these objects are illustrated)

5.5.1 Catalogue

Glass bead. Globular translucent dark blue glass bead, D-sectioned, with a perforation 3.5mm deep (Fig 40). One side has a protrusion where it was detached from a larger blob during manufacture. It is very worn on the ends and circumference, implying lengthy use in a necklace rather than as a pendant. This bead falls into Guido’s (1978, 70) group 7 (iv). Such beads are a long-lived type, starting in the later first millennium BC and continuing throughout the first millennium AD. This is a particularly early example: the context suggests an early-middle Iron Age date (connected with the use of the fogou, with a *terminus post quem* of 420-350 BC for its construction). Depth 9.5mm, height 7mm. Sample <1018>, context (806), from layer above floor in fogou.

Amber bead of Beck and Shennan’s group 1B (1991, 53): D-sectioned, rather irregular annular bead with narrow cylindrical central perforation (depth 1mm). Their survey suggests the type is undiagnostic, but the context suggests a late fifth-fourth century BC date. One edge was damaged in antiquity; a light brown patina covers all the surfaces. Length 6.5mm, width 5mm, thickness 4 mm, mass 0.08 g. Sample <1018>, context (806), from layer above floor in fogou.
**Glass fragments.** Two fragments of light-blue glass; no indication of their original form. Measures 5mm x 4.5mm x 3.5 mm and 3.5mm x 2.5mm x 2.5 mm; mass 0.1g. Sample <1019>, context (107), associated with the Bronze Age structure.

### 5.5.2 Discussion

Neither bead is chronologically diagnostic in itself, but they are consistent with the late fifth-fourth century BC date suggested for the occupation of the fogou. They are an important discovery, as it is unusual to get beads in secure, well-dated contexts, and even rarer to get dates so early in the Iron Age for these types. Both show signs of prolonged use: the glass bead is worn while the amber bead continued in use after the edge had partly broken.

Iron Age amber has seen rather limited study. This appears to be the first certain Iron Age amber bead from Cornwall, but there are examples from elsewhere (e.g. the East Yorkshire cemeteries and a promontory fort at Caeru, Henllan, Cardiganshire; Stead 1991, 93, 224, fig.69; Stead 1965, 65; Savory 1976, 72-3). It is an indicator of exotic contacts: the ultimate source was the Baltic, but the more immediate source may well be lumps washed onto the eastern coastlines of Britain.

Small dark blue translucent beads are a long-lived and common find on settlement sites in Cornwall as elsewhere, but there are no comparably early local examples. Two similar beads and one opaque blue example come from fourth century AD and later contexts at Trethurgy Round, St Austell (Price 2004, 89). A similar bead, perhaps of Roman date, came from the Goldherring settlement (Guthrie 1969, 27). Other Cornish examples of Guido type 7(iv) of Iron Age – Roman date come from Halangy Down (Ashbee 1996, 72, no.2, fig 34.1), Nornour and St Mawgan-in-Pyder (Guido 1978, 169), while closely-similar type 6(iv) annular beads are known from Iron Age or
Roman contexts at Castle Dore, Fowey and Kynance Gate, Lizard (Guido 1978, 155). Although these beads are more common from the Later Iron Age onwards, several earlier examples may be cited. There is one of third-first century BC date from Meare, Somerset (St George Gray 1966, 290-1), while several were found at Danebury (Henderson 1984, 396-8), from ceramic phases 4 and 7, dating to 360-310 BC and 270-50 BC.

Two small unidentified fragments of light-blue glass were found in association with a possible Bronze Age structure. Although Bronze Age glass of similar colour has been found elsewhere, such as Stockbridge, Hampshire (Guido 1978, 20) and Hauterive-Champréveyres, Switzerland (Henderson 1988, 441, pl 1), the fragments in this case are too small and abraded to confirm their date or origin without further scientific analysis into their composition. Early glass is known from Cornwall: an imported Mediterranean oblong glass bead was recovered during the excavation of a Bronze Age cremation burial at Boscregan, St. Just-in-Penwith (Borlase 1879, pl 16, no. 3).

5.6 The Flint

Anna Lawson-Jones

A detailed assessment of flint and chert recovered during the excavation, most of which was collected from the surrounding field as part of the field-walking exercise (and during earlier fieldwalking by Truro College in 2002) was carried out by Anna Lawson-Jones and appears in Gossip and Johns 2004. No further analysis was recommended: the discussion from the assessment is reprinted here.

A total of 127 pieces of flint and chert were assessed. Ninety-three were collected during field walking in 2002, eighteen during the 2003 field walking exercise and sixteen came from the 2003 excavation; none of the material is illustrated.
The 2002 collection, like the excavation assemblage is not a ‘selective’ collection and as such a number of non-utilised flint/chert pebbles have been collected. Although a percentage of these can be disregarded as later agricultural additions, some – on the basis of size, shape and comparison with the excavated assemblage may well represent part of the archaeological assemblage.

A range of flint work is included, varying from abraded and/or burnt indistinguishable lumps to waste pieces and much finer, specialised tools. The potential date for these pieces ranges from the Mesolithic through to the Bronze Age. Elements of Neolithic material came from the broadly identified ‘concentrations’ of material around grid squares D2, B5, C5 and D5. Material that was Bronze Age in character was marginally more recognisable within squares B1, B2 and B3 (located to the north of the excavated area; Fig 3).

Core rejuvenation pieces were found in grid squares A5, C2 and C6 (Fig 3), more strongly suggestive of a Neolithic rather than Bronze Age date. Although rejuvenation pieces are found throughout the Mesolithic and Neolithic periods, the three examples here are not typically Mesolithic in character. Rejuvenation pieces can also be a more frequent element within pebble-based industries as knappers tried to maximise pebble core use, but again are less frequent within Bronze Age assemblages.

5.6.1 Discussion
This assemblage consists of a broad range of material in terms of raw material source, date range, levels of abrasion and types of use or activity reflected. Very little of the material has been found in close association with related or contemporary contexts. A broad range of utilised tools is present, but they represent a small percentage of the total assemblage. A number of the pieces have seen clear use but little in the way of deliberate or focussed modification. Where retouch was noted, it varied between very fine, small scale
modification to apparently rapid or spontaneous, comparatively rough execution. This is primarily a reflection of date and contemporary tool type/reduction procedures.

The vast majority of the assemblage consists of pebble material, primarily flint (rather than chert). However, the existence of worked nodular material clearly indicates an earlier Neolithic presence. A small number of finely worked blades and bladelets (some of which have been finely retouched) and many of which have been broken suggest a Mesolithic to early Neolithic date. The lack of specialised blade cores, tranchet flakes, microliths or microburins (the resultant waste from microlith production) implies that this material may well reflect a peripheral Mesolithic location or a very early Neolithic presence. The relative lack of burnt pieces may suggest that the focus for earlier domestic activity is further away. As stated elsewhere the relative lack of closely associated Bronze Age domestic flint work is not an unusual feature.

A good proportion of the assemblage consists of flakes and broad (or flake-like) blades, plus occasional flake cores. Some of these pieces may represent Neolithic material, but much of it is considered to be broadly Bronze Age in date, although very little of it is diagnostically so (with the exception of the thumb-nail scraper).

In terms of types of activity represented by the assemblage, it is clear that raw material transportation to site took place, for instance from primary or secondary beach sources, and that core preparation, core reduction and tool production took place on site. Tool types varied from the finely worked to the spontaneously produced and included scrapers, knives, engravers, awls/points, denticulated pieces and waste (reflective primarily of production but also of breakage (and burning)). These pieces reflect a broad range of activity, much of it focussed around a domestic or peripherally domestic setting. No ‘special’ pieces with an obviously more ‘ritual’ than domestic association were identified.
Similarly no arrowheads or other particularly conspicuous examples of fine workmanship were identified within the collection.

To summarise, this collection reflects a typically mixed, plough-dispersed assemblage found within a field that has undergone soil improvement in the form of beach sand introduction and which consequently included beach pebbles. The date range is broad, from the Mesolithic/Early Neolithic to the Bronze Age period. Few of the pieces are diagnostic, but the use of nodular material does indicate a definite Early Neolithic date. Some limited evidence for the re-use of artefacts was recorded. Minor pockets or ephemeral/limited concentrations of material were noted in the two field walking exercises, but none were sufficiently concentrated or diagnostic in terms of date to allow specific interpretation or identify focuses of activity. The slight slope of the field in conjunction with ploughing will have had an affect on the movement of material within the plough-soil, although this was probably minimal. Excavation did show minor evidence for plough-related truncation, but it was not recognised as a major complication.

5.7 The Limpet Shells

*Jan Light*

A small deposit of limpet shells was retrieved from context (203) (sample <1020>) within the enclosure ditch [202] (Fig 11). These were assessed but no further work was recommended.

**Description**

A sample bag containing two complete limpet shells and partial shells and fragments representing probably no more than ten further individuals was examined. The shells are all of the genus *Patella* but it is not possible to say with certainty whether they are all the common limpet *P. vulgata* which inhabits all levels of the shore, or whether either of the two species which have more restricted distributions are present. *Patella depressa* is a low-
spired species which is most frequent at midshore level and *P. ulyssiponensis* is a species of the lower shore and permanently submerged pools across the littoral zone. The shells and fragments in the sample are all from small, low-spired individuals and the impression gained is that both *P. vulgata* and *P. ulyssiponensis* may be present.

The shells are in poor condition: they are chalky and their mode of fracture is annular. This is typical in limpets where the shell material has been weakened. This very corroded condition is consistent with the level of preservation which is observed in shells that have been sealed in acidic soils. A number of the shells lack their apex. Holed shells are a recurring feature at archaeological sites where molluscs are retrieved and the perforations can be ascribed to a wide variety of natural and unnatural processes. In nearly all instances of holed limpet shells where the apical region is missing leaving an oval ‘collar’ of shell, the process of breakage is natural in that fracture has occurred along the weaker growth lines of the shell.

In addition to *Patella*, amongst the small fragments and associated soil there are two corroded basal whorl fragments of the common dog whelk, *Nucella lapillus* and a worn specimen of the land snail, *Aegopinella nitidula*.

**Significance**

The limpet shell assemblage represents an archaeological deposit (203) stratified within enclosure ditch [202], probably food waste dumped into the open ditch as discarded rubbish. On the basis of the stratigraphic location in deposit above (204), which yielded Early Iron Age pottery, it is likely that this event occurred soon afterwards.
5.8 Charred plant macrofossils

5.8.1 Introduction and methodology
Following recommendations made as part of the assessment of bulk samples (Jones 2004) six samples were chosen for further analysis. 35 bulk samples had initially been assessed from features associated with a Bronze Age structure, an Iron Age fogou structure and features associated with a rectilinear ditched enclosure, but most floats contained only charcoal or small assemblages of charred plant remains.

The six samples chosen for full analysis were from a Bronze Age structure, deposits associated with the fogou and the curvilinear ditch [431]/[609] (both Early Iron Age in date), although assemblages from these features were still relatively small. The results are shown in Table 7. Cereal determinations are based on Jacomet (1989) and weed nomenclature and habitat information is based on Stace (1991). Preservation of the plant macrofossil remains was by charring and the condition of the remains was variable from good to poor.

5.8.2 The charred plant remains

Wheat
The charred cereal grains were mostly wheat (*Triticum*). Most had suffered from pitting of the surface from the charring process, with the testa in all cases lost, as well as some fragmentation, possibly from post-depositional abrasion. However the relatively long, slim form of the grains is characteristic of a glumed wheat, possibly emmer (*Triticum dicoccum*) or spelt (*Triticum spelta*). Unfortunately in most samples wheat chaff was poorly preserved although in two samples (<1016> and <1018>) *Triticum spelta* glume bases showing characteristic keel and surface striations confirmed the presence of spelt. Charcoal-rich silt clay deposit (107) within the Bronze Age roundhouse included a small assemblage of cereal grains. These were mostly hulled wheat, a single spikelet fork and glume base confirming this although unfortunately they were not well enough preserved to confirm if this was
emmer or spelt. In addition to hulled wheat grains there were four shorter, more rounded grains, typical of free-threshing wheat. Wheat grains were also from the base of the fogou in deposit (806), whilst the largest deposit was recovered from the charcoal rich fill of (606).

Barley and oats

Both barley (Hordeum) and oats (Avena) formed a minor component of the assemblages. A single barley grain were recovered from (414) and (426) and from fogou deposit (806), The barley was generally in poor condition with much of the grain surface lost during charring although in several instances evidence of the fused lemma and palaea suggest that hulled barley was present. Oats only occurred in a few samples, but no oat floret bases were found to suggest whether these were cultivated or wild.

Arable weeds

A range of arable weeds occurred in all samples; again these were in fair to poor condition, a fine covering of sediment in some cases obscuring surface patterning. The charring process also appears to have affected preservation of some taxa. Some of the Chenopodiaceae (Goosefoot family) seeds appeared to have swollen and split with much of the testa lost making identification to species impossible. However many of the Chenopodiaceae family occur in cultivated and disturbed ground and like many of the other taxa present in most samples are commonly recovered in association with charred cereal remains. Species such as orache (Atriplex), bartsia/eyebright (Odontites/Euphrasia), black bindweed (Fallopia convolvulus) and pale persicaria (Persicaria lapathifolia) would have occurred as impurities in fields where crops were being grown and been gathered at harvest. Most of these weeds do not have any specific soil preferences and could have occurred locally. Taxa such as selfheal (Prunella vulgaris), ribwort plantain (Plantago lanceolata) and grasses (Poaceae) may suggest field margins more akin to grassland habitats or have come from adjacent pasture.
A further small group includes taxa typical of wetland habitats, including spike-rush (*Eleocharis palustris/uniglumis*), blinks (*Montia fontana*) and glaucous sedge (*Carex flacca*). Both redshank (*Persicaria maculosa*) and pale persicaria (*Persicaria lapathifolia*), while typical of bare and cultivated ground, often occur in close association with water margins. It may be possible that these grew on ditched field margins where water levels remained high and have been gathered with the crops at harvest, or they may have been gathered as flooring material, subsequently discarded onto the hearth where they became charred.

**Other species**

A final group of woody plants includes hazel (*Corylus avellana*), sloe (*Prunus spinosa*) and oak (*Quercus*) buds, which are likely to have originated from wood collected for the hearth. The charcoal assessment (Gale 2004a) suggested much of the charcoal was probably residues or dumps of domestic hearth debris, gathered from a range of species, although both hazel and sloe may be the remains of food waste.

