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THE STRATIGRAPHY AND ARCHAEOLOGY OF BRONZE AGE AND ROMANO-BRITISH DEPOSITS BELOW THE BEACH LEVEL AT BREAN DOWN, SOMERSET

by

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with contributions from
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ABSTRACT

Fieldwork in advance of sea defence construction from Brean Down towards Burnham provided the opportunity to examine deposits below the beach levels. Limited trenching and extensive sampling enabled the archaeological significance of these deposits to be established and this estuarine sequence to be related to the well-known archaeological sites and sequence within the terrestrial deposits exposed in the sand cliff. The research provided an opportunity for investigation of the wetland margin of the previously investigated, largely dryland, sand cliff environment. The results contribute to an understanding of the resources exploited from the prehistoric and Romano-British sites and has produced evidence of Romano-British drainage and agricultural activity on the levels.

INTRODUCTION

A paper by ApSimon, *et al.* (1961), in these *Proceedings*, published the first systematic record of the stratigraphy accumulated against the southern side of Brean Down that had first been remarked upon by Knight, in 1902. That paper attempted to relate the stratigraphy to natural events and to a series of episodes of human activity. Nearly 40 years later this paper attempts to do the same for the nature and distribution of the deposits *below* the present beach surface. The two papers, although separated by a considerable period, together provide a holistic view of the stratigraphy and chronology of the Holocene sedimentation regimes within which to place the undisputed significant prehistoric and Roman activity on the Down and buried within the sand cliff (*cf.* ApSimon, 1965; Bell, 1990).

Initial archaeological work at Brean Down concentrated on defining the stratigraphy exposed in the sand cliff section and in attempting to indicate a date for the accumulated sequence (ApSimon, *et al.* 1961). Following severe erosion and the subsequent discovery of a Bronze Age gold bracelet in 1983 (Crabtree, 1984), a detailed survey was undertaken of the exposed section (Bell and Straker, 1984) prior to full-scale excavation funded by English Heritage (Bell, 1990). The sequence was further refined and elucidated during that excavation and through palaeo-environmental analysis in 1983-7 (Bell, 1990). Much smaller-scale test pit excavation and augering was conducted in 1989 (as a consequence of coastal protection proposals) and in 1991 (as an assessment for a proposal for housing development to the south of the sand cliff) but this has only been published in interim form (Bell, 1991).

Bell's and ApSimon's work demonstrated the existence of a series of stratified occupation horizons, largely identified by ApSimon, *et al.* (1961), the nature and extent of which were clarified by detailed excavation (Bell, 1990). The series of layers and units used by ApSimon, *et al.* was adopted by both Bell and in this paper, where appropriate, to maintain consistency. The previous investigations revealed a 'sub-Roman' cemetery (Unit 3), Late Bronze Age occupation surfaces (Unit 4), Middle Bronze Age stone and timber round-houses (Unit 5 and 6), and Beaker

