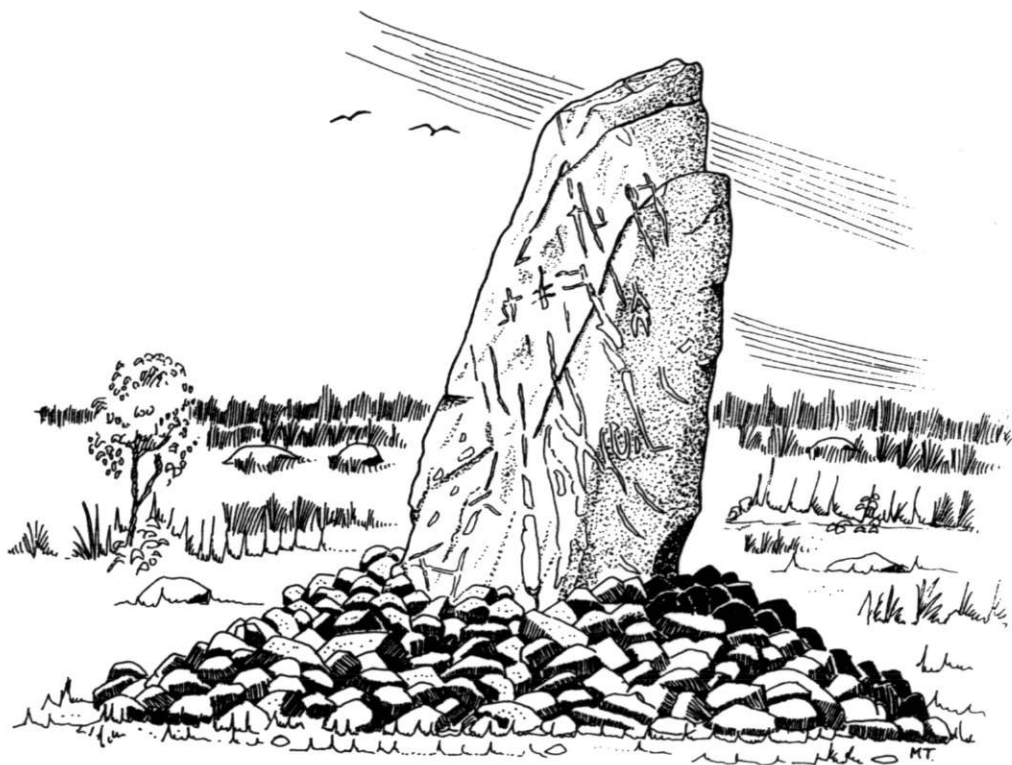


CORNISH ARCHAEOLOGY

No 36 1997



HENDHYSCANS KERNOW

COVER: St Breock Downs menhir, Men Gurta, the stone of waiting. Drawing by Michael Tangye.

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EDITORS

PETER GATHERCOLE AND PETER HERRING

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The excavation of a Neolithic enclosure complex at Helman Tor, Lostwithiel, Cornwall

ROGER MERCER MA FSA FRSE

Summary

Excavations at Helman Tor were commissioned by English Heritage in 1986 in order to investigate circumstances of preservation on the site and to ascertain its precise archaeological significance. The stone-built hilltop enclosure had been identified, on purely surface morphological grounds, in 1981 during consideration of the Carn Brea excavation results, as a likely parallel structure.

Excavation of one terrace at the northern end of the enclosure revealed that the enclosure was indeed of neolithic date with profuse structural and cultural remains of neolithic activity on its interior surfaces. The site is, unlike Carn Brea, virtually undamaged and is therefore of very considerable significance.

The excavation results are described and the material assemblage from the site compared with that of the type-site of Carn Brea.

Section 1 – The Excavation

Introduction

The discovery of a neolithic hilltop village, defended by its own stonebuilt rampart and set within a large enclosure complex at Carn Brea, Illogan, Cornwall (NGR SW 684408) (Mercer 1981) stimulated the discussion of likely parallel sites which could extend the unique insight this site had given into neolithic social organisation and culture (Mercer 1981, 187 *et seq*). The diagnostic features sought on the basis of the Carn Brea evidence required a hilltop site fortified by a massively constructed boulder wall which connected naturally unassailable 'tors' or outcrops of granite. If the parallel was to be exact there would be, within this *enceinte*, a series of artificially created terraces over an area of approximately 1 hectare. Good luck, in addition, would have furnished a number of stray finds of neolithic material on or near the site. A number of these criteria were satisfied at a number of sites but all of them were satisfied only at Helman Tor near Lostwithiel (NGR SX068607). 'A number of sites have been proposed (Trencrom, Roughtor, Dewerstone and, most confidently, Helman Tor) where uninvestigated parallels appear to exist, on grounds of surface morphology, with Carn Brea, and to which any extension of this enquiry might in the first instance be directed' (Mercer 1981, 193). The intention to open up Helman Tor

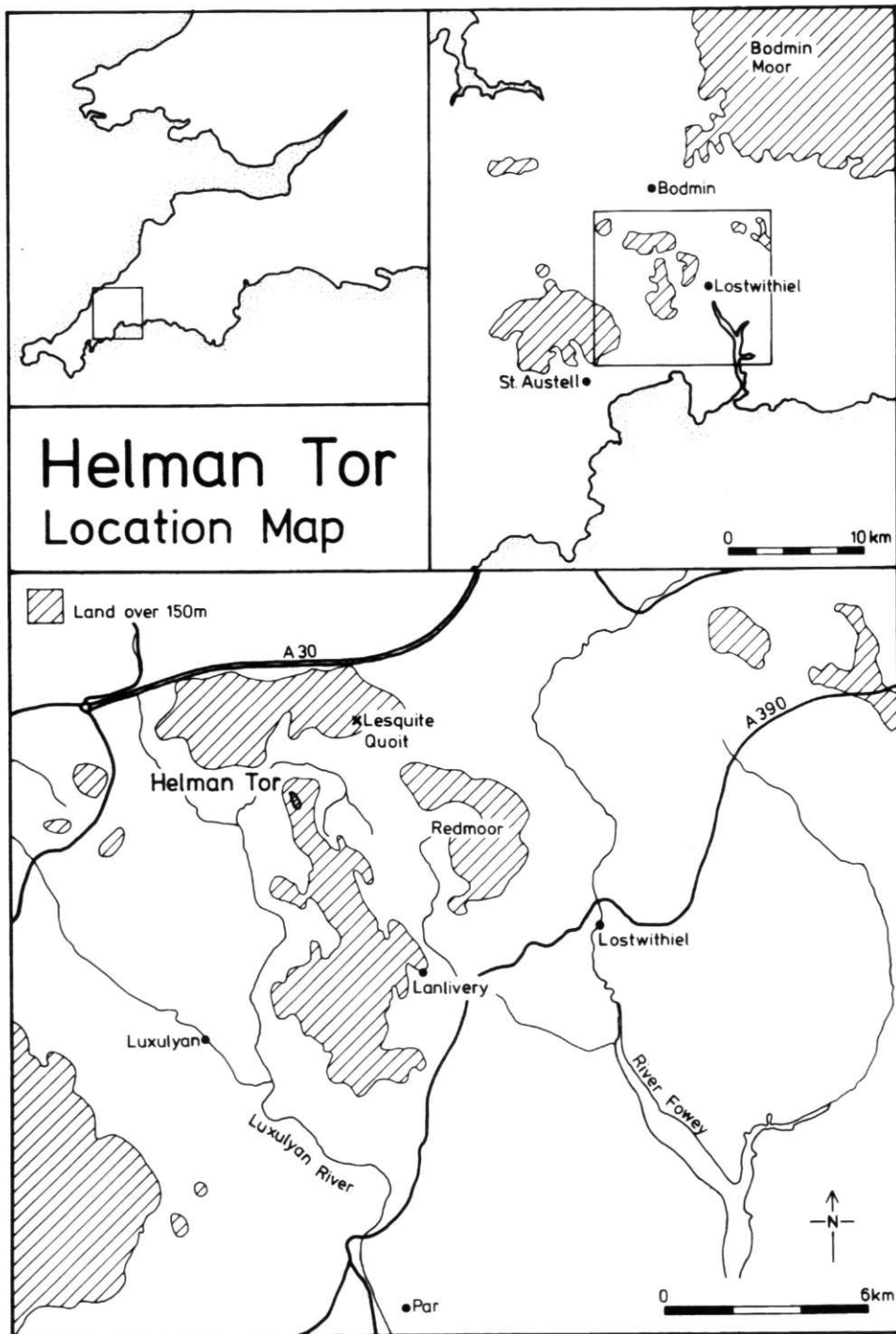


Fig 1 Location map, Helman Tor.



Plate 1 *Axe fragment 1831/CO420.*

to increased and more formal public access led the Historic Buildings and Monuments Commission (England) (English Heritage) to propose an evaluative excavation. Thus a valuable opportunity to explore this site arose, and excavation took place between 9th and 23rd August 1986.

Helman Tor (Pl. 13) is an isolated granite massif covered in bracken and grass, c.1 km long and 0.4 km wide, set within the civil parish of Lanlivery, and 4–5 km WNW of Lostwithiel, Cornwall. The foot of the hill stands c.110 m OD and its summit rises to 220 m OD. The hill forms the tip of a long spur running SSE-NNW jutting out in evenly rolling country based upon the metamorphic rocks that surround the Bodmin Moor intrusion. The hill overlooks Red Moor to the E and N where rise the northernmost headwaters of the river that flows southwards to enter the sea at Fowey. The river was, at least by the early medieval period, found to flow among tin-bearing gravels (and the descriptive place-name Red Moor must presumably allude to this fact). Extensive stream-working followed, and persisted into the present century. The modern-day landscape of scattered ponds and meres on the river flood-plain (which today is a Nature Reserve noted for its bird-life) may well, admittedly by an inconsequential process, reproduce that prevalent in the area in the fourth millennium BC. The eastern slopes of the hill today support fertile soils and a field pattern of some antiquity that has produced at least two neolithic stone axes (Harris *et al* 1977) – land that runs down to the floodplain of Red Moor. On the W flank of the hill, survey conducted by CCRA has demonstrated the survival of prehistoric field systems of unknown

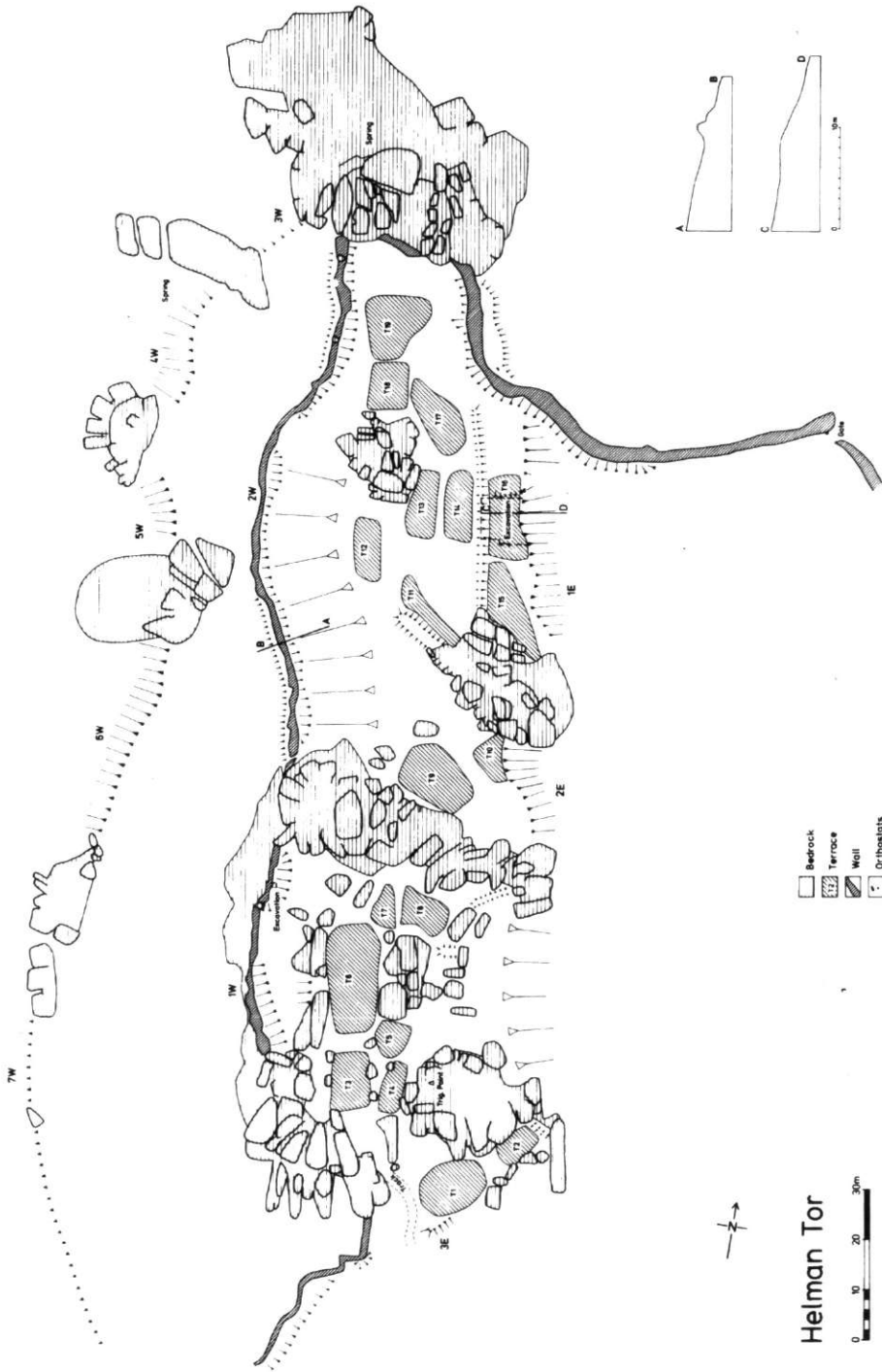


Fig 2 Site plan, Helman Tor.

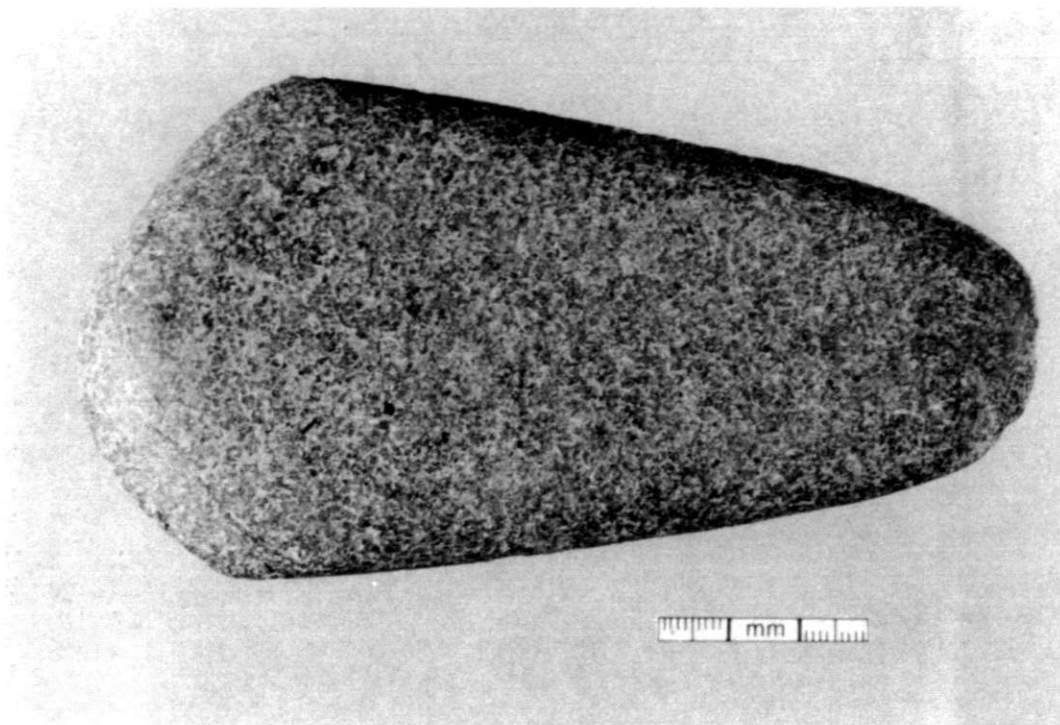


Plate 2 Axe 1833/CO422.

date. The nature of these field systems with clearance piles of small stones on to large natural boulders might prompt comparison with the evidence for cultivation of neolithic date located on Sites B and C on the SE slopes of Carn Brea (Johnson and Rose 1984).

Aims

The aims of the investigation were strictly limited. They were to establish the date, nature and cultural assignment of the site and by these means establish or disprove the degree of identity between Carn Brea and the enclosure on Helman Tor.

Results

The Site Survey: An excellent survey of the site had been completed in 1984 by the CCRA (Johnson and Rose 1984). This survey formed the basis for a detailed site inspection which was recorded in the form of a supplementary survey carried out by Edinburgh University at the scale 1:200 (Fig 2). This detailed inspection led to the conclusion that on the gentler sloping eastern side of the summit a massive boulder wall survived of the type present on the eastern summit of Carn Brea. This wall stretched for 75m from the northernmost 'tor' of the hilltop to the Central Tor (1E – see Fig 2) and then for a distance of 20 m southward (2E). At the southern limit of the hilltop a massive wall fragment turns to the W and a possible major gateway may remain here at the point where the modern track approaches the hilltop from the S, just to the W of Terrace T1 (3E). On the western side of the hilltop the approach is far steeper and more broken. Unassailable granite ledges occupy the

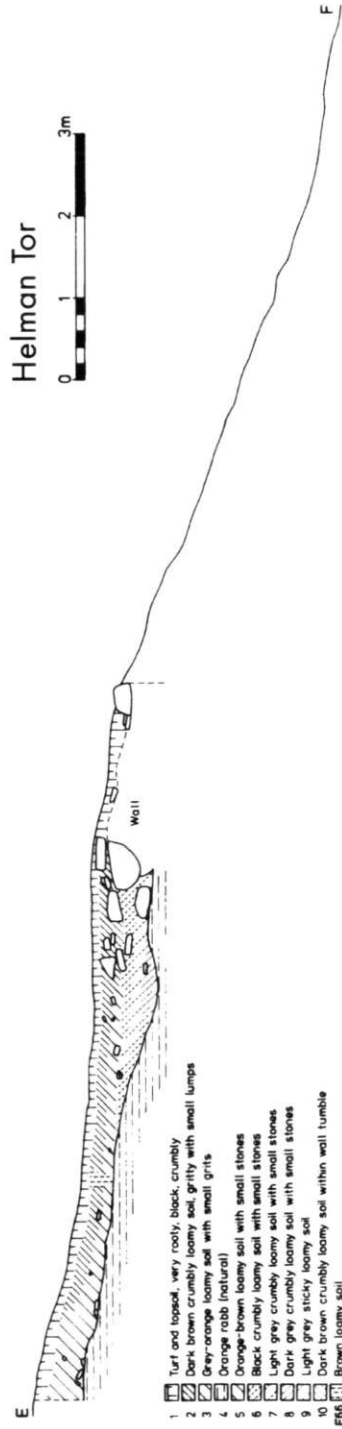


Fig 3 Section across excavated terrace and wall at Helman Tor.

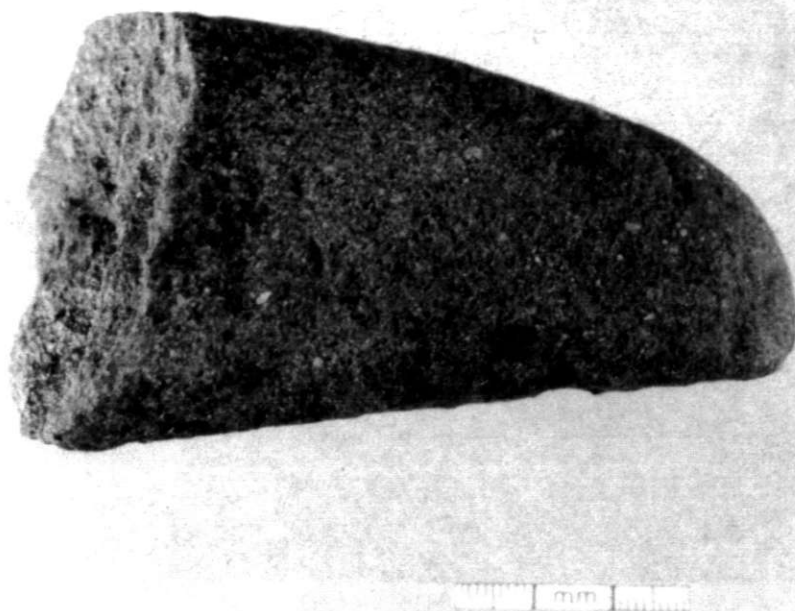


Plate 3 Rubber fragment of sandstone 1832/CO421.

southern half of this side of the summit, while elsewhere the going is very rough. Nevertheless a third wall does exist on the W side of the summit (1W and 2W) which offers a very attractive possibility as the western side of the summit enclosure. This wall is shown hatched on the plan and is built of some great blocks particularly at its base, but its upper structure, which would appear to be of more recent character, is of small rocks forming a 2 m high, still vertical, face. On the inner side of the wall a well-defined ditch exists at most points. A very small-scale excavation conducted in the filling at the bottom of this ditch produced recent bottle glass at its base. There is little doubt that this wall and its accompanying ditch are relatively recent, offering a control against stock moving from one side of the tor to the other. However, in its northern sector (2W) it does appear that this wall was built atop an early embankment (see cross-section A-B) which in all likelihood indicates the existence of an earlier wall correspondent with that on the eastern flank of the summit.

Set approximately 25–40 m below the break of slope from the summit on the W side there is a much dilapidated defensive line (3W–7W) (Plate 4) which in stature and form resembles closely the defence of the E side of the summit. It too joins natural granite outcrops to form a defensive line 240 m in length running N–S. This line, however, does not visibly form an enclosure with the eastern defences and furthermore occupiable areas are restricted to the immediate summit of the hill and do not extend, visibly, down the W slope towards this defensive line. The writer considers that this defence represents, in the context of Helman Tor, the outer enclosure element known at Carn Brea, in terms of ramparts 1S and



Plate 4 The outer wall on the W side of the site – length 3W from the N.

1N at that site. If this is the case the summit enclosure – defined largely by natural obstacles and the wall on the E side and its possible counterpart on the W is c.180 m N–S by 40 m E–W (an area of 9,000 sq m comparing very closely to the 1 hectare of the Carn Brea Eastern Summit enclosure) while the annex to the W enclosed by the Western rampart is at least 240 m N–S \times c.30 m E–W (an area of 9,200 sq m). This outer enclosure (if such it is) may well have continued into the present-day cultivation on the east side of the summit (thus, of course, being now destroyed) and, therefore, may have been originally much larger.

In sum, the *enceinte* of massively built, boulder-constructed wall at Helman Tor is only certainly present on the eastern side of the summit of the hill and at the southern extremity. On the western side there is the possibility of a former defensive line on the NW part of the summit (line 2W and 1W). A second line of defence down the slope on the W side is comparable with the E line of defence and may represent a secondary enclosure associated with the summit enclosure (line 3W–7W).

The area of approaching 1 hectare enclosed on the summit has a series of well-defined platforms and areas suitable for occupation set upon it. Nineteen were recorded during the survey conducted in 1986. These vary in size from 20 \times 10 m to 8 \times 4 m and a number are, at least partly, defined by built-walling (T2, T11, T15, T16). One of these terraces (Terrace 16) set against the massive boulder-built wall on the eastern side of the summit, was selected for excavation.

The Excavation (Figs 3–6)

After complete stripping of the terrace of its superincumbent bracken and gorse the outline of the site became very clear indeed. The terrace was well-defined with a clear bank of upcast

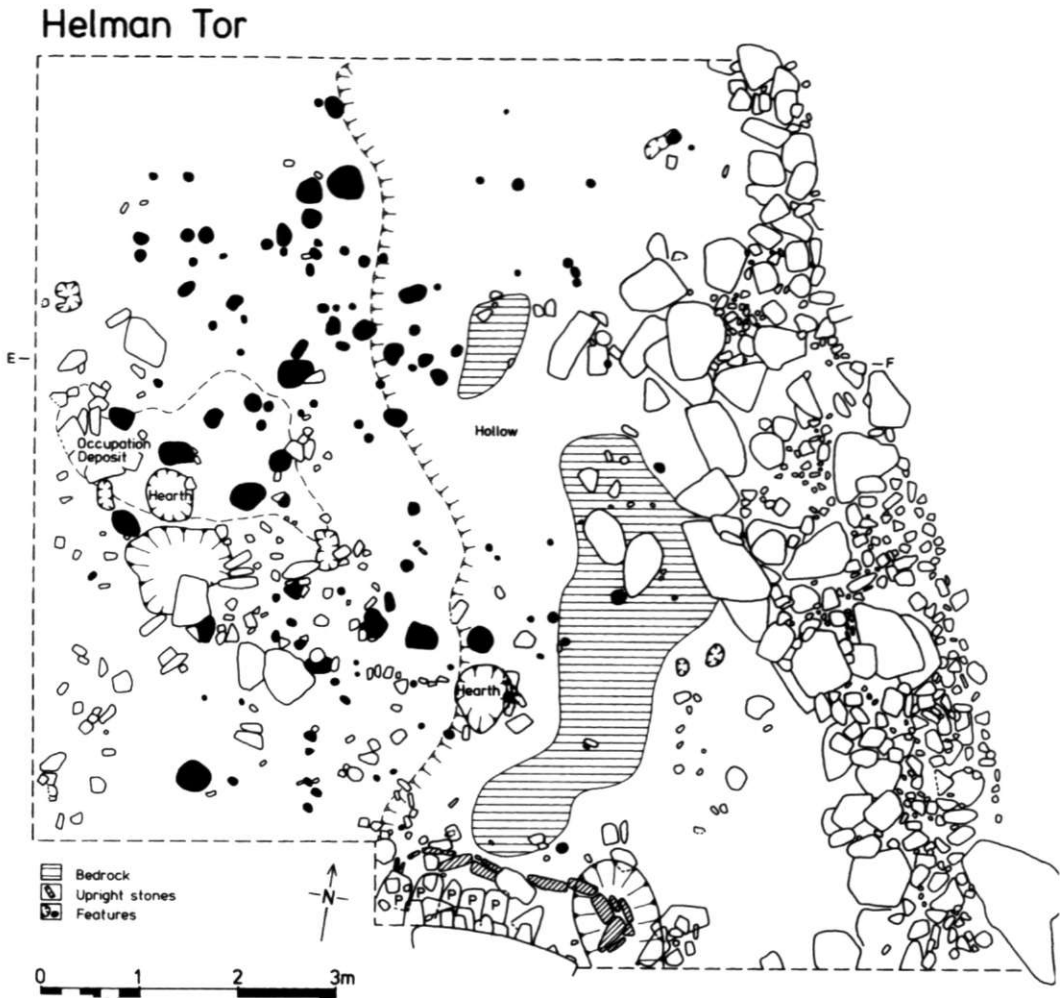


Fig 4 All features recorded within excavated area at Helman Tor.

material on its rearward side, a wall-face crowned by a massive slab at its S end and, of course, the massive boulder-built wall on its forward (eastern) edge. To the N the terrace sloped into a shallow depression created, possibly, by an entrance-way (whether original or later – or both – is uncertain) through the massive boulder-built enclosure wall. The excavation was sited so as to avoid the depressed area at the N end of the terrace and to include the whole S end of the terrace. It was hoped that examination of this apparently well-defined unit would enable understanding to be achieved of a complete entity of the prehistoric occupation of the site, while adhering to the strict limits of intervention laid down by English Heritage.

The stripping of the turf on the terrace produced virtually no finds of recent date. Indeed the evidence of ground survey seemed to confirm that very little recent activity had taken place on the site other than a limited amount of quarrying for stone by drill-splitting of granite boulders on the eastern extremity of the summit (and, indeed, the wall construction on the western side

Helman Tor

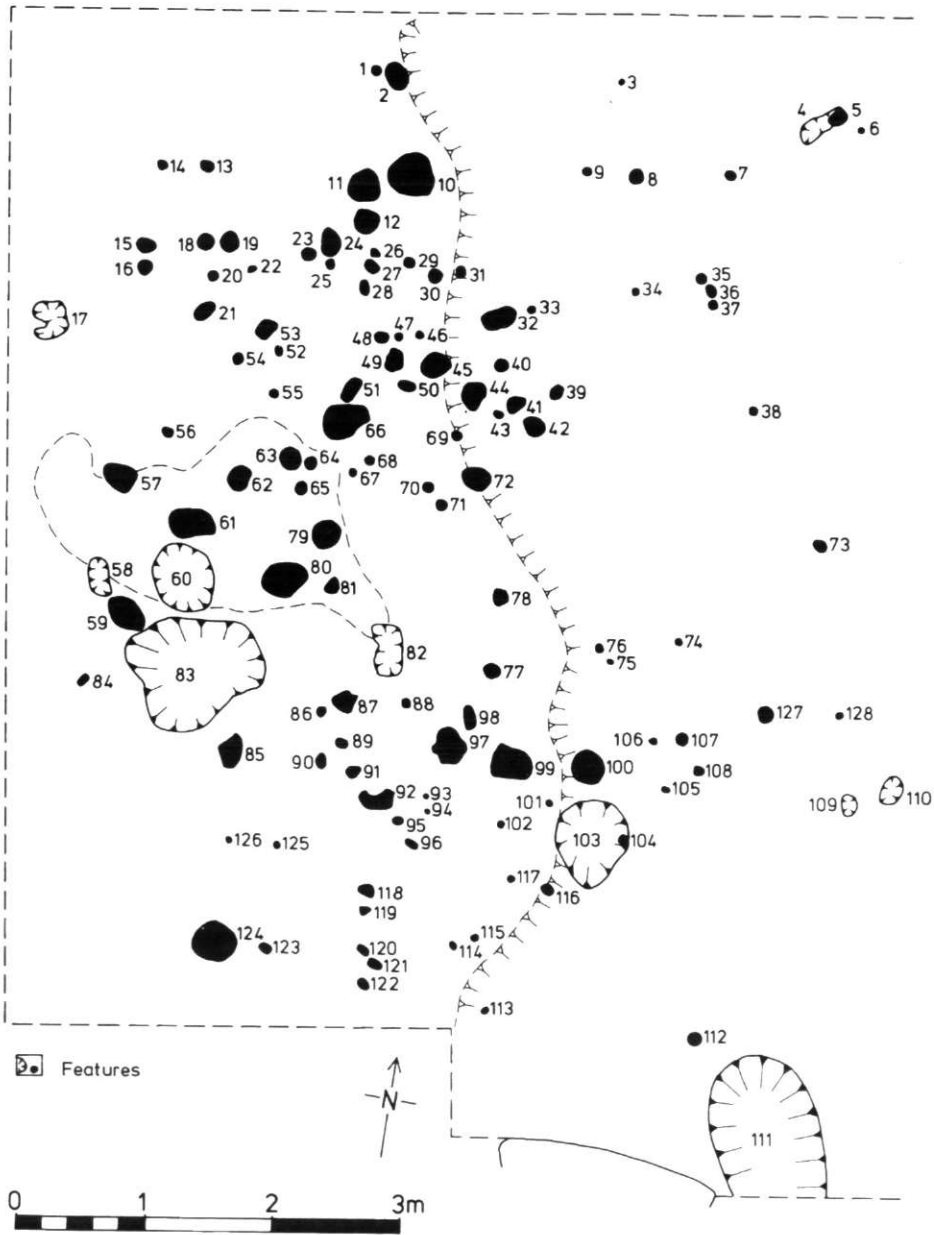


Fig 5 All earthfast features within excavated area at Helman Tor.

Helman Tor



Fig 6 All features bearing charcoal within filling at Helman Tor.

of the summit referred to above). In this the site stands in stark contrast to Carn Brea where recent activity had been intense and had led to major disturbance of the archaeological deposits. Below the turf (*Layer 1*, see section, Fig 3) was a layer of dark brown crumbly loamy soil, gritty in texture by virtue of its high content of quartzite grits, with decayed lumps of granite occurring occasionally (*Layer 2*). This layer masked the entire site other than at its westernmost extremity where the removal of turf revealed weathered slip from the embankment to the rear of the terrace (*Layer 5*) – an orange/brown loamy soil with small stones. Artefacts of neolithic date began to occur in very small numbers within *Layer 2* – although hardly at all in *Layer 5*. Bracken root action had penetrated these layers very thoroughly and indeed into the layer below (*Layer 3*). *Layer 3*, lying beneath *Layer 2* and overlying the forward edge of the *Layer 5* slippage from the rearward terrace embankment, was a layer of soil creep derived, presumably, from contexts further up the slopes of the hill. It was a grey/orange loamy soil with high quartzite grit content as befitted its ultimate derivation from rotted granite. It too produced relatively few artefacts of prehistoric origin, but its excavation led to the revelation of an area of black loamy soil, crumbly in texture and of a colour that had been altered patchily by the immediate presence of the fallen granite rocks of the wall (*Layer 6*). Indeed its texture was frequently more cement-like than soil-like, requiring the most vigorous treatment for its removal. Nevertheless the vigour of this treatment had to be adjusted to the fact that this *Layer 6* material began to produce large quantities of neolithic cultural debris. This area of black loamy soil was defined on its western margin by the natural rab surface (*Layer 4*), the rotted granite transmuted to an iron stained clay, which appeared directly beneath *Layer 3* and *Layer 5* further up the slope. Removal of the tumbled wall debris from its surface revealed variegated blocks of soil (e.g. *Layer 10*), reflecting the quite unusual condition of soil formation prevailing in compacted granite tumble.

The *Layer 6* material proved to be deposited as the upper layer within a quite clear hollow – often with very steep sides, dug into the rab behind the massive boulder-constructed enclosure wall. This hollow varied from 2.5–4 m in width and was up to 0.50 m in depth. Its filling was variegated through its length and depth with quite clear episodes of weathering. Nevertheless to a large extent the filling appeared to be composed of discrete deposits of organic material forming four principal horizons (*Layers 6, 7, 8 and 9*). *Layer 6* had upon its upper surface a thin crust (invisible in section) of orange material reflecting its status as a trampled surface with the orange *Layer 4* in close proximity. It produced a very substantial quantity of neolithic artefactual material in unweathered and unabraded condition. It is likely that features occurred within this surface but its mottled surface and its dark black soft-textured matrix made it impossible to trace these other than in a minority of instances – mostly on the western edge of the deposit where the immediately underlying rab facilitated immediate registration. *Layer 7* – lighter in colour – a green/grey loamy soil produced very few finds of neolithic material and only at the base of the hollow in *Layers 8 and 9* did material begin to occur again in quantity. In these basal layers pottery, in particular, was found in very good condition, a whole pot being impacted (i.e. smashed *in situ*) in two separate blocks on to the natural surface (P14). It should, however, be noted that fragments of this same vessel were located laterally quite close by but stratigraphically superimposed in *Layer 6* – suggesting some degree of disturbance and redeposition within the hollow.

The whole of the material filling this hollow (Pl. 6) was removed archaeologically by layer and in half metre squares in order to facilitate distributional analysis of artefacts within the deposits. The whole appearance and ‘feel’ of the deposit was however of midden debris discharged into the hollow and building up against and sealing the facing slabs of the massive boulder-built wall on its inner side. This stratigraphical relationship must present the primary evidence for the date of the enclosure wall in that once the wall had been built

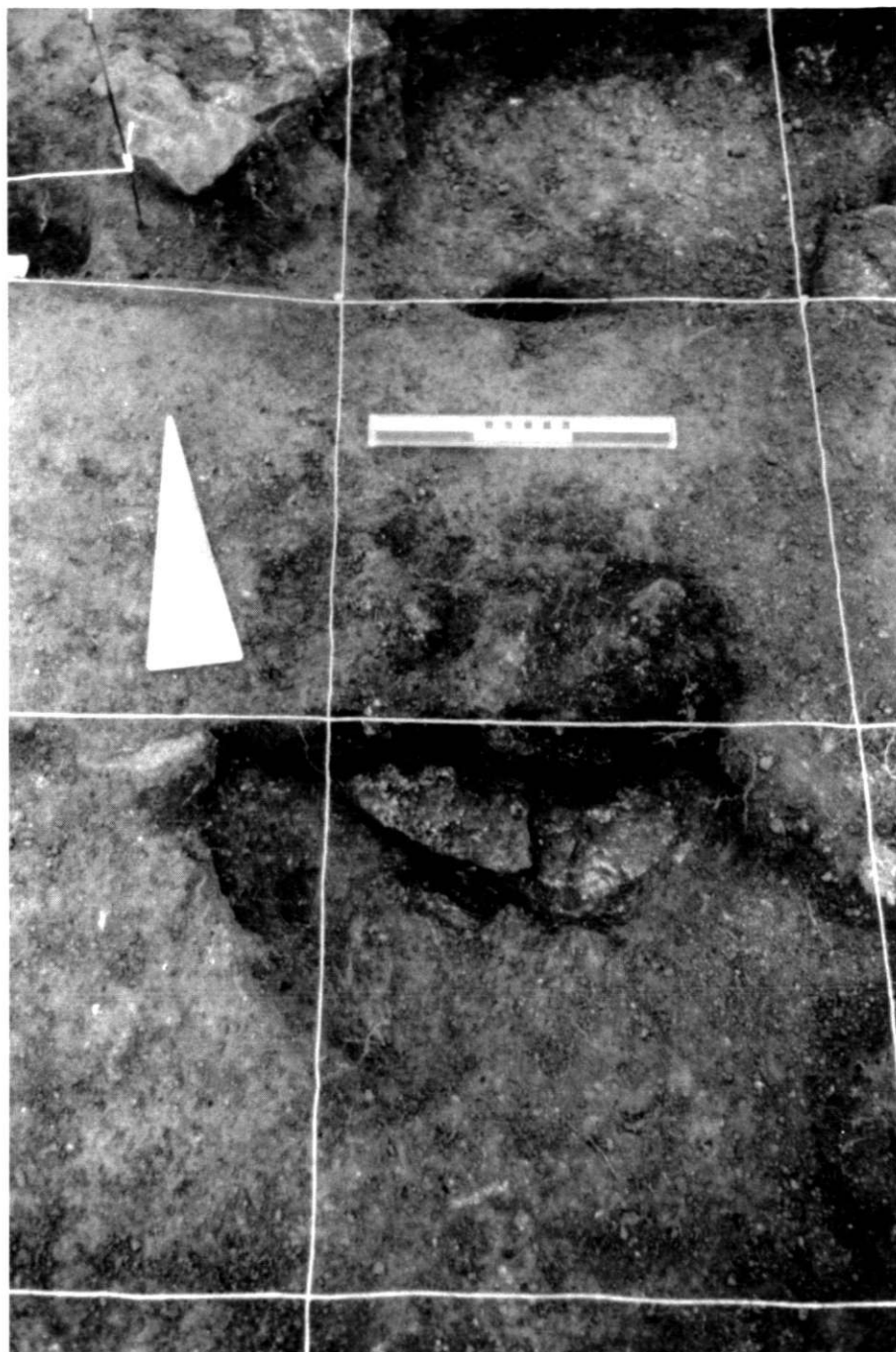


Plate 5 Pit hearth (F103) cut through filling of hollow behind enclosure wall.

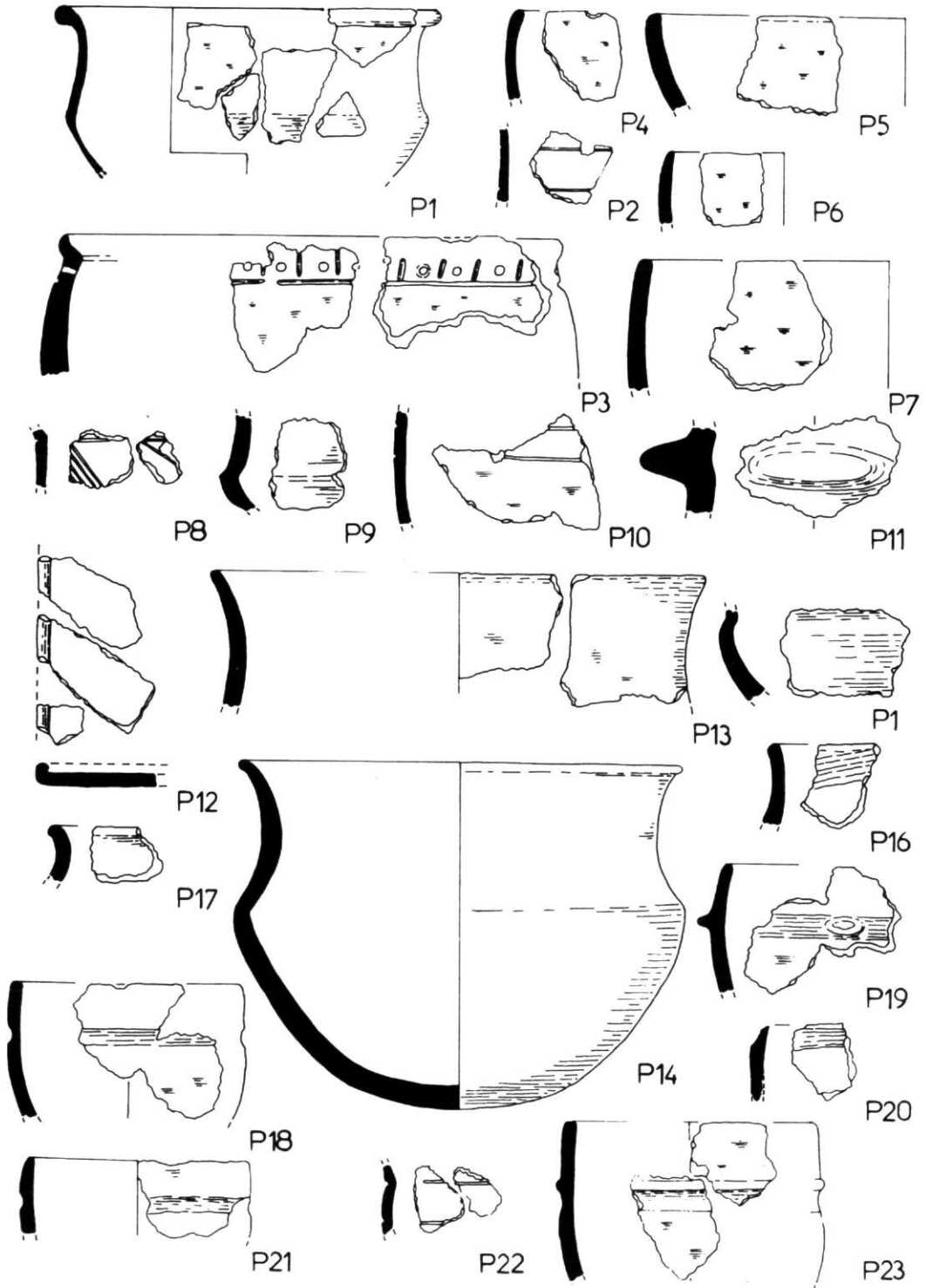


Fig 7 Pottery from Helman Tor P1-P23.

deposits containing absolutely fresh, and frequently impacted, neolithic material had been thrown up against it.

The base of the hollow (Pl. 11) revealed either rab (*Layer 4*) or bedrock granite. A few stake-hole type features occurred driven into the rab but these followed no interpretable pattern and furthermore were in one instance (Fs 127 and 128) seen in fortuitous section to have penetrated from high up in the midden material (from *Layer 6* although whether from the surface of the layer was unclear). Such were the subtleties of colouring and the variegated nature of these deposits that such minimal features were impossible to trace in plan within the *Layer 6* – midden complex. Large post-hole features would however have been traceable and none were visible except on the very westernmost margins of the midden. Set upon the surface of *Layer 4* (the natural rab) to the W of the midden-filled hollow was a *plethora* of earth-fast features – post and stake-holes, hearths and pits accompanied by a much worn and eroded remnant occupation layer. A number of the larger post-holes were stone-packed and exhibited a very distinctive blue-black burnt filling. Without doubt these would have been seen and isolated within the hollow to the immediate west and, indeed, some features of this type were isolated there (F32, 44, 72, 100).

Despite the possible loss of a probably small number of stake-hole type features unrecognised within the *Layer 6–9* midden deposit the writer feels that the retrieved post-hole pattern which is clearly defined on both its NW and S extremities does represent one complete entity of structural activity, however often replacement of individual components or possibly redesign has occurred. The total area of that activity (defined perhaps by Fs 10, 17, 24 and 100) is some 3.2 m × 5.5 m (17.6 sq. m) in a disposition that is broadly rectangular. Clearly this is one reflecting multiple replacement probably over a considerable period of time. Analysis of the feature pattern can be undertaken upon the basis of two

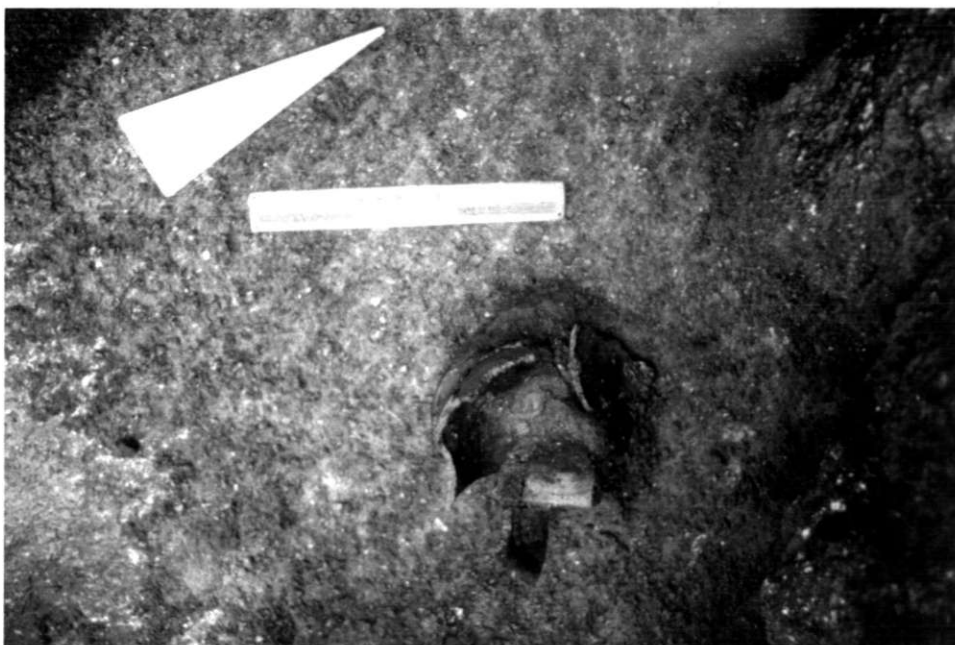


Plate 6 *Fragment of carinated bowl (P14) lying impacted within Layer 9 at base of hollow behind enclosure wall.*

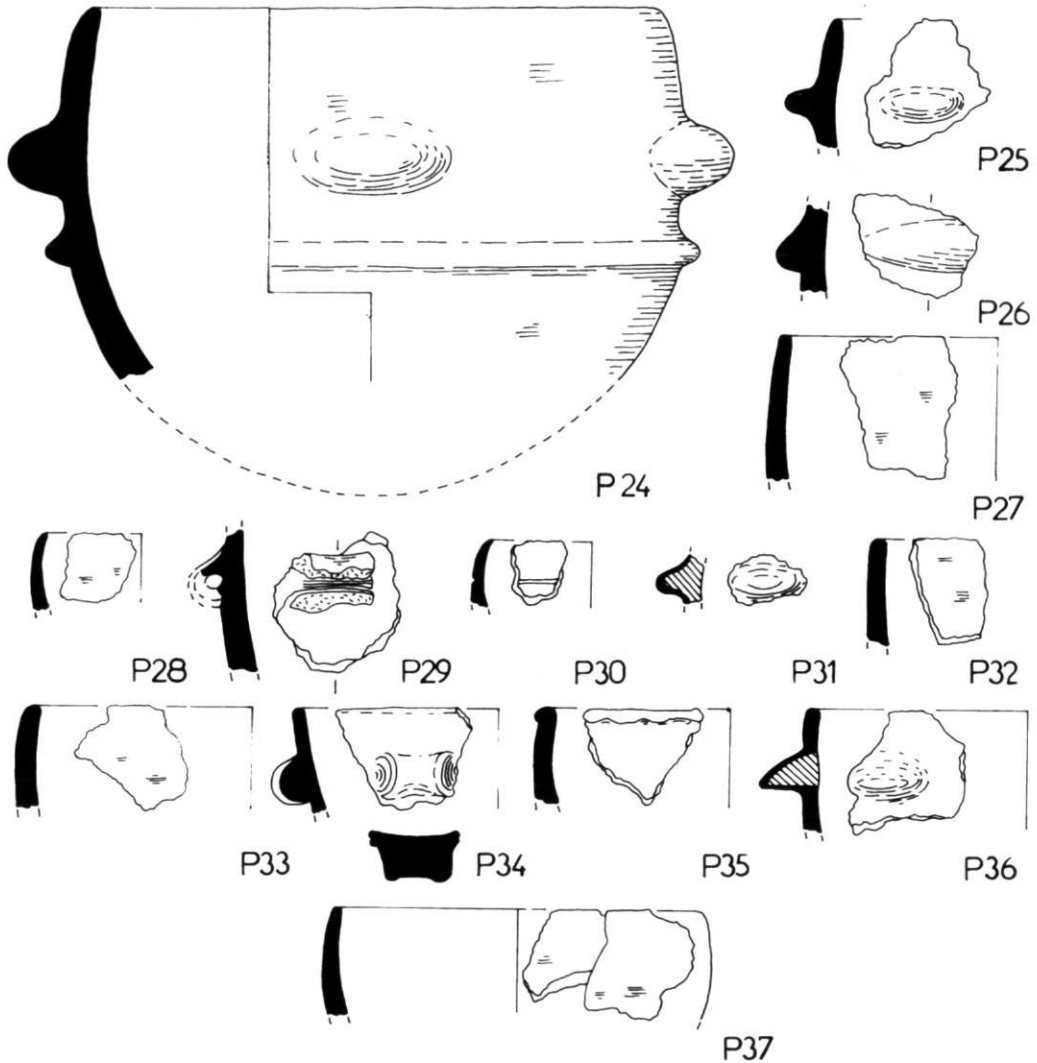
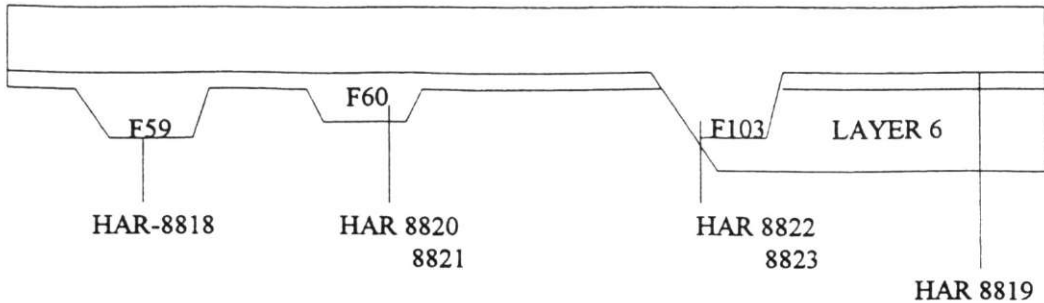


Fig 8 Pottery from Helman Tor P24–P37.

criteria – differential feature filling and differential form. On the basis of form it is possible to distinguish narrow cylindrical ‘stake-hole’ features from larger cup-shaped post-pit types. The stake-hole features do seem to present two principal linear arrangements, one NNW–SSE (Fs 122–118, 96–97, 81, 65, 64, 55–52) and one E–W (Fs 15, 16, 18, 19, 20, 22, 31). A further E–W arrangement of stake-holes may exist to the S (Fs 64, 65, 68, 70, 71). This may suggest the existence of one integral structure (corners F56, F15, F31, F71), aligned E–W, 2.5 m × 2 m in size. The NNW–SSE stake alignment could even be seen as leading to the centre of that structure’s S wall. This suggestion (and it is no more) may be borne out by an analysis of feature filling (see below).

The disposition of large post-pits (Fig 5), which may indicate a rather different form of structure, is a good deal more puzzling and apart from noting the concentration of such features in the centre of the terrace (Fs 57, 58, 59, 61–63, 66, 72, 79, 80) – where they

The above array of radiocarbon dating assays is generally satisfactory in furnishing the expected spectrum for a site of Carn Brea type, although HAR-8821 is perhaps a little later than one might have expected. Internal to the stratigraphy of the site there are, however, a number of problems that require comment. The situation is best represented by a simple diagram.



F60, the pit-hearth, and F59, a post hole, are stratigraphically divorced from the remainder of the sequence and are best dealt with first. For one hearth feature with 14C determinations taken upon a divided sample of small wood, these are disappointingly disparate, covering periods, at one sigma, that are mutually exclusive in both calibrated and uncalibrated form. HAR-8821 (2290 ± 70 uncal BC) and HAR-8820 (2540 ± 70 uncal BC) are sufficiently disparate to call into question the integrity of the sample which was, however, gathered from densely packed charcoal within the hearth feature, none of which visibly comprised fossil components, such as very old heart wood or peat ash. It may, nevertheless, be that in such circumstances the later date has to be recognised as the key date, which may, in the light of future evidence have important implications for the Cornish Neolithic. The date (HAR-8818) from a post hole equally divorced stratigraphically on the inner surface of the site, although spatially very close to F60 discussed above has yielded a radiocarbon date that is, again, quite distinct (2930 ± 120 uncal BC) despite its broad margin of error. These dates must presumably be taken to indicate the possibly extended period over which the site was in use, and the complex sequence of structures to which the features on the inner surface of the site might relate.

The difficulties that beset the 14C dating assays HAR-8822, 8823 and 8819 are perhaps even more challenging. F103 was a pit hearth which archaeologically was quite clearly cut through the uppermost neolithic occupation in the depression (*Layer 6*). The dates from F103 should, therefore, on archaeological grounds be later than the date from *Layer 6*. It will be quite apparent that the opposite is very markedly the case with the dates from F103 being statistically distinguishable from, and possibly 3–400 cal years earlier than, that from *Layer 6*.

The writer can present a model which might explain this anomaly and, at once, enhance our general understanding of the chronology of the site. Inherently the dates from closely packed closed features (like F60 and F103) must be more reliable than bulked samples from generalised, laterally disposed, deposits. If this general point is accepted then we might conclude that the *Layer 6* date (bulked from eighteen samples extracted from the dark black soft textured matrix of *Layer 6*) is the date most vulnerable to criticism. If that point is accepted then we may progress to the suggestion that it is HAR-8819 that is not doing the job that the archaeologist asked of it (which is, of course, the fault of the archaeologists not the date!). If we set aside HAR-8819 for the moment (but we will return to it), we can suggest that HAR-8820 and 8821 represent a median date for the occupation of the site at its latest stage which would be represented by a range of dates only just statistically



Plate 7 Features in excavation condition cut into the surface of Layer 4. (Scale 30 cm)

distinguishable ranging from 3300–2700 cal BC. This stage may have been prolonged but quite why this should reflect itself in one hearth is not clear.

The other dates that are uncomplicated (indeed the only dates that are truly uncomplicated) are those from F103 where two dates (HAR-8822 and 8823) are very closely aligned so as to be statistically indistinguishable, and it is upon these dates that we should perhaps build. These dates taken from a hearth dug through *Layer 6* shows close alignment between 3650–3380 cal BC (one sigma). We should, perhaps, build upon these dates of relatively clear integrity. F103, dug as is clear, *through Layer 6* is a date *ante quem* for *Layer 6*. Why should *Layer 6* therefore (on the bulked sample HAR-8819) produce a date so much later?

The suggestion must be that this *Layer 6* was indeed formed before F103 was cut through it but that that surface continued in use for a very long time and as it continued in use organic material was trampled into it which yielded (on bulked sample) a later date. Sadly it was not possible to obtain a radiocarbon sample from the *base* of the hollow behind the enclosed wall which may have helped to clarify the issue.

Thus the model the writer suggests is that the hollow behind the enclosure wall is dated *ante quem* by the dates (in closed context and in bulk) from F103 (the pit hearth dug through *Layer 6*). Sadly, independent demonstration of that point was not possible. Once the hollow was filled, its upper surface became the subject of recurrent activity which led there to the ‘adulteration’ of its carbon-rich assemblage with material of later date. That material relates closely, probably, to the later material contained within F60 and the arguments (see above) about structures extending from the *Layer 4* context over the area.

One structure exists on the terrace which is clear in its outline and, significantly perhaps, it must be one of the latest. At the very southernmost end of the terrace built against the wall defining the terrace-limit was a tiny enclosure, defined by a rab-cut slot, packed with upright granite slabs, that had served as wedges to support upright timber posts of slender



Plate 8 Very small enclosure at the southernmost end of Terrace 16 defined by rab-cut slot and packing stones. (Scale 10 cm)

stature (Pl. 8). The enclosure is 2.5 m × 0.75 m aligned E–W with a floor carefully paved with flat well-worn slabs. The palisade slot has been inserted through the surface of the *Layer 6* midden deposit and therefore this structure relates to a period when the midden filling of the hollow behind the enclosure wall was complete. Accumulation of deposits, however, continued abutting against it – deposits which were later to be perforated by the digging of a pit (F111) which contained within its basal layers an impacted neolithic vessel P22. The structure is thus relatively late in the sequence of activity on the terrace but is also clearly neolithic in date. But for the relationship established with F111 this might have remained in doubt as the filling of this tiny enclosure was a clean brown/yellow soil which contained no artefacts whatever and which directly underlay *Layers 2* and *3* at this point, and, furthermore, no artefacts of any date were located upon the paved floor. The absolutely clean state of this structure (by contrast with the considerable scatter of artefactual debris universally present elsewhere on the site) must be functionally significant, if indecipherable to the archaeologist.

Interpretation

The entire body of evidence from the area of limited extent excavated at Helman Tor in 1986, at all points, would suggest that the first stage of activity on the site was the excavation of a shallow (up to 0.50 m deep) hollow along the line followed by the enclosure wall and the immediate construction of the boulder enclosure wall on its forward (outer) edge. At this point on the circuit the wall exhibited relatively few 'standers' (even in fallen state) but appears to have comprised, for at least its lower courses, coursed blocks (thus differing

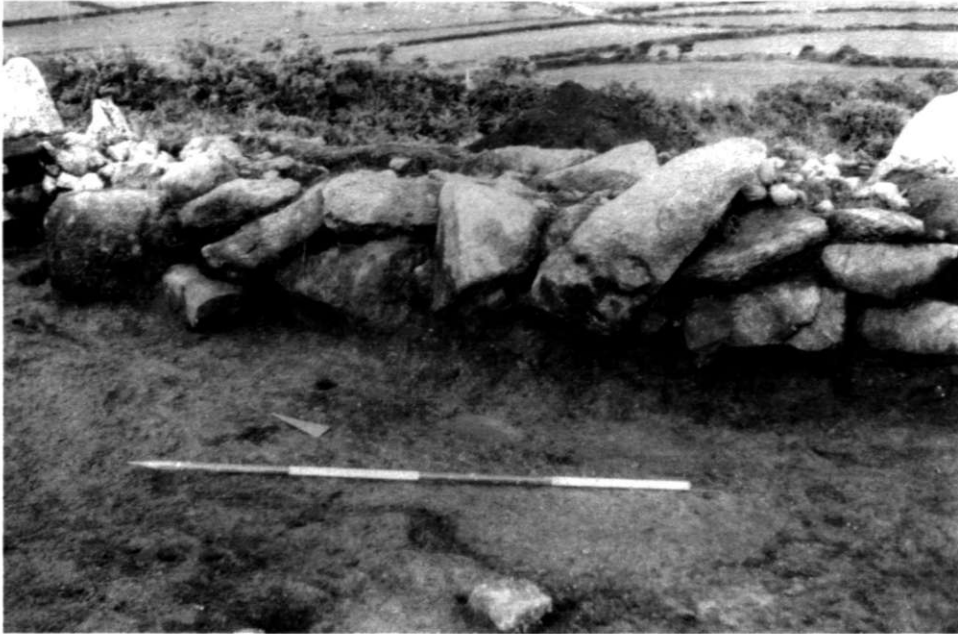


Plate 9 Detail of the enclosure wall construction after excavation (scale $\frac{1}{2}$ m).

from the wall on the E side of Eastern Summit at Carn Brea). The extent and depth of collapsed rubble beyond the outer face of the wall would suggest that the wall stood, in antiquity, to a height of 2 m+, (as was the case at Carn Brea). The excavation of the hollow (exactly paralleled on Site J and on Site A1 at Carn Brea) almost certainly served some purpose in conjunction with the wall construction. It may be suggested that this purpose was two-fold:

- a. to furnish a level platform upon which to found a stable wall structure, and
- b. to serve as a quarry for rubble with which to fill the interstices of the wall to enhance its stability – providing a ‘soft-set’ for each boulder offered up into the construction. Such a method is exactly reflected in the method of construction of many Cornish hedges in the more recent past.

Once the wall was complete, occupation commenced immediately on the interior and the hollow lying behind the wall began to be filled with midden debris. The existence of a good deal of impacted pottery, including one almost complete vessel (P14), alongside a number of stake holes found dug into the floor of the hollow suggests that initially the area may have been the scene of some degree of activity, but that after this initial activity the virtually sterile *Layers 7 and 8*, representing, presumably, a mass of organic material, indicate the use of the hollow as a receptacle for organic ‘midden’ debris. A pollen column at 10 cm intervals was extracted from these layers and has been analysed (see Section 6). It contains no pollens and only the most abraded macro-botanical materials. Erosion and abrasion and microbe action appears to have eradicated this source of evidence.

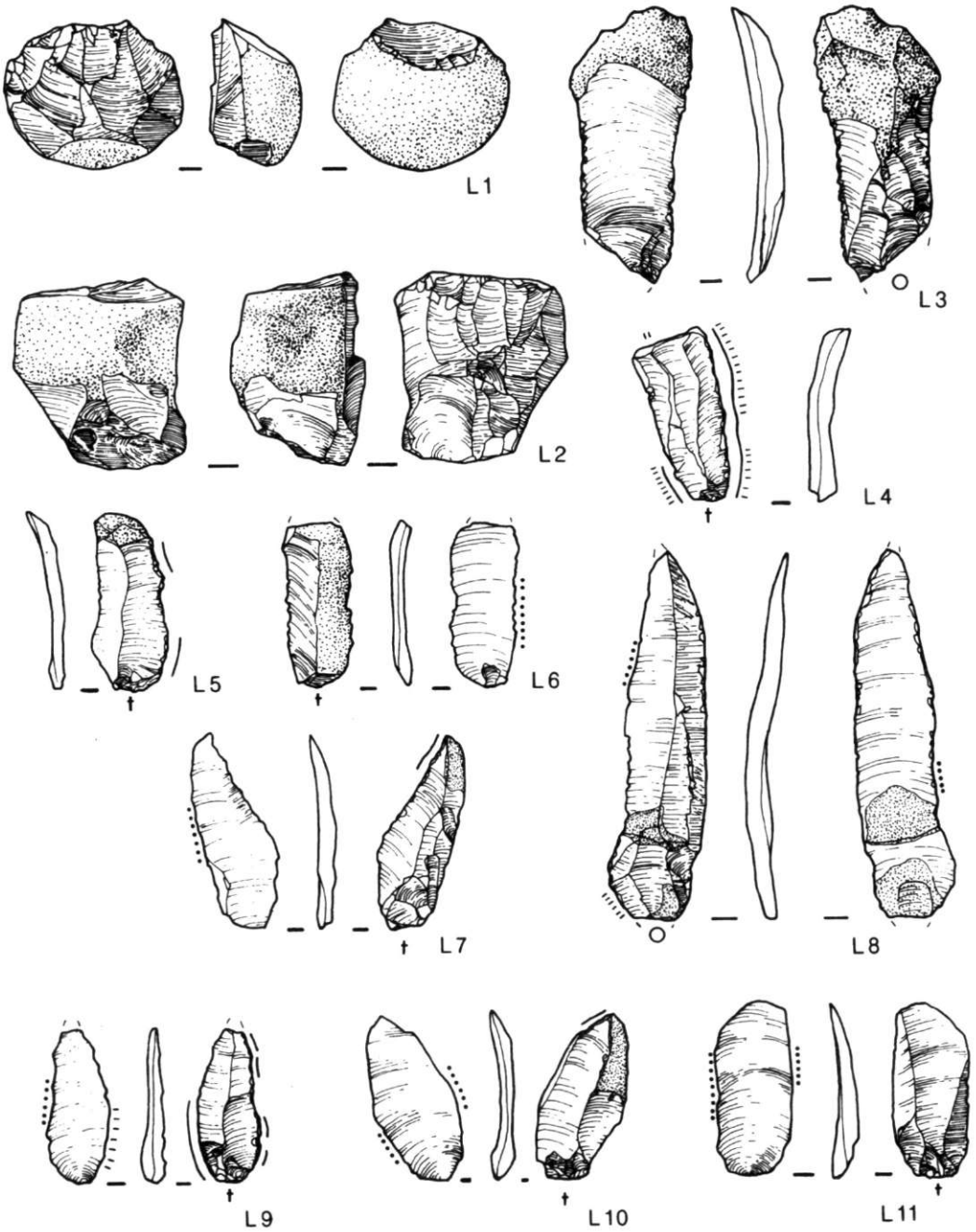


Fig 9 Helman Tor: flint artefacts L1-11. Scale 2:3. Drawn by Gordon Thomas.

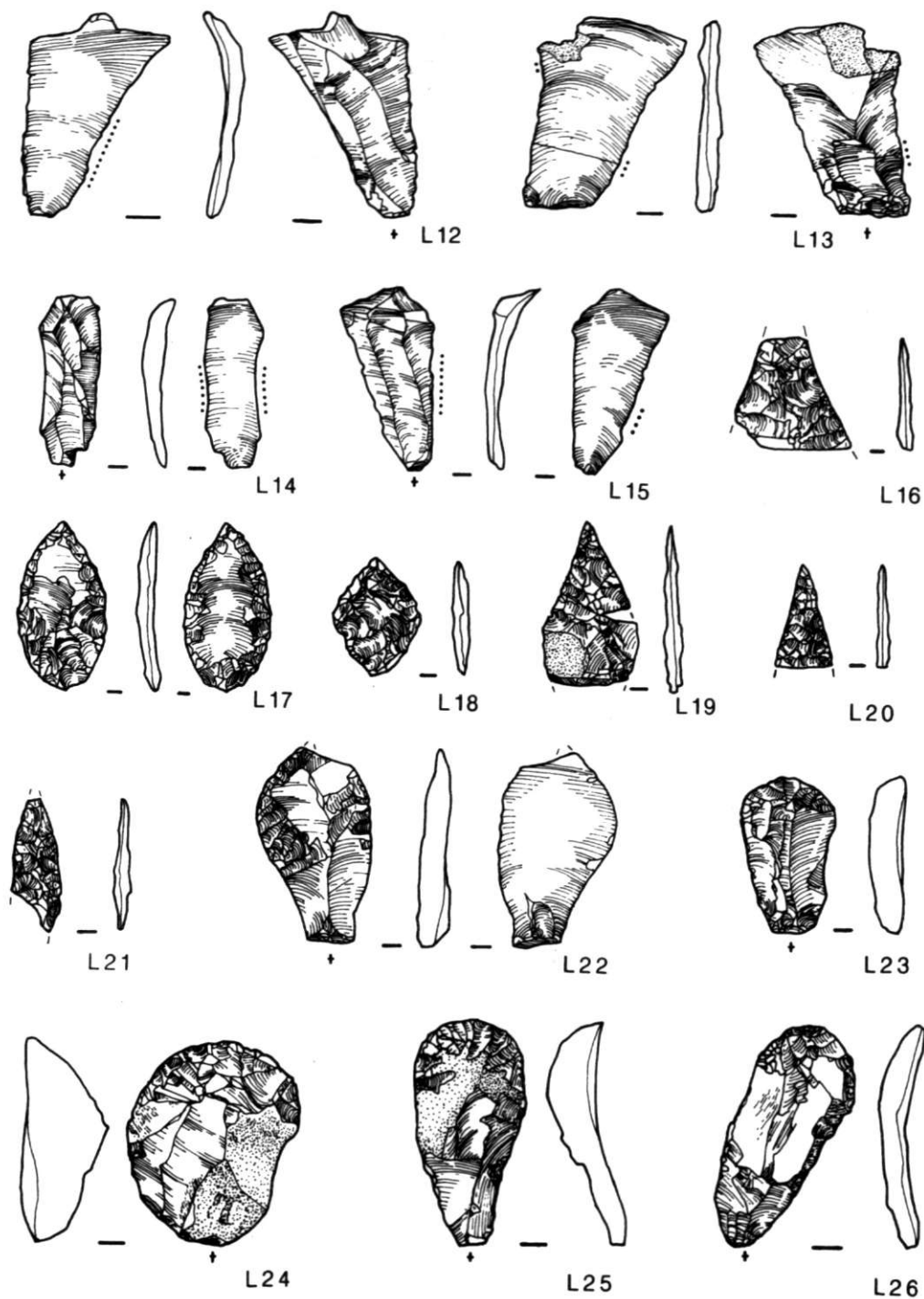


Fig 10 Helman Tor: flint artefacts L12-26. Scale 2:3. Drawn by Gordon Thomas.

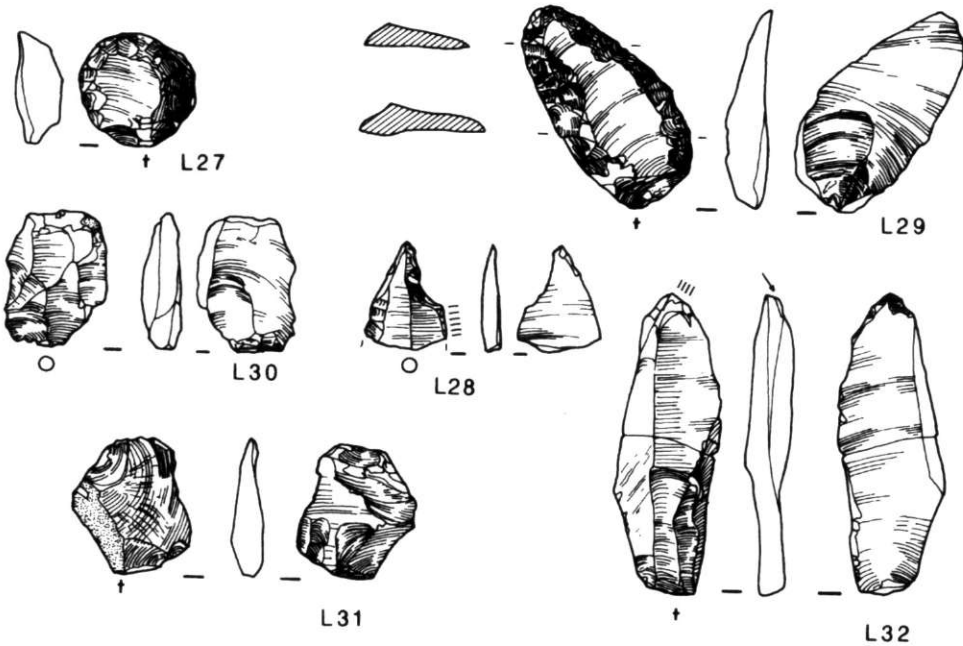


Fig 11 Helman Tor: flint artefacts L27-32. Scale 2:3. Drawn by Gordon Thomas.

During this period of the accumulation of organic debris, occupation appears to have extended onto the surface of the midden which ultimately levelled the hollow behind the wall and gave rise to the trampled surface of *Layer 6* and its high artefact yield. It is to this last phase of activity and those preceding it that the structural remains on the terrace to the W of the hollow and encroaching on to the surface of the midden relate. These structural traces represent a whole unit of activity as they are contained on both S and W by obstacles and appear to run out to the N. To the E, over the midden deposit, slight features, represented only by relatively faint discolorations and changes of texture, may have been missed during excavation due to the nature of the soil matrix, but substantial features are, it is felt, unlikely to have eluded attention. Two pit-hearths, closely comparable to those located on the terraces A1, K and J at Carn Brea, appear to relate to both phases of activity on the terrace. Associated with these hearths was an abundant scatter of post and stake holes representing more than one structure erected upon the terrace through time. Although, as has been suggested, it is felt that this group of structural features is well-defined so as to represent a whole structure in its various phases, it is extremely difficult to disentangle any clear pattern that would facilitate the reconstruction of any one structure's form. The filling of the features fell under two heads: (1) a brown soil fill, (2) a black charcoal fill. It seemed possible that the charcoal-filled features might represent the destruction catastrophically of one phase of structure and that therefore the selection of features so filled would provide a feature pattern in use at one moment in time. While a plot of such features (see Fig 5) does clearly show spatial concentration to the N end of the excavated area, it cannot be said to yield any convincing structural pattern that would allow reconstruction of house form. It would seem as though, as at Carn Brea (with the single exception of Site A1), erosion, multiple replacement and destruction have led to the evidence for structures being, while quite definite, unspecific as to form and nature.

Section 2 – The Neolithic Pottery

by I F Smith MA PhD FSA

The ceramic inventory comprises a minimum of 97 individual vessels identified by rims and other distinctive fragments and at least one artefact described as a 'dish' (Table 1). Table 2 provides a concordance of the illustrated pottery P1–P37 with excavation find-numbers, contexts and fabrics. Suffixes 'a', 'b', etc. are added to find-numbers relating to two or more vessels. Unillustrated sherds, when mentioned, are identified by their find-numbers.

Distribution and Stratification

Relatively small quantities of derived pottery, generally in a weathered condition, were recovered from *Layers 2* and *3*; only two sherds came from *Layer 5*. The great majority of sherds were contained in *Layer 6*, the upper deposit in the hollow alongside the enclosure wall. Many are in fresh condition and some retain traces of sooting and/or carbonised residues.

The two most nearly complete vessels from the site are represented by sizeable fragments from *Layer 6* as well as from contexts that antedate or post-date its formation. Two large portions of the carinated bowl P14, one of them resting on natural bedrock at the bottom of the hollow, were the only ceramic finds from *Layer 9*; a sherd from its neck and shoulder lay almost directly above in *Layer 6*. The three large conjoining pieces, with rim, lug and cordon, that provide the profile for P24 lay together in *Layer 6* a few centimetres N of an intrusive pit (F111) that contained in its basal fill many other substantial pieces from the upper part of the vessel. Consequently the pottery is treated as an integral assemblage.

Fabrics

After preliminary inspection of the assemblage with an 8X hand lens, thirteen pieces thought to represent four fabric groups were submitted to Dr D F Williams (English Heritage Ceramic Petrology Project) for examination in thin section under the petrological microscope. His note will be found in Section 3. Table 1 gives the numbers and types of vessels attributed to each fabric group and Table 2 sets out the provenances and fabric type of the illustrated pots.

Table 1 Composition of assemblage

<i>Vessel types</i>	<i>Fabric groups</i>				<i>Totals</i>
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	
Cups	5	19	–	–	24
Carinated bowls	5	6	–	3	14
Non-carinated bowls	4	6	2	–	12
Heavy containers	–	2	1	–	3
Dish	1	–	–	–	1
Small rim sherds	3	19	4	1	27
Detached lugs	4	11	–	–	15
Detached cordons	1	1	–	–	2
Totals	23	64	7	4	98

Table 2 Catalogue of illustrated pottery, with a concordance of find-numbers, provenances and fabrics (see Figs 7, 8)

<i>Illustration Number</i>	<i>Find Number(s)</i>	<i>Context</i>	<i>Fabric</i>
P1	577a	Cutting 1; G4; layer 6	A
P2	460c	Cutting 1; F1; layer 6	A
	573a	South baulk; in wall tumble; trample on top of layer 6	
	662	Cutting 1; C11; layer 6	
	664b	Cutting 1; B11; layer 6	
P3	668a, 671	Cutting 1 extension; square 2; layer 6	A
P4	177	Cutting 2; layer 2	A
P5	553a	Cutting 1; D2; layer 6	A
P6	423a	Cutting 1; J3; layer 6	A
P7	404a	Cutting 1; H3 layer 6	A
P8	439, 440	Cutting 1; layer 6	A
P9	226, 233	Cutting 1; layer 6	A
P10	555d	Cutting 1; E2, layer 6	A
P11	507	Cutting 1; F10; layer 6	A
P12	461a	Cutting 1; D9; layer 6	A
	517a	Cutting 1; D10; layer 6	
	519a	Cutting 1; C10; layer 6	
	714a	Unstratified	
P13	309a	Cutting 1; C9; layer 6	D
	606a	Cutting 1; B8; layer 6	
P14	697	Cutting 1; G6; layer 9, on natural	D
	376, 377	Cutting 1; G5; layer 9	
	563a	Cutting 1; F6; layer 6	
P15	350b	Quadrant 1; spread of occupation material overlying Features 79 and 80	B
P16	602a	Cutting 1; C8; layer 6	B
P17	315	Cutting 2; surface of layer 6	B
P18	404d	Cutting 1; H3; layer 6	B
	421a	Cutting 1; G3; layer 6	
	556a	Cutting 1; G2; layer 6	
P19	696b	Base of Feature 111	B
P20	639a	South baulk 1; 'by wall'; layer 6	B
P21	350a	Quadrant 1; spread of occupation material overlying Features 79 and 80	B
P22	690b	Feature 111	B
P23	170	Cutting 2; in wall tumble; layer 6	B
	644a	Extension to Cutting 1; All; layer 6	
P24	477	Cutting 1; E1; layer 6	B
	696a	Base of Feature 111	
P25	115	Cutting 1; under wall tumble; layer 6	C
P26	672	Cutting 1 extension; square 3; layer 6	B
P27	304a	Cutting 1; D1; layer 6	B
P28	243	Cutting 1; layer 6	B
P29	639b	South baulk 1; 'by wall'; layer 6	B
P30	592a	Cutting 1; F4; layer 6	B
P31	579c	Baulk 1/2; layer 3	B
P32	343a	Cutting 2; layer 3	B
P33	619a	Cutting 1; H2; layer 6	B
P34	312	Cutting 1; C9; layer 6	B
P35	580a	Cutting 1; J4; layer 6	C
P36	519b	Cutting 1; C10; layer 6	B
	596a	South baulk; layer 3	
P37	457a	Cutting 1; G7; layer 6	B
	685a	Cutting 1; F7; layer 6	



Plate 10 The collapsed enclosure wall during excavation.

Fabric A: Nearly 24% of all vessels are made of clay derived from the gabbro on the Lizard Head, some 65 km SW of Helman Tor. The majority are of fine quality; relatively hard, compact in texture, with inclusions generally under 3 mm in size; well smoothed and sometimes burnished. The range of forms is illustrated by P1–P12. The large lug, P11, with a cordon (108) and several thick body sherds, suggest the presence of one or more heavy coarse-ware vessels similar to P24.