**Table 7 Plant macrofossils**

<table>
<thead>
<tr>
<th>Trench</th>
<th>Bronze Age Structure</th>
<th>Fogou structure</th>
<th>Rectilinear ditched enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>(107)</td>
<td>(414)</td>
<td>(426)</td>
</tr>
<tr>
<td>Sample</td>
<td>&lt;1019&gt;</td>
<td>&lt;1021&gt;</td>
<td>&lt;1006&gt;</td>
</tr>
<tr>
<td>Sample size (litres)</td>
<td>60</td>
<td>10</td>
<td>20</td>
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<tr>
<td>Float size (ml)</td>
<td>260</td>
<td>100</td>
<td>110</td>
</tr>
</tbody>
</table>

**Grain**

- *Avena* sp (Oat) 3 5 #
- c.f. *Avena* sp (Oat) 1 2 #
- *Hordeum* sp (Barley) 3 1 1 2 6 #
- *Hordeum* sp (Barley - hulled) 1 #
- *Hordeum* sp (Barley - tail grain) 3 #
- *Hordeum* sp (Barley - tail grain - hulled) 2 #
- c.f. *Hordeum* sp (Barley) 1 2 #
- *Triticum* sp (Hulled wheat) 8 9 9 24 43 28 #
<table>
<thead>
<tr>
<th></th>
<th>Bronze Age Structure</th>
<th>Fougou structure</th>
<th>Rectilinear ditched enclosure</th>
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<tbody>
<tr>
<td><em>Triticum</em> sp</td>
<td>Free-threshing wheat</td>
<td>4</td>
<td>#</td>
</tr>
<tr>
<td><em>Triticum</em> sp (tail grain)</td>
<td>Hull wheat</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>c.f. <em>Triticum</em> sp</td>
<td>Hull wheat</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Cereal indet</td>
<td>Hull wheat</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>25</strong></td>
<td><strong>11</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

**Chaff**

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<th></th>
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<tbody>
<tr>
<td><em>Triticum</em> spelta glume base</td>
<td>Spelt wheat</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><em>Triticum</em> sp glume base</td>
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<td>1</td>
</tr>
<tr>
<td><em>Triticum</em> sp spikelet fork</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
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**Weeds**

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<th>Family</th>
<th>Genus (species)</th>
<th>Description</th>
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<th>Canberra</th>
<th>Melbourne</th>
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<tbody>
<tr>
<td>RANUNCULACEAE</td>
<td>Ranunculus acris/repens/bulbosus</td>
<td>Meadow/Creeping/Bulbous Buttercup</td>
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<td></td>
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<tr>
<td></td>
<td>Ranunculus flammula L.</td>
<td>Lesser Spearwort</td>
<td>16</td>
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<td>FAGACEAE</td>
<td>Quercus sp (bud)</td>
<td>Oak</td>
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<td></td>
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<td>HSW</td>
</tr>
<tr>
<td>BETULACEAE</td>
<td>Corylus avellana L. (nut frags)</td>
<td>Hazel</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
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<tr>
<td>CHENOPODIACEAE</td>
<td>Atriplex spp</td>
<td>Orache</td>
<td>14</td>
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<td>Fat-hen</td>
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<tr>
<td></td>
<td>c.f. Chenopodium album L.</td>
<td>Fat-hen</td>
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<td></td>
<td>Chenopodium spp</td>
<td>Goosefoot family</td>
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<td>Montia fontana L.</td>
<td>Blinks</td>
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<tr>
<td>POLYGONACEAE</td>
<td>Fallopia convolvulus (L.) A. Love</td>
<td>Black-bindweed</td>
<td>8</td>
<td>5</td>
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<td></td>
<td>Persicaria lapathifolia (L.) Gray</td>
<td>Pale Persicaria</td>
<td>6</td>
<td>2</td>
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<tr>
<td></td>
<td>Persicaria munhosa Gray</td>
<td>Redshank</td>
<td>5</td>
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<td>Rumex acetosella L.</td>
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<td>Plant Name</td>
<td>Species/Latin Name</td>
<td>Quantity</td>
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<td>Fogou Structure</td>
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<tr>
<td>---------------------</td>
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<tr>
<td>Rumex sp</td>
<td>Dock</td>
<td>15</td>
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<td>2 2 2</td>
<td>DG a,sandy</td>
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<td>Prunella vulgaris L.</td>
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<td>Poaceae indet (culm nodes)</td>
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Bronze Age Structure | Fogou structure | Rectilinear ditched enclosure
---|---|---
Poaceae indet (culm bases) & 3 & 
Total: & 106 & 74 & 18 & 1 & 10 & 4 & 3 & 1 & 
Macrofossil density: no. items per litre of sediment & 1.76 & 7.4 & 0.9 & 0 & 0.25 & 0 & 1 & 6 & 1 & 6 & 8 &

**Habitats**

B. Bankside  
C: Cultivated/Arable  
D: Disturbed  
F: Fens/Bogs  
G: Grassland  
H: Hedgerow importance  
M: Marsh  
P: Ponds, ditches - stagnant/slow flowing water  
R: Rivers, streams  
S: Scrub  
W: Woodland  

# cultivated plant/of economic importance

**5.8.3 Discussion**

Although the features examined as part of the investigation of the fogou at Boden Vean, produced fairly limited assemblages of charred plant remains it was hoped that the results would add to the fairly limited knowledge of crop husbandry in the south-west of England, particularly Cornwall and Devon, where despite large scale sampling and sieving programmes, little data has been recovered (Campbell and Straker 2003).

The charred macrofossil density at Boden Vean has been calculated by determining the number of items per litre of sediment sampled (Table 7). Concentrations are generally low with 1.76 for the feature (context (107)) from the Bronze Age structure and ranging between 0.16 to 7.4 for features associated with the fogou structure (contexts (414), (426)
and (806)) and between 0.25 to 0.68 for samples from the Early Iron Age curvilinear ditch (contexts (603) and (606)). Campbell and Straker (2003) calculate that during the prehistoric period the average density for most sites falls between 0.1 and 39, but with the majority producing below 1 item per litre.

Although macrofossil density is fairly low, it is clear from the limited evidence from the Bronze Age structure, the fogou and its associated enclosure, that crops of hulled wheat and barley were being consumed during occupation from the Bronze Age, with spelt wheat definitely present from the Early Iron Age phase. There is also the possibility of free-threshing wheat from the Bronze Age structure. While the charred remains from the Bronze Age phase can be more directly linked with domestic activities within the structure, the later features associated with the enclosure and fogou structure are secondary contexts. It is therefore difficult to be specific about the origin of material from these contexts and the possibility of mixing of deposits from different sources needs to be considered.

Apart from the cereal remains many of the remaining plant taxa are weeds of cultivation or disturbed soils and commonly occur as arable weeds. These would have been collected with the crops at harvest and with the occasional chaff fragments also present may have been deposited as burnt crop cleaning waste. It is difficult to suggest crop husbandry practices from the arable weed assemblages, as many of the taxa recovered can occur on a wide range of soil types but the fact that a similar range of weeds occur through all the periods investigated may suggest that cultivation was local and crop processing activities occurred on the site. Many of the weed seeds are small and would have been retained as part of the sieving process carried out to retrieve cleaned grain; this waste material then finding its way onto the hearth, perhaps as tinder or from floor sweepings.

The small suite of wetland indicators suggests that perhaps some more marginal ground was at times cultivated or perhaps that some field margins were ditched, producing “wet
boundaries” which would have supported those species typically associated with wet ground. Wetland plants, like sedges and rushes were also collected as flooring and roofing material, so this may have been the origin of these plants. Other wild species collected possibly to supplement the diet include hazel and sloe, although these may have come from wood collected for the hearth.

A geophysical survey undertaken as part of the project indicated that the archaeological remains investigated lay within a landscape of field systems and associated features. This supports the view that crops were cultivated in fields close to these features and that local crop processing for consumption of the local inhabitants occurred.

Comparison with other sites

A number of similar sites in Cornwall have also produced evidence for charred plant remains. A Bronze Age roundhouse at Trethellan Farm (Straker 1991), near Newquay showed that cereal cultivation here appeared to have been primarily naked barley, with emmer, some oats and occasional Celtic bean. As at Boden Vean, the settlement at Trethellan was close to a contemporary field system, so it is likely that crops were locally cultivated.

The Middle Bronze Age roundhouse at Trevilson was excavated as part of investigations along the route of the Mitchell to Newlyn East Pipeline (Jones and Taylor 2004) close to the north Cornwall coast. Samples were taken from postholes associated with the construction phase and produced small assemblages of wheat, barley and oat grains associated with arable weeds. A shallow scoop in the interior of the roundhouse produced a float estimated to be 90% Celtic bean (Vicia faba) fragments. There was little evidence for activity within the house during the occupation phase, although charcoal rich layers were interpreted as evidence of abandonment activity. Although these deposits were primarily
charcoal, small charred assemblages included barley with some wheat and oat present, arable weeds, but no cereal chaff.

At Callestick, north-west of Truro a later Bronze Age circular structure, dated 1100-700 BC produced only scarce crop remains including evidence for barley and hulled wheat with occasional arable weeds such as field madder (Sherardia arvensis) and vetch (Vicia) with grassland and grassy heath taxa ribwort plantain and heath-grass (Danthonia decumbens). The limited evidence for crop processing here supports the interpretation that the structure may not have had a primarily domestic function (Gilbert and Straker 1998-9).

The only comparable Early Iron Age context at present in Cornwall that has produced macrofossil material is pit [345] at Trenowah, which produced wheat grain suggesting that some arable farming had been taking place (Jones forthcoming).

There are no other comparable Early Iron Age sites excavated in Cornwall, although there are Romano-British examples at Penhale, Reawla and Pollamounter which show evidence for arable cultivation during the third-fourth centuries AD.

5.9 The Charcoal
Rowena Gale

5.9.1 Introduction
Following the assessment of 33 samples of charcoal, 10 were selected for full analysis and the isolation of suitable material for C14 dating. This report presents the results of this analysis. The charcoal assemblage represents material from a Bronze Age structure, an Early Iron Age fogou and an Early Iron Age ditch.

In general, the preservation of environmental material at the site seems to have been very poor, with sparse remains of plant macrofossils and little evidence of pollen. The charcoal, although degraded, appears to have had a better survival rate. Evidence of woodland vegetation therefore relies heavily on the charcoal analysis.
The charcoal analysis was undertaken to obtain the following data:

- The character of local woodland
- The use of woodland resources
- Temporal differences in the selection of fuel woods

5.9.2 Methodology

Bulk soil samples were processed by flotation and sieving using a 250 and 500 micron meshes. The resulting floats and residues were scanned under low magnification and the charcoal separated from plant macrofossils. Intact segments of narrow roundwood were infrequent. Charcoal fragments measuring >2mm in radial cross-section were considered for species identification.

The charcoal was mostly poorly preserved and rather friable. The samples were prepared for examination 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 (i.e. heartwood/sapwood) and stem diameters and the number of growth rings were recorded. It should be noted that charred stems may be reduced in volume by up to 40%.

5.9.3 Results

The taxa identified are presented in Table 7. Classification follows that of Flora Europaea (Tutin, Heywood et al. 1964-80). Group names are given when anatomical differences between related genera are too slight to allow secure identification to genus level. These include members of the Pomoideae (Crataegus, Malus, Pyrus and Sorbus), Leguminosae (Ulex and Cytisus) and Salicaceae (Salix and Populus). When a genus is represented by a single species in the British flora, it is named as the most likely origin of the wood, given the provenance and period, but it should be noted that it is rarely possible to name
individual species from wood features, and exotic species of trees and shrubs were introduced to Britain from an early period (Godwin 1956; Mitchell 1974). The anatomical structure of the charcoal was consistent with the following taxa or groups of taxa:

Aquifoliaceae. Ilex aquifolium L., holly

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

Caprifoliaceae. Sambucus nigra L., elder

Corylaceae. Corylus avellana L., hazel

Fagaceae. Quercus sp., oak

Oleaceae. Fraxinus excelsior L., ash

Leguminosae. Cytisus scoparius (L.) Link, broom and Ulex sp., gorse

Rosaceae. Subfamilies:

Pomoideae, which includes Crataegus sp., hawthorn; Malus sp., apple;

Pyrus sp., pear; Sorbus spp., rowan, service tree and whitebeam. These taxa are anatomically similar; one or more taxa may be represented in the charcoal.

Prunoideae. Prunus spinosa L., blackthorn.

Salicaceae. Salix sp., willow, and Populus sp., poplar. In most respects these taxa are anatomically similar.

Bronze Age

Charcoal <1019>, from soil (107) on the inner western side of the structure [117] (Trench 1) probably represents scattered fuel debris from an associated hearth (?domestic). The charcoal consisted predominantly of oak (Quercus sp.) heartwood, probably from both
largewood and roundwood. Hazel (*Corylus avellana*) and gorse (*Ulex* sp.) or broom (*Cytisus scoparius*) were also present.

**Iron Age**

Because of their association with the fogou and the enclosure, samples <1012> and <1015>, from the fills of the rock-cut ditch [609] (Trench 6), and sample <1018> from the silt below (805) between the fogou gateway (Trench 8), are attributed to the Early Iron Age. The origin of the charcoal in the ditch feature [609] is unknown but, in view of the abundant deposits of burnt bone and other domestic debris, e.g., spindle whorls/beads, it was probably the product of a domestic hearth.

The charcoal-rich sample <1012>, from context (606), was identified as predominantly oak (*Quercus* sp.) heartwood and sapwood. Other species present included gorse (*Ulex* sp.) and/or broom (*Cytisus scoparius*), the hawthorn/*Sorbus* group (Pomoideae) and hazel (*Corylus avellana*). The latter included several pieces of three year old hazel stem measuring 8mm in diameter; the structure and morphology were consistent with those of coppice stems. Sample <1015>, from context (610), the basal fill of Early Iron Age ditch [609], was sparser but also indicated the preferred use of oak (*Quercus* sp.); blackthorn (*Prunus spinosa*) was also recorded.

The silty deposit (806), above the floor of the fogou, has been dated to 420-350 cal BC (94% probability; Hamilton *et al*, below). Here again the charcoal is likely to represent domestic fuel debris. Sample <1018> was fairly abundant, although only small proportion was suitable for identification. This included hazel (*Corylus avellana*), alder (*Alnus glutinosa*) and willow (*Salix* sp.) and poplar (*Populus* sp.).

Enclosure ditch [202] (Trench 2) was located close to, but north of, the fogou and had been backfilled with dumps of domestic debris, including pottery, limpet shells and charcoal. Sample <1035> consisted mainly of oak (*Quercus* sp.) and the hawthorn/*Sorbus*
group (Pomoideae) although blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*) and elder (*Sambucus nigra*) were also present. Several pieces of slag-type material were also noted.

Charcoal samples <1010> (the fill around stones (300)) and <1011> (fill of posthole [308]) were obtained from Trench 3. Sample <1010> probably consisted mostly of fairly narrow roundwood. This included gorse (*Ulex* sp.) and/or broom (*Cytisus scoparius*), holly (*Ilex aquifolium*), oak (*Quercus* sp.), blackthorn (*Prunus spinosa*) and the hawthorn/Sorbus group (Pomoideae). Sample <1011> was sparser and included oak (*Quercus* sp.), hazel (*Corylus avellana*) and gorse (*Ulex* sp.) and broom (*Cytisus scoparius*).

Sample <1006> was obtained from the fill of a stone-lined pit (425) that had been constructed in the backfill of feature [412] (Trench 4). The charcoal consisted of small fragments, including oak (*Quercus* sp.), gorse (*Ulex* sp.) or broom (*Cytisus scoparius*) and hazel (*Corylus avellana*). Some of the hazel consisted of narrow roundwood, 10-11mm in diameter and aged between 5 and 6 years. Although the structure of one piece was consistent with that of coppice growth, the remaining pieces had grown more slowly and it would be imprudent to suggest the use of managed woodland based on such slim evidence. It was not clear whether the charcoal had been placed in the pit for a purpose or represented subsequent backfill. There was no evidence of *in situ* burning. The infrequent presence of charred cereal grain and grassland weeds (Jones, this vol) suggests later infill with domestic debris.

Sample <1009> was collected from context (432), the fill of a curvilinear anomaly [431] in Trench 4, an Early Iron Age feature despite containing intrusive Post-Roman pottery dated to the fifth or sixth centuries AD. Identifiable charcoal was fairly sparse but included oak (*Quercus* sp.), hazel (*Corylus avellana*) and birch (*Betula* sp.). A quantity of black bubbly, industrial residue material was also present.

*Undated sample*
A small rubble-filled pit [604] had been cut into the fill of the linear ditch [612] in Trench 6. Sample <1016>, from context (603), was identified as predominantly oak (Quercus sp.) but also hazel (Corylus avellana) and the hawthorn/Sorbus group (Pomoideae). This activity is likely to have taken place during the Iron Age use of the enclosure.

5.9.4 Discussion
Environmental conditions comprising acid and well-drained soils were not conducive to the preservation of organic material and few of the bulk samples collected produced suitable material for identification. The charcoal was very degraded and, although sometimes abundant, the quantity of material that merited examination (i.e., of suitable size and condition) was usually insignificant. Pollen and charred plants remains were particularly poor. An assemblage of 10 charcoal samples was selected for full analysis. The samples represent occupation of the site from the Bronze Age and Early Iron Age periods. The samples were obtained from Trenches 1, 2, 3, 4, 6 and 8, mostly from infill material in ditches and pits associated with the Bronze Age structure and the Iron Age enclosure and fogou. Since the charcoal was frequently mixed with domestic rubbish (bone, pot and occasionally charred cereal grain), it has been interpreted as domestic fuel debris. There was little evidence to indicate on-site industrial activity. Sample <1019> from the floor inside the Bronze Age structure (context (107)) and sample <1018> from floor deposits within the Iron Age fogou can thus be more certainly ascribed as from domestic hearths.

The charcoal analysis indicates the predominant and consistent use of oak (Quercus sp.) throughout all periods investigated. Hazel (Corylus avellana) also occurred fairly frequently. In addition, fuel appears to have gathered sporadically from a fairly wide range of taxa, including alder (Alnus glutinosa), birch (Betula sp.), ash (Fraxinus excelsior), holly (Ilex aquifolium), the hawthorn/Sorbus group (Pomoideae), blackthorn (Prunus spinosa), willow
(Salix sp.) and/or poplar (Populus sp.), elder (Sambucus nigra) and gorse (Ulex sp.) and/or broom (Cytisus scoparius).

5.9.5 Environmental evidence
The site was located on the southerly aspect of a gentle hill. The prevailing soils are thin and acidic. In the present day landscape in this region sessile oak typically dominants most woodland, sometimes with hazel and holly as understorey (Marren 1992). In the past, the character of local woodland, however, would have been influenced by soil type and moisture content, and aspect.

At Boden there appears to have been a diverse range of arboreal species, which suggests that fairly varied topographical/environmental conditions existed in the locality. It is difficult to assess the likely pattern of species distribution in the landscape using archaeological remains such as fuel debris, since its selection would have been biased in favour of function. High calorie wood, such as oak, would clearly have been preferable to poorer quality fuel, for example willow or poplar. The high ratio of oak in the charcoal, however, does conform to the present day dominance of oak in the environment and it is probable that the character of the woodland was similar in the prehistoric period. Alders and willows would have colonized damper soils or boggy land, whereas scrubby species such as gorse, blackthorn, hawthorn and other shrubs including elder would have grown on dryer, open ground. It could be anticipated that in the more exposed situations, woodland would have been windswept and stunted with high forest only occurring in sheltered valleys and creeks.