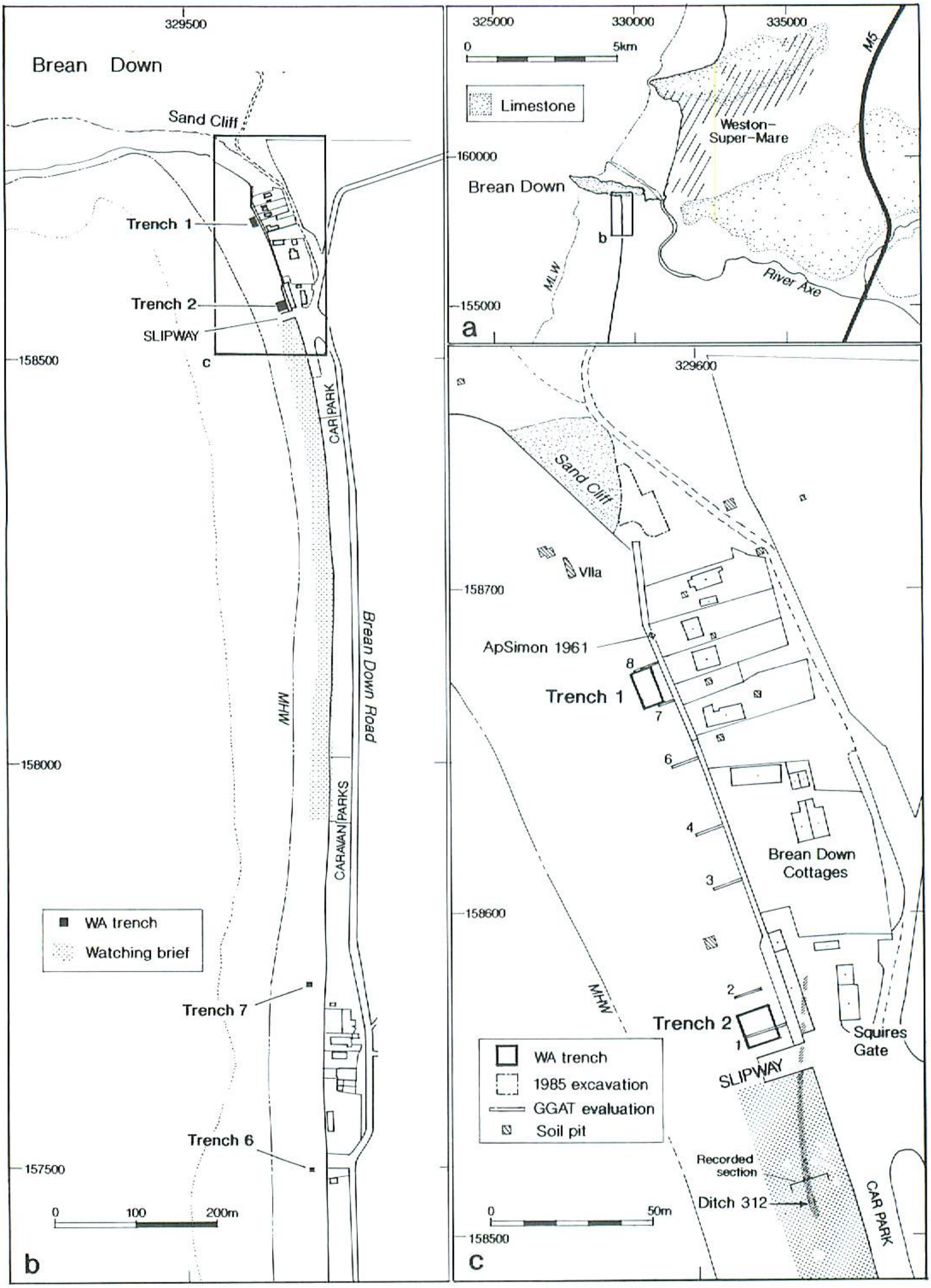

Figure 1. *Plan of Brean Down showing: a) the location of Brean Down b) the area investigated, and c) the location of evaluation trenches, excavations and the Roman ditch.*

and Late Neolithic activity (Units 7 and 8a) overlying Pleistocene Breccia (Units 8b and 8c) and blown sand (Unit 9). A series of soil pits was dug behind the sea defences at the foot of the sand cliff and an auger survey conducted to map the extent of the deposits exposed in the cliff. These investigations attempted to relate the sand cliff sequence to the estuarine clays (Crabtree, 1990; Bell, 1990) and the terrestrial sequences with the estuarine or marine inundations (Bell, 1991). A partial correlation was achieved (see Bell, 1991, figure 19) but investigations rarely extended below 3.5 m AOD.

The archaeological work reported here took place as the result of the construction of the Brean sea defences on the beach (1995-7) for the National Rivers Authority. It provided an ideal opportunity to extend knowledge of the sedimentation and stratigraphy of the sand cliff to deposits below the beach level the foot of the Down, within the scheduled area of the Brean Down sand cliff site, and the estuarine deposits over 1.2 km to the south. As part of the area was within the Scheduled Ancient Monument (No. 13811), the County Archaeologist requested archaeological works before and during construction.

In very general terms it can be seen that nearly all the evidence for anthropogenic activity has hitherto been restricted to the sand cliff sequences (Bell, 1990; ApSimon, *et al,* 1961) and the terrestrial fringes and margin of that sequence (Bell, 1991). Evaluation trenching by Glamorgan Gwent Archaeological Trust (hereinafter GGAT) in 1995 summarised the sequences and recorded the intercalation of the sand cliff deposits with the estuarine sequences and excavations by Wessex Archaeology (1996-7) attempted to reveal and correlate sub-beach deposits with the known stratigraphy. The combined record of these interventions provides the opportunity to examine the estuarine marine sequence in broad terms, rather in the way that ApSimon, *et al.* (1961) examined the deposits above the current beach level in the sand cliff.

THE GEOGRAPHY AND NATURAL HISTORY OF BREAN DOWN

Brean Down (centred on ST 29605870), is a long, narrow Carboniferous Limestone promontory that projects 1.6 km into the Bristol Channel and forms the westernmost extension of the Mendip Hills. The promontory has two summits: the western summit rises to 97 m and the eastern to 79 m. To the north the Down slopes to low cliffs while, to the south, the slope is much steeper and ends in cliffs up to *c.* 50 m high. The present cliff line is a multiphase landform of ancient origin and against its southern side thick deposits of Quaternary and Holocene sediments are exposed in the Brean Down sand cliff. The Down itself is a classic example of a small relict landscape containing both rare plant and animal species and much evidence of former activity by man. Altogether eight species of plants and animals found on the Down are listed in the British Red Data Books that identify biota of extreme national rarity (National Trust, 1982). It is an SSSI (Site of Special Scientific Interest) on geological grounds and is owned and managed by The National Trust.

To the north of the promontory lie Weston Bay and Weston-Super-Mare, and to the south lies Bridgwater Bay forming the seaward edge of the Somerset Levels. The River Axe debouches on the east end of Brean Down into Weston Bay. The enormous tidal ranges of the Bristol Channel (*c.* 11 m at Brean), together with the gently sloping beach to both the south and north of the Down, result in low water mark being about 1.5 km from the shoreline and at low tide a vast expanse of mud is exposed.

ARCHAEOLOGY OF BREAN

On Brean Down itself are nine tumuli or clearance cairns sited on the crest of the Down and surrounded by prehistoric and Romano-British field systems. Near the east end is a small Iron Age hillfort, the defences of which were sectioned by Burrow (1976) and at the east end of the eastern summit is a 4th century Romano-Celtic temple excavated by ApSimon (1965). The most recent activity is military and consists of a Palmerstonian fort at the west end that, together with an area round the Iron Age hillfort, was also fortified during the Second World War (Riley, 1996).

The beach to the west (seaward) of the sand cliff produced evidence of past human activity. In September 1936 pottery sherds forming half of a Beaker of 'Maritime' style decorated with comb and cord impressions, and a large fragment of a Beaker decorated with fingernail impressions were discovered in a pit (Taylor and Taylor, 1949, p88) which the finders suggested was a grave. The pottery and some of the charcoal from the pit which were on display in the UBSS Museum in Bristol, were burnt when the museum was 'destroyed by enemy action' in a German bombing raid in 1940 (Taylor and Taylor, 1949, p90). Some years later a radiocarbon determination of 3460±80 BP (HAR-8547) was obtained from charcoal from the pit which was clearly labelled and had been stored in the museum cellar. ApSimon, (this volume, pp68-70, below) now argues that the samples dated, though clearly labelled, cannot be safely associated with the deposition of the Beaker pots. More recent finds include an inscribed lead curse (Hassall and Tomlin, 1986) dated to the late 1st – 2nd century AD.