Fabric B: Around 65% of vessels are made of a clay in which reddish (ferruginous) pellets constitute the most conspicuous inclusions. The dominance of this fabric within the assemblage accords well with Dr Williams' suggestion that the source may lie on Red Moor, immediately NE of Helman Tor. One of the specimens examined in thin section (599c) was a lightly fired lump of clay, one of several recovered during the excavation; all exhibit the characteristic red pellets but none contains the hard inclusions present in most fabric B sherds. Vessel forms range from cups, non-carinated bowls (e.g. P33) and carinated bowls (P15) to heavy containers (P24).

Fabric C: About 7% of the vessels are characterised by inclusions of angular white quartzite; the clay may have been obtained at no great distance to the east of Helman Tor. The grits tend to protrude from surfaces and sometimes occur in dense clusters in the thicker sherds; one example (478) had been over 40mm thick. The single heavy vessel represented by rim sherds (685b) may have been a waster; although several sizeable fragments survive, the profile is too distorted for reconstruction.

Fabric D: This minor group (4%) is differentiated primarily by the presence of grains of tourmaline and is probably also of fairly local origin. All four vessels attributed to the group are of high quality; three of them are carinated bowls (P13, P14, 555c).

Morphology

Rim Forms

The 58 simple rims consist of: 20 rounded (P7); 19 pointed (P37); 3 squared (P27), and 16 are of irregular shape. Four rims, all from Fabric A open bowls, are slightly inturned with convex outer surface (P5). The developed rims comprise 3 that are lightly rolled over (as P14, P35), one heavier version (P1) and a sharply everted form with concave inner moulding (P3). Two cups also seem to have had everted rims (P8, P22).

Vessel Forms

Cups, defined as vessels 12 cm or less in diameter, are represented by 20 rims; a further 4 are identified by decorated body sherds (P2, P8, P10, P22). Shapes are straight-sided or slightly contracted at the rim. Textures and surface finishes are variable; only 3 cups, all fabric A, could be described as of high quality.

Carinated bowls comprise one fully restorable example (P14) and 13 represented by rim, neck or carination fragments. So far as can be judged, rim and carination diameters were approximately equal, necks were concave, and rounded shoulders outnumbered true carinations. As a class these bowls display a high standard of surface finish; one of the fabric A examples (P1) is exceptionally thin (2–3 mm).

Non-carinated bowls number 12 and range in shape from open (P5, P34) through neutral (P32, P35) to those with slightly contracted rims (as P3, P33). Quality of finish ranges from very fine (P5, P33) to coarse with protruding gaits (P25).

Heavy containers are represented by 3 surviving rims; the presence of several more is implied by thick wall sherds, large lugs and two cordons. The only partly reconstructable specimen is P24. Fabrics generally contain large inclusions and are often disintegrating.

A *dish* (P12) had a rolled-up rim of which enough fragments exist to indicate a straight edge. One or two similar artefacts may be represented by small sherds (50, 309b (P12), 601d). All are finely finished fabric A products.

Vessel Sizes

Rim diameters can be estimated for 30 vessels. Twelve cups include two that measure 5 cm each; the remaining 10 are 10–12 cm. Five carinated bowls measure 15 cm (1), 18 cm (2), 18–20 cm (1) and 22 cm (1). Of 11 non-carinated bowls, 5 measure 20–22 cm and 6 are evenly distributed within the range 14–19 cm. Each of two heavy containers attains a diameter of 25 cm.

Additional Attributes

Lugs and Cordons

A total of 18 vessels had been provided with lugs; in five instances the lugs are accompanied by rims and 15 lugs (belonging to 13 vessels) are detached.

The three trumpet lugs, all fabric B, comprise the remains of a large example with horizontal perforation (P29); a small imperforate version (P34) and a fragment (347). Two incomplete lugs retain traces of perforations. The remainder are all imperforate and generally oval in shape. P24 (fabric B) had four large lugs set about the cordon. P11 (fabric A) belonged to



Plate 11 A view from the W looking towards the enclosure wall across the gully behind it showing post and stake holes on the interior surface. (Scale ½ m)

another heavy container. Among the smaller lugs there appear to be two pairs. Some examples were attached to walls by means of tenons (e.g. P31, P36). One cup carries a very small lug set into a horizontal groove (P19).

The girth cordon around P24 is matched by two detached fragments (108, 208) from similar vessels (fabrics A and B).

Decoration

Four fabric A vessels (P2, P3, P8, P10) and one of fabric B (P22) display incised motifs. Three cups (P2, P10, P22) were apparently encircled by horizontal lines spaced 13 mm and 18 mm apart. On P8 a horizontal line forms the upper boundary to groups of diagonal lines. The incisions have been finely drawn with sharp, possibly bone, points.

The more complex ornament drawn immediately under the rim of P3 comprises short upright strokes bounded below by a horizontal line and round pits, sometimes perforations, set in the spaces between uprights. The bowl itself is roughly finished, lightly fired and very friable.

Five fabric B cups/small bowls (P18–P21, P23) are encircled by horizontal grooves, apparently drawn with fingertips. On P20 the groove alters the rim profile; a lug is set within the groove on P19; a low cordon runs above the groove on P23.

Black coating

Seventeen vessels retain traces of more extensive areas of a black coating similar in appearance to that thought to be a carbon paint on neolithic pottery from Carn Brea (Smith,

1981b, 170–172), but which may alternatively have been provided by smudging (Cleal, 1991).

It is present on vessels made of all four fabrics (3 fabric A; 11 fabric B; 1 fabric C; 2 fabric D) and on relatively crudely made examples (P24, P35) as well as on those that were more carefully finished (P13, P34). On P16 the lustrous black that covers the outer surface is carried over the rim and inner surface to a depth of about 10mm; other occurrences are confined to outer surfaces.

Comments

Before the excavation at Helman Tor, knowledge of the Earlier Neolithic pottery of Cornwall was confined to material from four sites: two sherds from Gwithian (Peacock 1969a, 148); an assemblage estimated to represent some 550 vessels from Carn Brea, Illogan (Smith 1981); fragments, including a rim sherd with trumpet-lug, from Poldowrian, St Keverne (Smith and Harris 1982, 47 and fig 18), and a small surface collection from Polcoverack, St Keverne (Smith 1987, 45–57). In each instance all the pottery had been made of the gabbroic clay from the Lizard Peninsula, a raw material that experiment has shown to be remarkably resistant to the rigours of bonfire firing and of which exceptionally fine pottery was produced and distributed as far to the east as Wiltshire (Peacock 1969a, 1988).

The pottery from Polcoverack (chiefly identified by an assortment of lugs including trumpet-lugs) came from the southern edge of the gabbro and was presumably made in the near vicinity although sites of production remain to be identified. Ill-founded doubts expressed by the writer (Smith 1981b, 179) about the precise origin of the Carn Brea pottery, partly elicited by the coarse and/or utilitarian nature of some of it, have been authoritatively dismissed by Peacock (1988) and by Williams (see below Section 3). It must

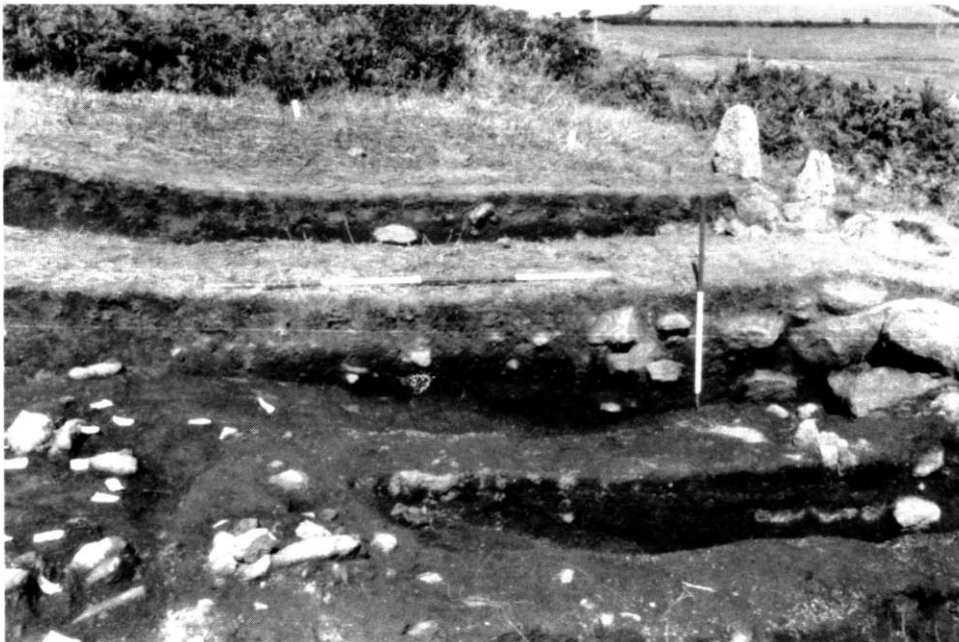


Plate 12 Sections cut across the hollow set immediately behind the enclosure wall showing infilling with organic 'hidden' debris. (Scale division ½ m)

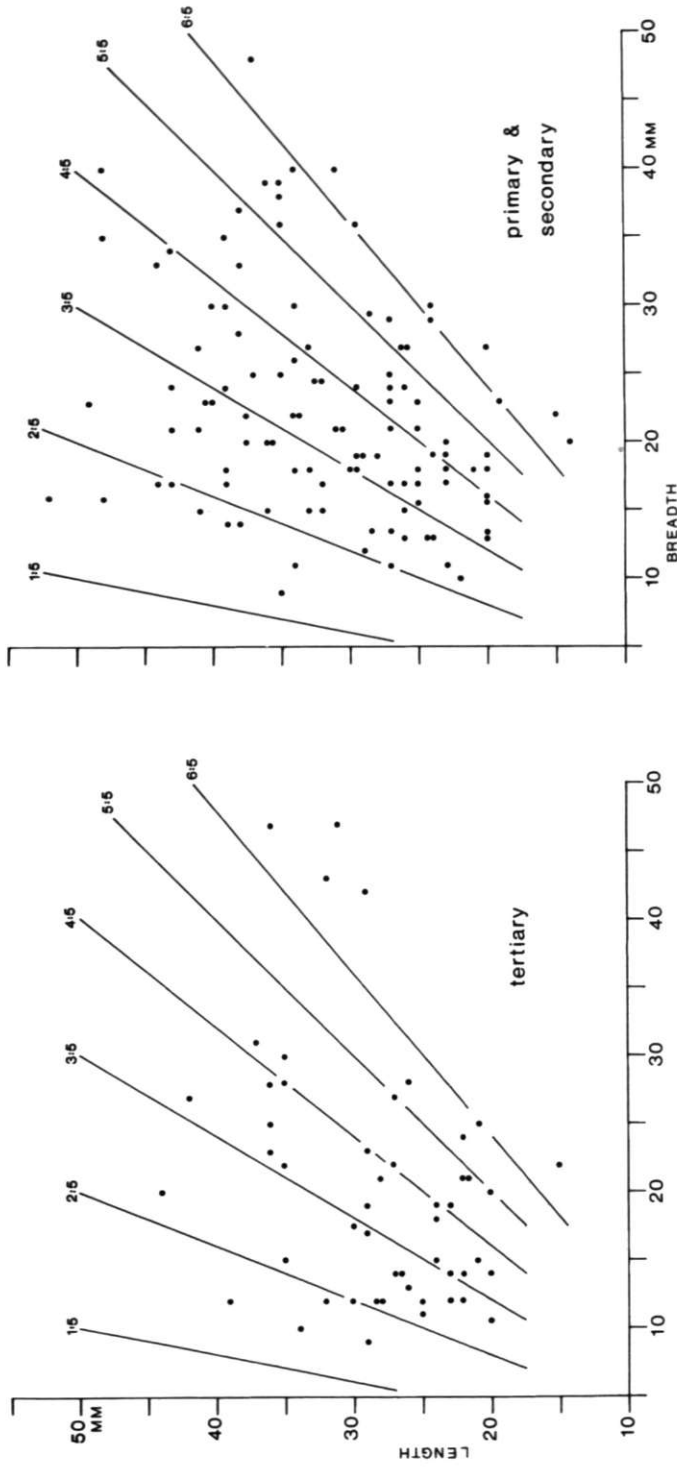


Fig 12 Helman Tor: length/breadth plot of all complete unretouched flakes.

now be accepted that all of this assemblage had been transported, either as finished goods or as raw clay, over a 'crow's-flight' distance of some 27 km from the Lizard – this despite the presence of good potting clays close to Carn Brea itself (Howard *in* Smith 1981b, 179).

The petrological diversity of the Helman Tor assemblage, located 65 km from the Lizard, reflects a pattern of procurement similar to that known from Earlier Neolithic sites in Devon and Wessex, where most of the pottery is more or less local in origin and the proportion of imported gabbroic ware varies according to distance from source. The 24% of gabbroic (fabric A) vessels from the present site is close to the figures that Peacock (1969a, 148) estimated for the two nearest sites to the east, Hazard Hill and Haldon in Devon, and well above that for any site in Wessex. It remains to be seen whether factors other than greater distance from source might be invoked to account for the contrast with the all-gabbroic assemblage at Carn Brea. In the meantime it may be noted that, as at Carn Brea, the gabbroic imports under discussion comprise a comprehensive range of vessel forms and sizes – cups, a variety of bowls, a few coarse-ware containers, a dish – whereas present evidence suggests that only the finer bowls were carried farther to the east.

With the exception of P3 (and perhaps also P8 and P22), rim and body shapes are readily matched at Carn Brea and clearly adhere to the conventions of the South-western regional style (Smith 1981b, 176). Even the dish (P12) can be compared with the two artefacts from Carn Brea described as plates or lids since their shapes would permit either use (Smith, 1981b, 168; fig. 74: P137, P153). The sherds representing P12, however, clearly indicate a utensil with a straight rim, possibly the ceramic counterpart of the oblong oak 'butter-dish' found beside the neolithic Sweet Track in the Somerset Levels (Coles *et al.* 1973, fig. 14).

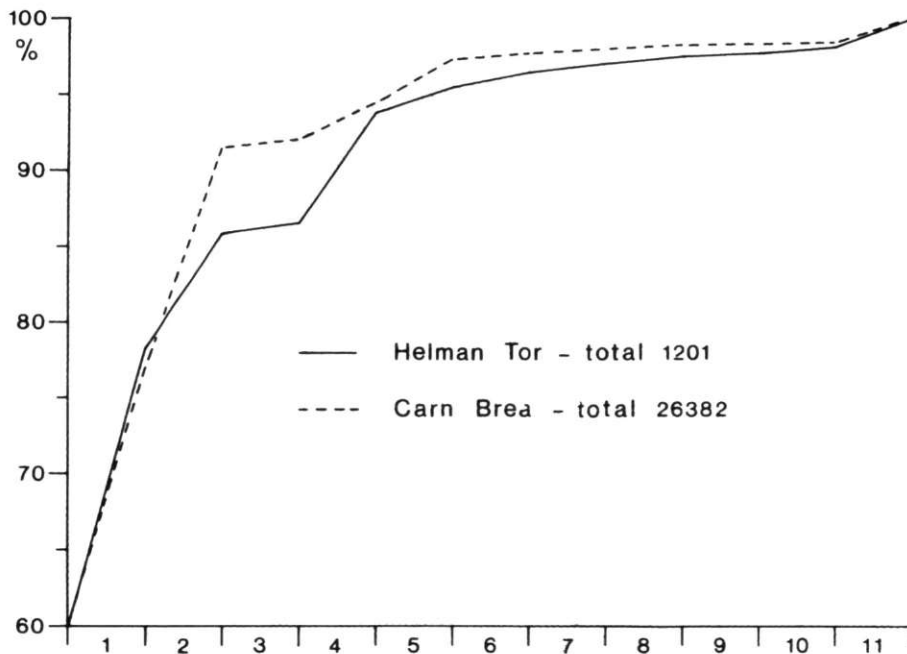


Fig 13 Cumulative frequency graphs comparing the Helman Tor and Carn Brea flint assemblages. Key: 1 unretouched flakes; 2 unclassified burnt fragments; 3 cores and core fragments; 4 edge-modified flakes; 5 leaf-shaped arrowheads; 6 scrapers; 7 piercers; 8 polished axeheads, flakes and fragments; 9 knives; 10 other implements; 11 miscellaneous retouched pieces.

The incised and/or impressed decoration on 11% of the vessels is unexpected in view of the rarity of such attributes on other South-western pottery (Whittle 1977, 77; Cleal 1991) and especially on the large gabbroic assemblage from Carn Brea (Smith 1981b, 172). Most of the added features are or appear to have been simple and repetitive. The encircling grooves on small fabric B vessels (P18–P21, P23) seem to have been drawn with the potters' fingers; further plastic elements comprise the miniature lug on P19 and the low cordon on P23. Four sherds from thin-walled cups (P2, P10 gabbroic; P22, P30 fabric B) carry horizontal incisions on their upper parts. Two gabbroic sherds (P8) display a horizontal line above closely spaced incisions, apparently arranged in groups.

The gabbroic P3 is remarkable not only for its combination of decorative motifs but also for the configuration of the rim – sharply everted, with an internal hollow or moulding, unlike any neolithic rim known to the writer (with the possible exception of the remnant rims on P8 and P22 from this site). Both elements of the decoration can, however, be matched from sites in Devon. The line of pits/perforations made before firing, usually unaccompanied by other ornament, is recurrent in assemblages from central Hembury (Liddell 1932, pl. XVIII: P272). The uncommon incised motif seems to derive from the same source as the horizontal 'ladder' patterns above and below the shoulder of the small, flat-based biconical bowl from the neolithic context at Haldon (Willock 1937; Piggott 1954, fig. 9: 3). In its way P3 seems to represent as radical a departure from the presumed conventions of South-western ceramic production as the Haldon bowl has done since its discovery in 1937.

Section 3 – A note on the petrology of some neolithic pottery from Helman Tor, Lanlivery, Cornwall

by D F Williams, PhD, FSA

Introduction

Some neolithic pottery sherds from Helman Tor were submitted for a fabric examination in thin section under the petrological microscope. The main object of the analysis was to confirm the validity of a provisional identification of sherds in the hand-specimen and allocation to fabric groups. Helman Tor is situated on the Hensbarrow Granite, fairly close to metamorphosed calcareous rocks (calc-flinta) surrounding the granite mass of the moor (Geological Survey 1" Map of England Sheet No.347).

Petrology

On the basis of the range of non-plastic inclusions present in the sample shreds from Helman Tor, a number of fabric visions are suggested.

Fabric A: Gabbro

519e, 668a, 687, 66, 517a

The most prominent inclusions in all five sherds are made up of partly decomposed feldspar, some of which has already altered to sericite, fresher plagioclase and colourless or brown grains of amphibole, many of which appear as fibrous aggregates. Also present is a little pyroxene, serpentine and some grains of quartz. Samples 66 and 517a appear to be slightly finer-textured than the other three sherds. This assemblage closely resembles Peacock's

(1969a; 1969b) description of the natural weathering clays overlying the gabbro on the Lizard Head, Cornwall.

During the prehistoric and Roman periods 'gabbroic' pottery is found over much of Cornwall and the counties to the east. Indeed, outliers of the Iron Age 'Glastonbury ware' have been found as far away as Sussex and Northamptonshire. In the vast majority of cases the identification of this pottery has followed Peacock's suggestion of a Lizard source (Barrow *et al* 1977). However, Sofranoff (1981) has questioned the generally accepted Lizard source of 'gabbroic' pottery in her examination of the Neolithic pottery from the Cornish site of Carn Brea (quoted more recently by Quinnell 1987). Although in thin section the range of mineral inclusions in the Carn Brea pottery was closely matched to Peacock's description of 'Lizard' gabbroic wares, the heavy mineral results on these same sherds produced a residue almost completely taken up with the micas biotite and phlogopite (Sofranoff 1981, 180–1). This prompted Sofranoff to suggest 'a possible norite gabbro source which is not described in the sheet memoir for the Lizard and Meneage' or 'a source of the biotite other than the gabbro, i.e. the granites, etc.' (Sofranof 1981, 180), and to sow seeds of doubt about the Lizard source for this distinctive plutonic fabric (see for example the report by Smith on the Neolithic pottery in the same excavation report, 178–179; also Quinnell 1987, 11).

In Peacock's rejoinder to Sofranoff's note (1988), he points out the peculiarity of a pottery fabric which in thin section is particularly high in amphiboles and lacks mica and yet which at the same time produces a heavy mineral suite which almost exactly reverses this situation, i.e. lots of micas and very little amphiboles. It is salutary to note that a re-examination by him of Sofranoff's Carn Brea heavy mineral slides revealed no micas. Furthermore, a heavy mineral separation on Neolithic 'gabbroic' pottery from Maiden Castle carried out by the writer (A M Lab. Report no.34/87) produced a residue which contained a high tenor of amphiboles and no mica, as would be anticipated given the thin section results. It would appear then, on this evidence, that Sofranoff misidentified the amphiboles in the Carn Brea sherds.

All this suggests that the 'gabbroic' pottery from Helman Tor derives from the gabbro outcrop on the Lizard, as originally postulated by Peacock. It is interesting to note that some recent non-petrological analysis of English gabbroic pottery would seem to provide additional evidence for this view (see Freestone 1982; Freestone and Rigby 1982).

Fabric B: Ferruginous inclusions

122, 340, 350b, 599c

All of these sample sherds (599c may possibly be a lump of clay) contain reddish opaque oxides scattered throughout the fabric. Also present are some grains of quartz, flecks of mica, felspar, quartzite and fine-grained silica. Ferruginous gravels have been noted on Red Moor to the north-east of Helman Tor (Ussher *et al* 1909, 119), and so it seems quite possible that these sherds may well prove to be locally made.

Fabric C: Quartzite

474c, 685b

White inclusions of quartzite can be clearly seen in the hand-specimen in these two sherds. Thin sectioning confirms that quartzite is the dominant inclusion-type in the paste, some of the pieces reaching over 2 mm in size, together with a little quartz, flecks of mica and fine-grained silica. It is difficult to be certain of the origin of these two sherds, but the presence of a contact metamorphic zone fairly close to the east of Helman Tor suggests that this may be a possible source for the quartzites in the paste of these two vessels.

Fabric D: Tourmaline

28, 377

Both sherds contain fairly frequent discrete grains of tourmaline scattered throughout the fabric, together with some flecks of mica (including large grains of biotite), a few large angular grains of quartz and opaque oxides. Tourmaline is commonly found in the granites of the south-west, is also present in other igneous rocks of the region and has even been found in the calc-flinta rocks of the metamorphic contact zone (Ussher *et al* 1909). In the absence of any other evidence a fairly local origin would seem to be suggested.

Section 4 – The Flint and Chert Artefacts

by Alan Saville BA FSA MIFA

Introduction

1,201 pieces of struck flint and chert were recovered during the 1986 excavation (Table 3), so the collection is very spatially localised. Only about 31% of the whole collection, came from secure early neolithic contexts. However, comparison of the stratified material with the rest of the collection (Table 1), which contains no lithic artefacts of forms necessarily typologically earlier or later than the Early/Middle Neolithic, reveals a completely homogeneous appearance. Also, some refitting was noted between pieces from stratified and unstratified horizons. For these reasons the whole of the collection is treated here as belonging to the neolithic occupation of the site, dated by the associated ceramics and radiocarbon determinations to *c.*3970–2700 Cal BC.

Raw material

The raw material exploited was predominantly flint, with only a very small amount of chert (Table 4).

Table 3 Helman Tor: typological analysis of the stratified and total collections of flaked lithic artefacts

	<i>Stratified</i>		<i>Total</i>		<i>Total wt</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>in grams</i>	<i>%</i>
Unretouched flakes	302	79.9	940	78.3	1,518.9	61.5
Unclassified burnt fragments	15	4.0	91	7.6	225.2	9.1
Cores	2	0.5	4	0.3	115.6	4.7
Core fragments	1	0.3	4	0.3	94.0	3.8
Edge-modified flakes	33	8.7	86	7.2	230.7	9.3
Leaf-shaped arrowheads	11	2.9	20	1.7	18.1	0.7
Scrapers	3	0.8	12	1.0	102.3	4.1
Piercers	3	0.8	7	0.6	22.0	0.9
Flakes from polished flint axeheads	2	0.5	7	0.6	17.2	0.7
Knife	–	–	1	0.1	7.5	0.3
?Burin	–	–	1	0.1	11.7	0.5
?Leaf arrowhead blank	–	–	1	0.1	5.6	0.2
<i>Pièces écaillées/esquillées</i>	1	0.3	2	0.2	9.7	0.4
Miscellaneous retouched pieces	5	1.3	25	2.1	90.2	3.7
Totals	378		1,201		2,468.7	

Table 4 Helman Tor: relative presence of flint and chert artefacts

<i>Type</i>	<i>No.</i>	<i>%</i>	<i>Weight in grams</i>	<i>%</i>
Flint	1,192	99.3	2,459.3	99.6
Chert	9	0.7	9.4	0.4

The pieces of chert, some very small, are mainly dark grey/black in colour, and of these at least one piece resembles Portland Chert. The typology of the chert artefacts is shown in Table 5.

Table 5 Helman Tor: chert artefacts, typology and chert type

<i>Artefact</i>	<i>Dark grey/black</i>		<i>Brown quartz</i>		<i>Totals</i>	
	<i>No.</i>	<i>Wt in gms</i>	<i>No.</i>	<i>Wt in gms</i>	<i>No.</i>	<i>Wt in gms</i>
Unretouched flakes	6	5.2	1	2.9	7	8.1
Edge-trimmed blade segment	1	1.0	–	–	1	1.0
Leaf-arrowhead fragment	1	0.3	–	–	1	0.3

The flint raw material can be divided into two basic types, beach pebble and non-beach nodule, on the basis of the character of the surviving cortex. Some 434 pieces of flint retain cortex, and the non-beach flint appears to be predominant (Table 6). The flint, which is in an uncorticated condition, except when heavily burnt, is generally a medium-to-dark grey in colour. A small number of lighter grey pieces are present, and where these have cortex they are invariably of beach pebble type, but it is equally clear that some pieces with beach cortex are indistinguishable in colour from the non-beach ones. Beach pebble flint could have been obtained from virtually any accessible beach on the Cornish coast. The precise origin of the non-beach pebble flint is not known, but it must have been imported from the east, presumably across a considerably greater distance than need have been the case with beach flint.

Unretouched flakes

The numerous unretouched pieces, indicative of knapping at, or close-by, the area excavated, are mostly in a broken, damaged state (Table 7). The complete examples have been assessed metrically for length, thickness, and length/breadth index (Tables 8–10). Those complete flakes of a size of 20 mm or more in length or breadth are plotted on a graph to show the

Table 6 Helman Tor: flint artefact raw material types (all cortical pieces)

<i>Cortex</i>	<i>No.</i>	<i>%</i>
Beach	28	6.5
Non-beach	336	77.4
Not assessed*	70	16.2
Total	434	

* = cortex area too small for assessment

Table 7 Helman Tor: unretouched flakes, complete and fragmentary

	<i>No.</i>		<i>Weight(g)</i>		<i>Av Weight(g)</i>	
Complete	224		626.2		2.8	
(tertiary)		102		178.5		1.8)
(primary/secondary)		122		447.7		3.8)
Fragmentary	716		892.7		1.2	
Totals	940		1,518.9		1.6	

shape-range (Fig 12). Breadth:length ratios were extracted from this graph (Table 11), and are complemented by the length/breadth indices for the same flakes (Table 12). Only four of the complete flakes are primary ones (i.e. with a wholly cortical dorsal surface), and only three of these are larger than 20 mm, so they are combined with the secondary flakes (dorsal surface partially cortical) in all analyses. The tertiary flakes (dorsal surface wholly non-cortical) include one chert flake over 20 mm in length.

While tiny flakes are present in the collection they are not dominant, presumably reflecting the absence of any use of sieving in their recovery. Unretouched flakes longer than 40 mm are

Table 8 Helman Tor: complete unretouched flakes, length values

<i>Length in mm</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
00-09.9	9	8.8	1	0.8	10	4.5
10-19.9	43	42.2	16	13.1	59	26.3
20-29.9	32	31.4	48	39.4	80	35.7
30-39.9	16	15.7	40	32.8	56	25.0
40-49.9	2	1.9	16	13.1	18	8.0
50-59.9	-	-	1	0.8	1	0.5
Totals	102		122		224	

Table 9 Helman Tor: complete unretouched flakes, thickness values

<i>Thickness in mm</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
01-1.9	9	8.8	3	2.5	12	5.4
02-2.9	36	35.3	15	12.3	51	22.8
03-3.9	17	16.7	20	16.4	37	16.5
04-4.9	16	15.7	19	15.6	35	15.6
05-5.9	5	4.9	12	9.8	17	7.6
06-6.9	6	5.9	14	11.5	20	8.9
07-7.9	2	1.9	15	12.3	17	7.6
08-8.9	1	1.0	6	4.9	7	3.1
09-9.9	5	4.9	6	4.9	11	4.9
10-10.9	1	1.0	5	4.1	6	2.7
11-11.9	2	1.9	2	1.6	4	1.8
12-12.9	-	-	3	2.5	3	1.4
13-13.9	1	1.0	1	0.8	2	0.9
14-14.9	-	-	-	-	-	-
15-15.9	-	-	1	0.8	1	0.4
16-16.9	1	1.0	-	-	1	0.4
Totals	102		122		224	

Table 10 Helman Tor: unretouched flakes, length/breadth index values of all complete flakes

<i>Index value</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>		
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	
1.1–1.5	38	37.3	54	44.3	92	41.1	medium/broad
1.6–2.0	19	18.6	26	21.3	45	20.1	medium/narrow
0.6–1.0	31	30.4	23	18.9	54	24.1	broad
2.1–2.5	9	8.8	12	9.8	21	9.4	narrow
> 2.6	5	4.9	7	5.7	12	5.3	very narrow
Totals	102		122		224		

Table 11 Helman Tor: unretouched flakes, breadth:length ratio values of complete flakes 20mm or more in length or breadth (see also Fig 12)

<i>B:L ratio</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
1:5–2:5	4	7.8	9	8.3	13	8.2
2:5–3:5	15	29.4	28	25.9	43	27.0
3:5–4:5	15	29.4	35	32.4	50	31.4
4:5–5:5	7	13.7	18	16.7	25	15.7
5:5–6:5	5	9.8	9	8.3	14	8.8
> 6:5	5	9.8	9	8.3	14	8.8
Totals	51		108		159	

Table 12 Helman Tor: unretouched flakes, length/breadth index values of complete flakes 20 mm or more in length or breadth

<i>Index value</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>		
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	
0.6–1.0	12	23.5	20	18.5	32	20.2	broad
1.1–1.5	14	27.5	46	42.6	60	38.0	medium/broad
1.6–2.0	14	27.5	23	21.3	37	23.4	medium/narrow
2.1–2.5	7	13.7	12	11.1	19	11.4	narrow
> 2.6	4	7.8	7	6.5	11	7.0	very narrow
Totals	51		108		159		

rare. The longer, thicker flakes were clearly used preferentially for implements (see Tables 14 and 15). In terms of shape, the presence of a marked tendency towards narrowness is apparent, with blades forming a significant element of the collection.

Unclassified burnt fragments

These fragments are probably all the result of incidental burning of previously struck flakes, cores, and implements, and simply represent the more heavily burnt end of a wide spectrum of heat damage. A further 169 pieces among the other artefact categories also show signs of burning to a lesser or greater extent. Since the burnt pieces include securely stratified examples, it appears that some, if not all, of the burning was contemporary with the neolithic occupation. None of the burnt pieces resemble pot-boilers, and there is no indication of the deliberate use of flint raw material for anything other than knapping.



Plate 13 Helman Tor viewed from the South East.

Cores and core fragments

The four complete cores can be classified as follows: 2 type A2, single platform cores; 1 type B2 bipolar-double-platform core; and 1 type C four-platform core. One can be described as a blade core, one as a flake core, and two have produced both flakes and blades in their final stages of flaking. The maximum dimensions of the cores are: 33, 39, 43 and 49 mm; their weights are: 20.1, 25.3, 27.2 and 43.0 g; and their maximum flake scar lengths are: 21, 22, 27 and 35 mm. The core fragments provide no further information, except that one is quite large, weighing 47.2 g, and yet is non-cortical, pointing to the potential large size of imported nodules (in this case almost certainly of non-beach flint). Two of the cores are illustrated, one a single platform core on a beach pebble (Fig 9, L1), the other a bipolar core on a non-beach nodule (Fig 9, L2).

Edge-modified flakes

The 86 edge-modified flakes can be subdivided into three variants (Table 11), according to the presence of edge-trimming or-gloss (see Saville 1981, 126–7 for typological definition).

Where edge-gloss is present, even on the fragmentary flakes, it is clear that the pieces have been used as edge-tools in their own right. In the case of the broken edge-trimmed flakes with no gloss, on which the trimming is rarely extensive or regular, it must be accepted that classification is imprecise and that these pieces could well be parts of other kinds of broken tools. Tables 14–17 record the length, thickness, breadth: length ratio, and length/breadth

Table 13 Helman Tor: edge-modified flakes

<i>Type</i>	<i>Complete</i>		<i>Fragmentary</i>		<i>Total</i>	
	<i>No.</i>	<i>Wt.</i>	<i>No.</i>	<i>Wt.</i>	<i>No.</i>	<i>Wt.</i>
Edge-trimmed flakes, no edge gloss	11	46.3	27	50.4	38	96.7
Edge-trimmed flakes with edge gloss	8	31.6	8	22.1	16	53.7
Unretouched flakes with edge gloss	13	37.4	19	42.9	32	80.3
Totals	32	115.3	54	115.4	86	230.7

index values of the 32 complete pieces, and demonstrate the tendency for robust narrow flakes to predominate. The main exceptions to the tendency for narrow flakes to be used comprise three chunky core rejuvenation flakes with edge-trimming, one of them also with gloss.

The only refitting pieces in this typological category are two segments, both from Cutting 1, Layer 2a, of an edge-trimmed blade with edge-gloss (Fig 9, L8). The refit produces a near complete blade with a present length of 82mm, giving an indication of the potential large size of some implements, a factor not otherwise represented in the assemblage.

Among the cortical pieces there is no indication of the use of beach pebble flint, and few of the non-cortical pieces are of distinctive raw material, apart from an edge-trimmed flake of black chert and another of light grey-coloured flint, possibly derived from the reworking of a polished axehead.

Table 14 Helman Tor: complete edge-modified flakes, length values

<i>Length in mm</i>	<i>Tertiary</i>	<i>Secondary</i>	<i>No.</i>	<i>Totals</i>	<i>%</i>
	<i>No.</i>	<i>No.</i>			
20–29.9	2	2	4		12.5
30–39.9	8	9	17		53.1
40–49.9	4	7	11		34.4
Totals	14	18	32		

Table 15 Helman Tor: complete edge-modified flakes, thickness values

<i>Thickness in mm</i>	<i>Tertiary</i>	<i>Secondary</i>	<i>No.</i>	<i>Totals</i>	<i>%</i>
	<i>No.</i>	<i>No.</i>			
02–2.9	1	1	2		6.3
03–3.9	3	4	7		21.9
04–4.9	5	4	9		28.1
05–5.9	3	4	7		21.9
06–6.9	–	2	2		6.3
07–7.9	–	1	1		3.1
08–8.9	–	–	–		–
09–9.9	2	1	3		9.4
10–10.9	–	–	–		–
11–11.9	–	–	–		–
12–12.9	–	1	1		3.1
Totals	14	18	32		

Table 16 Helman Tor; complete edge-modified flakes, breadth: length ratios

<i>B:L ratio</i>	<i>Tertiary No.</i>	<i>Secondary No.</i>	<i>No.</i>	<i>Totals</i>	<i>%</i>
1:5-2:5	1	—	1		3.1
2:5-3:5	8	7	15		46.9
3:5-4:5	4	9	13		40.6
4:5-5:5	1	2	3		9.4
5:5-6:6	—	—	—		
> 6:5	—	—	—		
Totals	14	18	32		

Table 17 Helman Tor: complete edge-modified flakes, length/breadth index values

<i>Index Value</i>	<i>Tertiary No.</i>	<i>Secondary No.</i>	<i>No.</i>	<i>Totals</i>	<i>%</i>
0.6-1.0	—	1	1		3.1
1.1-1.5	4	7	11		34.4
1.6-2.0	6	6	12		37.5
2.1-2.5	3	4	7		21.9
> 2.6	1	—	1		3.1
Totals	14	18	32		

The patches of edge-gloss are usually quite short, though edge damage was common and frequently truncates the gloss. The position of the gloss patches was noted for the 21 complete flakes, and is predominately to be found on the ventral edges (Table 18).

The 21 flakes have between them 30 edge-lengths of gloss. The maximum length of the gloss patch is 18 mm, the minimum 1 mm, with a mean of 7 mm and a standard deviation of 4.4 mm.

A selection of edge-modified flakes is illustrated to show the blank types and the positioning of the trimming and gloss (Figs 9, 10, L3-15). In at least two cases (Fig 9, L8-9) there is edge wear at the base of one lateral edge, probably associated with hafting, while another piece (Fig 9, L4) has very extensive wear undoubtedly associated with use, which alternatively could be classified as a worn-edge piece.

Table 18 Helman Tor: edge-modified flakes, edge-gloss position on complete flakes

<i>Position</i>	<i>No.</i>
One lateral edge: ventral	12
One lateral edge: dorsal	1
Two lateral edges: both ventral	5
Two lateral edges: one dorsal, one ventral	2
Two lateral edges: one ventral, one ventral and dorsal	1



Plate 14 From the summit of Helman Tor looking towards the S.

Leaf-shaped arrowheads

Only two complete arrowheads are present. One (Fig 10, L18) is a type A arrowhead with complete bifacial retouch, and has almost certainly been reworked at the tip after previous breakage, producing a squat, near diamond-shaped form. The other (Fig 10, L17) is a type B arrowhead with peripheral bifacial retouch on a slightly curved flake, the original flake surface of which is still clearly visible. The dimensions (in mm) of the first arrowhead are: L.26 × W.19 × Th.3 (wt. 1.3g), and of the second: L.36 × W.19.5 × Th.3.5 (wt. 2.9g). In Green's classification system (1984) these are type 3A and type 3B arrowheads respectively.

Few of the other fragmentary arrowheads are complete enough to make any valid comment on their shapes. The exceptions are Fig 10, L21, a very narrow, lenticular type, and Fig 10, L19, which is markedly angular on one edge and has an elongated point. Fig 10, L16 is a segment from a very large arrowhead, while Fig 10, L20 and one other (not illustrated) are the tips of very elongated points. Only two of the fragmentary pieces included in the total of 20 were found to conjoin (one from *Layer 3*, the other from the neolithic occupation horizon *Layer 6*), forming a still fragmentary medial segment.

Five of the 20 arrowhead pieces are burnt, but only two of these are so calcined that the flint colour is masked. Of the rest, and excluding the single example on dark grey chert, the colours are as follows (Table 19).

Cortex occurs in two of the pieces, but is too small in area for any assessment of cortex type. The evidence of the flint colour, however, suggests that arrowheads were not generally fashioned from raw material any different to that of the bulk of the assemblage.

?Leaf-shaped arrowhead blank. A leaf-shaped flake (Fig 10, L22) has invasive retouch, reminiscent of that found on leaf-shaped arrowheads, but on the dorsal surface only,



Plate 15 Terrace 16 after clearance of vegetation and prior to excavation.

mostly along the upper left edge. The bulb and platform are intact, and the piece has the appearance of an arrowhead abandoned in the course of manufacture.

Scrapers

Nine of the 12 scrapers are complete, but 10 could be fully classified, of which six are simple end scrapers and four are extended-end scrapers, where the scraping edge continues from the distal end down one or both sides without any marked angularity. All the scrapers have convex retouched edges. There are three long (length > 1.5 times width) end scrapers (Fig 10, L23, L25, L26) and, at the opposite extreme, a couple of small 'thumb' scrapers (e.g. Fig 11, L27). Fig 10, L24 is the chunkiest and heaviest scraper (wt. 26.9 g) in the

Table 19 Helman Tor: leaf-shaped arrowheads, flint colour

<i>Colour</i>	<i>No.</i>
medium grey	6
medium/dark grey	7
dark grey	1
medium grey/brown	1
light/medium grey	1
light grey	1

collection. The maximum length of any of the complete scrapers is 50 mm, the minimum 24 mm. Six of the scrapers are on cortical flakes, and five of these are definitely non-beach flint, while one may possibly be from a beach pebble.

Piercers

Only one of the seven piercers has a relatively elaborately retouched point (Fig 11, L28). This piece is 'shouldered' at the distal blade tip, and has heavily worn retouch on the right-side edge at the point at which the flake has snapped. Otherwise the piercers have minimally retouched points developed on naturally pointed projections, or in one case on the pointed edge of a snap-facet. Only a single piercer retains any cortex, and in this case is definitely made on beach pebble flint.

Flakes from polished flint axeheads

A total of seven flakes, weighing only 17.2g, is the only indication of the use of polished flint implements at Helman Tor. Two of the pieces rejoin as snapped halves of the same flake, one from *Layer 2a*, the other from the neolithic occupation horizon *Layer 6*. All the pieces are assumed to derive from polished axeheads, though only two show signs of edge-facets to prove their origin, and none are large enough to permit any indication of the size or form of the axeheads involved. The flint colour of all the pieces is a light grey/cream, distinct from the rest of the flint in the collection and indicative of a different source, the parent axeheads probably being imported as finished items rather than as raw material. It is difficult to estimate how many separate axeheads are represented by these flakes, but one major contrast in the appearance of the polished surfaces suggests a minimum of two axeheads are involved.

Knife

The single knife (Fig 11, L29) is an elaborately retouched piece, with bilateral unifacial removals, on a flake with a thinned bulb. There is no edge-gloss.

?Burin

Two separate flake fragments, one a proximal segment from cutting 1, layer 2, the other a distal segment from layer 2a in the same cutting, were found to conjoin (Fig 11, L32). The former was initially classified as an edge-trimmed flake, the latter as a miscellaneous retouched piece, but after refitting the whole tool is best regarded as a probable burin. This implement is of considerable interest, since its length (66 mm), thickness (24 mm), and typology place it somewhat apart from the rest of the assemblage. The piece is non-cortical, but the flint is a light-to-medium grey colour, which could point to a beach pebble origin. The thick distal tip is bilaterally faceted, though it is impossible to determine if the facets are deliberately produced by the removal of burin spalls or not. Only a tiny removal, some 8 mm long, has definitely been spalled off and is arrowed on the illustration. However the distal edge has been produced, it has undoubtedly seen extensive wear, leading to use-removals and some smoothing. The inverse trimming down the lower right edge probably relates to hafting.

Pièces écaillées/esquillées

The piece with *écaillé*-type removals at both proximal and distal ends of the ventral surface (Fig 5, L30) is probably the result of an unsuccessful attempt to create a core on a flake, with the distal end placed on an anvil. The *ésquillé* piece (Fig 11, L31) has inverse removals at the distal end only, and it is impossible to determine if these represent deliberate retouch or result from anvil-technique core reduction. The latter piece is from a non-beach nodule, while the former, though it only retains a spot of cortex, could well be from a beach pebble, the raw material most often associated with *écaillé* technique in Cornwall and elsewhere (cf. Johnson and David 1982, 85).

Miscellaneous retouched pieces

The miscellaneous pieces are mostly broken and undistinctive, apart from a flake with a crude oblique truncation at the base, removing the platform and bulb, and fragments of two elaborately retouched pieces, one a scraper or knife, the other possibly a piercer.

Discussion

The Helman Tor collection is numerically small, and derived from a very restricted area of the hilltop, and for that reason care must be exercised in its interpretation. Nevertheless, its homogeneity is impressive and the assumption is made here that it is, in general terms, representative of the flint industry produced by the neolithic inhabitants of the site. The technology, using simple core types, is a blade and flake one, with an emphasis on the production of blades for the major tool-type, the edge-modified flake. The presence of edge-gloss on 48 pieces in the latter category possibly reflects a principal usage involving the cutting of vegetation. Scrapers and piercers are relatively rare, interestingly so in comparison with the leaf-shaped arrowheads, though it must be remembered when comparing the relative presence of scrapers with many other tools that scrapers have the potential for a long individual use-life.

In seeking contemporary *comparanda* for the Helman Tor collection, the obvious example from Cornwall is that from Carn Brea (Saville 1981), and it is remarkable just how closely, in their main essentials, the two assemblages resemble one another. To begin with, there is the same pattern of raw material exploitation, with the use of imported non-beach flint outweighing that of beach pebble flint, and only occasional, presumably opportunistic, use of chert. Both sites demonstrate the import of polished flint axes, and the cannibalising of these as sources of raw material after breakage.

The composition of the Carn Brea and Helman Tor assemblages may be compared using the percentage figures given in Table 20, and, most clearly, by the cumulative frequency graphs in Fig 13. There are problems in making this kind of comparison, of course, in particular because the numerical analyses at this level ignore the mix of complete and broken pieces in each category. This is partly offset by the fact that the analyses being compared have been undertaken by the same person, and also by the fact that the data are available on the weights of the artefacts in each category, and these provide a crude check on the numbers, confirming the same percentage trends. The unclassified burnt fragments are included in these comparisons even though they do not constitute the same kind of typological category as the rest, since at both sites they are thought to be almost entirely struck material, which has subsequently become burnt, and to be largely unretouched flakes in origin. Their removal from the percentage comparisons do not materially affect them, and by leaving them in, the difference between Carn Brea and Helman Tor in the larger amount of burnt material at the former site is emphasised.

Table 20 Comparison between major components of the Helman Tor and Carn Brea flint assemblages, with figures expressed as percentages of numerical presence

Type Category	Helman Tor		site A1	site J	Carn Brea		total
	stratified	total			site K	stratified	
Unretouched flakes	79.9	78.3	76.0	72.2	73.0	80.9	77.0
Unclassified burnt fragments	4.0	7.6	16.8	13.0	19.3	8.5	14.5
Cores and core fragments	0.8	0.6	0.3	0.9	0.2	0.5	0.5
Edge-modified flakes	8.7	7.2	2.3	4.2	2.3	4.2	2.4
Leaf-shaped arrowheads	2.9	1.7	2.0	5.6	2.4	3.2	2.8
Scrapers	0.8	1.0	0.5	0.7	0.3	0.5	0.5
Piercers	0.8	0.6	0.4	0.5	0.2	0.2	0.3
Polished axehead pieces	0.5	0.6	—	—	0.5	—	0.2
Knives	—	0.1	—	0.2	—	0.2	0.1
Others	0.3	0.4	0.2	0.1	0.1	—	0.1
Miscellaneous retouched	1.3	2.1	1.4	2.5	1.7	1.8	1.6
Sample size	378	1,201	4,399	2,040	6,518	1,301	26,382

Otherwise, the main difference in the tool-types is the lesser prevalence of edge-modified flakes at Carn Brea. This may be more apparent than real, since it could relate to two factors. Firstly, it is probably the case that, since this is a trait normally identifiable (or at least confirmable) only under the microscope, a higher proportion of edge-trimmed and edge-gloss flakes will be identified in a small collection than in a large one. Secondly, the much higher proportion of tiny unretouched flakes at Carn Brea will inevitably have a biasing effect on the percentage presence of tool-types, and on the edge-modified flakes in particular. In other words, all things being equal, the more selective recovery and/or deposition of *débitage* at Helman Tor will have tended to inflate the proportion of the retouched element. This is apparent from comparing the two assemblages in Table 19, though the relatively small assemblage from sub-site J at Carn Brea has been included because it is almost identical to that from Helman Tor.

The proportion of leaf-shaped arrowheads at Helman Tor is somewhat lower than at Carn Brea, but perhaps not significantly so. This point needs elaboration in view of preliminary comments which have been made, suggesting a marked contrast between the two sites in this respect (Mercer 1986a, 11 and 1986b, 53). Expressed crudely, one in every 60 pieces of struck flint at Helman Tor is an arrowhead or fragment thereof, whereas at Carn Brea this ratio overall is one in every 27 pieces. The ratio does fluctuate quite widely between sub-sites at Carn Brea, however, and on sub-site D, for example, the ratio is one in every 70 pieces. If only complete arrowheads are considered, the overall totals would imply that

Table 21 Helman Tor and Carn Brea: comparison of major assemblage components

	Helman Tor		Carn Brea		Carn Brea	
	total collection		total collection		sub-site J collection	
	No.	%	No.	%	No.	%
Unretouched flakes etc.	1,031	85.9	24,248	91.5	1,738	85.2
Cores and core fragments	8	0.6	127	0.5	19	0.9
Retouched pieces	162	13.5	2,107	8.0	283	13.9
Totals	1,201		26,482		2,040	

these were about four times as common at Carn Brea as at Helman Tor, but this can be contrasted with the percentage presence of all arrowheads, fragmentary or complete, from stratified horizons at both sites: 2.9% at Helman Tor and 3.2% at Carn Brea. Whatever the exact situation in comparison with Carn Brea, the presence of arrowheads at Helman Tor is still much higher than appears to be the case at almost all other contemporary neolithic sites outside Cornwall: Windmill Hill (Wiltshire), for instance, only produced about 132 leaf-shaped arrowheads from all contexts (Smith 1965, 100), while from the recent excavations at Hambledon Hill (Dorset), there are only about 38 leaf-shaped arrowheads in a flint assemblage of over 80,000 pieces (Saville *in* Mercer and Healy forthcoming).

In order to effect direct comparison of the size and shape of the unretouched flakes at Carn Brea and Helman Tor, it is obviously most appropriate to consider only the flakes larger than 20mm. However, for the Carn Brea report, when calculating B:L ratios and L/B indexes, only flakes 20mm or over in length were included, not those 20mm or over in breadth if they were shorter than 20mm. Accordingly, taking the flakes from sub-site A1 at Carn Brea as a sample, the original measurements were used to recalculate totals on a strictly comparable basis. In the process some purely mathematical errors were also identified and corrected. Tables 22–23 below, therefore, now provide a sound basis for direct comparison with the Helman Tor flakes in Tables 11 and 12. The percentage figures in these tables demonstrate closely comparable profiles, with similarly significant blade elements.

Perhaps the most exciting aspect of the near identity of the Carn Brea and Helman Tor flint industries is that it confirms the trends revealed by the analysis of the Carn Brea assemblage,

Table 22 Carn Brea (site A1) unretouched flakes: breadth:length ratio values of complete flakes 20 mm or more in length or breadth

<i>B:L ratio</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
1:5–2:5	5	7.0	3	3.9	8	5.4
2:5–3:5	23	32.4	22	28.6	45	30.4
3:5–4:5	21	29.6	25	32.5	46	31.1
4:5–5:5	11	15.5	14	18.2	25	16.9
5:5–6:5	3	4.2	8	10.4	11	7.4
> 6.5	8	11.3	5	6.5	13	8.8
Totals	71		77		148	

Table 23 Carn Brea (site A1) unretouched flakes: length/breadth index values of complete flakes 20mm or more in length or breadth

<i>Index Value</i>	<i>Tertiary</i>		<i>Primary & Secondary</i>		<i>All flakes</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
0.0–0.5	3	4.2	–	–	3	2.0
0.6–1.0	8	11.3	14	18.2	22	14.9
1.1–1.5	24	33.8	29	37.7	53	35.8
1.6–2.0	26	36.6	21	27.3	47	31.8
2.1–2.5	5	7.0	10	13.0	15	10.1
> 2.6	5	7.0	3	3.9	8	5.4
Totals	71		77		148	

which at the time appeared somewhat anomalous. Apart from the high prevalence of leaf-shaped arrowheads, the most obvious of those trends were the low representation of scrapers and the absence of serrated-edge flakes. While it would be rash to be too dogmatic on the evidence from Carn Brea and Helman Tor alone, it does seem possible to conclude that, at least for the site-type of the defended hilltop enclosure, there is now a recognisably regional flint industry in the Cornish peninsula in the first half of the third millennium uncal BC. This has important implications not just for the study of the earlier neolithic period in southern England, but also for this kind of analysis, since it justifies the rigorous typological investigation of flint assemblages. The similarity of the flint assemblages from Helman Tor and Carn Brea denotes, at the very least, a technological equivalence between the two groups of people involved in their production and use. One may speculate that this technological equivalence betokens a socio-economic, and, in archaeological terms, cultural parity, which in this case is so pronounced that it is perhaps not too fanciful to postulate some kind of affiliative relationship between the flint-users at either side.

Table 24 Catalogue of the illustrated flint artefacts

<i>Fig No.</i>	<i>Find No.</i>	<i>Flint No.</i>	<i>Layer</i>	<i>Type</i>
L1	497	811	3	Core (A2)
L2	677	1,050	2	Core (B2)
L3	424	701	6	Edge-trimmed flake
L4	552	896	2	Edge-trimmed flake
L5	531	873	3	Edge-trimmed flake
L6	597	972	2	Unret. Flake w. Edge gloss
L7	80	231	2	Edge-trimmed flake
L8	131	289	2a	Edge-trimmed flake
	146	327	2a	
L9	491	794	2	Edge-trimmed flake
L10	584	933	2	Edge-trimmed flake
L11	221	501	3	Unret. Flake w. Edge gloss
L12	499	817	2	Unret. Flake w. Edge gloss
L13	499	818	2	Unret. Flake w. Edge gloss
L14	106	286	Neo. occup.	Unret. Flake w. Edge gloss
L15	422	700	2	Unret. Flake w. Edge gloss
L16	182	480	2a	Leaf-shaped arrowhead
L17	273	584	Neo. occup.	Leaf-shaped arrowhead
L18	462	723	Neo. occup.	Leaf-shaped arrowhead
L19	378	650	F17	Leaf-shaped arrowhead
L20	298	607	Neo. occup.	Leaf-shaped arrowhead
L21	168	469	2	Leaf-shaped arrowhead
L22	15	45	2	?Leaf arrowhead blank
L23	143	317	2a	Scraper (end)
L24	578	925	2a	Scraper (end)
L25	260	568	2a	Scraper (end)
L26	310	620	Neo. occup.	Scraper (end)
L27	541	878	2	Scraper (extended end)
L28	51	179	3	Piercer
L29	16	46	2	Knife
L30	262	581	Neo. occup.	Pièce ecaillée
L31	419	696	2	Pièce ecaillée
L32	20	73	2	?Burin
	260	562	2a	

Section 5 – Stone Axes and Rubbers

by F E S Roe

Six finds were examined, of which four were fragmentary pieces from the excavations, and two were complete axes found locally and in private possession. All are listed below (Table 25).

One of the two complete axes (681) came from the south east flank of Helman Tor, on land belonging to Bodwen Farm, and this axe proved to be of Group I greenstone, with a probable source in the region of Mount's Bay, Penzance. The other complete example (717) was found on the east flank of the site, and is made from Group XVII greenstone, with a suggested source again in Cornwall, either from Kenidjack Castle in West Penwith or Terras Mill, near St Austell. This axe is matched by two Group XVII excavated axe fragments (603 and 695) from the surface of the Neolithic occupation layer. The original purpose of the two remaining excavated fragments is somewhat ambiguous. One (123) is made of greenstone, again of probable Cornish provenance; its two flattened sides provide clear evidence for use as a rubber, but this could represent the re-use of a previously broken axe. The final incomplete piece (612) is made of sandstone; its uneven cross section suggests that it may not necessarily have been an axe, an alternative interpretation being a damaged rubber, now weathered over the area incorporating the worn surface.

These results suggest, at present, a bias in favour of a Group XVII origin, though further excavations may redress the balance. A contrast with Carn Brea is indicated, since here group XVI was the preferred material, with possible totals of 11–18 Group XVI axes and only two made from Group XVII greenstone (Smith 1981a, 154). The answer is in all likelihood a question of proximity. Carn Brea is near the source of Group XVI greenstone, which is thought to come from the Camborne area, less than 10 km away from the site. Of the two suggested sources for Group XVII, one, Terras Mill, near St. Stephen, is only about 15 km from Helman Tor (Flett 1909, 52), so it seems reasonable to suppose that this source was the one used. The alternative source at Kenidjack Castle would have been 78 km away. Despite problems concerning the variability of Cornish greenstones, this hypothesis could be tested by further fieldwork to examine selected greenstones from the vicinity of each site and compare them with the thin sections made from axes obtained from the excavations.

Table 25 Catalogue of stone axes and rubbers

<i>Find No.</i>	<i>Petro No.</i>	<i>Type of Implement</i>	<i>Location of findspot</i>	<i>Material</i>
HT86.123	1830/CO 419	rubber fragment	Under neolithic enclosure wall tumble within surface of occupation (midden) debris	greenstone
HT86.603	1831/CO 420	axe fragment	On surface of neolithic occupation layer (see Pl. 1)	Group XVII
HT86.612	1832/CO 421	rubber fragment	as above (see Pl. 3)	sandstone
HT86.681	1833/CO 422	axe	South east flank of Helman Tor, on Bodwen Farm (owned by Mr Pollard) (see Pl. 2)	Group I
HT86.695	1834/CO 423	axe fragment	On surface of neolithic occupation layer (6a), fill of F166	Group XVII
HT86.717	1835/CO 424	axe	East flank of Helman Tor (owned by Mr L Smith)	Group XVII

Group XVII is one of the less common stone axe materials, and these finds from Helman Tor bring the current total of known implements to 20, with a further two that have been determined as being 'near to Group XVII'. All but four of these finds come from Cornwall, Devon and Dorset. There are two shafthole implements amongst them, the majority being axes. Despite the comparative rarity of this rock, a high proportion of these axes come from early Neolithic contexts, such as Hembury, Maiden Castle, Hazard Hill and Carn Brea (Smith 1979, 17), and also from a surface scatter of finds at Bradfield Abbas (Evens *et al* 1972, 249). The two 'near XVII' axes both come from Hambledon Hill, one from the Main Enclosure, the other from the Stepleton Enclosure. Other materials variously associated at these sites include Groups I, IIa, IV, IVa and XVI. Helman Tor can now be added to this group of Early Neolithic sites in the South West known to have been using specific lithic materials of Cornish origin.

The Group I axe from Helman Tor does not come from a stratified context, and so it cannot be certain whether this find relates to the main occupation. However, it may be noted that Group I axes have been recorded in early Neolithic contexts at Carn Brea (Smith 1981a, 154; and see Mercer 1986b). Outside Cornwall, datable finds of Group I artefacts can usually be referred to a date of around 2,500BC or later (Smith 1979, 17). Two further Group I finds have been recorded from the neighbourhood of Helman Tor, part of an axe also found on Bodwen Farm (Evens *et al* 1972, 269; 1535/CO 326), and another from Lanlivery (Evens *et al* 1962, 254; 588 Corn 64). The stone for all three was presumably brought in from the Penzance area around 70 km away. A suggested Bronze Age settlement on the western slope of the hill (Johnson & Rose 1984, 186) would provide an alternative context for these Group I axes, but only excavated finds will show whether this material was used on the neolithic site in as early a context as the Group XVII greenstone.

Acknowledgements

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Section 6: Helman Tor – Pollen Analyses

by Richard Tipping

Six bulked samples, each of 10 cm thickness, were taken from 0–60 cm through the 'midden' deposit, and were examined with the possibility of undertaking pollen analyses on the material. Chemical treatment of the organic silty clay comprising the deposit was essentially standard (cf. Moore and Webb 1978), with the addition of one hour's boiling in hot hydrofluoric acid to remove silicate particles, and the use of 10 micron nylon mesh sieves to remove clays. The residue was stained with safranin and embedded in silicon oil, and the microscope slides were scanned at mag.x400 on a Vickers MISC microscope.

The material is non-polleniferous. Rare grains of Compositae *Liquiliflorae* and *Polypodium vulgare* (both types being highly resistant to deterioration) were noted, but there were insufficient pollen grains and spores to warrant further analysis, particularly given the rigour of the chemical treatment. It is likely that the almost complete absence of grains is due to drying of the deposit following deposition, and the resultant oxidation and bacterial breakdown of the pollen grains.

Section 7 – Discussion

The excavation at Helman Tor was undertaken on behalf of English Heritage as an evaluation to establish the date and cultural context of the site in order to establish its importance from the point of view of future management strategies. It was therefore conducted in a manner that impacted least upon the cultural resource on the site and indeed English Heritage, rightly, placed an upper limit upon the area that could be disturbed in the Scheduled Monument Consent that had to be obtained. Within that constraint it was decided to open one area only (thus easing future problems of locating the damaged area), that area to include as much as possible of one intelligible unit of prehistoric occupation while firmly dating the enclosure wall.

The objectives of the excavation were therefore strictly limited to chronological and cultural assignation with the furnishment of as much comparative material for Carn Brea as might be encountered within the execution of this narrow remit. The consequence is that the area excavated at Helman Tor is less than one tenth that excavated at Carn Brea within the E summit enclosure there – let alone over the site as a whole. With such a sampling diversity it is clear that the greatest care must be exercised in drawing comparisons between the two sites.

It is perhaps appropriate, therefore, that we should examine the chronological and cultural assignation first.

Chronology and Cultural Assignation

Six radiocarbon dates are available from the excavated area at Helman Tor. They show incontrovertibly that the site dates to the Early/Middle Neolithic of Southern Britain with dates ranging between 3970 and 2700cal BC. Even in this regard any direct comparison with Carn Brea is fraught with difficulty as, there, fewer (three) dates were obtained from a far larger sample of the site and a wider range of contexts. Consequently the apparently rather earlier focus of the Carn Brea dates may be a sampling feature and not necessarily a reflection of any real disparity. From both sets of dates it is perhaps clear that activity on both sites persisted through a considerable period of time measured in centuries rather than decades.

The cultural assignation of the site, as at Carn Brea, is left in little doubt. Indeed, at Carn Brea, activity in later prehistory, during the medieval period and later, had led to the presence on the site of quantities of later material – none of it, however, stratified in primary contexts. At Helman Tor virtually nothing was located, at any level, that was not at least putatively neolithic in date and certainly nothing in primary contexts. The chronological and cultural assignation of the site at Helman Tor as parallel with that already proven at Carn Brea can, therefore, within the limits of archaeological inference be accepted as demonstrated.

The Nature of the Site

Any commentary on the nature or functionality of the site at Helman Tor must depend heavily upon the discussion of the evidence from the site at Carn Brea, excavated on an altogether larger scale but with which Helman Tor, in microcosm, strikes such very close archaeological parallels. Sadly, the exposed nature of the sites and the abrasive and acidic nature of the soils have dictated that no fossil pollen, molluscan or animal (or human) bone remains of any kind have survived. As a consequence commentary on the agro-economic function of either site is not possible.

Furthermore Thomas (1991, 38) is not the first to point out that neolithic enclosures may have had a succession of functions, 'shifting meanings'; beside which we must also recognise that isolated and defined functionality, clearly identifying 'settlement', 'ceremony', 'industry' as segregated activities is unlikely to relate closely to any neolithic reality.

The hilltops of both Carn Brea and Helman Tor like many others in the South West are of dramatic and striking character. The hilltop tors are of highly-individual form (often imaginably anthropomorphic or zoomorphic) and in a landscape of less formality, particularly in circumstances of reduced visibility, to the writer's certain knowledge, their form can lend them vital significance in the comprehension (and thus organisation) of the landscape.

It may well be, therefore, that hilltops displaying tors, or some of them, became early foci of interest, vested perhaps with ritual or legendary associations, and that such locations might well have become regarded as suitable locations for sites used for ceremonial purposes and/or high status settlement. Conjecture at this level, however, seems to the writer beyond the limits of inference of the evidence available.

The evidence impresses the writer in three salient regards:

- (1) The enclosure at Helman Tor, like that at Carn Brea, is of massive proportions. The boulder-built walls that join the tors on both sides are truly cyclopic with blocks of ½ tonne and more making up the body. It would seem reasonable to suggest that the wall was built to impress and, possibly, by way of response to defensive needs. The evidence for attacks by archers has been set out for the site at Carn Brea, supported by broadly similar evidence from Hembury, Devon; Crickley Hill, Gloucestershire and Hambledon Hill, Dorset (Mercer, 1990). The evidence at Helman Tor is perhaps less dramatic but it too may have been attacked.
- (2) The excavated surfaces within both the enclosures displayed thick deposits of midden debris and substantial ground-fast evidence for timber supports for structures. These features were associated with very large quantities (by British Neolithic standards) of ceramic and lithic debris. There is no reason to suggest that this material was associated with activity other than settlement. In the absence of the palaeoecological component of evidence (see above Section 6) it is not possible to suggest whether this activity was seasonal or not, nor is it possible to suggest in our current state of knowledge whether it was restricted to a high stratum within contemporary society, nor whether the activity comprised an unusual degree of ceremoniality. All of these possibilities must, however, be borne in mind as more evidence accrues.
- (3) Both Carn Brea and Helman Tor are clearly a focus for long distance networks of communication along which travelled an extensive array of artefacts deriving from sources to the east in Wessex and to the west. Furthermore both sites would appear to have been linked to the same networks where any degree of specificity of evidence is possible.

In terms of the wider discussion of the British Neolithic modern views of a 'minimised' neolithic economy would appear to the writer to sit uneasily with the 'maximised' image that the work at Carn Brea/Helman Tor seems to offer. Thomas (1991, 181) encapsulates the 'minimised' view but, unfortunately, and perhaps significantly, he does not venture to draw the evidence from Carn Brea into his frame.

Clearly very large issues remain to be elucidated here that lie beyond the scope of this report. The writer would argue that Carn Brea and Helman Tor represent highly organised defended settlements reflecting an advanced societal organisation functioning within a widely established geographical continuum. The importance of the excavation at Helman Tor lies

in its demonstration that Carn Brea is not unique and in opening our eyes to a whole vista of likelihoods that may serve to dynamite the log-jam of minimalism into which our understanding of the neolithic appears to have drifted. A broader view of Carn Brea and Helman Tor within the context of neolithic enclosures as a whole, seen from the perspective of this writer is available (Mercer 1990).

The Wider Context

Carn Brea, therefore, has ceased to be an isolated phenomenon that, only with the utmost caution, can be adduced to wider debates and syntheses. Furthermore much work has proceeded since 1981 on the identification of yet further sites that offer the likelihood of identification with this class of site.

In 1981 this writer indicated Helman Tor as the 'most satisfactory' example of a parallel to Carn Brea (NGR SW684408). At a greater separation in terms of likelihood he placed the relatively little known site (at that time) of Roughtor, on the NW fringe of Bodmin Moor (SX147808) which had been suggested by Johnson (1980, 167) to possess 'a denture-like rampart reminiscent of the neolithic defence of Carn Brea' as well as platforms for occupation, while Mercer (1981, 190-1) developed its local neolithic associations. Since 1981 we have obtained a detailed survey of the site (Johnson and Rose 1994, 46-7).

Roughtor is set considerably higher in altitude than Carn Brea (227 m OD) and Helman Tor (221 m OD), as it tops Bodmin Moor at 370 m OD and this may suggest a fundamental functional, although not necessarily a chronological, difference governing the construction of this site). Morphologically it exhibits broad similarities with the known neolithic sites at Carn Brea and Helman Tor, as well as some contrasting features. In area the 6.5 ha of the Rough Tor enclosure contrasts sharply with the 0.5 ha of the eastern summit at Carn Brea and the 0.6 ha at Helman Tor. At over 12 times the size of Carn Brea and Helman Tor a sharp functional, if not chronological distinction must once again be drawn.

Technically, however, there are constructional similarities that do link Roughtor with the two known neolithic sites. First, of course, the technique of boulder wall construction linking 'tor' type outcrops is replicated at Roughtor - yet it is reasonable to suggest that such a constructional style is, to an extent, 'environmentally determined' on the site. The multi-vallation present at Roughtor is not reflected at Carn Brea or Helman Tor but the complex entrances and their multiplicity *is* reflected in the outer enclosure (Ramparts IS and IN) at Carn Brea and indeed if comparison is made between Roughtor and the outer enclosure at Carn Brea (6 ha) (and the possible outer enclosure at Helman Tor - 1 ha) then general parallels become somewhat more persuasive. Nevertheless the differences between Roughtor and the known neolithic sites remain dominant and convincing, and cause this writer now to question the likely functional links between these sites. Chronological links, of course, can only be established by excavation.

In 1981 this writer indicated as a second parallel to Carn Brea the hilltop enclosure at Trencrom, 4 km S of St Ives at NGR SX518362. Here little more can be said than in 1981. The site is set upon a prominent granite outcrop some 160m OD. It is of about 1ha extent and built using the familiar boulder wall technique joining unassailable 'tor' outcrops. The site commands what must have been an area of intensive industrial activity during the earlier neolithic (the 'factories' relating to Group II and V axes are probably situated somewhere close by - see Mercer 1986b) and two axes and flint work have been located on the hill. This site remains reasonably persuasive as a parallel site of similar function and date.

In 1981 the writer also recruited to his argument the promontory enclosure on Dewerstone Hill (NGR SX538640), situated on the western edge of Dartmoor at the confluence of the Rivers Plym and Meavy. In area some 3ha, with bi-vallate construction, and boulder walls

linking tor outcrops this enclosure has, possibly, more in common with the Roughtor type of enclosure (see above) than the known neolithic examples under discussion. This site, however, occupies a spur about 220 m OD. Once again function would appear to differ while the question of chronological assignation can only await excavational intervention.

With Roughtor, probably belongs the enclosure at Stowes Pound set close to Minions on the SE fringe of Bodmin Moor (discussed briefly by the writer, 1981 and surveyed and described by Silvester (1979), and again by RCHME (Fletcher 1989)). Once again Stowes Pound, while interestingly situated at an altitude and built in a manner that dissociates it from later enclosures (as Fletcher points out), is quite distinct constructionally, in siting and in size from the Carn Brea/Helman Tor model. Here the boulder enclosure wall linking tor outcrops is again present and the association with two large circular cairns set within the enclosure may also be significant. Here, however, unlike at Roughtor, a 'core' enclosure, 100 m × 75 m at its widest point, seems to act as a nucleus for the larger complex of some 18 ha situated at its northern end. Clearly defensive, and providing a ready parallel for the situation at Helman Tor and Carn Brea, this site, nevertheless, set at c.400 m OD is, perhaps, functionally distant from these known neolithic sites, although the notion of an earlier neolithic focus of activity is rendered attractive as a landscape component, with 'The Hurlers' stone circles set 900m to the S and the Rillaton barrow group lying between.

By 1986 the fieldwork of Peter Herring and Jacqueline Nowakowski had isolated yet another site that demanded discussion in the context of Carn Brea and Helman Tor – at Carn Galver (NGR SW426363) 3 km SW of Zennor in West Penwith. The site is set at 220 m OD and is of c.0.8ha extent commanding an extensive tract of the northern part of the Lands End Peninsula. Unfortunately, the plan of this site is, as yet, unpublished but the existence of subrectilinear terraces, within the enclosure, its setting and, morphology render it an attractive parallel for the known neolithic enclosures.

Since 1986 further discoveries have been made. In the summer of 1988 in conclusion of the RCHME/CAU Bodmin Moor Survey a sketch survey was conducted of industrial remains. In the course of survey around De Lank quarry a 'tor-enclosure' was discovered (NGR SX100752) which was further examined in 1991 and surveyed by RCHME. This enclosure which is described by Herring (1992) is set c.180 m OD on a spur within a meander of the De Lank river, 2 km N of Blisland, on the westernmost edge of Bodmin Moor. The enclosure wall has an inner orthostatic face in places, utilises natural tors in its circuit and is of something less than 1ha in size. Two menhirs less than two metres apart have been set up within the enclosure – possibly marking a gateway as was the case on Site G at Carn Brea (Mercer 1981, 95). This site also, it would seem, presents a most satisfactory parallel for the known neolithic enclosures.

In sum therefore, two further sites can be suggested with the degree of confidence that is ever allowed by the unsupported surface field analysis of sites. Carn Galver, Zennor and the new site near De Lank quarry, St Breward, would appear both closely to parallel in siting, scale, elevation and morphology the known neolithic enclosures at Carn Brea and Helman Tor. The enclosure at Trencrom, Lelant, exhibits some morphological similarities, but its siting it not by any means identical to the known sites. The sites at the Dewerstone, Rough Tor and Stowe's Pound differ in scale, detailed morphology and elevation from the known sites and while these differences in no way, of course, deny them neolithic assignation, the suggestion must be that they are, at least, functionally different and possibly may relate to a different chronological horizon altogether.

Parallels between Helman Tor and Carn Brea

So much for the comparison of Helman Tor and Carn Brea with other likely sites to which

they may relate. To what extent can we exercise comparison between the two sites? Structurally they are extremely closely related. The enclosure wall at Helman Tor with its orthostatic facings and boulder-built core is, effectively, identical to that at Carn Brea as are its size and stature. Behind the wall the cleared terrace with the hollow cut on its forward edge exactly parallels the situations recorded on Site A1 and Site J at Carn Brea – as indeed does the filling of that hollow with midden debris. The revetment at the rear of the terrace with small stones is also precisely replicated.

The traces of occupation on the terrace surface is also closely in parallel. Pit-hearths occurred on Sites A1, K and J at Carn Brea and two examples are encountered at Helman Tor. The post-hole pattern encountered is similar in density and 'style', representing, as it does, a succession of occupations in differently built structures which according to the C14 evidence, in both instances, extended over a considerable period of time. Stake holes and post-holes, the latter almost always without packing, were standard to both sites. As this writer remarked in 1986 (a, 53) the excavation of Terrace 16 at Helman Tor led to a 'consequent sensation (that) was an overwhelming one of *déjà vu*'.

Material Culture

The close similarity of the physical format of Carn Brea and Helman Tor is reflected in the material culture. Saville has indicated how closely comparable are the two lithic assemblages. At Helman Tor there is a somewhat more extensive use of imported non-beach-originating flint, with the same opportunist level of chert usage. The importation of flint axes occurred, as at Carn Brea, with a consequent reduction, for subsidiary tool manufacture, of their shattered fragments. A somewhat smaller proportion of burnt flint material occurred at Helman Tor – but not one that should be seen as undue in the light sampling differences. Equally a markedly lower proportion of flint arrowheads occurred at Helman Tor but not one that is lower than the lowest proportion registered on any site at Carn Brea. Nevertheless as a proportion of the struck assemblage from the whole site, or per sq.m of site, the number of leaf arrowheads is markedly less.

What is, however, most impressive is that the variant nature of the Carn Brea flint and chert assemblage when set alongside the whole range of assemblages from sites of similar date and cultural assignation from Southern Britain, which was registered by Saville (1981, 144–45) is reflected precisely at Helman Tor – so that the cultural sub-group reflected in this enclosure type is also reflected in a distinctive flint industry. Saville set out the possible implications of such an assemblage under four heads (Saville 1981, 146) but, it cannot be hoped that the relatively small assemblage from Helman Tor will enable any conclusion to these issues.

Of the two complete stone axes located on the site, one came from the south east flank of the hill on land pertaining to Bodwen Farm and is recognised as composed of Group I rock. The other from the east flank of hill, again from cultivated land, was composed of Group XVII rock, and two of the fragments located from the excavated area match this piece. Group XVII items are indeed rare, only four other clearly identified examples occurring within Cornwall – two at Carn Brea and two other examples, one in the Lizard peninsula near Mullion and the other in West Penrith near St Ives. It may be that this identification of three examples (out of four grouped examples) at Helman Tor may assist in the precise location of the Group XVII 'factory', at present undecided between Kenidjack Castle near the Lands End and Terras Mill, near St Austell, 15 km SW of the site.

The two other axe fragments, one of an ungrouped greenstone of probably Cornish origin and the other an unspecified sandstone, have both been converted into rubbers which may suggest some measure of axe-finishing at Helman Tor paralleling another aspect of activity registered at Carn Brea.

The Group I axe from the SE flank of the hill is also paralleled at Carn Brea and the writer has argued (1986b, 46) that local production from this 'factory' preceded for a substantial period its expansion to meet a wider demand. Indeed the complexion of the small assemblage at Helman Tor does not conflict at all with the model of W-E axe exchange proposed by the writer (1986b).

The links to regions 40 km to the SW suggested by the above object lead us naturally to the discussion of the pottery from the site conducted by Dr Smith. Here interesting divergencies occur that, however, serve, perhaps, only to emphasise the close links between the two assemblages.

First Dr Smith with the aid of Dr Williams identifies four different sources of pottery manufacture at Helman Tor, two local, one fairly local and one distant. Of the pottery from the site 65% is directly local (probably from clays in the Red Moor area) and includes the production of finely made bowl and carinated forms. Other (but distinct) more or less local fabrics account for another 11% while 24% of the sherds from the site relate to a class of ware first studied by David Peacock and published by him (1969a) as originating in the Lizard Peninsula and distinguished by the characteristic grits of gabbro, a rock only located within the parish of St Keverne. At Carn Brea the whole pottery assemblage (100%) was composed of material from this source, supplied over a distance, 'as the crow flies', of 29 km. At Helman Tor the direct distance is 65 km and at such a distance it was clearly not possible to sustain such a monopoly that was able to discourage all local production. At Helman Tor approximately a quarter of all pottery of all types emanated from this source, the rest being produced locally, and, to judge by fired lumps of material located on site, was manufactured within, or very nearby, the enclosure.

In these circumstances it is perhaps not surprising that a variation should occur in the styles of pottery produced at Helman Tor from that produced at Carn Brea. Interestingly these variations, in so far as they are detectable in a small sample, are informed from the east, with a higher proportion of decorated vessels than at Carn Brea, drawing their inspiration from potting traditions in Wessex and even further east.

Yet severely utilitarian issues relating to pottery technology are retained so that the black coating, possibly induced by coating the pottery in 'biscuit' condition in milk before firing in order to achieve an impermeable finish, is still retained. Thus differences (and similarities) occur that might be expected under the circumstances and the links to the east are witnessed that are set out fully in the writer's paper of 1986. Indeed, it might be agreed, if we are prepared to accept the role of pottery manufacture as one allocated to women, that women are being drawn into the 'Cornish' ambit rather than the reverse with the possible secondary suggestion (itself on the basis of a bald assumption) that a male oriented endogamous society was present on the site. Such a suggestion is, perhaps, rendered more persuasive by the nearly identical nature of the flint industry to Carn Brea (an activity often allocated to men).

More puzzling is the apparent variance in the proportion of vessel forms between the two sites. Small cup-like vessels (often associated with small-scale domestic consumption) form 23% of the assemblage from Terrace 16 at Helman Tor, whereas Sites A and J at Carn Brea produced only 14% and 10% respectively. Conversely only 15% of the assemblage on Terrace 16 related to carinated bowls compared with the 26% and 23% respectively from Sites A and J at Carn Brea. Once again we are faced with the difficulties created by the diminutive Helman Tor sample, and also by one last distinction to be observed, at present, between the ceramic assemblages of the two sites. The degree of abrasion on the Helman Tor sherds, and their degree of fragmentation, is far less than at Carn Brea and this is solely due, in the writer's view, to differing taphonomic conditions on the two sites. Much pottery was retrieved in the upper layers at Carn Brea due to lateral erosion caused by

solifluxion and human interference. At Helman Tor no evidence was present of these processes and consequently the 43% (Site A) and 50% (Site J) of 'other rims' (i.e. vessels of unspecified form) at Carn Brea was reduced to 27% on Terrace 16 at Helman Tor. In this difference may well lie the disparity noted above in vessel-form distribution between the two sites and this object lesson may well serve to emphasise, finally, the difficulties inherent in the comparison of features between such assemblages as retrieved at Carn Brea and Helman Tor (even when studied by the same experts).