Fast-grown hazel stems, consistent with those of coppice growth were noted in the Iron Age samples <1012> and <1006>. It would be necessary, however, to examine a much greater quantity of roundwood to provide convincing evidence of coppicing, since the material examined could have originated from hazel bushes growing in optimal conditions.
rather than in managed woodland. It may be significant, though, that Cornish woodlands were managed from ancient times to provide firewood and pit-props for tin-mining (Marren 1992).

Comparable sites on the Lizard peninsula are sparse. Two adjacent sites located to the west of Boden Vean at Caer Vallack and Gear Farm have been dated to the Late Neolithic, Iron Age and Romano-British periods (Quinnell forthcoming e). Charcoal obtained from ditches, pits and an Iron Age hearth (probably mainly from domestic fuel) indicated the predominant use of oak (*Quercus* sp.), with less frequent use of alder (*Alnus glutinosa*), birch (*Betula* sp.), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), blackthorn (*Prunus spinosa*), the hawthorn/*Sorbus* group (Pomoideae) and gorse (*Ulex* sp.) and/or broom (*Cytisus scoparius*) (Gale, unpub). These results correlate closely to those from Boden Vean.

**5.9.6 Conclusion**

The analysis of charcoal from spent fuel deposits from features dating from the Bronze Age to the Early Iron Age contexts indicated a consistent bias towards oak (*Quercus* sp.), supplemented with other species including alder (*Alnus glutinosa*), birch (*Betula* sp.), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), willow (*Salix* sp.) and/or poplar (*Populus* sp.) elder (*Sambucus nigra*) and gorse (*Ulex* sp.) and/or broom (*Cytisus scoparius*). It is probable that the emphasis on oak reflects its ready availability close to the site. These results conform to the dominance of oak in the present day landscape on the Lizard peninsula. There was slight but unconfirmed evidence to suggest the use of managed woodland in the Early Iron Age.

**5.10 Radiocarbon dating**

*Derek Hamilton, Christopher Bronk Ramsey, Gordon Cook, James Gossip and Charles Johns*

Twenty-four samples were submitted for radiocarbon dating from the Boden Vean fogou in 2005. The samples comprised both charcoal (n=16) and carbonised residues on pottery
(n=8). Of these samples, four had insufficient carbon to be measured (3 residues and 1 charcoal), and so the final number of radiocarbon determinations from the site is 22 (including two replicate measurements).

Eight samples were processed at the Scottish Universities Research and Reactor Centre (SURRC) in East Kilbride, and measured by Accelerator Mass Spectrometry (AMS) at the Scottish Universities Environment Research Centre AMS Facility. Details of sample preparation are provided by Slota et al (1987) and Xu et al (2004). The remaining 14 samples were processed at the Oxford Radiocarbon Accelerator Unit, and were prepared using methods outlined in Hedges et al (1989) and measured as described by Bronk Ramsey et al (2004).

5.10.1 General approach
A Bayesian approach has been taken to the interpretation of chronological data from this site (Buck et al 1996). This is a mathematical modelling technique which combines the radiocarbon dates with chronological information provided by the archaeological evidence. In this case, the results show three clearly separated phases of activity in the area. This allows more precise dating to be provided by determining which parts of the simple calibrated radiocarbon date ranges are unlikely because of scatter on the measurements (Steier and Rom 2000), and results in a reduced date range, known as a posterior density estimate (shown in black in the figures). These distributions are based on probability, and are shown in italics when expressed as date ranges in the text. The posterior density estimates are not absolute; they are interpretative estimates, which can and will change as further data become available and as other researchers choose to model the existing data from different perspectives.

The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal v3.10 (http://units.ox.ac.uk/departments/rlaha/), which
uses a mixture of the Metropolis-Hastings algorithm and the more specific Gibbs sampler (Gilks et al. 1996; Gelfand and Smith 1990). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001). The algorithms used in the models described below can be derived from the structure shown in Figs 41-43.

5.10.2 Results and Calibration
The results are given in Table 8, and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). The calibrated date ranges were calculated by the maximum intercept method (Stuiver and Reimer 1986), also using the program OxCal v.3.10 and the INTCAL04 dataset (Reimer et al. 2004), and are quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years. The graphical distributions in Figs 41 - 43 are derived from the probability method (Stuiver and Reimer 1993).

Replicate measurements were combined prior to calibration using the method outlined in Ward and Wilson (1978). This same methodology was also used as a test of statistical consistency for results which may have been precisely contemporary.

5.10.3 Objectives
The objectives of the dating programme were:

1) to provide dates for the Bronze Age structure, deposition, and last use of the Trevisker-ware pottery;
2) to provide a chronology for the enclosure and associated settlement;
3) to provide a date for the fogou and creep;
4) to provide a secure date for the Gwithian ceramic style.
5.10.4 Sampling
The initial step in sample selection was to identify non-residual short-lived material (Ashmore 1999). All samples were either charcoal from short-lived species, or internal carbonised residues that are thought to be the direct result of food preparation.

None of the carbonised residues were thought to be residual because the residues remained intact and the sherds were fresh. Similarly, all the charcoal samples dated appeared to represent single-episode dumps of freshly charred material in the context from which they were recovered. The exception is the charcoal from context (806), which appears to be a trampled primary silt associated with the use-life of the fogou. It should be noted that from the mixed derivation of this deposit it was attempted to date six carbonised residues in addition to the two charcoal fragments; however, three of the carbonised residues failed.

5.10.5 Analysis and Interpretation
The radiocarbon results show three episodic phases of activity at the site. The chronological models for these episodes are shown in Figs 41-43.

Bronze Age Activity
Three samples were measured from what is thought to be a dumped deposit from the lower fill of a Bronze Age structure. The recovery of a substantial number of sherds from five different Trevisker-ware pots, including vessel P1, which had the majority of the sherds visible laid so that their interiors were face-down, may suggest that this deposit was structured. It is possible that the vessels were broken and positioned in situ prior to the matrix being dumped around them, or alternatively the positioning of the sherds may be part of the formation process of that deposit.

Unfortunately, the two radiocarbon measurements on the carbonised residues adhering to the interior surface of sherds from vessel P1 are not statistically consistent ($T'=229.5$, $v=1$, $T'(5%)=3.8$; Ward and Wilson 1978). It should be noted that OxA-14567 had an extremely
low carbon content, and was pretreated using 1M HCl for 1 hour at room temperature. The other sherd from this vessel (SUERC-6170) contained more carbon and was pretreated using 1M HCl for 3-4 hours at 80º C. It appears that in this case, the latter treatment was better able to remove the surrounding soil contaminates. However, three of the four measurements are statistically consistent from this deposit (T'=3.0, v=2, T'(5%)=6.0), and suggests that this deposit dates to between 1530-1300 cal BC (95% probability; start_Bronze Age) and 1390-870 cal BC (95% probability; end_Bronze Age), probably in the thirteenth and fourteenth centuries cal BC (Fig 41).

The Trevisker-ware vessel (P1) was probably last used in 1400-1190 cal BC (95% probability; SUERC-6170).

Iron Age activity

The chronological model for the activity within the Iron Age enclosure is shown in Fig 42. Two samples were dated from a single context (201) in the enclosure ditch. The measurements on these separate fragments of Pomoideae charcoal are statistically consistent (T'=3.0, v=1, T'(5%)=3.8). Context (201) was a charcoal-rich dumped deposit well-stratified within the sequence of ditch fills. It provides a terminus ante quem for the digging of the enclosure ditch at around 400 cal BC (Fig 42).

Three samples were dated from a curvilinear ditch ([431] and [609]) within the main enclosure. Two samples from context (610) in Trench 6, provided measurements that are not statistically consistent (T'=19.4, v=1, T'(5%)=3.8). The single measurement from context (432), within Trench 4, is also not statistically consistent with those from context (610) (T'=23.5, v=2, T'(5%)=6.0). This deposit appears to be charred material dumped in the base of the cut, and contexts (610) and (432) appear to be equivalent basal deposits of the same feature, based on spatial analysis and the physical character of the two deposits.
Because of this archaeological interpretation of the taphonomy of the dated material, the best estimate for the construction of the ditch is probably provided by the latest dated material in the ditch (SUERC-6171), with date ranges of either 400-340 cal BC (at 51% probability) or 320-220 cal BC (at 44% probability).

Trench 4 contains a stratigraphic sequence of three contexts with dateable material. Contexts (414) and (411) appear to be single-episode charcoal-rich dumps forming the primary fills of cuts [416] and [412], respectively. The fill of the stone-lined pit (426) is the latest of the sequence.

The chronological model suggests that cut [416] dates to 420-350 cal BC (95% probability; SUERC-6172). Cut [412] probably also dates to the fourth century cal BC (Fig 42), and the stone-lined pit probably dates to the third century cal BC (Fig 42).

Turning to the fogou, one deposit was dated (806). This was a relatively thin, dark, charcoal-rich, trampled, silty layer that directly overlaid the natural weathered bedrock. Five samples were dated (three carbonised residues and two charcoal) from this context. Two measurements on a single fragment of charcoal are statistically consistent (T'=0.8, v=1, T'(5%)=3.0). The measurements on all five samples from the context are not, however, consistent (T'=72.9, v=4, T'(5%)=9.5), suggesting that the deposit contains material of a range of actual ages.

The determinations on the carbonised residues are also not statistically consistent (T'=15.2, v=2, T'(5%)=6.0), suggesting that context (806) accumulated over a period of time. Because the pot sherds were physically fresh and had well-preserved residues, and because residual charcoal has been identified elsewhere within this dating programme, charcoal sample BF03 (806) <1018>f has been excluded from this model. The earliest sample, therefore, dated from the fogou is probably carbonised residue <1018>e (SUERC-6168).

This provides a terminus ante quem for the fogou’s construction of 420-350 cal BC (94%
probability) or 280-260 cal BC (1% probability). Fig 42 shows that the fogou’s primary use is likely to be confined to the fourth century cal BC. It should be noted that if sample <1018>f is not excluded from the model, it is more likely that the fogou’s construction falls earlier, in the fifth century cal BC.

The chronological model for activity in the enclosure suggests that activity within began in 470-370 cal BC (95% probability; Fig 42; start_enclosure), probably in the decades around 400 cal BC (425-390 cal BC; 68% probability). Again, if charcoal sample <1018>f from the fogou is not excluded, this activity is likely to have started earlier in 530-400 cal BC (95% probability; alternative model not shown). Activity in the enclosure ended in 380-160 cal BC (95% probability; Figure 42; end_enclosure), probably either the middles decades of the fourth century cal BC (365-330 cal BC at 27% probability) or in the latter part of the third century cal BC (270-205 cal BC at 41%).

The enclosure was probably used for 5-275 years (95% probability), however the distribution of this span is strongly bi-modal. The enclosure was either used for 2-3 generations in the fourth century cal BC (30-80 years; 26% probability), or continued into the third century cal BC and was used for around 175 years (135-220 years; 42% probability). We have an insufficient number of radiocarbon dates to determine between these two possibilities, although the consistency of the measurements suggests that the latter possibility may be an artefact of statistical scatter.

Post-Roman activity

A late fill from the enclosure ditch, Context (314), provided two statistically inconsistent radiocarbon measurements (T*=456.8; v=1; T*(5%)=3.8). The earlier of these is undoubtedly residual from the initial use of the enclosure. The other, a carbonised residue adhering to the interior surface of a Gwithian Style platter, provided a radiocarbon date of cal AD 590-670 (95% confidence; OxA-14560).
Fig 43 shows Bayesian chronological model for Post-Roman activity.

A note on the Bayesian modelling diagrams Figs 41 – 43

The model structure is exactly defined by the square brackets and OxCal keywords at the left of the diagram. The distributions in outline represent the calibration of each result by the probability method (Stuiver and Reimer 1993). The solid distributions are *posterior density estimates* for the calendar date for each sample.

### Table 8: Boden Vean fogou radiocarbon dating results

<table>
<thead>
<tr>
<th>Laboratory Number</th>
<th>Sample ID</th>
<th>Material</th>
<th>δ¹³C (‰)</th>
<th>Radiocarbon Age (BP)</th>
<th>Calibrated Date (95% confidence)</th>
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<tbody>
<tr>
<td>OxA-14567</td>
<td>BF03 (107)</td>
<td>carbonised residue</td>
<td>-23.4</td>
<td>2277±33</td>
<td>400-210 cal BC</td>
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<td>OxA-14517</td>
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<td>3085±30</td>
<td>1430-1260 cal BC</td>
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<tr>
<td>SUERC-6169</td>
<td>BF03 (107)</td>
<td>charcoal, <em>Corylus avellana</em>, roundwood</td>
<td>-25.7</td>
<td>3055±35</td>
<td>1420-1210 cal BC</td>
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<tr>
<td>SUERC-6170</td>
<td>BF03 (107)</td>
<td>carbonised residue</td>
<td>-22.7</td>
<td>3005±35</td>
<td>1370-1120 cal BC</td>
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<tr>
<td>OxA-14521</td>
<td>BF03 (201)</td>
<td>charcoal, Pomoideae</td>
<td>-25.3</td>
<td>2272±28</td>
<td>400-210 cal BC</td>
</tr>
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<td>SUERC-6173</td>
<td>BF03 (201)</td>
<td>charcoal, Pomoideae</td>
<td>-26.9</td>
<td>2350±35</td>
<td>510-380 cal BC</td>
</tr>
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<td>OxA-14519</td>
<td>BF03 (314)</td>
<td>charcoal, <em>Corylus avellana</em></td>
<td>-24.6</td>
<td>2269±27</td>
<td>400-210 cal BC</td>
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<td>OxA-14560</td>
<td>BF03/GS (314)</td>
<td>carbonised residue</td>
<td>-25.6</td>
<td>1417±29</td>
<td>cal AD 590-670</td>
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<tr>
<td>OxA-14522</td>
<td>BF03 (411)</td>
<td>charcoal, <em>Quercus</em>, roundwood</td>
<td>-24.5</td>
<td>2240±28</td>
<td>400-200 cal BC</td>
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<tr>
<td>SUERC-6177</td>
<td>BF03 (411)</td>
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<td>-24.7</td>
<td>2190±35</td>
<td>390-160 cal BC</td>
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<td>SUERC-6172</td>
<td>BF03 (414)</td>
<td>charcoal, <em>Corylus avellana</em>, roundwood</td>
<td>-25.4</td>
<td>2315±35</td>
<td>410-260 cal BC</td>
</tr>
<tr>
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<td>BF03 (426)</td>
<td>charcoal, <em>Ulex</em></td>
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<td>2253±28</td>
<td>400-210 cal BC</td>
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<tr>
<td>Laboratory Number</td>
<td>Sample ID</td>
<td>Material</td>
<td>$\delta^{13}$C (%)</td>
<td>Radiocarbon Age (BP)</td>
<td>Calibrated Date (95% confidence)</td>
</tr>
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<td>-25.9</td>
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<td>2463±28</td>
<td>BC 770-410 cal</td>
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<td>SUERC-6171</td>
<td>BF03 (610)</td>
<td>charcoal, <em>Quercus</em>, sapwood</td>
<td>-25.3</td>
<td>2265±35</td>
<td>BC 400-200 cal</td>
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<td>2205±37</td>
<td>BC 390-170 cal</td>
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<td>carbonised residue</td>
<td>-26.4</td>
<td>2144±36</td>
<td>BC 360-50 cal</td>
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<td>BF03 (806)</td>
<td>charcoal, <em>Corylus avellana</em></td>
<td>-25.7</td>
<td>2261±28</td>
<td>BC 400-200 cal</td>
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<tr>
<td>OxA-14515</td>
<td>BF03 (806)</td>
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<td>2425±29</td>
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<td>2462±29</td>
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<td>carbonised residue</td>
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</tbody>
</table>

5.11 Geophysical survey

*Neil Linford*

5.11.1 Introduction

A geophysical survey of the site was undertaken soon after the rediscovery of the fogou chamber and associated features by the current landowner, Mr Chris Hosken, in September 1991. The initial survey, conducted in March 1992 and February 1993 aimed to map the extent of fogou itself whilst also placing the monument in a wider landscape context. This work made use of rapid geophysical techniques, including magnetic and earth resistance survey that proved highly successful in identifying archaeological activity surrounding the
fogou, but failed to produce a totally convincing response over the known location of the
buried chamber itself. To investigate the fogou further a novel geophysical technique known
as microgravity survey was applied in an attempt to determine the location and extent of any
buried void space associated with monument. Whilst this method of geophysical survey is
infrequently applied to archaeological surveys in this case it proved successful; predicting the
location of an extant void that was later revealed by the partial collapse of the monument
precipitated by agricultural machinery passing over the surface of the site. All of this initial
geoophysical survey work is reported by Linford (1998).