Of the main sequence defined previously and summarised below, only the lower portion (Unit 5 and below) was encountered in sub-beach deposits (see ApSimon *et al*, 1961; Bell, 1990, table 1).

Unit 3	Grey stony sand with 'sub-Roman' cemetery
Unit 4	Late Bronze Age occupation horizon - sand
Unit 5	Sterile blown sand (5a and 5d) separated by an occupation horizon (Unit 5b)
Unit 6	Bronze Age sand (and clay)
Unit 7	'Beaker Sand'; stabilisation horizon with occupation
Unit 8a	Red loam palaeosol
Unit 8b	Pleistocene breccia
Unit 9	Pleistocene blown sand

EXCAVATIONS OF DEPOSITS BELOW BEACH LEVEL (1996-7)

The archaeological work was commissioned by the then National Rivers Authority (Natural Environment Agency) through their consultant engineers, Sir William Halcrow & Partners Ltd (Halcrow). Archaeological investigations were conducted in advance of the improvement of the sea defences to the south of Brean Down, Somerset (centred on ST 29605870; Figure 1).

The archaeological work here comprised:

- a series of narrow evaluation trenches between the sand cliff and the slipway at Squires Gate (Figure 1) conducted by GGAT (GGAT, 1995; Locock and Lawler, 1996);
- excavation of Trench 1 and a large soil pit (Trench 2) by Wessex Archaeology at the northern and southern extent of the evaluation trenches (Allen *et al*, 1997);

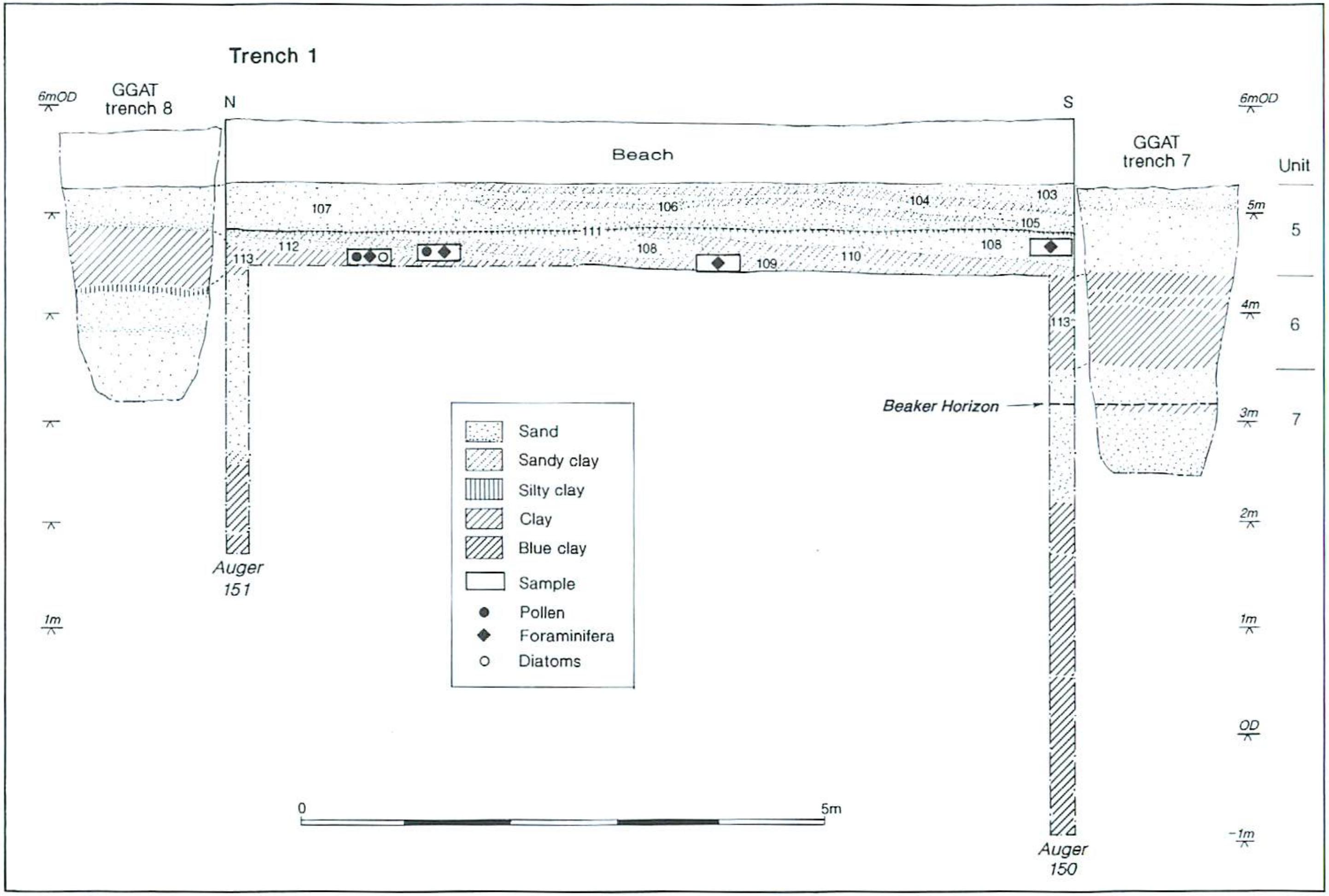

Figure 2. *Section of the sand cliff and alluvial deposits in Trench 1, showing sample location.*

- a watching brief and excavation of Romano-British ditch to the south of Trench 2 (Allen *et al,* 1997); and
- two soil pits excavated by Wessex Archaeology *c.*1000 and 1200 m to the south of Trench 2 (Figure 1) as a part of the mitigation of development (Mitigation Trenches 6 and 7)