In summary, the story is of two sites astonishingly alike, clearly very closely culturally and chronologically related, with some points of distinction which reflect more upon their differing geographic situation than anything else. The linkage to a W-E exchange system postulated by the writer in 1986b is reinforced. That such sites are not unique has been suggested with a further two examples, at least, indicated for further investigation. The temptation to suggest separate cultural recognition for such unusual sites is, in the writer's view, to be resisted. The circumstances, geological and preservational, at Carn Brea and Helman Tor, lend themselves to survival and detection in a manner not available in less fortunate tracts of country. For this reason, and in this spirit, the writer is, perhaps, justified in seeking the inclusion of Carn Brea and Helman Tor in the broader Southern British discussion of the neolithic that until now has, perhaps, not been fully accorded.

Once again the writer is proud to press this enquiry forward. Further goals lie in view, although now, perhaps, for other investigators to achieve.

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The changing landscape and coastline of the Isles of Scilly: recent research

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Introduction

Located 28 miles (45 kilometres) south west of Cornwall, the Isles of Scilly comprise a tiny granite archipelago teeming with archaeological remains, including the houses, fields and ritual and burial sites of its earliest inhabitants. An important aspect of Scilly's archaeology is the presence of remains below high water, the result of the gradual submergence of a once much larger land mass. Submerged stone remains (such as field walls, hut circles and cist graves) have been documented since the eighteenth century, but it is only in recent years that intertidal peat deposits have been recognised. As sea level continues to rise, erosion around the edge of Scilly's existing islands continually exposes archaeological structures and layers in the low cliff face. Though ultimately having a destructive effect, this process provides informative cross sections through many sites, including prehistoric and later settlement remains consisting of stone round houses and midden deposits.

Over a five year period from 1989 to 1993, with funding from English Heritage, Cornwall Archaeological Unit (in conjunction with the Ancient Monuments Laboratory and Bristol University) implemented a small-scale recording and sampling programme to assess the palaeoenvironmental potential of these early coastal sites. For the intertidal peat deposits, the aim was to test their potential for enhancing understanding of the vegetational history of Scilly and as a means of testing and refining the current model for sea level change. For cliff-face sites, the main aim was to assess their potential for yielding information on the subsistence economy and diet of the early inhabitants of the Islands, with particular emphasis on sampling for plant macrofossils which, apart from charcoal, were virtually unknown for Scilly. A total of twelve sites were assessed, the locations of which are shown on Figure 1, while Table 1 summarises the environmental work carried out at each. Figure 1 and Table 1 also include two sites that were sampled as part of developer-funded watching briefs – an early medieval midden at Lower Town (St Martin's) and a prehistoric field boundary at Mount Todden (St Mary's).

Early settlements exposed in the cliff face

The sites

There were nine such sites, located on both the outer and inner-facing shores of the present coastline, the cliffs in which remains were exposed being only 0.5–3.0 metres high, making

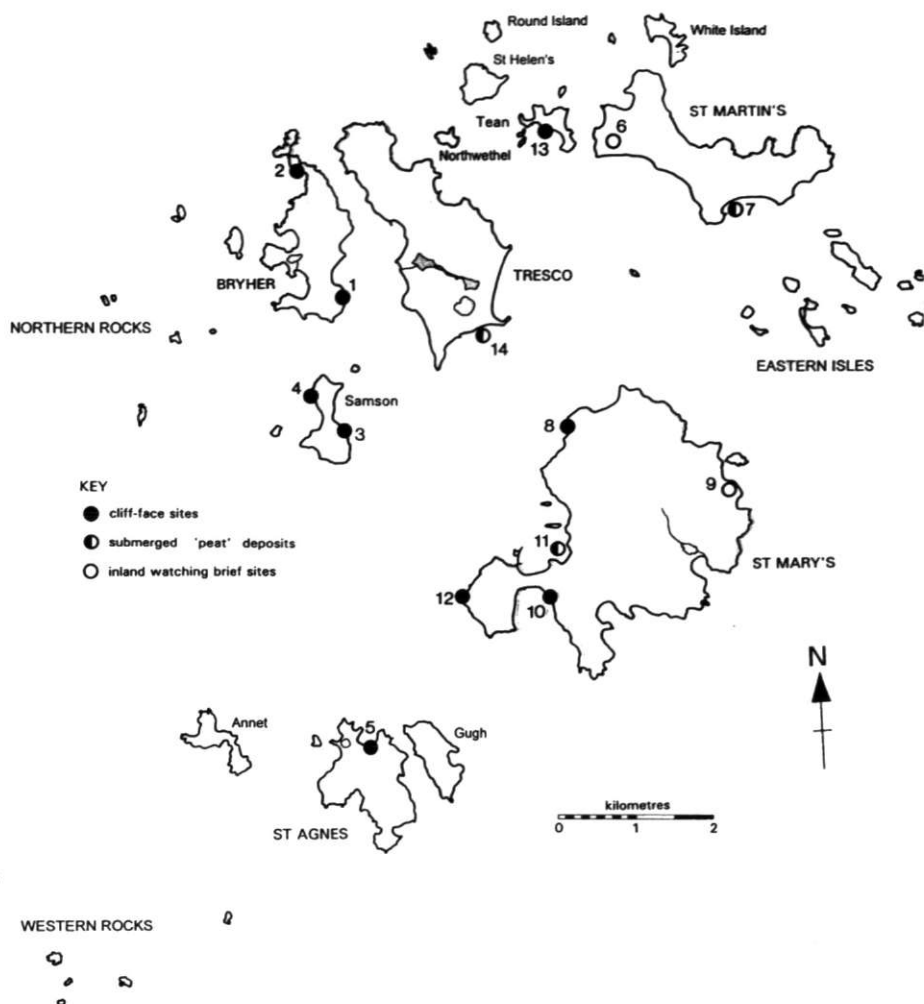


Fig 1 Locations of sites at which palaeoenvironmental work was carried out between 1989 and 1993 (see Table 1 for site names and dates, and a summary of the work carried out at each site)

them particularly vulnerable to coastal erosion, but also, on the whole, very accessible and easily recorded and sampled from the beach below. The degree to which the archaeological remains could be interpreted in each case depended on the way the cliff had eroded in relation to them – it being easier to define and interpret a straight and vertical cliff face than one which had eroded differentially along its length or slumped, been undercut or burrowed into by rabbits and rats.

The majority of sites were early settlements. At most, ruined stone-walled buildings were exposed in the cliff face, together with occupation and post-occupation layers and, in some cases, features such as hearths and stone-lined drains. A trend recorded at four settlement sites was the disposal of domestic waste within buildings that had gone out of use, the part of the site which generated the rubbish either having been already eroded away or perhaps still surviving inland. Middens dominated by limpets were a feature of three of the sites and in two cases (at Porth Killier and on Tean) provided the alkaline conditions necessary for

Table 1 Palaeoenvironmental work at sites in Scilly, 1989–1993 (see Fig 1 for location)

No	Date of Sampling	Site Name	Site type	Date of sampled context	Diatoms	Pollen	Seeds	Charcoal	Wood	Foram-inifera	Molluscs	Animal bones**	Soils, sedi-ments	RC dates
1	1993	Bonfire Carn	settlement	Late Bronze Age			✓	✓						✓ 2
2	1989, 1993	Shipman Head	cliff castle	Iron Age	✓									✓ 1
3	1990	Samson, East Porth	old land surface	Early Bronze Age			✓							✓ 2
4	1990	Samson, West Porth	settlement	Late Bronze Age/ Early Iron Age			✓	✓						✓ 3
5	1989	Porth Killier	settlement	Mid to Late Bronze Age			✓	✓		✓ M	✓			✓ 3
6	1992	Lower Town *	midden	Early Medieval			✓		✓		✓ L & M	✓		✓ 3
7	1990/1	Par Beach	peat	Mesolithic to Early Medieval	✓		✓					✓ teeth		✓ 10
8	1991	Halangy Porth	settlement	Early to Middle Iron Age			✓	✓						✓ 2
9	1992	Mount Todden *	field boundary	Prehistoric	✓									
10	1991	Porth Cressa	settlement	Mid to Late Bronze Age			✓	✓		✓ M				✓ 2
11	1992	Porth Mellon	peat	Late Neolithic/ Early Bronze Age	✓		✓	✓						✓ 4
12	1990	Steval Point	battery	Post-medieval, 17 th century			✓					✓		
13	1989	Teau, East Porth	midden	Late Roman to Early Medieval			✓			✓ M		✓		✓ 2
14	1990/1	Crab's Ledge	peat	Prehistoric to Romano-British	✓		✓						✓	✓ 8

* Inland site sampled as part of a developer-funded watching brief. L = land snails, M = marine molluscs ** including fish and bird bones

good bone preservation. With the exception of Shipman Head, all sites yielded artefacts – pottery, flints and stone objects, such as saddle querns. Of note is the pottery of a form dateable to the Late Bronze Age/Early Iron Age found at West Porth, Samson, this being the first identification of such pottery in Scilly. The neolithic potsherds and flints from the otherwise Bronze Age site of Bonfire Carn are also important, evidence for neolithic occupation being very rare in the Islands.

Sampling and recording methods

The sampling method consisted of taking bulk samples of limpet middens and other archaeological layers, and occasionally spot samples were taken for pollen assessment and Kubiena boxes for soil analysis. Owing to the fact that care had to be taken not to undermine the cliff section, the samples were smaller than those usually taken from excavations. To provide a context for the environment sampling, a detailed section drawing was made of the cliff face in each case (see, for example, Fig 2). Recorded layers and features were assigned context numbers and described on site context forms. Artefacts collected were allocated unique finds numbers and were marked on the section, as were the positions of the samples taken. A full photographic record was also made of the cliff face.

Assessment of the environmental samples

All the bulk samples were processed by flotation, and the resulting floats and residues were completely sorted through. Animal bone, marine shell, charcoal and plant macrofossils were extracted. The shell was not subjected to further study, but the bone was identified, together with those charcoal samples submitted for radiocarbon dating. For the plant macrofossils, owing to the small size of the samples, it was possible to make full counts of these.

Both charred and mineralised plant remains were preserved. The discovery of mineralised seeds is significant since it emphasises that the potential of archaeological deposits in Scilly to preserve information on past flora and land use is not confined, in dry soils, to charred plant macrofossils, which are inevitably biased towards arable activities. It also means that adequate provision must be made to recover this information when future sampling and recovery programmes are planned. A wide variety of animal bones were also identified, including very small fish, bird and amphibian bones.

Radiocarbon measurements were obtained from all of the cliff-face sites, except Shipman Head, where suitable organic material was not present, and Steval Point, where radiocarbon dating was not appropriate for such a late site. Charcoal, charred grain, animal bone and limpets have all been successfully used to obtain radiocarbon determinations (a marine offset being applied when calibrating determinations obtained from material of marine origin). The calibrated date ranges provide a near continuous sequence from the Early Bronze Age to the Late Iron Age, with a few Romano-British and early medieval date ranges in addition. This provides a chronological framework for the palaeo-environmental evidence and for the other types of data collected, and it increases the number of radiocarbon-dated settlement sites in Scilly from four to eleven.

New evidence for prehistoric crops and arable weeds

Prior to 1989, the most abundant source of evidence for the subsistence economy and diet of early Scillonians were assemblages of animal bone and shell from excavated settlement sites. The 1989–93 assessment project has provided additional bone evidence. For example, for the

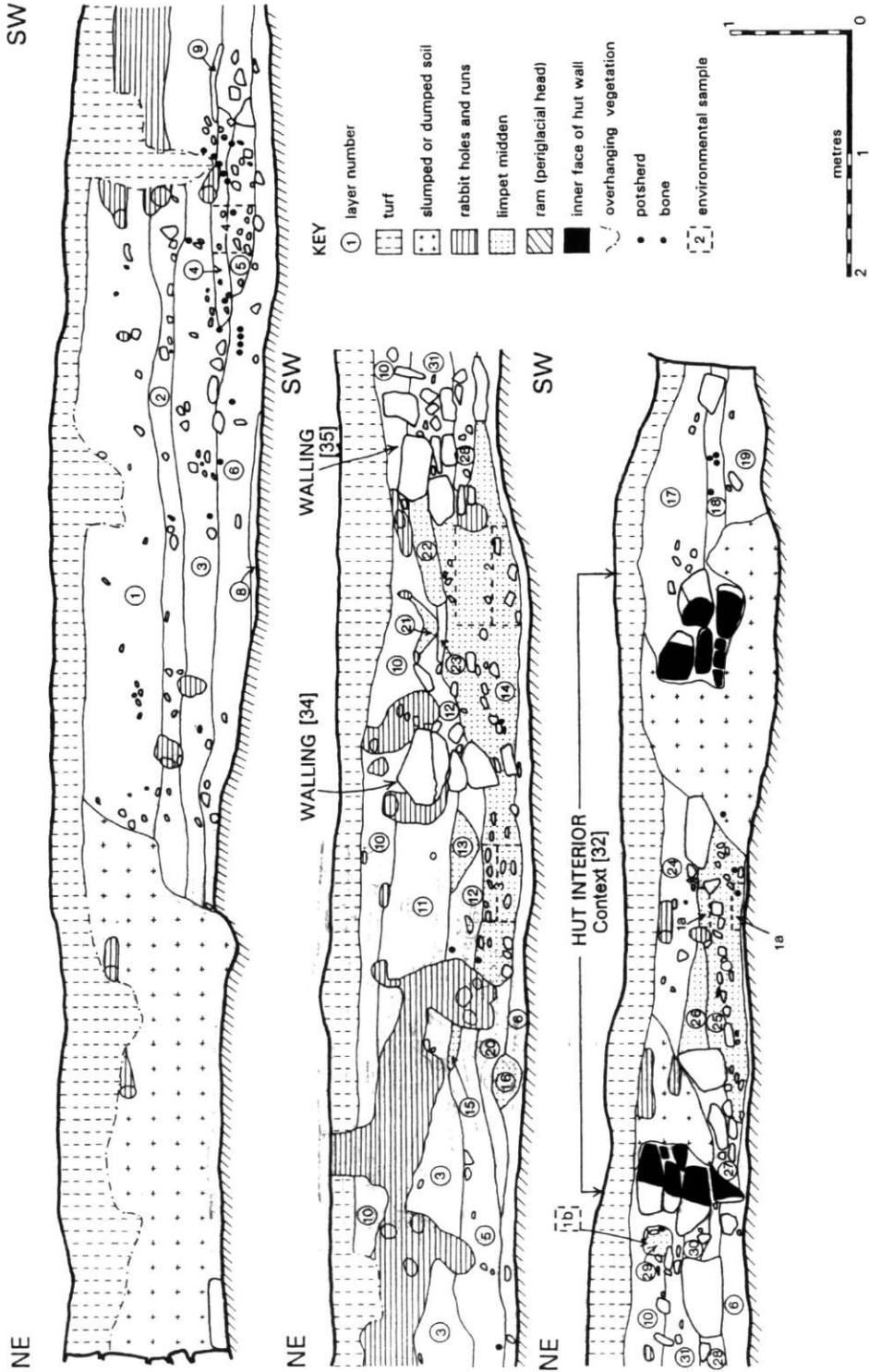


Fig 2 Section drawing of cliff face at Porth Killier showing locations of samples taken in 1989



Fig 3 Bronze Age limpet midden exposed in the cliff face at Porth Killier

Bronze Age it has added seven new fish and ten new birds to the list of species identified for Scilly. However, the key environment gain from the cliff-face sites has been the establishment of a range of crops for Scilly for the Bronze Age and Iron Age. These are naked and hulled barley, emmer wheat and celtic bean. The identification of naked barley in an Iron Age Scillonian context is important since as well as apparently being confined to westerly and northerly locations in the British Isles, it also tends to be found more commonly in a Bronze Age context. Accompanying the arable crops was a range of plants typical of cultivated and disturbed ground, such as fat hen, knotgrass, black bindweed and chickweed which are commonly found elsewhere in Britain. One or two have specific habitat requirements which provide additional information on soil conditions. Corn spurrey, for example, is characteristic of acid soils such as those that would have developed over the granite after woodland clearance, while ploughman's spikenard is typical of calcareous soil. The addition, either intentionally or accidentally, of shell sand would have created suitable conditions for calcicoles.

Intertidal peats

The sites

All three sites at which intertidal peats were recorded and sampled are located on inner facing shores, on the edge of the lagoon which (according to the present model for sea level change in Scilly) was a low-lying plain during prehistoric times. As well as shelves of peat exposed on the surface of the beach (Fig 4), buried bands were also recorded. A total of ten deposits were identified – five on Par Beach, three at Crab's Ledge and two in Porth Mellon. Most of these are not true peats but minerogenic intertidal sediments containing varying amounts of organic matter (humic silts, sands and sandy silts). Wood content is low or absent and the



Fig 4 Crab's Ledge exposure (1990), the upper shelf of 'peat' dating from the Late Iron Age

deposits appear, therefore, to be different in character to the submerged forest beds documented around the Cornish coast. All exposed areas of peat have been truncated by marine erosion and probably also by peat cutting for fuel, since this is known to have been carried out until recent times on Scilly's downs and inland mires. On all three beaches prehistoric stone remains (field systems, hut circles and a stone row) had a direct or indirect relationship with the peat deposits.

Sampling and recording methods

Exposed remains were surveyed and levels taken and related back to a known Ordnance Datum height in order that both the horizontal and vertical position of each exposure and each sample point could be recorded (see Fig 5). Samples were taken from the exposed areas of peat in monolith and Kubiena tins, blocks and bulk samples (the latter at consecutive 4 or 5cm intervals), once a clean section had been produced by cutting back the eroded edge of the peat or excavating a pit through its surface. These samples were later subdivided in the laboratory for specialist assessment and radiocarbon dating. A powered percussion auger was used to locate and sample buried deposits – pollen and radiocarbon subsamples being taken from two of the auger columns.

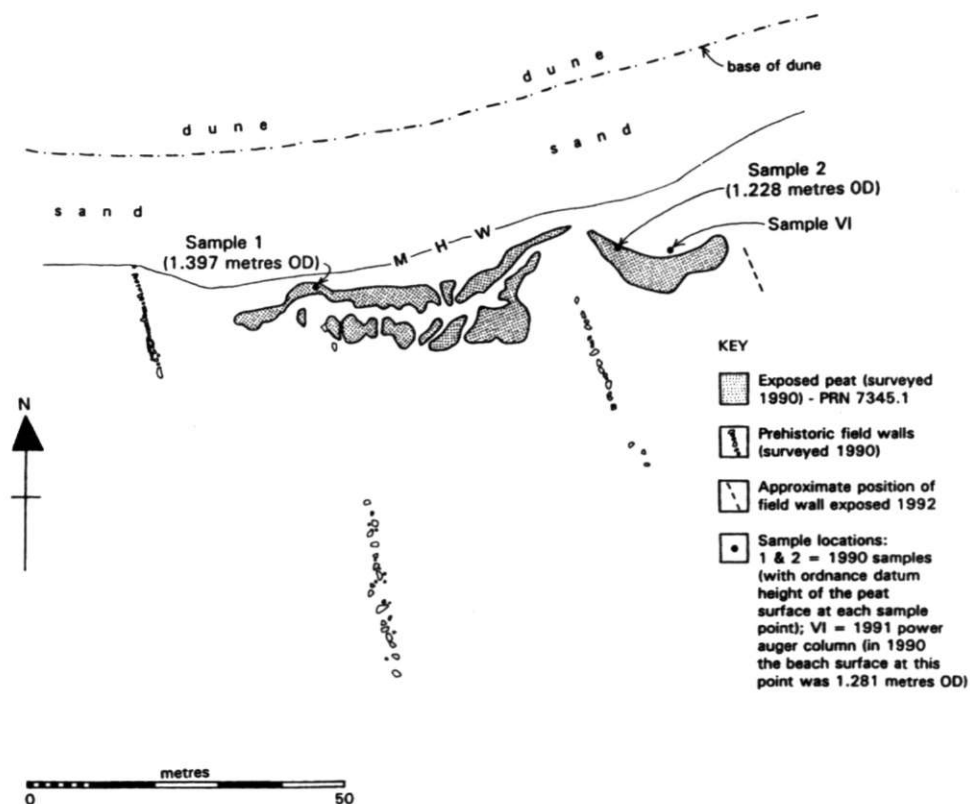


Fig 5 Plan of Crab's Ledge showing prehistoric field walls, peat exposure and sample points

Assessment of the environmental samples

The peat samples were assessed for pollen, and some were also assessed for plant macrofossils, diatoms and foraminifera. Full counts were made for the plant macrofossils, but not for the other types of evidence. The few pieces of wood collected were identified to species.

For most of the samples pollen preservation was good and concentrations high. Preservation of plant macrofossils was more variable, this material being poorly preserved in deposits located higher up in the intertidal zone and susceptible to more extensive drying out between high tides (the best results being obtained from Porth Mellon where the peat exposures are located at mean low water). For at least a third of the samples assessed for diatoms, the diatom abundances, preservation and species richness was such as to warrant more detailed analysis, and the assessment has confirmed that such analysis will provide data on the salinity conditions under which the various sediments accumulated. Unfortunately, foraminifera preservation was generally very poor. However, since this was probably the result of a combination of a) aerial exposure at the site and b) prolonged storage of the samples in a wet state at room temperature, better results may be obtained in the future by more targeted sampling and more careful storage.

Radiocarbon measurements were obtained from peat and wood samples from the intertidal sediments (from the base and top, and sometimes the middle of these). Samples taken from the exposed areas of peat produced good results, with calibrated date ranges spanning the late Mesolithic to the beginning of the early medieval period. However, the measurements obtained for samples taken from the auger cores are problematic. The dates for the different peat layers do not correspond to their relative stratigraphic positions and it is assumed that some contamination must have taken place during the sampling process.

Enhancing Scilly's vegetational history – the intertidal pollen evidence

Palynological evidence previously collected from Scilly came almost exclusively from St Mary's, primarily from the inland mires of Higher and Lower Moore (Scaife 1984). The pollen sequence from Higher Moors is the longest from Scilly and dates back to the 6th millennium cal BC. At this time the surrounding vegetation consisted of mixed oak woodland. This was subsequently partially cleared for cultivation (probably during the Neolithic), but during the Middle Bronze Age or later there was a period of forest regeneration, though some land remained open. However, from the Late Bronze Age or Early Iron Age there was extensive woodland clearance. This general picture of a deciduous forest which by the Iron Age had become transformed into an open environment of cultivated fields, pasture and heathland, was confirmed by the pollen evidence from Lower Moors and soil pollen analysis on St Mary's and on Nornour. It was unclear, however, to what extent it reflected the vegetational and land use history of Scilly as a whole. The sampling of intertidal peats during the 1989–93 project allowed for the collection of evidence from a wider area, though it should be noted that this new pollen evidence is based on assessment counts only and should therefore be regarded as provisional.

By and large the intertidal evidence corresponds with that from Higher Moors. The earliest of the deposits examined, at Par Beach, St Martin's, was dated to the late Mesolithic or early Neolithic (the late 5th/early 4th millennia cal BC) and provided evidence for the existence of mixed deciduous woodland (oak, hazel, birch, lime, elm, holly, alder and willow), broadly similar to that identified at Higher Moors for the Earlier Mesolithic. By the late Neolithic (3rd to 4th millennia cal BC), at Porth Mellon on St Mary's, this woodland is still a major feature of the local vegetation. This deposit may be tentatively correlated with the start of the second phase at Higher Moors, as may an insecurely dated late neolithic deposit on Par

Beach, in which there was charcoal and only low levels of tree and shrub pollen, suggesting that at this location some clearance took place at this date.

It was previously suggested that the high percentage of birch pollen in the initial forest phase at Higher Moors represented scrub regeneration resulting from anthropogenic disturbance and abandonment by mesolithic gatherer-hunters (Scaife 1984, 39). However, birch was also common in the neolithic woodland at Par Beach and Porth Mellon and it may in fact have been a major part of the postglacial climax woodland, which in Cornwall is usually dominated by oak and hazel. Whatever the significance of the high levels of birch, these late mesolithic to neolithic deposits provide a useful environmental context for the artefactual evidence of these periods, previously rare in Scilly, but now (especially in terms of neolithic material) more commonly identified.

There is currently no pollen evidence from elsewhere in Scilly for the Mid to Late Bronze Age forest regeneration recorded at Higher Moors. Neither is there any indication of it in the archaeological record – indeed the two Middle to Late Bronze Age settlements sampled as part of the 1989–93 project produced evidence for arable and pastoral farming. The Higher Moors evidence may reflect a local vegetational change and not necessarily the situation elsewhere in Scilly. Equally, the only dated pollen evidence for the start of the main phase of woodland clearance still comes from Higher Moors, where radiocarbon dating places it in the Late Bronze Age or Early Iron Age. However, given the emerging picture (from settlement sites) of fairly intensive occupation throughout the Bronze Age, this could have occurred earlier in other parts of Scilly.

The other intertidal deposits date from the Late Iron Age to the 7th century cal AD and the pollen assessments for these concord with the evidence from High Moors. At Crab's Ledge by the end of the Iron Age/beginning of the Romano-British period woodland and scrub had been largely replaced by areas of saltmarsh and open ground. By at least the early medieval period the area around Par Beach was an open landscape, with plants of disturbed ground, sand dunes and heathland represented in the pollen record.

Sea level change and the submergence of Scilly

Today the Isles of Scilly comprise two hundred individual rocks and islands but it is not difficult to imagine these as part of a much larger land mass which has become gradually submerged. At low tide, extensive sand flats are exposed on the inner facing shores of the northern half of Scilly, making it easy to visualise former plains fringed by low granite hills and sand dunes. Bryher, Treco and Samson are still joined at low astronomical tide (LAT), and the water is so shallow between the islands that a drop in sea level of less than 10 metres would re-unite all except St Agnes and Annet.

The current model for sea level change

An archaeological model for the submergence of Scilly has been published by Charles Thomas (Thomas 1985, 17–64). In the absence of radiocarbon dates from the intertidal zone, to calculate sea level change since 3000 BC, he used the vertical positions of submerged archaeological sites which could be broadly dated from artefactual evidence or by analogy with sites elsewhere. Thomas assumed that these sites were originally located at what he termed the Minimum Occupation Level (MOL), just above the contemporary shoreline, at 1.8 metres above High Astronomical Tide (HAT), 5.3 metres above Mean Sea Level (MSL) and that the tidal range in Scilly has remained constant for the last 5000 years – that is 6.4 metres between HAT and LAT (Low Astronomical Tide).

Having plotted the vertical positions of the dated sites in relation to present MSL, he was able to calculate the height of the latter for the periods when the sites were in use, by subtracting 5.3 metres in each case (Fig 7, Lines A and B; Thomas 1985, 26, fig 2). Thomas then adjusted the results of this calculation by introducing a downward deflection of 2 centimetres at 1000 AD and doubling this deflection at 5 century intervals. In this way he changed his sea level/age line into a curve, which indicated that around 3000 BC MSL was almost 17 metres below that of today (Thomas 1985, 27, fig 3). The curve for Scilly is much steeper than that for Newlyn or the Bristol Channel. Thomas suggests that this difference is the result of a very localised downward displacement of Scilly's granitic laccolith in addition to more general isostatic movement.

According to Thomas, his model represents an average yearly rise in sea level of 2.1–2.6 millimetres (*ibid*, 28), which equates to 21–26 centimetres every 100 years and 2.1–2.6 metres every 1000. However, although Thomas' model assumes that the submergence of Scilly was a gradual process, he recognised that there may be an alternative scenario, in that it could also have involved more dramatic events such as tidal surges – the displacement of huge volumes of water in a particular direction (*ibid*, 29–31, 48–52).

Perhaps the most controversial aspect of Thomas' model is his suggestion that today's islands did not finish forming until relatively recent times (*ibid*, 34). He postulated that until the end of the Roman period all of them (excluding St Agnes, Gugh and Annet) were joined together at high water, and that as recently as the 11th century AD the position was still the same at low water and that separation was not complete until the early Tudor period. He has used the distribution of Cornish and English coastal and shore place-names to support this hypothesis (*ibid*, 39, fig 10). The early pre-16th century Cornish forms are restricted to the outer coasts and rocks of today's islands, while the later English names populate their inward facing shores.

Results from the intertidal 'peat'

One of the key aims of the 1989–93 project was to assess whether the intertidal peat deposits could be used to test and refine Thomas' model. The assessments of the peats indicate that this should be possible provided that detailed analyses are carried out. These preliminary results suggest, however, that sea level rise in Scilly was more gradual than Thomas' model suggests. There are problems, however, with making such comparisons because different data have been used and for both types of data there are difficulties in ascertaining what the evidence actually means in terms of the evolution of the present coastline.

In the case of Thomas' model, he has had to assume that his dateable sites were located at the contemporary MOL and also that MOL has consistently been 5.3 metres above MSL. In addition, most of his sites are only very broadly dated and some could be attributed to different periods than those chosen by him.

As far as the intertidal peats are concerned, the extent of marine influence on the formation of these is varied and can be unclear. At Par Beach, for example, the deposits seem to have formed in and around the edges of freshwater pools, and marsh and fen conditions existed, perhaps developed in wet dune slacks. In contrast the deposits samples at Crab's Ledge are more likely to have formed under saltmarsh conditions or were at least subjected to marine inundation, though the exact nature of this needs clarifying. At Porth Mellon, though the area may have on occasions been protected by dunes, there is evidence for it having been subjected to marine inundation and salt spray.

A tentative first attempt to refine the curve for sea level change in Scilly is shown in Figure 6 (Line C), but it should be noted that detailed biostratigraphic analyses are required to confirm this. The 2 sigma calibrated date ranges for selected radiocarbon measurements obtained from the intertidal sediments have been plotted against their respective Ordnance Datum (OD)

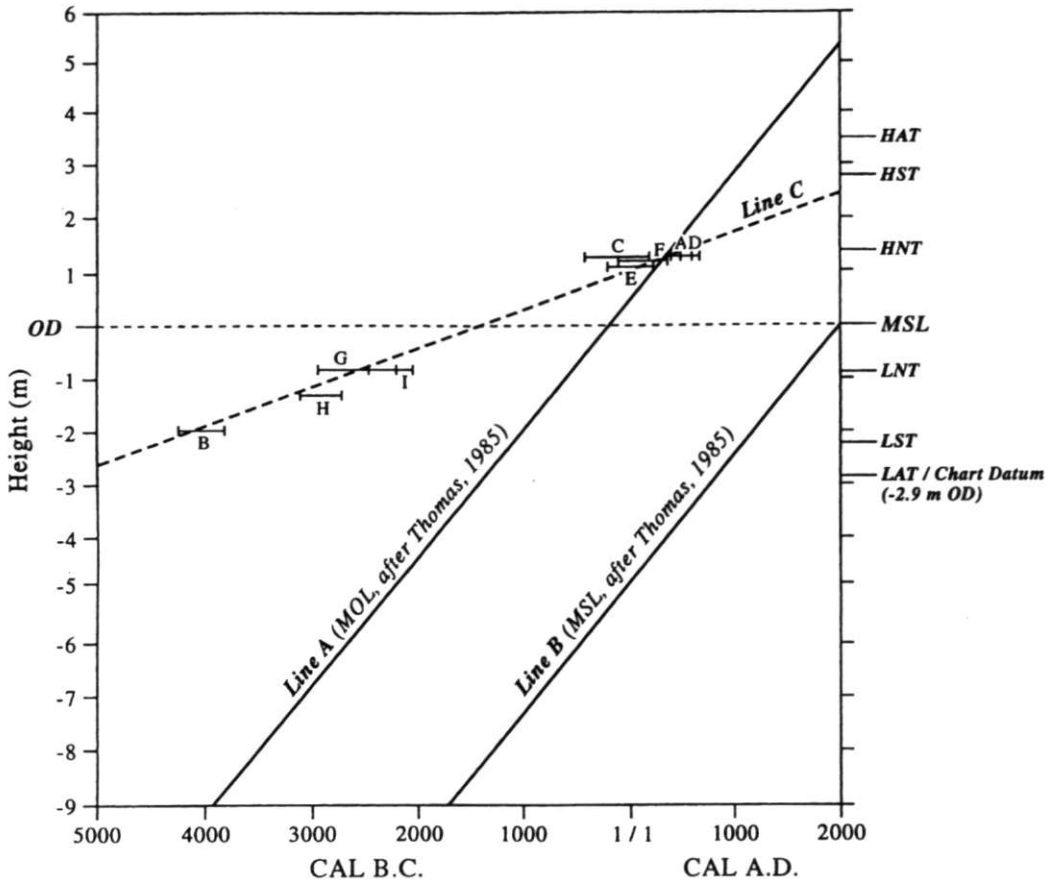


Fig 6 Sea Level change in Scilly – Lines A and B after Thomas 1985, Fig 2; Line C based on calibrated date ranges for selected intertidal peat samples (A–B = Par Beach, C–F = Crab’s Ledge, G–I = Porth Mellon). The following abbreviations have been used:

- HAT High Astronomical Tide
- HST High Spring Tide
- HNT High Normal Tide
- MSL Mean Sea Level
- OD Ordnance Datum
- LNT Low Normal Tide
- LST Low Spring Tide
- LAT Low Astronomical Tide

heights, and a best fit line (estimated by eye) drawn through them (Line C). This is shallower in gradient than Lines A and B, which are taken from Thomas (1985, fig 2) and recalculated to OD rather than CD (Chart Datum).

The intersection of Line C with around AD 2000 appears to suggest that the present intertidal sediments accumulated close to the High Spring Tide (HST) level. In order to facilitate comparison with Thomas’ data, if the (possibly erroneous) assumption is made that the difference between MSL and HST has remained constant (with MSL being c2.8 metres below HST), then it can be seen that between about 1 and 500 AD, MSL may

have been at about 1–1.6 metres below the present level, compared with Thomas' estimate of c3.5–4.7 metres below it. At about 1000 BC, Thomas' model suggests a figure of about –7.25 metres OD for MSL, which is in the order of 4.7 metres lower than that which the results from the peat deposits might point to. It is clear that the land exposed above HST was formerly more extensive in Scilly, but tentative though the figures suggested above are, it is unlikely that the land area was as great as Thomas has suggested.

The suggestion that the intertidal peats originally occupied a position between High Normal Tide (HNT) and HST gives a tentative context, which could be examined by looking at the relationship of Scilly's present inland mires to OD/CD. Examination of the coastal (and other) processes affecting these mires may also be relevant to the study of the submerged deposits.

It is clear from the preliminary results presented in this report that the potential exists to establish sea level index points for Scilly. Detailed biostratigraphic analysis is now required to explain the submergence of Scilly.

Future work

Against the background of a continually rising sea level and diminishing land mass there is clearly a need for further work around Scilly's coast, where sites have been shown to be rich in palaeoenvironmental and other types of evidence. More work is required not just at cliff-face and intertidal sites, but also inland (particularly at High and Lower Moors and other inland mires and pools) and within the marine area between Scilly's present islands, where stone remains and peat deposits have been identified but not yet recorded or sampled. Recommendations for future work are listed in Ratcliffe and Straker 1996, which report presents the results of the 1989–93 project in full and also summarises the results of previous palaeoenvironmental work in the Islands.

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C K Croft Andrew's Excavations in Tavistock Woodlands in 1937 and 1938

G F WALFORD and NORMAN QUINNELL

Summary

In 1937 C K Croft Andrew was commissioned by the Duke of Bedford to investigate an earthwork in Carthamartha Woods in Lezant Parish, Cornwall, on the River Tamar. This account is based on two reports he prepared for the landowner, his field notes, plans, photographs and correspondence, and related comments by GFW. NQ prepared the plans with explanatory comments.

Part 1: The Excavations (GFW)

Introduction

It is relevant to understand the times and conditions in which the archaeologist, C K Croft Andrew lived and worked. Perhaps in this case, this is more important than the archaeology itself which Croft Andrew, referring to his main enclosure, Carthamartha, described as a 'refractory site', and in a letter to Mr Bliss, the estate steward as 'one of the most poverty stricken sites I have ever dug'.

Croft Andrew lived at Darite near Liskeard, Cornwall. He was married and he and his wife had a daughter, a son being born shortly before the excavation began. He complained on a number of occasions about colds and appears not to have enjoyed robust health.

Carthamartha Woods lie on the Cornish side of the River Tamar above the tidal limit and about 20 miles (32 km) north of Plymouth (Fig 1). At the time of the excavations, 1937-38, they were owned by the Duke of Bedford, whose family appears to have acquired them from the Ecclesiastical Commissioners in about 1870 (Mitchell nd). The original Tavistock Woodlands further south were obtained from Tavistock Abbey following the Dissolution and more blocks were acquired over the years from other sources.

Croft Andrew's archive includes copies of correspondence with C A Raleigh Radford, working at that time in the British School at Rome, who was his adviser and with whom he was associated with the Cornish Excavation Committee on a number of sites, including Trelvegue, Castle Dore and the Hurlers. Excavations of the Rillaton Barrow and Goodaver Circle may have been considered but did not materialise. Radford sent Croft Andrew documentary details of many other sites to study, finds' drawings from Yarnbury, and part

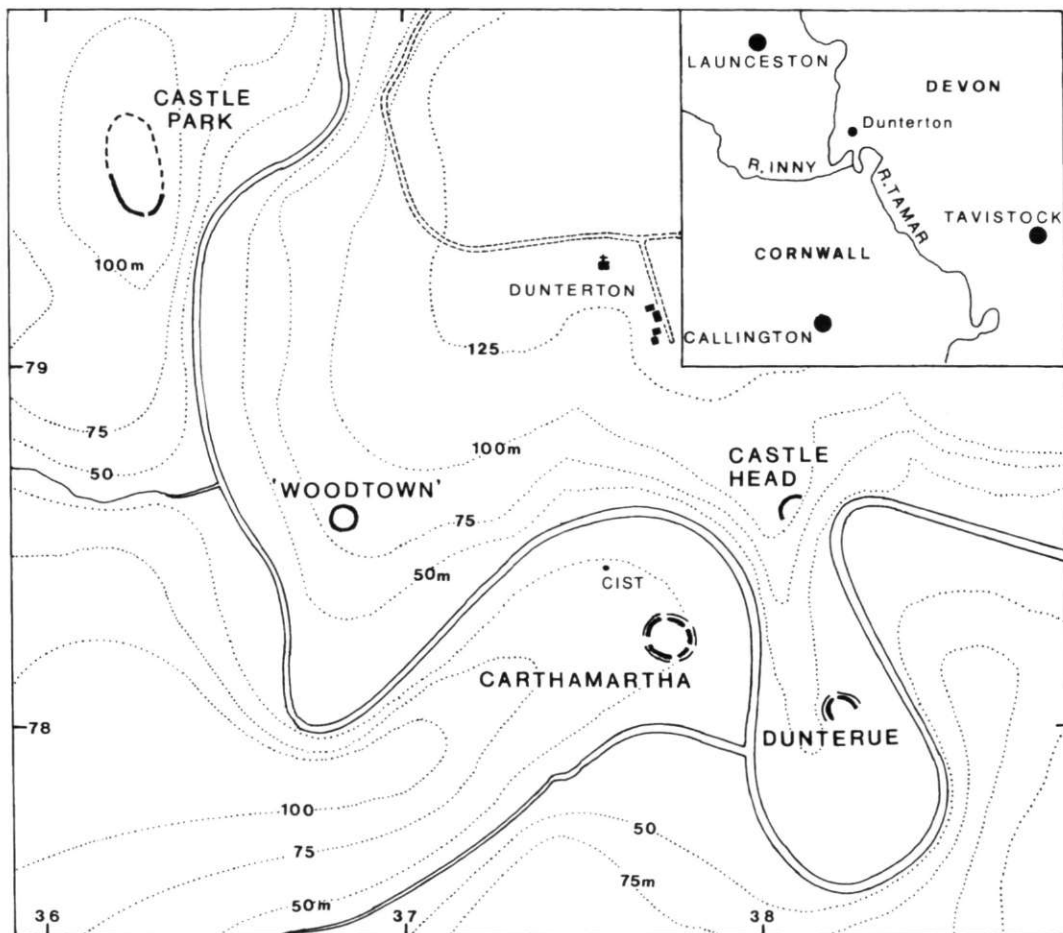


Fig 1 Location map. Carthamartha and earthworks in its vicinity (based on the 1907 OS 6 ins map)

of a paper on military engineering in the Iron Age by Lieut. Colonel B H Cunnington, so he was well prepared for Carthamartha.

Other correspondence was with Mr. Bliss, the estate steward. The earliest letter, dated 28 January 1928, is from Radford to Bliss, enclosing a copy of a description dated 10 November 1927 of a cist in Carthamartha Woods opened 20 years previously, ie about 1907. (As there is some mystery about this site, it is discussed in more detail below.) With this letter is a description of the Carthamartha earthwork (also discussed below), probably written at the same time, following a visit by Radford to the Woods. Neither of these reports was in the hands of Croft Andrew until after his first excavation here. The circumstances of Radford's visit to the Woods are unknown, unless it was at the request of the Duke of Bedford, anxious to know what his family had acquired. It is curious that it was ten years before an excavation took place.

The archive includes copy reports by Croft Andrew of his excavations from 11 to 23 October 1937 and 20 June to 9 July 1938, with two copies of the former. Originals were almost certainly sent to the Duke of Bedford. The page numbers of the two reports are numbered consecutively and are, for the most part, treated as one. There is a field notebook, a set of photographs, none

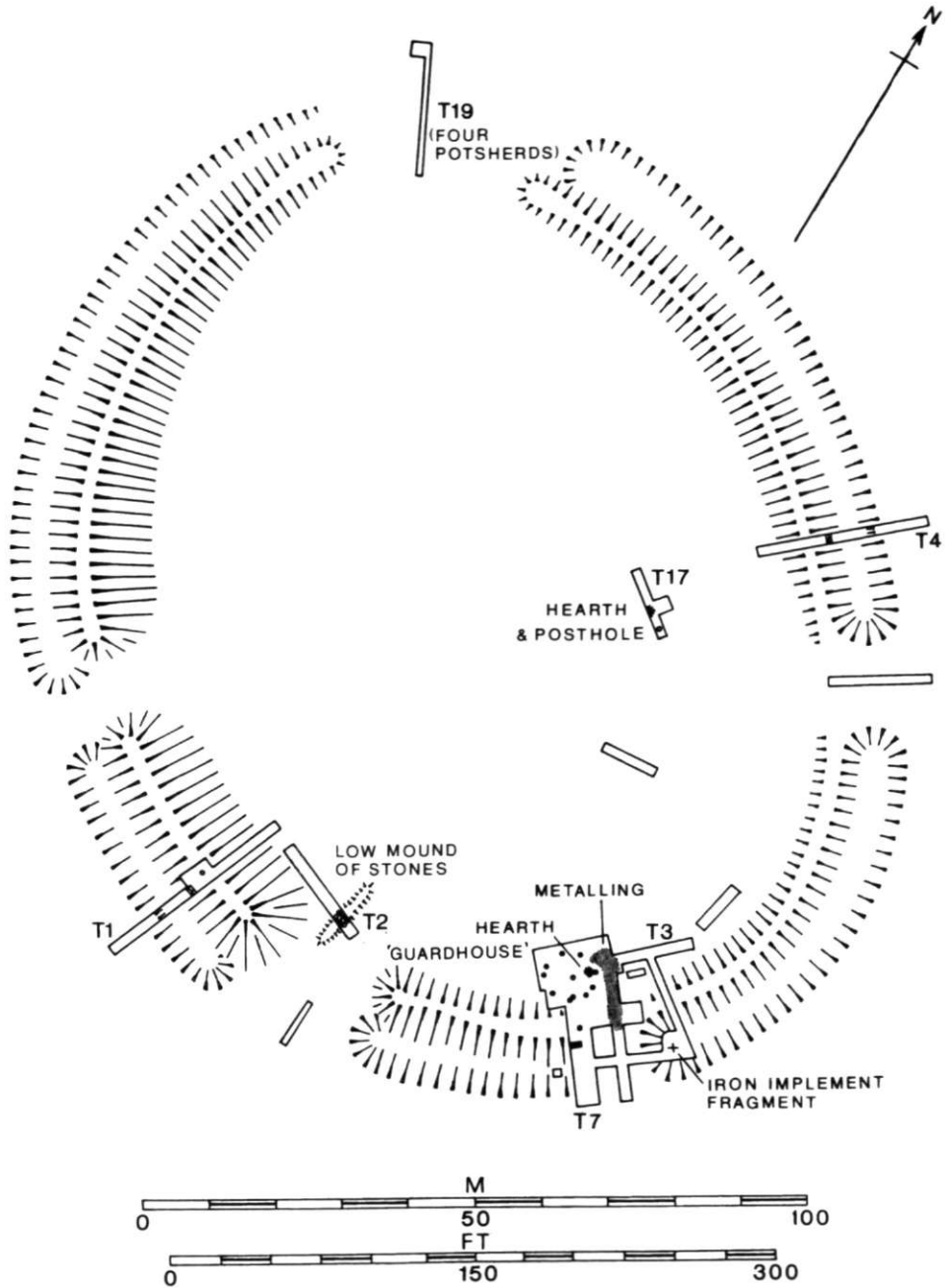


Fig 2 Carthamartha plan and excavations, 1937-8

of which are labelled and are probably spares (the originals having been sent to the land owner), and a working plan and section. The plan (Fig 2) and photographs are stored in the Cornwall Archaeological Unit, and the other material in the Royal Cornwall Museum (Royal Institution of Cornwall, Accession Number 1982/13); both archives are therefore in Truro.

The Mystery Of The Cairns

Radford sent a report to Bliss, dated 10 November 1927, about a cairn in Carthamartha Woods that had been excavated by some workmen who were seeking road stone. He intended to publish the report in the *Transactions of the Devonshire Association*, but this does not appear to have happened. The full account follows:

'The cist is composed of seven slabs of the local slaty stone and measuring internally 2 ft 7 ins by 1 ft 3 ins by 1 ft 5½ ins deep.

'It stands above ground level and was originally covered by a cairn of loose stones. The measurements of the cairn seem to have been 50 ft in diameter and 5 ft high but there was a certain divergence of opinion on this. I should personally think that it is unlikely to have been larger.

'When the cairn was removed and the cist opened about 20 years ago it was found to be empty except for a small piece of bone thought to be the top joint of a human finger.

'There was also stated to have been a dark discolouration around the bottom of the interior of the cist as though from some decayed fabric. Though it is not impossible that the body may have been wrapped in some fabric previous to burial, I should be inclined to attribute this stain to the infiltration of water.

'Their description – which I took down from two of the workmen who helped to remove the cairn – suggests a burial similar to those under the Bronze Age cairns on Dartmoor, ie that on Thurston Ridge. The dimensions of the cist are normal and many of them may be seen on the moor both with and without superincumbent mounds.

'The cairn, if of the size given, would be rather larger than most. Without associated finds, eg bronze or pottery, it is impossible to date the cist more closely than to say it belongs to the Bronze or Early Iron Age ie that it dates somewhere between BC 1800 and BC 0. I should think that the burial was by inhumation, the skeleton being buried in a 'contracted' position, ie with the knees bent up alongside the body. The action of acids in the soil might account for the absence of bones and if the rite had been cremation the remains of the urn would almost certainly have been found when the cist was opened.

'Cist burial with a contracted skeleton is found in Devon and Cornwall in the Early Bronze Age, ie the burial at Fernworthy and in the Early Iron Age, ie the cemetery at Mount Batten, Plymouth, similar to that at Harlyn Bay near Padstow. Between these two periods, during the later Bronze Age, the prevailing rite seems to have been cremation.

'Personally, I should be inclined to ascribe the Carthamartha burial to the Bronze Age, as the known burials of the Early Iron Age in Devon and Cornwall are not covered by tumuli or cairns.

'Carthamartha, with its camps on either side of the Tamar, probably represents an ancient crossing place of the river and it is possible there has been a settlement here from early times. Unfortunately nothing is known of the date of these camps and except the small round camp on the Devon side they are too overgrown to offer much hope of a successful excavation.'

Nowhere is the location of the site given, although it is probably that shown by the Ordnance Survey at SX 3758 7843. It is still visible with the cist restored but much overgrown. A box containing bones was apparently deposited with the estate manager and although Croft Andrew attempted to trace them he was unsuccessful. A short list under the heading '(?)cairn burial' in the back of his notebook had the word 'Dead' against two names. In a letter to Bliss he also asks for news of the bones. No reply has been traced.

When Croft Andrew was first being shown around the site, 'the foreman . . . shewed us, about 100 yds west from the enclosure, a low, stony mound which might prove to be a second sepulchral cairn'. In his report for 1937, in making recommendations for future work, he includes the 'possible cairn outside the ramparts which should be dealt with quite

expeditiously'. It is not clear whether this is the same cairn. He received funding but there is no record that it was ever dug. It is possible there were two, if not three cairns altogether, but at present dense vegetation makes it impossible to undertake a survey.

A local resident (Colwill nd) has a tin containing two pieces of bone received from the widow of one of Croft Andrew's workmen. He says a man came from Liskeard in 1940 and paid some workmen to dig for him. Apparently they found bones and a 'bronze sword' The location of this 'dig' is not known but it is likely these bones and the 'sword' came from it.

The Site

In November 1927, Radford sent the following description to the Estate Steward (he was probably acting as archaeological adviser to the Duke of Bedford following the estate's acquisition):

'Carthamartha

'A circular enclosure containing about 1.5 acres and surrounded by a single bank and ditch. These defences are best preserved on the west side where the bank now attains a maximum height of 6 ft and the ditch is about 7 ft deep. The width of the defences is about 50 ft. The entrance lies on the south side of the enclosure with a causeway crossing the ditch. Other gaps through the bank are not approached by causeways and appear to be modern. The site lies on a shale formation, which is apparently covered by a layer of decayed or partly decayed rock.

'The banks are formed of this material with large fragments of the underlying shale. In places the slope is so steep as to suggest a dry built revetting wall. The whole area is covered by timber, mainly fir.

'Carthamartha is situated on the west bank of the Tamar, on the south side of a spur, the ground sloping gently down towards the Inny. There is a ford across the main river just below the confluence. On the Devon side there is an extensive area of low ground almost surrounded by a loop of the river. Dunterton Castle, a promontory fort which runs across the end of the spur just beyond the steep rise from the flat by the river, protects this. The latter seems designed to control a road running along the spur and crossing the ford and the two earthworks are probably associated. Both belong to a type which cannot be earlier than the pre-Roman Iron Age (5th Century BC-1st Century AD) and the position of Carthamartha on the slope of the hill suggests an even later date, in the Dark Ages (5th-11th Century AD).

'There is no trace of buildings within Carthamartha enclosure and I expect these were of timber. Such buildings could be traced by postholes cut into the subsoil to hold the upright posts, but this is an expensive method involving the clearance of a large area. At Carthamartha it would involve the felling of the timber over the area selected and even then I doubt the success as disturbance by tree roots will have rendered the condition of the soil unfavourable for this purpose.

'I should rather advise the exploration of the defences by a trench cut through the bank and across the ditch and carried down to the undisturbed subsoil. This need be no more than 4 ft wide. It is most likely to give a satisfactory result where the bank is best preserved on the west side. Here it should be possible to find the remains of a wood or stone revetment if such existed. The trench could be extended on either side on the inner face of the bank as pottery or other remains are most likely to be found in this area.

'If more extensive clearance were thought desirable I should suggest that the gateway is most likely to yield results of value.

'It is not possible to suggest where the midden is to be found as conditions within these enclosures vary very widely. The interior might well be tested by one or two trial holes, up to 10 ft square. These could be extended if anything of interest were found. I should advise

choosing a position not far from the inner face of the bank as the centre of these earthworks appears often to have been an open space surrounded by houses set near to the rampart.'

A copy of this report was sent to Croft Andrew by Bliss in November 1937 after the first excavation, so it was not of much help to him.

Costs

In September 1937 Croft Andrew received a letter from Bliss saying:

'Mr. Raleigh Radford told me that he thought you would help us in making a small trial trench across an old English Camp at Carthamartha. If this is so could you let me know when it would suit you to come and what your fees would be in the matter?'

Croft Andrew agreed to start in the last week of October and that his fees would be 2 or 3 guineas a week depending on what arrangements would be made over lodgings and expenses. He explained that something more than a trench would be required (Fig 3), and there would not be much chance of finding a midden. In the event he submitted a claim for £13.1.0 (£13.05) which included £6.6.0 (£6.30) personal fee at £3.3.0 (£3.15) per week. Labour was provided by the estate at the rate of 5/11d (£0.30) per man per day. He kept within his budget of £45, spending only £43, and was allotted the same amount for the second excavation in 1938.

He was offered the alternative option of investigating Greystone (SX 363797), to the north, which was also a candidate for Ptolemy's 'Tamare', but decided it was more important to complete Carthamartha. In the event he did dig for a few days at Greystone (see below). The suggestion had been made that the Cornwall Excavations Committee might be interested in exploring Greystone (for two years they had been helping to excavate Castle Dore near Fowey). The objection was raised that they were accustomed to invite members



Fig 3 Croft Andrew with his 'volunteers'

of the public to inspect sites they were excavating and it was deemed undesirable for this to happen on the Endsleigh Estate.

The Locality

In the introduction to his first report Croft Andrew gives a description of the locality:

'His Grace the Duke of Bedford possesses on his Endsleigh Estate, in a vicinity where the River Tamar describes a double S-bend, is fordable and receives two considerable tributaries, an interesting group of five earthworks. The tributaries are the River Inny and the Lowley Brook.

'1. In Devon (Fig 1)

'A. On Castle Head on Dunterton; one sector of a small annular fort. Its date is probably early Medieval, or possibly of the Dark Ages: say between AD 400 and AD 1200.

'B. A little below and to the south, there is a bank and ditch. This earthwork has been considerably damaged. Although possibly contemporary with the fort above, it might on the other hand – and perhaps more probably – belong to an earlier period.

'C. On a field in Dunterton, 0.75 miles west from the preceding and 200 yds from the Tamar; a small annular earthwork with single bank, much ploughed down, containing about 0.8 acres Date uncertain.

'2. In Cornwall

'D. Castle Park Hill in Greystone Wood, parish of Lezant, 1.5 miles northwest of A, an important, well-defined and comparatively large contour fort of the Early Iron Age. So little of this handsome work is marked upon the Ordnance Survey maps that the site has hitherto been disregarded by antiquaries.

'E. Carthamartha Woods, 0.5 mile south-west from A; another ring-camp with single rampart and ditch, containing about 2.6 acres, the subject of the present report.'

Croft Andrew continues:

'Without visiting them, I had for some years felt an academic interest in these earthworks, since several lines of argument seemed to converge upon the suggestion that hereabouts should be found the town of Tamare, known in the early 2nd Century AD to Claudius Ptolemaeus, the geographer.

'That place-name seems to be preserved, for Carthamartha surely contains the words *Caer Thamara*, ie Castle Thamara.'

It is clear from this and references to the correspondence that the search for *Tamare* was a dominant theme for these archaeological enquiries (teaching at the British School at Rome, Radford was clearly interested in Roman History).

Croft Andrew writes:

'The strategic importance of the river crossing is a major factor. The Carthamartha ford is still one of the lowest on the Tamar and in prehistoric times was quite probably the lowest of all.

'It should be borne in mind, also that Carthamartha formed part of the fief of Landwithan (Lawhitton), which with Polltun and Caellwic were given by King Egbert to the See of Sherborne after his conquest of the Dumnonii in the early 9th Century AD, whence they were transferred to Crediton about 70 years later and thence to the See of Exeter in AD 1050.

'That famous donation was not made without substantial motive: partly religious, no doubt, but also largely political.

'From these manors Bishop Eadulf of Crediton was required each year to visit the Cornish people "to eradicate their errors". It seems probable that all three manors had previously been seats of the Celtic Kinglets of Cornwall and there is now more reason than was previously realised for believing that each of them contained an important defensible site which might well have been occupied in the Dark Ages.

'These aspects of the subject could be more fittingly developed when the Endsleigh earthworks have disclosed occupations of Ptolemy's period and of the Dark Ages but the little I have written here may serve to indicate why I received with special interest and gratitude an invitation to make a preliminary excavation.'

It is interesting to note within the woods a feature still known as the Bishop's Rock, a prominent platform with dramatic views to the north over the Tamar from which, no doubt, the worthy Bishop practiced his sermons.

Croft Andrew described the Carthamartha enclosure, 'as having an elliptical plan with axis of about 500 ft and 400 ft extreme measurement between the outer edges of the weathered ditch on opposite sides. Excavation has shown that the width of the defences, outer lip of ditch to inner heel of bank, is about 65 ft and the enclosed area is rather more than 2.5 acres. It stands on the lower slopes of the peninsula dividing the Tamar and Inny above their confluence, 170 yds from the former river and 200 yds from the latter. The Inny is forded immediately above and the Tamar just below the confluence, respectively 300 and 400 yds from the earthwork.'

The site is only about 60 ft (18 m) above the Tamar, beyond which rises the wooded cliff of Dunterue. On the southwestern side the hill rises, gently at first and then more sharply to an additional elevation of 190 ft (58 m) near Carthamartha House, half a mile distant.

The ground has some of the characteristics of an ancient river terrace. The underlying bedrock, encountered at a depth of 6 ft (1.8 m) is mainly the medium hard killas but in the valley it is associated with ridges and layers of inferior slate. The strata above the rock are, in most places, extremely porous.

The site was densely wooded, with 32-year-old larch and some beech and pine. Previously there had been oak coppice, which on Saxton's map of 1576 is marked as woodland. It was not clear whether it had been woodland in prehistoric times, but Croft Andrew felt it relevant to quote a remark attributed to Caesar, '... The Britons considered they had made a fort when they enclosed a tract of dense wood by a bank and ditch.' Croft Andrew was not permitted to fell any trees and this clearly created problems of light for photography and soil colour identification, as well as physical obstacles by roots (Fig 4). The site is still densely wooded with a mixture of trees and in summer dense undergrowth of bracken, bramble and seedling trees.

Croft Andrew's Excavations (Fig 2)

These took place between 11 and 23 October 1937, and 20 June and 9 July 1938. Two reports were submitted, amounting to 50 pages numbered consecutively. For the purposes of this paper summaries of the two have been combined.

Rampart and ditch were both interrupted by five gaps numbered 1 to 5 on Croft Andrew's site plan. Of these, one on the south-eastern side proved to be an original entrance with a causeway over the ditch. Initially he thought the gaps represented a ceremonial 'demilitarisation' of the site, either by its inhabitants or their voluntary removal to another



Fig 4 Terrain with 'volunteer' and long-handled shovel

settlement or by some conqueror or jealous overlord. In the conclusion to the second excavation Croft Andrew stated that the defences were never completed and the gaps were left for the gangs carrying spoil from the ditch to walk inside and deposit their loads on the bank. Eventually the gaps would be closed and the spoil would have to be carried in through the formal entrance.

The method of excavation was trenching and trial pits. In the first excavation eight trenches and two sampling holes were dug and in the second many of these were extended and new ones added. The first section was through the defences.

The Ditch (Fig 6)

On the south side Croft Andrew found a ditch 8 ft (2.5 m) deep, about 24 ft (7 m) wide at the top and 10–11 ft (3–3.5 m) wide at the bottom. The bottom was flat and of full depth for only 3 ft (1 m) in from the counterscarp. In the middle of the ditch there is some appearance of an unexcavated slate ridge.

The filling of the ditch consisted of a thin bed of earthy silt from the counterscarp and a large fall of earth and stone from the rampart including a fair number of slate slabs. It covers the ditch floor to an average depth of 2 ft (0.7 m) above which is a further 2 ft (0.7 m) or so of softer recent silt mixed with leaf mould.

In the second excavation Croft Andrew dug into the ditch near the main entrance, '... to test the filling and because, in the case of a long occupied camp, one can hope for a useful group of finds. The ditch filling proved in this location to be quite abnormal, consisting of 2–3 ft of clean stones at the bottom, with 12–18 ins of earthier matter above. The bottom of the ditch was equally suggestive. Instead of being neatly finished off to a regular and constant profile, it showed depressions and ridges in the native slate where work had been in progress and had been suddenly abandoned. Here was discovered the most decisive find of the excavation, a small pointed piece of iron, part of an implement used for hewing the soft slate, it had snapped off in use and lay concealed and fast embedded in the virgin shillet ... It undoubtedly belonged to one of the builders of the earthwork.'

The Rampart (Fig 5)

This stood at 5 ft above the original turf-line but there should be an allowance for settlement and there is likely to have been a breastwork of some sort.

'The first step in the construction of the bank was the scraping together along its middle line of turf and surface soil from the ditch-site and (a little) from the enclosed area. The ditch was then dug out and the resultant spoil banked up with a steep face outside and a much flatter slope within. The work seems to have been executed in two stages. Save at the entrance the revetment seems to have been of very poor quality.'

The only trace of timber work found initially in the rampart was the 4 ft (1.2 m) socket of a pole inclined at about 39 degrees towards the outer face. Croft Andrew thought it might have been a tie beam attached to the head of a heavier, upright timber. Later he found, near the main entrance, evidence that large, upright timbers had reinforced the rampart.

The Entrance

At the inner end Croft Andrew found a metalled way of poor quality with only one layer of small irregular stones rammed into the surface soil. This did not extend beyond the ramparts. Four trees in the trench complicated work as did disturbance caused by a recent footpath. It was shown, however, that it was a true causeway rather than an infilled ditch. On the causeway a pair of turf kerbs showed that the designed width was 10 ft (3.0 m). No postholes were discovered.

On both sides of the entrance the rampart had been largely demolished. It was shown that it was not incurved and there were no signs of defences outside the ditch.



Fig 5 Base of enclosure bank

Inside, the entrance excavation showed there to have been a structure that Croft Andrew called a 'guardhouse'. There was no evidence of a stone or earth wall, so the assumption was made that it was a timber construction or of wattle and daub on a timber frame. Two flints were found upon the floor, which consisted of two layers, the upper of dark brown loam and the lower of 'rich black earth with much charcoal.' Two postholes were found. The structure was likely to have been rectangular.



Fig 6 Section through enclosure

The Enclosed Area

Although a good deal of labour was expended upon a search for finds in the interior of the enclosure, the results were meagre. The loose nature of the soil, the shallow occupation level and disturbance by forestry work must have destroyed evidence.

A low mound of stones (Figs 2 and 7) curving across the surface might well have represented an ancient structure. Two hearths were found and a quantity of charcoal as well as a posthole and a flint. It is quite possible that careful stripping would have revealed a second hut but lack of time and bad weather prevented further investigation.

The Finds

In the first excavation five pieces of flint were found, four of them in the vicinity of the entrance. They were submitted to the British Museum but were not considered to be relevant to this site. Croft Andrew writes, 'The finds are a poor and indecisive collection; they included three pieces of iron, of which one was a nail and the others broken from larger tools. One was found in the base of the ditch in a satisfactory context. There were several pieces of pottery, which were inconclusively dated to the late Roman, Dark Ages or medieval periods, and a piece of glass thought to be modern.'

With labour unskilled in archaeological excavations several of the finds had been lifted before CKCA saw them, so the context was lost.

Several 'hurling stones', some large, were found on the rampart, in the ditch and outside it. Charcoal was found in the guardhouse site. No charcoal was found in the postholes,

suggesting the posts were extracted instead of being left to decay. No identifiable finds were included with the archival material and it is assumed they were sent to the Duke of Bedford with the two reports.

Conclusion

The excavations failed to resolve the question of dating but several other useful facts were learned:

'First, the defences were apparently never completed. One gap was intended to be a permanent entrance, the others were left for the passage of the gangs carrying earth and stone from the ditch to the back of the rampart.

'Second, the rampart and ditch belong to the age of iron.

'Third, this is not the 2nd Century AD "urbs Tamare" of Claudius Ptolomaeus.

'Fourth, the people responsible for the earthwork lodged in huts of light construction.

'Fifth, these people were an impoverished, or at least a very thrifty race as witness the paucity of finds and the immense trouble taken on abandonment of the projected fort to recover all useful timber, both from the hut or huts and from the substance of the rampart. It must be assumed that for hundreds of heavy tree trunks a better use was in view on some other site at no very great distance.'

On the subject of dating, CKCA explains:

'I must confess myself still very doubtful. The earthwork shews many characteristics of forts thrown up in the Early Iron Age, say between BC 200 and 100. The finds, however, such as they are point to a considerably later date. Two certainly and probably five of the flints are too ancient to have any meaning here save that they were collected by the inhabitants from the surface of the earth and brought in for use in striking fire or some such domestic need. The iron objects cannot be precisely dated, but the perforation in one does not look prehistoric.

'None of the trivial potsherds could be attributed to a period before the Roman Conquest, nor would I care to ascribe any single piece to the period of the occupation when, by the way, a native military work would hardly have been tolerated.

'One is thus thrown back upon the Dark Ages. Three of the sherds might have existed in Britain within that period, though one probably flatters the remainder in saying that they might be early Mediaeval. Another factor which may favour a Dark Age date is the location in the valley bottom, under a steep hill, certainly an unusual site for an Early Iron Age work, whatever the importance of the river and its fords. It would be easier to explain the creation of such an earthwork in, say, the 8th or 9th century AD of this era when the effects of the Saxon drive to the west were being felt in Damnonia.

'To sum up in a sentence: the weight of evidence seems slightly to favour a date between the 5th and 10th centuries AD, which may be adopted as a working hypothesis to be tested; while at the same time it should not be forgotten that the technique of the fortification suggests the 2nd century BC and that the sparse, ill stratified pottery might represent late intrusions.'

Castle Park Hill, Greystone Wood

When wet ground and bad weather made work at Carthamartha inadvisable, Croft Andrew took the men up into Greystone Wood to investigate the earthwork. He comments:

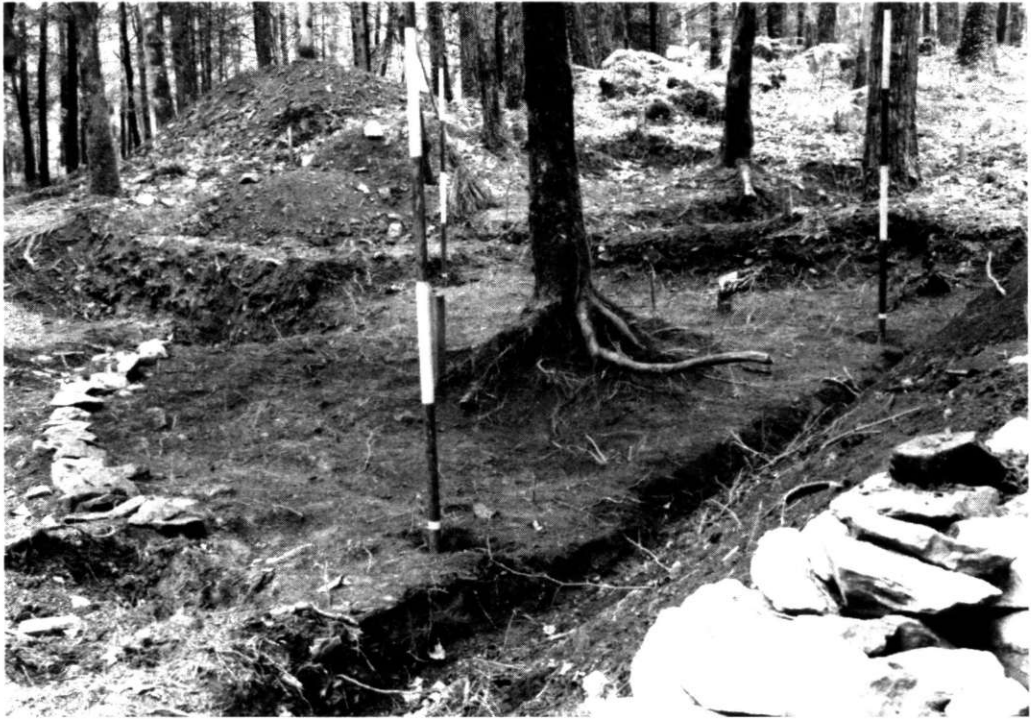


Fig 7 Ring of boulders presumably marking out a house base

'In an exposed position on the northern crest of the hill conditions were naturally worse, and it was impossible to work all the time. I therefore did not care to disturb the best parts of the defences but managed to cut one trial section through the low bank flanking the north gate. The bank, visible on the surface, proved at this point to be of little value. As expected, this little bank was found to have been placed on the ruins of some older work, aligned with the heavy, stone faced bank on the west side of the gate.

'I find that this large enclosure has a double gate at its south end, as well as that on the north . . . by pacing, the dimensions of the main enclosure seem to be length 260 yds width 135 yds. At either end of this oval, and approximately on its axis, is an inner gate protected by a semi-circular horn work running out 40 or 50 yds to the outer gate.'

Recommendations Concerning Continuance

Without knowing the Duke's intentions in the matter Croft Andrew suggested that, 'On scientific grounds a little more should be done at Carthamartha in order (a) to settle the last details of timber reinforcement in the rampart and (b) if possible to recover some decisive find which will fix the date.' He felt this should be combined with work on one of the other sites. Greystone did not justify his anticipations:

'It certainly is an interesting work, which deserves full examination. I now fear that it may prove to be of medieval date . . . the best sector for another trial would be that containing the south gate where the ancient defences seem to be less mutilated.'

'If Tamare were the prime object, I consider that the most promising site would be the peninsula of Dunterue . . . If the rocky mass of Dunterue, so closely embraced on all sides of the river, were indeed Tamare that would explain why the town name recorded by Ptolemy was practically identical with the river name which also was known to him. Tamare was almost an island, surrounded by the River Tamar.

'In my view a little excavation on Dunterue would make the most attractive sequel to the work at Carthamartha. . . If His Grace had sanctioned an expenditure equal to the last two years, the balance then remaining would suffice to open one or two trial trenches on Dunterue; though a slightly larger grant would render the investigation much easier and more effective.'

Finally Croft Andrew wrote:

'When ever these excavations may be terminated it will be desirable on scientific grounds that a detailed report on them be published in one of the archaeological journals. . . In submitting the finds for His Grace's inspection I venture to beg that pending publication they may be allowed to remain where I can have access to them for reference.'

He then signed himself: 'FSA; Hon. Director of Excavations, Cornwall Excavations Committee; Hon. Member & Henwood Gold Medallist, Royal Institution of Cornwall.'

It is to be hoped that Croft Andrew would not be too displeased that, in part at least, and over 60 years later, his wishes have been observed. In correspondence he was twice reminded that the estate had not received his second report, and in a letter dated 20 April 1939 he apologised, blaming in part Hitler and Mussolini. He had volunteered to act as an anti-gas instructor and a local Air Raid Warden and was clearly very busy. He explained he had left some trenches open, '. . . in case His Grace should wish to inspect them'. They are still open.

No further work has been done at Carthamartha or any other sites in the area, apart from brief survey visits. Perhaps it is time to look at them again.

Comments

If locating Tamare was the main object of the excavations it could not be said to have been successful. A difficulty is to know what Tamare was or for that matter who the Romans were. It is argued that Ptolemy, the Greek geographer, writing in the 2nd Century AD on the basis of earlier sources, included Roman places such as fortresses, forts and cities and not purely native sites (Todd 1987, 202). If, however, this is not strictly correct (Pearce 1981, 149), these enclosures on both sides of the River Tamar as described by Croft Andrew, must be candidates. If Tamare was simply a collection of native settlements there would not necessarily be evidence for Roman activity within them. The location of Carthamartha is in itself puzzling for it is unsuitably located as a pure farming settlement although the rivers must have provided a valuable source of fish. The probability is that it was intended to have some function associated with the fords.

On the subject of dating Croft Andrew states that, 'the weight of evidence seems slightly to favour a date between the 5th and 10th centuries'. Sixty years on this does not stand up to scrutiny, for much is now known about this type of site. He then states that, 'the technique of the fortification suggests the 2nd century BC and that the sparse, ill stratified pottery might represent late intrusions'. In this writer's opinion Croft Andrew comes nearer to the truth in the latter part of his assessment. The Carthamartha enclosure fits neatly into the category of 'small univallate enclosures, known in Cornwall as "rounds"' (Quinnell 1986,

115). Many hundreds have been recorded and new ones are still being discovered by aerial photography and field work. Rounds have considerable complexity and variation in plan (Johnson and Rose 1982). Although strongly defended hill forts were abandoned before and as a result of the Roman invasion, some rounds continued in use as farming settlements throughout the occupation. Without satisfactory dating evidence from pottery, radiocarbon or other methods one cannot say with certainty at what point in the Iron Age or the Romano-British period the Carthamartha enclosure was constructed and abandoned. Although a search has been made, no trace has been found of the few finds.

Excavations have shown (Cunliffe 1988) that there was considerable Iron Age and Romano-British activity at Mount Batten near the mouth of the Tamar, and the Romans made great use of waterways in other parts of Britain (Selkirk 1983; 1995), even above tidal limits. Why not in Devon and Cornwall too? Could such activity have had some bearing upon Carthamartha and the other enclosures?

Croft Andrew might have included in his list of local sites Ramsdon, Devon, a hill slope enclosure 3 miles (4.5 km) north of east from the ford, now badly damaged by the plough. He would not have known about a square feature noted in plough soil 2 miles (3.5 km) north of west in Lezant Parish by F Griffiths, P Brierley and G Walford 1987, photographed by Brierley in 1987, and later photographed from the air by Griffiths in 1990. The site is still under investigation. Should it turn out to be of Roman date, it would strengthen the argument for this being Tamare. It might also explain why the Carthamartha enclosure was abandoned. Square enclosures are not rare in Cornwall and are generally considered as Romano-British farmsteads (Fox 1973, 146, 174). More research is necessary on these sites.

It is possible there was a fort near Launceston and equally possible there was one in the Plymouth area. It is known there was a site at Kings Tamerton (O.S.1908; NMR 437419), described as a signal station, now unfortunately built upon. It would make sense for the Romans to seek to control navigation on the Tamar and other rivers as routes to the interior, thus explaining the lack of made roads (Selkirk 1983; 1995).

The name, Carthamartha, is both interesting and puzzling. Henderson (1928, 58) refers to Carthamartha as *Caer-Tamar*, the city of Tamare, named by Ptolemy, AD 120. It is likely that Ptolemy's information refers to a somewhat earlier situation. Alexander (1938, 183-4) favours *Caer Tamare*. Padel, in providing useful suggestions, writes, 'I have, I'm afraid, no idea of what to suggest as an explanation for the name. I wouldn't deny Henderson's explanation entirely but it has considerable linguistic problems.' Padel suggests *City* as an alternative to *Castle*. 'Whilst *Castle* on the Tamar seems most likely, the castle being the enclosure, a somewhat unlikely feature, it is possible there was once another site . . .' (Padel 1986).

Locals refer to the enclosure as the 'Roman Camp'. Romano-British might be more acceptable. There is a story (Colwill nd) that one of Croft Andrew's excavators had found Roman coins and sold them to a dealer in Plymouth.

Little has changed at Greystone Woods since Croft Andrew's account was written over 60 years ago. I have noted evidence at the southern end of a bank superimposed upon an earlier one, confirming what Croft Andrew deduced.

The excavation at Carthamartha was important not only for the points made by Croft Andrew in his conclusion, but it was the first and still only excavation of this type of feature in east Cornwall. It was also one of the earliest archaeological excavations in Cornwall and details of the method of construction and structure would have been of value for later excavators.

No reply from the Duke of Bedford is recorded regarding further work at Dunterue. The 1939-45 war brought such activities to a halt, and Croft Andrew was drafted on to more pressing work. There is no record of what may have happened to the finds. The woodlands were later sold to the Earl of Bradford who has since sold them on to an Irish pension

fund. They are currently managed by Tilhill Economic Forestry, Cullompton, Devon, from whom permission to visit must be obtained.

Suggestions

Since very little work has been done in east Cornwall almost any research into the Iron Age and Romano-British periods would be valuable. To continue the work of Croft Andrew would be a good starting point. It would be useful to spend more time on Carthamartha to try to determine its date, which should not be too difficult. Carbon dating was not available to Croft Andrew, but since he reported finding charcoal it ought to be possible to recover more without too much trouble. Apparently early tracks, much overgrown and eroded, in the vicinity of the enclosure need to be investigated. The enclosure in Greystone Wood still has secrets and needs to be surveyed. Limited trenching in the southern entrance area ought to be undertaken. There is everything to do on the Dunterue sites.

Part 2: Croft Andrew's Carthamartha Survey (NQ) (Fig 2)

It seems that the only extant plan by Croft Andrew is a working document for the excavations of 1937 and 1938. This is on cartridge paper, which has been much folded and mended with tape. On it a note in his handwriting says that an 'elaborated' version was drawn on 27 November 1937 (perhaps for the Duke of Bedford), and it is possible that a final one was made in 1938. The plan lacks a scale but, from the few measurements given, is deduced to be at 1:288, whereby 1 inch represents 24 ft.

Construction lines show a survey base line across the earthwork, off centre, and from SW to NE (Trench 1 was aligned upon it). From this base widespread measurements were made to pegs in the rampart gaps and the points fixed by intersecting arcs produced by a pair of compasses, the ends of trenches being similarly positioned. Measured lines between pegs allowed offset measurements across the ramparts. These offsets could exceed 100 ft in length and numerous small arcs drawn at the top and bottom of slopes indicate the use of compasses rather than direct scale plotting. Croft Andrew's report states that, unlike his trenches, the ramparts were 'sketched'. Nevertheless there are several amendments and the entrance trenches are annotated 'slightly out of position'. There are no profiles. On the plan each initial trench and trial pit is numbered, with adjacent trenches and extensions given a lettered suffix. There are 29 in total, of which 18 are at the entrance. Lengths varied from 7ft to 97 ft; widths were normally 5 ft, though a few were 3 ft, and T7 was doubled to 10 ft. Test pits and extensions varied in size.

The report implies that sections were drawn for Trenches 1, 4 and 7 across the earthworks, where rampart revetting is shown on his plan, and another for Trench 3, which continued across the 'guardhouse'. Only a measured and annotated draft for Trench 1 survives, covering the full length of the trench but with incomplete stratification, though it depicts the long inclined post-hole in the rampart.

The re-drawn plan incorporates the items shown by Croft Andrew, but omits trench numbers except where referred to in the above text, or to the remarks quoted from his reports elsewhere in this paper. In the production of the archive plan, the only large scale survey of Carthamartha, both available time and dense woodland must have presented problems for Croft Andrew, which resulted in a very simplified depiction. In this it is similar to the current O.S. 1:2500 plan, which is a re-drawing of that made before 1907, when it was customary to present details of earthworks in a very basic style. An O.S.

investigator's report of 1951 noted features that would have validated a re-survey, which, for practical or economic reasons, was not undertaken.