Prior to the 2003 excavation an additional geophysical survey was carried out using Ground
Penetrating Radar (GPR) to better image the extent of the fogou itself and determine whether
any further voids may exist that may pose a potential health and safety risk during the use of a
mechanical excavator at the site. The equipment and software necessary for operating a GPR
was not available to English Heritage at the time of the original survey, but was successfully
applied in October 2003 (Linford 2004a). The following text provides a review of all of the
available geophysical data from the site, discussed in the light of the excavation data.

5.11.2 Method
Fig 44 illustrates the areas of the site where geophysical survey was employed. The data was
collected during three campaigns of fieldwork; these commenced with a magnetic survey of
the field containing the fogou (squares 1-14, the area surrounding the fogou and earth-cut
tunnel/void) in March 1992 following the discovery of the fogou in the preceding September.
A second visit in February 1993 extended this survey through squares 15-56 and completed
the topsoil magnetic susceptibility survey of the same area. The microgravity survey was
conducted, together with the earth resistance and electromagnetic surveys, after the harvest of
the cereal crop in September 1993. A final visit to the site was made in October 2003 to
conduct the Ground Penetrating Radar (GPR) survey (squares 8, 9, 11 and 12) prior to the
excavation of the site.
**Magnetic survey**

Excellent results from the magnetic survey of a similar Iron Age enclosure at Penhale, Fraddon (David 1982) suggested that a geophysical survey could well reveal associated archaeological activity. A magnetic survey over approximately 4.5ha of the farmland surrounding the find spot (the fogou and earth-cut tunnel/void) was therefore conducted using Geoscan FM36 fluxgate gradiometers at a sample interval of 0.25m x 1.0m (the data is presented as a linear greytone image in Fig 45, together with a graphical summary of significant anomalies in Fig 46). Minimal post acquisition processing was applied to the data beyond setting each traverse to a zero mean, to remove the effects of instrument drift over the course of the survey, and the removal of spurious responses due to the presence of near-surface ferrous litter.

**Topsoil Magnetic Susceptibility**

The magnetic survey was complemented by a topsoil magnetic susceptibility survey conducted with a Bartington MS1 susceptibility meter with a 0.2m diameter field coil. Measurements were recorded over a coarse 15m x 15m area to identify possible concentrations of high magnetic susceptibility topsoil that may be related to former occupation activity. The data is presented as a greytone image superimposed over the base Ordnance Survey mapping in Fig 47.

**Earth Resistance survey**

The earth resistance survey was targeted over the suspected location of the fogou and the enclosure identified from the magnetic data (Fig 44; squares 5, 6, 8, 9, 11 and 12). Data was collected with a Geoscan RM15 earth resistance meter using a twin electrode array with a mobile probe spacing of 0.5m (shallow) and 1.0m (deeper penetrating) both acquired at a sample interval of 1.0m x 1.0m. Due to heavy rain fall at the time of the survey considerable grid matching errors occur between the individual 30m squares of collected data. Data
processing to remove these errors has proved only partially successful (Fig 48) and it is possible that the water-logged soil conditions at the time of the survey may well have influenced the quality of the results recovered using this technique.

Electromagnetic survey

A Geonics EM38 soil conductivity meter was also used to recover both in-phase (proportional to magnetic susceptibility) and quadrature-phase (proportional to conductivity) data. The majority of readings were collected over the find spot (the area of the fogou and void) in square 9 at a sample interval of 0.25m x 1.0m with the instrument coils were orientated in both horizontal (shallow) and vertical (deeper penetrating) modes for in-phase and quadrature-phase acquisition. A wider area quadrature-phase survey was also conducted over squares 5, 6, 8, 9, 11 and 12 with horizontal coil orientation for direct comparison with the earth resistance survey. Only the results of the latter survey are presented here (Fig 48) due to the complex response of the EM38 over the highly magnetic soils found at the site, but a full theoretical discussion may be found in Linford (1998).

Microgravity survey

The microgravity data were collected by Ian Bishop of Golder Associates Ltd using a LaCoste-Romberg model D gravimeter over grid square 9 at a 3m sample interval. Each of the marked sample stations was located to a vertical and horizontal accuracy of +/- 0.0002m using a Nikon Total Station EDM to allow for the correction of topographic variation over the survey area. Field methodology and post-acquisition reduction procedures following Bishop et al (1994) were employed to ensure that the resultant microgravity anomalies arose solely from variations of density within the underlying subsurface (see Linford 1998 for a full discussion of the application of microgravity survey for archaeological survey).

A minimum of four readings were collected at each survey station and hourly loops to a base station were conducted to evaluate instrument drift and tidal corrections (see above). The small
dimensions of the survey (30m x 30m) allowed latitude corrections to be ignored. Similarly, terrain corrections over the essentially flat survey area were discounted as any underlying trend would be removed by the subtraction of the polynomial surface discussed below. Elevation corrections, however, were required to a high degree of precision due to the large influence such errors impart to the interpretation of anomalies in the micro-gal range. The resultant data is presented as a Bouguer anomaly map (Kearey and Brooks 1991, 132) following the application of appropriate reduction procedures. A reduction density of 2.5g/cm³ was assumed throughout these calculations (Fig 49).

**Ground Penetrating Radar survey**

The Ground Penetrating Radar (GPR) survey was conducted with a Pulse Ekko PE1000 console and both 450MHz and 225MHz centre frequency antennas. The 225MHz antenna was selected as the most suitable centre frequency for obtaining the optimum depth of penetration and lateral resolution required to image the expected archaeological targets (Figs 50 and 51). Attempts to estimate the velocity of the radar wavefront in the subsurface through a common mid-point (CMP) velocity analysis conducted in the field suggested an average subsurface velocity of ~0.11m/ns. This latter velocity was adopted as a reasonable average value for processing the data from this site and for the estimation of depth to reflection events in the recorded profiles.

A 60m survey grid was established over squares 8, 9, 11 and 12, using a Trimble kinematic differential global positioning system, to allow data to be collected from parallel east-west traverses separated by 0.5m. Individual traces along each profile were separated by 0.05m and recorded the amplitude of reflections through an 80ns two-way time-window. Post acquisition processing involved the adjustment of time-zero to coincide with the true
ground surface, removal of any low frequency transient response (dewow), noise removal and the application of a suitable gain function to enhance late arrivals.

Owing to antenna coupling of the GPR transmitter with the ground to an approximate depth of $\lambda/2$, very near surface reflection events should only be detectable below a depth of 0.49m, if a centre frequency of 225MHz and a velocity of 0.11m/ns are assumed. However, the broad bandwidth of an impulse GPR signal results in a range of frequencies to either side of the centre frequency which, in practice, will record significant near-surface reflections closer to the ground surface. Such reflections are often emphasised by presenting the data as amplitude time slices. In this case, the time-slices were created from the entire data set, after applying a 2D-migration algorithm, by averaging data within successive 2ns (two-way travel time) windows (e.g. Linford 2004a). Each resulting time slice, illustrated as a greytone image in Fig 51 represents the variation of reflection strength through successive $\sim0.11$m intervals from the ground surface. A graphical summary of significant anomalies identified from the amplitude time slices is shown in Fig 52.

5.11.3 Results

Topsoil Magnetic Susceptibility

Results from the topsoil magnetic susceptibility data (Fig 47) demonstrate the strongly enhanced nature of the iron rich soils that have developed over this site. Whilst the range of values (from $\sim$100 to 400 x $10^{-5}$ SI) reflects the influence of the underlying igneous geology two distinct areas of concentrated high readings are found; the first in squares 6, 9 and 12 in the field containing the fogou, and the second in the field to the east in the centre of squares 24, 25, 28 and 29. Given the wide range of archaeological activity revealed over the entire survey area it is difficult to identify a group of anomalies specifically associated with either of the two concentrations of high topsoil magnetic susceptibility readings. However, the
enhanced readings found in the field containing the fogou do correlate well with the enclosure ditch revealed by the fluxgate gradiometer survey.

*Magnetic data*

In keeping with the agricultural setting of the survey there is little modern interference beyond a scatter of intense responses caused by near surface ferrous material and a negative linear anomaly [m1 on Fig 46] associated with the buried plastic water supply pipe. The known course of this pipe continues north through squares 14, 12, and 9, running close to the dividing field boundary and eventually exits the survey in square 6, grazing the location of the excavated "well" [m2]. The magnetic anomaly associated with the pipe trench fluctuates in intensity through this latter area and appears, in part, to produce a positive response - possibly caused by backfilling the trench with magnetically enhanced soil associated with former anthropogenic activity at the site.

*The enclosure*

The most striking anomalies of archaeological significance are revealed as a palimpsest of strong (>10nT) linear ditch-type responses that occur throughout the entire survey area forming a complex network of field enclosures and track ways. A single rectilinear anomaly [m3] surrounds the location of the partially excavated fogou [m4] and continues beneath the extant stone wall field boundary into squares 19, 23 and 27. Anomaly [m3] most probably represents an enclosure surrounding the fogou, with the southern circuit of the ditch presumably underlying the modern field boundary. Square 8 reveals a break in [m3] that may well indicate a former entrance and there is some evidence of associated activity [m5] beyond the enclosure immediately west of this gap. An additional entrance gap may also be present in the north-west corner of the enclosure.

The interior of the enclosure is of particular interest due to the discovery of the fogou and it is seen to contain a wealth of significant positive anomalies. These can be divided into those of a
discrete nature, indicative of buried pits, and a cluster of fragmented ditch-type segments [m6] immediately south of the excavated fogou [m4]. The data is not sufficiently clear to determine whether these latter anomalies are related to a common causative feature.

A number of curious negative responses are associated with [m3], both south of the enclosure and in the case of [m7], as an independent anomaly extending beyond the NE corner into square 19. These anomalies cannot be explained by the negative response to be expected immediately north of the main positive signal from gradiometer data collected over buried ditches at this latitude. This suggests the presence of either a remanent magnetic field in opposition to that of the earth's or the location of a magnetic "void" caused by the presence of material with a lower susceptibility than that of the surrounding subsoil.

The relationship between [m7] and the oval anomaly [m8] is again difficult to ascertain. However, it seems likely that [m8] represents the location of a ditch or gully surrounding a former domestic dwelling with a scatter of attendant pit-type anomalies. A similar example identified by geophysical survey at Reawla, Gwinear, Cornwall (Bartlett 1978) was confirmed through subsequent excavation (Appleton-Fox 1992) to be an Iron-age dwelling, although the slightly oval nature of [m8] may imply a Romano-British date (Quinnell 1986). Analysis of the rest of the survey area fails to identify any other convincing anomalies of this type, although it should be noted that the magnitude of [m8] is comparatively low (~8nT).

Interpretation of the data surrounding the fogou findspot (the earth-cut void) is hampered by its fragmented nature and the interjection of the weak linear anomaly [m9] bisecting the enclosure. Excavation proved that [m9] was part of an approach trench leading directly to the mouth of the fogou. A tentative postulation that [m9] pre-dates the enclosure can be advanced due to its weak relative magnitude in comparison to [m3] and its apparent failure to observe the enclosure boundary to the south. There is, however, no evidence to support this from the excavation as it seems to be contemporary with the fogou.
Immediately west of the enclosure a broad positive ditch-type anomaly \([m10]\) is seen to respect the north-west corner of \([m3]\) and then run to the edge of the survey area through squares 4 and 5. The precise nature of this confluence is complicated by an amorphous mass of positive readings in square 5 bounded by \([m10]\) to the north; confusing the interpretation of the apparent break in \([m3]\), visible in the north-west corner. This area of disturbance was later found to correlate with a more distinct GPR anomaly (Fig 51) that on subsequent excavation revealed the location of a Bronze Age structure in Trench 1. Activity throughout squares 1-14, excluding the interior of the enclosure, continues as a scatter of subtle linear anomalies, discrete pit-type responses and areas of magnetic disturbance the morphology of which defies a greater degree of interpretation. Of particular note are the two intense positive anomalies \([m11]\) and \([m12]\) defined largely within square 6; the former apparently containing a pair of discrete pit-type responses.

A more complete network of linear anomalies exists east of the enclosure through squares 15-47. To the north of this area the group \([m13]\) appears to represent the course of former field boundaries, respecting the location of \([m3]\) in square 23. Further south a similar group of ditch-type anomalies \([m14]\) are evident which exhibit a weaker magnitude of response than \([m13]\). These latter anomalies are obscured by a network of more intense double-ditched anomalies \([m15]\) and these may well represent the course of two field banks with ditches either side converging at a junction in square 34. Unfortunately, the course of the southern branch of this anomaly lies parallel to the north-south orientation of the magnetometer traverses and it would appear that the position of the sample points has degraded the clarity of this latter response. An additional group of more subtle anomalies \([m16]\) is visible in squares 21-22, which may possibly be related to an earlier enclosure cut through by \([m13]\). Two significant discrete anomalies \([m17]\) and \([m18]\) are located immediately west of \([m16]\) within an area of magnetic disturbance immediately north of \([m13]\); anomaly \([m17]\) is of particular
interest due to both the magnitude (>60nT) and characteristic nature of its response, suggesting a thermoremanent causative feature.

The gradiometer response throughout this area contains a degree of background "noise" to which it is difficult to ascribe any definite origin. However, the igneous parent geology within the Meneage crush zone is intrinsically magnetic and has led to the high values of topsoil magnetic susceptibility developed over the site. In addition, the geology of the region is recognised to be highly variable (Flett 1946) and it is possible that many of the more extraordinary magnetic anomalies arise from this origin.

Data from squares 48-56, is again dominated by an assemblage of intense linear anomalies [m19] that appear to converge with the enclosure immediately north of square 50. The branch of [m19] to the west is curious as it is formed from two parallel ditch-type anomalies separated by approximately 3m. This may represent either the course of a former trackway or, perhaps, a defensive land division. Again the incomplete nature of the more subtle linear anomalies to the north of this area hampers a more detailed interpretation.

Earth resistance data

Data from the earth resistance survey (squares 5-6, 8-9, 11-12) is disappointing due to the failure of the technique to replicate the majority of the significant anomalies revealed by the gradiometer in either the 0.5m (Fig 48 C) or the more deeply penetrating 1.0m mobile probe separation survey (Fig 48 D).

The two datasets are broadly similar with the lateral definition of the response appearing "sharper" in the more shallow 0.5m survey. Only anomalies [m1] (the modern pipe trench) and [m11] from the magnetic survey are corroborated by the earth resistance data; the former as low resistance ditch (although this is partially confused by the orientation of the modern plough furrows also detected by both resistivity surveys) and the latter, as an extremely subtle low resistance response in the area of extreme high resistance evident in squares 5 and 6. Over
the location of the fogou itself, an isolated low resistance linear anomaly is seen to extend NE for approximately 10m. The dimensions of this anomaly far exceed those of the limited hand excavated trench opened by the land owner during the re-discovery of the feature in September 1991 (Rose and Preston-Jones 1991) and it is conceivable that this low resistance anomaly is related to the course of the buried fogou. However, the nature of this response is at odds with the stone construction of the feature, suggesting either a very near surface "paradoxical anomaly" (Scollar et al 1990, 350-1) or a response to moisture retentive material in-filled along a collapsed section of the fogou.

Electromagnetic data

The field data itself (Fig 48 B) shows a much closer correlation to the anomalies identified by the magnetic survey than to either of the earth resistance plots. In particular, the horizontal conductivity data (Fig 48 B) depicts both the enclosure ditch north of the excavation and the amorphous area of high magnetic susceptibility immediately south-east, both absent from the resistivity results; a most peculiar result given the reciprocal relationship between resistance and conductivity.

Further analysis of the conductivity survey suggests that the quadrature phase data represents a palimpsest of the reciprocal of the earth resistance values superimposed upon the anomalies from the magnetic survey. Unfortunately, conversion of the relative earth resistance field data (Ω) to apparent resistivity values (Ωm; for direct comparison with the conductivity results) is hampered by the varying geometry (with respect to the mobile and remote electrodes) of the twin-electrode configuration. However, an approximate reduction can be made when the mobile probe separation is equal to that of the remote electrodes by multiplying the observed field reading by a factor of $\pi \times \text{probe separation}$. Applying this reduction to the earth resistance data indicates that the near surface response is more conductive (8→13mS) than the deeper
sediments (6→9mS); in general agreement with the results of the conductivity survey and the occurrence of heavy rainfall during this stage of the field work.

**Microgravity survey**

Fig 49 A shows the Bouguer anomaly map for the microgravity data acquired over square 9 containing the partially excavated fogou. Anomalies within this data set are obscured by an underlying local trend that has been attenuated by subtracting a third-order polynomial surface fit of the data (Fig 49 B and Parasnis 1986, 77-8) to produce a map of residual gravity values (Fig 49 C). The residual data contains three anomalous areas of interest; two negative towards the east of the square [G1 and G2] and a more central positive response [G3] trending NE close to the partially excavated fogou. G3 corresponds with a linear low resistance ditch-type response in the earth resistance data and an amorphous area of low conductivity/susceptibility within the electromagnetic data (Fig 48 B).