A series of seven machine-excavated evaluation trenches between the scheduled area and the slipway revealed a complex of alluvial and estuarine deposits for which some correlation was attempted (GGAT, 1995; Locock and Lawler, 1996). The trenches were immediately seaward of then existing sea defences. Each evaluation trench, between 8 and 14 m long, only *c.* 1.5 m wide and up to 3.75 m deep, was recorded in detail in the upper 1.2 m and more cursorily below that depth. The most significant element of this work was to record the continuation of the Beaker sequence (Beaker Sand, Unit 7) and earlier Bronze Age (Unit 6) sand cliff deposits below the current beach level in the most northerly trenches (GGAT trenches 7 and 8). These excavations also recovered Beaker pottery in a very dark grey, clayey silty sand (Locock and Lawler, 1996). Deep alluvial estuarine and marine deposits were encountered at the southern extent of the evaluation (GGAT trenches 1 and 2) where what was initially through to be a palaeo-channel and also recorded (evaluation trench 1, GGAT 1995).

Trenches 1 and 2 were excavated by Wessex Archaeology to record these finds in more detail. The loose beach deposits were removed by machine, then the trenches were excavated by machine in level spits with a toothless bucket enabling full archaeological recovery of any artefacts. Any archaeological surface was recorded in plan.

The aims of these investigations were to:

- record the presence of any archaeological deposits and relate them to previously published work, and
- record, sample, analyse and interpret the fluvial sub-beach deposits to enhance the off-site palaeo-environmental record

An extensive programme of environmental sampling for sediment characteristics (magnetic susceptibility), snails, pollen, foraminifera, and diatoms was conducted through each of the sedimentary sequences, as described below (Palaeo-environmental evidence).

TRENCH 1 (AND GGAT EVALUATION TRENCHES 7 AND 8)
Figures 1 and 2

Narrow (1.5 m) evaluation trenches opened by GGAT (GGAT trenches 7 and 8) revealed a clean brown (10YR 5/3) sand at 4.20 - 4.28 m AOD (GGAT Trench 8, layer 020) thought to be a part of the Beaker Sand (Unit 7), in which a very dark grey silty clay horizon occurred at 4.17 m AOD and produced Beaker pottery. This can be compared with a thin band of brown (10YR 5/3) sand which contained fine charcoal and burnt flint (Bell, 1990, pp23-4). A second layer of very dark grey (5YR 3/10) organic silty sand, thought to be a weakly developed palaeosol, within this sand facies was found in GGAT trench 7 at greater depth (3.26 m), but no artefacts were recovered from this horizon.

An excavation 5 x 12.5 m was opened between GGAT evaluation trenches 7 and 8 over the area in which they recovered the Beaker Sand (Unit 7) and overlying deposits. Specifications for archaeological investigations drawn up by the County Council and English Heritage with their consultants only allowed excavation to 4.5 m AOD. As this depth was between *c.* 0.25 m and *c.*1.25 m above the deposits producing Beaker finds and the weakly developed palaeosol in the GGAT trenches, none of these significant deposits were encountered.

Consequently only a shallow sequence (*c.* 1.4 m) of deposits was exposed. Beneath the present beach was a series of five layers, dipping gently from north-north-east to south-south-west at about 6° and thus not inconsistent with the stratigraphy in the sand cliff. Although this did not encounter the Beaker Sand (Unit 7) nor any of the stabilisation horizons within it, two auger holes confirmed its presence at about 3.2 m AOD (auger 150) recording a thin (0.05 m thick) lens of dark grey (10YR 4/1) sand loam.

The red loam, the basal palaeosol/buried soil (Unit 8a) and the Upper Breccia (Unit 8b) were not recorded in either auger hole beneath the Beaker Sand, despite reaching a maximum depth of -1.0 m AOD, from which we can conclude that this layer (Unit 8) extends at greater depth, but we have no evidence that it continues more than 30 m from its most southerly exposed point. Boreholes in the area of Trench 2 sunk to -5.82 m AOD also did not encounter it (Frederick Sherrel, 1994) but extrapolation from Figure 8 (below) suggests that it might occur at about -7.5 to -10 m AOD in the area of Trench 1 and about -16 m AOD in the area of Trench 2. Hand augering revealed a series of grey (10YR 5-6/1) and dark grey (10YR 4/1) alluvial clays with some sand lenses. Although these deposits are similar to some of those described in Trench 2, here they must pre-date the Beaker horizons, and may relate to the 'blue clay' in Trench 2. The majority of the sequence in Trench 2 is, however, Roman or later.

The remaining sequence is described from the base upwards and related where possible to the Units defined in the sand cliff.

Beaker Sand

The Beaker Sand was not encountered during excavation (Trenches 1 and 2), but evaluation trenches revealed Beaker Sand with a humic sand lens (GGAT 020, trench 8) at 4.17 m AOD from which eight Beaker sherds were recovered (Figure 6) and another humic sand lens (GGAT 041, trench 7) at 3.26 m AOD from which no artefacts were recovered.

Context 113; Unit 6 (?6b)

Layer 113 was the basal layer encountered at a maximum height of 4.68 m AOD. It comprised a greyish-brown (10YR 5/2) to grey (10YR 5/1) clay with very occasional charcoal flecks, subangular limestone fragments and rare subrounded breccia clasts. The deposit thickened southwards, being 0.25 m thick at the northern end of the excavation but up to *c.* 0.85 m thick at the southern limit where its extent was recorded by augering. This is thought to equate to Unit 6 (possibly specifically Unit 6b) deposits which are derived from the red loam palaeosol and Breccia (Unit 8). No artefacts were recovered by hand excavation but a few animal bone fragments (sheep/goat and mammal) were recovered by flotation.