A letter from Croft Andrew to the Ordnance Survey in 1951 forms a postscript to the excavation results, written after his experience working with Radford at Castle Dore, and his own direction of the Trevelgue excavations. He describes Carthamartha as an, 'unfinished Early Iron Age B fort', and re-assesses the excavated potsherds as fragments of modern plant pots.

Acknowledgments

GFW: In writing this paper much help has been received from a number of people. First I would mention Henrietta Quinnell who invited me to write this report too many years ago and from time to time has offered suggestions. If it has turned out rather differently to what might have been expected then I must accept responsibility. Norman Quinnell has provided indispensable help with drawings. The Forest Manager, Brian Shaw, has always allowed me free access to all the woodlands under his control and within the constraints of having to produce and extract timber has minimized damage to the sites. Others who have helped in various ways include Oliver Padel (1986); Cynthia Gaskell Brown; Steve Hartgroves, Sites & Monuments Officer, CAU; Colin Squires; W Colwill, Agricultural Contractor, Lezant; Jane Marchand; Ann Mitchell, Archivist, Woburn Abbey; Frances Griffiths, Sites & Monuments Officer, Exeter; D & A Coumbes (farmers), Roger Penhallurick, Royal Institution of Cornwall Museum, and my daughter Alison, who typed the manuscript.

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A new perspective on West Cornwall Courtyard Houses

JACQUI WOOD

Introduction

In West Penwith, the upland area of West Cornwall bordered by the low-lying lands between Marazion on the South coast and Hayle on the North, is a particular type of dwelling known as the courtyard house, occupied during the late Iron Age and Romano-British periods (see Quinnell 1986).

The term courtyard house was first used in preference to hut clusters by H. O'Neil Hencken in relation to his excavation at Chysauster (Hencken 1933), which distinguished them as a separate entity from clusters of hut circles found in the area. This was followed by Hirst's publication of the Porthmeor courtyard house site (Hirst 1936) and his survey of all known sites (Hirst 1937).

This paper puts forward the hypothesis that courtyard houses were in fact large buildings having one main roof, to be called provisionally West Cornwall galleried houses. The opposite hypothesis more generally accepted, is that the houses were individually roofed, with a central open courtyard. Houses 6 (Fig 1) and 4 at Chysauster (Fig 2) will be used to illustrate the two theories.

The following are typical features of courtyard houses:

- a. Rooms or enclosures conforming to a variety in plans.
- b. Covered drains or water systems inside and outside houses.
- c. Paved entrances; occasional paving inside rooms or ways and paved enclosed courtyards outside houses.
- d. No ditches outside houses.
- e. Hearths sometimes lined with sherds.
- f. Levelled garden-like enclosures outside houses.
- g. Rooms often containing basins cut into granite slabs.
- h. Certain types of beach stones and boulders apparently contemporary, suggesting special industries present, of unknown type, possibly associated with the tin trade.
- i. Often, a fogou in each settlement.

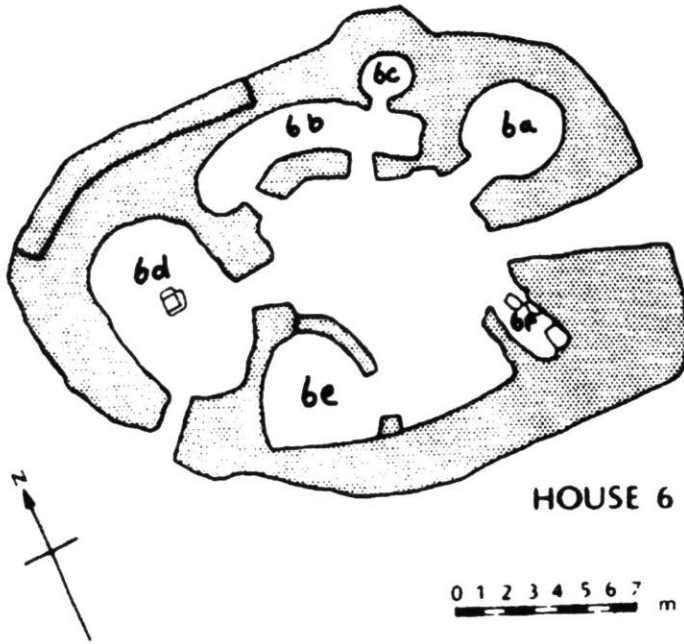


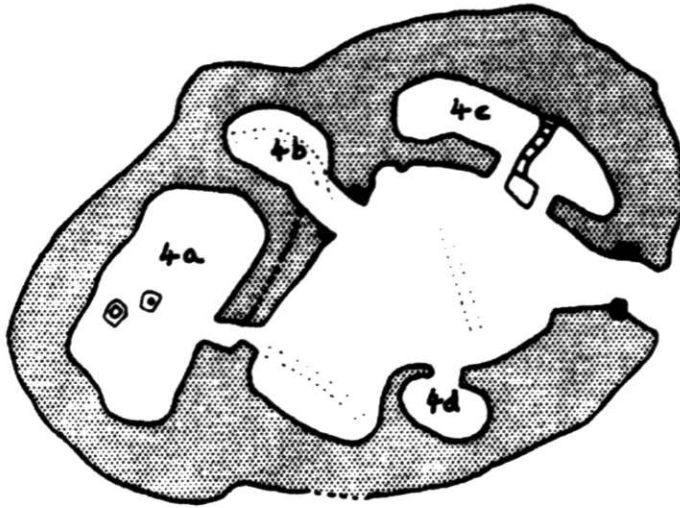
Fig 1 Chysauster house 6

Courtyard House Walls

First one must examine the house walls. Courtyard house walls are impressive structures, of massive granite blocks, with inner and outer faces, the space between infilled with rubble and soil, in some cases two metres thick. Two possible methods of construction can be suggested. The first would be begin with the interior walls. Taking Chysauster house 4 (Fig 2) as an example, the walls of the oval-shaped room, 4a, would be built, next room 4b, to which would be added those of the long sub-rectangular subdivided room, 4c. The planned overall oval shape of the building would be retained throughout, a gap being left for an entrance into the inner courtyard, followed by an anomalous sub-triangular area of stone. Tracing the line of the oval building, a small circular room, 4d, would be constructed, the structure being completed by building a wall linking room 4d to 4a.

Then these interior walls would be built to a height of approximately six feet, followed by the outer walls. This would be carried out in an anti-clockwise direction commencing at the courtyard doorway. A double wall construction, later infilled with rubble, would be achieved by leaving a three foot gap between inner and outer walls, the line of construction moving from room 4c to 4b, too sharp an angle being avoided by leaving a large gap between the walls to be infilled later. The wall line would continue to room 4a, smoothing off any sharp angles in the process. As the wall continued round to the courtyard doorway, a rough oval and this anomalous, sub-triangular infill would be created. With the double wall construction complete, an infill of rubble would provide a strong support for the roof.

The second possible wall construction would start with building the exterior walls. Assuming that the objective was to build a large thick-walled oval structure, this would be the most logical approach. However, when one looks at Chysauster house 4, one immediately notices that its outer walls do not form a perfect oval, there being a definite bulge in the outer wall at room 4b. This suggests that the first method is more likely to



HOUSE 4

Fig 2 Chysauster house 4

have been used, where the rough bulging oval shape is the inevitable result of smoothing off any angular exterior edges, with resulting large infills its natural by-product.

Applying this argument to Chysauster house 6 (Fig 1), the rounding off of the external walls becomes explicable. It manifests a very detailed room plan which, if the initial construction of internal walls was followed, explains the thickness of the infill, particularly to the left of the entrance to the courtyard, and in the area between room 6a and the store, room 6c. The overall plan of the outer walls is distinctly oval, the only visible exception being a bulge in the outer wall behind room 6c. This supports the supposition that the building of the inner walls took place first, because the builder had to deviate from the overall smooth lines of the outer wall to accommodate it.

The shape of some other courtyard houses in the area adds weight to this argument of wall construction. On the next ridge West of Chysauster is the courtyard house settlement of Mulfra Vean. Courtyard house 1 (Fig 3) has, it appears, two courtyard entrances, although this could be the result of a section of the outer walls having fallen in antiquity. There was an oval room at the back of the courtyard and what appears to have been two rooms in areas b and c, with a possible partition wall between them. The outer walls behind b and c are good examples of this smoothing of outer wall lines. Moreover, the general oval line of the outer wall of courtyard house 3 at Mulfra Vean (Fig 4) is flawless, except where it has to lose its shape to accommodate room 3a.

Another courtyard house settlement on the next ridge to the west, is at Boswarva (SW 429 330), where there are two examples of this possible construction practice. Courtyard house 2 (Fig 5) has a very simple outer contour, apart from the area behind Room a, which is consistent with Mulfra Vean. House 3 at Boswarva (Fig 6) has a complicated interior wall plan, yet the outer wall is a simple oval. In consequence, this leaves two large infilled areas between rooms a and b and also between rooms b and c. This suggests that the inner walls were constructed first, to provide the required size and type of room. The outer walls could then be erected to supply strength, stability and insulation to the whole structure.

MULFRA VEAN



HOUSE 1

Fig 3 Mulfra Vean house 1



HOUSE 3

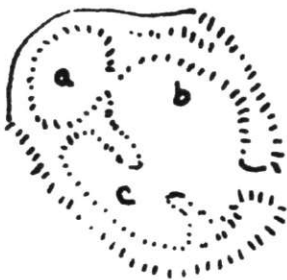
Fig 4 Mulfra Vean house 3

The Courtyard House Roof Structure

One of the most intriguing questions asked since the discovery of courtyard houses is: how were they roofed? Only when there is a prospect of reconstructing one, can this question be answered. There are two possible methods of roofing. The accepted interpretation is that an open courtyard was left in the centre of the dwelling. The alternative is that the whole structure was roofed. Each method can be tested by reference to Chysauster house, room 6d where the posts would support the roof rafters.

The shape of this room is oval, therefore a typical conical roof would not be successful. There are, however, various examples known to archaeology of hipped roofs being built on oval post structures. The requirement for this type of roof is two internal support posts close to the ends of the building, as at the Iron Age sites of Heuneburg and Appelshofen, Germany (Audouze & Büchschütz 1992, 65 and fig 30b). The two support posts could be placed on flat granite slabs for stability. With rafters and thatch added, it would be

BOSWARVA



HOUSE 2

Fig 5 Boswarva house 2



HOUSE 3

Fig 6 Boswarva house 3

impossible, given the roof load involved, for them to move. If these two supports were large timbers with a natural fork at the correct height, the cross member could be slotted into them. Rafters would then be added across the two straight sides culminating in fan-shaped rafters at both ends. These rafters would have to be approximately 18" apart, with concentric circles of battens attached. The pitch of the roof would depend on the height of the two supporting posts.

This interpretation is based on my own research, inspired by the pottery house urn from Konigsau (Audouze & Büchenschütz 1992, 84 and fig 44, 1, bottom right). This model of a thatched house shows a very steeply pitched roof of approximately 55 degrees, which seems to indicate a much steeper roof pitch than has been used at research centres in Britain.

At the Cornwall Celtic Village Research Centre we constructed a roundhouse having this roof pitch to test its durability. It was found that a roof with 55 degree of pitch appeared to be most efficient. The skeleton roof structure was constructed first, followed by thatching. Owing to the steep pitch of the roof, the thatch did not need to be very thick to provide adequate cover from the elements. When a roof pitch is as steep as 55 degrees, rain runs off too quickly to penetrate the thin thatching layer. In fact it is a positive disadvantage to thatch these structures in the conventional way, where the roof usually has a pitch of 45 degrees, and a considerable thickness of thatch is required to stop rainwater from seeping through. Builders of reconstructed prehistoric dwellings in Britain have found, when using this conventional method of thatching, that once a fire is lit in the hearth, dwellings become unbearably smoke-filled. On the other hand, smoke filters quite freely through thinner thatch, providing a smoke-free environment for the occupants.

The Roof and Open Courtyard Hypothesis

The conventional theory of roof construction, with a central open courtyard (Fig 7) can be illustrated by looking at Chysauster house 6 (Fig 1), beginning with room 6d. Because of its oblong shape it would require a hipped roof. After constructing the hipped roof, the end of the thatch would rest on the centre of the house walls. This roofing method is represented in the English Heritage interpretation boards at the site.

This interpretation has flaws when looked at in practical terms. It would not be possible to prevent rain from pouring into the infill in the walls between rooms 6e and 6d, and 6d and 6b. (see Fig 7). Next, the partitioned room, 6b, viewed as one room, would have to be roofed, another hipped roof would be appropriate here, with two supporting forked posts. This would not merit three supporting posts, and a cross member placed between them. The usual artists' impression of this type of room in a courtyard house has an almost flat lean-to roof over these side rooms. In my opinion, this would not be weatherproof, as the pitch would not allow the thatch to drain. The oval ends of rooms 6b/6c buttress up to the bottom of the thatch of Room 6d and would do the same between 6b/6c and 6a. The latter is a near perfect round, so a typical conical roof indicative of normal roundhouses with steeper pitch would be required. As the walls are so thick at the courtyard entrance side of this room, it would be difficult to have all but a small overhang of the thatch of room 6a. The area between rooms 6f and 6e is normally also shown on artists' interpretations as a long flat roof. This also would not withstand the rainfall characteristic of the area.

Room 6f would also present a roofing problem, as it is very small and rectangular, so small that it would perhaps only be possible to make a small cone-shaped roof resting entirely on the walls. The span would make this possible, and a supporting post would be unnecessary. The last room to thatch is 6e, a small workshop-like area that could have a small conical roof as in 6f, with one side of the thatch buttressing up to the thatch of room 6d. A central courtyard

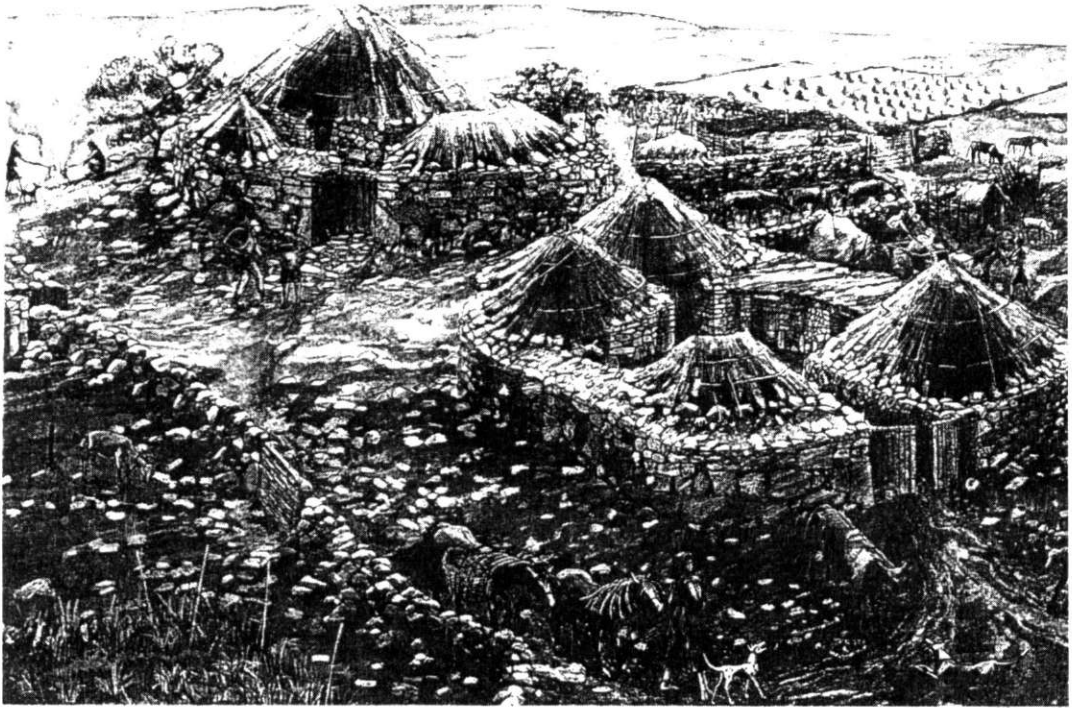


Fig 7 The conventional theory for roofing courtyard houses

with individually thatched rooms leading off would be created, with possibly a wooden door at the entrance to the courtyard.

One of the striking features of the courtyard house is the preponderance of drains and drainage systems, indicating a wet climate, and people keen to keep themselves dry within. Their existence argues against this type of multiple roof structure because rain from steeply pitched roofs would pour gallons of water, especially during a thunderstorm, into the soil and rubble infill of the walls. Therefore the areas that join the rooms, and where the thatch does not overhang, must be made waterproof in some way. A solution would be to hard pack subsoil in these areas, lining it with a layer of puddled clay. On top could be laid birch bark, with an overhang to allow the rain to pour away from the walls. This practice, the feasibility of which can be demonstrated by the American Indian technique for making birch bark canoes (Schneider 1972, 223–47), would have been well within the capability of courtyard house dwellers.

The Large Roof Hypothesis

Courtyard houses are generally situated along moorland ridges (Fig 8). The topography is bleak, with the prevailing wind from the west, the first land reached by the Atlantic gales. Therefore, the direction of the wind would have been considered when building. All courtyard houses with complete and intact wall foundations in West Penwith were examined with a view to establishing in which direction the main courtyard doors were set (Fig 9). Of 43 courtyard houses, 8 faced South, 10 South East, 14 East and 7 North East, i.e. 39 faced away from the prevailing wind. Only 2 sites faced West, and 2 South West. One of the

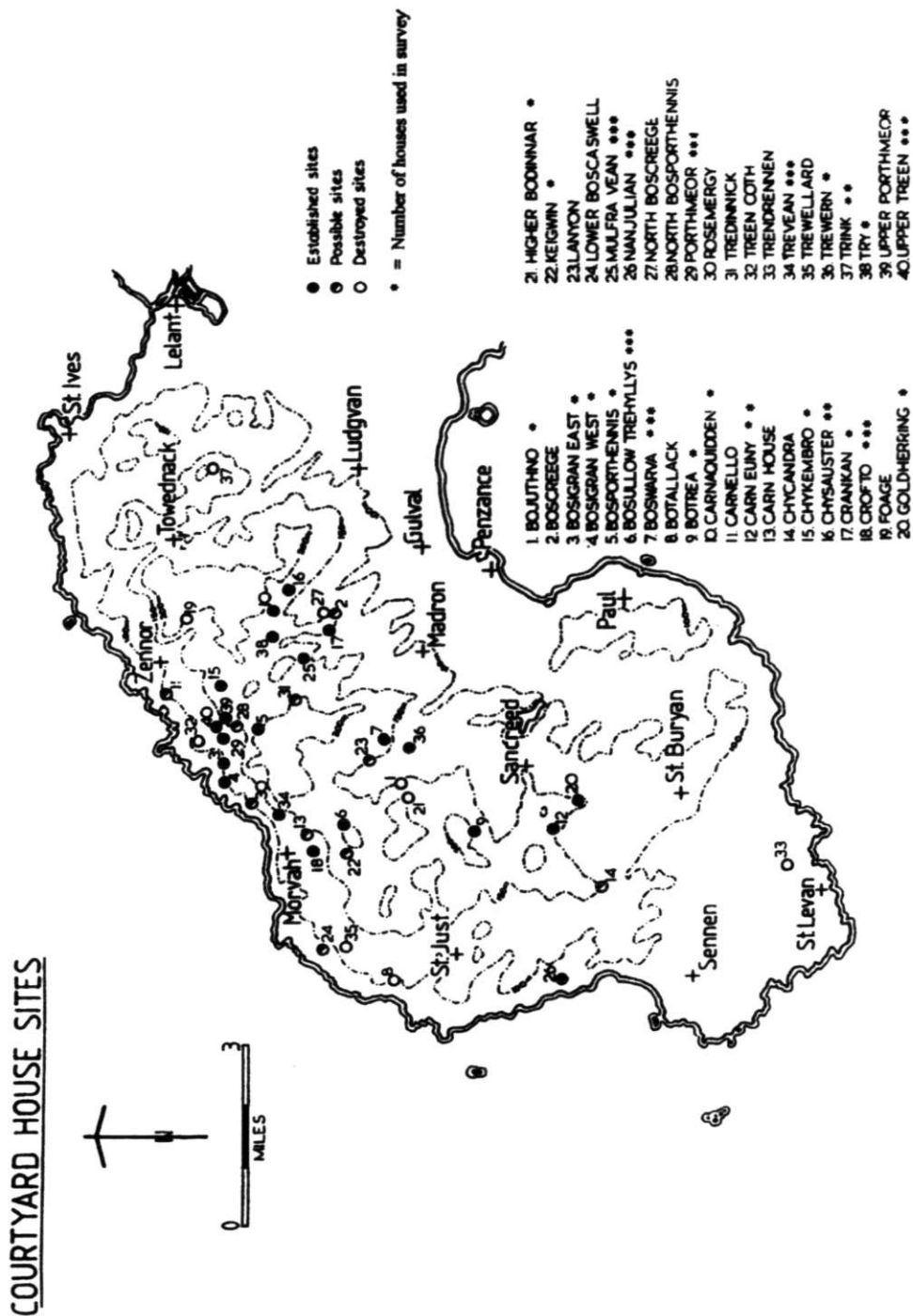


Fig 8 The distribution of courtyard houses (after Weatherhill 1982)

ORIENTATION OF COURTYARD HOUSE OUTER DOORS

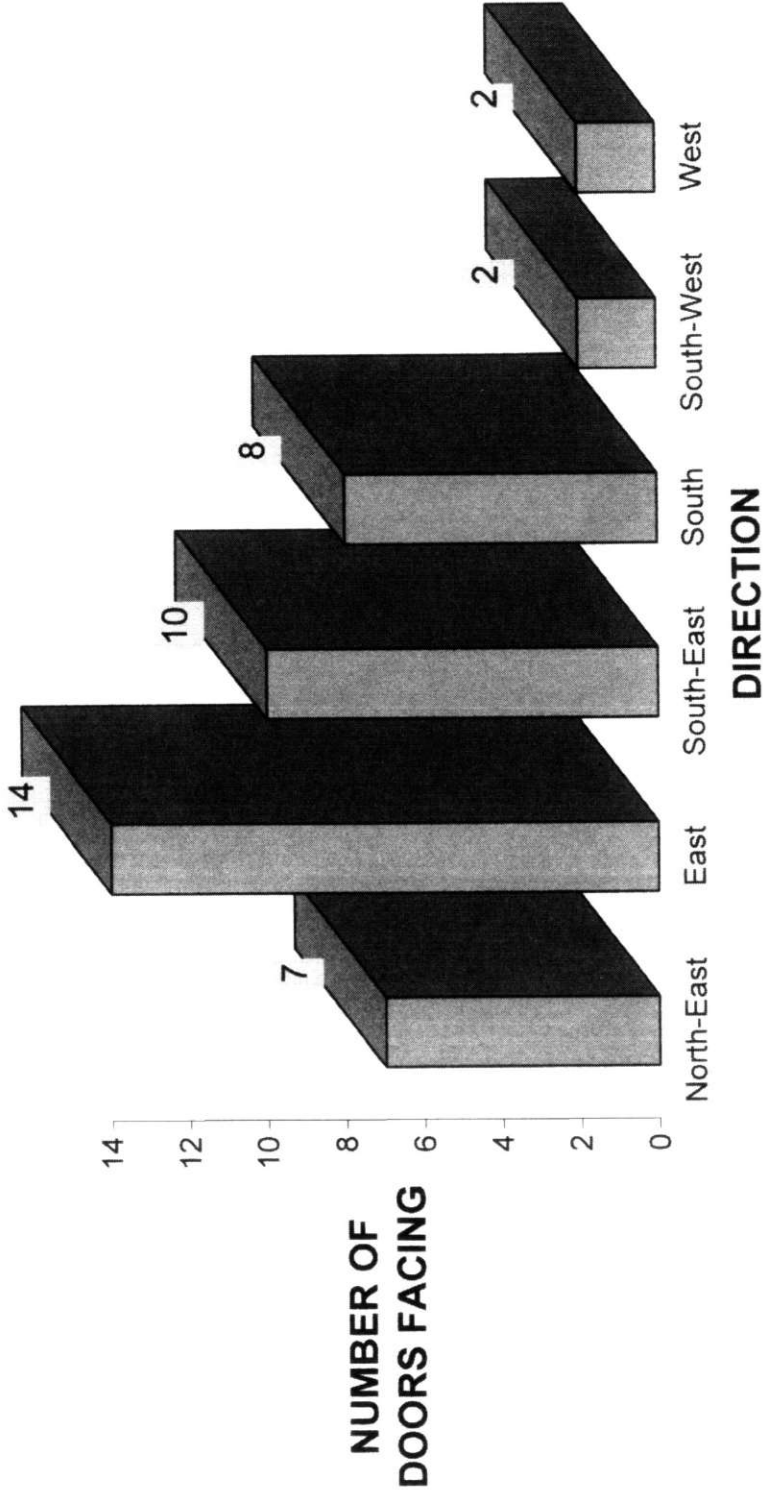


Fig 9 The orientation of courtyard houses' outer doors

West-facing houses at Porthmeor, courtyard house 2, had a house directly in front of it for shelter from the wind. This is compelling evidence that orientation of the courtyard doors took into account prevailing winds.

The inspiration for writing this paper came from experimental work carried out at Chysauster in the summer of 1994. English Heritage decided that a temporary thatched roof should be added to house 6 for an Ancient Technology project for school children, in order to give them a better impression of the appearance houses might have had in antiquity.

The room chosen for this purpose was 6a, whose raised floor provides an important clue to the type of roof structure probably employed. It was my task to supervise this work. A simple conical roof was erected from local timber, and water reeds from a nearby marsh at Marazion. The result was a great success, with the roof helping to recreate the atmosphere of a Romano-British settlement. However, on the last day, as is usual in this area, a strong wind blew from the west. A fire had been made in room 6a, to experiment with ancient cooking techniques. Because of this strong westerly, it became increasingly difficult to keep the temporary door covering in place. Whenever anyone came in, the wind blasted all those within, making the central fire flare fiercely as the doorway faced directly into the wind. The room had a raised floor, which meant that the surrounding walls of the courtyard gave no protection from the wind.

If the courtyard house 6 had been roofed in the accepted way with an open courtyard, due to an elevated floor in this room there would be nothing to stop the wind entering this part of house 6. In addition, because of the elevation of 6a, the roofs on the other side of the courtyard would not have helped to break it. The survey of courtyard door orientations indicate that, with few exceptions they all face away from the prevailing wind. I suggest that the entire structure of house 6 was roofed, and that the courtyard was a central hall, with rooms leading off it. With a few exceptions their outer doors would be courtyard doors, all facing away from the prevailing wind. It is irrelevant that room 6a faces west, as it would have been an interior door, with the west facing raised floor particularly draft-free when the outer east facing doors were opened.

It might be argued that this large roof would be too large to construct. However, surveys of prehistoric structures in Europe indicate that such sizes were not at all uncommon, diameters of 49 to 52 ft being known. As Audouze & Büchenschütz have noted:

From the Neolithic period buildings were erected in the Orkney and Shetland Islands that were oval, circular or trefoil-shaped, whose plan was conditioned by the use of very thick (2–3 m (6.5–10 ft)) drystone walls faced on both sides. Some internal posts laid out in an irregular ring supported a roof which rested for the most part on the walls. The scarcity of wood in these islands, which contrasts with the abundance of stone slabs, may explain this choice of construction (Audouze & Büchenschütz 1992, 74).

This type of roof would need the support of a substantial ring beam in order to acquire the necessary height to pitch the rafters at the right angle. The posts of this ring beam would have to be placed on top of the walls surrounding the central hall (compare the arrangement of post holes at House T at Trethurgy, St Austell; Miles & Miles 1973, 26 and fig 12).

The purpose of the substantial infill of the walls would now come into its own (Fig 10). There could have been another shorter ring of posts to support another ring beam nearer to the outer walls, adding stability to the roof. Looking at the structure from this viewpoint another possible use for the substantial infills becomes evident. The large flat areas at the top of the walls could have been covered with timbers to create another well supported floor.

The aerial photograph of houses 6 and 4 at Chysauster (Fig 11) demonstrates just how large the infilled areas are between the inner and outer walls relative to the size of the rooms within.

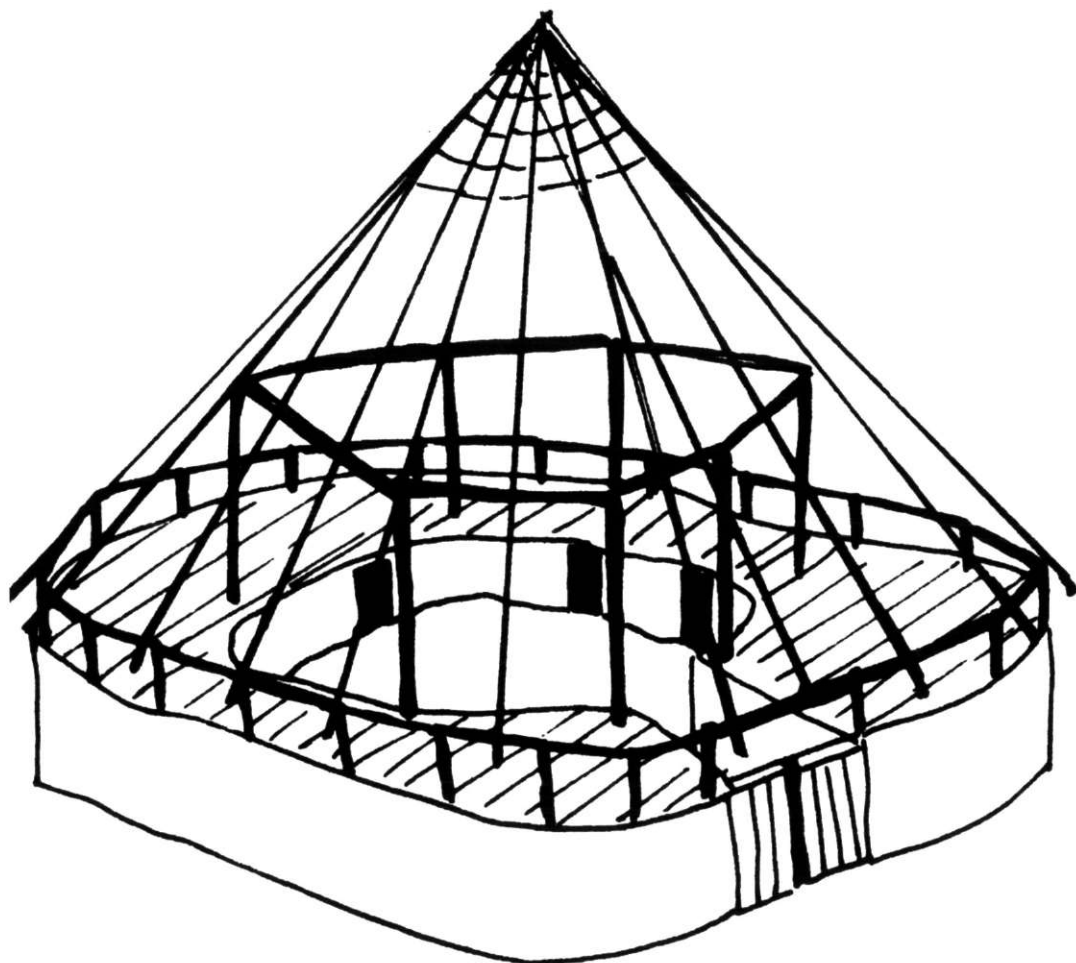


Fig 10 The arrangement of posts and ring beams on walls to illustrate support for an enlarged roof

If roofed over completely, the dwelling space in a house of this type could have been almost doubled.

Conclusion

The argument favouring an open courtyard surrounded by individually roofed rooms, does not stand up to close inspection. Above all there are matters of drainage. How would rain water be prevented from pouring into the infilled cavity walls? Although drainage systems were a prominent feature of this type of dwelling, it is questionable if water pouring into these walls would have been tolerated by its occupants. Of course this problem could have been overcome by hard packed rammed earth infill and a thick layer of puddled clay on top. With the addition of a bark guttering system, this could have coped with most of the water. There is also the difficulty, however, of making the flat-roofed areas waterproof. In a climate well known for its considerable annual rainfall, this would be a formidable undertaking.



Fig 11 Air photograph of Chysauster houses 4 and 6, showing the size of infilled walls

The orientation of the courtyard house doors, predominantly to the south, south east and east, indicates an awareness of the importance of the prevailing westerlies. The raised floor of Chysauster house 6a, with its doorway facing directly into the prevailing westerlies, and its ensuing problems for the inhabitants, was an anomaly. This leads to the supposition that the East-facing entrances away from the westerlies, would have made the inhabitants' life much more tolerable.

This fact, together, perhaps with another floor built on top of the room walls, and the entire structure roofed, suggests that the presumed courtyard was actually a central hall. The courtyard house could have been a substantial dwelling, capable of housing large, extended families. Its central hall and the upper gallery floor would be an impressive sight. The gallery would have been warm and dry, benefiting from the rising hot air of the pit fires on the ground floor. The rooms below could have been stores or workshops, of considerable advantage during winter. Courtyard houses could well have been galleried houses.

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St Buryan Crosses

ANN PRESTON-JONES and ANDREW LANGDON

The parish of St Buryan is notable for the number and variety of crosses within its boundaries. The accompanying catalogue lists sixteen crosses, six fragments, two missing and eighteen suggestive field-names of the 'Cross Park' type; extant examples are illustrated in Figures 4 to 7. The parish is notable also for the fact that many crosses are *in situ* or close to their original locations, so offering a better opportunity than in most parishes in Cornwall of examining and analysing the different cross types, and their dates and functions within the landscape. This is not a new idea. Attempts have been made in the past to link the distribution of the crosses to the special sanctuary at St Buryan and to footpaths in the parish (Maxwell 1976, 10–11 and map 14; Crofts 1955, 37). What is new in this instance is the application of a fresh approach to landscape mapping recently developed by the Cornwall Archaeological Unit.

This paper begins by summarising the documentary and topographical background, before moving on to look in more detail at the crosses' locations and dating; the results of these analyses are discussed in the conclusion.

Historical Setting

Prominent on a plateau-like hill at the centre of the parish is St Buryan church, its fifteenth century tower a distinctive landmark for miles around. The church, in its curvilinear churchyard, is on the site of a pre-Norman monastery endowed by charter in the reign of Athelstan (AD 924–939) (Olson 1989, 78–80 and 84) but known from a tenth century list of Cornish saints' names to be of earlier origin (Olson and Padel 1986, 48). In Domesday Book, St Buryan is recorded as a collegiate establishment and this survived, albeit in reduced form, served by non-resident Dean and prebends, until the Reformation (Henderson 1925, 68). During the medieval period, the church was noted for its privileged sanctuary, which extended beyond the church and churchyard (Cox 1911, 214–20; Crofts 1955, 35–8).

Settlement in the modern parish of St Buryan is characterised, like the rest of Cornwall, by a pattern of dispersed farming hamlets. A number are known to be of at least early medieval origin since they are recorded in Athelstan's charter, but the place-names of many of the others, prefixed by the place-name elements *tre* and *bos/bod* are also likely to be of early medieval origin (Padel 1985, 24, 223–7; Preston-Jones and Rose 1986, 141). Figure 1 shows the distribution of medieval settlements in St Buryan.

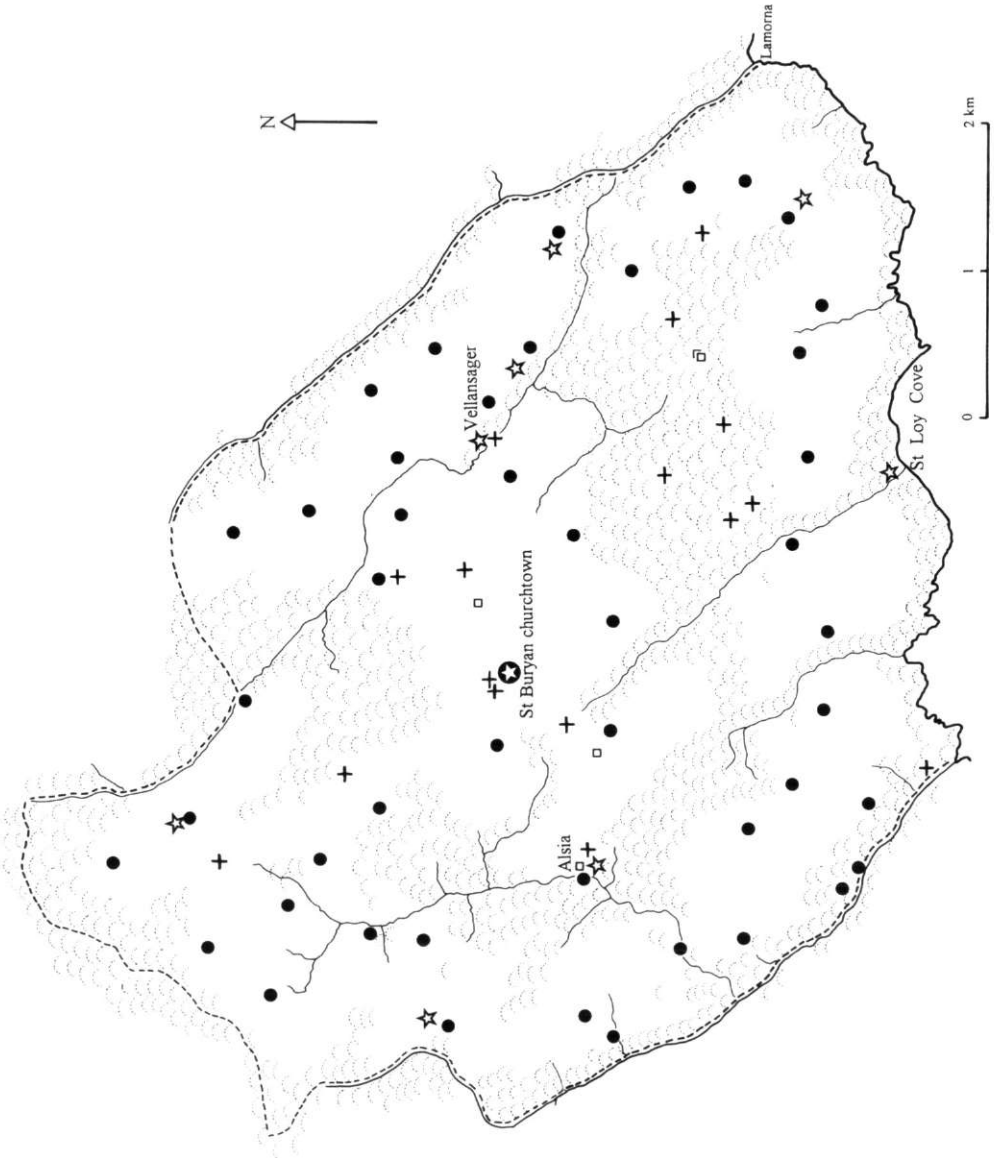


Fig 1 Medieval settlement and topography of St Buryan. (Round dots, settlements; stars, chapel sites; +, crosses; open squares, cross bases.)

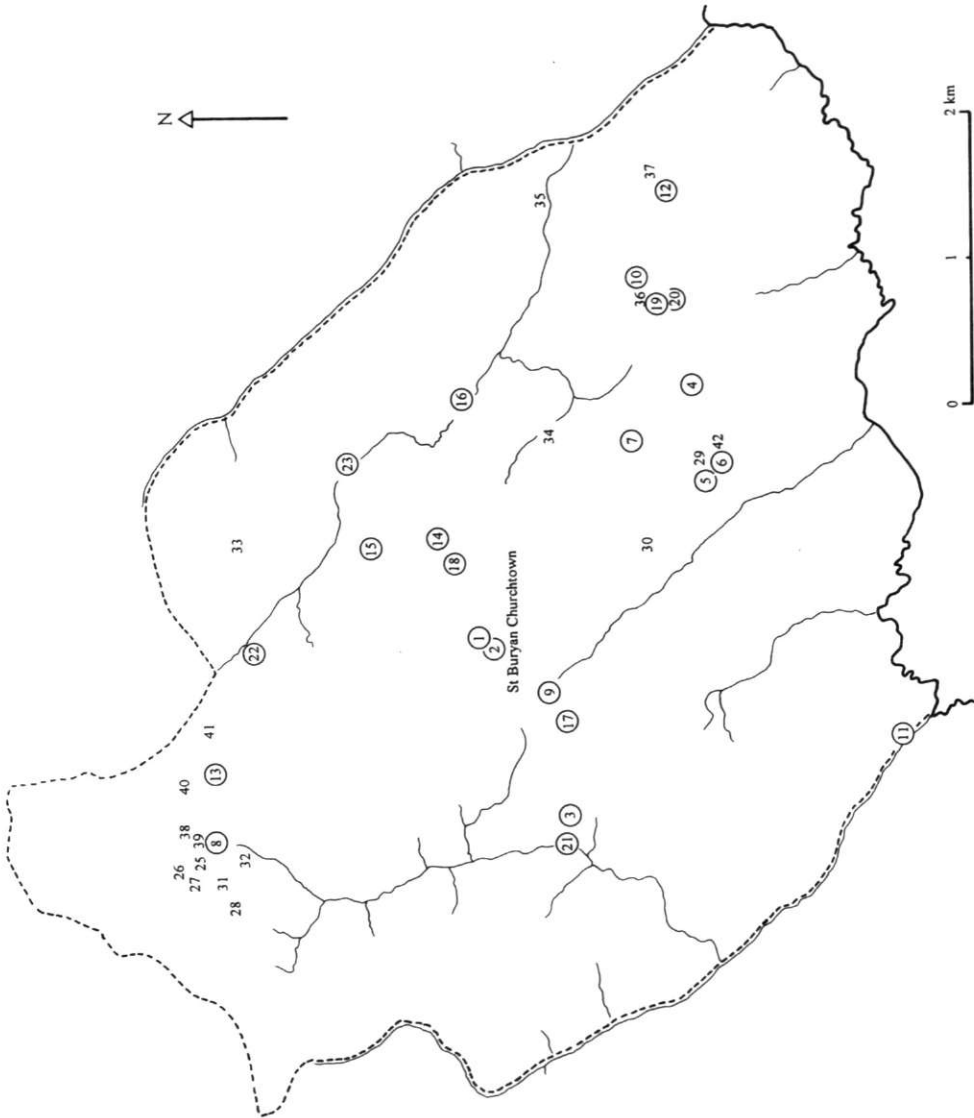


Fig 2 Crosses and 'cross' field names in St Buryan: numbers refer to the catalogue.

Around the settlements were their fields and beyond these, areas of coastal, valley bottom or upland rough ground used for seasonal grazing. The latter would have been a significant feature in the past although they are not always obvious now, due to post-medieval enclosure and improvement. Following methods recently established by Cornwall Archaeological Unit for the Cornwall Landscape Assessment (Cornwall County Council 1996) it is possible, with a certain degree of accuracy, to distinguish between areas of former rough ground and anciently enclosed land. The method relies on an assessment of modern topography, the form of fields and field boundaries (curving/straight; large/small), the distribution and type of place-names and an examination of various nineteenth-century maps. The result of this exercise for St Buryan is also shown on Figure 1, which as well as showing settlements recorded before 1540 also plots the probable extents of enclosed land and rough ground associated with these settlements. The map does not attempt to show footpaths or tracks of early origin, yet it must be assumed that many, if not most, of the tracks linking these ancient settlements are of similar antiquity. This map shows the framework of the medieval landscape, into which the crosses were set.

Topography of St Buryan

Figure 1 shows that the topography of St Buryan is dominated by streams flowing north-west to south-east through the parish. A broad ridge between streams reaching the sea at Lamorna and St Loy Cove runs from Bartinney Hill in the north-west and to Boscawen Rose and Rosemodress in the south-east. St Buryan churchtown is located roughly at the centre of this ridge. The map reveals that significant areas of rough ground existed in the past: the first is in the north of the parish, an extension of Bartinney Hill; the second is to the south-east of the churchtown, around the Merry Maidens (by the modern farm name Chyoone: Cornish *chy an goon*, 'house on the down': Padel 1985, 79). The third is to the west of St Buryan church, centred on Alsia and another area immediately north of St Buryan churchtown which now contains a farm known as Bunkers Hill. The main nucleus of settlement and enclosure appears to have been around St Buryan church, but there was also a well-settled strip just back from the coast, and on the ridge between tributaries of the Lamorna stream, along the north-east edge of the parish. The character of the place-names along the western boundary of the parish (which has fewer names in *tre* and *bos/bod* and more topographic names, cf Davidstow, Preston-Jones and Rose 1986, 143–4) suggests less intensive and possibly later settlement in this area. If we are to understand the distribution of the crosses, we have to consider them against this background and by reference to the modern Ordnance Survey map.

Figure 1 also shows that there are two main concentrations of crosses in St Buryan: one, in the central nucleus of the parish, around St Buryan churchtown, and the other on the area of former rough ground south-east of the churchtown. The majority are wayside crosses, standing on roadside verges. A closer examination however, shows that the situation is considerably more complex than these initial impressions suggest.

Included as an appendix is a list of crosses in St Buryan parish and also a list of field names suggesting the former existence of a cross. This also has notes on the individual locations of the crosses, the information being derived from the modern 1:25,000 map and the landscape map (Fig 1). From a study of these, it emerges that crosses occupy the types of locations which are listed below. For the most part only extant crosses or cross bases, not the field names, are included in this discussion. This is because the field names are not always a completely reliable guide to the former existence of a cross. Although it has been demonstrated that names of this sort can refer to former crosses (Langdon 1994, 66), 'cross' field names could

just as easily be referring to a nearby cross-roads. And where a cluster of such names exist, it might in any case be difficult to pin down the exact location of the alleged cross. Henderson (1930, 7) has suggested that such names as *Park an Grouse* can give a more positive clue to the existence of a cross than the English equivalent *Cross Park*. Here in St Buryan, of the eighteen relevant field names, both English and Cornish forms can refer to a cross: for example, near the Crowz an Wra in 1842 there were, amongst others, a *Great Crows an Wraugh Croft*, a *Park Grose*, and *Higher* and *Lower Cross Crofts*. Most of the 'cross' field names in St Buryan in fact relate to existing crosses, as Figure 2 shows. Tithe Award field number 1359, *Higher Cross Close*, is adjacent to Boskenna 2 (5 and 29 in this catalogue); field 1452, *Park an Growse*, is adjacent to the Boskenna Gate Cross (6 and 42) and field 3259, *Cross Gear*, appears to relate to the Tregurnow Down cross slab (12 and 37). Particularly notable is the group of names around Crowz an Wra, where there are nine in the immediate vicinity and another slightly to the east – although this may be too far to be related. These seem to demand further explanation, although the reason is not at present obvious to the writers. There is also a small number of isolated 'cross' field names which do not appear to relate to an extant cross (30, 33, 34, 35, 41 in the catalogue). These may suggest lost crosses, for which it may be worth hunting: Tithe Award field 1300, *Lower Cross Close* (30) might be a particularly good candidate since it is not at a crossing of any paths, tracks or roads, and therefore cannot be referring to a cross roads.

1. Wayside

Almost all crosses in St Buryan are wayside crosses, that is, crosses marking a path or trackway (and usually assumed to be leading to the church). But almost all are at significant points on their respective tracks/roads:

Cross roads: examples include Crowz an Wra (8) Boskenna (4), Nun Careg (Rosemodress) (10), Boskenna Gate (6).

At a point where tracks/paths merge (usually where a farm path joins a more important route to the church): for example Trevorgans (13), Trevorian base (18), Chyoone (7), Boskenna (5)

At a point where a track/path crosses a stream (ford): examples include Trelew (23) and Vellansager (16).

All wayside crosses are indeed on routes leading to the church. But only two (Tregurnow Down (12) and Trevorian Lane (14)) do not now appear to have any other function, in also marking a junction, cross-roads or ford. Several of the crosses are actually on paths or tracks to the church where they are crossed by routeways across the parish. For example, Crowz an Wra (8) is on a route leading roughly east-west across the northern part of the parish while Boskenna Gate (6), Boskenna (4), Rosemodress (19, 20) and Nun Careg (10) are all on the line of the present main road which runs west-south-west to east-north-east across an area of former rough ground in the southern part of the parish. Another 'highway' leads across the parish through St Buryan churchtown and the crosses at Pendrea (9,17), Trevorian (18) and Trelew (23) can be seen to be located on this. To the west of the churchtown, this route links St Buryan with its former chapelries of St Levan and Sennen (Langdon 1997, 13).

Local communications, that is paths between farms, are not apparently marked by crosses, although such paths must be assumed to have existed – as for example the path which now links the farms of Tregurnow, Rosemodress, Tregiffian and Boscawen-Rose along the south coast.

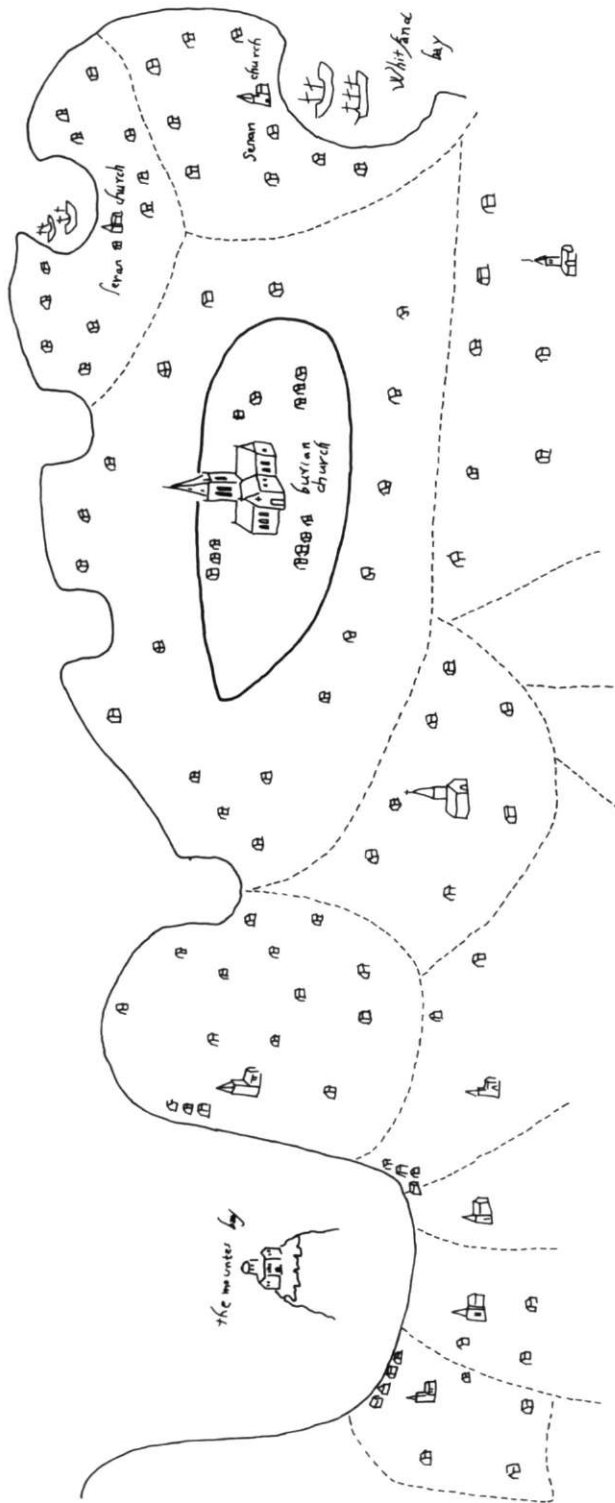


Fig 3 St. Buryan's extended sanctuary in the reign of Elizabeth I.

2. *Boundary*

Only one cross, Penberth (Langdon 1997, 17), appears to have been located on the St Buryan parish boundary. However, it is possible that many are located on the boundaries between farms or hamlets for hardly any are actually located at settlements (see below). This is an area which would merit further investigation, perhaps by reference to the Tithe Map.

3. *Marking a route over heathland.*

It has already been noted that a significant number of crosses are concentrated on the large area of former downland in the southern part of the parish. These include Tregurnow Down (12), Nun Careg (10), Rosemodress (19, 20), Boskenna (4), Boskenna Gate (6), and Chyoone (7). All are marking paths or tracks across the downland, leading from farms and hamlets to the parish church. Several are also located at the point where an important routeway crossed this area of downland from west-south-west to east-north-east, from Penberth to Lamorna.

4. *Fords*

As noted above, the cross at Vellansager (16) and the base at Trelew (23) are at points where a route to St Buryan church crosses a ford, the crosses marking a safe crossing point and a firm footing. Elsewhere in Cornwall, crosses have occasionally been found in use as a footbridge across a stream, as at Trevear in Sennen (Langdon 1896, 107), losing their significance once adopted for this use.

5. *Chapels*

At Vellansager there is also the traditional site of a chapel, to which the cross here (16) may be related. 'Cross Garden' at Trewoofe (35) may also be related to the former chapel site here (Henderson 1955, 61). The distribution of potential medieval chapel sites has been included on Figure 1 in order to complete the map of the medieval religious landscape of St Buryan parish (based on Henderson 1955, 61-3 and Russell 1971, 71). While this is of considerable interest in showing the chapels fairly symmetrically dispersed around the margins of the parish, it should be noted that the majority are based on late-recorded field names or traditions only; whilst only those at Vellansager, Alsia and St Loy/St Dellan have any claim to an early medieval origin.

6. *Holy Well*

A cross socket was recorded at the site of the holy well at Alsia by Quiller-Couch (1894, 5) and a fragment of this is still visible in the boundary wall of Alsia Mill (Cooke 1996, 246). This is possibly related to cross no. 3.

7. *Churchyard*

In the churchyard is the finest cross in the parish (1), and a fragment of a coped grave cover.

8. *Settlement/market*

The only crosses at settlements are those in the churchtown (2) and that at Vellansager (16) – the latter possibly also associated with a ford and a chapel site. The function of the churchtown cross is perhaps the most obscure of all in the parish. Is it a market cross, as Crofts (1955, 47) suggests? Did it mark a former extent of the churchyard, as a tradition recorded by Blight (1856, 9) and Langdon (1896, 125) states? Or was it moved here from elsewhere? It has, after all, the appearance of a typical wayside cross.

The present churchyard at St Buryan is a seemingly complete oval (Preston-Jones 1987, 154) and on the grounds of shape it is difficult to believe that it was ever much larger than it is now: but the tradition of a large yard may perhaps have originated in confusion with the sanctuary at St Buryan which once extended beyond church and churchyard. One possible explanation for the existence of a typical wayside cross in a central location in the settlement might be that when the market was established here in 1302 (Crofts 1955, 165) the cross was re-located from elsewhere to perform the function of a market cross. The open space to the south of the churchyard is quite likely to have been the site of the market.

9. *Sanctuary*

Several historians have suggested a link between the large number of crosses in the parish and the possibility that some of them may have marked a boundary to the sanctuary. At Ripon (Cox 1911, 165) there was a privileged sanctuary which extended beyond the four walls of the Minster and the sanctuary boundary was marked by eight crosses. The remains of Sharow Cross, one of the original boundary crosses, still exists today. At Beverley this practise was also adopted with four crosses marking the extent of the boundary, some remains of which can still be seen, and a similar arrangement existed at Hexham (Cox 1911, 128, 155).

Some of these crosses are mentioned in medieval documents, usually court rolls, naming fugitives who flew to the boundary cross and claimed sanctuary. At Probus in Cornwall the Carvossa Cross is mentioned in the Assize Roll of 1301 as marking the liberty or sanctuary of Probus (Henderson 1955, 415–6).

Cox (1911, 219–20) suggested that some of the old crosses at St Buryan could have been moved to mark the boundary of the sanctuary. Crofts (1955, 37) later elaborated on this idea, suggesting that there may have been a double ring of crosses marking the chartered sanctuary at St Buryan. These he considered would have marked the extent of the sanctuary, with an inner ring marking a second approach to the precincts of the church itself. This theory continued to attract interest and in a report about Pendrea Cross in 1960 (Anon 1960, 478) an attempt to name the crosses which stood on this double boundary ring was made. It was suggested that the outer ring of crosses included Crowz an Wra, Higher Leah, Trembothick, Vellansaga, Nun Careg, Chyoone, Boskenna Road Fork, Boskenna Gate, Boskenna and Alsia, while the inner ring included Trevorgans, Trevorian, Boskennal and Pendrea. Unfortunately, not all of the crosses suggested actually exist. The writers have found no evidence to suggest that there was ever a cross at Boskennal; the place-name Trembothick may relate to the cross base that was recorded at Trelew (23); and the stone which was referred to at Higher Leah has been proved to be the base of a cheese press (Henderson 1983, 173), although recently another small wheel-headed stone, possibly but not certainly a cross, has been discovered here (22) (Langdon 1997, 67).

The limit of the extended sanctuary at St Buryan is actually shown on a map of the reign of Queen Elizabeth I (Fig 3: the original is at the Public Records Office; this is a copy of a copy in the Cornwall Records Office, CRO catalogue number FS/3/957). This map shows the

sanctuary to occupy a large area within the parish, with the church at its centre. The sanctuary boundary appears to have a radius which is approximately half that of the distance from the church to the parish boundary; given that the parish is between five and seven miles across, this would suggest a radius of about a mile and a half. Unfortunately, however, the map is by no means accurate. For example, it compresses the parish from north to south and it lacks features like rivers, streams and roads, which might enable the details of the line followed by the boundary to be reconstructed. Nevertheless, it does give a reasonable impression of the relation of the boundary to the settlements in the parish and for this reason it can be helpfully compared (if inverted) to the map of the parish in Figure 1. Comparison of these two maps indicates that the little houses on the sanctuary map (Fig 3) are attempting to represent the pattern of dispersed settlement in St Buryan parish which, as noted above, is distributed in a core around the church and then, separated by tracts of rough ground, around the margins of the parish. Especially along the southern coastal fringe, there is a reasonably close correspondence between the little houses on Figure 3 and the dots which represent the medieval settlements on Figure 1. It therefore seems likely that the sanctuary's boundary would have run along the areas of rough ground to the north, west, south and south-east of the churchtown with its eastern limit formed by a tributary of the Lamorna stream and a section on the north-west by the stream which flows down to Alsia (site of crosses 3 and 21). Thus defined, the proposed sanctuary boundary follows natural features, just like the parish boundary, and the crosses at Trevorgans (13), Trelew (23), Vellansager (16), Merry Maidens (10, 19, 20), Boskenna (4), Boskenna Gate (6), and Alsia (3, 21) may perhaps once have marked the sanctuary's limits: but as described below and seen in Figures 4 and 5 they do not form a stylistically uniform group and there is no way of being sure. Noteworthy also, although its significance is uncertain, is the fact that on this hypothetical line, to the east and west of the church, are Alsia, with its holy well, and Vellansager, site of an early medieval inscribed stone and the traditional site of a chapel. Both were, in all probability, sites of early Christian activity which maintained some significance into later medieval and even post-medieval times.

The Dating of the Crosses

The dating of Cornish crosses is notoriously difficult, because so few have dateable stylistic features. However, as a result of the work of Charles Thomas (for example, 1978, 75–84) and research undertaken for a proposed *Corpus of Anglo-Saxon Stone Sculpture for Cornwall* (Preston-Jones and Okasha 1997), it is possible to suggest a chronological framework which is founded on a rather sounder base than the guesswork which has predominated in the past. There is not space in this paper to attempt any more than a summary, but more detailed descriptions of a number of the crosses exist in Preston-Jones and Okasha 1997. All of the St Buryan crosses are illustrated in Figures 4 and 5.

Apart from the inscribed memorial stone from Vellansager (now at Boskenna: Okasha 1993, 68; Thomas 1994, 271, 285) the earliest Christian stone monument in St Buryan parish is the churchyard cross (1). For reasons outlined below, this can be considered to be of the late 10th or early 11th century. It is the head only of a ring-headed cross very similar to those at Sancreed and Lanherne (Langdon 1896, 357–65) and must be assumed to have originally had, like these, a shaft carved with interlace, key patterns, and perhaps a sinuous dragon-like beast. The ring-head of the cross indicates that it must date from at least the Viking period (ie late 9th century onwards) (Bailey 1980, 70). The figure of Christ, upright, forward-facing, wearing a knee-length tunic, feet out at right angles, is very similar in style to crucifixions on crosses in the north of England for which a 10th or early 11th century date has been suggested (for example Gosforth (Bailey and Cramp 1988, 100–104),

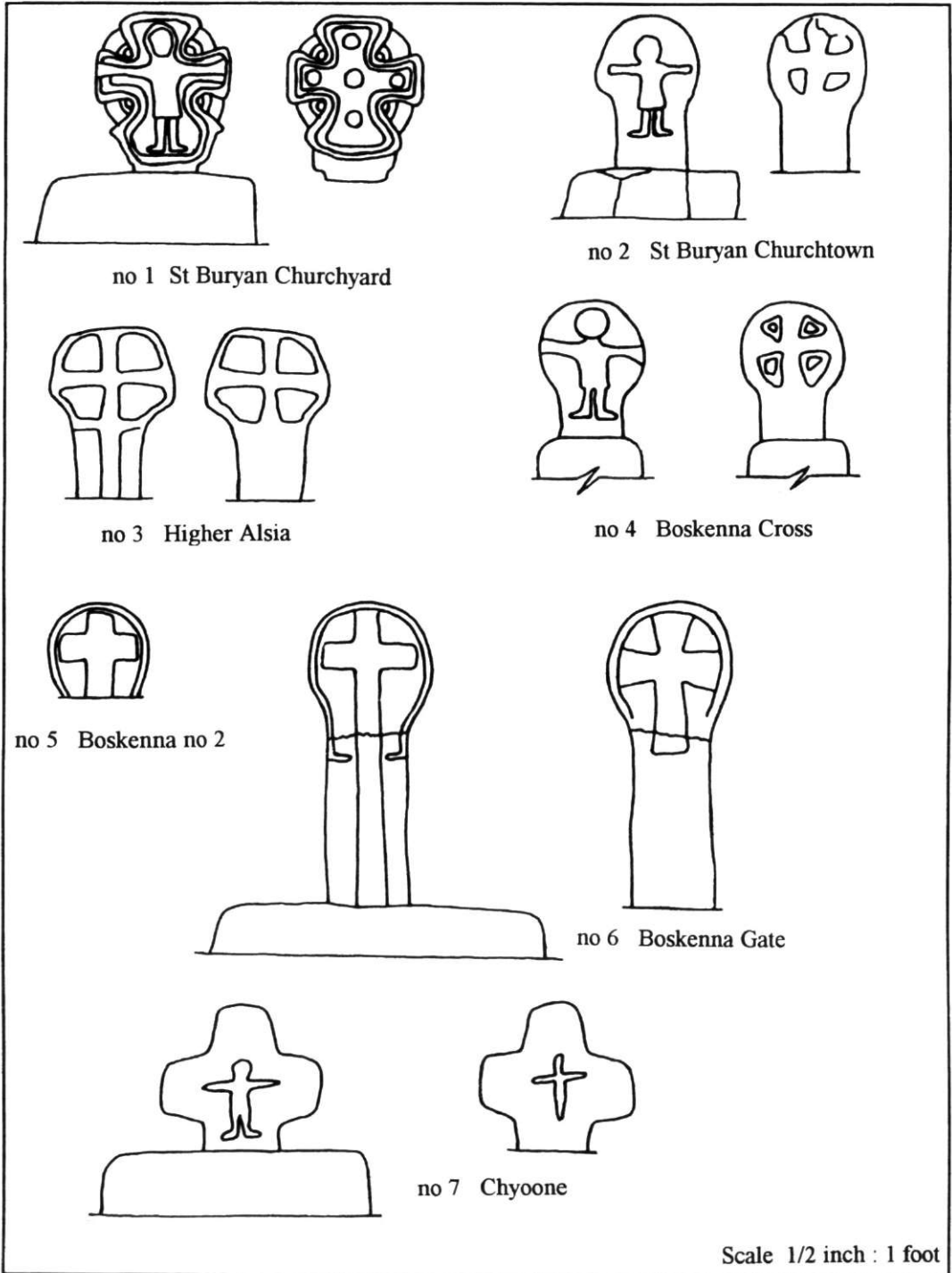


Fig 4 Illustrations of St Buryan crosses.

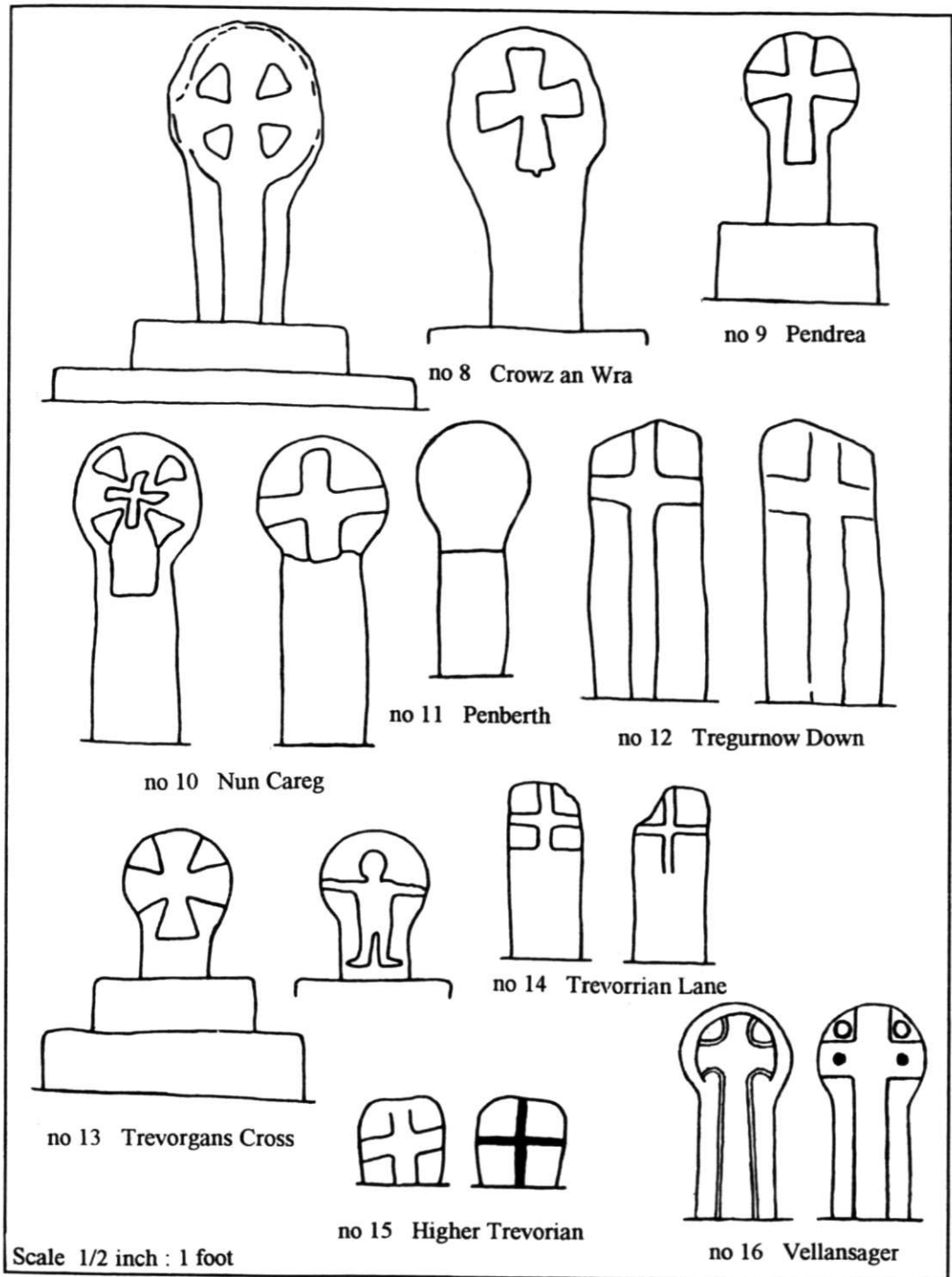


Fig 5 Illustrations of St Buryan crosses.



Fig 6 Photograph of St Buryan churchyard cross (1).

Durham 768 (Cramp 1984, 70–72), and Aycliffe 1 (Cramp 1984, 41–43)). The decorative patterns on the shafts of the Sancreed and Lanherne crosses and their inscriptions bear this dating out. Charles Thomas (1978, 75) has suggested that Athelstan's charter to St Buryan forms a likely context for the carving of this cross and it certainly seems probable that the re-foundation of the monastery here, under English authority, may have led to the introduction of fresh ideas and new craftsmen capable of carving what must at the time have been a large and impressive monument and an entirely new concept.

As Charles Thomas has pointed out (1978, 78), three other crosses in St Buryan parish are very similar to the churchyard cross. These are at Trevorgans, Boskenna and in the Churchtown (numbers 13, 4, 2 in the accompanying catalogue). Thomas suggests that these

pre-date the churchyard cross and provided motifs for it, but in the authors' opinion that idea must be rejected. Their simple, round-headed form is not reflected in 9th or early 10th century stone sculpture anywhere: it is more likely to be the result of copying and simplifying the more complex ring-head of the churchyard cross. The figures of Christ on each of these can likewise be seen as simpler copies of the original in the churchyard: they do not have haloes, their feet are more ridiculously out-sized, their bodies less well proportioned. The four bosses on the back of the Boskenna Cross, which Thomas believes may have suggested the five bosses on the churchyard cross, are merely the result of failing to completely sink the four triangular areas which form the cross-motif and misunderstand the derivation of the five bosses from the gems or studs on a metal pectoral or altar cross. Moreover, the form of the carved crosses on each of these monuments, formed by incising or sinking triangular areas, may be compared to the early geometric crosses found on medieval cross-slab grave-covers in other parts of England (for example, Kirkstall 1, Kirkstall 2, Dewsbury 7; in Ryder 1991) which have been dated to the early Norman period: to the late 11th and early 12th centuries.

It seems simplest, then, to assume that these round-headed crosses are copies of the churchyard cross, carved perhaps a century after the original. Their locations, on routes leading to the church, and outside the churchyard, also suggest that they are secondary. We cannot be sure what promoted their carving, but it seems at least a possibility that this small group may be amongst the earliest of the series of round-headed crosses with figures of Christ which are unique to west Cornwall (see Langdon 1896, 119–154). Although early crosses like the St Buryan churchyard cross occur elsewhere (Lanherne and Sancreed, as mentioned above, also St Erth, Paul and Phillack), in none of their parishes were such close copies made, at an early Norman date.

Following on from these early post-Norman Conquest round-headed crosses with their simple geometric crosses and figures of Christ, the crosses of Vellansager (16), Crowz an Wra (8), Nun Careg (10) and Boskenna Gate (6) may be seen as a slightly later development, of perhaps the twelfth to early thirteenth century. Although they are still round-headed, compared with Trevorgans, Boskenna and Churchtown, the crosses carved on them show more variety and experimentation. At Vellansager, Boskenna Gate and Crowz an Wra the lower arm of the cross extends down onto the shaft. Pool suggests that a reference to *Crows* in 1262 may be to the Crowz an Wra (Pool 1973, 49); if so, this cross must have been in existence by the second half of the 13th century.

From the Boskenna Gate cross, it is a simple step to completely removing the sides of the shaft and creating a free-standing latin cross, like that at Chyoone (7). Although free-armed (as opposed to ring-headed) crosses were characteristic of pre-Viking Anglo-Saxon cross carving in England, all the evidence indicates that in Cornwall, latin crosses are not as early as this. For one thing, they do not have the complex ornamentation or arm shape of Anglo-Saxon crosses: in fact they rarely have any decoration at all (the crucifixion on the Chyoone cross is a rarity, presumably attributable to the popularity of the symbol on crosses in this area). In contrast, they are more often chamfered or of octagonal section, and therefore clearly to be dated to the 13th century or later.

Dating the cross slabs at Trevorian Lane (14) and Tregurnow Down (12) is more difficult, since there are few monuments of this type in Cornwall and again, they tend to be very simple. However, in the absence of any other evidence, it seems easiest to compare the form of the carved cross on them to that on the Boskenna Gate cross, and suggest a broadly similar date.

So, it is proposed that cross-carving in St Buryan parish spans a period of about three hundred years, from perhaps the late 10th to the 13th century. The churchyard cross is first and of late 10th or early 11th century date, with Trevorgans, Churchtown, and Boskenna perhaps being carved soon after the Norman Conquest. These may have been followed by Boskenna Gate, Nun Careg, Vellansager, Pendrea and Crowz an Wra which, if the



Fig 7 Photograph of the Trevorian Lane cross-slab (14).

documentation can be relied on, may have been in existence by 1262. Tregurnow Down and Trevorian Lane cross slabs may be of similar date; the Chyoone latin cross may be slightly later. It should be emphasised that this dating, though far from precise, is by no means certain, relying as it does on comparisons with material from outside Cornwall, mixed with a certain amount of speculation. However, it at least provides a model which can be critically applied to crosses in other parts of Cornwall.

Conclusion

Finally, the separate threads of the locations and chronology of crosses in St Buryan can be woven together into a brief historical summary of Christian monumental carving in St Buryan.

The oldest and best-executed cross is at the centre of the parish, just outside the church which is on the site of an early medieval monastery of sufficient status to merit an Anglo-Saxon charter and to be recorded in the Domesday Book. Comparison with similar monuments in west Cornwall suggests that it may have been a memorial but the presence of the impressive crucifixion makes it likely that it was also used for preaching or in rituals. An early copy of this cross is located nearby, in the churchtown; other close copies are the Trevorgans cross, originally on unenclosed rough ground on the main ridge route north-west from the church and the Boskenna Cross, also on formerly unenclosed ground but on the main ridge route south-east from the church. Clearly these are wayside crosses, highlighting the significance of St Buryan church as a parochial as well as a monastic centre, but the uniformity of the group may imply some further significance. Are they all very close in date? Were they all executed by the same craftsman? Might *these* even have been set up to mark the boundary of the extended sanctuary?

Four crosses – Boskenna Gate, Crowz an Wra, Nun Careg and Vellansager were identified as perhaps mid/late 12th to early 13th century. These are all on major routeways through the parish, as well as on church paths, where they may have served long-distance travellers, as well as local parishioners, and two may also have been on the sanctuary boundary. The simpler cross slabs at Tregurnow Down and Trevorian do not appear to relate to medieval ‘trunk’ routes, but only to paths from settlements to the church. There seems to be an indication here that the more important routes merited more elaborate monuments and *vice versa*.

A point of particular interest is the fact that the area of unenclosed rough ground in the south-east of the parish – clearly a significant topographical feature in the past but now no longer so – was unexpected and yet helps to explain the presence in this area of a large number of crosses. Crosses erected to guide travellers over areas of barren heath are a recognised feature of uplands like Bodmin Moor and Dartmoor but are less expected elsewhere. However, it may be that a careful study of past landscape patterns would show that many more crosses, in other parts of Cornwall, once related to rather smaller but locally significant areas of heathland or open rough ground.

Finally, it is worth emphasizing that the foregoing is a geographical and art-historical analysis only, which largely omits the human dimension: we can now only guess at the full significance of the crosses to medieval folk. Today, the main ritual acted out at a cross is to admire and take a photograph, yet in medieval times they must have had a far more important role. Although the crosses certainly stood as track- and boundary-markers, they surely also stood as symbols of faith, as reminders of God’s presence, or as wayside shrines where offerings and prayers could be made in preparation for the more important ceremonies to be acted out at the parish church. The oft-quoted will of Reginald de Mertherderwa, of 1447, hints at this when it orders:

'New stone crosses [are] to be put up, of the usual kind, in those parts of Cornwall from Kayar Beslasek to Camborne Church, where dead bodies are rested on their way to burial, that prayers may be made, and the bearers take some rest' (Langdon 1890, 87).

Catalogue of St. Buryan Crosses

Crosses

1. ST BURYAN CHURCHYARD SW 4090 2569

Ring-headed cross with a figure of Christ on the principal face and five bosses on the reverse face.

On the south side of the churchyard, considered to be in situ.

2. ST BURYAN CHURCHTOWN SW 4089 2569

Round-headed cross with a figure of Christ on the principal face and an equal-limbed cross on the reverse face.

In the churchtown just outside the churchyard; tradition states that it once stood within the cemetery.

3. HIGHER ALSIA SW 3967 2514

Round-headed cross with a narrow latin cross in low relief on each face. Possibly associated with base (21).

Wayside cross marking a route west to the former chapelries of St Levan and Sennen

4. BOSKENNA CROSS SW 4259 2426

Round-headed cross with a figure of Christ on the principal face and an equal-limbed cross on the reverse face. The cross is set up on a modern composite shaft and base stone.

Wayside cross, on a large area of former downland, at the point where a ridge-top route leading north-west to the parish church branches off a major south-south-west to north-north-east routeway across the southern part of the parish.

5. BOSKENNA no 2 SW 4194 2418

Round-headed cross-head displaying an equal-limbed cross in relief on one face; the reverse face is inaccessible. The cross-head is supported on a modern shaft.

Wayside cross on an area of former downland, at a point where two routes leading to the parish church merge.

6. BOSKENNA GATE SW 4204 2407

Round-headed cross displaying a broad-limbed latin cross on each face and supported by its original base stone.

Wayside cross, on the edge of a large area of former downland, set at the crossing point of routeways leading north-west to the parish church and south-south-west to north-north-east across the southern part of the parish.

7. CHYOONE SW 4220 2469

Latin cross with a figure of Christ on the principal face and a small latin cross in relief on the reverse face.

Wayside cross in the centre of a large area of former downland, at a point where paths from south-east and south-south-east merge and continue north-west to the parish church.

8. *CROWZ AN WRA SW 3953 2762*

Round-headed cross with an equal-limbed cross on each face, its lower limb extending down the shaft.

Wayside cross, at junction of major east-west route across northern part of parish with route leading south-east to parish church.

9. *PENDREA Formerly SW 4050 2527, now SW 4059 2533*

Round-headed cross displaying a latin cross in relief on each face and supported by a modern base, Probably associated with base 17.

Wayside cross, on route north-east to parish church across low ridge between two valley heads.

10. *NUN CAREG (ROSEMODRESS) SW 4329 2460*

Round-headed cross, with an equal-limbed cross on both faces; the one on the front has the lower limb extending down the shaft. The monument was possibly originally associated with either base 19 or 20, west of the Merry Maidens (Russell 1971, 83 followed by Johns and Herring 1995, 67).

Wayside cross, set on an area of former downland (as the name suggests – Nun being derived from Cornish goon, 'down', and on a major south-south-west to north-north-east routeway across the southern part of the parish.

11. *PENBERTH SW 4017 2290*

Round-headed cross or boundstone, considered to be unfinished, since there is no cross symbol on either face.

Originally found on the parish boundary in the Treen valley on the St Levan side of the stream. Today it stands in private grounds at Penberth.

12. *TREGURNOW DOWN SW 4392 2440*

Cross slab displaying a latin cross in relief on each face.

Wayside cross, on a route leading north-west to the parish church and, as the name suggests, on an area of former downland.