Whilst the negative gravity anomalies G1 and G2 are most likely to represent a subsurface depletion in density, such as an air-filled void, the proximity of G3 to the location of the excavated fogou suggests a direct relationship to this feature, possibly indicative of a partial collapse of the structure. The negative anomalies revealed by the microgravity survey were proved as surviving void features when a hole in the ground leading to an underground passage opened in July 1996 above the location of G2, subsequently investigated through the excavation of Trench 8/9. The precise nature of G1 has not been established through excavation and is only partially described in the microgravity data but may well represent an extension of the fogou structure.

**Ground Penetrating Radar**

The response to GPR survey over the site was subdued although an acceptable degree of penetration, to a depth of approximately 2.0m, was achieved. The slightly disappointing nature of the GPR response was not surprising given the previous earth resistance data
that failed to identify the course of the enclosure ditch, but did identify a high resistance anomaly in the vicinity of the excavated fogou (Figs 48 and 49). It is possible that both the original earth resistance survey and the GPR survey have been adversely affected by extreme soil moisture conditions at the site. The earth resistance survey was conducted in the midwinter, when the soil conditions were fully saturated, and the current GPR data was collected at the end of a dry summer with little significant rainfall. As both techniques, to a certain degree, rely on a contrast in soil moisture more optimal seasonal conditions might well improve the recorded geophysical response.

However, trial 30m GPR profiles, conducted immediately south of the collapsed passage way with both 225MHz and 450MHz centre frequency antennas, successfully identified anomalies associated with the visible void features (Fig 49). The agricultural water supply trench has been detected to the east of the trial profiles with responses to the known voids appearing approximately 5m from the field boundary. The 225MHz centre frequency antenna has, apparently, defined both the “roof” of the void (~0.8m from the ground surface) and the floor of the structure (~1.7m from the ground surface). This is, no doubt, due to the greater penetration depth afforded by the lower frequency antenna although at a reduced lateral resolution in comparison to the near-surface data recorded with the 450MHz antenna. Additional anomalies found approximately 10m west of the visible collapse correspond with the known location of the previously excavated fogou remains and a possible second passage way or creep 10m further to the east again.

Amplitude time slices

Following the trial GPR profiles a detailed survey of a 60m × 60m area (Fig 44) was conducted using the 225MHz centre frequency antenna to produce the amplitude time slices shown in Fig 51. From the estimated velocity of the radar wave front at the site (~0.11m/ns) each grey scale plot in Fig 51 represents the variation of relative reflector
strength within successive 0.11m thick slices through the subsurface. To assist with the interpretation of the data a graphical summary of significant anomalies is provided in Fig 50.

The near surface time slices (0 to 16ns) provide evidence for a number of anomalies due to recent features, such as the surface plough patterns [GPR 1] and the agricultural water main [GPR 2] running along the east edge of the survey grid. An amorphous area of high magnitude reflections following the course of the water main to the south may well indicate water leaking from this supply into the pipe trench.

High amplitude reflections are also recorded over the known location of the excavated fogou [GPR 3] and the collapsed passage way [GPR 4] where the presence of a temporary plywood sheet cover allowed the antenna to be traversed directly over the exposed void. However, both [GPR 3] and [GPR 4] are more completely described in the deeper time slice data.

The location of an anomaly associated with the enclosure ditch [GPR 5] becomes partially visible within the 14 to 16ns time slice. Later time slices, 22 to 40ns, reveal a more complete anomaly that correlates directly with the magnetic response to this feature from the original survey. Whilst the initial GPR reflections from the enclosure ditch appear to originate from a depth of approximately 0.8m the later time slice data suggests a response from a greater depth in excess of 1.5m.

Of greater interest is the high amplitude reflection [GPR 6] found along the course of the enclosure ditch (from 18 to 40ns) in the vicinity of the postulated entrance to the enclosure suggested by the magnetic data. Anomaly [GPR 6] is apparently circular in shape with a diameter of ~5m and may well represent a more substantial stone-built structure, possibly associated with an additional pair of responses [GPR 7] at a similar depth immediately east of the proposed entrance to the enclosure.
Returning to the remains of the known fogou, the GPR survey has provided additional information to complement the previous geophysical results from the site. The anomaly at [GPR 3], over the location of the excavated portion of the fogou, suggests a north-south orientated feature approximately 3m wide sloping from the north for a length of approximately 10m. The deepest reflection from [GPR 3] occurs in the final time slice (42 to 44ns) at the southern extent of the structure, although there is some suggestion of an additional, perhaps partially collapsed, passage way [GPR 8] extending from the south. An additional, curvilinear response [GPR 9] follows a similar north-south orientation parallel to the axis of [GPR 3] but the GPR data does not fully support any direct association between the two anomalies.

To the north of [GPR 3] there is evidence for a right-angled passageway heading east towards the location of the current collapse at [GPR 4]. This concurs with visual evidence viewed from the ground surface into the void that suggests two apparent passage ways, the first heading SW towards [GPR 3] and the second heading south-east following the course of the anomaly suggested by [GPR 4] towards the field boundary to the east (cf Fig 45). The GPR data also supports the continuation of [GPR 4] north beyond the current open void terminating at the confluence between [GPR 4] and the north circuit of the enclosure [GPR 5]. This suggests material covering the collapsed void has fallen into the passageway to the north partially blocking the continuation of this structure.

One final area where the GPR data suggests added complexity over the original geophysical survey results is found at [GPR 10]. This was previously identified as an area of amorphous magnetic disturbance but a more intriguing structure is suggested by the GPR survey. Anomaly [GPR 10] first becomes apparent in the 14 to 16ns time slice and with increasing depth appears to separate into a more complex response bounded within an approximately oval region of disturbance. The response continues to a similar depth as the
other reflections [GPR 3] and [GPR 4] associated with the known fogou (32 to 34 ns) and was later revealed to be the remains of a Bronze Age structure.

**Comparison of the GPR survey with the previous geophysical data sets**

As noted above, the original earth resistance survey produced disappointing results and failed to identify any significant anomalies, beyond the location of the excavation trench opened over the partially collapsed fogou following its initial rediscovery (Fig 51). Whilst the poor earth resistance results may well have been due to excessive soil moisture conditions, it is surprising that the strong conductivity contrast expected between the extant void spaces of the fogou and the surrounding subsoil was not detected. However, a far greater degree of success was achieved through magnetic survey with a wealth of significant anomalies, including the response due to the rectilinear enclosure ditch, being recorded.

The GPR survey has certainly improved upon the results of the earth resistance survey and has replicated many of the anomalies identified within the original magnetic data, albeit with a reduced magnitude of response. It is unclear whether the success of the GPR survey, compared with the earth resistance data, is due to more favourable soil moisture conditions or the influence of the magnetic properties of the soils. This might well be due to the strong quadrature phase susceptibility recorded during the electromagnetic survey of the site with a Geonics EM38 that dominated the conductivity response of the soil (Linford, 1998).

Many of the magnetic anomalies have been replicated by GPR reflections from a more considerable depth. Whilst this may indeed reflect the geophysical response to the varying physical contrast of the features with depth, it is possible that, in part, these represent partially collapsed passageways or chambers. In this case, the lower lying base of the feature is likely to be composed of the collapsed wall stones or roofing lintels of the fogou, resulting in a detectable GPR reflection. Closer to the surface enhanced magnetic topsoil will have
accumulated in the depression created by the collapse, producing the near-surface magnetic anomalies recorded by the fluxgate gradiometer survey.

Perhaps of greater interest is a comparison between the GPR data and the void type anomalies identified by the microgravity survey (microgravity anomalies G1, G2 and G3 on Fig 52). The predicted negative microgravity response G2 was subsequently proven by the partial collapse of the void in July 1996 and corresponds to the location of anomaly [GPR4]. However, the GPR data has, apparently, provided a more complete description of the underlying causative feature. The positive gravity response G3 is found in the vicinity of [GPR3], close to the known location of the partially excavated fogou, and G3 was originally interpreted as a response to the buried stone work in this region. From the GPR data it would appear that G3 is located slightly to the west of [GPR3], suggesting the microgravity anomaly may not, necessarily, be directly associated with the excavated remains of the fogou.

No significant GPR response was found to correspond with the location of G1, a negative void-type microgravity anomaly located immediately north of the enclosure ditch.

Fig 53 shows an isovolume plot of the GPR data collected from a 20m x 20m square positioned over the location of the fogou. In this representation of the data high amplitude reflections, mainly from the fogou, have been rendered as a solid isovolume and all other data has been made transparent. An oblique view point from the south-east has been chosen (Fig 52) together with a false lighting model to produce a pseudo-3D image of the buried structure. The main passageway of the fogou [GPR3] is visible heading north where it meets the possible second passageway [GPR4] in the vicinity of both the original microgravity anomaly [G2] and the later partial collapse. The enclosure ditch of the enclosure [GPR5] has also produced a sufficiently high amplitude reflection to be rendered in the model to the north.
Conclusion

The combination of geophysical survey methods applied to the suspected fogou site at Boden Vean has revealed a complex distribution of archaeological activity confused by the highly variable nature of the local geology. The results reveal the presence of a enclosure surrounding the location of the suspected fogou, confirming the suspicions of Polwhele (1816) made during his initial observations of the site. Furthermore, the application of both microgravity technique and Ground Penetrating Radar techniques corroborated the interpretation of the partially excavated stone lined passageway as a collapsed portion of a fogou prior to the excavation. The geophysical data informed the location of trenches for the subsequent excavation and mitigated the Health and Safety risks associated with working close to a known void structure.

In particular, the extent of the passageways to the north of the excavated fogou, discovered through the partial surface collapse, has been clarified through the GPR survey results. From this latter data, the fogou itself would now appear to be formed from a central, stone-lined chamber approximately 3m wide following a north-south orientation parallel to the rectilinear enclosure ditch for a length of at least 10m. A curvilinear passageway may also exist to the west of the central structure, although there is no evidence to fully support a confluence between the two. To the north of the central fogou chamber there is evidence for a right-angled passageway, sloping gently upwards to the east towards the location of the observed surface collapse. At this latter point the GPR survey has revealed an additional passageway approximately 12m in length running on an approximately north-west-south-east alignment. This passageway apparently extends towards both the enclosure ditch to the north, beyond the area of partial collapse visible from the surface, and along the observed passageway heading to the present day field boundary to the east.
Beyond the location of the fogou the GPR survey suggests the presence of a more substantial structure along the course of the enclosure ditch to the west in the vicinity of the postulated entranceway, as interpreted from the magnetic data. In addition, an area of amorphous magnetic disturbance found beyond the north-west corner of the enclosure reveals a more complex structure of subsurface GPR reflectors that was subsequently proved through excavation to be a significant Bronze Age structure.

6 Discussion
6.1 Introduction
6.1.1 Key results
A number of significant results have emerged from the project at Boden. Principal aims of the project were centred around the fogou, establishing its character and immediate and wider context. This has been achieved, with a much clearer plan of its extents, layout and structural form, and its context within a contemporary enclosure. Analysis of the in situ deposits at the base of the fogou have provided secure radiocarbon dates for the fogou, three of these from carbonised pottery residue, with construction dated to before 420-350 cal BC (94% probability).

Excavation of the fogou, the enclosure ditch and associated features within it produced an important and well dated assemblage of Later Early Iron Age pottery occurring in the fourth century BC.

Excavation of the Bronze Age structure in Trench 1 revealed sherds from a very remarkable Middle Bronze Age vessel, with no known comparanda in terms of size or decoration. Radiocarbon dates from residues on the pottery suggest that the vessel was last used 1400 – 1190 cal BC (95% probability) when it was deliberately broken and laid out the base of the structure, probably as part of a ritual act.
Post-Roman activity in the later fills of the enclosure ditch and internal features was also well represented by a distinctive assemblage of Gwithian Style ceramics representing at least 22 vessels, carbonised residues from which it have provided the first published dated assemblage of Gwithian style material, OxA-14560 cal AD 590 - 670 (95% probability).

Overall the evaluation trenches revealed evidence of intermittent activity starting in the Middle Bronze Age (c 1400 BC) and occurring again in the Later Early Iron Age (c 400 BC), the Romano-British period (first to second centuries AD), and finally in the sixth and seventh centuries AD. Flint which could be Neolithic in date (along with some pieces that are potentially Mesolithic in character), suggest that human presence on the hill may have occurred earlier probably in the northern part of the field (see Lawson-Jones above). The geophysical survey of fields surrounding the site has revealed circular, oval and curvilinear anomalies suggesting that the excavated features represent only a small part of a complex, long-lived landscape which is likely to contain more extensive settlement from each of these periods.

Trench 1 revealed the western edge of a Bronze Age structure which despite the ritual nature of its closure, may have had a primary domestic function, although this cannot be verified. Environmental evidence in the form of cereals recovered from the structure supports the notion of a settled Bronze Age community and show that ground was being cultivated, with wheat and barley were being consumed at this time.

The rectangular enclosure, principal internal features and fogou were constructed during the Later Early Iron Age, probably around 400BC. Structural evidence for domestic occupation was not identified by the excavation, although postholes, surfaces and deposits containing discarded refuse suggests that occupation was settled during this period. Construction of the fogou and the enclosure must have been a major undertaking and suggests a level of special status and/or function, structures which must surely have been
used by a well established community. Plant macrofossil and charcoal evidence shows that a cereal crop regime (spelt wheat) was in place at this time and that there had been significant clearance of woodland to allow field systems to be established. It is likely that a number of functions were served by the enclosure and what would have been a substantial bank or rampart. Whilst the physical characteristics of the ditch and rampart would have provided protection for the community, its livestock and other valued commodities, the appearance and nature of the enclosure in a symbolic sense may have been just as vital.

Use of the enclosure, but not the fogou, continues during the early centuries of the first millennium AD, although the intensity of activity is less clear. Romano-British pottery from the later fills of the enclosure ditch show this to have silted substantially by this time, although it was clearly still in use. A ditch excavated in trench 1 represents part of a field system in use at this time and produced Cordoned Ware pottery from this period; the geophysical survey anomaly suggests that this field plot may have been attached to the north-western corner of the enclosure. The extensive linear and curvilinear ditch anomalies evident from geophysical survey and an apparent oval structure with which they could be associated suggest extensive use of the surrounding landscape and perhaps unenclosed settlement during this period. Pottery recovered from the ‘well’ or shaft show that the upper levels of this were being infilled between the second and third centuries AD. The investment of effort in the excavation of a shaft of this depth (and it may be considerably deeper that the level to which it has been excavated) suggests that substantial community was present on this land at the time.

Occupation and use of the site continued in the Post-Roman period (sixth and seventh centuries AD) and is represented by the extensive collection of Gwithian Style pottery.
6.2 The Bronze Age Structure in Trench 1

A number of excavated settlement sites around the coast of the Lizard peninsula have been dated to the Middle Bronze Age. These include Kynance Gate, Carngoon Bank and Poldowrian (Thomas 1960; McAvoy 1980; Christie 1986; Smith and Harris 1982), although the house structures at each of these sites vary greatly from the sunken hollow structure at Boden. The earlier Bronze Age barrows of Goonhilly Downs have been well documented but not investigated, the exception being a barrow at Trelan, a multiple phase ritual complex (Smith 1984).

Morphologically the Boden structure can be compared with a typical Cornish Bronze Age roundhouse, as excavated at sites such as Trethellan Farm, Calestick and Trevilson. These tend to comprise circular earth-cut hollows of varying depth, occasionally surrounded by stones acting as a wall or kerb (Nowakowski 1991, 14-103; Jones 1998-9, 43; Jones and Taylor 2004, 104). A number of large stones in the fill of the hollow at Boden could indicate parts of a collapsed wall that once surrounded the structure, though none were found in situ. These structures tend to contain postholes cut into the base of the hollow for supporting the roof and/or entrance structures, in addition to features such as hearths and storage pits. Whilst no such features were evident at Boden this may be due to only limited excavation taking place around the perimeter of the structure, thus missing internal features. Again it is possible that these internal features survive beneath the unexcavated topsoil to the east.