Contexts 112, 110 and 109; Unit 6

Overlying context 113, at the northern end of the trench only, was a light olive brown (2.5Y 5/4) sand (112), recorded to only 90 mm maximum thickness. Over the majority of the trench area to the south of this point the layer was recorded as a thin, compacted interface less than 10 mm thick. This sand was sealed by a sequence of grey (10YR 5/1) sandy clay (110) and brown (10YR 5/3) clay loam (109) up to 0.25 m thick containing occasional subangular limestone fragments and rare subrounded breccia clasts. A single undiagnostic plain body sherd with a fabric typical of Early - Middle Bronze Age date was recovered from (109) along with a few fragments of animal bone. These contexts can be generally related to Unit 6 and it is tempting to correlate them specifically with the grey silty clay of Unit 6a.

Context 108; Unit 5

Unit 5 comprised a moderately substantial deposit of light olive-brown (2.5YR 5/4) sand with occasional grey sand lenses and discrete intermittent layers of iron-staining throughout. This layer produced a single small sherd of a Trevisker-style vessel (or 'Collared style of the Food Urn tradition', *vide* Tomalin, 1996, p193) in association with some animal bone. This probably equates with brownish-yellow blown sand (Unit 5b) containing the round-house structures.

Context 111; base of modern beach deposits

A thin intermittent horizon of iron-stained, dark greyish-brown sand up to 60 mm thick, tending to a silty clay towards the southern limit of the trench, was the horizontal interface between the Bronze Age deposits and the modern storm beach. It contained a few bone fragments derived from the erosion of the underlying horizons.

TRENCH 2 (AND GGAT EVALUATION TRENCHES 1 AND 2)
Figures 1 and 3

The southern evaluation trenches (GGAT trenches 1 and 2) adjacent to the Squire's Gate slipway encountered deep sequences (over 2.5 m) of estuarine clays and a 'broad palaeo-channel cutting into the estuarine clay' (GGAT 1995, p13) was recorded in GGAT trench 1. A second large soil pit (Trench 2) was excavated straddling GGAT evaluation trench 1 to record this sequence and, in particular, any evidence of a palaeo-channel. The excavation cleared an area of storm beach in excess of 13 m x 13 m and was machine excavated in spits to enable recording and recovery of artefacts. Any specific archaeological horizons were cleaned, recorded and hand excavated in plan. Owing to the considerable depth of this trench (up to 5 m below current ground surface) it was necessary, for safety reasons, to step-in the trench every *c.* 1.2 m leaving a shelf in excess of 1 m wide, which enabled the exposure of an area more than 5 m x 5 m at the base of the excavation, at 2.65 m AOD.

No part of the sequence of estuarine silts and clays with sand lenses exposed in the excavation could be related to any of the Units of the sand cliff (Figure 8), nor readily to the soil pit VI at the foot of the cliff (Bell, 1990) or to other soil pits excavated by Bell (Bell, 1991; Bell, *unpubl.*). The sequence is therefore described from the base upward (Figure 3).

'Blue' Clay

The base of the excavations were at 2.65 m AOD (i.e. 4 m deep) and the basal horizons covering over 1.75 m were dark grey (10YR 4/1) to dark greyish-brown (10YR 5/2) homogeneous massive 'blue clay' varying slightly in colour and texture (contexts 215-212). One clear medium sand lens (213) 0.17 m thick was present in this sequence and is thought to be derived from a sandy bar which lay to seaward.

Lower Romano-British sequence

At the top of the 'blue clay' a sharp distinct boundary was present separating it from a greyish-brown sand loam (10YR 5/2) and slightly mottled grey (5YR 5/1) silty clays (211 and 210 respectively). This sharp boundary may represent a truncation surface. These two horizons were distinctly more sandy but also contained weak blocky structure and many fine macropores,