13. *TREVORGANS CROSS Formerly SW 4020 2685, now SW 4000 2751.*

Round-headed cross displaying a figure of Christ on the principal face and an equal-limbed cross on its reverse face. Today it is supported on a modern stepped base.

Wayside cross, marking a route along the edge of a former area of downland (now known as Bunker's Hill) to the parish church; at a point where the two routes merged.

14. *TREVORIAN LANE SW 4155 2600*

Cross slab with an equal-limbed cross on each face.

Wayside cross, on a route leading south-west from Trevorrian Farm to the parish church.

15. HIGHER TREVORIAN SW 4152 2646

Round-headed with an equal-limbed cross in relief on one face and an incised cross on the reverse face.

Wayside cross, marking major route from St Buryan churchtown north-west to Penzance.

16. VELLANSAGER SW 4253 2585

Round-headed cross with an incised latin cross on each face, supported by an old millstone as a base.

Wayside cross, on major route leading east-west to parish church, at a point where it crosses a stream. Traditional site of a chapel, and former location of an early medieval inscribed stone.

Fragments

17. PENDREA SW 4032 2515

Base built into hedge, probably the original base for cross 9.

Wayside cross, on a route north-east to the parish church, across a low ridge between two valley heads.

18. TREVORIAN SW 4136 2590

Base built into a hedge.

Wayside cross, on route leading south-west to parish church, close to a point where two routes merge.

19. ROSEMODRESS (MERRY MAIDENS no.1) SW 4314 2450

Cross socket in natural rock, possibly the original location of cross 10, Nun Careg (Russell 1971, 83; followed by Johns and Herring 1995, 67).

Wayside cross, on a large area of former downland, set at the point where a route leading north-west from Rosemodress to the parish church crosses a major south-south-west to north-north-east routeway across the southern part of the parish.

20 ROSEMODRESS (MERRY MAIDENS no.2) SW 4315 2448

Half of a socket stone, recorded by Henderson (1983, 187) as a cross base and by Johns and Herring (1995, 60) as a prehistoric holed stone.

Wayside cross, on a large area of former downland, set at the point where a route leading NW from Rosemodress to the parish church crosses a major south-south-west to north-north-east routeway across the southern part of the parish.

21. LOWER ALSIA SW 3951 2520

Fragment of a cross base built into the boundary wall of Alsia Mill.

Recorded at Alsia holy well by Quiller-Couch (1894, 5). Possibly associated with cross 3.

22. HIGHER LEAH SW 4083 2728

Small round-headed stone with no cross symbol, which appears to be possibly an unfinished cross.

On a path leading south to St Buryan Churchtown, and on the edge of Bunker's Hill, formerly an area of downland.

Missing crosses and fragments

23. TRELEW SW 4211 2665

Cross (*remains of*) marked on OS 1908 map.

Wayside cross, marking major route from St Buryan churchtown to Penzance, at a point where it crosses a stream.

24. ?ST BURYAN

A cross was allegedly sold in about 1850 by a Rev. Beckerlegge and removed from St Buryan to Winterbourne; then moved again in 1900 to Chute in Wiltshire (Henderson 1983, 172).

Field names

25. BOLANKAN SW 3944 2765

Field name: *Crows and Wraugh Field*, Tithe Award no 2475.

Close to Crowz an Wra; to which the name undoubtedly refers.

26. BOLANKAN SW 3939 2778

Field name: *Great Crows and Wraugh Croft*, Tithe Award no 2478.

Close to Crowz an Wra; to which the name undoubtedly refers.

27. BOLANKAN SW 3930 2775

Field name: *Park an Grose*, Tithe Award no 2479 (Russell 1971, 83; Henderson 1983, 172).

28. BOLANKAN SW 3917 2759

Field name: *Lower Wraugh*, Tithe Award no 2481.

Close to Crowz an Wra; to which the name undoubtedly refers.

29. DOWNS BARN SW 4201 2417

Field name: *Higher Cross Close*, Tithe Award no 1359.

May be related with either Boskenna Gate or Boskenna no 2.

30. DOWNS BARN SW 4149 2455

Field name: *Lower Cross Close*, Tithe Award no 1300.

Close to the abandoned settlement of Adam's Hill. It is not obvious to what the name refers.

31. TREVORE SW 3927 2755

Field name: *Park Grose*, Tithe Award no 2443 (Russell 1971, 83; Henderson 1955, 65 and under Park Groase Henderson 1983, 172).

Close to Crowz an Wra: may relate to the cross, or the cross-roads there.

32. *TREVORE SW 3948 2745*

Field name: *Crows and Wraugh Field*, Tithe Award no 2461.

Close to Crowz an Wra; to which the name undoubtedly refers.

33. *CHYANOWENS SW 4153 2736*

Field name: *Park Growse*, Tithe Award no 1940 (Russell 1971, 83; Henderson 1955, 65; Henderson 1983, 172).

In the angle formed by the merging of two tracks, but these are not obvious church paths. On the edge of a large area of former downland in the north of the parish.

34. *BOSLIVEN SW 4226 2524*

Field name: *Cross Close*, Tithe Award no 1528 (Russell 1971, 83). Henderson (1983, 172) records this field under Higher America at SW 4222 2505.

No obvious topographical reason for this name.

35. *TREWOOFE SW 4390 2526*

Field name: *Cross Garden*, Tithe Award no 3088 (Henderson 1983, 172; Russell 1971, 83).

Possibly associated with manorial chapel here?

36. *ROSEMODRESS SW 4315 2454*

Field name: *Cross Close*, Tithe Award no 3442 (Henderson 1983, 172; according to Russell 1971, 83 Cross Field T.A. no 3442).

May refer to the cross bases at Rosemodress.

37. *BORAH SW 4389 2450*

Field name: *Cross Gear*, Tithe Award no 3259 (Henderson 1983, 172).

This appears to relate to Tregurnow Down Cross.

38. *CARDINNEY SW 3960 2776*

Field name: *Higher Cross Croft*, Tithe Award no 1994 (Henderson 1983, 172).

Close to Crowz an Wra: may relate to the cross, or the cross-roads there.

39. *CARDINNEY SW 3956 2766*

Field name: *Lower Cross Croft*, Tithe Award no 2090 (Henderson 1983, 172).

Close to Crowz an Wra: may relate to the cross, or the cross-roads there.

40. *CARDINNEY SW 3997 2779*

Field name: *Cross Fields*, Tithe Award no 2086 (Henderson 1983, 172).

At a short distance from the Crowz an Wra, but may relate to the cross, or to an adjacent crossing of footpaths.

41. *CARDINNEY SW 4027 2760*

Field name: *Park an Grouce*, Tithe Award no 2078 (Henderson 1955, 65; Henderson 1983, 172).

On the east-west route across the northern part of St Buryan parish, at a point where it is crossed by a track from Tredinney and Cardinney to the Churchtown. Probably too far from the Crowz an Wra to be referring to this.

42. BOSKENNA SW 4212 2408

Field name: *Park an Growse*, Tithe Award no 1452. (Russell 1971, 83 records *Park an Grouse*).

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Some navigational considerations of pre-medieval trade between Cornwall and North-West Europe

P.R. DAVIS

This paper presents a detailed consideration of the navigational requirements and difficulties posed by Channel ports in Cornwall and North-West Europe for cross-Channel trade during the period from the Late Bronze Age to the early Medieval period. There is good knowledge concerning the types of early boats and their use in the Mediterranean. There is a more modest but growing body of knowledge concerning the ships used in Northern waters, and considerations of this and of navigational factors have been presented by Casson (1994) among others. A most detailed consideration of ships and their behaviour is given by McGrail (1987, 1998). Just as now, as well as the qualities of the ships and their crews, route practicality must have depended upon navigational considerations, the nature of the routes and port requirements, and the availability of support from the various shores.

Ships and crews

Early boats were flat bottomed, relatively narrow and up to 40 metres in length (Casson 1994). By the turn of the millennium wider barges with more rounded bottoms appeared, and were used in 55 BC for the Channel crossing by Caesar. Most boats in these times had some oarsmen for steering and small square sails. Later Roman cargo ships were larger, with two or three square sails, the largest having one or two extra fore and aft sails. All had a masthead crow's-nest, and most had a few oars for use in harbour. They still had oar steering. Such craft clearly reached Britain (see Kemp 1978, Casson 1994, McGrail 1998).

Square rigged ships can only sail before or across the wind. When across the wind shallow draught vessels require heavy weights in the bilges for stability and, lacking the keels or lee boards of much later vessels, these early types must have had considerable sideways drift. Records of journeys, and the experiments of Severin (1987) with reconstructions, confirm that even with sweeps such ships have much sideways drift and no windward ability. Oar steering is less efficient than the modern transom hung rudder, and the big cargo craft would have handled clumsily, particularly in harbour.

Passage speeds were slow. Until well beyond Roman times sailing cargo boats could only achieve 3–5 knots, and even the biggest Roman freighters could make only 6 knots in best conditions. With good winds big freighters took 2–3 weeks to sail the 1200 nautical miles (nm.) from Rome to Alexandria, averaging 60–80 nm per day, the return trip against the wind sometimes taking two or three months (Casson 1994).

Flat bottomed cargo vessels could be run ashore on flat beaches of mud, sand or gravel. In Northern waters tidal excursions of 6 metres or more occur. Boats grounded at high tide could dry out for loading or unloading, and refloat on the next high tide; some had a stern windlass to help in kedging off backwards. Some were designed to be beached stern first. Most early cargo ships carried ladders to be lowered over bows or stern.

Ships were presumably sailed by professional officers, and crewed by a mixture of professionals, slaves, and passengers working a passage. Little is known about crew sizes. Having limited shelter, the sailors and passengers must have been fairly hardy people.

For portage between rivers, equine pack animals or carts could be used, travelling 10–30 miles per day, depending upon the road state. An ass can carry 150 kg. A mule can carry about 170 kg or pull a cart load of over 1000 kg (Ohler 1986). The modern shire horse can pull 2 tonnes on a cart (Hadfield 1984). Slaves, of course, could walk.

Navigation

At sea, sailing a ship with safety requires constant knowledge of boat position, steering direction and speed. Within close sight of land the sailor has no difficulty. Further out, look-out height is most important; on deck one can see the horizon at 3 nm, or 6 nm from a 7 metres high mast top or crow's-nest. High landmarks greatly increase landsight distance; a 100 metre hill being visible from on deck at 23 nm, or at 26 nm from a masthead. Masthead lookouts can be seen in illustrations of boats as early as 1400 BC (see Casson 1994). Ships sailing in company can overcome short distances out of landsight by sailing in line ahead; the leader's masthead being visible 10–12 nm ahead of the second ship, the leader may sight land in front before the second ship loses it behind, both ships using a back bearing to maintain course.

Without landsight there would have been great difficulties. Magnetic pointers were not known until the eleventh century (Croome 1982), and accurate chronometers were only made much later. Before these became available only astronomy or wind and wave direction could be used for guidance.

Mariners have known of the roundness of the Earth, the constancy of the Pole Star and the movements of the sun since Phoenician times (Kemp 1978). By night in Northern climes the Pole Star allows courses to be held to within 2–3 degrees. Pacific navigators, in their long periods of settled clear weather, sailed towards sequences of stars setting on the required bearing at night and resting by day (Lewis 1972), a method unusable in Northern weather conditions. Sun positions at dawn, midday and dusk can be used as guides to direction; but as the sun changes altitude by 15 deg. every hour, and its daily course moves North-South by about 46 deg. through the year, it cannot be used with great accuracy except at noon at its zenith, when it bears due South. However, determination of the zenith requires more accurate measurement than can be obtained without optical instruments. If, when on land, one can point an arrow on a piece of wood in the course direction required, one can then use an hourglass and draw lines pointing at the sun from the base of the arrow. If one then sails with the arrow pointing forwards in the boat and uses the hourglass so that the appropriate solar lines are kept pointing to the sun one can keep a reasonable course for many miles, provided that there are no significant cross currents and the boat is not drifted sideways by the wind. Even then, when using either stars or sun, without landsight the effects of currents on sideways drift cannot be measured, and the fast tidal currents in the English Channel can sweep vessels many miles off their required courses.

Out of sight of land when under cloudy skies or in fog one can only hold a steady angle to the wind and/or the waves. A device, the wind-rose, was developed by the Phoenicians in about 900 BC for use with winds from North, East, South or West (Kemp 1978). The

Greeks and Romans added more winds, and by relating the wind's direction on a clear day to the Pole Star or the midday sun, they could determine wind direction and lay course accordingly. With a wind-rose, even in steady conditions, significant errors may be expected. On a summer night in cloud in Northern European waters, a wind-rose directed voyage lasting 8 hours might err by as much as 10 nm, whereas with stars the expected error would be 3 nm. Wind shifts change wave direction, and with repeated wind changes courses can be lost completely. Greek and Roman boats losing landsight in the Mediterranean and having changes in wind direction had to find other craft or land to find out how to return home (Caesar, Kemp 1978).

Thus, at least well beyond Byzantine times, prudent sea sailors would have waited in port for settled weather, clear skies and a steady and suitable wind before setting sail.

In the English Channel and eastern Atlantic the weather is very variable, skies are often cloudy and sailing out of landsight can be dangerous. Fortunately the Channel narrows towards the East, where distances allow slow crossings to be made fully within daylight in continuous landsight, even in winter.

For all sailing craft wind direction was and remains of paramount importance. The North European weather in the period under consideration was probably as it is now (Lamb 1977). Detailed studies in the 1920s on the winds in the Western Channel and North-West France have been published by various authorities including the British Hydrographic Department and the Office National Meteorologique in Paris, and may be summarised as follows:

January	Winds blow from North-West, West, South-West or South on about 20 days, Northerlies and Easterlies on about 10. Gales occur on about 5 days, mostly from the West, at other times winds are mostly good to strong sailing winds.
April	Winds more variable. North-West, West or South-West for about 18 days, North-East for 5 days, and variable otherwise. 3-4 gales, Westerly or North Easterly, otherwise equal numbers of light breezes and good sailing winds.
July	Mostly South-West to West for 22 days, half calm or light, half good sailing strengths. North-West for 5 days, 3-5 days of Easterlies, mostly rather light for sailing. Gales rare, 0-1 per month.
September	Varied wind directions, North-West, West, or South-West for 15 days, North-East or East for 9 days and others for 7 days. Winds mostly good to strong, and 7 gales from any direction may be expected, each from any direction.

On average a square rigged ship in the English Channel not sailing towards any wind could hope to sail Eastwards on twice as many days as Westwards; in late autumn and winter the risk of a gale is about one in five on any given day; in spring and summer it is about one in twelve.

Thus a ship sailing from Plymouth to Christchurch and return in January could hope to start within a day or two with a good Westerly or Southerly wind, and sail to Christchurch in 28 hours or so: to return, a wait of several days might be needed, the voyage might take 36 hours, and it could well be necessary to shelter in the Solent for two or three days before finishing the voyage. The trip could take even longer in summer with its periods of calms. Ships sailing across the Channel, say Plymouth to Alderney, could expect a good wind in spring and autumn, and have to be prepared for a slow passage in summer.

Ports

Since the Neolithic, world wide sea levels have risen as a result of the melting of post-glacial ice. There is clear evidence of a rise in sea level during the last 3,000 years in the North Sea, the

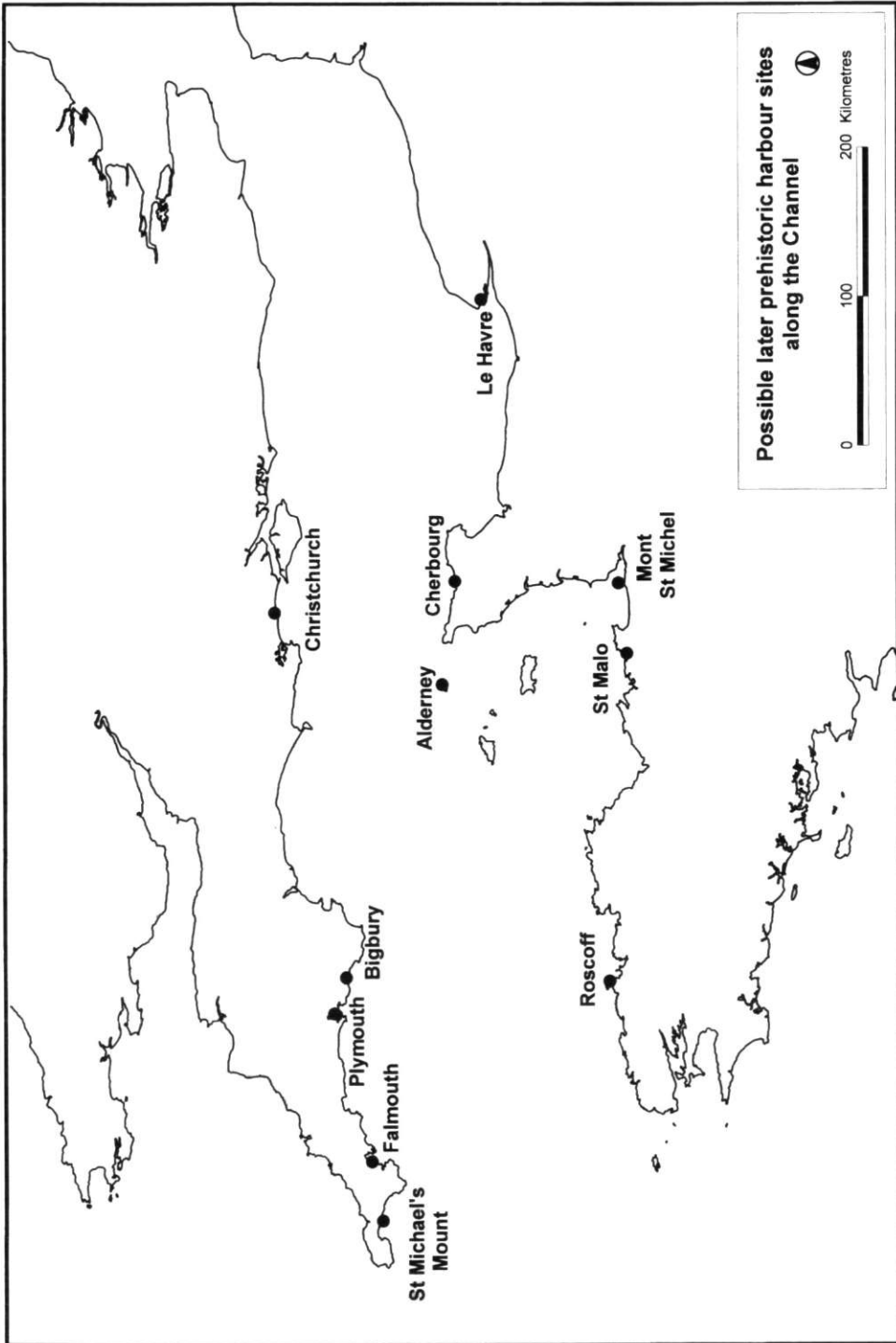


Fig 1

English Channel and the Eastern Atlantic by several metres (see reports in Thompson 1980, Thomas 1985).

To consider the form of ports available in the Late Bronze Age to Roman period using modern charts, one has to try to see them without later constructions, and use modern soundings to suggest their form with the earlier lower sea level. In the Mediterranean this is fairly easy as the remains of Greek and Roman docks and slipways can be found in the shallows by many of today's ports. In the Atlantic and the English Channel it is more difficult, for apart from a few Roman remains, much of the past has been buried by later large port constructions and particularly in Cornwall by massive deposition of industrial sediments. Thus much of the change assessed here must be conjectural.

Ideally, for the larger cargo boats, a port should have a safe and easy entrance, plenty of space for manoeuvre, good shelter from all winds, good holding ground in which to anchor, hard clean beaches, and potentially a good road inland. From personal knowledge, charts and pilot books the author has made a subjective assessment of some possible Western ports on the Channel coasts of Britain and France, and of a selection of Northern French Atlantic ports. Christchurch was included as it is the most Western port allowing daylight crossings at 5 knots mostly in sight of land. The relevant features have been scored to allow comparisons (Table 1). Those ports with the higher totals are then considered further. As ports should also be visible from well out at sea, the distance at which land would first appear from deck level is also given; some courses would have been made initially to highly visible promontories, so St Catherine's Head on the Isle of Wight near Christchurch, Bolt Head on the approach to Bigbury and Plymouth, and Lizard Head near St Michael's Mount are included.

A form of port not much used today which would have offered much to the pre-Medieval sailor would have been sites with a semi-island connected at low tide to the mainland by a causeway lying between two hard sandy beaches. Such sites occurred, for instance, at Bigbury, Mountbatten, St Michael's Mount and Alderney.

Routes

While it is tempting to think for instance of Cornish tin being loaded from nearby beaches and then being sailed directly across the English Channel to Cherbourg, Bordeaux or St Malo, the practicalities and distances would have been prohibitive to all but the most daring. Night sailing, even if some of the later Roman beacons such as those at Dover were available, would have been very dangerous. It seems likely that in the Bronze and Iron Ages Cornish trade goods went East until the crossing distance had shortened to a practicable level. With the restraints posed by navigational considerations, wise sailors at all times must surely have used crossings which severely limited or avoided any periods out of landsight. Table 2 summarises these factors for some of the possible voyages. Navigation out of sight of land without fixed references is known as Dead Reckoning (DR), and is shown as such in the table.

In the Iron Age small quantities of goods for local trade may have been carried across the Channel in fishing boats. Even today local boats may sail so that A is in landsight, perhaps 20 nm, B 7 nm further can see A, and C 7 nm further still can see B. The outermost vessels of Brittany and Britain may then see each other and be able to exchange catches or goods and return home without losing direction. But when ships with heavier cargoes started to trade with Cornwall it seems most likely that they would have been sent eastwards to the shorter Channel crossings, to avoid the considerable dangers arising from Channel weather. This increases the relative importance of Christchurch as a staging post.

Table 1 Channel port assessments and landsight distances.

<i>Location</i>	<i>Approach and entry</i>	<i>Space to move</i>	<i>Shelter</i>	<i>Anchor?</i>	<i>Beach</i>	<i>Roads</i>	<i>Total score</i>	<i>Land seen (nm)</i>
<i>Score weight</i>	20	10	20	20	20	10	100	
St Catherines (1)	–	–	–	–	–	–	–	30
Christchurch	14	10	18	16	20	10	88	50
Weymouth	14	10	12	6	20	8	70	25
Lyme Regis	18	6	6	0	8	8	46	30
Exmouth	8	6	16	16	13	5	64	23
Teignmouth	6	8	12	14	20	2	62	21
Brixham	14	8	8	8	15	6	59	16
Dartmouth	5	2	18	3	10	3	41	15
Bolt Head (2)	–	–	–	–	–	–	–	16
Bigbury (3)	18	10	15	20	18	4	81	24
Yealm	4	2	13	10	14	2	45	19
Plymouth (4)	18	10	20	12	15	10	85	32
Looe	14	4	4	0	12	4	40	17
Fowey (5)	10	6	15	14	10	6	61	16
Mevagissey	10	8	14	12	14	5	63	19
Falmouth (6)	18	8	20	18	14	2	80	15
Lizard Point (7)	–	–	–	–	–	–	–	18
St Michael's Mt (8)	15	10	16	17	20	3	81	16
Le Havre (9)	16	10	17	16	15	8	82	27
St Vaast	4	10	7	6	14	6	47	23
Cherbourg	16	8	14	14	15	8	75	24
Alderney (10)	10	10	15	14	20	0	69	22
St Malo (11)	2	6	12	12	9	6	47	10
Mont St Michel (11)	5	8	17	18	20	3	71	30
Paimpol	2	4	18	10	12	4	60	16
Lezardrieux	4	4	15	8	12	4	47	18
Roscoff (12)	6	6	14	10	13	8	57	20
St Nazaire (13)	16	10	16	12	14	10	80	22
La Rochelle	16	8	16	8	10	8	66	28
Royan (14)	14	10	8	10	15	6	63	24
Bordeaux (14)	14	4	18	16	10	10	72	70

Notes

1. St Catherines Point. Southernmost point on Isle of Wight.
2. Bolt Head. Prominent headland at entry to Bigbury, Plymouth etc.
3. Bigbury, causewayed island with superb beaches.
4. Plymouth. Many sites, including Drake's Island. Most beaches muddy.
5. Fowey. End of river route from Camel, too narrow for large ships.
6. Falmouth has many creeks. St Just and Trelissick beaches suitable.
7. Lizard Point. Prominent headland at entrance to Mount's Bay.
8. St Michael's Mount, Island site, in forest to 2000 BC. Good beaches.
9. Le Havre. Start of River Seine. River passage inland ?150 nm.
10. Alderney. Presumed staging post. Suitable beaches on either side, one with a Roman fort. 40m hill.
11. St Malo (Alet), and Mont St Michel. Many rocks to North and West.
12. Roscoff. Only port on rocky coast, ?refuge en route to Sark q.v.
13. St Nazaire. Good port of refuge, possibly also local trade.
14. Bordeaux. At inland end of 45 nm. estuary of River Gironde. Royan at estuary mouth a possible refuge or staging post for river lighters.

Table 2 Distances between Channel ports in and out of landsight (DR).

	From	To	Full	Distances (nm.)		DR (hours) at 5 knots
				In sight	(+ DR)	
1.	Cherbourg	Christchurch	75	54	21	4+
2.	Cherbourg	Bolt Head	95	40	55	11
3.	Cherbourg	Alderney	27	27	0	0
4.	Alderney	Christchurch	62	52	10	2
5.	Alderney	Bolt Head	70	38	32	6+
6.	Bolt Head	Plymouth	15	15	0	0
7.	Roscoff	Christchurch	150	70	80	16
8.	Roscoff	Plymouth	100	52	48	9+
9.	Alderney	Lizard	90	40	50	10
10.	Roscoff	Lizard	86	38	48	9+
11.	Lizard	Mount's Bay	15	15	0	0
12.	St Malo	Alderney	75	75	0	0
13.	St Malo	Roscoff	85	85	0	0
14.	Le Havre	Christchurch	100	77	23	5-
15.	Alderney	Bordeaux	400	290	110	22

Navigational aspects of these voyages:

- Cherbourg-Christchurch. Route relatively easy in suitable weather. Mainly a cross tide trip taking 13-16 hours to reach the Isle of Wight. The 4 hours out of landsight could be timed for overnight, but with a strong and steady wind the whole crossing might be made in summer daylight. May well have been used. Continuing Christchurch-Bolt Head-Plymouth adds 95 nm., total 160 nm., at least another 243 hours.
- Cherbourg-Bolt Head-Plymouth. 110 nm. with 11 hours out of landsight which could be done at night, but in Channel weather this voyage dangerous, so probably only used in very settled weather.
- Cherbourg-Alderney. A half day journey at the right time with the right wind; along a dangerous coast, so choice of weather paramount. Ships would keep as far North as possible to clear the dangerous Alderney Race.
- Alderney-Christchurch. Only 2 hours unsighted, within daylight with a good wind. Alderney well sited to be a staging point for Southerly voyages, with multiple landing sites.
- Alderney-Bolt Head-Plymouth. With a good wind, and a clear night sky for the 6 hours out of landsight, an experienced sailor might have considered this voyage as worthy of the risks. It would save at least a day compared with the voyage via Christchurch.
- Roscoff-Christchurch. The 16 hours out of landsight would surely have been unacceptable.
- Roscoff-Plymouth. With good conditions, and leaving at dawn to pass the 9 hours unsighted at night, could well have tempted an experienced sailor with local knowledge on a clear night. A wide enough target to tolerate quite large navigational errors, but less tolerance on the return.
- Alderney-Lizard-Mount's Bay. A full 24 hour sail, and could be timed to pass the 10 unsighted hours at night. However, a 5 mile southerly error could be lethal, missing Britain altogether, crews being swept to starvation by the tide.
- Roscoff-Lizard-Mount's Bay. Slightly shorter, similar to Alderney-Mount's Bay.
- St Malo-Alderney. A dangerous passage past many rocks and the main Channel Islands. Could only have been undertaken safely by an experienced local pilot, who would surely have kept to the west of the islands, finally turning east to reach Alderney. The shorter route to the east of the islands sweeps ships into the Alderney Race, and the clumsy ships of the day would probably have been wrecked, as have many later vessels.
- St Malo-Roscoff. Along a rock strewn shore, but reasonably safe with an easterly wind and good visibility. Entrance to Roscoff rocky and rather narrow.
- Le Havre-Christchurch. A straightforward voyage in settled weather, and tides can be worked to advantage in both directions.
- Alderney-Bordeaux. By keeping west of the Channel Islands land sight can mostly be maintained until the north coast of Brittany is reached. Thence the coast is followed round past Roscoff and through the Chenal du Four, a dangerous passage unless the tide is right. Thence one continues down the west coast of France to Royan and Bordeaux. This would have been a formidable route for even the later Roman ships, but was then perhaps the fastest route for heavy cargoes from Britain to Rome.

Discussion and conclusions

The available evidence strongly suggests that, until the late Iron Age, ships engaged in cross-Channel trade were small and relatively slow, and restricted to short crossings. Towards the end of the Iron Age larger ships began to take part, some making longer crossings. In Roman times some even more substantial but slow and clumsy ships were in use. Sailing ships all had rigs which did not permit windward voyages, so that all had to await favourable and settled wind conditions for any substantial journeys; eastward passages were generally easier than trying to sail to the west.

Throughout, Channel navigation posed many difficulties. The rarity of reliably clear skies meant that most voyages would have been undertaken in clear daylight, limiting them to at most 16 hours (80 nm at 5 knots), in mid-summer, and 8 hours (40 nm) in winter. Without sky- or land-sight, wind or wave direction might help to hold a course for a short period but would be very unreliable in the Channel. Given the navigational and ship limitations, up to the Late Bronze Age most export trades must first have involved passage of the goods to the east of Britain for passage to France. In the later Iron Age trade moves west to the Isle of Wight region, the larger sea-going craft allowing longer journeys when conditions permitted.

The analysis of potential shipping routes suggests that, apart from small local cargoes, export trade from Cornwall was an expensive activity which could only have involved very valuable cargoes. In Roman times much trade would have continued with initial eastern coastal passages, with longer trade routes to the Empire via the River Seine. The advent of larger ships certainly opened trade with Alet, and presumably facilitated the creation of routes via Bordeaux and the River Garonne, or via the River Loire. The cross-Channel hazards for these longer routes make it unlikely that direct crossings from west Cornwall were used. The advantages accruing to the use of Alderney suggest that further investigations there might prove fruitful.

Cornish ports in the period under review would have needed room for manoeuvre, good shelter, and hard beaches. Some ports in use today would not have been suitable for the larger contemporary craft; some ports in use then are not used as such today. This survey suggests that sites with beaches facing in different directions and good land connections would have had advantages for early seamen, and are worthy of further investigation. Shelter ports en route also need further consideration. Ships using these early ports would have lost some anchors, and such sites could well be marked by the presence of anchor stones or remnant bronze or stone anchor stocks on the sea bed.

The conclusion regarding ports for Channel crossings adds a little to the debate on the siting of Ictis, discussed in detail by Maxwell (1972) and considered in relation to St Michael's Mount by Herring (1993). Navigational requirements certainly suggest that, before Roman settlement in Britain, any significant quantity of tin for export would have first been taken eastwards before crossing the Channel, and not direct from St Michael's Mount. Plymouth is a possibility, but the Christchurch route would seem safer. According to Maxwell, Pliny suggested that the tin was taken by six days sail to the port of export; this fits Christchurch, remembering the need to wait for a wind. However, if the word 'sail' is incorrect, Plymouth or Bigbury would have taken about 6 days by pack animals from the Lizard.

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The evaluation of a medieval leper hospital at St Leonards, Cornwall

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with contributions by G J BURGESS and C THORPE

Summary

The medieval leper hospital at St Leonards, founded in the thirteenth century, was investigated by the Time Team television series following the chance discovery of human remains. Earthwork survey, geophysics and trial trenching confirmed the boundaries of the hospital and recorded a section across the Wittemore ditch, an extant boundary of the hospital. Excavation established the limits of the cemetery but suggested that the hospital buildings lay beneath the Launceston Sewage Works. The excavation of an additional inhumation provided a radiocarbon date contemporary with the hospital.

Introduction

Human remains, including articulated inhumations, were discovered in September 1995 near Launceston, Cornwall by a local landowner, Mr A Reeve, while searching for a leaking water main. The remains of approximately four individuals, most of which had been recovered unsystematically, were placed in context and recorded by archaeologists from the Cornwall Archaeological Unit in a salvage excavation. The stratigraphy was recorded and a partially excavated articulated skeleton was exhumed. The bones were described in a report prepared by Dr T Waldron, Institute of Archaeology, London. It was assumed that the remains belonged to lepers from a nearby hospital known to have existed in the area in the 13th century, the precise location of which was unknown. The Cornwall Sites and Monuments Record (PRN 37129) shows that there has been considerable debate regarding the location of the hospital. Robbins (1884, 66, 119) suggested that the farmhouse of St Leonards, south of the River Kensey (SX 351848), could be the site, a location still recorded by the Ordnance Survey. Most authors, however, have preferred to locate it around the present sewage farm (SX 351849).

It was, however, beyond the scope of the salvage excavation to establish the full extent of the cemetery, or its date, or to investigate the precise location of the hospital, its extent and state of preservation.

Site and location

The inhumations were discovered 2 km east of Launceston, Cornwall on the west side of the lane from Lower Bamham to Dutson, in the parish of St Stephens by Launceston Rural (Fig 1). The site (SX 3505 8481) was on the north bank of the River Kensey (Fig 2), approximately 300m above its confluence with the River Tamar, on the river cliff of a meander, at approximately 57m OD. The lane deviates at this point across a modern road bridge, but the cemetery lay under the former road, now waste ground, which was served by a foot bridge. The area is maintained as pasture land although the plot opposite the cemetery is occupied by the Launceston Sewage Works of South West Water. The area is mapped as Shale Limestone and Grit, Culm Measures of Carboniferous Age (Geological Survey of Great Britain 1997, Sheet 337 – Tavistock).

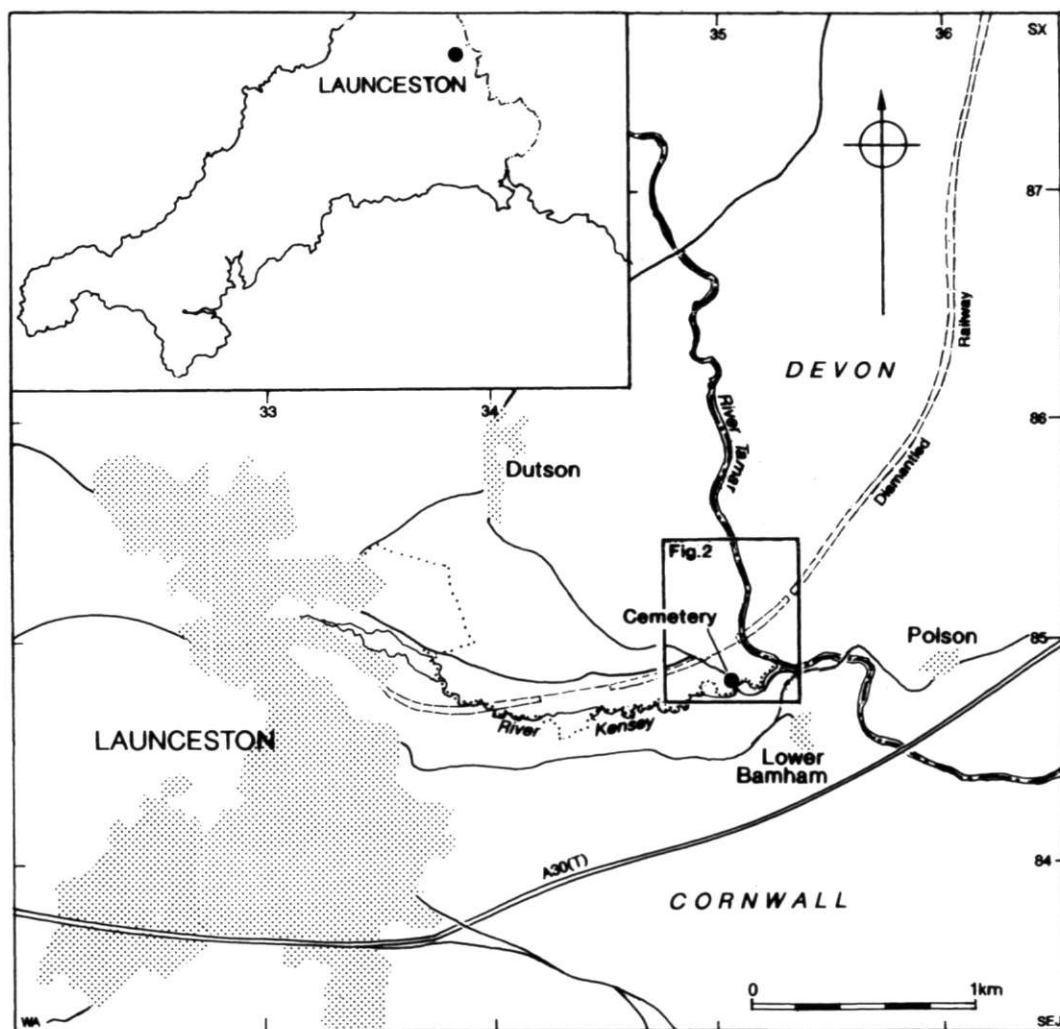


Fig 1 St Leonards Hospital: Site location

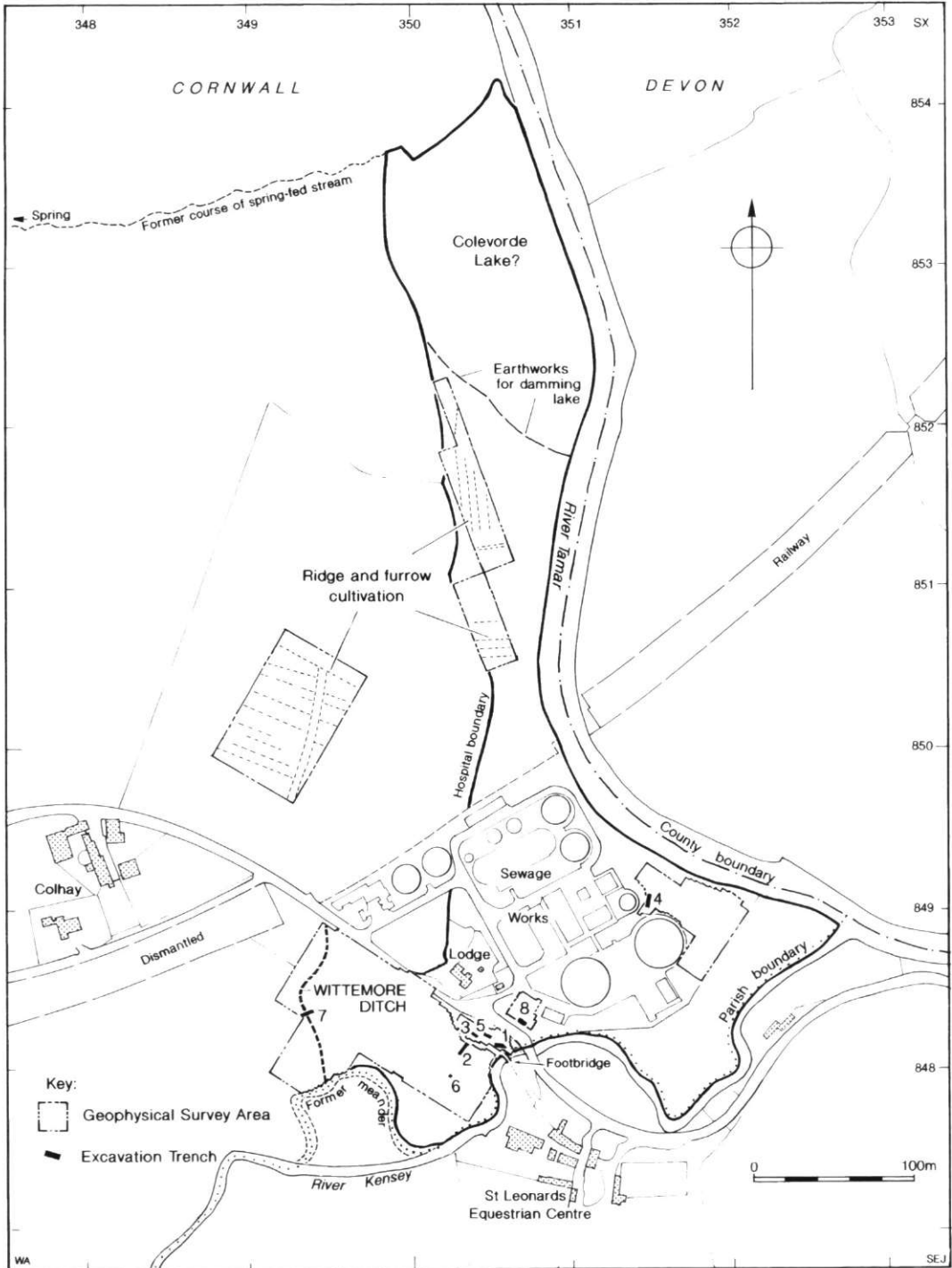


Fig 2 St Leonards Hospital: Site plan

Documentary background

Leper hospitals in Cornwall are poorly documented although three, of which one is the hospital of Launceston (St Leonards), are well described. The foundation, development and decline of St Leonards has been well researched and described fully by Peter and Peter (1885), Somerscales (1965) and Orme and Webster (1995).

The hospital was originally founded at Launceston by Count Brian of Brittany in 1075 but its relocation at St Leonards is described in a charter signed by Robert Fissacre, prior of Launceston, before 1258. The boundaries are clearly defined as, 'going up the Kensey from the Tamer to the ditch of Wittemore, from the ditch to the spring at the head of the causeway, along the causeway to the wall of the chapel cemetery, thence northwards to the park, via *Meddelonde* and *Holemede* to the stream called *Colevorde* Lake, down the stream to the Tamar and back to the Kensey, an area of some 18 acres' (Cornwall Record Office, TA 213, 16). A water supply was assured as were payments and tithes to ensure that it was financially self sufficient. The chaplain, appointed by the Prior of Launceston with the agreement of the hospital, was responsible for services and bread was delivered daily from Launceston. There is nothing to indicate whether a chapel already existed on the site although at the time of its establishment it contained 60 lepers.

Thereafter documents relate to occupants of the hospital being admitted as burgesses of Launceston as well as to a series of bequests and donations to the hospital, particularly those made in the later 16th and early 17th centuries.

In 1535 the *Valor Ecclesiasticus* recorded that the hospital received 6s 8d pa, 'for the soul of the founder'. Peter and Peter (1885, 44) refer to a royal charter of 1555 following the Dissolution in which responsibility for the hospital was vested with the Mayor and Commonality of Launceston. However Somerscales (1965, 73) places the transference of responsibility to the civil authorities with James II in 1685. Under this agreement the land was available for lease provided that no lepers were present. In 1697 the property was leased to Richard Man for seven years at £8 pa with conditions for the improvement of the boundaries which had clearly fallen into disrepair. In the event that a leper might wish to be admitted, the agreement would become void. Regular renewals record the lease of the land before the property was finally invested in the Trustees of Local Charities in the mid 19th century, when it was still tithe free. The land of the hospital was finally passed to the Gilmartin Trust for administration before most was sold off and the proceeds invested.

Aims

The project design, compiled in consultation with the County Archaeologist, Mr N Johnson, aimed to confirm the land boundary of the hospital within the present topography, to locate any surviving structures, and to establish their level of survival. It was also proposed to establish the extent of the cemetery, to exhume an intact inhumation for a comprehensive pathological examination, and to submit a sample for radiocarbon dating to establish its relationship with the hospital. The work undertaken would use documentary sources, topographic survey, geophysical survey and excavation.

The results here described represent a summary of the work undertaken. Individual detailed reports are retained in the archive deposited with the finds at the Royal Cornwall Museum, Truro. The human remains were reinterred at St Thomas Church, Launceston.

Results

The topographic survey

The survey showed that the former hospital boundaries are preserved in the modern field layout and can be related to the modern topography (Fig 2). The former meander of the River Kensey, on the south, is marked by a steep bluff from the flood plain, while the field to the north contains a small number of visible earthworks including an apparent shallow ditch with low flanking banks. This forms the boundary of Fair Park, as depicted on the tithe map of 1840 (Fig 3), and undoubtedly represents the Wittemore ditch. West of the Wittemore ditch remnants of ridge and furrow ploughing appear as earthworks aligned north-west to south-east. The return of the boundary south, 'from the spring at the head of the causeway to the wall of the chapel cemetery' (CRO *op. cit.*) has been destroyed by the construction of the railway and associated changes in the road lay out; however to the south the original line may be enshrined in the hedge on the western side of the road. There is no indication of the spring or the causeway.

The change in direction northwards of the boundary is fossilised in the hedge between the sewage works and its former lodge, now a private house. This should indicate the approximate location of the west wall of the chapel cemetery as described in the foundation charter and implies that the chapel itself may have lain to the east. North of the abandoned and now re-landscaped railway line the former boundary of the hospital, as defined on the tithe map, is preserved in a Cornish revetted bank/hedge which runs north for approximately 400 m before turning abruptly east to the River Tamar. In its northern part the boundary bows westwards around the bluff of the Tamar flood plain. Earthworks on the flood plain indicate that this area, which would have been liable to natural flooding, has been dammed on the east and south and adapted into an artificial lake. The north end of the lake coincides with a dry valley feeding from the west, which was spring fed, and probably coincides with the 'stream called Colevorde Lake, down the stream to the Tamar' (*ibid*). A leat feeding the lake from the river is also visible as are former fish ponds beyond the present boundary. The original hospital boundary probably skirted the north side of the lake, 50 m to the north of its present course which crosses the lake bed. [Editors' note: 'Lake', as in Colevorde Lake, was a common later medieval and post-medieval element in stream names in Cornwall, derived from Old English *lacu*, and need not refer to a standing body of water.]

South of the lake a narrow strip of land shown as Lower Strap and Higher Strap on the tithe map (Fig 3) may be the Meddelonde and Holemede of the charter. The present boundary earthworks of these fields, which contain evidence of ridge and furrow cultivation (Fig 2), are shown on the tithe map.

Geophysical survey

Six areas (Fig 2), amounting to 2.1 ha, were surveyed using either resistivity or gradiometry as appropriate. Numerous anomalies were identified, some of which were tested by excavation; however none could be associated with the hospital. Most anomalies correlated with geological features, particularly those caused by manganese, which are enshrined in field names on the tithe map west of the Wittemore ditch (Fig 3). Other anomalies could be correlated with land boundaries, ridge and furrow cultivation or disturbances in the sewage farm.

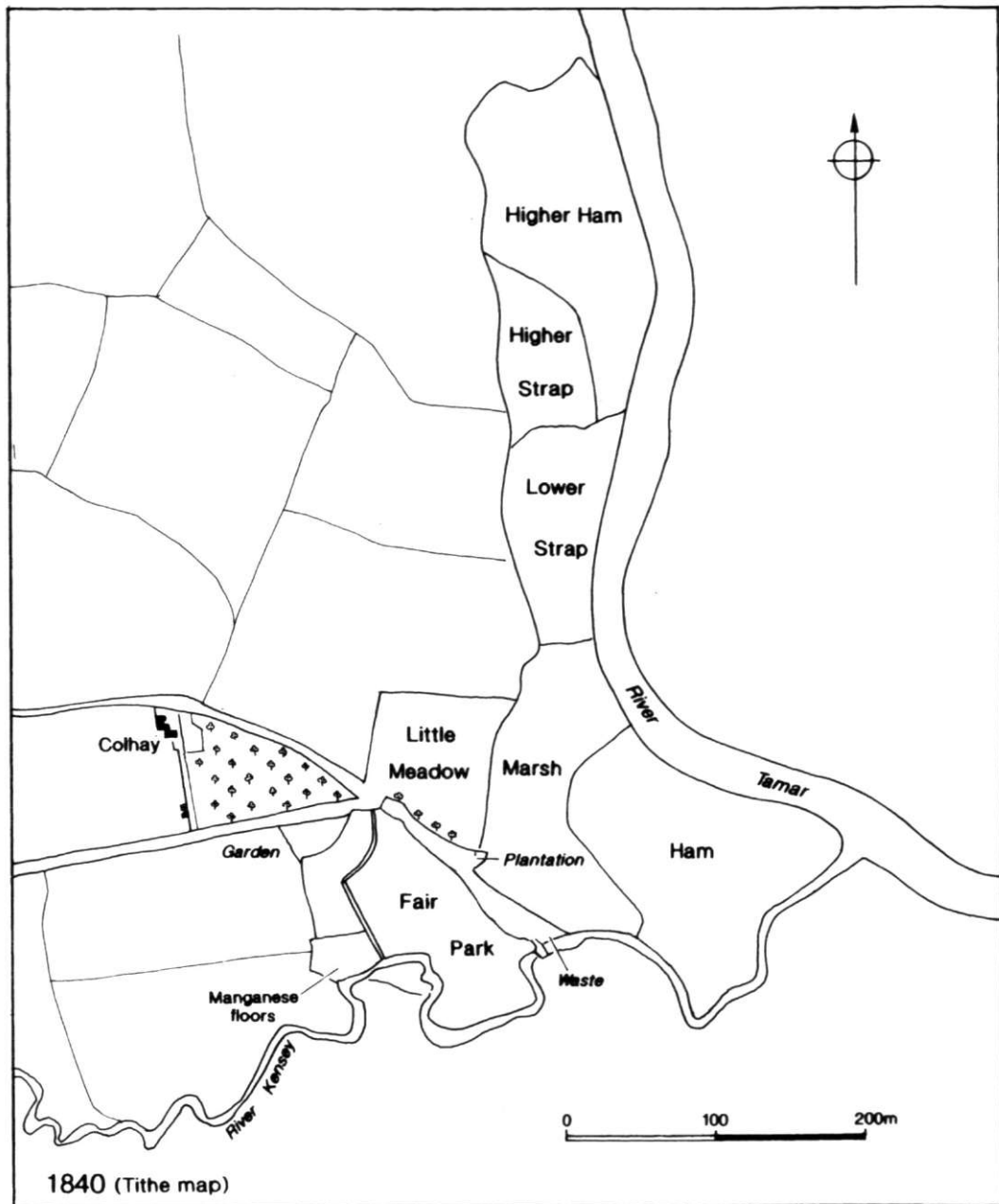


Fig 3 St Leonards Hospital: Details of 1840 Tithe map

The excavations (Fig 2)

Trench 1 (Fig 4)

The 1995 trench, measuring 2.10 m long and 1.60 m wide, was re-excavated and extended eastwards to examine an inhumation (8) which had been detected but not completely exposed. The backfilled spoil was wet sieved to recover previously uncollected bone fragments.

The trench extension revealed a thin grey brown loam topsoil, 0.10m deep, and spread of stony yellow brown clay, 0.07 m deep, which overlay a modern water pipe (12). This feature cut through stony dark grey brown clay loam which was heavily disturbed by roots. The upper surface of this deposit was very stony and may have represented an *ad hoc* path surface.

The grave cut (9), was 0.50 m wide and oriented east-west. It was apparent 0.32 m below present ground level and cut a further 0.37 m into the natural clay. The grave containing the extended inhumation (8), with arms folded across the chest and hands clenched, was filled with grey brown/brown silty clay (7) with frequent small to medium stones.

An additional grave (15) containing articulated bones (14) was revealed south of, and apparently parallel to, grave (9). It had probably been disturbed during the excavation of 1995. It measured >0.20 m wide, 0.27 m deep, was filled with grey brown silty clay (13) and had been cut by grave (9). This grave was not examined.

Trench 2

This excavation, positioned to investigate a geophysical anomaly, was cut by machine and measured 8.5 m long and 1.75 m wide. A grey brown topsoil accumulation 0.32 m deep, overlay a stony lens at the south west end and stony yellow brown clay loam natural subsoil. There were no archaeological features and it seems likely that the anomaly resulted from the manganese rich geology.

Trench 3

This machine dug trench was excavated to establish the extent of the cemetery on the west side. It revealed a grey brown topsoil, 0.56 m deep, overlying natural yellow brown clay which was cut by two water pipes trenches.

Trench 4

Staff at the sewage farm reported that traces of a stone wall had been observed during development at the site. The wall, aligned north-east to south-west, was detected by geophysics. Excavation showed that it revetted a lynchet, 0.6 m deep on its north side and was of probable 19th or early 20th century date, and therefore unassociated with the hospital.

Trench 5

Trench 5, measuring 4 m long by 1.5 m wide, was located in echelon between trenches 1 and 3 to establish the west edge of the cemetery. Topsoil, 0.30 m deep, overlay natural clay subsoil. Some bone fragments were embedded in the natural clay but there was no other archaeological material.

Trench 6

A trial pit measuring 1.20 m long and 0.80 m wide was dug south of trench 2 to examine a geophysical anomaly. The pit revealed topsoil, 0.40 m deep, over natural manganese rich clay subsoil. There were no archaeological features.

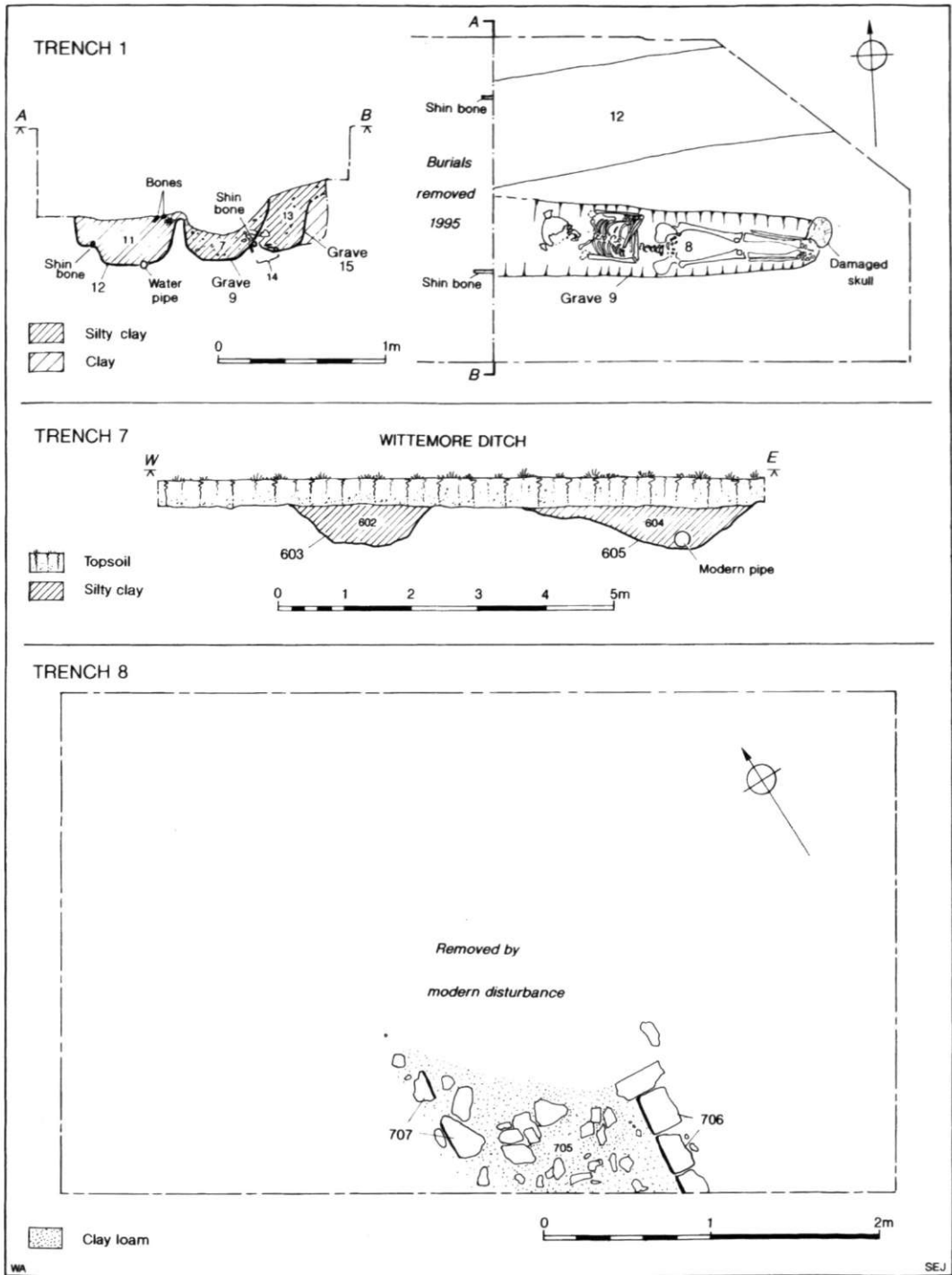


Fig 4 St Leonards Hospital: Trenches 1, 7 and 8 showing detailed plans and sections

Trench 7 (Fig 4)

This trench, 9 m long and 0.80 m wide, was machine excavated to examine the Wittemore ditch, a slight bank with flanking ditches, 1.5 m apart. The west ditch (603) measured 2 m wide and 0.58 m deep with sloping sides and a flat base. The east ditch (605) which was 3.35 m wide and 0.60 m deep contained a land drain. Both ditches were filled with stone free grey silty clay (602, 604). No traces of the bank construction survived.

Trench 8 (Fig 4)

A trench, 5 m east-west by 3 m north-south, was excavated by machine near the entrance to the sewage farm, following the discovery of medieval pottery in the flower beds and a subsequent geophysical survey. Removal of topsoil showed that most of the area had been destroyed by the construction of the sewage farm. However at the south a spread of pea gravel overlay a basal soil. This soil sealed a deposit, 0.90 m long, 0.80 m wide and 0.20 m deep, consisting of stones and slate fragments in a matrix of firm pale brown clay loam (705) containing medieval and post-medieval pottery and a clay pipe stem. The deposit was defined on the east side by an alignment of four dressed polyphant stones (706). Three sherds of North Devon medieval coarseware were recovered from the soil between the stones. A disturbed alignment (707) approximately 1 m to the west may have formed a similar edge on that side. Excavation of (705) revealed that it overlay a possible metallated path surface sloping to the south, towards the road. This feature had been truncated on the south by a land drain and destroyed by landscaping on the north.

Finds

The finds were subjected to spot analysis and are shown by context in Table 1.

Pottery

by C Thorpe

The medieval wares are predominantly North Devon medieval or late medieval coarsewares of 13th–15th century date. The largest group of material was recovered from the surface of the sewage farm flower beds, shown as Trench 8 U/S. This group included a sherd with an applied strip showing pie crust decoration and two sherds of handmade micaceous Cornish medieval coarseware (Bunnings Park/Stuffle ware).

Table 1 All finds by context

<i>Trench</i>	<i>Context</i>	<i>Med</i>	<i>Pottery PM/Mod</i>	<i>Iron</i>	<i>Building material</i>	<i>Bone</i>	<i>Clay pipe</i>	<i>Others</i>
1	U/S	1		1				
1	2	1						
1	3			1				3 chalk
1	7			1	1	8 human		
2	U/S		3					
3	201	1	4					
8	U/S	24	9					
8	701	1	19	9	4	2	1	
8	703	1						
8	705	2						
8	706	3						
Total		34	35	12	5	10	4	3

The post-medieval pottery was also predominantly North Devon coarse wares dating to the 16th–18th centuries. Diagnostic sherds included three pieces of North Devon gravel tempered ware (Trench 8 U/S) and a sherd of Sgraffito ware from Bristol/Somerset (West Country type) of 16th century date.

The remaining pottery is principally modern industrial wares.

Human bone

by G J Burgess

Condition

Most of the bones from the skeleton (8) were in a good condition although the hands and feet were poorly preserved.

Methods

The individual was aged and sexed according to Brothwell (1981), Ubelaker (1989) and Bass (1987). Measurements were taken using osteometric board and sliding callipers. The results indicate that the individual was a young adult female aged over 25 years. Accurate age at death is however extremely difficult to calculate using macroscopic methods (Molleson and Cox 1993).

The stature of the individual has been estimated as 1.63 ± 0.04 m (Trotter and Gleser 1952). The individual also has a platymeric index of 76.5 (right) and 72.7 (left).

Pathology

The facial area, which can show characteristic leprosy bone changes, was absent, however in general the individual displayed few signs of disease or trauma. The teeth displayed medium alveolar resorption (Brothwell 1981) and dental health was good. The posterior surface at the distal end of the left radius displayed vertical striations and very tiny holes in the cortical bone. The right radius also displayed a small area of perforation though this was less marked. The dorsal surface of the left hamate exhibited pitting and minor hypertrophy.

The medial surfaces of both tibiae also displayed vertical striations representing periostitis which is common in archaeological material (Roberts and Manchester 1995, 129–30), particularly from the medieval period.

Trauma

Cut marks apparently made in an anterior direction, above the left auditory meatus for a length of 4 mm, and also on the squamous bone for a length of 10 mm, do not appear to be post-mortem. They may represent evidence of medieval surgical intervention.

The report by T Waldron on material from the previous excavation also found no conclusive evidence of leprosy; however a proximal foot phalange was present with advanced diaphyseal remodelling, the distal spicule missing and the remaining shaft thinned to a point. Such diaphyseal remodelling of the proximal phalanges is part of the pathological process of leprosy and its condition could result from leprosy. A single bone is insufficient to confirm the disease.

Two fused lumbar vertebrae displaying a wedge shape with anterior collapse reminiscent of tuberculosis, or possibly the result of a compression injury were also noted.

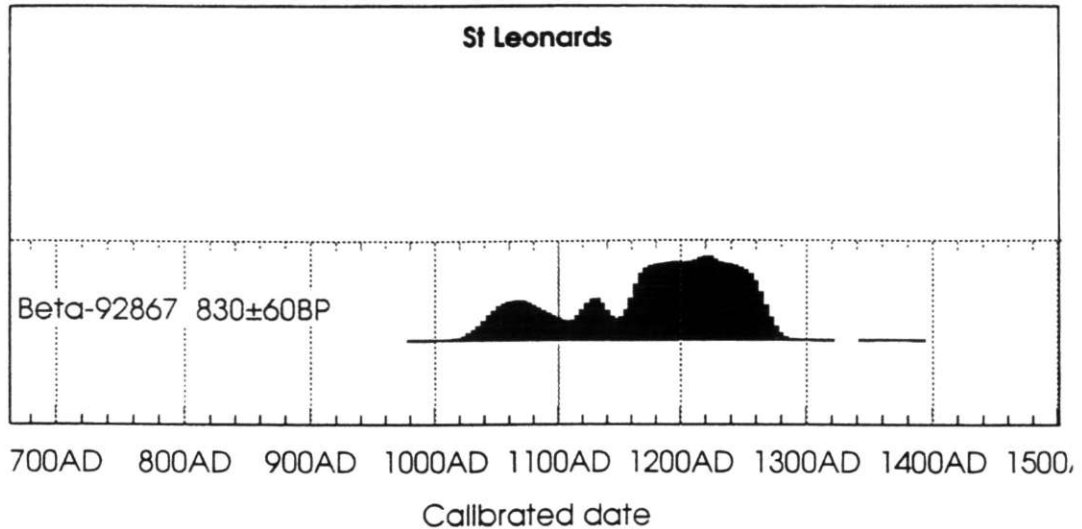


Fig 5 *St Leonards Hospital: Graph showing calibration using Oxcal (v2) distribution*

Dating

A sample of long bone was submitted to Beta Analytic Dating Laboratory for radiocarbon analysis. The radiocarbon determination has been calibrated with the 20 year atmospheric calibration curve using CALIB 2.0 and is expressed at the 95% confidence level with the end points rounded outwards to 10 years following the form recommended by Mook (1986). The determination of 830 ± 60 BP (Beta 92867) calibrates to cal. AD 1040–1280. Although this spans a period of over two centuries, the Oxcal (v2) distribution (Fig 5) shows that the date is actually more likely to fall in the later part of this range, around AD 1200.

Conclusion

A young, gracile, adult female with little unusual evidence of disease, dated to cal. AD 1040–1280, appears to have experienced periostitis and periodontal disease, neither of which are unusual during the medieval period. It is also possible that, prior to death, she received some sort of surgical intervention near her left ear. No evidence of leprosy was apparent from the remains or from those from the previous collection.

Discussion

The St Leonards project has undertaken the first comprehensive survey of the land within the boundaries of the leper hospital as defined by the charter of foundation. The results have indicated contemporary land use, including previously unrecorded fish ponds associated with the Colevorde lake. These water features cannot be conclusively linked with the hospital, although it may be assumed that they provided a valuable food source to a local community. Their maintenance however would probably have required healthy individuals. It is likely that these fishponds had become obsolete by 1697 when the land was first leased for rent. The terms of the lease confirm that the land had fallen into decay and make no mention of a lake.

Survey of the remaining higher land indicates that most of the land has been farmed by ridge and furrow cultivation, but geophysics failed to identify any surviving structural remains beneath it. The study of the field names offers no guidance to indicate when they were changed from those on the foundation charter to those on the tithe map. It is, however, tempting to regard Fair Park as an open space for fairs, on the margins of the hospital. This may have supplied some income to the establishment.

The hospital complex itself probably lay beneath the modern sewage farm above the flood plain. Excavation has identified medieval remains near the entrance to the farm, which covers 1.5 ha. There is no evidence that the hospital extended beyond it.

The charter of foundation defined the hospital as a chapel and houses. Unfortunately few comparative ground plans of contemporary leper hospitals exist to suggest scale, number, extent or type of construction of building. Hart (1989, 264) described hospitals as institutions comprising a group of single storied cottages with adjoining chapel and cloister formalised around a green in a monastic arrangement, as at St Mary Magdalen, Exeter. He stressed that size and nature were variable, sometimes involving a group, row or quadrangular lay-out so that individual cottage plots with gardens may also have been included.

Alternatively the hospital may have taken a ward-like form more common with traditional medieval institutions for the sick. These buildings were aisled with separated screened bays providing individual accommodation and were joined to a chapel (Morley, pers comm). Facilities were available for either sex.

Nothing was recorded to suggest that remains of the principal buildings, particularly the chapel, were uncovered during the construction of the sewage works. This work undoubtedly destroyed or severely damaged large areas of the hospital by topsoil stripping and groundwork. However it is possible that undisturbed areas remain. The gardens of the lodge, which may contain crucial deposits, are undeveloped and it has been shown in Trenches 4 and 8 that peripheral areas of the site also retain potentially undisturbed fragments of deposit.

The work in the cemetery confirmed by radiocarbon techniques that the inhumations were not only contemporary with the hospital but also suggested that they may have been interred soon after the foundation. There is however no clear pathological evidence for leprosy. Excavation has defined the perimeter of the cemetery on the west side but has not been able to show whether it was cut by the present road on the east. If the interpretation of the documentary evidence locating the chapel near the present area of the lodge is correct, it suggests that the cemetery extended northwards in that direction. The cemetery appears to have comprised a series of intercutting graves aligned east to west with much bone being redeposited. This suggests that it was in use for a considerable period with no long term formal planning. Its expansion may have been prevented by defined boundaries.

Pottery has provided the only artefactual evidence for continuity of occupation from the foundation to the present day. Despite the destructive effects the construction of the sewage farm entailed, sufficient evidence has been collected to allow the hospital to be located with more certainty and its environs to be investigated in greater detail than ever before.

Acknowledgements

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Nigel Thomas of the Cornwall Archaeological Unit who, with Jenni Butterworth, undertook the excavation and prepared the post excavation archive. Individual thanks go to B Thomason and RCHME for mapping the site and for supplying survey equipment, B Morley for discussion on the structure of the hospital, M Cox for advice on the human bones and C Harding who helped with their processing. S E James of Wessex Archaeology prepared the illustrations.

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Stonaford

PETER HERRING and ERIC BERRY

Introduction

Opportunities to examine below-ground remains within standing early dwellings occur rarely in Cornwall. So, when the Cornwall Archaeological Unit learnt from Abigail Armstrong Evans in July 1994 that a 17th-century or earlier farmhouse at Stonaford, North Hill, was undergoing extensive repairs and some alteration, Martin Roseveare, a BSc student at Bradford University who was spending a year with the Unit on placement, threw considerable energy into organising the rapid excavation of parts of the floor and the recording of the standing building's fabric (Roseveare 1994a; 1994b). A group of ten volunteers was gathered from the Caradon Archaeological Group, part of the Cornwall Archaeological Society.

This paper describes their results and discusses the architectural importance of the building, which proved to have once been a longhouse, comparing it with other excavated and standing longhouses. It also places the house and Stonaford in their wider architectural, landscape and historical contexts.

Stonaford (SX 2556 7594) is immediately to the east of Bodmin Moor, just off the granite at *c*155m OD; towards the foot of the long moorland edge slope falling from the hill called Ridge on East Moor down to the River Lynher just north of Trebartha (Fig 1). Although an essentially lowland settlement, Stonaford is on one of the several lanes leading onto the Moor and there can be little doubt that its agricultural economy will always have included use of moorland resources, notably the summer grazing, and its inhabitants will have had close relationships with the Moor and its people. Today there are three dwellings at Stonaford; the house discussed here is to the south of a road junction and the others, the present farmhouse and a barn-conversion, are on either side of the Tolcarne road running away to the north-west. A water-powered sawmill established some time between 1840 and 1880 to work timber from Trebartha Hall's plantations lies to the east of the dwelling under study.

The settlement was first recorded in an Assize Roll of 1304 as 'Stenyford juxta Trevynyel' (Gover 1948, 168); see below for discussion of historical background.

Methods

Excavation

The whole of the house's ground floor was to be removed in the building works, but after

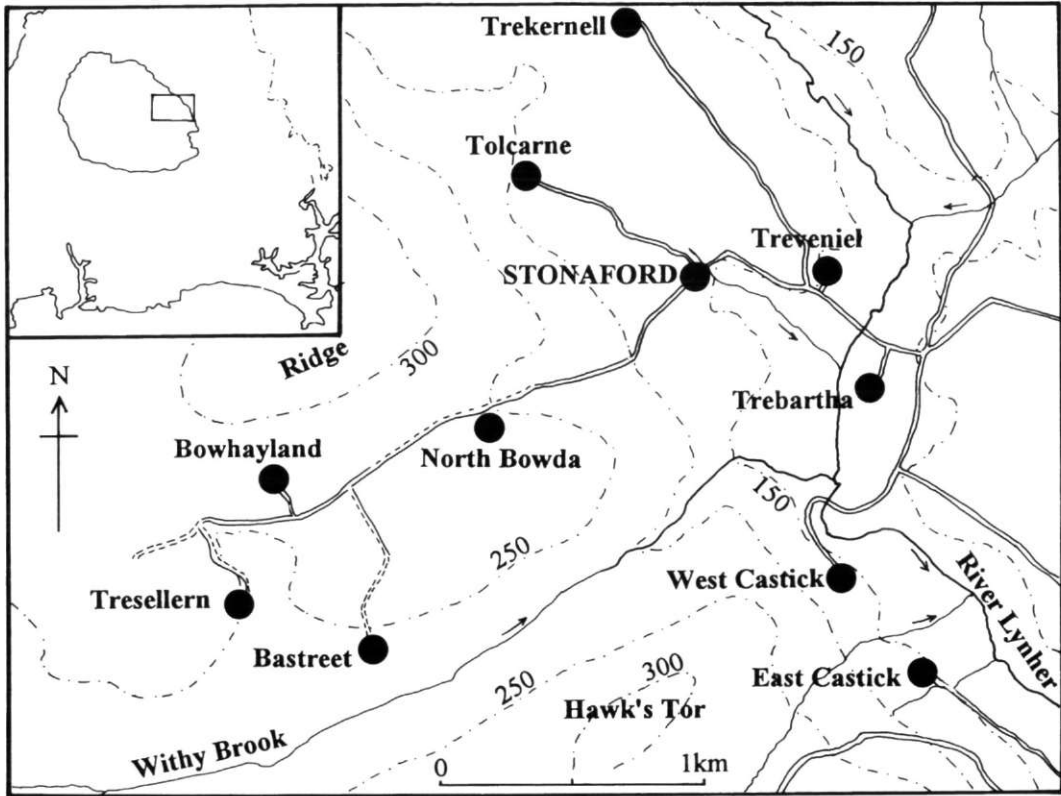


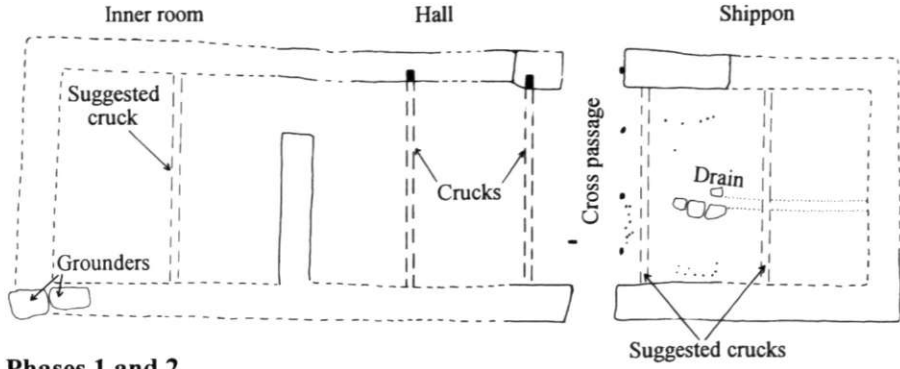
Fig 1 Location map showing Stonaford among contemporary later medieval farming settlements

initial examinations of the floors in each of the three main rooms archaeological excavation was largely confined to the lowest, north-eastern room where remains of former structures had been encountered (see Fig 2 for plan of house). The south-western room's floor had been removed by the contractors before investigations began and the examination of the central room revealed that most archaeological layers and features (except for two truncated stakeholes) had been removed in previous alterations. A complex sequence of deposits, approximately 0.25 m thick, was sealed by a 19th-century slate floor. Fourteen separate deposits were recorded (excluding those associated with the longhouse's drain); mainly fragments of floors, from medieval rammed earth to post-medieval cobbling. One or two small trial pits were also dug outside the building, mainly to trace any continuation of features noted within.

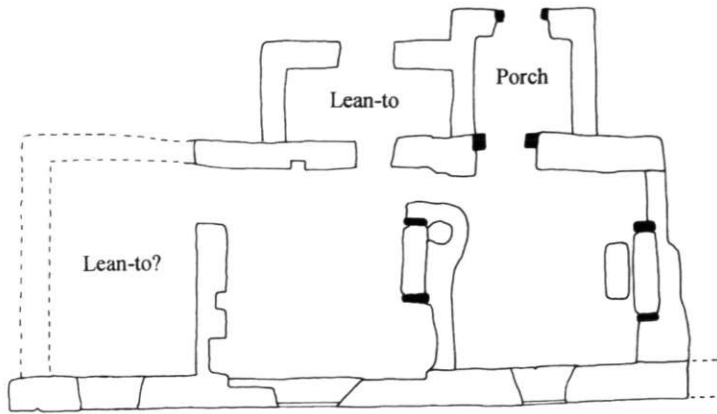
The whole of the lower room was cleared by trowel to natural clays, and a succession of plans and sections drawn.

Buildings survey

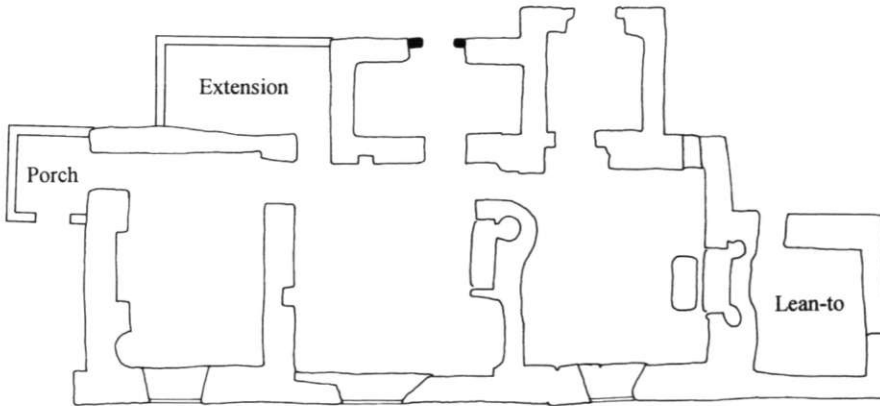
A measured plan (at ground floor window height) and elevations (all at 1:100) were drawn, recording all structural divisions and architectural joints. This exercise helped tie phases observable in the excavations into those visible in the standing building, enabling a fruitful dialogue between the two sources to clarify the history of the house's development.



Phases 1 and 2



Phase 3



Phase 4



Fig 2 Phase drawing of Stonaford's house plan, generated from the evidence gathered from excavation and standing building analysis. For more details see Roseveare 1994a

The fieldwork results were collated and described in an archive report (Roseveare 1994a) which included a detailed account of stratigraphic and structural evidence: from this, Martin Roseveare identified three, or possibly four principal phases, each of which could be further subdivided to account for stratigraphic and structural complexity (see Fig 2):

1. A longhouse.
2. Possible later medieval hall-house (this may not in fact be distinguishable from the longhouse – see discussion below).
3. Early or mid 17th-century alterations and additions including: storeyed porch and lean-to (possibly later 17th century although evidence of weathering in the side wall of the porch may confirm coeval dating) on north-west (?rear) wall; partial rebuild of south-east (?front) wall; insertion of dividing wall and fireplaces.
4. 18th and 19th-century alterations including: raising the walls of the south-western two-thirds of the house; insertion of 18th-century segmental arch openings and fireplace lintel (upper, south-west end); lean-to on lower, north-eastern gable rebuilt. Documentary evidence (see below) indicates that these were works carried out by the Rodd estate to turn the farmhouse into a terrace of three labourers' cottages.

Finds

Artefacts, recovered by context, were examined by Carl Thorpe. Although they reflect the date range of occupation at Stonaford, from 14th to 20th centuries, most dateable ceramics were collected from disturbed or residual deposits and were thus not very useful for dating phases beyond confirming the broadest of associations. So 18th and 19th-century material was largely, but not entirely, confined to the uppermost deposits, 15th to 17th-century wares dominated down to the longhouse floor, and the earliest ones were largely found in the drain and adjacent contexts. Larger medieval sherds were recovered from secure micro-contexts towards the base of the drain's rubble fill, apparently confirming a 14th-century date for either use or construction of the longhouse (Roseveare 1994a).