It is believed that many of Cornwall’s Bronze Age roundhouses display signs of ‘ritual abandonment’ a final event marked by elaborate patterns of ‘closure’ (Nowakowski 1991, 92, 208-209; Jones 1998-9, 49). The fragments of decorated pottery, part of a structured deposit and sealed by a stony layer would conform to this model, described below in the discussion.
An alternative interpretation of the Bronze Age structure may be that it was a ‘ritual’ hollow, with no obvious domestic function. Features of this type have been identified at Trethellan Farm (Ritual Hollow 136/2021) and Trenowah (Hollow 392), where the excavated remains comprised oval hollows cut into the natural subsoil (Nowakowski 1991, 14-103; Johns forthcoming). At both sites these hollows contained numerous sherds of decorated pottery, the Trethellan example also containing cow bones and teeth, which along with the pottery occurred in clearly deliberate, structured deposits, covered by sealing deposits of clay silt and rubble (Nowakowski 1991, 208). This is also the assumption at Trenowah, where the pottery sherds included possible curated material and quartz filled pits were cut into the base of the feature, the structure being ‘sealed’ by a final event deposit (Johns forthcoming). Unfortunately the limited excavation of the structure at Boden is such that definitive interpretation is not possible at this stage. It certainly conforms to either model in that it is an oval or circular hollow cut into the subsoil, with possible disturbed walling, and as yet unidentified (or absent) internal features such as postholes. A large number of pottery sherds, apparently part of a structured deposit, and a more or less single episode of backfill sealing the structure and its contents, suggests a deliberate abandonment ritual. Radiocarbon dating determinations from residues on the large Trevisker Ware vessel at Boden (P1) suggest a date between the middle and end of the second millennium BC (SUERC-6170, 1400-1190 cal BC (95% probability), broadly consistent with those dates from Trenowah (pit fill (192), Wk-11932 2155 ± 50 BP, 1530-1300 cal BC) and Trethellan (context (2095), UB3110 3070 ± 40 BP, 1430-1228 cal BC). The most intriguing aspect of the Boden Bronze Age structure is the character of the large vessel P1. The vessel displays a number of unusual attributes, particularly its large size (perhaps at least 0.92m high) and unparalleled decoration (combination of cord impressed chevrons and incised lines). It has been calculated that the vessel had a capacity of 218 litres, although it is not known what it might have contained. The storage of a valuable
commodity, perhaps grain or other foodstuff, or perhaps salt, is a possibility. An alternative view could be that the vessel was never intended to hold anything; its unparalleled design and size would certainly have made it a significant showpiece and something to impress, and its fundamental use may have been in acts of ceremony. It has been demonstrated that the arrangement of the sherds was highly structured, and the cracking up of the sherd blocks may be suggestive of ritual activity, such as dancing immediately after the sherds were covered (see Thorpe above).

Also included in this assemblage at the base of the feature were sherds from a miniature Trevisker vessel (P3); comparanda for both of these vessels are from Early Bronze Age barrow contexts where deposition is related to ceremonial activity. The later date of the deposit and its structured nature suggests the continued tradition of certain types of vessel more appropriate for special deposition which were then linked to rituals of closure.

6.3 The environment of Bronze Age, Iron Age and Roman Cornwall

Environmental studies have shown that the second millennium BC was a period of drier, warmer climatic conditions, with parts of the landscape still heavily wooded but with areas of open grassland, heathland and scrub (Caseldine 1980, 10-14; Christie 1986, 83). Parts of the landscape of the Lizard peninsula may have conformed to this environmental model; it is uncertain whether some areas (eg Goonhilly Downs, Predannack) were ever wooded, although there is evidence to suggest more intensive use of heathlands for grazing during the Bronze Age (Balaam 1984, 32). By the early Bronze Age these areas of open downland probably had the appearance of an extensive, open, ritual landscape dominated by barrows, although this is still to be verified (Smith 1984, 32; Sturgess 2004, 7).

It is not certain to what extent the Helford estuary and other creeks were affected by sea level rise, but it is likely that these marine resources were used by local communities during the Bronze Age, Iron Age and Romano-British periods. One of these tidal inlets, Gillan
Creek, lies a short distance to the north of the site at Boden and was no doubt exploited by the Boden communities in each of its periods of activity.

Generally, environmental studies carried out at a number of prehistoric sites across Cornwall such as Trethellan (Straker 1991, 169), Tremough (Gossip and Jones forthcoming), Trevilson (Jones and Taylor 2004, 97) and Stencoose (Straker 2000-1, 76), have produced results consistent with those from Boden. During all periods in which the site was occupied the local woodland was one dominated by oak, hazel and birch. Alders and willows would have grown on damper soils whilst gorse, blackthorn, hawthorn, elder and other shrubs would be present on drier, more open ground. It appears as though all of these species were used for fuel, with a particular emphasis on oak, which sees persistent use throughout all of these periods (Gale above). The use of local oak woodland and collection of gorse and other scrub is consistent with the clearance of land for agricultural purposes as summarised below, and the collection of gorse for fuel, known in Cornwall as ‘furze’ is a phenomenon that has died out only recently (Sturgess 2004, 15).

There is also evidence of fast grown hazel consistent with coppice growth – hazel rods were certainly used at other settlements such as Trethellan Farm (Straker 1991, 169) as a material for stakes and hurdled screens and wicker work (Nowakowski 1991, 183).

Despite large scale sampling and sieving programmes comparatively little data has been recovered from sites in Cornwall and crop husbandry regimes in the south-west of England generally are still not fully understood (Campbell and Straker 2003). But even the small numbers of ecofacts collected from Boden can help to supplement this incomplete picture; macrofossil analysis suggests that crops of hulled wheat and barley were being consumed during the Bronze Age, with spelt wheat definitely present in the Early Iron Age phase. There is also the possibility of free-threshing wheat from the Bronze Age structure.
In addition to cereals a number of weed species also indicate the cultivation of ground, and it can be assumed that by the time of the Bronze Age occupation a significant proportion of local woodland had been cleared for arable agriculture. This pattern was much the same during the Iron Age occupation at Boden, where environmental evidence is compatible with the evidence of pollen and other environmental samples taken from Romano-British courtyard house deposits at Carn Euny (Christie 1978, 424-429).

Geophysical survey of the adjacent fields at Boden suggests a cultivated pattern of fields surrounding the settlement that may have been used by Bronze Age, Iron Age, Romano-British and early Post-Roman farmers, a feature recognised as common to many enclosures of Iron Age or Romano-British origin (Johnson and Rose 1982). These results are consistent with those of the Bronze Age settlements at Trethellan Farm (Straker 1991, 169), Callestick (Gilbert and Straker 1998-9, 38) and Trevilson (Jones and Taylor 2004, 97). Studies of Romano-British sites too have similarities with Boden. Excavations at Reawla (Straker 1992, 90-91) and Pollamounter (Jones and Taylor 2004; Gale 2004b, 87) have shown the use of wheat, barley and oats, as well as evidence for the exploitation of heathland species such as heather and gorse.

The upland fields and tenements farmed by Cornwall’s prehistoric communities have long been recognised and extensively surveyed (eg Bodmin Moor; Johnson and Rose 1994). Evidence for the layout and character and extent of fields in lowland Cornwall is very limited at present, although in recent years geophysical survey and large scale open area excavation have begun to identify lowland field systems.

At Boden, geophysical survey outside the enclosure has identified a number of linear and curvilinear anomalies, many of which have no apparent relationship with the modern field layout. Two of these anomalies were tested in Trenches 1 and 2, and proved to be shallow narrow ditches, almost certainly the boundaries of fields associated with activity probably
during the Romano-British period (Cordoned Ware pottery was recovered from ditch [120] in Trench 1). Some of these geophysical anomalies may relate to unenclosed settlement during the Romano-British period outside the enclosure; the oval nature of anomaly m8 suggests that it could be a Romano-British roundhouse (Linford 1998, 193-4).

Early and Later Iron Age field systems have been identified at Trenowah, (Johns forthcoming, 70-71) whilst recent excavations at Tremough revealed a series of rectangular plots, identified as part of a ‘ladder’ type field system, probably established during the Iron Age. Their use probably continued into the Romano-British period, at which point they became associated with ditched enclosures (Gossip and Jones forthcoming). Recent large scale open area excavations at the Richard Lander School development has revealed limited field system patterns dating to the Late Iron Age.

At Penhale Round, Fraddon, a complex series of linear ditches, probably Romano-British, formed part of a multi-phase prehistoric landscape comprising extra mural parcels of land, providing comparison with the pattern of contemporary land division outside the enclosure at Boden (Nowakowski 1998, 32-55). Cropmark patterns of boundaries associated with enclosures are generally not very complete and consequently evidence of multi-phase ditched fields at Boden, parts of which appear to be contemporary with the enclosure, are very tantalising, and suggest that complete and extensive patterns could be recoverable if geophysical survey could be extended at this and similar sites.

It is likely that small fields in the immediate vicinity of settlements were also used to contain domesticated livestock, although the faunal record from archaeological sites in Cornwall, including Boden, is particularly poor due to the acidic nature of the majority of soils. The range of animals represented by faunal remains at the Bronze Age site at Trethellan or Romano-British site at Atlantic Road, Newquay being cattle, sheep/goat and
pig, is probably similar to that of Boden (Nowakowski 1991, 192-193; Ingram forthcoming).

6.4 The contribution of Boden to the study of Cornish enclosed settlement.

Iron Age and Romano-British enclosed settlements, commonly known as ‘rounds’, are now known to have dominated the Cornish landscape in the latter stages of the first millennium BC and the first few centuries AD. Their prevalence as extant earthworks, as enclosures fossilised by modern-day field boundaries and as crop-mark sites in the Cornish landscape (see for example, Jones and Taylor 2004, fig 34) has resulted in their dominance in discussions of settlement activity in later prehistoric and Romano-British Cornwall (Johnson and Rose 1982; Quinnell 1986). Recent work by the National Mapping Programme has identified over 2000 sites conforming to this type and in places they have a density of as many as two per square kilometre (Quinnell 2004, 211; Andrew Young pers comm). These are often small univallate enclosures which exhibit great variety in size, as small as 25m in diameter, often oval or circular but with some rectilinear forms (Quinnell 2004, 213). They are not necessarily sited for reasons relating to defensive strength, and are more likely to occur on lower hillslopes than hilltops (ibid, 211).

Although only a comparatively small number of rounds have been excavated it has already been established that some have origins in the Later Iron Age period, such as Threemilestone (Schwieso 1976) and perhaps Carvossa (Carlyon 1987; Quinnell 1986, 121). Some are exclusively later, such as Trethurgy, the only round to have seen total excavation, and which is an oval enclosure established in the second century AD (Quinnell 2004), illustrating this form extending well into the Romano-British period.

Since Johnson and Rose (1982) identified the diversity of this settlement-type, a process that continues with the National Mapping Programme, questions of function, status, inter-site relationships and chronology have been raised (Appleton-Fox 1992; Quinnell 2004). It
has been proposed that rounds were places of permanent settlement whose inhabitants controlled their own resources and that their proliferation during the Later Iron Age and Romano-British periods was a result of a stable social structure (Herring 1994; Quinnell 2004, 214).

Issues such as status and function are further complicated by the presence of contemporary unenclosed settlements, and the question of relationships between them and enclosed rounds complicates the character of Iron Age and Romano-British settlement in Cornwall – as the density and status of unenclosed settlements is not clearly understood. An unenclosed lowland settlement has recently excavated during the development of the Richard Lander School, Threemilestone, located near to at least one, and possibly two, contemporaneous rounds (Gossip forthcoming).

Whilst these enclosures were previously thought to have followed a general evolution from oval/round to rectangular as time progressed, possibly as a result of Roman military contact, the morphological development of these enclosures is no longer considered straightforward.

The enclosure at Boden has as area of 0.4 hectares (0.98 acres) and is rectangular in plan, slightly wider at its southern end. The dating evidence from the enclosure ditch and internal features, including the fogou have established the earliest dates for this type of rectilinear enclosure in the fourth century BC date and the evidence is growing for the establishment of other small enclosed sites towards the end of the Early Iron Age. As discussed above, only one excavated example, at Threemilestone, appears to have been occupied solely during the Middle/Later Iron Age (Quinnell 2004, 213; Schwieso 1976, 65-66). The previous supposition that there is a tendency to a more rectangular form in some of the later sites can be disputed by rounds such as Tregilders, Carvossa (Johnson and Rose 1982, 157) and now Boden and others. The regular rectangular plan of the the
enclosure at Boden is particularly interesting and so far unique for the Early Iron Age. At Halliggye the sequence begins with Early Iron Age Plain Jar Group ceramics, and the associated enclosure is potentially the same date (Elsdon and Quinnell forthcoming). Ceramics from the enclosure at Boleigh (associated with a fogou) again appear to suggest Early Iron Age origins (Quinnell 2000-1), so at these sites at least it appears that enclosures and fogous developed together earlier than previously thought. The coexistence of circular, oval and rectangular enclosures is intriguing as is the variation in terms of size and location (Quinnell 2004, 213). This may reflect differences in function or particular local construction traditions but further excavation and survey is required to clarify the meanings of these differences.

In the area close to Boden a number of small enclosures have been identified from analysis of maps and aerial photographs, although no comparable sites have been excavated. Only 185m to the south of the Boden site, immediately west of Higher Boden is a circular ‘camp’ recorded by Charles Henderson, with its western edge is preserved today by a modern hedge. According to Henderson’s sketch the site measured approximately 85m in diameter and was sufficiently preserved in 1916 for him to record its full circular plan, although no ditch was extant by this time (Henderson 1916, 148). It is intriguing to consider whether the two enclosures, with conspicuously different shape and one at a slightly higher altitude than the other, are contemporary, and questions must be asked of the relationship between these two enclosures. Unfortunately today little can be discerned apart from the curvilinear field boundary hedge on the western side. In the future it is hoped to carry out a fieldwalking exercise with the Cornwall Archaeological Society and local volunteers.
At Gear and Caervallack enclosed sites have been partially excavated which appear to be distinct from rounds. The size, position and defensive nature of these sites (particularly the size of Gear) suggests that they are better classified as hillforts.

6.5 Fogous

The word fogou is derived from the Cornish word for cave, ogo (Padel 1985) and refers to a class of monument confined to a distinct regional area comprising the Land’s End and Lizard Peninsulas (Fig 54). Fogous are man-made subterranean tunnels dating to the Iron Age and Romano-British period which although unique to Cornwall have similarities with Breton, Scottish and Irish souterrains.

The number of confirmed extant fogous in Cornwall is a matter of debate since it can be argued that some have been wrongly classified as such by past observers. Recent writers have claimed the existence of eleven confirmed fogous (Cooke 1993), with the discovery of the fogou at Boden raising this total to twelve. Many more potential, or alleged fogous have been recorded as a result of field name or anecdotal evidence. In places it has been problematic distinguishing fogous from later hulls and crows, post-medieval storage structures often built into walls or partially subterranean (Tangye 1973, 40; Cooke 1993, 37), whilst some potential fogous have been mistaken as passage graves; at Porth Mellon on St Mary’s, Isles of Scilly, both interpretations have been considered for a subterranean structure found eroding from the cliff (Ashbee 1990). On closer examination however it has transpired that the structure is almost certainly of eighteenth or nineteenth century construction, probably a smuggler’s cache (Parkes 1988, Cornwall and Isles of Scilly Historic Environment Record).

The excavations at Boden have provided an understanding of the layout of the fogou and its relationship with the enclosure. The principal component is the stone built passage, curving at its northern end where it is likely to have continued until its junction with the
earth-cut section. This earth-cut section, now visible as the void under the field, may originally have continued eastwards and opened into the enclosure ditch. The southern end of the main passage is marked by two upright stones forming a sort of doorway, at which point the passage widens. The stone-built walls in this southern section are less well preserved, and contained collapsed roof stones. To the south again, and connected to the southern end of the stone-built section of the fogou was a long north-south aligned trench cut into the natural subsoil, perhaps an approach to the fogou.

Generally all confirmed fogous conform more or less to a particular morphology and character. A number of criteria are fulfilled by these structures: they are all of dry stone-walled construction, usually corbelled, but may contain earth or rock cut elements. Stonework is usually laid in roughly horizontal courses. They are all subterranean structures, but parts or the majority of them may be visible above ground. They tend to be roofed with stone slabs, but some have had their roofing slabs removed, or have collapsed, may never have been roofed at all, or may have been roofed over with timber. They all contain at least one linear (or curvilinear) walled passage, as well as side chambers or ‘creep’ passages, and they are, almost without exception, associated with contemporary settlements such as ‘rounds’ (enclosures) or courtyard house settlements; although these would appear to be contemporary with later fogou phases (eg Carn Euny, Christie 1978).

Discussion has been made of a specific consistent orientation (Cooke 1993), and although eight fogou passages are aligned approximately north-east to south-west, there are three, including Boden that do not fit this orientation.

Fogous fitting the above criteria are known at Boden, Halliggye, Carn Euny, Boleigh, Pendeen, Trewardreva, Lower Bosacaswell and Chysauster (Cooke 1993, 53, 64, 82, 91, 108, 113, 121). Two fogous, at Higher Bodinar and Castallack are now destroyed but have legitimate and detailed antiquarian records (ibid, 132, 139). At Treveneague (ibid, 143) the
location of the ‘lost’ fogou has now been identified by geophysical survey as part of a Time Team programme in 1995 and excavation of a small trench across the top of the fogou confirmed that the roof capstones are still in place (Cornwall and Isles of Scilly HER, PRN 29033.1). The entrance to this fogou remains blocked. A popular account has been published (Channel 4, 1996, 5-9).