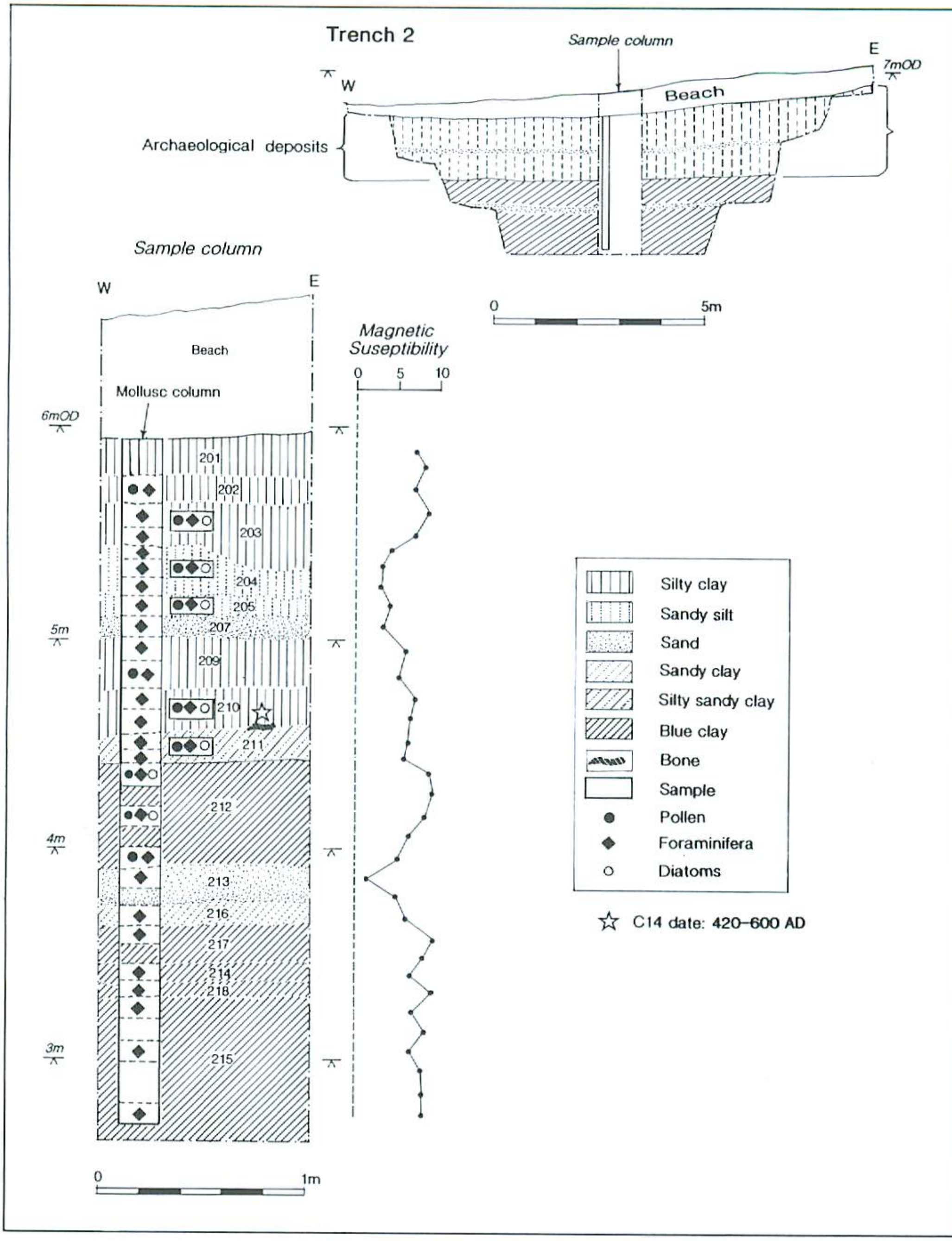

Figure 3. *Section of Trench 2 showing sample location and magnetic susceptibility profile.*

possibly indicating stasis if not limited pedogenesis. A large horse femur and tibia were recovered from the interface between these two layers, confirming the suggestion of stabilisation, and gave a date of cal. AD 420-660 (see radiocarbon result, below). The layer sealing this (209) was artefact free and distinctly gleyed, perhaps indicating locally wetter conditions before inundation by greyish-brown (2.5YR 5/2) sand lens (207).

Upper Romano-British sequence

Greyish-brown and grey silty sands (205 and 204) and dark grey silty clays (203) with occasional subangular limestone fragments overlay the sand lens. These deposits become less influenced by sand and more mottled up-profile. Romano-British pottery and animal bone were found throughout this sequence. The sherds were not particularly abraded and did not indicate any evidence of transport. We may suggest that this sequence, too, indicates temporary stasis with intermittent local activity. The nature of the sharp, but undulating, interface between this layer and the overlying layer (203) may indicate an erosion surface.

Layer 203 (also recorded as layer 206) was a dark grey silty clay with occasional mottling up to 0.4 m thick, whose upper surface sloped gently from east to west, at a maximum height of 5.82 m AOD. Finds recovered from this layer include Romano-British pottery, fired clay and animal bone.

Post-Roman sequence

Below the present day storm beach, two other layers were removed by machine prior to hand-excavation. These were a grey silty clay with occasional iron staining (202) and brown silty clay with occasional iron staining and thin discrete sand lenses (201); no artefacts were found in the spoil of either.

WATCHING BRIEF 1996-7

An archaeological watching brief was conducted during the construction and improvement of the sea defences. This was recorded in sections (bays), each *c.* 10 m wide and extended from foot of the sand cliff and the slipway at Squire's Gate, then south of the slipway for 1.4 km. Additional information to that reported above was only recorded within an area of approximately 155 m by 24 m south of the slipway.

A single archaeological feature was recorded during the watching brief (Figures 1, 4 and 8). This was a V-shaped ditch (312) recorded in Bays 10, 12 and 13. The ditch was aligned north-south and curved slightly to the east at its most northerly observed section. It was approximately 1.1 m deep and 1.9 m wide at the upper part and the base was recorded in Bay 10 at 4.38 m AOD.

The upper, grey clayey sand, fill (307) contained a single rim sherd of 3rd-4th century AD Romano-British pottery. Seven sherds of late 1st-2nd century AD pottery were recovered from the middle, grey clayey sand, fill (309) and the lower, mottled grey/brown clay, fill (310) contained a single undiagnostic body sherd.

The ditch was sealed by modern beach sands and storm shingle and the uppermost layer into which it was cut was a brown sandy clay (303). This contained a single piece of 1st-2nd century AD decorated samian pottery. Below 303 was a thick (up to 0.75 m) layer of blue-grey clay (304) which, in turn, sealed a layer of pale brown fine sand (305) up to 0.3 m thick. The lowest recorded deposit was a brownish-yellow fine sand (306), the full depth of which was not determined.