Medieval pottery found in the upper floor levels, mixed with material from all periods down to the 19th century, included four bodysherds (possibly from the same Exeter chert-tempered coarseware vessel; fabric 21), two of which had thumb impressed applied strip decoration (see Fig 3, nos 2 and 3); a decorated rimsherd of later medieval (16th century) Lostwithiel Ware

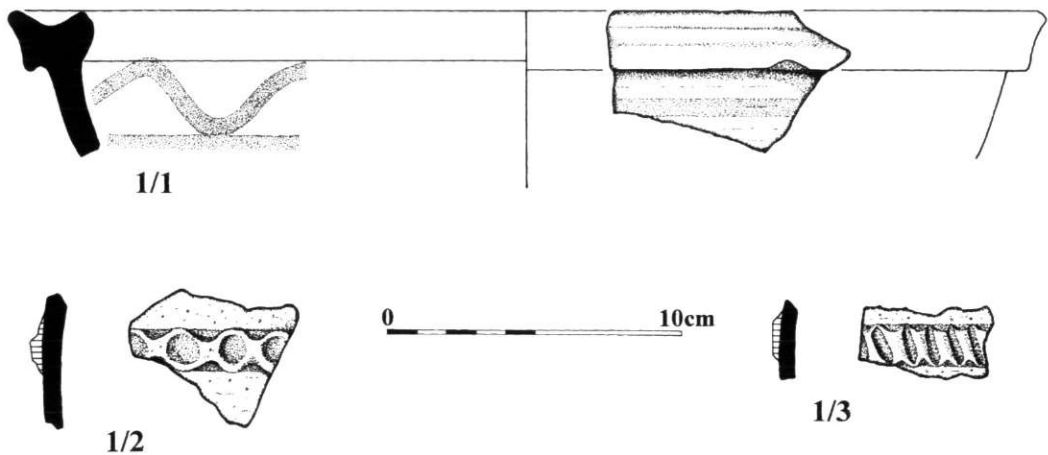


Fig 3 Decorated later medieval sherds from the Stonaford excavation (from Thorpe 1994)

(Fig 3, no. 1); three other grey coloured bodysherds and a rimsherd from a 14th or 15th-century jug (Thorpe 1994).

Among pottery found within the middle layers were four rimsherds of a 17th-century dish or bowl of North Devon coarseware; and five bodysherds of 14th-century Exeter chert-tempered coarseware. The drain fill did contain eight 19th and 20th-century sherds, which had worked their way into cavities in its upper part, but eleven larger 14th or 15th-century body and basal sherds were found in the denser lower fill (Thorpe 1994).

Phases 1 and 2 The longhouse

Martin Roseveare separated the later medieval period structure (probably 14th century?) at Stonaford into two distinct phases with a hall-house, whose roof was supported by raised crucks truncated by the later, 17th-century roofing, succeeding a longhouse whose walling had been largely dismantled or rebuilt. The apparent insertion of one raised cruck into pre-existing walling was used to indicate a fragment of pre-hall standing walling, allowing Martin to separate longhouse from hall-house. The evidence for this cruck insertion, however, is equivocal – the disturbance around the timber could also have been the product of repair – and the present authors prefer to simplify the later medieval remains into one principal phase, albeit one incorporating several quite major structural alterations; for instance the crucks certainly need not be associated with the earliest building (see Fig 5). In so doing much more of the standing walling is drawn into the longhouse, making Stonaford an unusually well-preserved Cornish longhouse.

It is also possible to identify quite good reasons for seeing the original longhouse at Stonaford, provisionally dated by ceramics found in and around the drain to the 14th century (see above), extending the line of the present house at both ends (see below) and having an original layout of three ground floor rooms, two human or domestic (hall and inner room) above a cross-passage and one animal, a large shippon below it, allowing it to fit well with other excavated and standing later medieval longhouses in Devon and Cornwall. The plan in Fig 2 is partly conjectural and partly a simplification, to allow the reader to appreciate the likely layout of the Stonaford longhouse without the image being too confused by representations of the intricacies of the early structural development. See Martin Roseveare's archive report (1994a) for full details. Ten of the 23 longhouses excavated in Devon and Cornwall have this plan, as do 16 of the 56 unexcavated houses recognised on Bodmin Moor (Herring 1986, Vol 2, Table 4). Another 18 longhouses have these three rooms at their core, with other rooms added to either their ends or sides, giving 44 out of 79 (*ibid*).

The shippon (Fig 4)

Successive later floor deposits had sealed most of the lower room's medieval floor and when removed they revealed one of the key defining features of a longhouse – the shippon's central drain – together with numerous post and stake holes, and traces of beaten and rammed stone flooring. Shallow post-holes defined a timber screen separating the shippon from the cross-passage.

If the original shippon was confined to the present lower room it would be unusually short, just 2.6m, with parallels only in very modest houses such as those at Tresmorn (Beresford 1971, fig 24) and Lanyon (Beresford 1994, fig 7). We can look to the clear continuation of the lower courses of the outer face of the south-east wall into what is now a small lean-to at the lower end for an indication that the shippon originally extended further this way, and we can then postulate that the present north-east end wall is a 17th-century (phase 3)

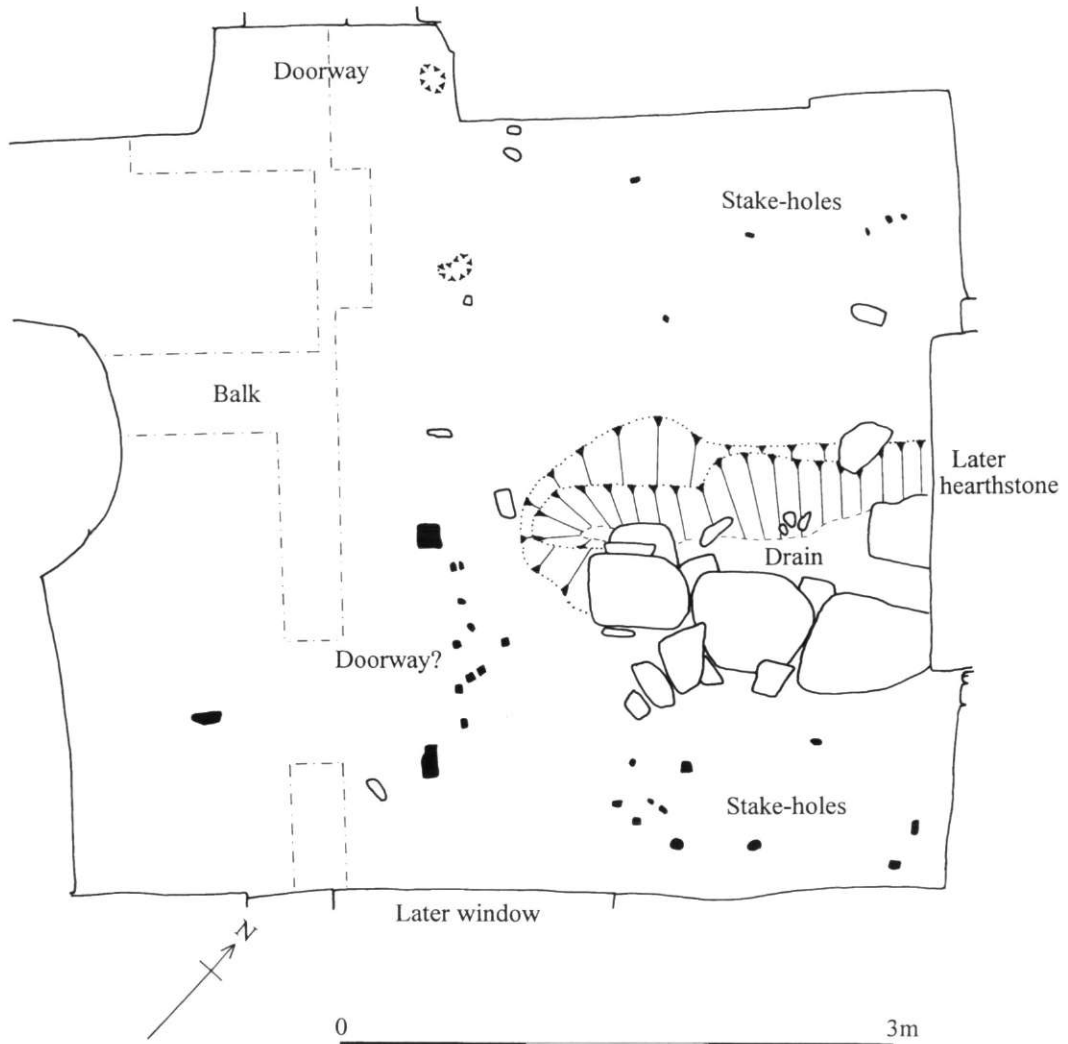


Fig 4 Simplified plan of the excavated south-western portion of the longhouse shipp (adapted from Roseveare 1994). Two definite postholes and another possible define the probable timber screen against the cross-passage

insertion on the line of a medieval cruck. It would have been extensively or totally rebuilt anyway in the 17th century in order to insert the ground and first-floor fireplaces. Its position is consistent with the spacing of the surviving crucks and it is tempting to see the medieval shipp extending one more bay to the north-east, to the corner of the lean-to. It would then be c5.5 m long internally and would fit into a group of excavated later medieval south-western longhouses with similar shippens including Treworld I (Dudley and Minter 1966, fig 13) and Houndtor 1, House 8 (Beresford 1979, fig 15).

The drain at Stonaford is a substantial structure with an unusually deep channel (maximum recorded depth, 0.5 m) which is probably a function of the relatively gentle slope of the site compared with those houses excavated on the south-western moors and in north Cornwall

valleys. The drain's walling of laid granite blocks survives best on the south-east side but a single in-situ stone on the north-west provides a width of 0.23m. The drain's line is rather eccentric (to the south-east of centre) and from the fragment that survives appears to have an irregular line, at a slight angle to the shippon's long axis. It should be borne in mind, however, that longhouse drains were covered with capstones (all lost at Stonaford) and probably also dung and their neatness was probably a minor consideration to the house builders. So although the Stonaford drain sits oddly beside the straight-as-a-ruler drains of sites like Treworld House 1 (Dudley and Minter 1966, fig 13), Sanders Lettaford (Alcock *et al* 1972, fig 1) and Houndtor 1, House 7 (Beresford 1979, fig 10), it does have friends in the archaeological literature like Hutholes House 3 (Beresford 1979, fig 20), Bunning's Park (Austin *et al* 1989, fig 3.6), Okehampton Park B2 (Austin 1978, fig 9) and Dean Moor (Fox 1958, fig 37).

Three roughly equally-spaced post-holes defined a timber screen against the cross-passage, a surprisingly rare feature in excavated south-western longhouses. One was recorded at Crane Godrevy (Thomas 1958, fig 14) and there were screens of stone walling at Garrow, Treworld, Trewortha Marsh and in phase 2 or Houndtor Village House 1 (Dudley and Minter 1962-3, fig 88; Dudley and Minter 1966, fig 13; Baring-Gould 1891, Plate II; Beresford 1979, fig 14). To be a longhouse 'proper' there should be evidence of internal access to the shippon from the cross-passage; the loss of some of the shippon's external walling at Stonaford means we cannot be certain that livestock did not enter the shippon from an external doorway. Martin Roseveare interpreted the rather deeper post-holes to the SE of centre of the screen as a likely shippon entrance from the cross-passage. Similarly off-centre doorways through the screen were recorded at Trewortha Marsh and Garrow, and with an arrangement of four panels in the Stonaford screen any entrance would have had to have been off-centre.

A roughly linear arrangement of nine stake-holes across the entrance immediately within the shippon was tentatively interpreted by Martin Roseveare as evidence for a hurdle being driven in to close loose animals in the shippon. No sensible alternative interpretation for the arrangement can be offered at present although it is noted that Martin's archive report (1994a) shows that three of the stake-holes were not definitely sealed by the later flooring, and it is therefore possible that the feature is not of the longhouse phase. It is, however, suggested here that if a hurdle was re-positioned daily or even annually then many more stake holes should have been identified. Also, there is no suggestion that doors were not used to close entrances elsewhere in south-western longhouses (see Dudley and Minter 1966, 46; Austin 1978, 205; Beresford 1979, 127) and also elsewhere in this house. Furthermore, with the exception of the very early (10th century?) structure at Mawgan Porth (Bruce Mitford 1956), there is no supporting evidence from other south-western longhouses that cattle were not tethered. Tethering made management of the animals (feeding, milking etc) much easier and safer, and allowed the farmer to efficiently house more animals, and reduced the likelihood of them damaging either themselves or the building.

No holes for posts supporting the roof were found and, like all other excavated south-western longhouses (Herring 1986, Vol 2, 93), the roof was apparently supported by the walls via either wall-plates or, much more likely, the raised crucks whose remains still survive. No trace of roofing slate was encountered in the longhouse levels at Stonaford, again as in all other excavated south-western examples (*ibid*, 94), so the roof clearly had some form of thatching.

The internal width of the shippon, 4.23m, suggests that there were two rows of cattle at Stonaford stalled down the long walls of the shippon: examination of longhouses excavated elsewhere in the south-west has shown that only shippons less than 4.0 m wide housed just one row of cattle (Herring 1986, Vol 2, 79). There are patterns of stake-holes within one metre of each of Stonaford's shippon's long walls and although it is not easy to make out

particular mangers or stalls, the holes close to the wall and those nearly 1 metre out do suggest that there were both. Again, excavated south-western long-houses with clearly identifiable stalls suggest an average stall width of 1.26 m (*ibid*) so the postulated 5.5 m long shippon at Stonaford would have housed two rows of four cattle.

The stake-holes and post-holes of the shippon were forced into a floor of 'compacted clay, reinforced towards the front of the building by rammed stone' (Roseveare 1994a).

Cross-passage

If the single post-hole (context 100) 1.1 m south-west of the screen against the shippon is part of another screen against the hall then the cross-passage width would be closely comparable to those excavated at Houndtor House 1, Garrow and Treworld (Beresford 1979, fig 14; Dudley and Minter 1962–3, fig 88; Dudley and Minter 1966, fig 13). There appear to have been doors at both ends and a possible door post-hole was excavated on the north-eastern side of the north-western doorway. This was probably the house's 'front' door if it can be assumed that the eccentrically positioned door from the cross-passage to the shippon (see above) indicates that the animals entered from the south-east door. Certainly the north-west door faces the road and the rest of the hamlet while the south-east side faces the hidden side of the house, possibly the site of any contemporary farmyard.

Hall and inner room

The floors of these parts of the later medieval house were not excavated and our understanding of their form derives from the evidence of the standing building. Two sawn-off raised crucks 2.2 m apart, probably of oak, survive in the long north-western wall, emerging just above present first-floor height at 1.5 m above present ground floor (see Fig 5).

Two more crucks have been proposed to provide roofing structure for the shippon (see above). An internal stone-built gable at the division between hall and inner-room, largely extant though containing a later fireplace and alcove, supported the roof here but we can predict that a fifth cruck existed another 2.2 m to its south-west at the centre of the inner-room, giving the latter an internal length of approximately 4.4 m. This prediction is based on the lowest courses of the south-eastern wall clearly having originally extended beyond the house's present south-eastern corner. In all, then, and including the shippon and cross-passage, the house will have been of seven 2.2 m bays.

The extant fireplace in the hall's south-western wall is a 17th-century insertion, and the traces of blackening on both the cruck fragments and also the surfaces of the walling apparently associated with them presumably derive from an open hearth. Virtually all excavations of south-western longhouses have such hearths, usually a large granite slab, sometimes with a vertical fireback and a cooking pit, placed roughly centrally between the two long walls but slightly further away from the cross passage than centre (egs in Beresford 1979; Austin 1978; Dudley and Minter 1962–3; 1966). The focus of domestic activity and evening-time gathering, the hearth's position will have determined the arrangement of furniture and the flow of life around and through the hall.

The inner room in south-western longhouses was usually only entered from the hall, at Stonaford probably by way of the surviving doorway at the north-western end of the hall's south-west wall. We can assume that the positioning of furniture against the wall of either or both hall and inner room forced the doorway to be either near or at the end of the wall. The function of the inner room in these longhouses is still not fully understood and the example at Stonaford, being poorly defined and partly hypothetical does not allow discussion to be extended. It was usually unheated and was of peripheral importance

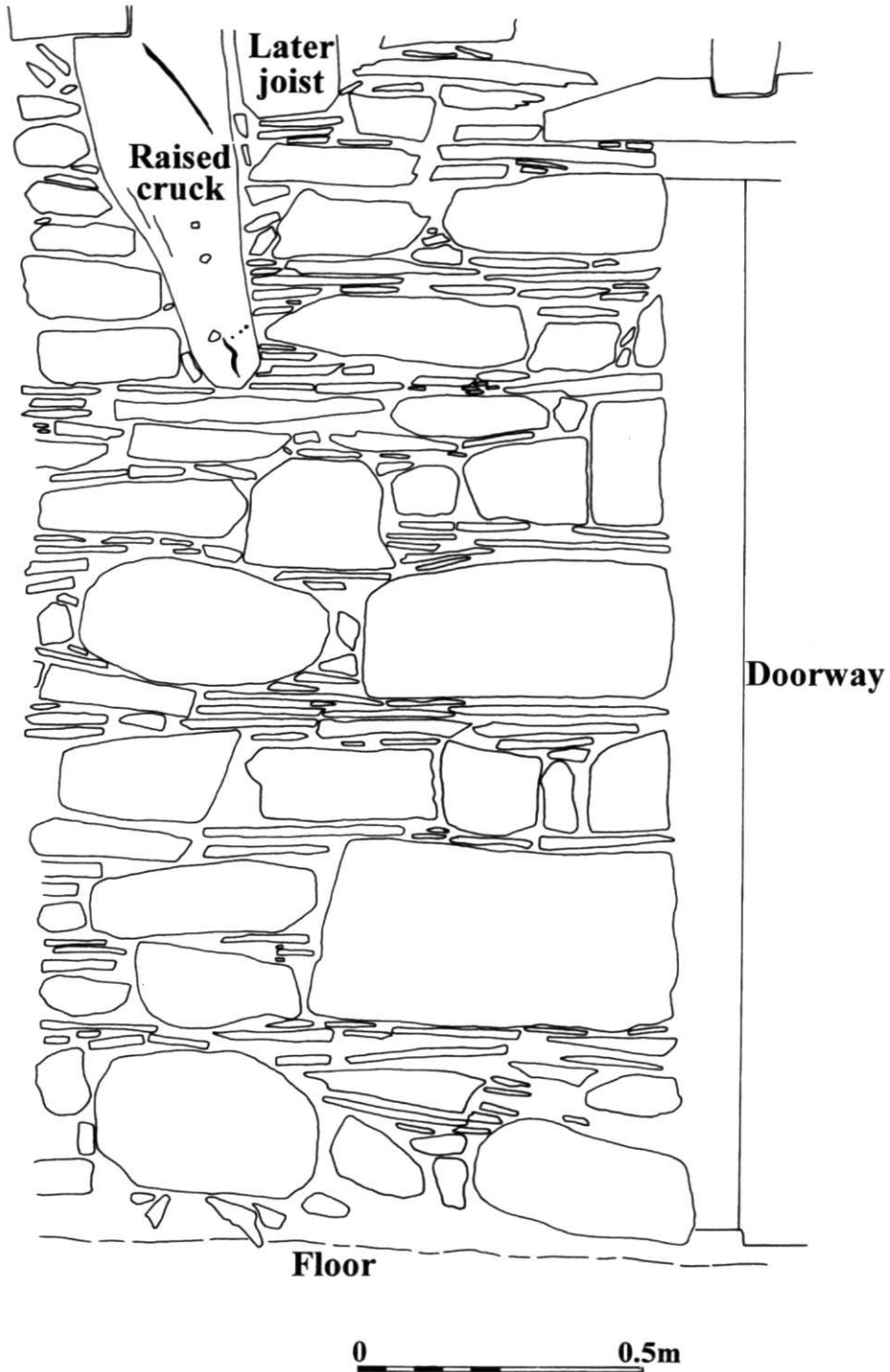


Fig 5 Elevation drawing of walling containing the northern raised cruck at Stonaford (from Roseveare 1994). The walling immediately to its left is clearly different from that below and to the right

compared with the hall (Alcock 1969, 90); a domestic service room of some kind has been suggested for the inner rooms of later medieval and early post-medieval Devon longhouses (Jones 1971, 52) but similar rooms in recent longhouses in Ireland were parental bedrooms (O'Neill 1977, 21) and in Scotland were secure stores for important domestic chattels (Laing 1969, 77). Austin and Thomas in a recent analysis of the social spaces recoverable from longhouses (1989) have identified a repetition of layout of certain features and spaces in Dartmoor longhouses which can be attributed to their builders following a template which allowed all local visitors to the house to feel comfortable and know how to behave in it – where to sit, which parts of the house (like the inner room) were private etc. So a pattern was observed which had the entry to the inner-room on the same side of the hall's back wall as the house's front 'enhanced' door, creating a direct line of movement for the head of the household from the outside to their private space (the inner-room). Visitors, on entry, may then have known to arrange themselves on the cross-passage side of the hearth.

Phase 3 Seventeenth-century house

Sometime in the very late 16th or early 17th century the house was considerably altered, as many in Cornwall were in this period which is often termed, following W.G. Hoskins' 1953 coinage, The Great Rebuild (see Chesher and Chesher 1968, 39–40). At Stonaford this involved:

- Reorganising the ground floor plan into either two, or more likely three roughly equal-sized rooms, all smaller than those of the preceding long-house and thus withdrawing both gable ends (see Fig 2); the upper, south-western room may have been given a lean-to roof and not have had a first floor over.
- Adding a first floor over the two lower rooms by heightening walls, removing the crucks and creating a new roof with lapped and dove or fish-tailed collars (surviving over the lower room (Fig 6) and porch) and slate covering.
- Building fireplaces and chimneys in the north-eastern walls of both lower rooms.
- Attaching a storeyed porch to the north-western door; the porch's first floor room communicated with that formed over the longhouse's cross-passage and lower end. This room was heated and was presumably the principal bedroom.
- Building a single-storeyed lean-to, possibly a dairy, in the angle between porch and north-west wall.
- Rebuilding much of the long south-east wall, including blocking the cross-passage and inserting three large ground floor windows and at least two smaller first floor ones.

Evidence for the position and nature of the 17th-century staircase is lacking, making it less easy to reconstruct the mundane movements within the house and the functions of the rooms. It may, however, be supposed that the lowest, north-eastern ground-floor room, partly re-using the shippon and having the larger fireplace, was the kitchen and the other two rooms were hall and parlour (see Chesher and Chesher 1968, 42–59 for a detailed discussion of Cornish 17th-century house layout). Any 17th-century staircase is likely to have been a winder type contained within a stone stair projection from the hall and access to the other rooms would have been by walking from one room to the other with no corridors to provide privacy. Such a staircase would seem to have been lost in a later rebuilding/remodelling phase. There is no sign of a cross-passage in this house and the porch protected a door opening directly into the kitchen.

Stonaford may stimulate a discussion of the replacement of the semi-communal longhouse with the much more 'private' type of house outlined above. There is a growing need to draw



Fig 6 Seventeenth-century roof structure with lapped and dovetailed (or fishtailed) collars to the trusses, over the chamber at the lower end of the house (photo by Eric Berry)

out the broader historical implications of such radical changes in the template of socially acceptable arrangements of domestic spaces in south-western farmhouses.

Phase 4 Eighteenth and Nineteenth-century alterations

By at least 1787 the house appears to have ceased to be a farmhouse as the two post-medieval agricultural holdings at Stonaford were combined and farming activities were focused on the northern farmstead (see below). The landlords, the Rodds of Trebartha Hall, re-used the house under study as a terrace of three small cottages certainly by 1841 (census returns show three families there; see below) and probably from soon after the amalgamation of holdings. The alterations made were extensive, especially in the upper two-thirds of the house.

The lowest third, with the porch, was left largely intact, alterations to the 17th-century house being confined to such details as inserting a cloam oven into the fireplace and overlaying a cobbled floor with one of sawn slates. The granite dressings of the 17th-century windows were largely removed as casement windows were inserted both here and elsewhere in the house. Many of the chamfered stones were re-used in the heightening of the long south-east wall in the upper two-thirds. This heightening accompanied the replacement of the 17th-century roof and the building of new chimneys including, at the upper end, one with finely shaped stonework, possibly re-used from another higher-status dwelling. Six pigeon-holes were built into the walling above the old eaves-line on the south-eastern side of the house.

Sometime in the nineteenth century, certainly before the 1881 OS 1st edition 1:2500 map was drawn, a small porch was attached to the door on the south-western gable and a brick lean-to was attached to the south of the 17th-century one. Sawn slate flooring extends throughout the ground floor of the house.

The new upper chimney served a wholly new fireplace in the south-west gable wall and a cloam oven was inserted into the fireplace in the house's central room. Each of the three principal ground floor rooms therefore contained a substantial fireplace and no doubt each formed the focus of one of the three cottages, serving as a kitchen/hall. The central and northern cottages had supplementary ground-floor rooms in the 17th-century porch and 'dairy' lean-to, and by at least 1881 the southern cottage had apparently also been provided with the brick lean-to and porch although the new lean-to, while largely attached to the southern cottage's external wall, appears to actually open into the central cottage.

Although the lower cottage had the benefit of a second first floor room in the chamber over the porch, this gain in floor space was somewhat countered by its rooms having lower ceilings. Again, positions of staircases (or ladders) are not known so calculations of the roughly similar usable floor areas for each cottage cannot be precise and those given below (in m²) will be slightly above the actual:

Northern cottage

Ground floor

Kitchen	16.3		
Porch	4.0	Total	20.3

First floor

Main room	16.3		
Chamber	4.0	Total	20.3

Overall Total 40.6

Central cottage

Ground floor

Kitchen	16.2		
Lean-to	5.5	Total	21.7

First floor

Main room	16.2	Total	16.2
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Overall Total 37.9

Southern cottage

Ground floor

Kitchen	13.0		
Lean-to	6.1		
Porch	2.6	Total	21.7

First floor

Main room	13.0	Total	13.0
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34.7

These figures can be compared with an average of 22.5m² for a sample of prehistoric round houses recorded on Bodmin Moor (Herring 1979, 27) and 30.2m² for the domestic ends of longhouses on Bodmin Moor with inner rooms (Herring 1986, Vol 2, 92).

The census returns indicate that between 1841 and 1861 each cottage housed a family, the largest recorded being that of William Hawke in 1851 who had a wife, four children and a young nephew. The 1871 and 1881 returns show that the house was then home for just two families. It is possible that one of the three cottages was left empty but as one of the 1881 families contained two adults and seven children (see below) it seems more likely that the accommodation was re-organised.

The two or three families resident in the house appear to have been more than just very close neighbours. Although each cottage had its own external ground floor door there does seem to have been some intercommunication between the cottages indoors; certainly the southern and central cottages appear to have had a shared door if the brick lean-to belonged to the southern cottage and as it is not clear how the first floors were reached some sharing of stairs is also possible. Outside, there appears (from contemporary maps) to have been no subdivision of the yards or gardens between the households and the several stone outhouses, including that built against the lower northern gable end of the house, may have been shared as well.

The building's local contexts

The earliest surviving documentary reference to Stonaford, as Stenyford juxta Trevynyel in the 1304 Assize Roll (see above), neatly indicates its subsidiary position in relation to Treveniel, the older and more important neighbouring townland to its east. It is clear from the 1841 North Hill Tithe Map that most of the farmland worked by the inhabitants of Stonaford had been taken out of the townlands of either Treveniel or Tolcarne, another small Domesday estate to the north-west (see Thorn and Thorn 1979, 5.14.4 and 3.6).

The extents of the medieval subdivided (strip) field systems of Treveniel and Tolcarne, fossilised in their enclosure, were still readily apparent in 1841. Stonaford hamlet, established on relatively neutral ground, apparently wasteland beside a road junction located between the two primary settlements, had appropriated, or been given, over half of Treveniel's western fields and just less than half of Tolcarne's southern fields; it had also taken the rough ground within Tolcarne's southern ring fence (see Fig 8).

Martin Roseveare's excavations appear to have shown that this appropriation/donation took place either in or before the 14th century as the building of the longhouse at Stonaford by then indicates the existence of a standard Cornish medieval farm requiring fields for fodder and grain production. It seems likely that we have at Treveniel and Tolcarne a situation recognised at Brown Willy (Herring 1986) of the re-organisation of two medieval subdivided field systems, perhaps involving some enclosure, at a surprisingly early date.

Detailed surviving documentation for Stonaford appears confined to the last 325 years (Rodd collection in CRO; Pearce collection in RIC). By 1677 it was part of Edmund Spoure's Trebartha estate and a useful series of leases allows the history of ownership and occupation of the settlement to be outlined, throwing some light on the more recent history of the building under study.

In the late 17th and early 18th centuries Stonaford was clearly a tiny hamlet with two principal holdings (termed here A and B), of unequal size but each with a 'message', or farmstead, and a third holding (C), just a few fields, which may have been attached to holding A. The largest holding (A), then lately in the occupation of a Robert Gaich, was leased in 1677 by Edmund Spoure (of Trebartha) to William Gill for 3 lives or 99 years for £120 consideration and at a rent of 23 shillings (CRO, RD 911). The other (B), lately

occupied by Henry Webb, was leased by Edmund Spoure in 1695 to Gilbert Webb, husbandman, for £10 consideration (together with the surrender of an earlier lease), again for 3 lives or 99 years, at a rent of 10 shillings (CRO, RD 912). There are reasons for believing that this smaller holding, later referred to as Webb's Tenement was that containing the house under consideration.

Holding C was leased in 1712 to Joan Colling of North Hill, a widow, for just 5 shillings rent and comprised part of the common land called Casland, and the ham (meadow) below, and part of Wester Halland formerly held with a tenement in Stenaver (Stonaford), part of the manor of Tolcarne (CRO, RD 885).

By 1721 Joan Collinge was also leasing holding B (CRO, RD 913/1-2) and in the following year a Robert Collinge yeoman of North Hill had taken the lease on the larger holding, A (RIC, PE/11/7). It seems likely that the Collinges, assuming that they were related, were instrumental in consolidating the two Stonaford holdings into one, sometime in the first half of the 18th century. Holding B is not clearly visible in the documents after a re-lease in 1729 to Joan Colling (CRO, RD 914/1-2) and in 1787 Henry Coumbe, yeoman of North Hill was leasing from Francis Rodd of Trebartha Hall both the 'tenements called Stonaford and Webbs' (CRO, RD 917). The consolidated farm passed in and out of the hands of Coumbes and Collings until 1813 when it was firmly back with the Coumbes (RIC, PE/11/18).

The 1841 Tithe Map shows Francis Rodd Esquire possessing the whole of Stonaford and John Coumbe occupying the agricultural fields and the northern house and farm buildings, Rodd keeping to himself the several enclosed plantations on the rising ground to the west of Stonaford and the large Stoneford Meadow (TA 635) to the south of our house, which was the only other dwelling at Stonaford. The house had two smaller plantations to its east and west, possibly planted to screen the main working farm to its north-west from Trebartha Hall's view, and it was recorded as Cottages and Gardens occupied by 'Nicholas Lay and others' (TA 607). An L-shaped outbuilding touched the house's eastern corner and ran off to the south-east (see Fig 7).

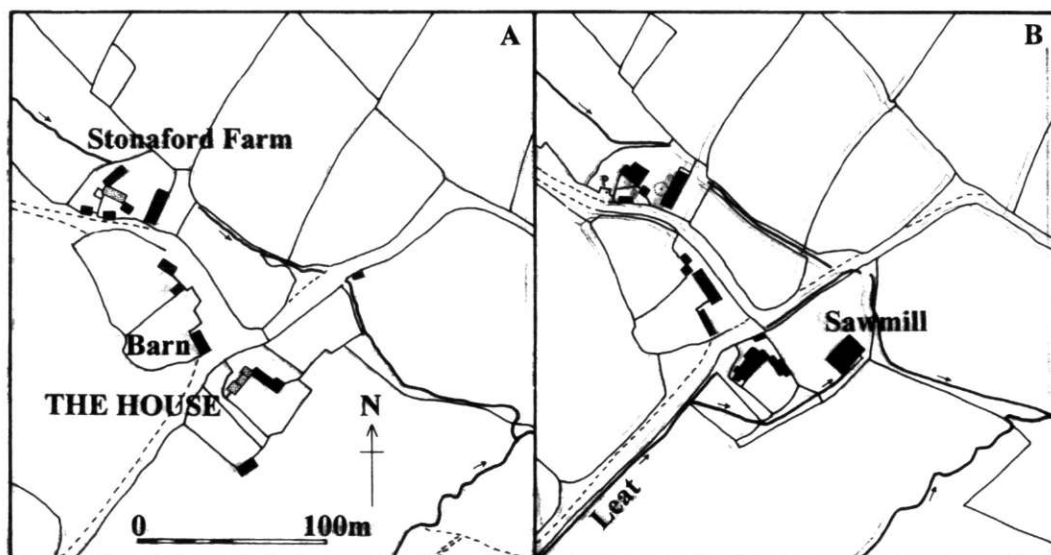


Fig 7 Stonaford settlement as portrayed on the 1841 Tithe Map (A) and the 1881 OS 1:2500 map (B) showing the earliest two mappings of the house and its context. The ford which gave the settlement its name is to the north-east of the house

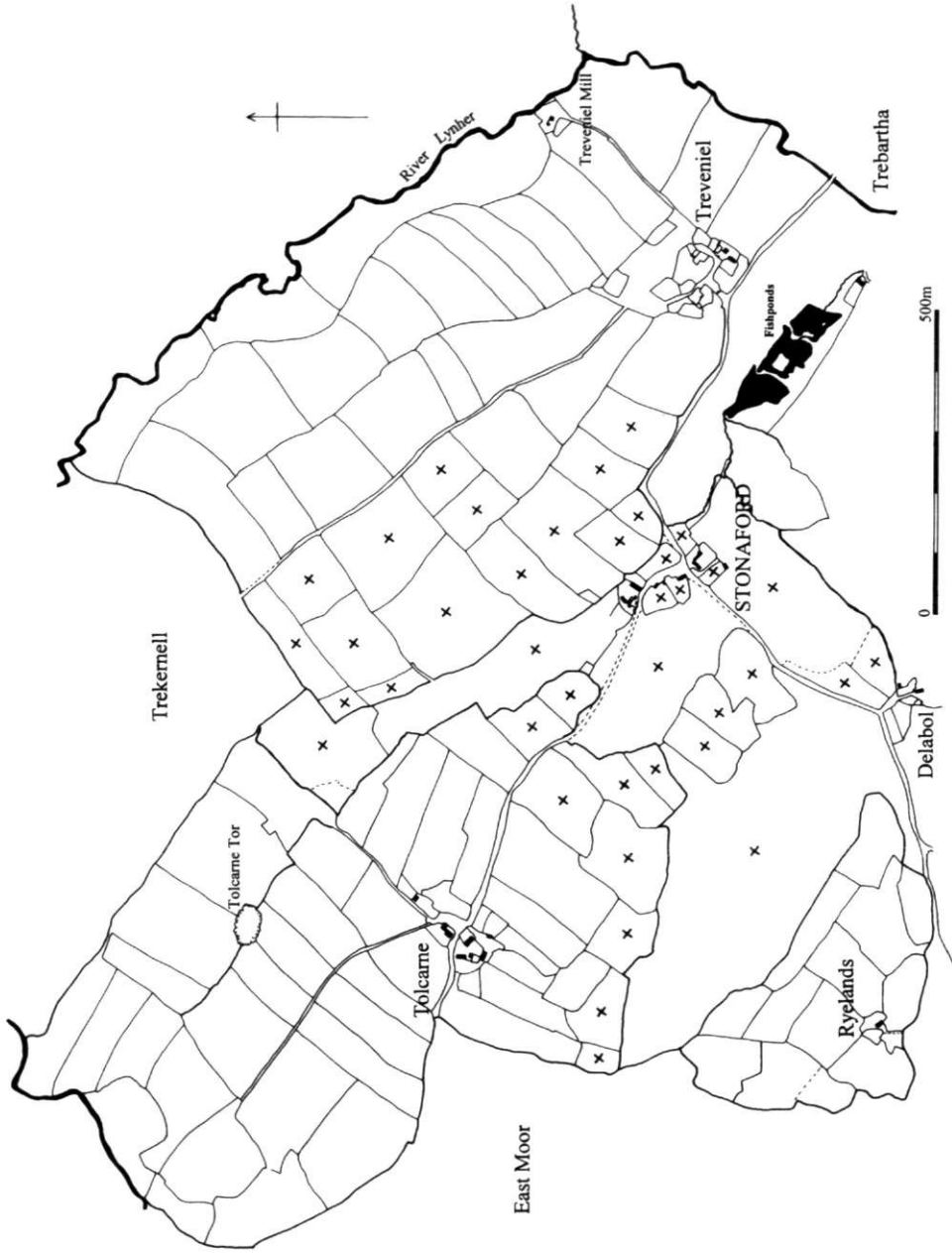


Fig 8 Stonaford in 1841 (from the North Hill Tithe Map). Parcels attached to holdings in Stonaford settlement are marked with a cross. It is clear that portions of the field systems of both Treveniel and Tolcarne were either appropriated by or given to the farmers of Stonaford, probably in the later medieval period

The 1841 census returns indicate that three families of agricultural labourers occupied the house then. Nicholas Lea (the 'Lay' of the Tithe Map) was aged *c*50, married and with three children (aged 8 to 12); Richard and Mary Laundry (*c*65 and *c*60) had their twenty-five year old son Adam, another agricultural labourer, at home with them; and Nicholas Wilton (*c*60) and a wife and three children (12 to 20). Seven adults and six children. Ten years later in 1851 there were eight adults and six children. The Leas had been replaced by the Hawkes, headed by William, a forty year old labourer on the Parish Roads who with Jemima had four young children (2 to 8) and a baby nephew James. Richard Laundry had died leaving Mary a widow and Adam sole provider, and Nicholas Wilton was now a former agricultural labourer and classified a 'pauper' and his son Richard (28) was an agricultural labourer; Nicholas' daughter and grandson (William Kittow, presumably son of his other daughter) also lived in the house.

The 1861 census returns tells a slightly brighter story. William Hawke had become 'Foreman of the Parish Roads' and Adam Laundry, having lost his mother had gained a wife, Elizabeth, and baby son, and had become a 'woodman', as had his wife. They may well have worked in the saw mill established around this time in the yard to the east of the house. The Wilton family had been replaced by the Brohlers, both adult agricultural labourers. The house now contained seven adults and six children.

By 1871 Adam Laundry was a labourer again and the house contained just two small families, the Laundrys and the Jefferys, labourers. Four adults and two children. Adam Laundry was still there in 1881, now a general labourer, while Elizabeth his wife had succumbed to the inevitable and was a laundress, presumably working at Trebartha Hall. The Jefferys did not stay long, replaced by the Bartletts, agricultural labourers, with a large family of seven children (aged 1 to 13).

From the above, one or two principal conclusions can be drawn. Firstly, our house was apparently never solitary but always part of a small hamlet – as well as the evidence of the fields and the 17th century leases it is shown as such on Thomas Martyn's map of Cornwall of 1748. The hamlet is a settlement type in which most longhouses are found on Bodmin Moor (see Johnson and Rose 1994). Secondly, it probably ceased to be a working farmhouse in the mid-18th century and was then subdivided for use as labourers' cottages at least until the late 19th century. Thirdly, this early redundancy as a farmhouse but protection through continued occupation as cottages has ensured not only the house's survival but also the modest scale of alterations in the last quarter of the millennium.

Context within the county and within the region, by Eric Berry

In order to understand the excavation results of Stonaford better it is important to place the building in its archaeological and architectural context and to look at the characteristics of the longhouse as a building type, ie as a farmhouse with shared human and animal access and use. The distribution, survival and character of the longhouse has long been the subject of debate. Many claims have been made by owners, researchers and even estate agents about whether certain houses are in fact longhouses, or rather started life as longhouses. The reality is that the practice of remodelling old houses to bring them up to the fashions of the day has usually removed or obscured the definitive evidence of proof. This essential evidence is the survival of a drain in the lower end of the house proving that it was originally a space used for animals, usually cattle; together with access, usually via a cross-passage between two doors, shared by both people and animals. Without this conclusive evidence those houses that display other characteristics distinctive of the longhouse can only be considered as possible longhouses. It is important therefore that this contributory evidence is explained

and understood. To this end it is worth setting out a list of characteristics or features that provide a basis for further examination and these are as follows:

- (1) A two or three room plan with cross passage between two of the rooms
- (2) Construction on a sloping site with the room at the lower end adjacent to the passage
- (3) Evidence that the room at the lower end was originally unheated
- (4) Evidence of pre-1700 features or structure
- (5) Evidence for an open hall in the room at the higher end of the passage
- (6) Smoke-blackened roof timbers either just over the hall or for the whole length of the house
- (7) The existence of a separate doorway directly into the lower end room [this might indicate it was not a longhouse proper if there is no evidence of internal access from dwelling]
- (8) Unusually thick walls
- (9) Evidence of phasing, including a rebuilding or remodelling of the lower end
- (10) Heightening of walls
- (11) Addition of wings at the higher end (sometimes to provide all the domestic functions at the higher end because of there being no opportunity to use the lower end for this purpose)

This list could be greatly expanded to give more detail for the likely features and roof structure types. In Devon, where the survival rate of early buildings is higher, the existence of significant numbers of longhouses within both upland and lowland areas has been firmly established and distribution maps have been created. Unfortunately, similar research results are not available for Cornwall. In fact the known examples of this building type are so few that a distribution map may not tell us much about whether longhouses were once spread throughout the county, as suggested by the social template model outlined above, or just concentrated within certain areas. The best evidence for them in any number is in those places where settlements were abandoned, particularly in upland areas such as Bodmin Moor. Many of these examples were never subjected to the later alteration experienced by the early houses that are still occupied, and the definitive evidence of the drain is more likely to be visible or is easier to uncover.

Other recent longhouse discoveries by Eric Berry

It is fortunate that two other longhouses have recently been identified making the Stonaford discovery very timely. These other houses now known to have started life as longhouses are Cullacott in Werrington parish and Halbathick near Liskeard. Like Stonaford, both of these houses have been the subject of extensive repairs involving traditional building techniques. Both Cullacott and Halbathick had been empty for many years before work started and had escaped the more usual process of modernisation.

Cullacott (SX 303 881), in particular, after a period of occupation of the lower end of the house as farm labourers' accommodation, had been used as a farm building since 1884 when a new farmhouse was built. Some of the timbers from the hall roof structure have been dated by dendrochronology, giving dates ranging from 1394 to 1481 (Tree-ring dates, list 64, published in *Vernacular Architecture, Volume 26*, 1994) making a late 15th-century build date probable. Unusually, the roof of the hall incorporates trenched purlins (dovetailed together above the truss blades), not the more usual threaded type used for this general raised-cruck design type. This house seems to have been in use as a longhouse until the



Fig 9 Cullacott; rear elevation (the original front) prior to collapse of large areas of wall. Renovation works were undertaken in 1995 and 1996 (photo by Eric Berry)

1650s despite having undergone a major, and high quality, rebuilding and extension of the parlour end dated 1579 and having a two-storey porch added at about the same date (Figs 9 and 10). Of particular interest is the survival of substantial areas of high quality late medieval and 16th-century wall painting both in the hall and in the chamber over the entry that is jettied over the hall. The existence of wall painting at Cullacott, combined with its rare survival with so many historic features has resulted in a grade I listing status. The results of the analysis of this important house, incorporating the work carried out by Keystone, of Exeter, and of the repair techniques used in the refurbishment, are likely to be published in the near future in co-operation with English Heritage.

Halbathick (SX 253 664) was first mentioned in the manor rolls of the Duchy of Cornwall in 1333. In the seventeenth century it was the home of Thomas Mounce who in the 1660s and 1670s used part of the house as a Quaker meeting house (the earliest known in Cornwall). Its last use had been for mine workers until 1967 when it was abandoned by its last occupants. Except for occupation by a barn owl it had lain empty until rediscovered during the List Review of Liskeard in 1992 (Fig 11). It was subsequently acquired and carefully recorded, repaired and partly rebuilt (Fig 12) by Abigail Armstrong Evans and Vaughan Upson, who have managed to re-occupy the house without dislodging the owl. As at Cullacott, the evidence that Halbathick had originally been a longhouse was only revealed during excavation of its lower end. Also like Cullacott, the house had experienced substantial remodelling and extension of its higher end, in this case in the seventeenth century. The lower end had fallen into ruin and was considerably overgrown prior to its



Fig 10 Cullacott; the courtyard front in the late 1980s. The lower end (the original shippon) is left of the porch, the open hall right of the porch, and the parlour at the far right with wing in front (photo by Eric Berry)

rebuilding. Justification for this rebuilding included the survival of the 16th-century plank and muntin screen at the lower end of the hall, which had been protected only by some rusting corrugated iron sheeting. The rebuilt lower end now gives protection to this screen as well as providing a good kitchen for the house.

Conclusion by Peter Herring and Eric Berry

The archaeological recording at Stonaford has been of great value in extending discussion of the longhouse through the inclusion of a lowland Cornwall example. Others are emerging as restoration work on houses reveals their key defining feature of a cross-passage which gave animals and humans shared access to their particular rooms, animals in their shippon below, humans in a hall and other rooms above. The architectural realisation of a common template of socially acceptable domestic arrangements makes it not at all surprising that the longhouse prevailed in the lowlands as well as in the uplands. It is now clearly very important that every opportunity should be taken to examine below-ground remains and associated standing fabric in buildings which might have developed from longhouses. Houses with 17th-century or earlier features whose long axes run across the slope will be especially fruitful and the depth and complexity of the deposits at Stonaford indicate the archaeological potential of such sites. There is a need to build up a corpus of data from such buildings to set beside the at present much richer information gathered from the more marginal parts of Cornwall and Devon.



Fig 11 Halbathick as found, prior to renovation and re-instatement of the through-passage and the lower end. The 16th-century oak screen of the original passage survives hidden and protected by corrugated iron (photo by Eric Berry)

There are many ways that we can fill the gaps in our knowledge about the longhouse. These include:

- (a) A desk examination of all the listed building descriptions to identify likely examples of the longhouse type
- (b) Detailed recording and analysis of the most likely examples in their surviving form
- (c) Excavation or watching brief of all listed pre-1700 houses when consent for work that is likely to disturb floors is being given
- (d) Documentary research together with assessment of standing structures
- (e) Detailed recording whenever pre-1700 buildings have works carried out such as removal of plaster surfaces
- (f) In the event of major refurbishment works to an early building, detailed recording both before and during such works, ideally involving both archaeologists and historic buildings experts

Appendix Inspections by Eric Berry of the standing building at Stonaford

Pre-excavation inspections

When first inspected by this writer, Stonaford was identified as a likely medieval house that had undergone a major remodelling in the late sixteenth or seventeenth century plus further



Fig 12 Halbathick after renovation and rebuilding of the lower end, the lower part of the front masonry having been numbered and reset in its former position, the porch doorway and mullioned window re-discovered on site and re-assembled (photo by Eric Berry)

remodelling in the eighteenth century. (This assessment of the building preceded the documentary research outlined above.)

The clues to its likely medieval origins were in the unusual wall thickness in the central part and lower end of the house, and the evidence that the seventeenth-century masonry was added to an earlier structure. Puzzling features included the position of the porch fronting the higher end of an unusually short room at the lower end of the house. There didn't seem to be enough space for both the usual wide cross or through-passage and a reasonable sized room.

In other respects the house appeared to be typical of its farmhouse/small manor house type, with a three-room plan plus a porch fronting a possible former passage position between the hall and the lower end. The higher end room retains no obvious pre-1700 features (except some chamfered ceiling joists, discovered during the building works, running axially, that appear to be re-used) but this may be because this end was added in the eighteenth century or rebuilt on the site of an older higher end. Evidence in the right-hand gable end of a former steeper and lower roof was, however, a good clue to the likely existence of an early three-room plan. Early houses with a two-room plan in Cornwall may not be unusual. A good example of this type may be the oldest part of Truthall in Sithney parish.

At this stage the dating evidence for a late sixteenth or seventeenth-century phase was very strong and verified by the survival of a number of complementary features that appeared to be of a similar date including:

- (1) Roof structure with lapped and dove-tailed joints to the collars above the lower end
- (2) Chamfered and stopped joists to lower end room (some of them serpentine shaped)



Fig 13 Stonaford; the original front (but present rear) with its 17th-century eaves line on the right, otherwise heightened (photo by Eric Berry)

- (3) Chamfered and stopped joists to porch
- (4) Roof truss with curved feet in the porch
- (5) Hall fireplace with chamfered surround backing on to the cross wall adjacent to the lower end
- (6) Lower end room fireplace with chamfered surround built into gable end
- (7) Fireplace with chamfered surround to chamber above lower end room
- (8) Chamfered surround of former two-light mullioned window with square hood mould to porch
- (9) Chamfered doorway to porch with chamfered string above
- (10) Chamfered doorway from porch into lower end room

Two unchamfered doorways with monolithic granite jambs in the lean-to right of the porch may be of a similar date.

Inspection during renovations

A second inspection of Stonaford, carried out when much of the plaster had been stripped from the walls, revealed some exciting finds. The feet of two curved roof principals set quite low down in the wall to its inside face. The original design of this former roof is difficult to guess from the minimal surviving evidence but is likely to have been one of two early types:

- (1) Arch-braced base cruck with square-set purlins and reduced upper principals as at Penfound, Methrose, Truthall, Penellick and at one end of the 'Food for Thought' restaurant at Fowey (and similar to the medieval barn at Cargoll, Newlyn East)



Fig 14 Stonaford: 17th-century entrance porch fronting the lower end, originally the shippon and likely to have been one roof bay longer to the left (photo by Eric Berry)

- (2) Raised-cruck with mortised collars and threaded purlins as at Tintagel Old Post Office, Poundstock Guildhouse (Church House); The Abbey House, Padstow, and many others

Other features revealed included an area of roof structure with common rafters pegged to purlins in the lean-to right of the porch. The main discoveries, however, were evidence of former alterations, including: straight joints, rebuilt areas of masonry and re-use of features. It was obvious from the complexity of these alterations that the building had undergone numerous changes at many different periods. The internal masonry to the rear (south) wall of the lower end seemed to indicate that there had once been a rear doorway and therefore a through passage. The masonry of the outside of the rear wall was now clearly seen to have been re-faced or rebuilt in many places, and probably heightened at the higher end to provide for the building of the row of pigeon holes that had been later blocked. The rear wall continued at either end beyond the external line of the gable ends. The front wall is also very complicated, containing various joints in the area of the lean-to. There are ovens in both the hall and the lower end room, all inserted later. Alterations to these fireplaces had introduced structural weakness and movement of the lintels. The fireplace to the higher end room appears to have been remodelled, the masonry to the right of the jamb being of a different character to that surrounding the fireplace itself. The stone segmental arch spanning this fireplace is similar to those spanning the ground-floor openings of the rear wall and is presumably of the same date, probably late eighteenth century.

Post-excavation inspection

By this time many of the wall surfaces that had been on view for the second visit were partly mortared over and there had been two new openings cut into the walls: to provide a doorway from the higher end room into the lean-to and to provide an extra window left of the porch.

Post-renovation inspection

Another very brief inspection was carried out following completion of the building works and with the house furnished and occupied. Except for the fireplaces, the internal walls are now plastered and the slate floors have been relaid. The external walls have been repointed but it is still possible to identify the principal phasing of the building and it is in some ways easier to distinguish the different character within the various periods of the masonry.

Acknowledgements

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Mrs Caroline Latham gave permission for the excavation and she, her family, and the building contractors, Darrock and Brown of Bodmin, provided considerable support during investigations. Mrs Latham also showed Eric Berry the house before, during and after the restoration work. The excavations, conducted entirely on a volunteer basis, were carried out by Ursula Davey, Abigail Armstrong Evans, Stephen Hartgroves, Charles Johns, Paul and Theresa Lowndes, Michael Peacock, Martin Read, Vaughan Upson and Geoff Walford. Martin Roseveare was also given advice by Frank and Veronica Chesher and Jim and Rosa Frey.

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Abbreviations

CRO Cornwall Record Office
 RIC The Royal Institution of Cornwall
 TA Tithe Apportionment

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Early prehistoric sites at Leskernick, Altarnun

PETER HERRING

This paper complements two others published in an earlier volume of this journal; one an important discussion of prehistoric Bodmin Moor by Chris Tilley (1995), the other the first interim report of the Leskernick Project, by Chris Tilley and his colleagues from University College, London (UCL), Barbara Bender and Sue Hamilton (Bender *et al* 1995). Fuller publication of the stone row and second stone circle discovered in 1981 at Leskernick was promised in Volume 1 of the Bodmin Moor Survey (Johnson and Rose 1994, 31). Also included here are descriptions and discussions of two more recently discovered elements of the Leskernick landscape, a 'quoit' and a long mound.

Stone circle and stone row

These sites were identified in the spring of 1981 when skirting Leskernick Hill, on Altarnun's West Moor in the north-east quarter of Bodmin Moor, while walking from Bolventor to record the deserted medieval hamlet on Bray Down as part of postgraduate research (Herring 1986). They were found, then, accidentally, or incidentally; as many archaeological discoveries are in upland Cornwall. Only an optimist sets out in search of stone circles or stone rows but anyone can expect to trip over important archaeological remains, even in a landscape as intensively recorded as Bodmin Moor.

Attention was drawn to the stone circle (SX 1859 7993) by its three surviving uprights. They lay towards the northern edge of a plain with previously recorded ceremonial sites including another stone circle and a barrow (see Fig 1). A cursory examination revealed an obvious ring of standing and fallen stones and stumps while a large whale-back stone lying just north of the circle's centre was felt to be another possible fallen upright.

A group of three roughly equal-sized stones, apparently the fallen uprights from a stone setting, was found 125 m to the south-east of the circle (at SX 1871 7985); and then a line of fallen stones, a stone row of presumed Bronze Age date, leading away to their north-east (SX 1872 7985 to SX 1899 7991). This was cut by two medieval streamworks.

The sites were planned the following day: the circle by trilateration based on three fixed points; the row by offsets from a straight line laid out with ranging poles.

The *stone circle* is relatively small for Bodmin Moor; only Nine Stones on the Altarnun/North Hill parish boundary has a smaller diameter (*c*15 m), but the Leskernick circle at 22.5 to 23.0 m is broadly similar to the two King Arthur's Down circles (23.5 and 23.25 m diameter) and Leaze (*c*24.8 m) (all dimensions, apart from the new circle, taken from

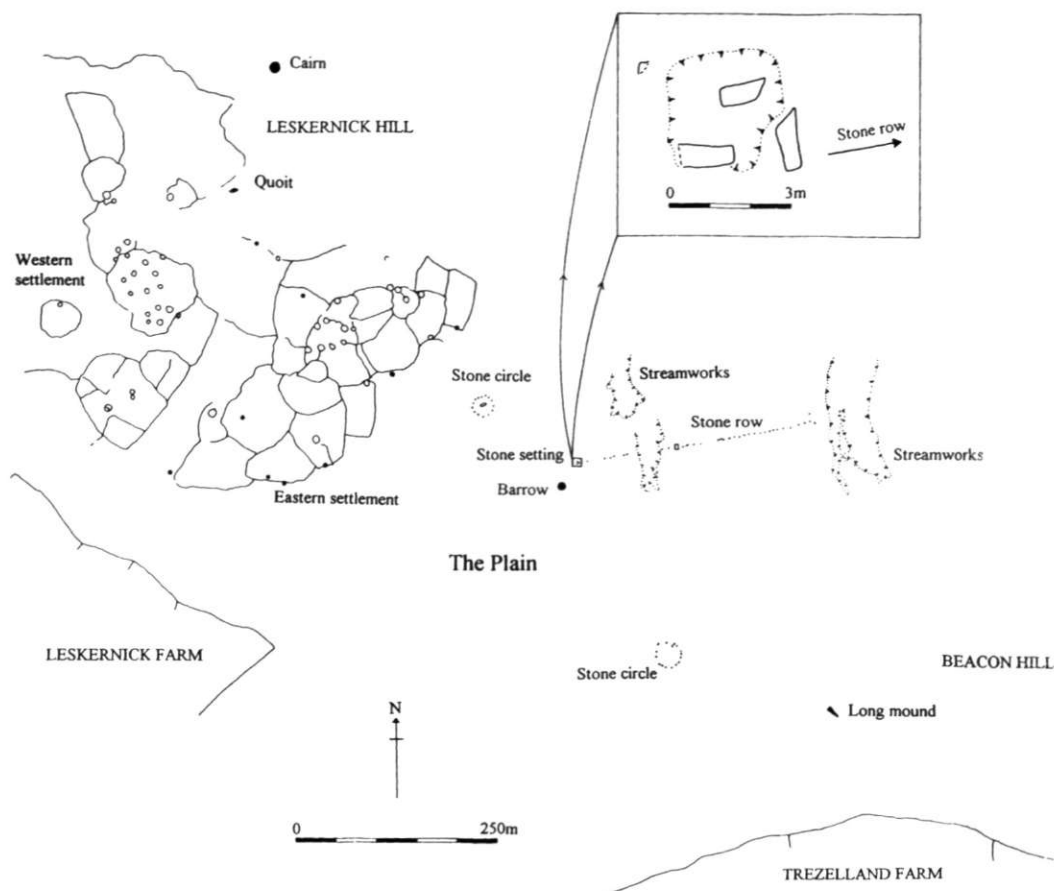


Fig 1 Simplified plan of Leskernick locating the principal features mentioned in the text and including as an inset a plan of the stone setting at the stone row's western end

Barnatt 1980). The stones themselves are also of uneven shape and fairly small. The three orthostats are 0.6 (northern), 0.4 m (north-eastern) and 0.65 m high (southern) and are likely to be set in quite shallow pits judging from the measurable length of fallen stones (0.3 to 0.8 m long, average 0.45 m). Stone spacing was probably fairly even and centres of adjacent stones were on average 3.0 m apart, using the better preserved western half of the circle as a guide. Including one stump, one apparently broken stone, and three low mounds which have developed over fallen stones, there are 18 stones which are securely part of the circle and between 9 and 11 missing stones, making an original circle of between 27 and 29 stones. This is closely comparable to eight other Bodmin Moor circles: Stripple Stones, 28–29; Hurlers Central, 29; Craddock Moor 27; Hurlers NE, c29; Hurlers SW, 29; Trippet Stones 26–27; Goodaver 30–32; Leskernick SE, c31 (all figures from Barnatt 1980).

It is not possible to assess the site's original circularity because of the number of fallen stones but it is likely to have been quite close to a perfect circle (see Fig 2).

Just north of the circle's centre (c1.5 m north) is the large whale-back stone, 3.8 m long, which may have been either a particularly attractive moorstone around which the circle was built, or a standing stone. The latter interpretation is perhaps more likely, making the circle

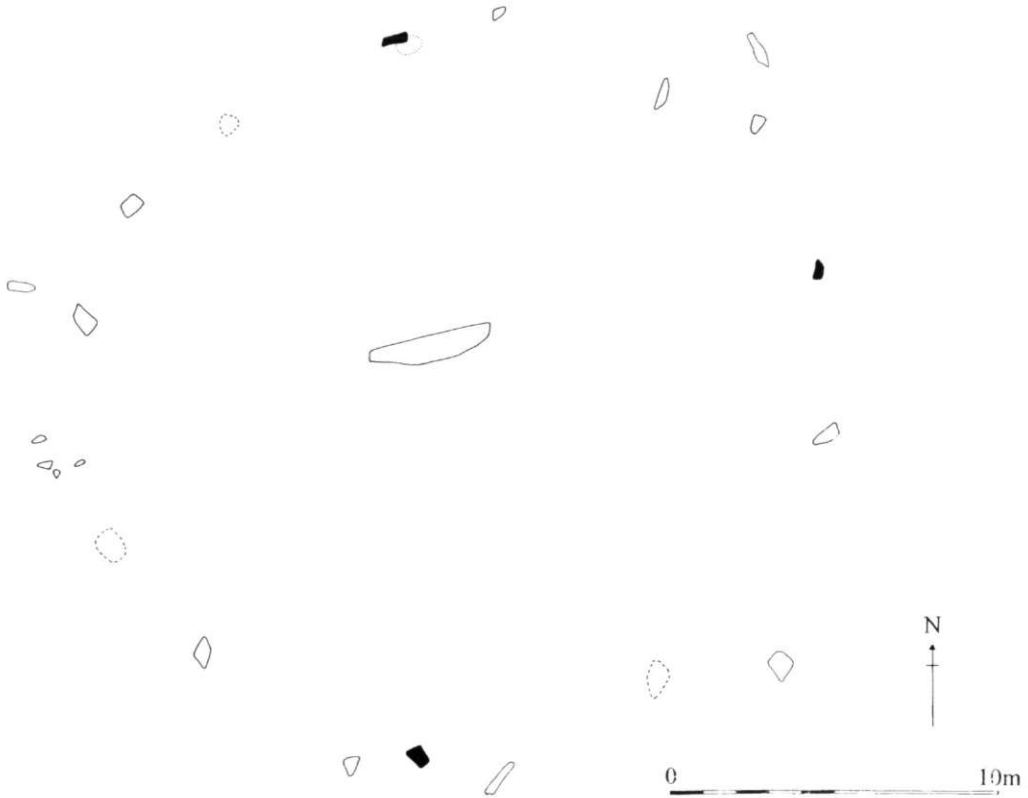


Fig 2 Leskernick, northern stone circle. Standing stones shown infilled, fallen stones open and buried stones with broken lines

similar to others in Cornwall with central stones: those at Boscawen-Un and The Stripples Stones are, like Leskernick, larger than the stones in the ring and slightly eccentrically positioned (although the centre stones at both the other sites are just to the south of centre; see plans in Barnatt 1982). Tony Blackman has suggested (pers comm) that the Leskernick stone may not have simply fallen down from one of its two ends but instead may have been deliberately taken down and laid across its stone hole in the same way that a stone-setting stone excavated by the UCL team at the end of the Leskernick stone row was carefully 'decommissioned' (see Bender *et al* 1995). If so, the stone will have been rather closer to the centre of the circle.

Of course it is not possible to determine whether the centre stones are primary in relation to the circles, contemporary with them (all one build), or secondary. It does seem certain, however, that rituals or activities performed at these slightly more complex monuments involved both the ring and the pillar. There is also a feeling, derived from the stones' eccentric positions, that those who erected them respected the precise centres of the circles. This was perhaps because people will have been performing rituals there with the standing stones, all substantially taller than a typical adult (2.4 m at Boscawen-Un, 2.9 m at The Stripples Stones and perhaps c2.8 m at Leskernick), close and powerful presences.

The circle is on the lower slopes of Leskernick Hill, near the north-western edge of the relatively stone-free plain. It is the closest of the major ritual or ceremonial sites at

Leskernick to the settlement (with the exceptions of the cists and small cairns built into the field system; see Fig 1, but where relationships are visible these generally prove to be secondary to the field boundaries). The arrangement of the peripheral fields in the eastern settlement appears to suggest that the circle was primary in relation to them. These fields, which may have been laid out some time after the core settlement was established (there being clear chronological depth visible in the accretive field system), seem to be arranged in a respectful arc 70 to 120 m distant from the circle (see Fig 1), as if the fields, the most secular creations on the hill, should not encroach too far onto an area used more for ritual or ceremony. If this reading is acceptable, then the circle, if not built by the people of this settlement, was clearly being used by them, its symbolism still having sufficient potency to influence the layout of their fields. The simplest implications of this are that there really is a coherent landscape here at Leskernick (always bearing in mind that there may also have been timber structures), and that the eastern settlement, at least, is probably of the Early or Middle Bronze Age.

Running across an essentially stone-free plain towards West Moor, the *stone row* comprises a straight line, 317 m long, of mainly fallen small stones. Only two are still standing and these are less than 0.3 m high. Its WSW end is marked by a group of three larger but fairly equal-sized stones (each *c.* 1.3 m long as visible at surface; but see Bender *et al* 1995 for their excavated dimensions) close enough together (all within 2.5 m) to have been a stone setting if all were originally standing (but, again, see Bender *et al* 1995 for their original arrangement).

There are gaps in the stone row due to peat growth, stone robbing, disturbance by medieval tin streaming, and the building of a more recent turf stead (peat platform), but there are stretches where the stones are fairly evenly spaced, 4.0 to 5.0 m apart. While the WSW terminal setting is clear the ENE end is not, and the row could easily have been longer; a second medieval streamworks interrupts the line 25 m beyond the last recorded stone.

The line appears not to be aligned on any significant landscape feature although, as noted below, it does seem to respect an earlier, possibly Neolithic, arrangement of ritual sites.

Quoit and long mound

In April 1995 Bodmin Moor study week field-trippers were walking south-west from Leskernick's mutilated summit cairn towards the hill's westernmost prehistoric settlement. The group paused briefly at an intriguing arrangement of stones noticed by the author and Tony Blackman. On a low tor (SX 1827 8019) overlooking the settlement three stones (maximum dimension 0.95 m) had been placed to support a large, deliberately tilted capstone (2.5 m by 2.0 m and up to 0.5 m thick). The structure, clearly not natural, was christened a pseudo-quoit but regarded as modern, perhaps a creation of the Royal Engineers, and the group moved on.

Later in the day, having walked through the settlements, visited the northern stone circle, and fruitlessly pursued the stone row's alignment into the heart of West Moor, we climbed the area's dominant hill, Beacon, and peered over fences to see the two wrecked summit cairns before descending the western slopes on our way to the southern stone circle at Leskernick. From this angle Leskernick Hill's profile is smoothly rounded, despite the quantity of surface rock. The author then stumbled upon a low mound (SX 1903 7955) about two-thirds of the way down Beacon Hill.

At first this feature appeared to be a fragment of bank but there was no sign of any continuation and its form was clearly trapezoidal with the broad north-western end also slightly higher, rather like a long cairn. The group gathered for a final coffee and notes were made on the mound. It is 18 m long, 0.4 m high and 2.5 m wide at its narrow uphill end and 0.6 m high, 4.0 m wide at its wider end (Fig 3). There were no visible stones and

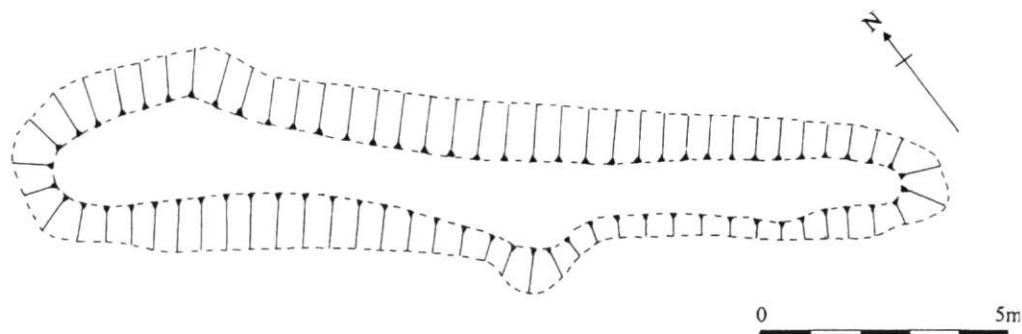


Fig 3 Leskernick/Beacon long mound

the mound appears to be an essentially earthen feature. A later track, now a hollow-way, curves around its northern end, having been apparently aligned on it (there being few other features on the slopes of Beacon Hill). This track, which was shown on the 1888 Ordnance Survey 1:2500 1st edition map and is now a registered bridleway, has caused a little erosion (now stable) of the mound's north-eastern corner, but a second, much slighter track running downhill to join the first at the north-eastern corner of the mound appears to have caused no damage.

In 1986 Sandy Gerrard, during sketch survey of the streamworks complexes of West Moor, had recorded the hollow-way as a leat (1879/1a in CAU Industrial Survey archive) serving probably medieval eluvial streamworks to the west, and he had also interpreted the slighter, downhill track as another leat taking run-off water from Beacon Hill to eluvial streamworks to the north. Although Sandy did not record the long mound as a streamwork dam, it is not unlike them (being a low linear bank). There is, however, no sign of the second bank to the north-east which would have been needed to form the 'V' of a functioning reservoir (although it is conceivable that any such bank has been completely eroded away by the east-west hollow-way which may itself have re-used the line of a leat). A small dam was, in fact, built inside the hollow-way, further downhill from the mound, to its west, indicating that run-off water from the slopes was indeed collected and used at a later date.

Returning to the account of the first visit, once our eyes were lifted from the mound itself we considered its place in the landscape, overlooking the plain containing the two stone circles, stone row and earthen round barrow. We were surprised to find that the mound's long axis was aligned not only with the round barrow on the plain but also with the morning's pseudo-quoit which was now startlingly visible as a skyline feature, breaking the smooth profile of Leskernick Hill. It seemed that we had happened in the one day upon the two parts of a prehistoric alignment. Chris Riding, a CAS member in the group, noticed that the pseudo-quoit was at roughly 315° when viewed from the mound and thus close to the likely summer solstice sunset.

The long mound appears to have been also carefully placed on the slopes of Beacon Hill at the level where only the cheesewring on Showery Tor is visible, poking a strong vertical silhouette above the smooth back of High Moor. This cheesewring, a natural rockpile, was a significant prehistoric feature, having had a substantial ring cairn built around it (see Johnson and Rose 1994) and the apparently carefully contrived visual relationship between it and the long mound reinforced the likelihood that the latter was also of prehistoric origin.

Downhill from the long mound, about 40 m to its north-west, and also aligned south-east to north-west, were two lower, narrower, stonier banks, about 15 m apart, one on either side of a line projected north-west along the mound's main axis. They may be unrelated to the mound but proximity and the shared axis is suggestive of association.

The group returned to the pseudo-quoit, where there was further debate about its likely antiquity. The lack of tare-and-feather drill-marks on the supporting stones, which appeared to have been hewn or at least broken, suggested a date prior to AD 1800 and thus before very recent military activity but there was still concern that some faces of the stones had minimal lichen growth and seemed too freshly broken to be prehistoric. Nevertheless a group determined to return to Leskernick on the longest day of 1995.

The solstice coincided with the final day of the UCL expedition's first season of fieldwork at Leskernick and its members were also looking forward to watching the sun set from various points, both on the plain and in the western settlement. The sun grew vast as it descended the cloudless sky and we decided to chase its setting across the sloping plain to watch it kiss Leskernick again and again, from first the northern circle, the stone row's west end, the barrow, the southern circle and finally the long mound. No alignments with features protruding above the Leskernick skyline were noticed from any of the first four sites although as the plain was to its south-east the sun did always set behind the beautiful hill. The UCL team moved off to the western settlement to watch the sun set over High Moor and Roughtor while we made our way to the long mound to wait.

As it set the sun slid eastwards, towards the pseudo-quoit which as part of Leskernick's black silhouette was now looking dramatic, now a proper quoit with the window formed by capstone on supports clearly visible even from nearly one kilometre away. The alignment with the sunset was going to be very close indeed but it was also apparent that the top or upper limb of the sun would actually miss the quoit by a short distance to the left (or west) when viewed from the long mound. By moving just 11 m to the east of the centre of the narrow uphill end of the mound we could watch it set directly behind the quoit and as it disappeared send out a last flash of bright light through the window. We knew that slight changes in the position of sunsets was likely to be the cause of the error and felt that we had witnessed an event last seen several thousands of years before.

We noticed figures climbing towards the summit of Leskernick from the western side; Chris Tilley and the UCL team were still chasing the sunset. When he joined us at the barrow on the plain half an hour later we learned that the quoit itself appeared to have been designed for summer solstice sunset watching. When Chris had looked through the narrow tunnel formed by the supports and capstone he had seen and photographed the sun set on the High Moor horizon. On other days of the year the sun will have set too far to the south to have been visible through the tunnel.

Later in 1995 Gary Stephens, on a Cornwall Heritage Trust field trip to Leskernick, noticed that two of the quoit's supporting stones (A and B on Fig 4) had been in place long enough for them to protect the flat top on which they stood from weathering. The supporting stones stand on low 'islands' of unweathered granite 6cm high, and thus seem to indicate that the site is of some considerable antiquity, certainly not modern, and probably prehistoric. Inspection of other early prehistoric granite sites, particularly quoits where some faces of stones are sheltered, reassured the author that the minimal lichen growth on some faces of Leskernick quoit's supporting stones should not be used to suggest a late date.

The quoit was planned at 1:50 on the winter solstice of 1995 (Fig 4).

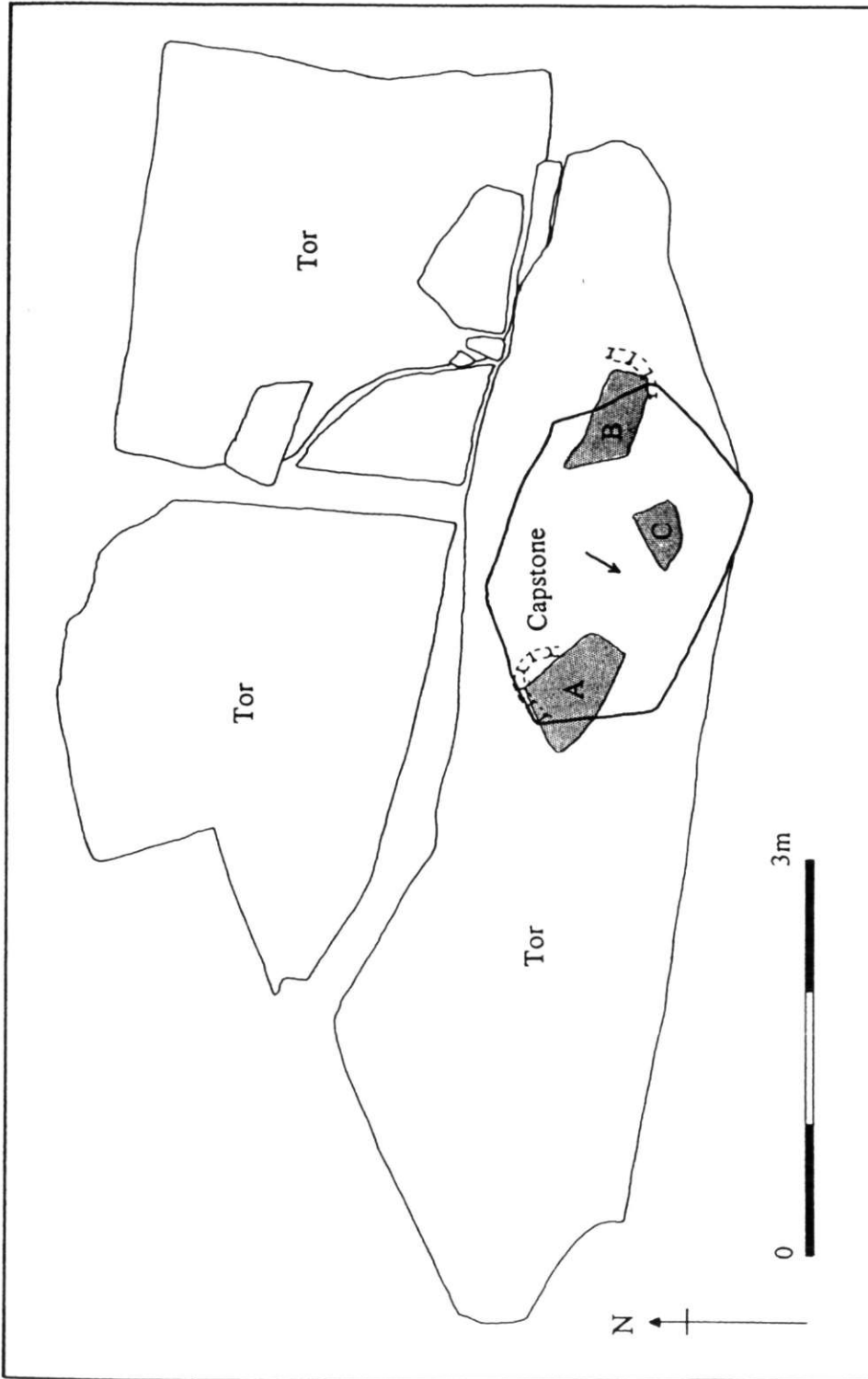


Fig 4 Leskernick quoit. Arrow indicates direction of capstone's tilt and curved hachured lines are the 'islands' of less weathered granite protected by the two northern supporting stones (A and B) which are shown shaded

Using the slight shift in sighting lines to date the monuments

The long mound was mapped by Andrew Young of CAU using the photogrammetric plotting equipment he is using for the National Mapping Programme. Ten-figure grid references and altitudes of the quoit, the south-east end of the long mound, and the position from which the solstice sun was seen to set behind the quoit were then sent to Dr Bernard Yallop, Superintendent of Her Majesty's Nautical Almanac Office at the Royal Greenwich Observatory to assess the potential for using the recorded shift in viewing positions to date the original alignment.

Dr Yallop used the information supplied to suggest three possible date ranges for the arrangement's construction based on changes in obliquity. This is 'the angle between the ecliptic and the equator, and at present it is about $23^{\circ}.44$, in 4000 BC it was $24^{\circ}.11$, and it reached a maximum of about $24^{\circ}.24$ around 7300 BC and then started to decrease again. In other words before about 4000 BC it is much more difficult to confine the date range, if the calculations are based on the change of obliquity' (letter from Dr Yallop, 3rd Jan 1996). The three possible dates are dependent on the alignment being to the top, centre or bottom of the setting sun, and the ranges, as calculated by Dr Yallop, are based on $0^{\circ}.2$ error on either side of the orientation. Dr Yallop made it clear that he would have preferred to use more accurately recorded positions of features.

1. Alignment of mound and quoit with top, or upper limb, of the sun:
AD 300, with error range from 570 BC to AD 1200
2. Alignment with centre line of sun:
1600 BC, with error range from 2600 BC to 630 BC
3. Alignment with bottom, or lower limb, of sun:
3900 BC, with error range from 5800 BC to 2700 BC

(Details all from a letter dated 3rd January 1996 from Dr Bernard Yallop to the author).

These preliminary figures, based on fairly crude data, encouraged the author to organise the precise plotting of the various points, in June 1996, using the triangulation pillar at Bray Down as a fixed point and employing an Electronic Distance Measuring theodolite operated by Steve Diment of the Technical Services Section of the Planning Directorate of Cornwall County Council and Terry Pascoe of the Council's Transport and Estates department. The new co-ordinates (now with sixteen figure grid references, and with altitudes also measured to single millimetres) were passed to Dr Yallop for reworking of his calculations, their precision improving 'the accuracy of the results enormously' (letter of 11th June 1996). Dr Yallop produced dates for the upper, centre and lower limbs of the sun for both capstone and the surface of the tor on which the quoit was built. It will be seen that even the 0.75 m difference in altitude between the top of the capstone and the top of the tor can produce significant differences in date (836 years for the centre line), indicating that the sensitivity of positioning was very fine. Potential error is introduced by basing the calculations on an assumed standing adult's height of eye (1.8 m) so the following dates cannot be used as absolutes.

	Base	Capstone
Upper limb	765 BC	1400 BC
Centre line	2851 BC	3687 BC
Lower limb	6611 BC	7267 BC

Obviously the Early Neolithic date calculated for the centre line alignment at Leskernick fits best with the general date assumed from the monuments' morphology (the quoit resembling Cornwall's portal dolmens, the mound resembling its long cairns). It seems reasonable to suppose that the quoit was built before the mound. Not only is its siting less flexible (being on a tor), but it is also the foresight in the alignment; it would be much easier to adjust the position of the backsight on the tilted plane of the north-west slopes of Beacon Hill. In addition it appears likely that the form of the quoit, the positions of its supporting stones etc, may have been determined by a desire to create a tunnel for viewing the midsummer sunset over High Moor (see above). A simple sequence may then be:

- (a) quoit, earlier Neolithic;
- (b) long mound and alignment, 3687 to 2851 BC;
- (c) northern stone circle and stone row respectful of the alignment (see below), later Neolithic or early Bronze Age;
- (d) peripheral fields of the eastern settlement respectful of the northern stone circle (see above);
- (e) cairns and cists imposed on the partially abandoned field system of the eastern settlement (see above).