A suggested above-ground fogou at Porthmeor (and perhaps also Bosullow Trehyllys) courtyard house settlement is possibly an adaptation of a curving long room, but may have its origins in the same tradition as the fogou (ibid, 100, 164). Some of these additional fogous may be misclassified monument types (eg passage graves or hulls) or a result of the misinterpretation of folklore, others are almost certain to have once existed but have been totally obliterated, at least above ground. Others no doubt await discovery – the recent appearance of a void in a field to the west of the Pixie’s Hall (Trewardreva) may indicate the earth-cut section of a fogou similar to Boden (Historic Environment Service Information File). It should be noted that the earth-cut passage at Boden lay hidden for nearly 200 years; the stone-walled passage for perhaps over 2000.

6.5.1 The phenomenon of fogous
Only three fogous, at Carn Euny (Christie 1978), Halliggye (Startin forthcoming) and now Boden have been excavated using modern techniques and practices, although many fogous were recorded in local folk memory and have been explored by antiquarians over the last 300 years. The earliest known written account of a fogou was by John Norden, when the fogou at Pendeen Vau was drawn on his map of Cornwall (Cooke 1993, 92). In 1702 William Hals recorded that Royalists took refuge at Boleigh fogou during the Civil War (ibid, 82), and later in the eighteenth century the fogous at Boleigh, Pendeen Vau, Higher Bodinar were explored and recorded by William Borlase (1696-1772) (ibid 82, 92, 132).
In 1816 Reverend Richard Polwhele (of Manaccan and St. Anthony) was the first to record the fogou at Boden, recording it as ‘merely an excavation of the earth, without any stone for walls in roof’ (Polwhele 1816, 128); clearly a description of the earth-cut tunnel rather than the stone-walled passage. The reports of later writers appear to “embellish Polwhele’s original report without reference to any further field observations” (Linford 1998, 188), although it is possible that Charles Henderson, a renowned Cornish historian (1900-1933; Cooke 1993, 31) visited the site.

Previously in 1803 he had entered the long passage at Halliggye through a hole in its roof (the ‘antiquarian hole’) and stated that it ‘contained urns’. It was in the same year that he visited the ‘Piskey Hall’ at Trewardreva on the north side of the Helford estuary (ibid, 107-111). Others such as Reverend Buller, Henry Crozier, and most notably JT Blight continued to explore fogous in the latter half of the nineteenth century, often producing the first measured plans and engravings of these enigmatic structures (Cooke 1993, 27). All that survives of the once impressive fogou at Castallack are the drawings and engravings of Blight. Later antiquarians include W.C. Borlase who excavated the fogou at Carn Euny, discovering that the long passage had been deliberately blocked, and who created a record of Higher Bodinar before the fogou was destroyed. Charles Henderson continued the work of recording and planning fogous into the first half of the twentieth century (ibid 31).

Whilst all fogous share common morphological characteristics, inconsistencies make comparisons between structures difficult to draw. Since many fogous, including that at Boden, do not survive in their original form, measurement of their true dimensions and characteristics are problematic. However, with the notable exceptions of Carn Euny and Halliggye there is little disparity in length between the main passage at Boden (estimated as being in the region of 10m) and those at Boleigh, Treveneague, Porthmeor and Higher Bodinar, and wall heights and passage widths are all generally uniform (Cooke 1993, 86,
144, 101, 137). Other shared characteristics such as the presence of side passages or creeps, restrictions (width and height) and earth-cut elements are outlined in the table below (Table 9).

Antiquarian writers recognised that the construction of fogous was most probably undertaken during the pre-Roman Iron Age. Boden has provided secure dates for final use of the fogou in the fifth-fourth centuries BC (a radiocarbon determination provided a \textit{terminus ante quem} for the fogou’s construction of 420-350 \textit{cal BC} (94\% probability), consistent with those for the first phase of construction at Carn Euny (Christie 1978, 331), but probably a little earlier than those at Halliggye (Elsdon and Quinnell forthcoming).

**Table 9 comparison of fogou characteristics**

<table>
<thead>
<tr>
<th>Site</th>
<th>Max Length (m)</th>
<th>Max Height (m)</th>
<th>Width 1 (m)</th>
<th>Width 2 (m)</th>
<th>Creep/side passage</th>
<th>Earth-cut elements?</th>
<th>Restriction</th>
<th>Assumed orientation</th>
<th>Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boden</td>
<td>9.8</td>
<td>1.5</td>
<td>1.9</td>
<td>1.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>LEIA</td>
<td>N-S</td>
</tr>
<tr>
<td>Carn Euny</td>
<td>20</td>
<td>1.82</td>
<td>1.98</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>LEIA</td>
<td>NE-SW</td>
<td>3</td>
</tr>
<tr>
<td>Halliggye</td>
<td>27</td>
<td>1.8</td>
<td>1.65</td>
<td>1.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>LEIA</td>
<td>NE-SW</td>
</tr>
<tr>
<td>Boleigh</td>
<td>10.8</td>
<td>1.95</td>
<td>1.0</td>
<td>1.46</td>
<td>Y</td>
<td>X</td>
<td>Y</td>
<td>LEIA</td>
<td>?</td>
</tr>
<tr>
<td>Trewardrevva</td>
<td>7.9</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>IA</td>
<td>NE-SW</td>
</tr>
<tr>
<td>Pendeen</td>
<td>17.1</td>
<td>1.49</td>
<td>1.5</td>
<td>1.65</td>
<td>X</td>
<td>Y</td>
<td>Y</td>
<td>IA/RB</td>
<td>NW-SE</td>
</tr>
<tr>
<td>Lower</td>
<td>6.1</td>
<td>1.8</td>
<td>1.49</td>
<td>1.81</td>
<td>Y</td>
<td>X</td>
<td>?</td>
<td>IA/RB</td>
<td>WNW-</td>
</tr>
<tr>
<td>Boscaswell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>ESH</td>
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<tr>
<td>Bodinar</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castallack</td>
<td>6.0</td>
<td>1.05</td>
<td>1.2</td>
<td>0.93</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>IA/RB</td>
<td>NE-SW</td>
</tr>
<tr>
<td>Treveneague</td>
<td>10.2</td>
<td>1.4</td>
<td>1.2</td>
<td>1.8</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>IA?</td>
<td>ENE-</td>
</tr>
<tr>
<td>Porthmeor</td>
<td>13</td>
<td>1.36</td>
<td>1.82</td>
<td>2.12</td>
<td>X</td>
<td>X</td>
<td>N</td>
<td>IA/RB</td>
<td>NE-S</td>
</tr>
</tbody>
</table>

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Cornish fogous share similarities with the souterrains, or underground tunnels, of Brittany, Ireland, Scotland and Jutland. Although it has been considered that the presence of underground structures in these areas reflects a cultural tradition spreading northwards along the Atlantic seaboard away from continental European influence, there are problems of chronology that could question this model.

The souterrains of Brittany appear to be the closest counterparts to Cornish fogous in chronological terms, and are generally thought to have been constructed between 600 – 100BC. Breton examples occur mainly in the western coastal area and are almost without exception cut from solid rock (Giot 1995, 287; only a handful, like that at Trinité-sur-Mer being stone built and associated with hut complexes. A similarity that the Breton souterrains share with fogous is that they are associated with settlement sites (Clinton 2001, 179; Giot 1995, 290). Breton souterrains, thought to be exclusively Iron Age in date are typically far more complex than Cornish fogous and have little consistency of design, although this will be depend largely on the nature of the subsoil or bedrock into which they are cut (Giot 1995, 290). Orientation of Breton souterrains is variable (ibid, 292), lacking the broadly consistent north-south alignments of fogous.

Thousands of Irish souterrains are known to exist. These have some similarities with Cornish fogous, namely that they are drystone constructions in trenches, are built using a corbelled technique and roofed with capstones. Others have ‘restricted’ or ‘unrestricted’ passages, circular ‘beehive’ chambers or ‘door jambs’ (ibid, 8). These are often very complex structures, built on more than one level, with air shafts, rooms and internal and external entrances, and are more obviously associated with defensive enclosures such as ringforts (eg Raheenamadra, Co Limerick), although the secondary function of storage is also likely (ibid, 56). Examples include those which are earth or rock-cut, or constructed from timber (eg Coolcran, Co Fermanagh) and are thought to date to c 500 – 1300 AD,
and unlike Cornish fogous have references in ancient literature (eg Lives of the Saints, chronicles of saints written by Irish clerics in the 12th and 13th centuries; *ibid*, 13). No Irish souterrains constructed before the middle of the 1st millennium AD have been verified (*ibid*, 13).

Morphologically Scottish souterrains (or ‘earth-houses’) are the closest parallels to Cornish fogous, although these occur in clear regional groupings with marked differences in distribution and type. Those of ‘Southern Pictland’ (Angus, Perth and Fife) compare most favourably in terms of morphology with Cornish fogous, basically ‘consisting of a long curving chamber’ and a ‘narrow entrance passageway’, although they tend to be wider and taller (*ibid*, 186). Scottish souterrains in all regions, although varying greatly in form, share the common fogou characteristics of dry-stone walled passages (often curved), stone-jambs forming entrances and lintelled roofs. Several have been found to contain timber elements such as roofs or revetments (Pollock 1992, 153) or to have been constructed entirely of timber (Wainright 1954-56; Watkins 1978-80a and b; Armit 1999 581-582). The evidence suggests that these mainly date from the late Iron Age to sixth century AD, and are usually associated with settlement. A large number, perhaps the majority of those in the ‘Southern Pictland’ group saw abandonment in the second century AD (Armit 1999, 587). A small number lying to the south of the Forth-Clyde isthmus share many similarities but it seems that these are more likely to be of Roman date (Welfare 1984, 311).

Another small group of souterrains exists in Jutland, comprising simple curving or angled passages leading to a chamber, with use during the late pre-Roman period (Clinton 2001, 190-191).

Despite the occurrence of the souterrain phenomenon along some of the Atlantic coasts there is little evidence to suggest that these communities were directly influenced by one another, or that the building tradition could indicate the migration of an ‘idea’ along
Atlantic coasts, especially when one takes into account the chronological range over which souterrains were built. Although they share a general similarity in their structural form, ie they are all subterranean tunnels and have inherent megalithic qualities, the suggestion that the people building and using these structures shared a common notion of architecture is one for which there is little evidence.

6.5.2 Function
Ever since William Borlase an answer to the question of function has evaded those writing on the subject of Cornish fogous and souterrains generally. It has already been noted that the later souterrains of Ireland are generally accepted as having a primary defensive function; and this is supported by written texts (*ibid* 14, 59). Although this was the prevailing antiquarian hypothesis for many of the Scottish examples, and particularly for those in the north and west (*ibid*, 189), where souterrains were thought to have more obvious militaristic associations, these theories are no longer widely accepted (Welfare 1984, 318; Barclay 1978-80, 206; Armit 1999, 582).

Three basic functions have been suggested and explored for the Cornish fogou: as a place of storage, refuge or ceremony (Maclean 1992 31-64; Christie 1978, 332; Cooke 1993, 267). Despite the efforts of writers to establish a single primary function it remains a possibility that all of these practical needs of Iron Age community were served by the fogou. Storage of food stocks, whether for animal or human consumption would have been of utmost importance, and probably necessitated the practice of ceremonies and rituals in order to ensure food preservation and thus the survival and prosperity of the community.

Structures with perhaps a primary function of food storage or even refuge may not necessarily have been viewed in a purely utilitarian light (Rose 2000-1, 116); these structures probably having significant symbolic meaning as a result of the ‘special commodities’ placed within their care (Quinnell 1986, 119). The currently accepted argument of Scottish souterrains as grain storage vaults has not diminished the likelihood
of their association with ceremony or ritual. Whilst food storage may be the primary function of these structures it is probable that their construction and use was linked to ritual practices surrounding cycles of food production and storage (Armit 1999, 583). As that writer concludes “it is likely that nothing within Iron Age society was entirely devoid of a ritual or symbolic dimension” (ibid).

There is other evidence for the subterranean storage of foodstuffs. Ash pits recorded by Polwhele (1816, 129) at Trewardreva have been suggested as being for the preservation of gulls eggs, as demonstrated by the islanders of St Kilda (Fox 1964), and it has been shown that certain foodstuffs, particularly dairy products and beer last particularly well in the dark, cool, atmosphere of the fogou (Clark 1961). The prevalence of hulls close to Cornish farms for the storage of dairy and other products, in use from the post-medieval period up to the present day (Tangye 1973, 38), and the ‘crows’ of West Penwith (Nicholas 1968, 70, 72) is testament to the usefulness of dark, stone-lined and semi-subterranean structures.

That fogous are thought of today as particularly damp places has caused some writers to preclude them as places in which to store foods such as cereal surplus (Maclean 1992, 44-47). However, that they were not better maintained during the time of their use is unlikely, and they may have been far drier than they appear today and could even have been waterproofed. Another commodity of great value to local communities and which was probably only traded at particular times of the year is tin (Herring 1994). This material would certainly have required safe storage and fogous would have been the ideal place for this.

The usefulness of a fogou as a refuge in times of attack is open to debate. Some fogous lack a double entrance, and even without this feature it is easy to see that they would only serve to trap those seeking refuge below ground. This is an argument analogous with the Scottish souterrains (Welfare 1984, 318). Since it has been argued that most, if not all fogous would have been visible to some extent from the ground above then they would
not have protected the whereabouts of those under siege. Perhaps if they were solely to provide refuge from raiding parties for short periods of time then they would have provided adequate protection. Other examples such as Halliggeye and probably Boden do have an entrance within the enclosure and an ‘exit’ into the enclosure ditch, but the restricted passages at both would not allow for rapid escape. The extension of the earth-cut tunnel, or ‘creep’ as far as the enclosure ditch to the east of the Cornish hedge has not been proven, but the geophysical survey and comparison with other sites would seem to suggest that this is likely. The earth-cut approach trench connecting to the stone-built section of the fogou is an element without parallel in other known fogous, and is suggestive of more than a basic entrance from inside the enclosure.

The restricted access nature of their passages could however be seen as a design feature consistent with a refuge function and for the storage of valuables during raids (Startin forthcoming). It is well-documented that the fogou at Boleigh was used by Royalists during the Civil War (Hals 1702, 82), but at this time it was probably easy to conceal from those unfamiliar with the area.

Although they are tantalising, suggestions of ‘ritual’ or ‘ceremony’, such as the possible carving of a human figure at the entrance to Boleigh or the niche in the corbelled round passage at Carn Euny, cannot prove emphatically a primary function of ritual. A carving of some sort may have existed at Boleigh, having been first noted by a Dr Ford in 1957 (Cooke 1993, 88), but is now totally eroded; an attempt to draw the figure by the archaeological illustrator Rosemary Robertson failed to identify any definite signs of carving (Young 2000-1, 138). If the carving did exist, interpretation of its purpose, and what it represents, should be treated with caution (Cooke 1993, 87-88). The author supports the view that "refuge and ritual (or storage) should not be seen as mutually
exclusive interpretations” (Rose 2000-1, 116) and that each or all of these may have been the functions of some or all of the known fogous at a particular time during their use.

Another interesting occurrence is the apparently deliberate closure of fogou passages. The main passage at Boden had been infilled in what was more or less a single event, probably at the same time as disturbance to its southern entrance, and almost certainly carried out in antiquity. The spread of pottery, beads and a polished stone S5 in the basal deposits also suggests the ritualised deposition of material prior to the ‘closure’ of the structure, since this material appears to have been deliberately deposited on the floor of the fogou without any significant lapse of time before the main infilling episode. The pottery is not heavily abraded, and is likely to have been deposited on the base of the fogou soon after being broken, possibly even broken deliberately for the act of deposition. The infilling event must have resulted in the entire structure going out of use, even if activity continued within the enclosure. There is no evidence that the fogou went out of use as a result of its dereliction, reinforcing the very deliberate nature of the fogou’s ‘closure’, a phenomenon recognised at Scottish souterrain sites such as Dalladies, Newmill and Cyderhall (Watkins 1978-80a 122-164; and 1978-80b, 165-208; Pollock 1992, 153). The souterrain at Longforgan showed that there the stone roof had been very carefully removed and the passage filled in a “single continuous operation” (Wainwright 1954-56, 62). It is not clear whether the fogou approach continued to function after the infilling of the main fogou passage, although the presence of pottery (P25) other than Early Iron Age suggests that this linear trench may have stayed open following the closure of the stone-built sections of the fogou. The long passage at Carn Euny shows a similar episode of deliberate filling or closing off, and suggests the purposeful closure of sections of the fogou, if not total concealment of the structure. Here the careful backfilling of the long passage would indicate a process of ritual closure (Christie 1978, 332), although this does not necessarily signify a primary ritual function. The indications are that Halliggye too was “cleared” and
blocked or sealed perhaps in or after the fifth century AD (Startin forthcoming). Deliberate infilling of fogous would therefore seem to imply a ritualised motivation for closure if not a primary ritual function.