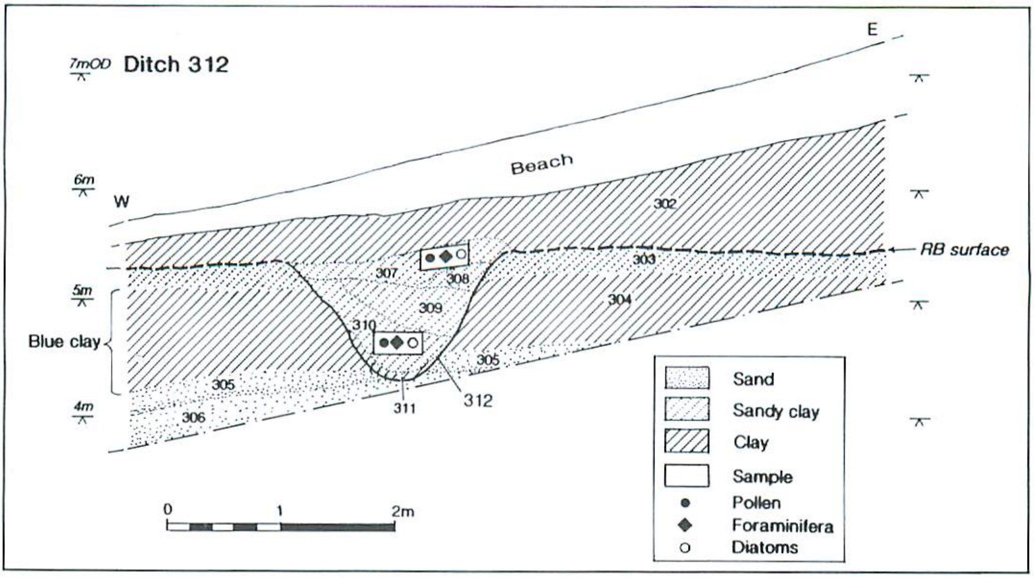

Figure 4. *Section of Romano-British ditch 312.*

TRENCHES 6 AND 7
Figures 1 and 5

Two further soil pits (Trenches 6 and 7), each 5 m x 5 m were excavated at the southern end of the development. These were, respectively, some 850 m and 1075 m south of Trench 2. The aim of these trenches was to record the full sequence of deposits to compare with the stratified sequence and environmental results from Trench 2. A full suite of environmental samples was taken for assessment to aid correlation. In view of the poor and sparse preservation of pollen, snails, diatoms, ostracods and foraminifera from Trenches 1 and 2, sampling was confined to columns of contiguous samples at about 0.1 m intervals through each exposed sequence (Figure 5).

The soil pits were machine excavated in the same fashion as for Trench 2, each comprised a surface area of 5 m x 5 m stepped to depths in excess of 2.5 m. No finds were recovered from either excavation. The stratified sequences are very simple and similar to each other, comprising clays with varying amounts of silt inclusions overlain by the modern beach comprising sands and gravel. For these reasons only summary descriptions are presented here:

Trench 6 was excavated to 2.84 m depth i.e. 3.15 m AOD; brief descriptions and stratigraphic sequence of deposits within this trench are listed in Table 1. Trench 7 was positioned *c.* 225 m north of Trench 6 and was excavated to 2.59 m depth i.e. 2.86 m AOD, revealing similar deposits; brief description of the stratigraphic sequence of deposits within this trench are listed in Table 2.

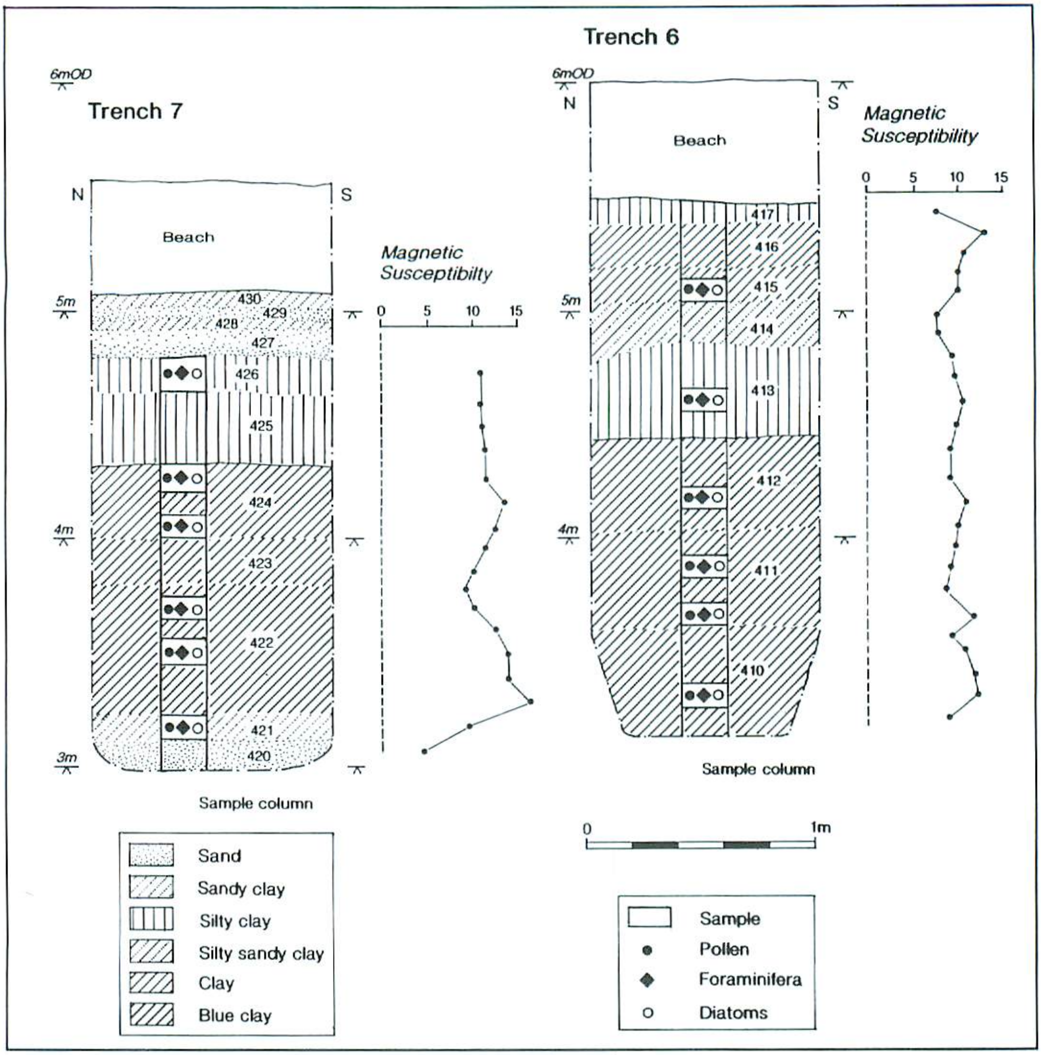

Figure 5. *Schematic section of the sequences in Trenches 6 and 7 showing sample location and magnetic susceptibility profiles.*