The quoit is invisible from the houses within the eastern settlement (due to the convex slope creating dead ground between them), but from virtually all the houses of the western settlement it is a prominent skyline feature. In addition, while the stony banks of the western settlement's enclosures reach onto the edge of the summit plateau, and link together large boulders, outcrops and clutter streams, they do not include the quoit and its tor, as if the people who laid the enclosures out deliberately kept the tor beyond the land enclosed. It seems as if the quoit may have been an important pre-existing feature that the settlement was designed to relate to.

There appears to be potential for using the sites described here to reinforce some of the ideas concerning continuity of symbolic meaning in the natural and created landscape presented by Chris Tilley (1995). The round barrow (Earlier Bronze Age?) on the plain is not only on the line between the long mound and the quoit (Early Neolithic), but when viewed from the quoit it is also visible on the false crest of Leskernick's convex slopes. So it is invisible to a person crouching beside the quoit but becomes visible on the plain as soon as they stand up. This may be coincidental but the impression that the Bronze Age ritual landscape was planned in relation to the apparently Neolithic alignment is strengthened by the northern stone circle (described above) also being on the alignment and the stone row not extending to the west of it (see Fig 1).

Continuity between the Mesolithic and the Neolithic and later periods can also be considered, again following Chris Tilley's suggestion that natural tors may have served as significant landmarks to the nomadic gatherer-hunters and have gradually accrued symbolic meaning (Tilley 1995). The tor on which the pseudo-quoit was built (8 m by 5 and just 1.1 m high) may not be as dramatic as those in the north-western and south-eastern quarters of Bodmin Moor but it is a rare outcrop among the rolling hills of West Moor and it is a skyline feature from the middle stretches of the Fowey valley. The views from it down the Fowey valley and across to Brown Willy and Roughtor are spectacular and may also have been potentially useful – the Fowey being a likely routeway onto the Moors while Brown Willy, Roughtor and the intervening High Moor were probably areas of open summer grazing grounds for ungulates. It is possible then that the tor had meaning in the Mesolithic period which was inherited, understood, and reinforced or made concrete in the Neolithic by the

erection of the quoit. Then, as we have seen, in the later Neolithic and Bronze Ages, the meanings of the quoit and the alignment with the long mound were further enhanced.

The UCL team is studying in greater detail visual relationships between the quoit and other features on the hill and full discussion of the implications for our understanding of early prehistoric ritual, calendars and manipulation of the landscape will be saved until their Leskernick Project has been completed.

Acknowledgements

Mike and Pauline Matthews provided moorland accommodation in the 1980s. Patrick Hutton helped organise the 1995 field trip and Tony Blackman, Julie Tamblin, Arthur Parkes, Chris Riding and Janet Donald were important members of the group. Rosemary Parkyn and Charles Johns accompanied the author and Julie and Tony on the solstice evening. Chris Tilley, Barbara Bender, Sue Hamilton and the UCL Leskernick team were also there; their inspiring interest in the Moor, stimulated by *Bodmin Moor Volume One* (Johnson and Rose 1994), has encouraged the belated publication here of circle and row. Gary Stephens provided valuable dating evidence for the pseudo-quoit. Andrew Young plotted the position of the viewing mound, and Steve Diment and Terry Pascoe of Cornwall County Council fixed the positions of it and the quoit. Dr Bernard Yallop, Superintendent of HM Nautical Almanac Office spent considerable time calculating likely dates for alignments. Tony Blackman has continued to study aspects of the hill and has been very supportive. Jenny McLynn word-processed this text and Cathy Parkes helped sort out the sense of it.

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Rock-cut baths in Cornwall

MICHAEL TANGYE

The story of the rapid rise of spa towns in Georgian Britain has been well recorded. Their success was heightened from 1750, when Dr Richard Russell published his first edition of *A Dissertation on the Use of Sea Water in the Diseases of the Glands*. By the 1780s Weymouth was patronised by both the Duke of Gloucester and King George III. It was considered to be socially desirable to be seen at such resorts where aristocracy and gentry resorted to sea-bathing, sea-water drinking and salt baths in the belief that they provided a cure for most ailments – from gout to arthritis.

Many of the Cornish gentry of the period had residences in London and had, no doubt, taken to the waters at Brighton and at other spas during breaks from business and parliamentary matters. It was only natural that they should provide similar amenities for themselves and their families on their sea-bordered estates in Cornwall.

Francis Lord de Dunstanville and Basset of Tehidy (1757–1835) created his own miniature Brighton at Portreath, Illogan (Tangye 1968, 49) providing there a series of rock-cut, tidal filled baths for his family. At Stackhouse Cove, Perranuthnoe, John Stackhouse (1741–1819), heir of the Pendarves Estate, and near neighbour of the Bassets, had two baths made. Jonathan Rashleigh (1820–1905) of Menabilly, Tywardreath, continued the vogue with an example at Polridmouth (locally ‘Pridmouth’) a sheltered cove below his mansion.

There are, perhaps, other examples of the period awaiting identification, but this paper identifies and discusses the rock-cut baths which are known to survive.

Stackhouse Cove

Stackhouse Cove is situated in the parish of Perranuthnoe. Overlooking it is Acton Castle, a castellated granite mansion built in 1775 by John Stackhouse FLS (1741–1819) who inherited the Pendarves Estate, near Camborne on the death of Mrs Grace Percival. He married Susanna Acton in 1773, only daughter and heir of Edward Acton of Acton Scott, Salop (*Collectanea Cornubiensa* 1890, 922).

Oxford educated, his great passion was the study of seaweeds. The cove was ideal for such a pursuit, with a level and extensive foreshore of slate rock interrupted by narrow crevices of varying depths, running across the cove, providing the habitat for numerous seaweeds which would normally be less accessible.

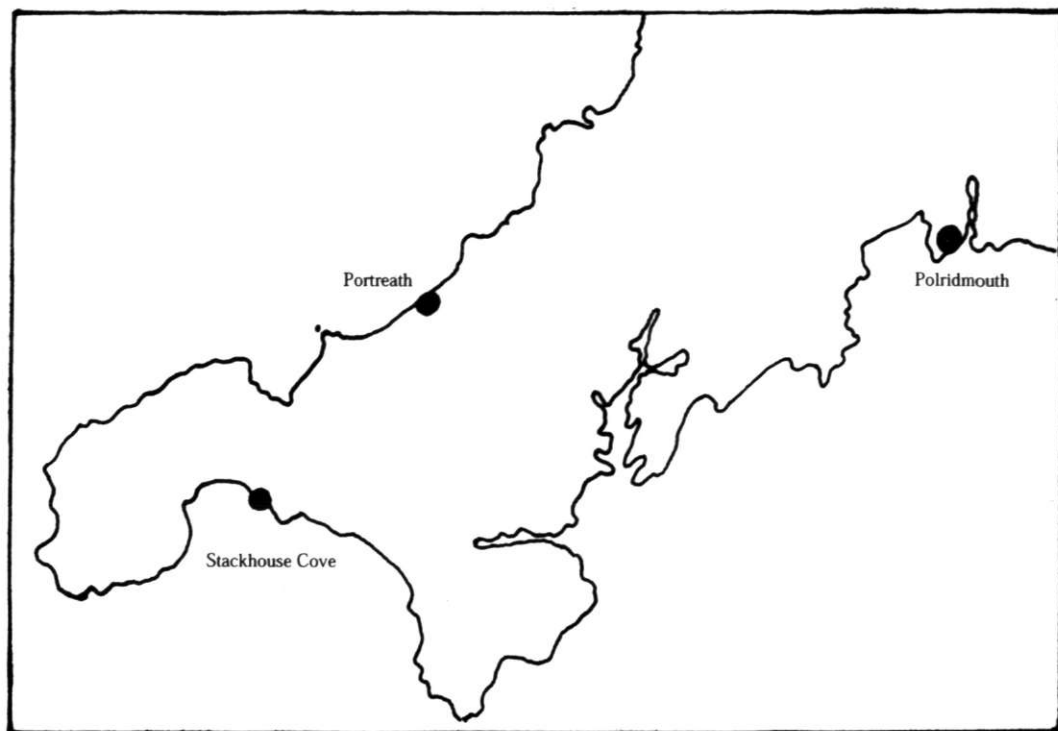


Fig 1 Locations of rock-cut bath sites discussed in text.

Being newly married, he would have been reluctant to leave his young bride in seclusion at the distant Pendarves mansion, whilst he indulged in his interest. No doubt he built Acton Castle, naming it after her family, in order that she could be with him whilst he continued his studies at leisure.

The late Dr Frank Turk visited Acton Castle in 1948 and saw there tanks in the cellars, installed by John Stackhouse, together with arrangements for a supply of sea water which was, apparently, pumped up from the cove below – to be used entirely for his work on the life histories of marine algae (Turk 1994). In 1795 he published *Nereis Britannicae* which contains all species of Fuci native to the British coast.

During fieldwork carried out in 1972, as part of a still on-going study of fishing coves, several additional features were then noted and recorded, some of which were, undoubtedly, associated with the activities of John Stackhouse.

Slipway no. 1

Access to the cove is afforded by a wide slipway on the south side cut out from the slate rock of the cliff face. In its surface is a deep groove caused by the passage of boat keels over a long period, and in the coves of West Cornwall referred to as the 'Draft'. An iron mooring ring remains *in situ* in its surface near a flight of five rock-cut steps, on the landward side, that possibly led to another feature, which, with other steps have been covered by a cliff fall.

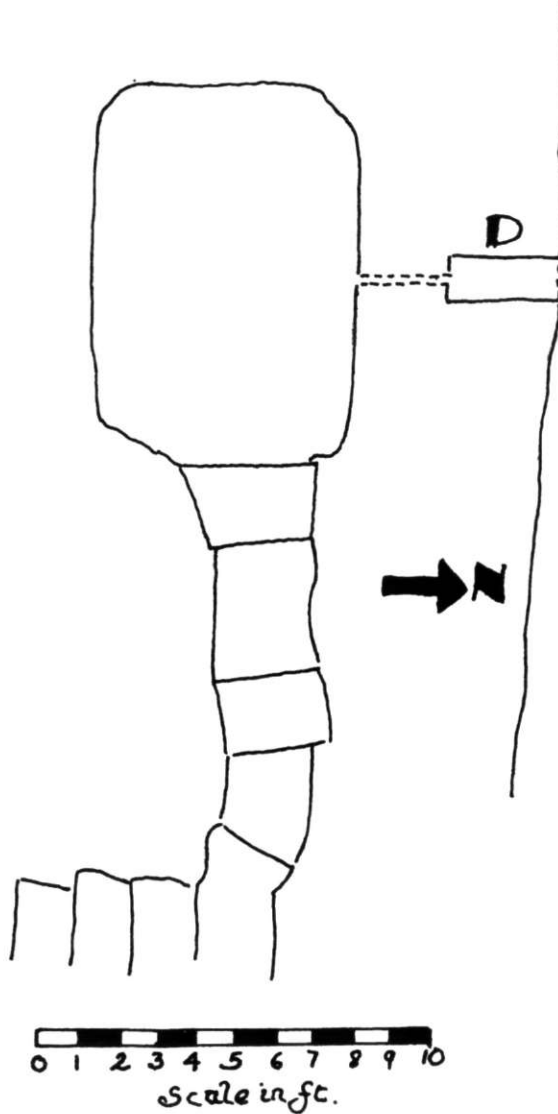


Fig 2 Stackhouse Cove – Bath No. 1. D = drain.

Rock-cut shed

Near the bottom of Slipway no. 1, in an elevated position approached by six ascending steps, is a building cut from the slate-rock of the cliff face, 23 ft (7.01 m) long by 10 ft (3.05 m) wide; its walls are 8 ft 6 ins (2.59 m) high receding to 6 ft 6 ins (1.98 m) at the entrance and bear pick marks on their surfaces. Concrete beams, supported on concrete pillars, partially roof the structure, but numerous sockets cut into the stone walls indicate that it was once roofed with timbers.

The natural stone floor slopes gently towards the entrance, and on its northern side is a narrow channel to drain water emerging from the rock face at the back end of the structure. A small shelf and recess, possibly for a lantern, has been cut into the south wall.

In its elevated position, this stone shed, used to store fishing equipment etc., was safe from high seas. It is possibly associated with John Stackhouse and must have, later, also been used by subsequent owners of the property, and others, for fishing activities.

Rock-cut channel

Leading to Slipway no. 1 is a wide channel which appears to have been excavated and blasted through the rock foreshore to enable small boats, or fishing boats, to enter and leave the cove. There is an iron mooring ring on the south side.

Slipway no. 2

On the south side of this channel are traces of another slipway extending upwards and across the rock foreshore for approximately 90 ft (27.46 m). It is represented by a series of parallel, eroded, shallow rectangular grooves, cut into the slate rock, into which the ends of wooden timbers, laid transversely, were obviously placed and secured with irons driven through them into the underlying rock; these sinkings remain, three of them containing iron. Each timber would have been 6 ft 8 ins (2.03 m) long by 8½ inches (216 mm) wide and placed at intervals of 4 ft (1.22 m) with other timbers wedged tightly between them.

This feature was probably constructed for John Stackhouse to provide a less steep, and more convenient wooden slipway, nearer the channel than Slipway no. 1. Any small boat would have been left safely beneath the cliff above the high water mark. The use of heavy timbers fitted to rock-cut sockets is seen in other coves in the area such as at Bessie's Cove at Prussia Cove, where a similar method was used to bridge a deep gap between rock masses to provide a route to the anchorage.

Near the top of this slipway, and possibly associated with its use, is a man-made circular pit sunk into the rock surface with a curved smooth recess cut above and behind it. Its original purpose remains open to conjecture – perhaps a socket for a small capstan pillar or a temporary store-pot for shell fish.

Rock-cut bath no. 1

On the south side of the channel mentioned above, at its edge, and in an elevated position, is a rock-cut bath. It is approached from the fairly level rock foreshore by eight descending steps cut from the slate. It measures 9 ft (2.74 m) by 7 ft 7 ins (2.31 m) and is 5 ft 5 ins (1.65 m) wide, but its rectangular shape has been somewhat eroded by wave action on its south side, which is higher than the north side, formed by the edge of the channel. It is 3 ft (0.92 m) deep with a small round drain 1 ft (0.30 m) above its base, drilled through to the rock face of the adjoining channel. The bath is submerged with each tide and subsequently drains to a constant level at ebb tide.

In the rock surface, near and beyond the steps are thirteen round sinkings, once drilled to contain upright irons – one still has traces of iron *in situ*. These must represent the remnants of some form of handrail for users of the bath, and they would have also conveniently denoted its site, not easily seen from the shore. It is typical of other 18th and early 19th century rock-cut baths, and was almost certainly created by John Stackhouse for himself and his young wife Susanna.

Rock-cut bath no. 2

This remarkable and unique feature lies within the rock cliff face at the centre of the cove.

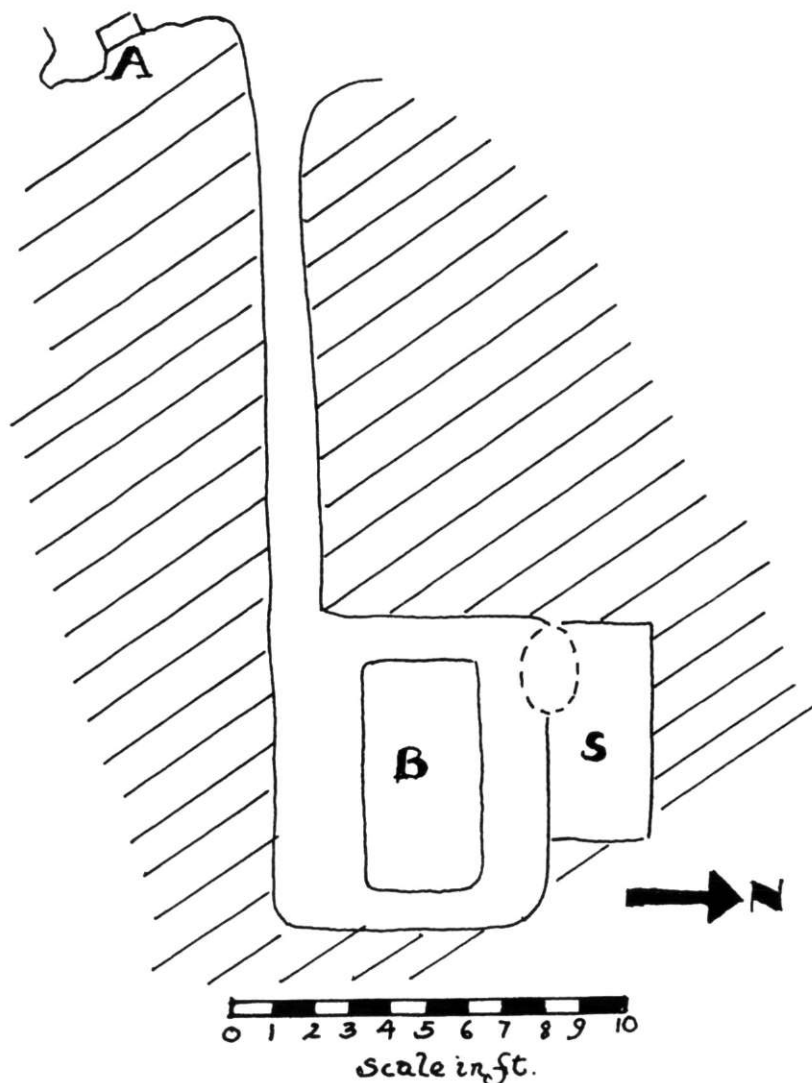


Fig 3 Stackhouse Cove – Bath No. 2. A = Step at ledge edge; B = bath; S = shaft.

Here, several feet above the beach level is a tunnel which at first glance resembles a mine adit outlet. It appears to have been originally approached by rock-cut steps ascending from the beach on the south side, of which only one, at the top, has survived sea erosion. The tunnel extends for a distance of 24 ft (7.32 m) into the solid slate cliff face; it is 6 ft (1.83 m) high, rounded at the top and tapers from 2 ft 3 ins (0.69 m) in width to 1 ft 2 ins (0.36 m) at the base. Pick marks can be seen on its walls. This leads into a rock-cut chamber 8 ft (2.44 m) square and 6 ft (1.83 m) high. In its floor a rectangular bath has been sunk 6 ft (1.83 m) long, 2 ft 9 ins (0.84 m) wide, and 3 ft (0.92 m) deep.

In the north-west corner of the roof, a rectangular chimney-like shaft, again cut from the solid rock, ascends some 20 ft (6.1 m) to the cliff top. Fresh water, from a small stream, drains into this, falls down the shaft, then through a hole in the stone roof of the chamber, 2 ft 3 ins (0.69 m) by 1 ft 7 ins (0.48 m), and into the bath beneath. The constant overflow drains along the approach tunnel to the exterior.

This fresh water bath, situated within its dark, cold and secluded chamber must have been again created for John Stackhouse and Susanna, his wife.

Portreath

The snug west corner of Portreath beach, once known as Carvannel Cove, and from 1825 onwards as 'Amey's Side' (Tangye 1968, 7). provided the 18th and 19th century Bassets of Tehidy with a convenient watering place. Here, in 1782, Lord de Dunstanville (1757-1835) paid William Harry, the estate mason, 'for building a house at Portreath for a Bathing Machine' (Tangye 1984, 90). At the same period, William Harry cut six baths in nearby rock surfaces, and in the cliff face for the pleasure of Lord de Dunstanville's wife Susannah and his young daughter Frances (1781 - 1855) (*Tehidy Accounts*).

Their activities centred around the facilities afforded by a small cottage, today known as 'Smugglers Cottage', which was described by the artist Joseph Farington in 1810, 'After divine service I went with the ladies to Portreath, where they have everything for a breakfast or a repast, with books to amuse those who read and admire the prospect. Near this place, in Baths formed on rocks, Miss Basset frequently comes to bathe, and this in scenery as would be quite poetical' (Farington 1926, 141).

The six baths were created in an area identified by this writer in 1983 as the site of an earlier 18th century quay and harbour (Tangye 1984, 90). All are tidal filled, and are situated at varying distances below the high water mark so that at least one would be accessible at most states of the tide.

Bath no. 1

This is cut into the surface of rocks extending out from the cliff base. It lies north-south and measures 6 ft 4 ins (1.93 m) by 3 ft (0.92 m) tapering at the south end to 2 ft 8 ins (0.81 m).

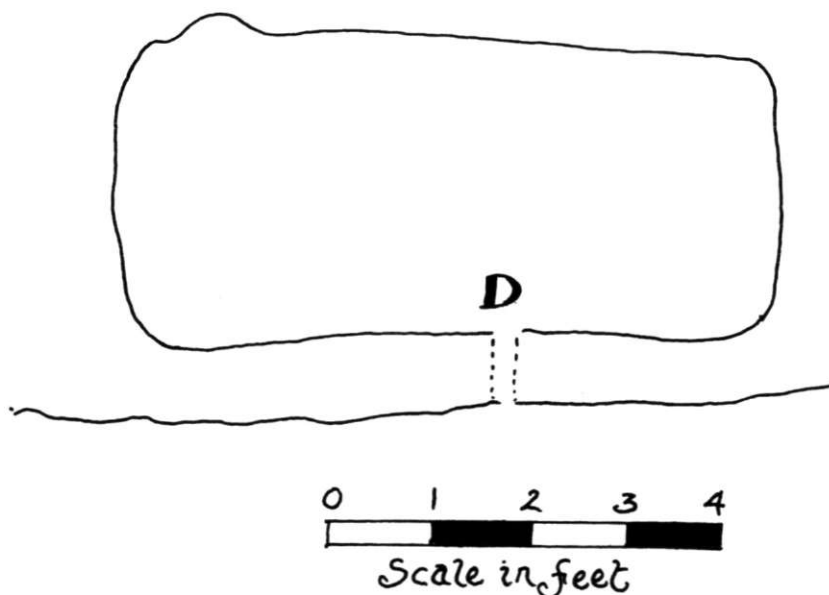


Fig 4 Portreath - Bath No. 1. D = drain.

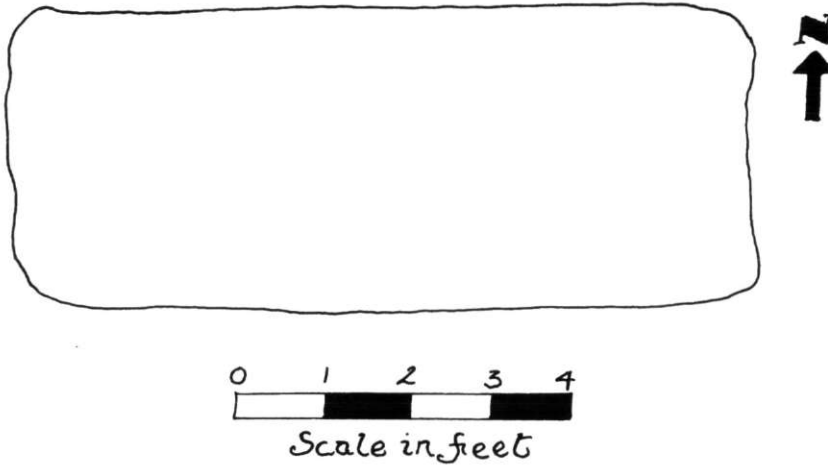


Fig 5 Portreath – Bath No. 2.

Its corners are rounded and it is 2 ft (0.61 m) deep. It has a drain drilled through rock to the exterior on the east side.

Bath no. 2

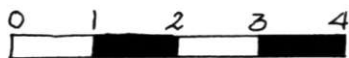
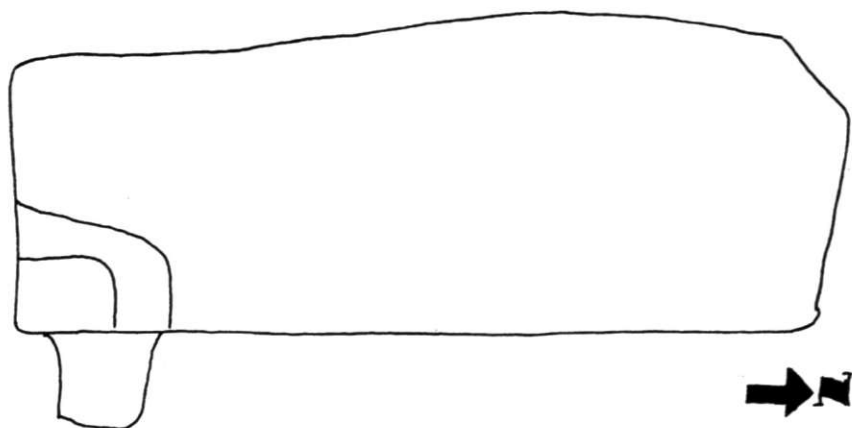
This is situated to the north of Bath no.1 on a rock surface at beach level. Similar to Bath no. 1 but orientated east-west. It measures 8 ft 5 ins (2.57 m) by 3 ft 9 ins (1.14 m) and is 2 ft (0.61 m) deep.

Bath no. 3

This, the best of the Portreath examples, has been cut out of the south facing cliff face of a small promontory known locally as 'Point', but in 1869 referred to as 'The Hollow Rock' (*West Briton* 15th July 1869), being pierced by two caves. The latter were once known as 'Smuggler's Cave' and in 1964 were referred to by a Portreath octogenarian as 'The Zawn' (Tangye 1968, 7), a Cornish term for a cleft in a rock, normally not found east of West Penwith.

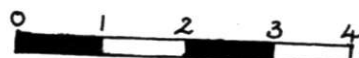
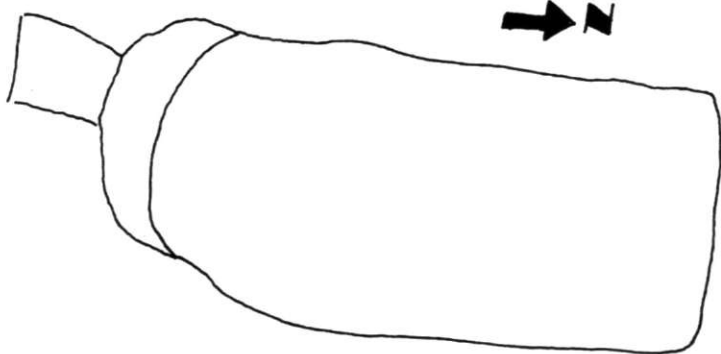
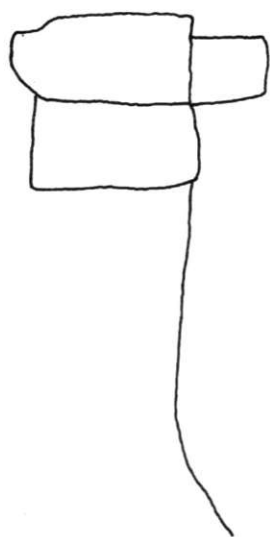
The bath is elevated some 5 ft (1.52 m) above the beach level and recessed deeply back into the slate cliff face which forms its rising rear wall. It is orientated east-west and measures 7 ft (2.13 m) by 3 ft 6 ins (1.07 m). There is a small ledge between the bath and its rear wall which has sinkings at both ends bearing traces of iron, and another inside the uppermost of the three steps which descend into the bath. These suggest that some form of hand-rail existed to assist the bather.

In the south side a hole has been drilled, 1 ft (0.30 m) down, through the rock to the outside, to maintain the water at a constant level. An expanding wedge shape has also been cut at the top of this side of the bath as an additional drain. Access today is gained by ascending iron rungs, of unknown date, fixed into the cliff face, which extend to a ledge higher up.



Scale in feet

Fig 7 Portreath - Bath No. 4.



Scale in feet

Fig 8 Portreath - Bath No. 5.

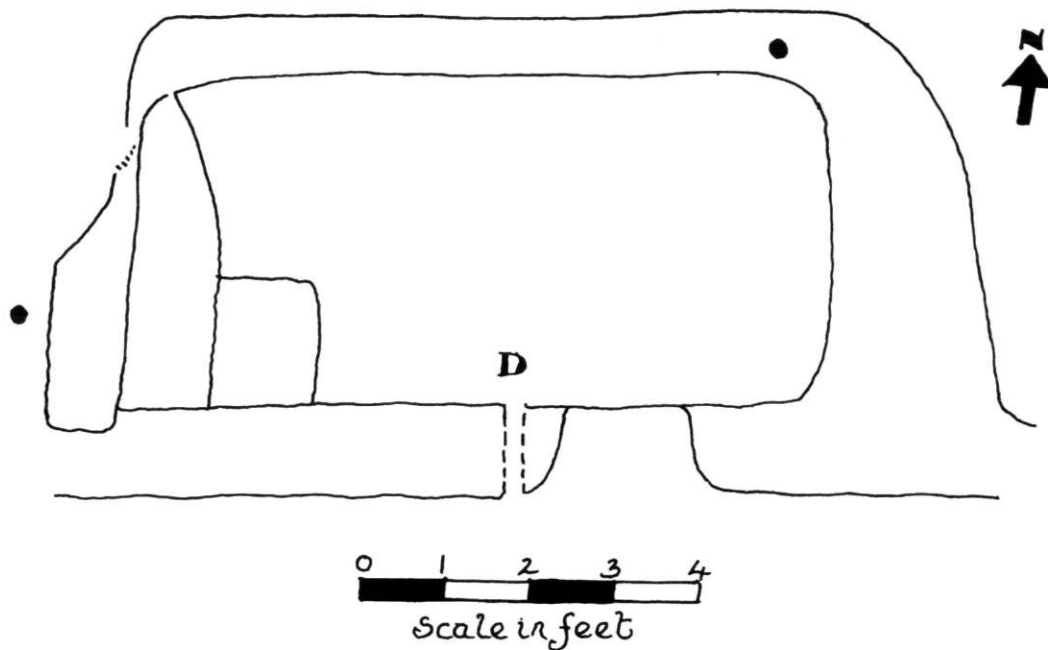


Fig 6 Portreath – Bath No. 3. D = drain.

Bath no. 4

This is situated on a ledge on the east side of the small promontory, near Bath no. 3. It is orientated north-south, is rectangular, 7 ft 4 ins (2.23 m) long on the west side and 8 ft 1 in (2.46 m) long on the east side; it is 3 ft (0.91 m) – 3 ft 5 ins (1.04 m) wide, and 3 ft (0.91 m) deep. Three steps descend into it at the south-east corner. Another four steps are situated at the south extremity of the ledge, at the cliff edge. These are badly eroded and must represent the uppermost remnant of a flight of rock-cut steps ascending from the beach below.

Bath no. 5

This is situated in an elevated position on the fairly flat surface of the westernmost of two isolated rock masses on the seaward side of the promontory. It is orientated east-west, measures 6 ft 10 ins (2.08 m) by 3 ft 2 ins (0.97 m) tapering to 2 ft 9 ins (0.84 m) at its west end. It is 2 ft 8 ins (0.81 m) deep and is approached on the south side by three ascending steps, and then by two descending into it. It overflows from the top step of the latter. No steps ascend the rock mass itself.

Bath no. 6

This lies on the west side of a large dark and cold cave in the cliff near Bath no. 5. It is situated on a ledge some 5 ft (1.52 m) above the beach level, within a rectangular recess cut from the cave side, the vertical face of which forms its west and north sides. It is oval in shape, orientated north-south and is 9 ft 10 ins (3.0 m) long, 3 ft 11 ins (1.19 m) wide at the south end, and 4 ft 6 ins (1.37 m) at the north end. Although it is 3 ft 8 ins (1.12 m) deep, it drains to a depth of 2 ft (0.61 m) where the east side has eroded.

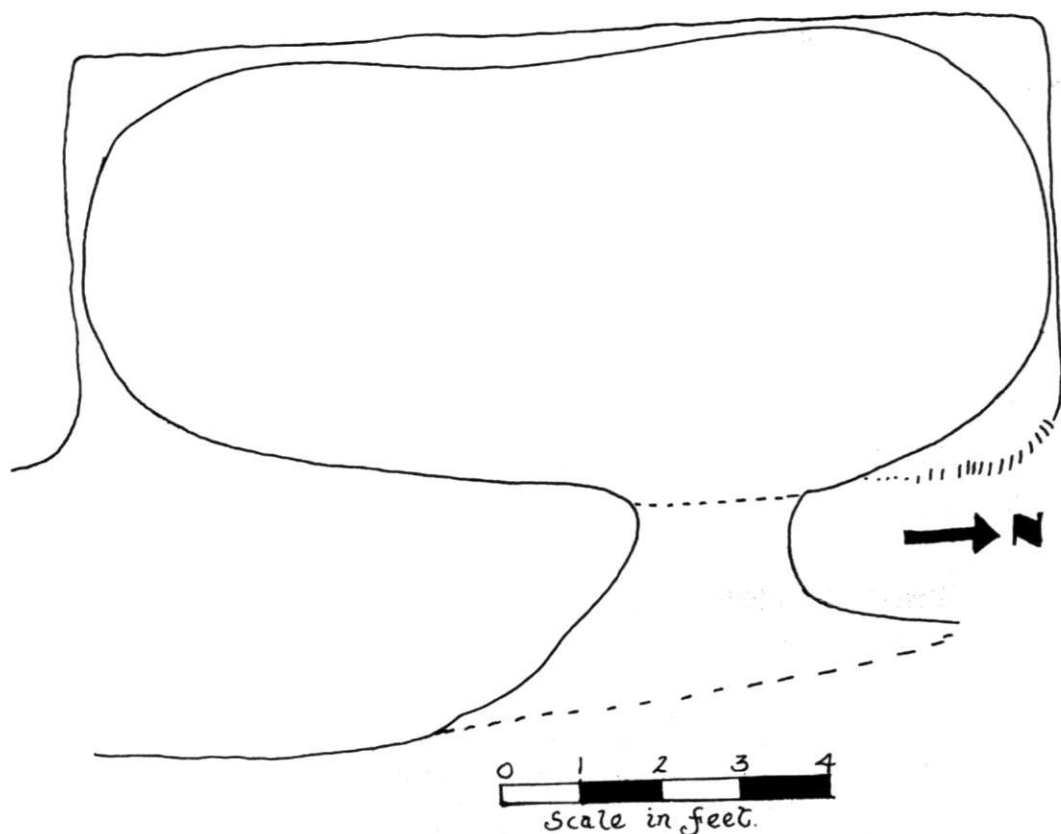


Fig 9 Portreath – Bath No. 6.

Bath no. 7

This is situated on the east side of Portreath beach in an area of rocks adjoining the harbour wall, once commonly referred to as 'Rocky Side', sometimes abbreviated to Rocky. It is a roughly square bath 4 ft 3 ins (1.30 m) by 5 ft 6 ins (1.68 m) with a descending step at its south-west corner. Its depth is 2 ft (0.61 m) and it drains via a channel cut at the north-east corner.

Polridmouth, Menabilly, Tywardreath

This bath, although similar to the example at Stackhouse Cove, (Bath no. 1) is of a later date. It was reputedly made for Jonathan Rashleigh (1820–1905) who sat in it for health reasons. His daughter also used it (King 1983). It lies at the edge of the slate rock foreshore on the north side of Polridmouth. Tidal filled, it is sub-rectangular in shape with sides sloping inwards and a slightly concave base, 2 ft 2 ins (0.66 m) wide, which was exposed on removing sand. On the east side it measures 4 ft 3 ins (1.30 m) long and on the west side 5 ft 10 ins (1.78 m) long; width 4 ft 4 ins (1.32 m).

The sea has eroded a gap at the south-west corner, and adjacent to this is a lead-lined drain drilled into the rock, but which fails to appear on the outside of the bath. This would have kept the bath at a constant depth of 6 ins (0.15 m).

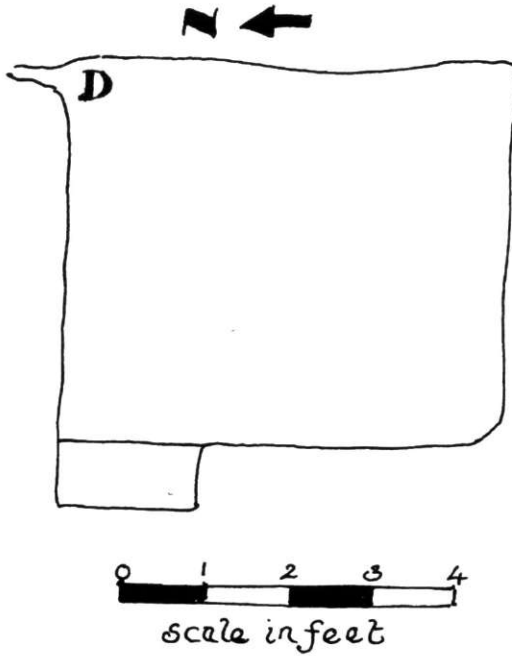


Fig 10 Portreath – Bath No. 7.

It is entered by four wide and deep steps descending on the north side. Deep rectangular sockets in the rock on either side of the third step down suggests that timbers were inserted for some unknown purpose. Eight surviving round sinkings surround the bath, some with iron in situ suggesting that some form of iron rail once existed.

A natural fault in the surrounding rock, running east-west from the grass sea-front, appears to have been widened, and its base levelled, to form an even approach across the rough rocky foreshore, ending near the bath steps.

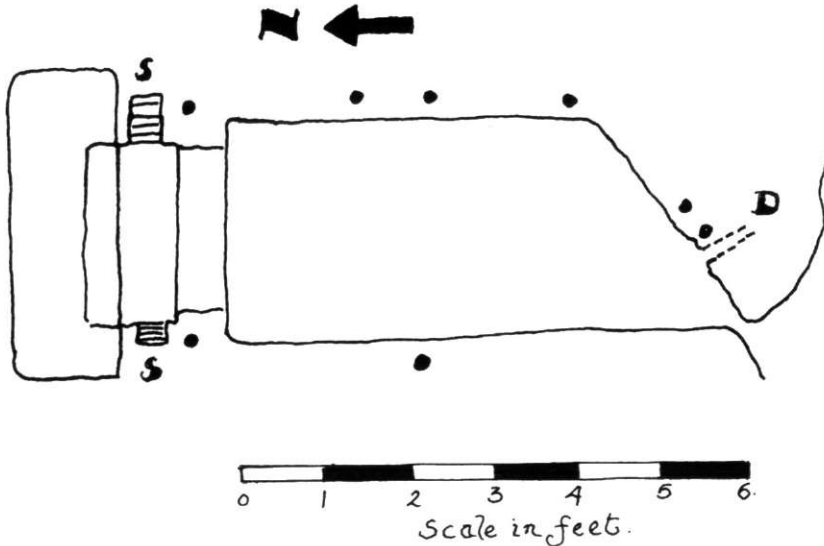


Fig 11 Polridmouth Bath. D = drain; S = socket.

Discussion

It can be seen, that although varying in format, the baths have certain common features. All are tidal, except Bath no. 2 at Stackhouse Cove, which is filled by fresh water; six of the ten have steps leading into them, and four examples – no. 1 at Stackhouse Cove, nos. 1 and 3 at Portreath, and the Polridmouth example, all have drains. Some form of iron-work is associated with Bath no. 1 at Stackhouse Cove, no. 3 at Portreath, and the Polridmouth bath.

The fresh water bath at Stackhouse Cove is remarkable; such a stone-cut chamber and shaft were either cut by the estate mason or by experienced local miners. With its dark and cold location we find a parallel with Bath no. 6 at Portreath, situated within a cave, where spartan like conditions were endured, possibly for the sake of privacy. The Stackhouse Cove example could also have served as a well, providing John Stackhouse with a supply of fresh drinking water to refresh himself on hot summer days spent in the cove.

During the 18th century both locations would have been quite private; nevertheless, at Portreath a bathing machine, probably horse drawn, was used to convey the Bassets, and their guests, to both the baths and sea, in order to assure such privacy. It was housed in a quite substantial building, solidly built with a slate roof, as evidenced by an entry in the contemporary Tehidy Accounts:- '1782, July 19. Knapp, Knight & Co, for lime, Hellingstones, for covering the Bathing Machine House at Portreath, £5. 4. 9.' (CRO).

The side walls of this building, revetted against the low cliff at the foot of the small slip-way at 'Amey's Side', appear to have survived until early this century. Postcards of that period show a stone building, used by a tin-streamer, built between two existing walls, incorporating one into its structure.

Bath no. 7 at Portreath, situated beneath the harbour wall, provided no privacy and was probably copied from the Basset examples, for public use. No doubt, because of the secluded location, the baths at Stackhouse Cove were used by those who owned Acton Castle after John Stackhouse – Admiral Bulkeley Mackworth Praed who was resident there in 1832 (*West Briton*, 4th September 1899), and who was followed in 1854 by Mr Thomas Field, a prominent mining adventurer (*Royal Cornwall Gazette*, 6th May 1854).

With the great upsurge in activity at Portreath during the 19th century, the baths there were probably abandoned by the Bassets, and their use transposed to the public. References to the baths are rare, but in 1861 the *West Briton* referred to Portreath Bath no. 3 when it reported that Samuel George 'was injured in a fall when climbing over an exposed part of the cliff near a spot known as "Ladies Pool"' (*West Briton*, 26th July 1861). This must refer to Frances Basset, daughter of Lord de Dunstanville, who succeeded to the Tehidy Estate on his death in 1835, and was known to have suffered from arthritis. It was probably the same superior bath mentioned in 1869 when a Mr Vicary, a travelling evangelist, baptised several women at 6.00 am one July morning, 'The dipping was accomplished on the beach, outside the promenade known as the Hollow Rock – they were conducted to the bath with great propriety' (*West Briton*, 15th July 1869).

Penzance, with its mild climate, was once visited as a place of convalescence and many obviously took to the waters there. William Jenkin of Trewirgie, Redruth, wrote to Hon. C B Agar in June 1806, 'I have observed when I have been at Penzance people in a bathing machine driving into the water but I have lately been informed that that practice is now discontinued because the going down into the water by steps is thought by the Faculty not so well as by plunging at once under water, and that therefore those machines are now laid aside. The practice now is to fix a tent near the water's edge in which the person puts on the bathing dress – and there are women who attend the ladies, in the like dress, to assist them in plunging at once into the water' (Jenkin 1951, 126).

In a report on the activities of the Penzance Natural History and Antiquarian Society in the *Cornish Telegraph* in 1883, a Mr J B Magor described what appears to be a rock-cut bath on the Battery Rocks, 'a place 12 feet square cut in the rock with steps to approach, and a sort of doorway with parts of a superior fire-brick and wood. The sea flowed into it'. Nothing certain was known of it. Some said it was a bath for invalids before the recently demolished baths were erected. There is a legend that it was the house of a Wizard when Mounts Bay was covered with a forest. One theory was that it was a store-pot for fish, another that it was connected with smugglers. It was known as 'Ladies Bath'; 'Barber's Pool' was further south, where a barber was drowned (*Cornish Telegraph*, 1st November 1883).

The 'recently demolished' baths referred to were then owned by a Mr Norton. They were probably the same ones established by Mr J Burt in 1837 on the sea front at Penzance 'opposite Cornwall Terrace'. That November he thanked the public for their support since their establishment, 'To make money is not the object in view, but to give Penzance the first bathing establishment west of London is his chief desire. The utility of the Baths, particularly at this season of the year has been appreciated by hundreds who have sought and found relief in various diseases. Sundays excepted, baths open from 6.00 am to 9.00 pm. Suites of apartments for invalids and others wishing to have benefits from the baths, sea air, or the splendid marine views that the house commands' (*Royal Cornwall Gazette*, 10th November 1837).

A correspondent wrote to the *Gazette* claiming that Burt's venture was the first 'Vapour Baths' established in Cornwall, attracting many visitors to Penzance, thus increasing the demand for lodging houses and boosting the local economy. He added that great benefits were obtained from the baths, 'in all scorbutic complaints, rheumatism, indigestion, coughs and colds'. Facilities were provided free for the poor 'letters in their own hand writing which are suspended from the walls in the Bathing Room will fully bear out my assertion' (*Royal Cornwall Gazette*, 17th November 1837).

In 1864 the baths were known as the 'Royal Baths' and were described as being near the 'Queens Hotel' and opposite the Cornish Serpentine Marble Manufactory (*Directory of Penzance and Neighbourhood for 1864*). By 1883 they had changed ownership, as the *Cornish Telegraph* then reported that, 'Mr Norton's Salt Baths had been swept away'. A correspondent added that he had visited them for forty years for, 'the enjoyment of a salt water warm bath. Mr Norton's baths were homely, but perfectly clean, comfortable and satisfactory, and attention and civility were the order of the day. They have now gone and not replaced' (*Cornish Telegraph*, 1st November 1883).

Burt's Baths, situated on what is now the Penzance promenade, was not the first such facility at Penzance. In 1814, following a meeting in 1813, Dr John Ayrton Paris chaired a public meeting at the Guildhall there, 'for the purpose of taking into consideration the expediency of erecting Hot and Cold Baths'. It was agreed to promote it at 10 guineas per share. Dr Paris stated that the project should compare favourably with the Margate (Kent) Sea Bathing Infirmary, as Penzance had a warmer climate in winter. A separate bath was planned for the Penzance Dispensary patients and £330 had already been subscribed (*Royal Cornwall Gazette*, 29th January 1814).

On 15th June 1816 the *Gazette* reported, 'We understand that the hot and cold sea water baths at Penzance are already much frequented and prove a great accommodation to invalids'.

These early baths were probably those advertised for sale in the same newspaper on 11th June 1825, situated at the bottom of Jennings Street, 'close to the sea', on what is now Wharf Road, 'together with all the furniture which consists of everything useful and convenient for the accommodation of the ladies and gentlemen bathing. The house consists of two excellent Warm Baths, a Cold Bath, a Pump Room and a handsome spacious Waiting

Room over the Baths which commands a delightful view of Mount's Bay. The Baths were built a few years since at the expense of upwards of £600 and are now in complete repair and good condition. Apply Mr John Thomas Junior'.

In 1827 gentry who owned Georgian town houses in Truro would resort to the tidal River Fal at Newham, where a Mrs Jane, 'begged to inform the nobility and gentry of Truro and its vicinity that she has erected a shower bath on an improved principle, together with a bathing machine'. She could also provide her customers, 'genteel lodgings at No. 75 Lemon Street' (*West Briton*, 29th June 1827).

By 1837 the Truro Public Baths were available at Bath Place, Ferris Town, in the centre of today's city, 'for the convenience of invalids and others in Truro and its vicinity'. Mr and Mrs Symons, 'beg leave to announce that they have fitted up a commodious house in Ferris Town, with every variety of baths and precisely in the manner of those so successfully conducted by them for the last six years at the Bar, Falmouth, namely Hot, Cold, Shower, Vapour, Sulphurous, Hot Air and other medicated baths' (*Royal Cornwall Gazette*, 8th September 1837).

In addition to the baths mentioned at the Bar on the Falmouth sea front there was possibly another in a similar position off Church Street. In 1827 John Philp, in his *Panorama of Falmouth*, mentions a spacious court there, 'extending to the harbour', on part of which it was intended to build hot and cold sea water baths.

We find a similar commercial venture at Flushing, near Falmouth, which with its sheltered aspect and mild winters, was widely advertised as an ideal place for convalescence. In May 1852 the 'Clinton Baths' were opened there, named after Lord Clinton of the Trefusis Estate. Its owner, Mr J Roberts, was an enterprising gentleman who lived near the quay at Falmouth, and who also owned a commodious lodging house in Flushing to accommodate his clients. He obviously saw the advantages of Flushing as a spa, and provided a great variety of facilities in his bath house – cold and warm showers, tepid or hot baths, vapour baths, sulphurous, fumigating, Russian baths etc., etc., – 'the tide from the harbour flowing through the baths affords a continual supply of pure sea water. Experienced male and female attendants' (*Royal Cornwall Gazette*, 7th May 1852).

By the 1860s the tradition of bathing for health reasons was waning, but at that time the Gregors of Trewarthenick, near Tregony, continued to visit their summer residence at Newquay, bringing with them, annually, a large white bathing machine towed by a pair of horses (Teague 1923, 67).

New found recreations, made possible by improved means of transport during the late Victorian and Edwardian periods, increased the popularity of coastal venues in Cornwall, and numerous rock-cut bathing pools were excavated for public use. Far too numerous to enter here, they are to be found in most coves and resorts. Thus the custom of sea bathing in such 'baths' continued, not for health reasons, as in the 18th century, but purely for pleasure.

Redruth

Acknowledgements

I am grateful to Miss E M King for drawing my attention to the Polridmouth bath, and for providing details of its creator. My thanks also to the Courtenay Library of the Royal Institution of Cornwall and to the Cornwall Local Studies Library, Redruth, for the use of newspaper files.

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Prehistoric Antiquities from Cornwall in two West Midlands museums

P.J. WATSON and P.J. WISE

The following note is a result of a survey of archaeological collections in West Midlands museums carried out by the West Midlands Archaeological Collections Research Unit under the auspices of the West Midlands Area Museum Service. All museums in the counties of Herefordshire, Shropshire, Staffordshire, Warwickshire, West Midlands and Worcestershire were included in the survey, but not private collections or material currently under study at Fields Units. One of the aims of the project was to make awareness of the collections more widely known, especially artefacts of non-local origin, through a series of short notes in relevant county and specialist journals. This method of disseminating information was thought preferable to the compilation of a single catalogue which would be so disparate as to be of little appeal to the researchers we are trying to reach.

Two West Midlands museums, Birmingham and Warwickshire, have antiquities from Cornwall (post 1974 boundaries) and these are all of prehistoric date; no artefacts of later periods were identified during the survey. They are presented below, arranged alphabetically by site. Many do not have a more precise provenance and the four figure grid references in square brackets are given merely as an aid for locating sites; where further details about findspots or circumstances of discovery are known these are noted, together with a fuller grid reference if available. Resources have not allowed the compilation of full catalogue details, the commissioning of professional drawings and photographs, or extensive trawls through documentation and literature; however, outline drawings are provided where it was thought they might help with typology or further identification. As the primary intention of the listing is to give researchers an idea of the type and quantity of material held in West Midlands museums it is hoped that this brevity will be forgiven.

All dimensions are in mm. and the following abbreviations have been used when citing museum accession numbers: Bir = Birmingham Museum and Art Gallery; War = Warwickshire Museum.

Bodmin (SX0767)

Bronze bow brooch of Hull and Hawkes' group D 'bow brooches with twin lateral knobs'. This example has a broad cushion shaped bow with a long pin which projects well beyond the body. Undecorated. The closest examples from Britain are those from Princethorpe

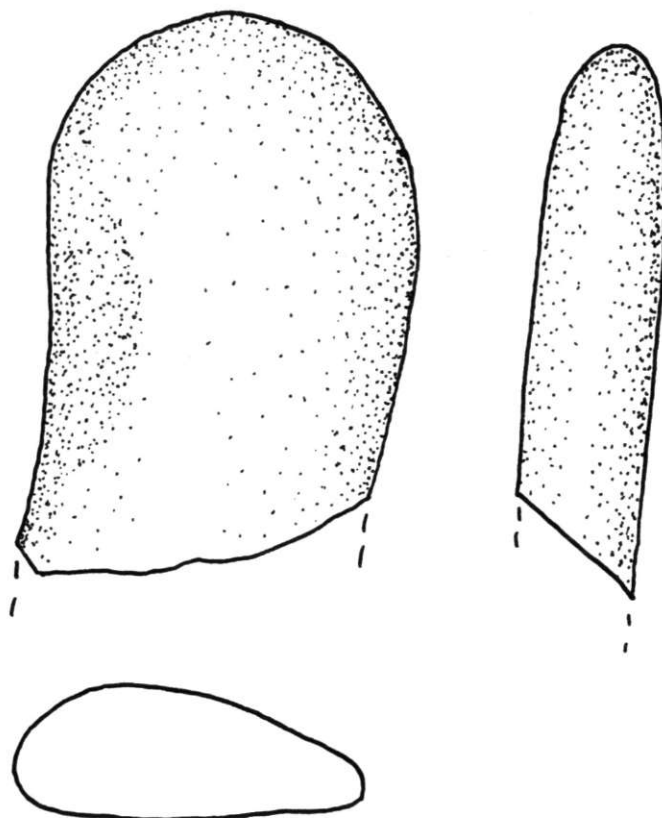


Fig 1 Whetstone from 'Hingstone Down' (1:1)

(Warwickshire), Boughton Monchelsea (Kent) and Sussex (Hull and Hawkes 1987, 30, nos. 7060, 7276, 7252). L. bow 55, L. pin 96, max. W. 40. (War A7786).

Callington, 'Hingstone Down' (SX3871)

Bronze Age? Whetstone or rubber 'from rubble in a mine working'. Not sectioned but identified as micaceous sandstone. Incomplete. $74 \times 47 \times 15$. See Evens 1962, 264 no. 1090; Clough 1988, 146 no. 239. (Bir 1959A141). (Fig 1)

Bronze Age? Whetstone or rubber of rounded rhomboidal section. Possibly found with a burial. This sectioned and identified as sandstone. $89 \times 14 \times 12$. See Evens 1962, 264 no. 1089; Clough 1988, 146 no. 238. (Bir 1959A140). (Fig 2)

Carbis Bay area (SW5339)

Group of 10 flint arrowheads. A triangular one in beige flint L 38, W 34 and a kite shaped leaf of type 3B in pale grey flint L32, W15 are from Hellesveor; another pale grey flint leaf of type 3B L39, W18 is marked **Jueg.?**

The remainder are simply given as 'Carbis Bay'. These comprise: a tanged/leaf of uncertain type L 61, W32; a single barbed L64, W34; two Sutton type a barbed and tanged L31, W 18

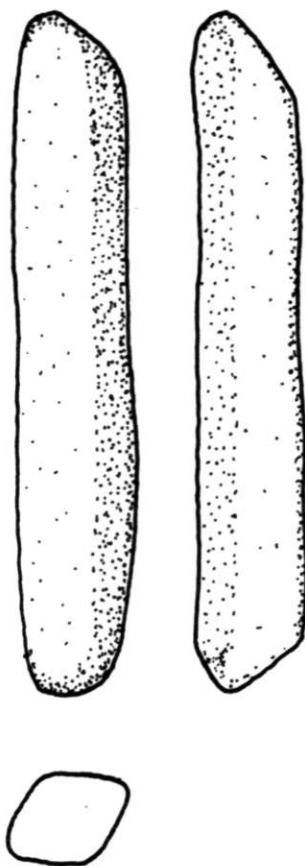


Fig 2 Whetstone from 'Hingstone Down' (1:1)

and L 41, W 32; a Sutton type b barbed and tanged L37, W20; a Sutton type c barbed and tanged L 24, W 25; and a Sutton type with broken barbs L 25. (Bir 1991A392) (Fig 3)

Two Neolithic/Bronze Age flints: a point on a blade flake in grey and brown flint and a point on a curved flake possibly a spoke shave in mid grey flint. Ex J.S. Champion of Carbis Bay (see below). (Bir 1991A132)

Carbis Bay, Hellesveor (SW5040)

Group of Neolithic/Bronze Age flints comprising 5 blade flakes, 2 borers, 2 end scrapers, 1 point and 1 modern gun flint. Fawn and grey flint. Ex J.S. Champion of Headlands Rd, Carbis Bay 'collected in this part of Cornwall' before 1954. (Bir 1991A131)

Constantine Bay Kitchen Midden (SW857752)

Two thin flat circular slate spindle whorls; Di 37, Th 5; Di 46-50, Th 1-3. (Bir 1991A375). (Fig 4)

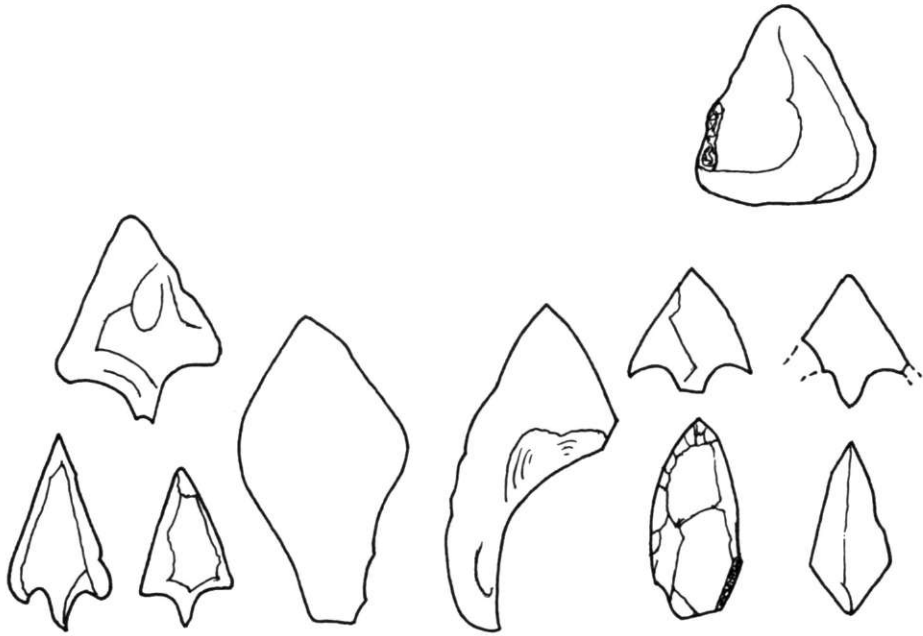


Fig 3 Flint arrowheads from the Carbis Bay area (1:1)

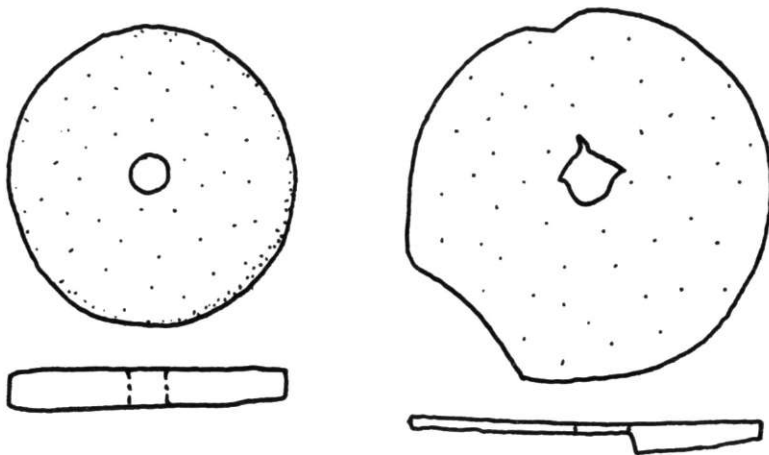


Fig 4 Spindle whorls from Constantine Bay Kitchen Midden (1:1)

Dozmary Pool (SX1974)

Group of 43 Mesolithic flint tools and flakes (War A4028).

Men Scryfys, near Madron (SW427353)

Early Bronze Age whetstone or rubber; oval with oval section. Surfaces polished smooth but edges battered in places. Group I greenstone, L 75, W 57, Th 28. (Bir 1958A684).

Porthcurno area (SW32)

A group of about 80 flints (blades, scrapers, cores etc.) ex J.R. Ratcliffe who was given them by J.G. Marsden of Porthcurno (c.f. PPS 3 (1918–19), 59ff.). In a letter dated 27.10.19 Marsden describes them as 'a selection containing the more ordinary types that are found round here, mostly from cone sites.' The majority of the pieces are marked in pencil with a locality, presumably the findspot: there are 12 pieces from Greeb, 8 from Raftra, 7 from Trevilley, 4 from Treen, 2 each from Bosfranken and Selina and a single piece from each of Bosliven, Crean, Down's Barn, Polgigga, Porthcurno, Rospletha, Trebehor, Trendrennen, and Treverven. In addition there are 7 pieces marked 'RKL' (for Rokestal?) and 6 marked 'RK Cliff'; 3 pieces have 'RPL' (for Rospletha?). Uncertain readings include Bosistow?, Saw?ah, Trelico?, Treridden? and Trewey? And there are about 10 pieces with no markings. (Bir 1946A4.200).

Porthcurno area, Rospletha (SW3822)

White iron-stained flint with some cortex on one face (Bir 1946A4.4).

St Ives, Helleslast? (cSW5140)

Flat, oval suspension weight with perforation near one end which is slightly tanged. 'Found near the Bronze Age village.' 94 × 73 × 13. (Bir 1991A367). (Fig 5)

St Ives, Hellesvean (SW5040)

Four stone spindle whorls/suspension weights Di 28, Th 13; Di 29, Th 9; 73 × 55 × 12; 26 × 33 × 15. Ex J.S. Champion of Carbis Bay. (Bir 1991A377).

St Ives, Millpool (SW5140)

Neolithic/Bronze Age worn point on a thick narrow flake; buff flint with some cortex. Ex J.S. Champion. (Bir 1991A133).

St Ives, Tregenisa (SW5140)

Neolithic/Bronze Age flint flake; ex J.S. Champion of Carbis Bay.

St Ives, no detailed provenance (SW5140)

Black stone axe. Polished on blade half only. Slightly convex sides to narrow rounded butt. Sharply curved cutting edge with no distinct junction with sides. L 93, W 54, Th 25. (Bir 1988A16). (Fig 6)

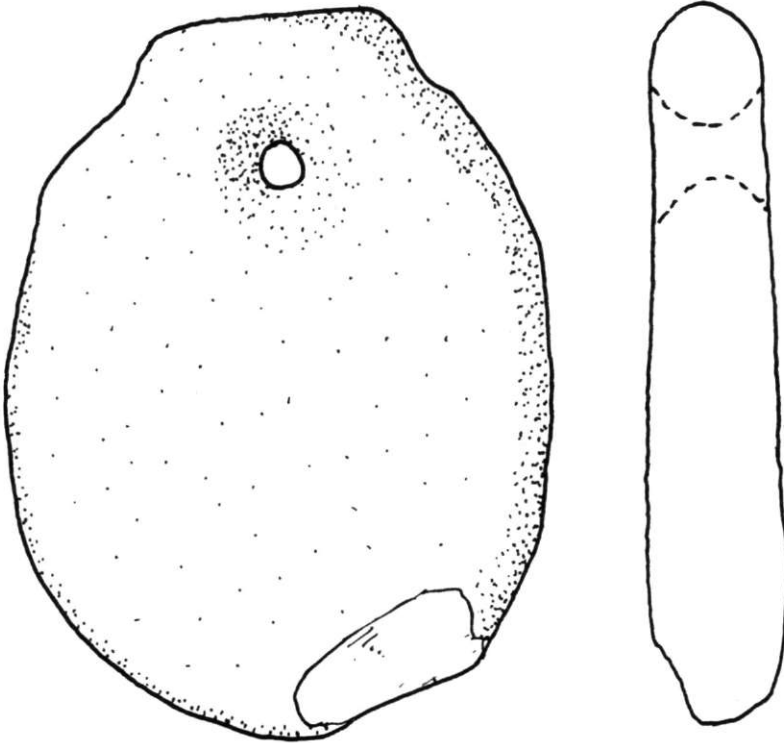


Fig 5 Suspension weight from St. Ives area (1:1)

Fragment of flint axe/chisel. Buff flint. Ground on edge only. Straight, slightly tapering sides; curved cutting edge. Butt lost. L 74. (Bir 1988A17).

Barbed and tanged arrowhead of Sutton type c (approaching Kilmarnock) in dirty beige flint with brown patches. L 35, W 21. (Bir 1991A391). (Fig 7)

Sixteen flints, mainly blade tools but including 2 burins, 1 button scraper and 1 natural piece. Various colours and qualities of flint. Ex J.S. Champion of Carbis Bay. (Bir 1991A135).

St. Merryn, Harlyn Bay (cSW875755)

Mesolithic flints. Group of 50+ microlithic tools and flakes mainly in white-buff flint but some in pale fawn and grey and two darker grey. (Bir 1991A130).

St. Wenn (SW9664)

Basin shaped lump of tin; Bronze Age? (Bir).

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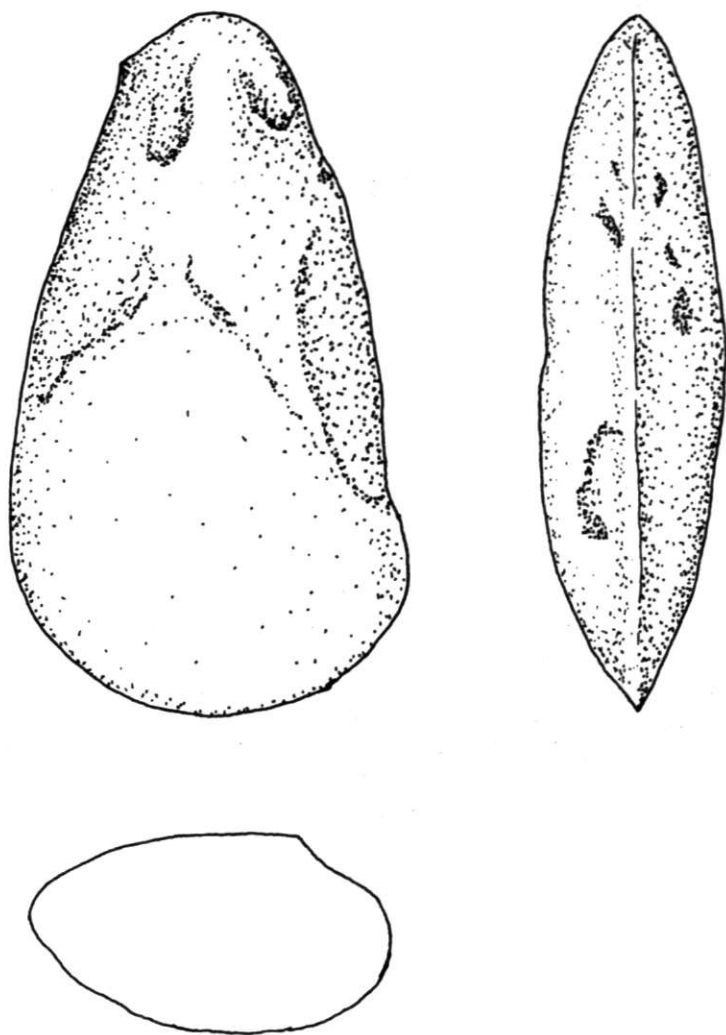


Fig 6 Stone axe from St. Ives (1:1)



Fig 7 Arrowhead from St. Ives (1:1)

Tintagel Island 1994: An interim report

CHRISTOPHER D. MORRIS

Two excavation seasons were undertaken in 1994 under the direction of the present author assisted by Dr Colleen Batey (of Glasgow Museums). A three week campaign at Easter was followed by a four week training excavation for Glasgow University students in September. This represented the most concentrated effort to date on a project started in April 1990 (see Morris 1991) and continued through short seasons in 1991 (Morris 1992) and 1993 (Morris 1995). Work was carried out in five separate excavations in total, with the Easter season being largely concerned with the completion of excavation on the Lower Terrace and the first part of examination of the relevant areas of the Middle Terrace, prior to the main excavation on that area in September (Fig 1). The discovery of further complex deposits on the Lower Terrace necessitated the continuation of work in that area through the September season. Efforts were also focused in September on the Upper Terrace, first examined in 1990, and a further location on top of the Island to the west of the 'Garden' enclosure.

Lower Terrace

After the work of previous years on the Lower Terrace, it was felt that the stratigraphy left in this trench would be limited. However, this proved not to be the case as excavation of further complex deposits during the Easter season demonstrated. This discovery necessitated the redirection of some of our efforts to this terrace in the September campaign in order that the full archaeological potential of the area be realised.

The area that required further work was that of the original Area C03/4 and the results were very fruitful, adding a further nine phases to those known by the end of the 1993 excavation.

The earliest of the phases was characterised by the remains of two walls collapsing eastwards towards the sea and may indicate what has been lost from this terrace through natural erosion. One wall was located in the north-east of the trench after removal of the bank and curved round to the north to define a D-shape. A large notched slate was used in the wall and may have been a timber support. The other wall was located in the SE of the trench and was of a more ephemeral nature. Following this phase of walling was an attempt at levelling the ground surface of the terrace using the abundant shillet to create a surface for some structural feature, whose character is not clear.

Above this phase of levelling, two possible floor layers were identified. A large piece of structured charcoal was recovered in association with these floors and may represent the

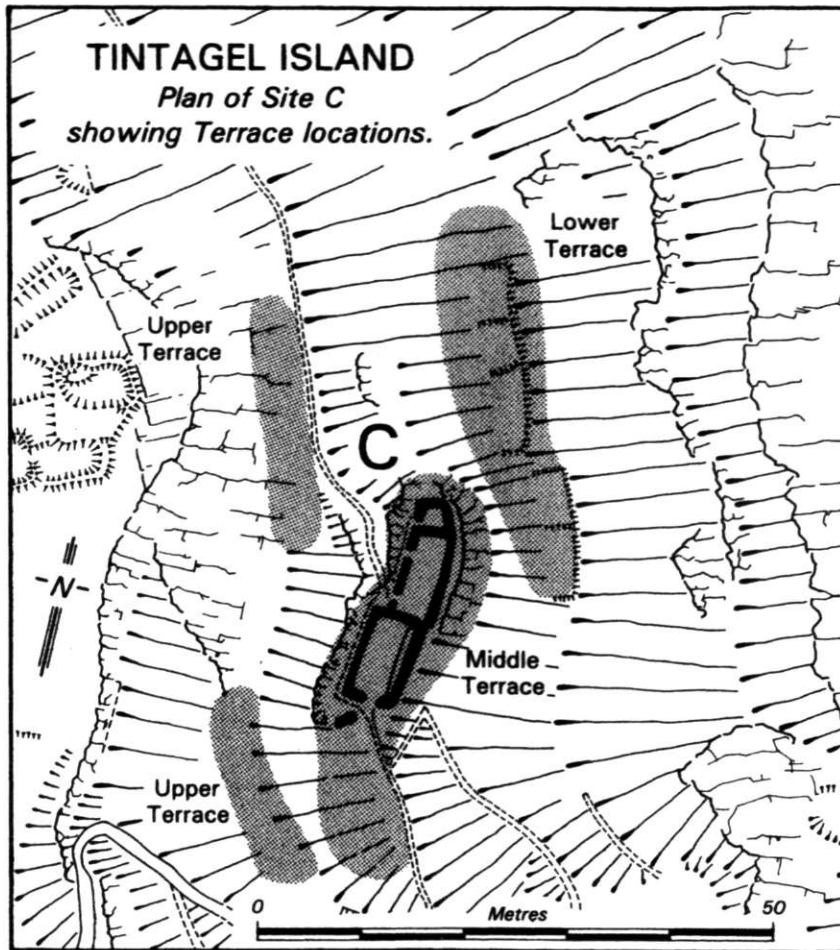


Fig 1

remains of the end of a burnt stake. Also in this phase was a charcoal filled, stone box hearth consisting of upright stones around a square base of flat slates. Associated with the hearth were three charcoal filled stakeholes, possibly representing the remnants of a windbreak.

The layer directly above this produced a fire pit, again surrounded by charcoal filled stakeholes, set in a concreted floor surface. Three worked quartz flakes were recovered from this phase and a piece of possible Roman glass, and a tiny piece of burnt bone was found in association with the fire pit.

Above these features successive new floor levels were laid down, the earliest of which produced a small piece of burnt bone, two notched slates, a worked slate disc and an incised slate. The floor level above this revealed a figure-of-eight shaped feature surrounded by charcoal filled stakeholes and several stone objects including a small piece of burnt flint flake. Again, a number of possible clay floor surfaces overlay this burning but produced only two spreads of charcoal, a tiny piece of burnt bone and a perforated slate.

Another attempt at levelling the terrace using shillet characterised the phase succeeding this activity and prepared the surface for the hearth that dominated the next phase. This had two flat slabs as its base and was surrounded by five stakeholes. Both the stakeholes and hearth proved charcoal rich and were sampled. The phase succeeding this was first excavated in 1993 and the continuation of work in 1994 uncovered a further two hearths.

This concluded excavation on the Lower Terrace, whose stratigraphic and structural history proved to be far more complex than anticipated when first begun in 1990!

Middle Terrace (Fig 2)

Work on the Middle Terrace continued on from the trial work of 1993 and indeed was greatly expanded. The metre wide strip opened as *Trench C10* in the preceding season was expanded to incorporate the entire area within the southernmost room (Room 1) of the building complex and the east wall and bench.

The earliest features, directly above the bedrock, appeared to have survived undisturbed by Ministry of Work's consolidation carried out in the 1930's. The lower two to three courses of the east bench were unmortared, as were the bottom two courses of the east wall, and therefore probably original. Some evidence of attempts at levelling the surface were also noted and appear to relate to the original construction of the building, with which two sherds of imported pottery (B ware) were associated. A rectangular shaped socket (the fill of which produced a red glass bead) was uncovered at the southern doorway and may be the slot for an original doorpost.

All other excavated deposits and features in this trench clearly related to modern activity. The frequent occurrence of pickmarked slates pointed towards contexts being backfill from from Dr C A R Radford's excavation in the 1930's and the reconstructed wall levels were evident due to the use of concrete and mortar. Part of the consolidation of the building (carried out some time between the 1930's and the 1960's) had included the levelling of the interior of the building and this was reflected in the wide range of ceramics recovered from the same contexts, ranging from 5th–6th century, through medieval and up to the twentieth century. A 1951 shilling was found associated with the wall reconstruction.

Trench C11, as with C10, was extended from its 1993 proportions to cover the entire area of Room 2 of the building complex on the Middle Terrace. Again several early, original features were uncovered, including two post slots cut into the bedrock at the north and south doorways of C11. Original levelling of this area appeared also to have survived intact and incorporated two fine sherds of imported ware at the east side of the trench where the terrace slopes down to the Lower Terrace. However, there was also a clayey patch with carbonised material on the west side of the building (but with no stratigraphical relationship to it) which contained apparently medieval pottery. Its stratigraphical situation (below MoW levelling) is such that it could be quite late in the sequence and, if undisturbed, may indeed relate to a period of *re-use* of the building in the later medieval period (or, if re-deposited, be the result of the twentieth century activity here). C11 extension, located outside the building to the east, produced much the same pattern of levelling and including one sherd of imported ware associated with the activity. As noted in C10, the original walling survived to some two to three courses of unmortared masonry. This was built upon, using concrete and mortar bonding, and the same pattern of Radford backfill, MoW reconstruction and consolidation, as was noted for C10, was evident here. The eclectic, multi-period assemblage of artefacts in single contexts followed the pattern of the trench to the south.

The northernmost room of the building complex (Room 3) was opened for the first time in 1994 and was excavated as one area, *Trench C12*, covering the whole room. The stratigraphy and extant original remains closely followed the picture noted for C10 and C11, with

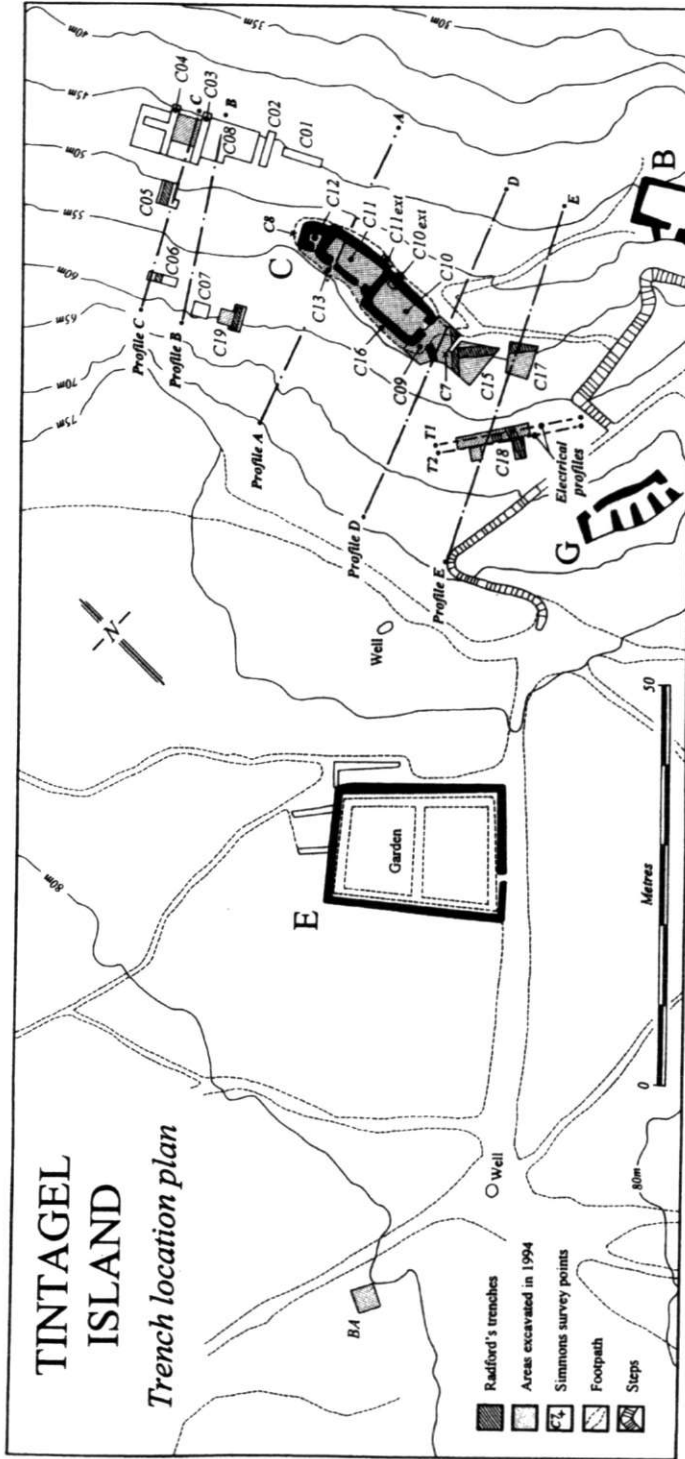


Fig 2

unmortared courses at the bedrock level being built upon mortared stones, for reconstruction, earlier this century. Two sherds of Bii amphora came from the levelling up, but otherwise the artefactual assemblage was poor. The disturbance resulting from the Radford excavations was again recorded in this room.

To the west of C11, another trench (*Trench C13*) was opened at the modern footpath. This was primarily to establish whether the area outside the building (Room 2 and 3) had been excavated previously and if, indeed, some deposits remained intact below MoW consolidation work. A similar pattern of undisturbed levelling, associated with imported pottery, below disturbed deposits, was revealed.