The modern mind might sense that fogous often lack the design features that make them unmistakeably 'ritual' although the corbelled round chamber at Carn Euny is an obvious exception (Rose 2000-1, 116). The importance of twenty first century preconceptions has to be questioned however, and anyone who has spent a short time at the far reaches of Halliggye fogou would attest to this. Here there really does seem to be a separation from reality and above-ground everyday life, where the dark stillness creates the atmosphere of a special and even supernatural place. The eerie and magical play of candle light on the walling of the fogou accentuates the effect on the senses, and one imagines artificial light during the Iron Age to have had a similar if not more eerie effect. This sense of restriction, secrecy and spirituality is in some way accentuated by the megalithic nature of fogou construction, most easily appreciated at the largest fogous of Carn Euny and Halliggye, but also sensed at Boleigh, Trewardreva and indeed here at Boden. The monumental nature of fogou architecture has led some writers to draw analogies between fogou building and Iron Age communities and the significance of the medieval parish church to its parishioners, particularly in terms of the local investment of effort, skill and curation (Christie 1978, 332-333).

In Peter Rose’s exploration of Cornish caves he argues that they had a place in the psyche of the people of Cornwall, as places mixing 'practical convenience, mystery and a sense of enchantment', a concept which can be applied to all subterranean passages, natural or otherwise (Rose 2000-1, 95). There is also widespread evidence of prehistoric ritual practice in caves most often comprising burial and also including the deposition of votive metalwork; and later Christians adopted use of caves as places of solitude and devotion.
Caves have had practical functions, used as dwellings (such as Daniel Gumb’s cave on Bodmin Moor), hunting sites (seals), natural caves linked to mines, smuggler’s caves and hiding places (*ibid*, 96, 100-101).

Many natural caves, and fogous too, have been woven into folklore stories and popular mythology; Pendeen Vau is traditionally thought to run deep under the sea and be ‘the haunt of some terrible spirit’ (Blight 1876, 165) known as the ‘Spirit of the Vow’ (Rose 2000-1, 109). The fogou at Boleigh was believed to be inhabited by evil spirits where mothers would caution their unruly children with the threat of being “taken down to the Fuggo, and leave them there for the Bucca-boo” (Bottrell 1873, 28). This was also a place which hares were thought to frequent, used as familiars to communicate with their witch masters. Again, this fogou was thought to extend far beyond its true extents; perhaps this alludes to the separation from the real world felt by those entering fogous (Cooke 1993).

There are stories of the occupation of Higher Bodinar (known locally as The Giant’s Holt) by “ugly spriggans” (a malicious fairy in Cornish folklore) keeping watch over treasure, and at Carn Euny too there was a tradition of buried treasure. Elsewhere the supernatural presence in fogous would result in misfortune for those foolish enough to explore these ancient edifices; at Boleigh the roof would fall on those that stayed too long, whilst at Pendeen Vau people would return terrified but refuse to say why. An early twentieth century account recounts a tale at Trewardreva of its haunting by piskies, “little people” or ghosts (*ibid*, 217-220, 309-311).

So popular folklore shows us that fogous have been seen as liminal places, on the edge of the known world, and marking the transition from light to dark – ‘epitomising the wild rather than the safe’ (Rose 2000-1, 114). The recurrence of tales of “spriggans” and “piskies” and the general misfortune occurring to those that entered them emphasises the secret and restricted nature of the fogou. These are traditional stories of unknown date or origin recorded during the historical period. It is tempting to suggest that during the Iron
Age similar rules are likely to have been applied and recognised by the communities using fogous, but it is a fact that there is no direct evidence for this. Impossible to prove but similarly possible is the idea that restrictions of access were in place during the use of fogous which made them available only to the few with authority, perhaps those that were powerful, initiated, invited, or sacred. Bill Startin believes that Haliggye fogou could have provided the structure for an “oracle” or secret access/exit for spiritual ceremonies (Startin forthcoming). The often restricted access to fogous, and the restrictions often built into passages – their small lintelled ‘doorways’, bottlenecks and ‘creep’ passages, as demonstrated at Boden, Halliggye, Carn Euny and others, supports the notion of fogous as ‘secret’ places, to be visited only by the initiated few. Perhaps the deposition of S5, a pebble polishing stone with a high sheen deposited against the western stone upright ‘pillar’ of wall (801) is an indicator of the importance of this place where the fogou narrowed.

6.6 A special hill - the importance of the site
6.6.1 Structured deposition in the Bronze Age and after
Although incomplete the excavated evidence from Boden is intriguing to say the least, and points to the repeated occupation of a site over a period of around 2000 years. During two of these phases of activity, the Middle Bronze Age and the end of the Early Iron Age, there are structures built at the site which have unusual and rather special characteristics. The Bronze Age structure identified to the west of the enclosure in Trench 1, whilst not extraordinary in itself, contained pottery (P1) with no known comparanda in terms of size or decoration. The reasons for its breakage were deliberate, and its deposition, clearly structured, may reflect a specialised function for the structure or a complex process of ritual abandonment. It is quite possible that the remainder of the vessel lies buried in the part of the structure that is unexcavated to the east and if these and any associated finds were excavated they may shed additional light on the practices at work at the time of its
deposition around the middle and the end of the second millennium BC. Processes of deliberate abandonment are now recognised as typifying the final phases of Bronze Age structures in Cornwall. Post-built structures set into hollows are seen to have been deliberately infilled, and sealed (for instance by stones) at a number of sites such as Trethellan, Callestick and Trevilson (Nowakowski 1991 14-103; Jones 1998-9 43; Jones and Taylor 2004, 104). These elaborate patterns of ‘closure’ are likely to have occurred at Boden too - the fragments of highly decorated pottery from an unusually large vessel having been deliberately broken and carefully arranged and subsequently sealed by a stony layer of earth.

The special treatment of everyday objects has been recognised on many sites of Iron Age and Romano-British date and is seen to have been particularly prevalent in the pits of Iron Age Wessex (Hill 1995). Structured deposition in Romano-British settlements is thought to indicate the survival of local practices throughout the Roman period (Clarke 1997, 80; Richardson 1997, 88). The deliberate selection and placement of artefacts is therefore accepted as commonplace in Iron Age contexts (Hill 1995), and the continuance of long-held ritualized practice from the Bronze Age and into the early centuries AD is likely.

The most obvious evidence for structured deposits in the Iron Age and Romano-British features at Boden are the basal silts within the fogou and broken pottery and querns in the ‘well’. Basal deposits within the fogou at Boden produced a range of Plain Jar Group ceramics (including P5-P9, all from (806)) in addition to stone finds S3, a large cobble muller; S4, part of cobble whetstone; and from (805) S5, a pebble polishing stone with a high sheen deposited against the western stone upright ‘pillar’ of wall (801) where the width of the passage narrows, or is ‘restricted’. Polishing stone S3 and a handle (or ‘lugged’) sherd appeared to have been wedged against the base of the fogou stone-work. Two small beads, one of dark blue glass and one of amber were also recovered from ‘floor’
deposit (806). These finds in a deposit which probably represented the end of use of the fogou may have been specially selected for inclusion, marking a final ritual act at the time of closure. If this was a deliberate act of closure the event must not only have required huge physical effort to remove the capstone roof and to backfill with soil, perhaps with bank material, but must also have had a profound impact and held great importance to the community who deemed it necessary. Acts of closure as part of a ritual tradition could therefore have survived into the Iron Age from the Bronze Age. In addition to Boden, deliberate infilling has been identified at Carn Euny and Halliggye (Cooke 1993 64, 53).

Pits and shafts have been recognised as marking spatial and conceptual boundaries (such as enclosure entrances) and making divisions within social, physical space and temporal space. Ritualised ‘rubbish’ has been specially selected for deposition in these contexts. The deposition of a saddle quern, waterworn stones, pottery and an iron ring in pit [78] at Trethurgy and a complete and broken saddle quern and other stone tools in an Early Iron Age pit [345] at Trenowah are possible structured deposits relating to foundation deposits (Quinnell 2004, 237; Quinnell forthcoming c). A pit containing pottery and burnt bone was found close to the enclosure ditch at Pollamounter, a Romano-British site (Jones and Taylor 2004) and two were located near to the upper edge of the Romano-British field system at Stencoose apparently the focus for deliberate deposition of ceramics, perhaps marking the boundary to a field system and emphasising ownership of the enclosure in a symbolic way. A pit ([21]), thought to mark the same alignment as the field system ditches had also been filled with a large number of pottery sherds and other discarded everyday objects, supporting the notion of deliberate deposition (Jones 2000-1, 84).

Other structured deposits have been identified at Trethurgy, where an unusual deposit including large amounts of imported or exotic material, a stone bowl and quern was seen in association with Structure G, a possible shrine (Quinnell 2004, 236-7). Also at Trethurgy
was a pit which had a close spatial relationship with a suspected granary, and a hearth-pit within structure A1b also contained apparently deliberately selected and buried material (Quinnell 2004, 237). The stone mensuration weight recovered from a posthole at Tremough may indicate a deliberate deposit marking the end of use of the House (Gossip and Jones forthcoming). At Stencoose the terminal of a Romano-British field ditch ([6]) was the focus for deliberate deposition of ceramics, perhaps marking the boundary to a field system. A pit ([21]), thought to mark the same alignment as the field system ditches had also been filled with a large number of pottery sherds, iron and a broken stone object, suggesting special, ritualized emphasis of these alignments and boundaries (Jones 2000-1, 84). A pit just outside the Romano-British enclosure at Tremough contained a carefully laid out assemblage (all external surfaces facing up) of deliberately broken pottery and is evidently structured. The special nature of deposits such as this, like those within the Boden ‘well’ could have been linked to ideas associated with the marking of boundaries, or the protection of activities or practices. Perhaps the deliberate inclusion of broken querns in the ‘well’ acts as a symbolic reference to the importance of cereal production and processing. In Iron Age Wessex, deliberately broken, decorated pottery has been recognised as being selected for deposition at spatial and conceptual boundaries, such as enclosure entrances (Hill 1995). Or perhaps was there an increasing need to justify ownership (Bradley 2005, 169), a need expressed in the ritualized deposition of everyday artefacts with metaphorical links to agriculture and the production of food. The selection of domestic items should not be taken to imply mundaneity. In prehistoric communities even everyday actions could have symbolic meaning, where the sacred need not be distinct from the profane in terms of either the content or location of deposits (Hill 1995). Elsewhere in Cornwall are examples of the marking of boundaries with ritualised deposits; a pit containing pottery and burnt bone was found close to the enclosure ditch at Pollamounter with a Romano-British site (Jones and Taylor 2004, 39), and two pits were
located near to the upper edge of the Romano-British field system at Stencoose (Jones 2000-1, 84); similar ritualized practices could also have occurred at Boden.

The location of the pit, shaft or ‘well’ at Boden and its spatial relationship with contemporaneous features such as the enclosure ditch, bank and fogou may have been important factors in both its original location and the structured, perhaps ritualised nature of its backfill deposits.

At Bosence, St Erth, a pit or well in the corner of the rectangular enclosure measured 36 feet deep with a diameter of 30 inches, which when excavated included a pewter patera dedicated to Mars, a lead jug (of third to fourth century date), a stone stone weight, a ‘small millstone’ (probably a quern stone), a patera with two handles, fragments of horns, bones, half-burnt sticks and pieces of leather (Borlase 1769, 316-317; Page 1924, 8). The shaft and the unusual nature of artefacts contained within it strongly suggests a religious function and may indicate that the enclosure acted as a religious shrine. Further excavation of the Boden pit or shaft would be required if a true understanding of its function is to be sought, but it is possible that this too contained material deposited in a ritualised way. The Boden shaft certainly contained an intriguing assemblage of artefacts, including an amphora sherd of Italian origin, three fragments of rotary quern, a fragment of saddle quern and two worked cobbles, all with signs of deliberate breakage prior to deposition.

Outside Cornwall, where conditions for preservation have been more favourable, significant deposits of animal bones have been recorded in similar contexts (Merrifield 1987, 37-40) perhaps incorporated into features as part of a feasting ceremony (Fitzpatrick 1997, 78-9). Unfortunately faunal remains rarely survive in Cornwall and any such evidence has not survived at Boden.
6.6.2 Site Inter-visibility

The site at Boden lies just below the summit of a gentle hill at a height of 70m above sea level. The panoramic view from the site includes a number of known prehistoric monuments, particularly those close in date with the Bronze Age structure. To the north much of the distant landscape is hidden by the summit of the hill, but there are commanding views of the surrounding countryside to the south, east and west. From this point are clear views to the south-west and south-east and to sites on the horizon where the land rises up to its highest points on the Lizard peninsula. Due south-east the skyline is clearly punctuated by Roskruge Beacon, a Bronze Age barrow below which are two probable enclosures of prehistoric date. More distant views to the south-west show the ridge of the Goonhilly Downs plateau, with several barrows just discernible to the naked eye. A slightly higher area close to the Goonhilly telecommunications centre marks the position of Dry Tree barrow, today somewhat obscured by vegetation. This lies at 112m above sea level, almost the same altitude as Roskruge Beacon, at 114m.

Today the line of sight to the north is blocked by the modern hedge at the north end of the field. If this was removed the distant granite ridge would just be visible above the brow of the hill, comprising the prominent hills of Godolphin Hill, Tregonning, Carn Brea, Carmenellis, Carn Marth and possibly Nancrossa and Trannack Downs. A slightly elevated position (possible from the hedge to the east of the field, and therefore from the enclosure bank when extant) affords clear views to the north-east, overlooking Falmouth Bay to the prominent headland of St Anthony Head and Zone Point.

It is possible that the visibility of important sites was a factor in the positioning of the Bronze Age structure and the Iron Age enclosure and fogou; almost certainly monuments in the landscape acted as focal points and places of memory, with acquired cultural significance. The affinity between the natural landscape and prehistoric settlements has been discussed at length (eg Tilley 1994) and examples of site intervisibility and the
importance of hills and outcrops have been noticed elsewhere in Cornwall, particularly ‘ritual’ sites where monuments reference particular places in the landscape (Cole and Jones 2002-3, 136-137). So the natural landscape too is likely to have had greater significance to prehistoric than modern societies, who will have drawn less distinct divisions between their natural and cultural worlds. For Bronze Age and Iron Age communities at Boden the landscape surrounding them would have been seen as a world created by their gods, where distinctive natural features would have been directly associated with ancestors and memory, places of creation and communication with other worlds (Tilley 1999, 59, 117, 204). Although a comprehensive study has not taken place it is interesting to note that similar long distance views are possible towards upland areas prolific in both natural features and prehistoric monuments from the fogous at Halliggye, Trewardreva, Carn Euny, Chysauster, and Pendeen. More detailed observations from these sites may indicate that important places in the landscape were visible from all known fogous.

6.6.3 Conclusion
Whatever the purpose of the fogou, and only those interpretations most comprehensible to the modern mind have been presented here, it is reasonable to assume from their scarcity that they held a special significance to the people that built and used them. Other equally enigmatic features have been identified within the same field at Boden, but are so far very poorly understood. The ‘well’, shaft or pit, whatever its nomenclature, is an unusual feature on Iron Age and Romano-British sites and would certainly merit further exploration. The curvilinear, charcoal-filled ditch and the curvilinear alignment of stones are also tantalising but unexplained. What is clear is that these features are part of a complex site occupied during the Iron Age and again in the early centuries AD, superimposed on a site which was of special significance during the second millennium BC. The significance of an Early Iron Age date, in the centuries around 400 BC, for the enclosure and fogou at Boden should
not be underestimated; this is the first time that stratigraphically secure contexts have provided dates this early for either structure.

Also of note is the continuance of activity into the Post-Roman period, and although the exact nature of this is poorly understood it has provided the first published dated assemblage of Gwithian style material, OxA-14560 cal AD 590 - 670 (95% probability).

At present our understanding of Bronze Age occupation of the site is limited to the presence of a structured deposit of highly unusual, and indeed unique, pottery. Cumulatively the ‘special’ nature of finds, deposits and structures from each period of activity at Boden combine, making this hill a unique and enigmatic place in the landscape.

7 Location of the project archive
Artefacts and environmental material retrieved during the excavations, together with site documentation, specialists reports, drawings and photographs are housed at the Royal Cornwall Museum, River Street, Truro, TR1 2SJ. The HES project number is 2003067, the site code is BF03 and the museum accession number is 2005.23.

The documentary and artefactual archive from the 1991 investigation is held by HES (site code BDN 91).

The artefactual material from the 2002 fieldwalking by Truro College, which included flint tools and flint waste, medieval and post-medieval pottery, has been washed and bagged by grid square and is stored in CAU’s finds archive store (site code BDN 02). In time all material will housed at the Royal Cornwall Museum.

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