Trench C16 was located to the west of the building complex outside Room 1, and eventually joined C09. Again, levelling of the bedrock was evident and it seems clear that this was done for the original construction of the building. One large fissure had been deliberately filled and produced two sherds, one a possible Roman period native ware, the other a sherd of the imported pottery (Bii amphora) found all over the Middle Terrace. Two rock cut 'footstep' shaped features were also uncovered and may represent post settings similar to those excavated elsewhere. These were sealed by deposits yielding imported ware. A drain found in C09 stretched into the most southerly part of this trench and the west wall of the building exhibited the same details as noted elsewhere, with similar finds assemblages.

Perhaps the most rewarding of the trenches opened on the Middle Terrace was that to the south of the building complex. *Trench C09*, briefly examined in 1991, was extended across the whole of the front of the building and produced undisturbed structural remains. This area was not fully excavated as appalling drainage problems continually left the area under water. The main structural element revealed was a flagstone capped drain which ran from the SW corner of the building, past the south entrance and on to the east of the terrace. Over twenty units of imported pottery were recovered, either above this drain or in association with it, and all come from apparently undisturbed contexts. Interestingly, and unusually for this site, bone was recovered from this area along with other finds including charcoal. The waterlogged nature of this part of the trench promises rich ecofactual evidence from the sampled drain fill. More work is required in this area to better understand the engineering employed in the construction of this impressive feature.

Other parts of C09, most notably to the east, exhibited the signs of Radford excavations and MoW consolidation noted inside the building and associated with its reconstruction.

Trench C15 was located to the south of Trench C09 in a successful attempt to exactly pinpoint Radford's 1930's trenches in that area. This area has great potential for future work as parts of a previously unrecorded structure were noted, which may prove to be associated with a small section of walling at the south end of C09. Many units of both fifth to sixth century imported ware and thirteenth century medieval wares were recovered from this trench, and the relatively undisturbed stratigraphy of this area may well have much of interest to bear upon the interpretation of the excavations and reconstructed buildings of Site C. *Trench C17* to the south located another Radford trench cutting through undisturbed deposits, presumably associated with this new structure.

Upper Terrace

Work on the upper terrace was largely concerned with locating several of Radford's trenches from the 1930's and followed up work begun in 1990 with Trenches C06 and C07. Trenches C18 and C19 were successful in doing this but afforded only the slightest glimpse of extant deposits in section. Both imported wares and medieval pottery were found in significant numbers from the disturbed scree deposits and Radford's backfill, indicating the potential of the undisturbed parts of this terrace (especially at the southern end). This is again an

area where future work may prove fruitful, on the analogy of the quite unexpected structure and deposits from the Lower Terrace.

Top of the Island

One further trench was opened in 1994 (*Trench BA01*) and was in response to HBMCE's attempt to find, or create if feasible, an 'archaeologically sterile' area upon which a pump house could be built to help prevent a repeat of the disastrous fire which swept the top of the Island in 1983. The area turned out to have very complex stratigraphy involving extensive rabbit burrows and large sections of collapsed walling, and proved to be artefactually rich, with fifth-sixth century pottery, slag and charcoal. The opening of this trench served to highlight the wealth of archaeological remains that exist all over this fascinating site and the difficulties involved in selecting any area in which to provide services.

Other work

Further to the three profile surveys (A, B and C) recorded across the Site C complex of terraces in 1991 and 1993, two more were added (D and E), which crossed the Upper, Middle and Lower Terraces.

The environmental sampling programme continued to form an integral part of the excavation process at Tintagel and continued along the lines of previous years. The combined total of samples taken across the two seasons of work in 1994 was 144. Of these, 58 samples were sent to Bristol for laboratory analysis. The samples sieved on site had a combined weight of 2288 kg and combined volume of 1741.5 litres. All of the samples sieved produced charcoal, 73 in moderate amounts, 6 frequently and only 7 occasionally. Bone was again notably absent from the samples processed on site, although some of the laboratory samples may yet produce this category of ecofactual material.

Yet again, the public interest in the Island in general and our excavation in particular was keen. As in previous years our guided tours were well received and the explanatory notice-board, location map and illustrated leaflets were eagerly perused by many visitors. The small-scale nature of the Easter campaign meant only three tours a day were organized and attracted some 120 people over eighteen days, sometimes in the most atrocious weather. The extra number of people available to the team in September meant that five tours a day were run, each day a different student. Over twenty eight days this attracted 911 people, clearly showing that any future excavation could gainfully employ a full-time guide.

Summary

In summary, 1994 was an exceptionally successful year for the excavation programme at Tintagel. The most surprising aspect was the continued recovery of archaeological material, and more particularly structural deposits, on the Lower Terrace. It is clear that there were several phases of occupation prior to the arrival of imported pottery to the site. A reasonable hypothesis would be that there was a gradual retreat back up the slope and away from the cliffedge, with the earliest occupation phases now lost or inaccessible.

On the Middle Terrace, the picture is rather different, for the investigations were concerned with the nature of the structures and deposits associated with 'Site C'. Areas C10, C11 and C12 have proved to be limited in what has survived intact from earlier excavations but C09 and C16 were very rewarding and demonstrated that Radford had concentrated on the interior of the buildings. The area to the south of the Site C buildings (C15 and C17) have great potential and future work must be concentrated here, in part to throw light upon the

Radford excavations. The Upper Terrace work helped to clarify the extent of previous excavations and the trench on top of the Island shows how much potential there is to be tapped into at Tintagel, if a coherent long-term strategy of research is undertaken.

Acknowledgements

As with previous years a debt of gratitude is owed to the Regional Director, P.I.C. Inspector, Ancient Monuments Laboratory staff, Custodial and Maintenance staff of English Heritage for administrative, scientific and depot services. On site, particular thanks are owed to Dr Colleen Batey; my co-director, who directed the Easter programme due to my continuing back injury problems. As usual, Rachel Harry and Paul Johnson supervised many aspects of this season's work, and were invaluable assistants in both parts of the season. Carl Thorpe acted both as visitor guide (and student trainer for this aspect of the work in September) whilst keeping on top of the daily finds recording. Both Charles Thomas and Vanessa Straker contributed significant specialist advice on site to the directors and supervisors, who are most grateful to them. A comprehensive interim report of the 1994 season has been prepared and distributed through English Heritage. The Lower Terrace final report is now at an advanced stage of preparation for publication in the *Antiquaries Journal* in the near future, and work has begun upon the first part of the Middle Terrace report.

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Recent work by the Cornwall Archaeological Unit

Aerial reconnaissance in Cornwall, 1995

We have recently completed a review of the results of the past ten years of aerial photography by the CAU air photo team at the request of our main funding body for this work, the Royal Commission on the Historical Monuments of England. The review provided a timely opportunity to assess the cumulative coverage of the county and the nature and distribution of new sites and discoveries. The following areas have been identified for particular attention.

1. Two areas of the county have produced numerous new cropmark sites and in these areas sites are now densely distributed through the landscape. The Roseland and the area around the Camel estuary have been selected for intensive, long-term, reconnaissance since these areas provide the best locations for studying later prehistoric settlement patterns.
2. Parts of the Lizard 'in the shadow of' RNAS Culdrose, have been underflown because of the difficulty of overflying helicopter training zones. These areas have demonstrated good cropmark potential, but are under-represented in the record.
3. Areas in the north and east of Cornwall have been regularly flown over the period of the project, but apart from one or two notable exceptions, have not produced dense clusters of cropmarks largely because they support predominantly grass and pasture.

With these priorities in mind, and considering the reduced levels of funding available from the RCHME, it was hoped to carry out flights to investigate each of the above areas during the 1995 summer season. After a very wet winter practically no rain had fallen from early June until the end of August in 1995 and expectations for a good cropmark season were high. However, the almost total lack of rainfall coupled with the clear skies and unusually high temperatures rapidly dried out the ground and cropmarks appeared early and were short-lived. Some cropmarks and parch marks appeared later in the season, but overall the results were disappointing. It is unusual, if not unique, to have to report that results did not fulfil expectations because the weather was too good!

Altogether four flights were carried out: the first covered the Lizard and parts of the Roseland, the second looked at the Camel estuary and areas a little further north, the third took in the north and east of the county and the fourth looked at the south-east. In a sense then, the research design was fully implemented; however, the first three flights absorbed all of

the funding from RCHME and it was only as a result of a further grant from the Cornwall Heritage Trust that it was possible to complete the programme. The single flight over each area made it impossible to monitor the development of the cropmarks through the season and it is likely that many more archaeological features appeared than it was possible for us to record.

Best results were achieved during the earlier flights: several new sites were recorded including an oval enclosure close to Culdrose, a small square enclosure adjacent to the extant round at Crasken east of Helston, and rectilinear enclosures (presumed to be Iron Age or Roman) at Trevince on the Roseland and Tregonce near the River Camel. New enclosures were also recorded during the last two flights, including a double ditched enclosure showing faintly near Dobwalls, west of Liskeard, and an extensive complex consisting of circular and rectilinear enclosures representing lengthy occupation possibly involving both prehistoric and medieval phases, at Kerrow near Looe. The number of new cropmark settlement enclosures resulting from the years work will not emerge until the cataloguing has been completed, but it looks to be between ten and twelve sites. Most of these sites appeared as very faint colour differences in the crops and few of them could be reproduced adequately to be included in this report.

Stephen Hartgroves

Caer Brân

The Iron Age hillfort of Caer Brân, Sancreed (SW 407 290) is the most prominent feature within an 18 hectare area surveyed for Penwith District Council to provide information for a Countryside Stewardship scheme. The new survey has produced some exciting and unexpected results. What had always been tentatively described as a central roundhouse, cut by a later post-medieval track, is now interpreted as one of three probably Bronze Age ring cairns, possibly within their own contemporary, banked enclosure.

The study area also contains an abandoned post-medieval granite quarry, a scattered series of prospecting pits and a linear spread of lode-back pits and occasional shafts. Elsewhere there are large numbers of clearance heaps and fragmentary field banks, probably medieval.

Anna Lawson Jones

Tremedda

A classic West Penwith tenement, Tremedda in Zennor (SW 45 39) had been surveyed by a National Trust team in the 1980s (the land was covenanted to the Trust by the late Mrs Elsie Griggs). A management report has now been prepared which identifies 85 sites ranging from prehistoric hilltop pasture boundaries through typical later prehistoric fields and the early medieval farming settlement on the coastal plain to a cliff edge mill and an early 20th century hydroelectric generator shed on the rocky foreshore. The report takes the opportunity to review archaeological management of this internationally important historic landscape, considering such issues as the agricultural pressure to remove the large granite boulders scattered through the fields, and how to record disturbed prehistoric boundaries.

Peter Herring

Kit Hill

Funding has been made available from English Partnerships to consolidate extant building remains at Kit Hill (Phase 1 – coordinated by the County Land Reclamation Officer). These

include South Kit Hill mine chimney stack, the summit chimney stack, the Smithy building at No. 2 Adit and two gunpowder magazines. Archaeological watching briefs were required for the clearance of rubble and the removal of obscuring vegetation. Records were also made where masonry had to be dismantled and rebuilt and measured surveys undertaken during the Kit Hill survey of 1987–8 were updated.

Future phases of the project will concentrate on safety works to surface mine shafts and quarry faces. Kit Hill is currently being considered for Scheduled Monument status under English Heritage's Monuments Protection Programme for Industrial sites.

Colin Buck

Week St Mary

This was once a thriving borough and 45 sherds of 12th/13th century pottery were recovered from the fill of the medieval churchyard boundary ditch during an evaluation of a proposed development site near the church. Possible marking out trenches for the burgage plots of the medieval borough were also excavated.

Charles Johns

United Downs

Archaeological evaluation of the proposed Blackman's landfill site at United Downs revealed the foundations of one of the handful of man-engine houses constructed in Cornwall. The bulldozing of this site during the last war in preparation for a US Army encampment was shown to have destroyed all but the footing courses of this rare structure.

Adam Sharpe

Little Pinnock

A fairly ordinary looking barn at Little Pinnock, Tywardreath (SX 105 537) was closely examined during an archaeological evaluation by Anna Lawson Jones after Restormel Borough Council planning officers had noticed early features during a pre-planning inspection. It proved to be a late medieval dwelling with a 16th century wooden internal doorframe, and 17th century lateral fireplace retained in the 19th century conversion to cowhouse and barn. Its walls are up to 1 m thick and trial excavations showed surviving medieval floors in the lower room. Two other buildings were a simple cowhouse, incorporating some possibly medieval walling, and a more complex early 19th century cowhouse with threshing loft over and stable, cartshed and piggery attached. The whole group has considerable historical value as a relatively unspoilt Cornish farming settlement.

Peter Herring and Anna Lawson Jones

HMS Raleigh

Built c1880, the Martini-Henry Rifle Butts are located on the eastern tip of Deadman Point, at the southern end of *HMS Raleigh* (SX 423 542). Two Cover Blocks, built to shelter men employed to put up and take down targets, are located on the west and east sides of the Rifle Target complex, which consists of two vertical walls retaining an earth bank, in front of which were sited the targets. The newer Trevol range is found immediately north west of the Butts and represents a much larger and more efficient firing range. The CAU was asked to survey the

west cover block (Listed Grade II) prior to repair works (or demolition) being carried out to its deteriorating brick vaulted roof. The overall site was surveyed at 1:200 and the west cover block at 1:50.

Colin Buck

St Budock Church

In April 1995 foundation trenches were being dug for the construction of a new organ loft within the nave of the church, and in the area of the north aisle ground was being prepared for the repositioning of the font when human bone was encountered. Building work stopped and CAU (with funding from the local parish) investigated. Eleven 18th or 19th century graves were recorded along with a succession of five floor levels, three of which pre-dated the graves and possibly relate to building phases from the 13th to 16th centuries. With advice from CAU the builders were able to revise their programme of works so that there was minimal archaeological disturbance.

Carl Thorpe

North Petherwin Church

A Latin gable cross carved out of polyphant stone was recovered at North Petherwin Church during groundwork to upgrade electricity and water supplies to the church. Large quantities of human bone, disturbed by the trenching, were recovered for reburial in a special service by the vicar. Research work included an investigation of documentary sources for the later medieval re-building of the church by Dr Joanna Mattingly.

Charles Johns

St Michael's Mount

In February 1996 CAU undertook archaeological evaluation and watching briefs for South West Water in potentially sensitive locations on St Michael's Mount itself, where a waste pumping station was being constructed, and on the line of the main across to the mainland. A series of trial holes was dug by auger and JCB (kindly provided by the National Trust) along the length of the main, running alongside the causeway; elsewhere in Mount's Bay submerged peat levels have been found, providing evidence for the nature of the early environment; no such levels were found to survive here. On the Mount a 4 m deep shaft was to be dug to house the pumping equipment and sump. A late 19th, early 20th century cesspit that was originally flushed by the sea was encountered which entailed a slight repositioning of the shaft. The shaft revealed in section nearly 3.5 m of made up ground before bedrock was found, indication of massive land reclamation on the north coast of the island, though unfortunately no dating evidence was recovered.

Carl Thorpe

Higher Coldvreath

Following survey of its fields in 1994 the settlement of Higher Coldvreath in Roche was investigated for ECCI in Autumn 1995 in advance of extension of their northern tip at Littlejohns. The farmhouse and its outbuildings were recorded with measured plans, elevations and photographs. Excavation around the farm found no evidence for the suspected

medieval origins of the settlement but suggested instead that it had been established in the 18th century in a far corner of the medieval field pattern of Coldvreath.

Andrew Jones

Isles of Scilly Historic Landscape Assessment

Following on from the landscape assessment for Cornwall prepared in 1994/5, the Unit was pleased to be involved during 1995/6 in a similar exercise for the Isles of Scilly. Commissioned by the Duchy of Cornwall in partnership with the Countryside Commission, this study was carried out by Land Use Consultants, with information on the historic character of the landscape being provided by CAU. The impetus for the project was the intended extension of the Countryside Stewardship scheme to include farms in Scilly and there was as a result particular emphasis on the enclosed agricultural land on the five inhabited islands of the archipelago.

The Unit's role was to describe how the Scillonian landscape had evolved through time and to define a series of historic landscape types, which represent the cumulative effect of historic and natural processes. Using archaeological, cartographic, documentary and place-name evidence twenty-one landscape types were identified and plotted by colouring up copies of the 1:10,000 map sheets. They range from Rough ground (subdivided into heathland, valley bog and dunes) to Communication (roads, quays, heliports) and Foreshore (rocky and sandy).

The farmland, which was the focus of the assessment, was divided into four historic landscape types, identified primarily on the basis of field pattern – that is shape and size of fields – since this had been shown in Cornwall to be a good basis for assessing the period during which a piece of land was first enclosed. The character and extent of these types was checked by a limited amount of fieldwork. Anciently Enclosed Land (AEL) refers to land enclosed prior to the 19th century, generally comprising small fields forming an irregular pattern, and mostly medieval in origin. Late Post-Medieval Enclosures (LPE) are straight-sided fields, usually square or rectangular, which are the result of 19th century taking in of former heathland or remodelling of AEL. Most visually striking are the blocks of narrow, parallel-hedged enclosures created around the turn of the century for flower cultivation (daffodils and narcissi). These Bulb Strips were laid out mainly within AEL (and to a lesser extent LPE), but were created by sub-division of existing fields and so in most cases the line of earlier boundaries has been preserved. Comparison of the 1908 and 1980 OS maps shows that there has been little change in field pattern during this century, with large straight-sided Modern Enclosures being relatively rare. This is particularly gratifying from an archaeological and historic landscape point of view.

In addition to assessing the character of the Scillonian landscape, the aim of the project was to prepare a management strategy that could guide MAFF in its implementation of the Countryside Stewardship Scheme. This involved identifying the key forces for change that could undermine the special character of the farming landscape (mainly associated with the abandonment or neglect of farmland and the conversion of redundant farmbuildings to alternative use), and drawing up island-by-island management objectives to conserve and enhance its historic character. Two typical areas of farmland (Helvear on St Mary's and the southern end of Bryher) were chosen as case studies and a Stewardship application prepared for each to provide a model for future Agreements. The first Stewardship applications have started to trickle in and it is reassuring to know that these can be judged against a background of good understanding of the character and management requirements of the historic environment.

Jeanette Ratcliffe

St Keverne Historic Landscape Survey

The project area covers some 800ha of St Keverne parish in the south-eastern part of the Lizard peninsula; stretching from Trebarveth and Lowland Point in the south to Porthallow and Tregarne in the north, and also including Lestowder near the mouth of the Helford Estuary. At its heart is an enclave of Anciently Enclosed Land, a particularly well-preserved pattern of small fields with farms and hamlets, tracks and lanes which, judging from the evidence of place-names – a concentration of farms with the Cornish place-name element **tre** meaning farm, hamlet or estate – dates back to before the Norman Conquest.

However, to the north and west of the main project area the essential Cornish character of the landscape has been damaged by the removal of internal field boundaries on many farms – ‘the big field syndrome’. Changes in farming practices and lack of management also pose a threat to the survival of the hedges, and thereby the ancient pattern of fields, in the project area.

In an initiative by Mary Combe of Cornwall’s Farming and Wildlife Advisory Group, the area was defined as a Group Farm Conservation area, and subsequently identified as a target area for the Countryside Commission’s Countryside Stewardship Scheme under the ‘Historic Landscape’ option. The CAU assessment, which was funded by English Heritage and MAFF, was designed to assess the archaeological and historic importance of the area and, by providing specialised input on the historic character of the landscape, formulate proposals for management and presentation.

A desk-based study of old maps, documents and photographs, a search through the Cornwall Sites and Monuments Record and a scan of aerial photographs was followed by a programme of fieldwork carried out in the winter of 1995–6.

The fieldwork provided an opportunity to study the construction of the hedges in the area and find out about traditional local methods of repair and maintenance. An exciting result of the fieldwork was that the linear field pattern in the south of the area, at Lowland Point and on the farms of Trebarveth and Trevean, probably represent the fossilised boundaries of a field system laid out in the Bronze Age, over three thousand years ago. Elsewhere in the project area the boundaries preserve the outline of medieval field patterns.

The results of the assessment are presented in a report which includes an inventory of archaeological and historical sites in the area, general management recommendations such as presentation and hedge repair plus detailed farm by farm recommendations. The main objectives of the project are to ensure the continued survival of the pattern of ancient fields in the area by positive management of the field boundaries and to improve public appreciation of this important historic landscape.

Charles Johns and Peter Herring

Hawkstor and Ivey Farms: survey for Countryside Stewardship

Hawkstor and Ivey Farms comprise some 4.75 square kilometres, in the heart of Bodmin Moor, which contains a range of well preserved archaeological sites. Part of the farms are also registered Sites of Special Scientific Interest.

Included within this area is the remarkable hill of Garrow, which includes the remains of 180 Bronze Age hut circles and a medieval longhouse settlement partially excavated by Dorothy Dudley in the 1950s; as well as Carkees Downs, Scribble Downs, Hawkstor Downs and Ivey.

The owners of the farms, Mr. and Mrs. Mansfield, have decided to include their land within a Countryside Stewardship Scheme. Such schemes give incentives to farmers who manage ecologically and archaeologically important land in a sensitive and traditional manner. It is

hoped that that this Stewardship Scheme will establish a model of conservation practice for other farmers on the Moor.

The Cornwall Archaeological Unit was commissioned by English Heritage to prepare an archaeological assessment to identify, map and interpret all known archaeological sites within the Stewardship Area, and to make management recommendations for their conservation to guide future landscape management. An archaeological sketch survey at 1:2500 was undertaken; previously known sites such as the hut circles on Garrow, the Neolithic henge and post-medieval farms on Hawkstor Downs were visited, and a number of new sites were recorded for the first time. These included a number of burial cairns on Scribble Downs, prehistoric boundaries on Hawkstor Downs and a post-medieval tinner's shelter on Carkees Downs.

At present, the vegetation on this section of moor varies between low grass cover and bracken, gorse and thick molinia (purple moor grass). Discussions are currently underway with local environmental agencies, concerning the best methods to maintain this area as heathland or low grass cover. Such actions will add to the enjoyment of the area for individual members of the public and educational groups, whom Mr. and Mrs. Mansfield welcome onto their land.

Richard Cole

Fal Estuary Historic Audit

During 1995 and 1996 Cornwall Archaeological Unit carried out an historic audit of the Fal Estuary. Funded primarily by English Heritage, but with financial contributions also from the District and County Councils, this project came about as a result of a request for more comprehensive information on the historic resource of the estuary. This was required to ensure that well-informed policies for the historic environment could be included in strategic guidelines being drawn up by the Falmouth Bay and Estuaries Initiative (FBEI). The latter, part of English Nature's Estuaries Initiative, is aimed at promoting the long-term, sustainable use of the area. The historic audit was seen as a necessary complement to two other studies commissioned by the FBEI – an ecological overview and an examination of the coastal processes affecting the estuary.

The Fal Estuary is one of the finest natural harbours in the world, which has served as a refuge for shipping for thousands of years. A drowned river valley which began forming during the Quaternary, it now consists of a deep tidal basin opening into Falmouth Bay and fed by numerous rivers and creeks. The estuary is tidal for a distance of 18 kilometres inland and has a shoreline totalling about 115 kilometres in length.

Human activity around the estuary probably dates back to the Mesolithic, when sea level in southwest England was an estimated 35 metres lower than today. Submerged forest deposits recorded at a number of locations are probably of this date. Evidence for later prehistoric and Romano-British occupation is provided by the remains of barrows, cliff castles and defended farmsteads (rounds). During the early medieval period the basic rural settlement pattern that endures today was established, place-name evidence making it possible to recreate the distribution of pre-Norman farming estates and early Christian *Lanns* (enclosed settlements containing a chapel, a burial ground and a few houses). Some of the latter developed into the medieval parish churches which are tucked up many of the estuary's creeks. From medieval times the Fal Estuary became a major focus in Cornwall for local and foreign trade, its position on the south coast making it ideal for contact with the continent.

Ports, such as Truro, Tregony and Penryn, were initially established at the heads of navigable creeks where they had good access to their hinterlands and were less prone to raids by pirates and enemy ships. However, the gradual silting up of the upper part of the estuary with waste from tin workings and the increased size of ocean going ships led to ports being

established nearer the estuary mouth, which owing to the construction of artillery forts in the 16th century had been rendered less vulnerable to attack. Falmouth, in particular, defended by Pendennis and St Mawes Castles, rapidly developed into a port of international renown. The haven's strategic location at the gateway to the English Channel made it very important in terms of coastal defences and it was successively fortified over a period of 400 years (from 1540 to World War II), Pendennis Headland being one of the most important military complexes in the country. In addition to fortifications, there are numerous other post-medieval sites and structures around the estuary, reflecting intensive activity associated with industry, trade and maritime safety and regulation: remains of pilchard cellars, bakehouses, mills, shipyards, sail lofts, mine workings, smelting houses, foundries, smithies, ropewalks, limekilns, malthouses, brickworks, timber ponds, sawmills, quarries; quays and slipways, wharves, warehouses, boat-houses, railways, viaducts, bridges, carriageways, ferryman's cottages; lighthouses, coast-guard lookouts; navigational markers; customs houses; castle, forts, batteries, D-Day embarkation beaches and pillboxes.

This is the first opportunity in Cornwall for the historic environment to be fully integrated in an estuarine management strategy. The project has also served as a pilot in Cornwall for studying the history of an estuary and coastal archaeology, and for integrating information on wrecks (provided by the RCHME) and World War II sites (identified by the Defence of Britain Project). The aim of the audit (which included a desktop assessment and limited fieldwork) was to gain an overall impression of the historic environment, the historic components that comprise it and its management requirements. The emphasis was on rapid recording of sites and structures which are estuary specific by virtue of their location and/or function. A report of the results of the audit is currently being compiled and when completed will form the basis for the future protection, conservation and promotion of the historic heritage of Cornwall's most important estuary.

Jeanette Ratcliffe

Scheduled Monument Management Project

The scheduled monument management project has continued successfully this year. The project relies upon grants from English Heritage, the Cornwall Heritage Trust and Cornwall County Council, which are pooled to form a budget used for conservation works to scheduled monuments in Cornwall. A variety of monuments have benefited this year, including a medieval wayside cross, a stone circle, an Iron Age hillfort, an 18th century canal culvert and a 19th century stamping mill.

Two of the jobs have been to monuments suffering severe animal erosion – a direct result of late 20th century farming economics and practice. Damage of this sort is regrettably all too common to earthworks nowadays and while it may not be too difficult to repair, it may be difficult to sustain the improvement without removing the source of the damage. We are learning that very careful aftercare is necessary for work of this kind, to prevent damage to new repairs. A further small repair job at the Rillaton Barrow was to a monument suffering from the pressure of human feet.

It is perhaps another sign of the times that two of the projects have arisen as a result of vandalism – to the Nancor Cross near Grampound, and the Merry Maidens Stone Circle. However, these have also revealed one of the strengths of this project. With the existence of the monument management budget, we are able to react rapidly and provide quickly for the necessary recording and restoration, without involving too much bureaucracy.

The project this year has involved a number of groups and individuals across the county, and several field workers from the Unit. The projects are often of great interest to local people and have attracted publicity which helps to raise the profile of archaeology in Cornwall.

In 1982, the entrance grave at Brane (SW 4014 2818) was described as one of the best preserved chambered tombs in Britain; but by 1989 it had deteriorated to one of the worst cases of erosion in Cornwall. Where the kerbstones retaining the mound were missing, cattle were getting onto the mound, dragging the stones and earth to the ground. With the help of Mike Rosendale of Penwith District Council and the co-operation of the owners, the Wherrys of Brane, a plan to repair the entrance grave was devised. New granite kerbstones were provided to replace the missing ones and the mound re-formed. Andrew Marment, Marcel Deigan and Morgan Marment carried out the work under the supervision of Mike Rosendale; a watching brief was carried out by Ann Preston-Jones of CAU.

Bury Down Fort in Lanreath (SX 188 594) is an excellent example of an Iron Age hillslope fort. The inner rampart is particularly well preserved except in one section where stock erosion had created a bare, vertical scar over 10 metres long. Increased gorse growth was also a problem in places. The owners, the Tamblyns of Botelet, were very sympathetic to proposals to repair the erosion and so in September 1995 a team from the British Trust for Conservation Volunteers spent a week on Bury Down, cutting scrub and re-forming the eroded rampart. A timber revetment was constructed, to retain the soil-filled sand-bags which were used to fill the scar. Soil laid over the top of the sand-bags was held in place with geojute matting and the whole thing finally turfed over.

Porthmoina Mill (SW 4175 3670), dramatically set near the cliff edge at Bosigran in Zennor, is an early 19th century water-powered tin stamping and dressing mill. Although generally in good condition, the stability and safety of the wall revetting the spalling (ore-breaking) floor were of particular concern to the National Trust, owners of the monument, since the Cornwall coast path runs alongside it. In October 1995 the massive boulders which had fallen from the wall were replaced and the spalling platform restored by contractor Alan Matthews under the supervision of Andrew Monteith and Paul Bonnington of the National Trust. Peter Herring of CAU drew elevations of the wall before and after repair and produced a leaflet for the public describing the site and explaining what was taking place.

The Merry Maidens (SW 433 245) is the best preserved and probably the best known stone circle in Cornwall. It came as a shock then, in June 1995, when Mike Rosendale of Penwith District Council reported that the circle had been vandalised: one of the stones had been uprooted and left prostrate on the ground. Before the stone was re-erected, the stone hole was excavated by Charlie Johns and Andy Jones of CAU. They made the surprising discovery that the stone had originally been set at right-angles to the circle and that when restored in the 19th century it had been turned through 90° and placed in line with the circle. On this occasion, the stone was set up again as it had been before vandalism. It was re-erected by Andrew Marment and Marcel Deigan, under the supervision of Mike Rosendale, on the occasion of a visit to Cornwall by English Heritage Inspectors and Field Monument Wardens from southern England.

In February 1995, the Nancor Cross (SW 944 483), which stands at a road junction just outside Grampond, was vandalised. It appeared to have been hit on the head with a blunt, heavy instrument and was found lying on the ground, broken in four pieces. The fragments were rescued by Cornwall County Council's Transportation and Estates department and stored in their depot at St Austell until Sue and Lawrence Kelland were able to carry out the necessary repairs. After some initial problems, the cross was finally restored on St Piran's Day – March 5th – 1996, by the Kellands with assistance from Andrew Langdon. It was re-erected in a more prominent and hopefully less vulnerable location suggested by Dave Stark, Transportation and Estates' Area Surveyor. Transportation and Estates also helped in preparing the base.

Ann Preston-Jones

Four Holes Cross

Four Holes Cross, a Scheduled Monument situated on Bodmin Moor beside the busy A30 road on Minzies Downs (SX 1714 7495) was excavated by Nigel Thomas and Carl Thorpe prior to removal and storage during road widening. When removed the cross was found to have been re-sited, probably several times during its known history. Decoration near the bottom of the cross shaft was revealed and the cross was also found to have the remains of a tenon, indicating that it once stood in a base stone.

A limited amount of documentary research was also carried out. The early history of the cross is obscure and the monument is not recorded until the 18th century. Its decorative style suggests it dates from the 11th century. The cross probably served as a waymark to guide travellers following a trackway across Bodmin Moor. Its highly decorated shaft and head is a relatively rare feature in such a remote location and this suggests that the cross may have also been a memorial. No inscription has been recorded on the stone. Map evidence suggests the cross was formerly sited on the Blisland/St Neot parish boundary. At some time, probably in the mid 19th century, the cross became a boundary stone for Lord's Waste farm.

The upper part of the cross head was damaged in the dim and distant past, apparently by 'militia who saluted it with a volley of bullets'. This tradition may relate to an episode in the Civil War. John Swete illustrated the cross in the late 18th century and showed a fragment of the head lying beside the shaft. Later engravings of the cross do not show the fragment, which may have been pilfered.

After completion of the road works, the cross was replaced on a new site just a few metres away from its previous location. A new granite base stone was prepared and the shaft refitted. Replacement of the cross using a crane attracted considerable local and media interest. The stone was turned around 90° to make the cross more visible from a distance. Addition of the base stone has also allowed more of the cross shaft, including the full extent of the decoration, to be seen.

The project was undertaken for the Transportation and Estates Department of Cornwall County Council acting for the Highways Agency. CORMAC (Andy Brodest and colleagues) provided considerable practical assistance throughout the project. David Attwell of North Cornwall Heritage Coast and Countryside Service organised the acquisition and setting up of the new base stone and helped further with the re-erection of the cross. Advice was given at all stages by cross expert Andrew Langdon.

Nigel Thomas

Golden Keep, Probus

Golden Keep (SW 9210 4685), a Grade II* Listed Building belonging to the Trewithen estate was restored and upgraded for re-letting during the winter of 1995–6. An archaeological watching brief was maintained by Nigel Thomas, in co-operation with the Building and Design Department of Stratton Creber. The Trewithen estate funded the archaeological work.

Golden has been of importance since prehistory, when a hillfort was constructed on a spur overlooking the River Fal. In later medieval times, Golden was the centre of a manor belonging to the Wolvedon family. In 1514 the Tregian family acquired Golden by marriage. The Tregians were tin merchants who owned several manors and also obtained status and wealth from their position at the court of Henry VIII. Staunch Catholics, they had family links with the Arundels of Lanherne. They appear to have enhanced Golden according to their status as John Leland recorded a house under construction here in 1538.

Golden is well known as the place where Cuthbert Mayne, a Catholic priest, was arrested in 1577. Mayne was taken to Launceston, tried and executed. Francis Tregian was imprisoned

and his estates confiscated. The family tried to regain possession of Golden but refused to give up their faith and through debts and legal battles their property was acquired by Protestant owners. In more recent centuries Golden has been succeeded by the development of an estate centred on nearby Trewithen.

The present house, Golden Barton, is a much altered building and may incorporate materials from an earlier structure. Golden Keep is a relatively small brick building adjacent to the Barton. It has previously been suggested to have been a gatehouse and/or a slaughterhouse but neither of these interpretations has proved satisfactory. When Listed, the Keep was recognised to contain finely moulded granite door and window frames and Tudor diaper brickwork (dark coloured bricks placed in decorative diagonal patterns). Early diaper work is not known elsewhere in Cornwall and, on the strength of the evidence now available, Golden Keep appears to be the earliest brick structure in the county, dating to the earlier 16th century.

Architectural and map evidence indicates that Golden Keep is a fragment of a much larger structure. It may be the corner of a courtyard plan house (similar to Cotehele, Pengersick and Godolphin). Other fragmentary brick-built structures around Golden Barton may relate to it. Inside, the structure bears hallmarks of a high status domestic building and the presence of four pointed niches on the ground floor suggests positions for religious icons (a probable connection with the Tregian family).

Restoration works included trenching around the building and removal of internal render, allowing the opportunity for detailed elevation drawings. Survey demonstrated that the Keep has a complex structural history. It has undergone several changes of use including a dovecote and pound house (for cider making). Its present incarnation as a cottage dates to the 19th century. Removal of a 19th century floor revealed a fragment of a brick floor beneath and an associated granite footing, apparently contemporary with the early house.

Many questions remain unanswered at present, but it appears that the Keep and its surroundings could provide many clues to the story of Golden.

Nigel Thomas

Pengersick Farm

Pengersick Farm near Praa Sands (SW 5813 2843), covers part of the site of Pengersick Castle, a late 15th or early 16th century fortified residence of which the main surviving component is an impressive tower.

Built by Thomas Worth c1490s to 1502 it comprised a western courtyard with a small tower overlooking the entrance, a hall range on the eastern side, possibly other ranges on the west and south, with a four storied rectangular tower adjoining the hall on the south east side forming a salient angle to cover the curtain walls with its gunloops.

In 1571 the property being divided among six heiresses, the castle reverted to the Godolphin family. Their seat of power lying elsewhere, Pengersick was neglected and eventually became ruinous. In the 18th and 19th centuries material was constantly robbed so that by 1734 the Buck brothers' engraving showed the whole castle in ruins apart from the defensive tower.

Pengersick Farm is in the western courtyard of the castle. Scheduled Monument Consent (SMC) was granted in 1990 for the conversion of a barn (a Grade II* Listed Building) and cowshed into holiday accommodation; in September 1995 CAU was contacted by the owners who wished to activate the planning consent, to dig two trenches along the route proposed for drainage pipelines from these buildings to fulfil the SMC requirements, this work being completed in November 1995 by Carl Thorpe and Dick Cole.

The barn proved of great interest. Examination showed it was a surviving element of the castle, a fortified tower covering the main gateway into the western courtyard, standing to first storey ceiling height. Access up to the first floor was by trapdoor and ladder, a defensive

feature allowing its isolation from the floors above should it fall to an assault. The first floor gave access to those above via a newel staircase, the hood of which survives. In the excavation trench a threshold of granite flagstones and a jambstone marked the actual position of the gate.

The wall adjoining the barn, the northern boundary of the farmyard, was identified as a defensive curtain wall.

It was expected that the trench through the cowshed wall would intersect the western wall of the hall range. No medieval remains were encountered; though in the northern wall of the cowshed (part of the curtain wall) a large fireplace in the thickness of the wall at first floor level was observed.

This small scale excavation revealed the form of the fortified entrance way to the castle, the complexity of the building being an indication of the importance of the Pengersick (Worth) family in the 15th and 16th centuries, the defences reflecting the political uncertainties of the region.

Carl Thorpe

Callestick

In the Autumn of 1995 South West Water began to construct the next phase of the Cornwall Spine Main water pipeline, from Higher Engelly to Sevenmilestone. Although the pipeline did not cut through any known archaeological sites it did run close to an Iron Age round (enclosed settlement) near to the village of Callestick. CAU recommended a geophysical survey along the pipeline where it passed by the round as associated remains might be anticipated.

The results of the magnetometer survey (by Geophysical Surveys of Bradford) showed that the round site would not be affected, but revealed a circular blob approximately 8 m in diameter to the east of the round (at SW 7694 5059). Experience elsewhere in the county led us to suspect this to be a structure of Bronze Age or Iron Age date. A controlled topsoil strip of the area revealed a circular structure defined by a ring of quartz stones, with a 'porch' type entrance on the southern side.

With funding from South West Water an excavation was carried out over 12 days during January 1996, by a small team of CAU archaeologists and volunteers. The working conditions during the excavation were at times arduous as the weather was often wet and cold.

The structure was soon revealed to be a Middle Bronze Age round house, some 3000 years old. It was set within a sheer sided hollow between 8 m to 9 m in diameter and up to 0.60 m deep. The stone wall of the structure lined the inside of the hollow. The southern entranceway was nearly 4m long and 1m wide. Internal postholes were found within the remains of the perimeter wall, and inside the centre of the building.

Very little actual occupation evidence was gathered from the excavation of the structure. The floor layers of the house appear to have been cleaned out, the entrance passage was blocked by a quartz wall, and the interior of the structure and entranceway deliberately infilled with earth.

As a result of the clearing out of the occupation deposits only a small amount of pottery was recovered from the pre-destruction phase of activity. However large quantities of Trevisker style pottery were recovered from the earth which had subsequently been used to infill the interior of the hollow. This ceramic material is dated between 1500 and 900 BC. Worked pieces of flint and stone were also found, some of which were Mesolithic and Neolithic in date. These artefacts predate the structure, and they indicate that the landscape around Callestick had been occupied for centuries before the structure was constructed.

The results of the excavation were very exciting and provided a fitting culmination to the programme of fieldwork along the water pipeline. The structure at Callestick is broadly

contemporary with the recently excavated structures found at Penhale Moor and Trethellan Farm. The Callestick structure will contribute to our understanding of the lowland Bronze Age landscape in Cornwall.

Andrew Jones

St Austell North-East Distributor Road

In 1995 The Design Consultancy, Transportation and Estates CCC, commissioned CAU to carry out an archaeological assessment of the proposed route of the St Austell North-East Distributor road.

A two-stage study was undertaken to identify the archaeological resource of the area of the road corridor, to assess the impact of the proposal on that resource, and to provide recommendations for mitigation. Stage 1 was a desk-based study and a walk-over survey, Stage 2 consisted of further research, measured survey and trial trenching of selected sites and a sample geophysical survey.

Archaeological sites identified along the route included two possible prehistoric field systems, medieval fields associated with farming settlements such as Boscundle and Trenowah, the sites of two demolished 18th/19th century farms, three tin streamworks, five areas of mining interest – Boscundle, Wheal Eliza, Boscoppa/Trenowah, Menear and Carclaze plus a number of leats and watercourses including the Charlestown Leat.

If construction of the road goes ahead all the sites which lie within the road corridor or areas of proposed landscaping will effectively be destroyed. Recommendations for archaeological recording have been made but it is hoped that liaison with Transportation and Estates will help to minimise the extent of the impact on the prehistoric fields and enclosures at Trenowah.

Charles Johns

English Garden House, Mount Edgcumbe

Small scale excavation and field observation was carried out by Nigel Thomas and Carl Thorpe adjoining the English Garden House in Mount Edgcumbe Park (SX 4548 5316). This Grade II Listed Building, currently undergoing conservation, forms a focus in the complex of gardens laid out in English, Italian and French styles. The excavation results provided considerable new information regarding the structural sequence of the building.

Funding for the archaeological work was provided by Mount Edgcumbe Country Park with grant aid from English Heritage.

The English Garden House is one of the earliest structures in the Park and dates before 1729. It was evidently a 'pleasure house', where members of the family could relax and occasionally entertain, away from the more formal atmosphere of the main house. Engravings show that in its earliest form it was a simple rectangular building, having a decorated front facade with a central Egyptian style doorway and pillars. The structure is oriented so that its facade, fronting the lawn area of the garden, is on the south-east. Rectangular windows are indicated in the sides of the building nearer the front. The rear of the building contained small round windows set at a high level (two of which still exist). This suggests the building had an internal division and may indicate the rear, less attractive, part was set aside for servants.

Two wings were added sometime after 1795. This involved demolition of the original roof and the piercing of the side walls to create connecting doorways into a study and a boudoir. Alterations were also made to the rear, the most notable feature being the addition of a room containing a sunken marble bath. Revd. Richard Warner's account of 1809 records that the bath was supplied with hot and cold water from two bronze dolphin spouts.

During this century the building has been occupied as a dwelling. In the 1950s the dolphin spouts were removed from the bath and the bath itself covered with floorboarding. The floorboarding has now been removed and the bath has been conserved.

CAU were called in to examine the arrangements for water supply and drainage for the sunken bath and a trench was dug in the garden adjacent to the bathing room. An inspection chamber containing a lead waste pipe from the bath was located and two additional waste pipes, probably from rainwater goods around the building. A soakaway probably lay beneath the floor of the inspection chamber but this was not excavated. Lead piping for a water supply was also traced. This piped water supply was evidently secondary; it is likely the bath was originally filled by servants and only drainage from the bath was required. The piped supply must have been installed prior to 1809 as it is described by Warner.

Another question was whether there were any traces of a boiler house adjoining the rear of the building. None was evident in the area of the trench and the most likely site is a sunken room built at the extreme rear of the Garden House. This structure had been greatly altered when the building was converted to a dwelling but it is a suitable location and was screened from the house by a wall. It is shown on the OS map of 1895 along with a small square structure close by. This latter feature may have been a water tower to provide a feed to a boiler.

Nigel Thomas

Archaeology and Derelict Land, 1995–6

Following the trend set over the past few years, the Unit has continued to be involved with works to derelict industrial sites undertaken by local authorities under the English Partnerships' Derelict Land scheme, projects which have included both safety works to individual shafts and the treatment of larger areas of former mining sites.

Within Kerrier District the majority of the safety and landscaping works associated with the Flat Lode section of the Mineral Tramways Project have been completed with the capping of a large number of shafts on the hillslopes to the south of Carnkie, the re-opening of the Basset Tramway tunnel under the Four Lanes road and the creation of a new car park at Marriott's Shaft. The district council rolling programme to treat dangerous shafts has once again seen Unit staff peering into an assortment of holes in the ground. Most, like those at Pool, Tolgus or Lanner, were in the Camborne-Redruth orefield but CAU has also recorded features associated with some of the important group of mines around Tregonning Hill at Polhigey, Horsedowns, Keneggy, Porthleven and Carleen.

Such investigations have not been confined to Kerrier District. In the east of the county, the first stages of major safety and landscaping works have now been completed at Drakewalls near Gunnislake, whilst preliminary assessments of publicly-accessible shafts have been made in the Caradon mining district around Minions for Caradon District Council. In Carrick District, assessments of sand-choked shafts on Perran Sands have revealed traces of early copper mining and smelting, whilst a full archaeological survey of the formerly important Poldice Mine near St. Day is presently near completion. In west Cornwall, work at Nanledra for Cornwall County Council recorded extensive outcrop workings passing under the school playing field whilst at Gwithian, traces of the former tailings works near the beach were revealed during drainage improvements. At Geevor Mine, a second wide-ranging programme of works included the treatment of areas of contaminated land, the consolidation of historic masonry and safety works to a small number of important shafts in the lower part of the site. Most importantly, innovative low-impact approaches to shaft safety treatment have been developed during joint CCC/National Trust projects at Wheal Edward and Ballowall near St. Just in Penwith and Parc an Als Cliff near Porthleven.

Archaeological recording during these projects is rarely easy. Because of budget limitations, rapid sketch survey is used as the principal recording tool during preliminary assessment surveys, but most of these abandoned mining sites are now thickly overgrown with brambles, bracken and gorse in which the locations of former shafts are not always apparent. Watching briefs during shaft treatment are heavily constrained by safety requirements and the field record is generally built up from what can be seen from a safe vantage point as the archaeology is rapidly removed by swing shovel.

Although much of the fine detail of these sites is inevitably lost in this way, our involvement has certainly been worthwhile, with undocumented features being found at well over half of all the shafts investigated. Perhaps most interesting has been the prevalence of shallow mine workings intersected by so many of these shafts – evidence for important and previously unrecorded early activity at these sites. On a small number of occasions, CAU has been able to conduct more leisurely investigations. At Rules Shaft, Pool Mine on the edge of the Cornwall College grounds, trenching revealed parts of an early Newcomen engine house and its associated buildings; at South Condurrow Mine, survey revealed a series of dressing floor structures whilst at West Wheal Seton parts of a complex masonry structure recorded within the shaft throat may have been associated with a man-engine whose installation was never completed. At Ballowall, St Just, the investigation of the shaft interiors revealed a warren of shallow mine workings, some of which appear to be amongst the earliest on the site, and therefore probably of 16th century date or earlier.

Adam Sharpe

Obituaries

Peter Arundell Jewell, 1925–1998

Peter Jewell came to Cornwall and archaeology simultaneously, with the excavation of the sanded early medieval site at Mawgan Porth. His family had Cornish roots, which were of great interest to him, and he found the county, and its unique environment, inherently attractive. He joined the Cornwall Archaeological Society when it began in 1962 and acquired a house at Gwithian to which he had steadfast recourse, especially after marriage and the founding of a family.

Born in London on 16 June 1923 and educated at Wandsworth School, he read agriculture at the University of Reading and physiology at the University of Cambridge, obtaining first-class degrees which led to his doctorate. His research involved dogs and began a life-long love of the creatures. Indeed, an early companion was considered as resembling the famous Windmill Hill dog known from its skeleton.

Peter was already a Lecturer at the University of London's Royal Veterinary College when he came to Mawgan Porth, where he developed an interest in archaeology and the part it might play in the pursuit of his own particular goals. A first fruit was the development of a course concerning domesticates within prehistoric environments, which led to an appreciation of rare breeds. In 1960 he became a Research Fellow of the Zoological Society of London and investigated mammalian ecology and breeding patterns. A short secondment to the University of Biafra, where he directed its Department of Biological Science, brought about bizarre and, probably dangerous, experiences when that institution was assailed during the Nigerian civil war. He returned in 1967 to University College, London, where he directed a new wildlife conservation course. A by-product of this was field-work on the Isles of Scilly (see below). In 1972, he became Professor of Zoology at Royal Holloway College, London University, then returning to Cambridge in 1977 as Mary Marshall and Arthur Walton Professor of the Physiology of Reproduction and a Professorial Fellow of St. John's College. Peter had, in 1958, married Juliet Clutton-Brook who, after working with Frederick Zeuner at London's Institute of Archaeology, specialised in the archaeology of domestic animals at the British Museum (Natural History).

The discipline of archaeozoology was largely Peter's creation and many of his distinguished zoological publications are applicable to archaeology. His work on the sea weed-eating Soay sheep of St. Kilda is renowned, as is his study of field mice and bank voles on Skomer. These

small creatures had been numerous at Mawgan Porth and their bewilderment, when isolated in an excavation trench, was always a matter of kindly concern for him. He was also generous with his time devoted to the various bodies concerned with wildlife and the environment. His address to the 1971 Rare Breeds Conference led to the foundation of the Rare Breeds Survival Trust. He was tireless in stressing their scientific and educational value as well as their place in our national heritage. Over the years he served on the many councils concerned with ecology, animal behaviour, mammals and fauna and flora, as well as London's Zoological Society.

After the Mawgan Porth years, Peter, ever conscious of the nature of soils, became fascinated by the problems of change and decay, common to earthworks and, indeed, all archaeological sites. He joined Nicholas Thomas, our President at the time of writing (2001), at Snail Down, in Wiltshire, in 1955, and, from time to time visited the present writer at Amesbury, in 1956, and Fussell's Lodge in 1957. At Snail Down, where a considerable work-force excavated a number of the damaged mounds of the great barrow cemetery, he observed the denuded mounds, silted ditches and the nature of differential weathering. Well-preserved animal bones were seen on those chalkland sites, including those of small mammals. In many instances, the latter he saw as regurgitated by *Raptors* which had perched upon the stakes of barrow circles.

Peter was a life scientist, but he made a massive contribution to archaeology, beyond archaeozoology, most notably by inspiring the Experimental Earthwork project. He proposed such an earthwork, designed particularly for the study of silting, in a lecture he gave at the 1958 Darwin Centenary Meeting of the British Association for the Advancement of Science. In his lecture *Natural History and Experiment in Archaeology*, he recalled Darwin's observations on earthworms which emphasised that even certain stones at Stonehenge would gradually sink because of their ceaseless action. Ditch siltings, terracettes on steep, grassy, slopes, and lynchets, all presented impressive evidence of soil movement. He suggested that an experimental earthwork should be built and studied to document the processes of denudation and silting. Peter always said that it was an exhortation rather than a proposal, nonetheless, Section H's Recorder, John Hurst, took up the idea with enthusiasm and the British Association's Committee for Field Experiments, with Peter as its first Secretary, came into being.

An extended meeting, held at the University of London's Institute of Archaeology, on 28 October 1959, led to an intimate committee from which emerged the notion of a simple, proportionate, bank and ditch, together with a time-scale for its investigation. By the end of July 1960, the first Experimental Earthwork, constructed under Peter's supervision, stood upon Overton Down's chalk. As a part of the experiment, a length of the earthwork was dug with antler picks and shoulder-blade shovels, the debris being removed in wicker carrying baskets. Their efficiency was impressive and work with them proceeded at about two-thirds the rate of modern tools. At Peter's instigation, for whom such tools were a particular interest, an all-out endeavour was made with them. This Stakhanovitic operation (Stakhanov was a war-time worker-hero honoured by Stalin who dug coal faster than any other man), led by Peter, achieved an output of 8.3 cwt/head/hour. Thereafter he planned and edited the *Basic Manual*, a joint, comprehensive, account of the experiment and its objectives, which appeared early in 1963. As the author of the introductory essay, the present writer saw much of Peter's exact and efficient editing. From the first it was manifest that the Experimental Earthwork's construction, and the early stages of its weathering and denudation, had wide applications, although he was critical of extravagant extrapolations. A further experimental earthwork was raised on the acid soil of Morden Heath, near Wareham, in Dorset, while Peter was in Africa. Despite his absence, and unexpected subsoil difficulties, his ordinances and examples carried the day.

The monitoring of the experimental earthworks under Peter's supervision was executed to a relentless timescale, for he insisted on the necessity of adhering as closely as possible to the intervals of years on a geometric progression, 1, 2, 4, 8 etc. After 32 years, in 1992, the Overton Down earthwork was grassed, and by which time it was established that dramatic changes could take place in a lifetime. It gave him great pleasure when it was observed that a barrow with, initially, a raw, chalk-cut, encircling ditch could have attained much the same form as is seen today within that span.

Because Peter had a first-hand knowledge of England's principal prehistoric monuments, and of the manifold difficulties inherent in excavation, one sometimes forgot that he was a distinguished zoologist. This was memorably manifest at the *Research Seminar in Archaeology and Related Subjects*, held in London's Institute of Archaeology in 1968. He talked of ancient domestication, while stressing that so few of the world's rich mammalian fauna had been so utilized. At the same time he was tireless and remarkably effective in the almost superhuman task of making those attending this interdisciplinary gathering comprehensible, one to another. A further notable achievement was his study, aided by a group of graduate students, of the progressively damaging impact of humankind, mostly tourists and the facilities provided for them, on the fragile environment and ancient monuments of the Isles of Scilly, undertaken while he was Director of the University College, London, conservation course. Every aspect of Scilly and Scillonian life, was considered in detail and the dangers indicated. Sadly, this considerable, dynamic, document never attained more than a limited circulation.

Few, except those of Peter's friends who worked with him, appreciated the breadth of his interests. Indeed, he must have been one of the century's most effective interdisciplinary practitioners. In prehistoric archaeology he was deeply inspired by the many publications of Gordon Childe and those archaeological interpretations which employed the principles of historical materialism and evolutionary thinking. The complementary nature of many of the notions of Karl Marx and Charles Darwin, his hero, were ever a stimulus, as was his belief that consciousness is determined by life. Another hero was William Morris, with his unique combination of socialism and art. He was also keenly interested in ceramics and their endless permutations of form, functional and inutile, which he collected. Peter had a particular antipathy to the constraints of organized religion and friends would receive a Yule, rather than a Christmas, card, which was of his own creation. Nonetheless, he was extremely well informed concerning the origins and place of an ideological superstructure within past and present societies. He was also conversant with the intricacies of brewing's biology, which led him to enthusiastically support the Campaign for Real Ale.

In every dimension of life, Peter was possessed of a generosity of spirit which attracted all to him, while he was always entertaining and spontaneous. It was often said that a day in his company equalled a month with many. His rigorous scholarly standards have been attained by few and his passing leaves a considerable gap in our ranks. He is remembered by all his friends and associates with the greatest affection.

Paul Ashbee

Frank Chesher

Members and friends were very saddened by the death of Frank Chester.

Frank was born in South Norwood in 1916. After completing Secondary education at Selhurst Grammar School, Croydon, he worked with an Insurance company in the City of London until the beginning of the Second World War. Then, being a member of the Territorial Army, he joined up. He served in N. Africa and Italy, becoming a Captain in the Reconnaissance Regiment. After the war, he took teacher training and came to Cornwall as a

supply teacher. He and Veronica met at weekend schools organised by the Joint Committee and were married in 1955.

In 1950 Frank went up to Fitzwilliam Hall, Cambridge to read History, largely financing himself. On returning to Cornwall, he taught history first at Callington and then, from the early 1960s, at Helston Grammar School which later became Helston Comprehensive. He was Head of Department until he retired in 1980. He was an excellent teacher who took an interest in his pupils, especially his 6th form. After his retirement, he returned briefly to teaching to help out at St Austell Sixth Form College. For many years, whilst at Helston, he and Veronica lived at Angrouse – an old farmhouse near Poldhu Cove, which was an ideal setting for them and their young family, and where they dispensed generous hospitality. On retirement, the family moved to Devon to another old farmhouse near Walkhampton.

Neither of them severed their Cornish connections, however. Frank was vice-chairman of the Cornwall branch of the Historical Association; a member of this Society since 1962 he was brought onto the Historic Buildings and Towns subcommittee in 1967 and became its convenor in 1969. In that year he became a member of the General Committee; he was a founder member (1969) and member of council of The Cornish Buildings Group; he was one of our representatives on the Cornwall committee for Rescue Archaeology Committee (later Cornwall Archaeological Unit Advisory Group) since 1981; he was also, for many years, the historic buildings correspondent for The Council for British Archaeology and also a committee member of the Vernacular Architecture Group; he never failed to be interested in the work of the Cornwall Association of Local Historians and he, with Veronica, was a founder member in 1981. This is, by any standard, an astonishing example of service – service to the subject he loved and knew so much about, but also service to Cornwall and the local community.

At all of these organisations he was valued for his knowledge and expertise – and for his quiet and unfailing help. He will also be greatly missed by local historians: he not only contributed interesting and well-written articles and book reviews but was happy to share his expert knowledge of buildings on field days. On many occasions we remember his persistent efforts to prevent unnecessary damage to or demolition of important buildings and his regular subcommittee reports faithfully reflect his determination.

In 1968 Frank and Veronica published *The Cornishman's House*, now regarded as a classic regional study and he also wrote articles in *Cornish Archaeology*, vol. 6, pp. 57–63 on 'The late medieval house at Colquite, St Mabyn' and in the Cornish Buildings Group newsletter for 1994 on 'Trenethick Barton'.

Frank's other interests included music, travel and railways. He enjoyed planning and making long rail journeys, the longest having been on the Trans-Siberian Express across Russia to Siberia. His description of such journeys showed great powers of observation.

Frank was a kind and gentle man and a steadfast friend. His Roman Catholic faith was a constant element in his life. As well as being very knowledgeable himself, he had a great capacity for entering into other people's interests and doings. He will be remembered with affection and respect.

Nicholas Johnson

Peter Pool and Raleigh Radford

In August 1961, with a confirmatory meeting in April 1962, Cornwall Archaeological Society came into being, formed by planned expansion – in scope, membership, aims and title – from the previous West Cornwall Field Club. Most of the WCFC officers were carried over, with C.A. Raleigh Radford as President, Florence Nankivell as Secretary, P.A.S. Pool as Treasurer and myself (after an 18-months lapse, when Bernard Wailes stood in) as Editor.

That bald statement serves to introduce this short, necessarily rather sad, memoir penned by a survivor. It does so because Peter Pool and Raleigh Radford are no longer with us, and Florence Nankivell has also departed.¹ When what must now seem, in retrospect, as rather an old-fashioned and sub-County field club decides to enlarge itself and to join the ranks of full County societies – this has happened in a number of places – the process requires a great deal more than an AGM with appropriate resolutions, and the printing of new headed paper. As Secretary, Florence Nankivell's job was relatively straightforward and as Editor, mine was simply to design, fill, and produce a new and larger annual proceedings, manifest as *Cornish Archaeology* 1 (1962). The real burden fell on the other two. Peter Pool, not just a lawyer but a person richly experienced in such fields, had to draft a new constitution for CAS embracing all possible eventualities, and at the same time to construct actuarial forecasts; could we afford to produce a bigger and much more expensive journal? Could we contemplate any sort of enlarged excavation programme? Radford by then was widely recognised as the most experienced, possibly the most cunning, chairman in British archaeology. Having decided a course of action, he never took votes but worked through magisterial persuasion. I recall that members of the committee expressed alarm at the idea of the necessarily increased annual subscription. Would existing followers not resign? Radford's forecast, entirely correct, was that about ten percent would drop out but that membership would rise from around 100 to 400 in ample time to meet likely outgoings. By 1963, when work started at the Rumps, most people had forgotten that doubts had ever been expressed. In retrospect, I can see – and Florence Nankivell would have agreed with me – that the successful launching, the productive decade in the field that followed, the continued existence of CAS and the appearance of our journal well into its fourth decade (a striking and remarkable contribution to south-western prehistory and history) are all things made possible, and arguably *only* made possible, by the personal endeavours of Peter Aubrey Seymour Pool, FSA, 1933–1996, and Courtenay Arthur Raleigh Radford, FBA FSA, 1900–1998. Both men were stalwarts from the era of the West Cornwall Field Club; if Peter can be labelled as an archetypal Cornishman, Raleigh would have to be described as a lifelong Dumnonian. This is no place to repeat or to paraphrase the main public obituaries² and indeed anything approaching a full account of Dr Radford's prolonged and extraordinary life would require something close to a short book.³ May I confine myself, for the benefit of those who knew both of them and I hope also for the enlightenment of members who knew neither, to an appreciation.

Both were Oxford men. Peter read law, or Honours Jurisprudence, at Keble, while Radford very much earlier had been at Exeter where he read medieval and modern history. In respect of their contributions to the pre- and protohistory of south-west Britain (remembering that Radford also worked in a great many other areas) it could fairly be claimed that they exemplified the truth of one of Christopher Hawkes's more pungent comments: 'At Cambridge, they are taught that Cambridge men know all the right answers. Oxford has always been different. At Oxford, people are taught to ask the right questions'.

Peter Pool was born in Penzance and when, after Oxford, he attended law school in London and joined the London Cornish Association he was involved with the Cornish language; with Robert Morton Nance, Mordon, second Grand Bard whose children were indeed briefly tutored in the 1920s by Raleigh Radford; and with Cornish history. His election to Fellowship of the Society of Antiquaries, expanded to his role as 'Local Secretary for Cornwall', set the seal on what was to be a dual career. He was a practising solicitor, and very shrewd and skilful in that role, in Penzance, forcing himself to attend an office when he would overtly, and far rather, have been out in the sunshine. He was also an Antiquary, as had been his hero Dr William Borlase, but the delightful thing about Peter was that a practical, productive and impressively learned concern with Cornwall's past was indivisible.

One could separate out his roles as fieldworker, excavator, linguist, dialectologist, place-names exponent, local historian, palaeographer, historical jurist and social chronicler, and in compiling a full catalogue of his published work – a formidable task! – sub-divide the books, pamphlets and papers under those specific headings. It never occurred to him to do so. The past, most notably of his beloved west Penwith and of the borough of Penzance to which he gave so much, and which rightly honoured him as an Honorary Freeman in 1988, was an unending challenge, but it *was* also indivisible. To every one of his investigations he brought a powerful critical mind, the mind of a trained jurist and a first-class historian, and was aided by a prodigious memory. To his friends, Peter was a constant delight because of his humour, sweet nature and cultivated eccentricities; but those same friends appreciated his stature as President of the Royal Institution of Cornwall, as Editor of *JRIC* and in all the many other elected or appointed capacities in which he served in Cornwall, and deplored with shared fury such setbacks as the failure to elect him Grand Bard. *Proceedings of the West Cornwall Field Club*, *Cornish Archaeology*, *Journal of the Royal Institution of Cornwall* and *Old Cornwall* all possess indices. Perusal, s.n. 'Pool, P.A.S.', suffices to sketch, not the whole extent of his published output, but enough of it to confirm his stature as Cornwall's premier historian of the day.

If Peter was the Cornishman *par excellence*, in later life even unhappy to venture beyond the Tamar in case of being run over by a bus in foreign England, Radford was perhaps the Last of the Dumnonians. His near-lifelong involvement with Cornwall – like Peter Pool, also a Bard and also a President of the RIC – accompanied comparable status in Devon, and in Somerset. Though he was actually born in Middlesex, the family removed to Bradninch Manor in Exeter when Raleigh was in his teens. Among his names, 'Radford' denotes a vast Devonshire clan of medieval origin, its story explored in print by several members, 'Courtenay' and 'Raleigh' hardly call for further Devonian explanation and 'Arthur', in fact the first name of his father Arthur Lock Radford, almost predicated an involvement – at Glastonbury, Castle Dore, Tintagel and other minor localities – with the quasi-historical *dux bellorum* of the same title.

Radford's involvement with both the archaeology and the early history of Cornwall spanned eight decades, almost every period from the Early Iron Age to the sub-recent, and most of the elective offices open to him. Punctilious in attendance at every council or committee that had managed to secure his services, generous with shrewd advice (and, behind the scenes, often generous in other directions). He made little allusion when in Cornwall to his huge range of wider positions – on Royal Commissions, Ancient Monuments Boards, regional societies elsewhere in the British Isles, and national societies ranging from the Prehistoric Society to the Society for Medieval Archaeology. Nor did more than a handful of those friends and followers permitted to call him 'Raleigh' know, and then only in outline, his pre-War career at the British School at Rome or the Indiana-Jones-style adventures attendant upon his period, ranking as a lieutenant-colonel, in a Department of Psychological Warfare. Fewer still were professionally equipped to explore, though somebody must explore, the paradox of a man who never wrote a book yet was very largely responsible for the emergence of early medieval archaeology as a discipline; who dug so many crucial sites, yet brought few to the state of a final report and lived to see most of his earlier conclusions overturned, not least by his own disciples; and who, giving hundreds of learned lectures and holding dozens of impressive offices, neither held nor could ever have wished to hold a university post.

I conclude with a retrospective glance at an extremely happy event, the 1985 celebration of the West Cornwall Field Club's 50th anniversary and thus of the ultimate genesis of our later Society.⁴ Peter Pool, on a previous occasion – a Prehistoric Society conference based on Penzance – had been deputed to drive H. St George Gray around, and to his delight was

able to hear from the venerable Sage of Mendip first-hand stories about Lieut-General Pitt-Rivers, who was born in 1827, or just over a half-century from William Borlase's death (1772). We were talking along these lines and Radford, who at Oxford had attended classes given by Haverfield, effectively the founder of Romano-British archaeology, pointed out that when he himself was elected an FSA in March 1928, he met certain octogenarian Fellows whose elections belonged to the Hanoverian phase of the Society of Antiquaries, before the move to Burlington House, at Somerset House. The day itself was graced by July sunshine of a kind we seem no longer to enjoy. It began with an address on 'Our Founders', which as the CAS president I had prepared at length because it contained the first full account of Lieut-Colonel Frederick Christian Hirst, née Shirt, the WCFC's founding president. This was to be given from the pulpit at Zennor parish church, and as a Methodist I had been uncertain what I was supposed to wear for the occasion. Seeking Radford's own High Anglo-Catholic advice, as I had done on so many points since about 1950, I was told – rather unexpectedly – that academic dress was required, and with slight embarrassment I emerged from the vestry in scarlet and grey Oxford D.Litt. robes. (The garment, hideously expensive to clean, was packed up before we left the church for our Wayside Museum picnic.) After lunch, Peter and I asked Radford, the only person present who had known him personally and who had actually been offered, but had then to decline, the WCFC's initial presidency, what Fred Hirst was *really* like; as a living, breathing, man, that is. Radford lowered his voice. We awaited our mentor's reply. 'I found him a very carnal person', he told us. Peter and I were baffled then, and I still am. Clearly this comment in no way diminished Radford's considerable admiration, which we and all the remaining Field Club members shared, for Hirst's many and remarkable pioneer accomplishments and predictive ideas. Indeed delivering as always a masterly impromptu address to precede unveiling of a plaque, Dr Radford paid a glowing tribute to Colonel Hirst, Mrs Constance Lloyd as she then was, and Ted Wigley. The present was united with the past. As 'the present' marches onward, into this fresh century and millennium, the formative past of the Cornwall Archaeological Society is inevitably largely unrecorded at the level of all the individuals – officers and members – who have constituted it, and the band of memory-holders diminishes. Peter Pool and Raleigh Radford were both, by standards much wider than those of Cornwall and Dumnonia, memorable scholars and outstanding personalities. My preceding memoir here may be unconventional, but I know that it will strike many chords in the hearts of all those who remember them.

Charles Thomas

1 See notice by Daphne G. Harris, *CA* 32 (1993), 181–2.

2 P.A.S. Pool: obituaries, *The Independent*, 27 May 1996, *The Times*, 31 May 1996, and *The Cornishman*, 23 May 1996, with longer tribute, 'A Scholar', in *JRIC* n.s.II.4 (1997), 32–6, and shorter notice, Soc. of Antiquaries, *Annual Report 1997*, 74–5. C.A. Raleigh Radford: obituary, *The Independent*, 8 January 1998, further notices in *Med Arch* 42 (1998), 104–6, and Royal Archaeological Institute's *Newsletter* 17 (April 1999), 4pp. Earlier and much fuller 80th birth appreciations: *JRIC* n.s.VIII.4 (1981), 164–6, and *CA* 20 (1983), iii–iv.

3 See my forthcoming memoir in *Proceedings of the British Academy*.

4 'The Fiftieth Anniversary of the West Cornwall Field Club', *CA* 24 (1985), 5–14, a permanent record of the celebrations at Zennor church and Wayside Museum, 6 July 1985.

Reviews

SEASONAL SETTLEMENT: PAPER PRESENTED TO THE DECEMBER MEETING OF THE MEDIEVAL SETTLEMENT RESEARCH GROUP, 1993, edited by H.S.A. Fox. Vaughan Paper No. 39: University of Leicester, 1996, 69 pages, 10 illustrations. ISBN 0 901507628 ISBN 0038 9258 Price £4 inc. postage

This small volume consists of six papers which represent a record of the lectures on settlement presented at a Medieval Settlement Research Group conference in 1993.

The lengthy, and highly illuminating introductory chapter by Harold Fox sets the scene for the remaining papers. In it he focuses on seasonal settlement and the different types of transhumance that have been identified: the lesser transhumance, when livestock was moved from lower valleys to higher pastures, and greater transhumance which is more characteristic of Mediterranean countries. In England, Fox contends that it can be recognized in the movement of livestock to different *pays* by medieval landowners.

The second chapter deals with the evidence for medieval Sheepcotes, or to use the Latin term, *bercarie*, in Gloucestershire, by Chris Dyer (this paper has been expanded in *Medieval Archaeology* 39, 1995). In it he presents the evidence for seasonal settlement when sheep were moved from the earthworks in the region and two have been excavated whilst documentary evidence shows that there were once many more. Sheepcotes were often sited close to the manorial farmyard, whilst others were sited perhaps 1.5 to 2.5 km from the nearest settlement.

Of especial interest to readers of this journal, however, will be Peter Herring's paper entitled, 'Transhumance in Medieval Cornwall'. He asserts that the benefits of transhumance must have been substantial since it would entail the possible abandonment of one's home for a period, or, alternatively, splitting up a household. He also uses place-name evidence to illustrate likely transhumance settlements, i.e. *havos* names indicating summer dwellings, and *hendre* names meaning winter or home settlement. He also demonstrates the antiquity of some such places (two are mentioned in the Domesday Survey), and suggests that they were probably of seventh century date. Herring then goes on to examine the evidence for Bodmin Moor where a number of groups of ruined sub-rectangular huts, similar to late Roman-British date or early medieval houses found in lowland Cornwall, have been identified. He goes on to argue that, although none of the huts have been excavated, that they are, in fact, summer dwellings. Two case-studies are used to illustrate his argument, at Brockabarrow Common and Brown Willy. A fuller account is to be published in the journal, *Landscape History*.

Other chapters in the booklet include contributions from Gillian Quine who reviewed the evidence of sheilings on the Isle of Man, arguing that the majority appear to be related to transhumance, although the multi-period nature of the structures and changes in use make it a complicated picture. Mary Higham follows this with a contribution on the Norse name *aegi* as indicators of transhumance. The final paper was by the editor, Harold Fox, and he chose seasonal settlement along the South Devon coastline. All the papers contain extensive references and footnotes, always useful for those who wish to follow up an argument.

Although this small publication is regionally confined principally to the south-west, with the exception of the isle of Man and Lancashire, it is, nevertheless, an extremely useful book, and I would commend it to those who are interested in medieval settlement.

G. Brown
Swindon

FAL ESTUARY HISTORIC AUDIT by Jeanette Ratcliffe. Published by Cornwall Archaeological Unit, 1997 (Truro). Obtainable from Cornwall Archaeological Unit, Planning Directorate, Cornwall County Council, Old County Hall, Station Road, Truro, Cornwall. Softback 298 × 210 mm, vii + 202 pp, 72 figs including 42 monochrome photographs and 1 table; 5 appendices, ISBN 1 898166 12 9. Price: £12.

A striking, colour air photograph of part of the Fal Estuary provides an eye-catching cover to this report. It presents the results of an 'historic audit' of the Fal Estuary, funded in the main by English Heritage, with contributions from Carrick District Council, the Falmouth-Fowey Countryside Service, and the Falmouth Bay and Estuaries Initiative (FBEI). The detailed heritage information provided by this audit was needed to feed into the strategic guidelines being drawn up by the FBEI, itself part of English Nature's Estuaries Initiative, ensuring that the historic environment will not be neglected in the planning process. This report synthesises the archaeological and historic landscape of the Fal Estuary, and puts it in a regional context; a further report details general management recommendations (Ratcliffe 1997).

The presentation and layout of this volume is excellent, with a high standard of illustration throughout, the air photographs in particular support the text. The report represents very good value for money. Two things detract from the overall high standard: the photographs and most of the maps are not referenced in the text, although this is mitigated to some extent by the explicit captions, and some of the justification of the text is very distracting (section 2.4).

Section 1 provides a useful summary of the project. Section 2 details the audit process, presenting the background, research aims, scope, methodology and archive arrangements. It is essential reading for those who wish to find out what an historic audit is. The project used similar methods to those developed by the rapid identification surveys, recently completed elsewhere in Cornwall by the CAU. There is a combination of desktop assessment, integrating information from databases, air photographs and documents, complemented by a limited amount of fieldwork. The sources used are clearly set out and fieldwork methodology discussed.

The bulk of the report is provided by Section 3, *The Historic Environment of the Fal Estuary*. The topographic and geomorphological background is presented in the form of easily digested, referenced summaries (Sections 3.1. and 3.2). The archaeological and historic periods, from the Mesolithic to the 20th century, are treated in a similar way, and the archaeology and history of the Fal Estuary is placed in its regional context (Section 3.3). These sections will prove particularly useful for the non-specialist reader and for those unfamiliar with the history and archaeology of Cornwall. Section 3.3.8, *Post-Medieval* (AD 1540–1900), is a very clear treatment of this busy period. It is divided into manageable sections: farming,

fishing, industry, stately homes, ports, maritime trade and shipbuilding, fortifications, shipwrecks and maritime safety and regulation.

A Summary of the Historic Environment is provided in Section 3.4. This looks at the range of recorded archaeological sites and historic structures in the estuary, divided into 16 component parts, all referenced to the *Gazetteer of Sites* (Appendix B). This section really does whet the appetite, sites recorded include a lepers village, pilchard cellars, Perran Foundry, fish tail and elephant ears barrage balloons, and the reuse of WWII cables to moor concrete water barges in the 1960s and 1970s in the event of a national emergency due to the Cold War.

Section 4 outlines the current state of the archaeological and historic resource, identifying three main threats: development; neglect and coastal erosion. Useful information includes the location of interpretation centres and sites. The remaining two-thirds of the report is taken up with five appendices. Appendix A shows the distribution of different site types by period, in the form of 20 distribution maps, all of which are very clear. The maps and tables provided in Appendix B, a gazetteer of all recorded sites (ordered by 1:10,000 map sheets) are, presumably, derived from a GIS; if so, then some technical details of this would have been of great interest.

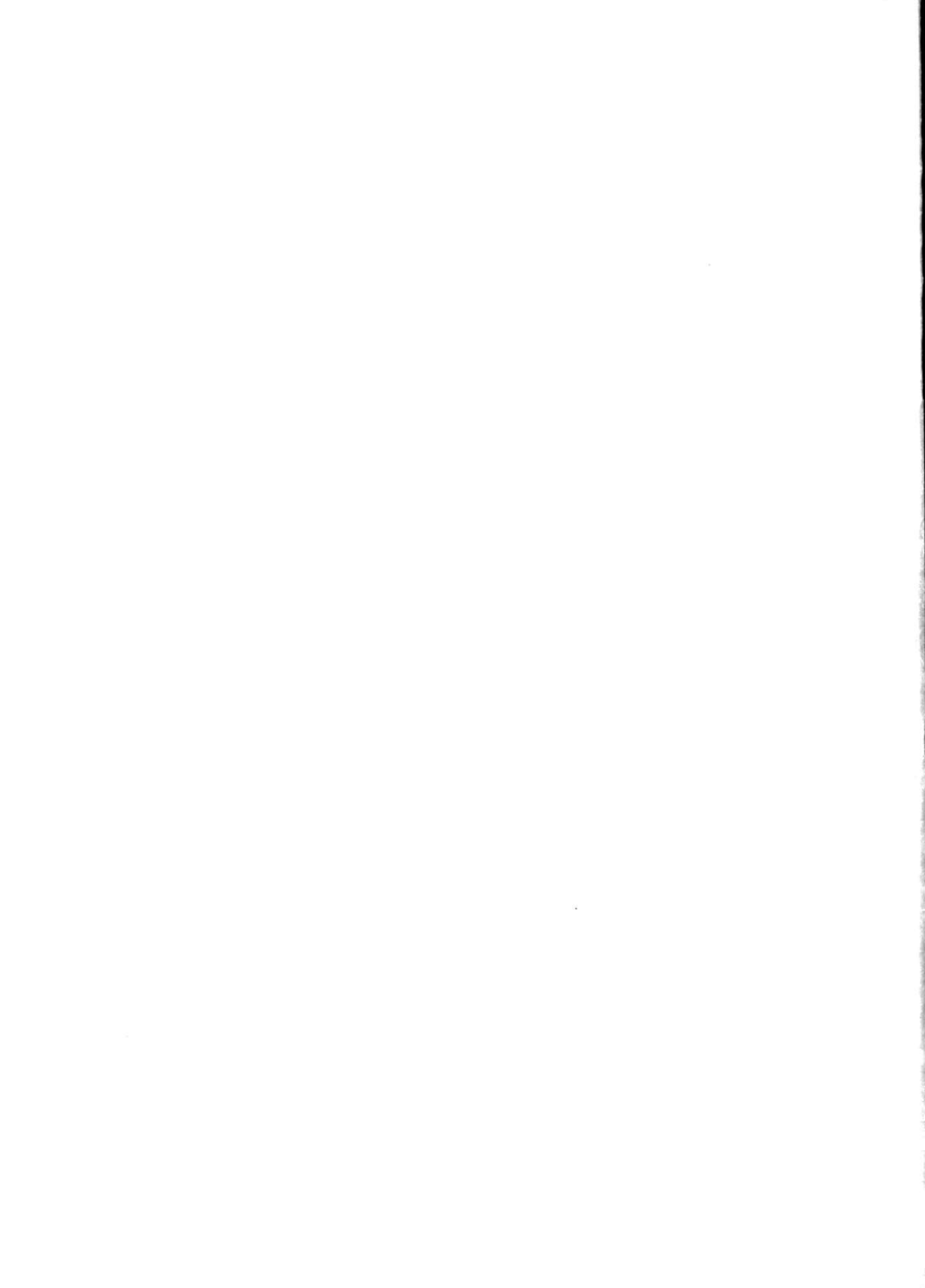
The information is well presented and easy to access. I was delighted to discover, within a matter of seconds, that I had spent most of my formative years living only two miles away from a manure works, a vitriol works and an arsenic works. Appendices C and D provide detailed record of shipwrecks in the Estuary and vessels built around it from 1786–1914. The final appendix contains extracts from the FBEI Strategic Guidelines final report.

This volume deserves a wide readership, reflecting the scope of the project and the accessibility of this report. Both the specialist and non-specialist reader with an interest in Cornwall's history should find much to intrigue and stimulate. The report also draws attention to the study of a wide range of estuarine activities, often neglected in the past during archaeological survey. As the author states in the research aims in Section 2, this project is a pilot for the study of Cornish coastal archaeology and historic estuarine environments. We can therefore look forward to a series of reports of a similar standard for the rest of the county.

Reference

Ratcliffe, J, 1997, *Fal Estuary Historic Audit General Management Recommendations*, Cornwall Archaeological Unit report for project sponsors

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