LOCAL CORRELATION

Correlation with ApSimon's sand cliff sequence was only possible for Trench 1, excavated just beyond the southern extent of the sand cliff. This correlation was made by comparison of the stratigraphic contexts and finds, (above) supported by environmental evidence. Correlation cannot be made between the sand cliff related deposits in Trench 1 and deposits seen in the other excavations (Trenches 2, 6 and 7).

Although 'blue clay' was recorded in Trench 1 (beneath the Beaker Sand), in Trench 2 (beneath the Romano-British layers) and also occurred in Trenches 6 and 7, correlation is difficult. This facies is a product of estuarine deposition and reworking along the edge of the sand cliff and is not chronologically distinct, unlike the stratified sequence of deposits overlying it.

Context	*Soil description*	*Approx. thickness (m)*	*Approx. depth (m AOD)*
419	10YR 7/2 (very pale brown) SAND with very occasional charcoal flecks	0.47	5.99
418	10YR 5/8 (yellowish brown) SANDY GRAVEL, very wet	0.04	5.52
417	10YR 5/2 (greyish brown) SILTY CLAY, soft and sticky	0.12	5.48
416	5B 5/1 (blue grey) CLAY, firm smooth and sticky	0.18	5.36
415	5B 5/1 (blue grey) CLAY, soft smooth and sticky	0.15	5.18
414	5B 5/1 (blue grey) SILTY SANDY CLAY, sticky and compact	0.17	5.03
413	5B 5/1 (blue grey) SLIGHTLY SILTY CLAY, sticky and compact	0.41	4.86
412	5B 5/1 (blue grey) CLAY, very sticky and compact	0.41	4.45
411	10YR 5/2 (greyish brown) CLAY, very smooth and sticky, slight hint of Blue, very compact	0.42	4.04
410	5B 5/1 (blue grey) CLAY	0.47	3.62

Table 1. *Summarised Stratigraphic Sequence, Trench 6*
m AOD = metres above Ordnance Datum (Newlyn)
Thickness (m) indicates the approximate recorded thickness (or range where valid) for the context
Depth (m OD) indicates the approximate height (or range where valid) for the context upper surface.

Context	Soil description	Approx. thickness (m)	Approx. depth (m AOD)
432	10YR 7/2 (very pale brown) SAND with very occasional charcoal flecks	0.34	5.45
431	10YR 5/3 (brown) SANDY GRAVEL	0.16	5.11
430	10YR 7/1 (light grey) SANDY CLAY, rare pebble inclusions	0.06	4.95
429	10YR 6/3 (pale brown) SAND, contains pockets of iron staining, some small pebble inclusions	0.05	4.89
428	5B 5/1 (blue grey) SANDY CLAY, soft and sticky	0.04	4.84
427	10YR 6/3 (pale brown) SAND contains thin discontinuous lenses of grey clay	0.13	4.80
426	10YR 6/3 (pale brown) SLIGHTLY SILTY CLAY, compact and sticky with rare small to medium sized pebble inclusions	0.15	4.67
425	10YR 5/2 (greyish brown) SLIGHTLY SILTY CLAY, compact, some small pebble inclusion	0.32	4.52
424	5B 5/1 (blue grey) VERY SLIGHTLY SILTY CLAY, smooth and compact	0.33	4.20
423	5B 5/1 (blue grey) CLAY, soft, smooth and sticky	0.20	3.87
422	5B 5/1 (blue grey) CLAY, smooth and compact	0.57	3.67
421	10YR 5/2 (greyish brown) SANDY CLAY	0.10	3.10
420	5B 5/1 (blue grey) SAND, very slightly clayey	0.14	3.00

Table 2. *Summarised Stratigraphic Sequence, Trench 7*
m AOD = metres above Ordnance Datum (Newlyn)
Thickness (m) indicates the approximate recorded thickness (or range where valid) for the context
Depth (m OD) indicates the approximate height (or range where valid) for the context upper surface.

MAGNETIC SUSCEPTIBILITY
by D. Wright and Michael J. Allen

The excavation of sub-beach sediment sequences offered an opportunity to explore the potential of magnetic susceptibility as a palaeo-environmental indicator and local stratigraphic correlation tool (*cf.* Allen, 1990). The main aim was to use magnetic susceptibility signatures as for litho-stratigraphic correlation (Dearing *et al,* 1981; Snowball and Thompson, 1990; Thompson *et al,* 1975) and to attempt a correlation between the sequences in Trenches 6 and 7, with the sequence from Trench 2, and ultimately with previous work (Allen, 1990, e.g. soil pit VI). Variations in magnetic susceptibility within sampled profiles can be compared and peaks and troughs used to match the profiles where they are believed to represent synchronous depositional processes or events. The implication is that the rates and processes of erosion within the catchment zone for the sediment and changes in the land use patterns or allogenic inputs such as pollutants or volcanic ash, will affect the magnetic profile of the stratigraphy.

A further aim was to attempt to identify episodes of magnetic enhancement resulting from human occupation or stasis and pedogenic enhancement (Allen, 1990; Linford, 1994). Readings were made on 10 g subsamples (<2 mm) of all contiguous columns of samples and from bulk samples, using a Bartington MS2 meter, and magnetic susceptibility profiles created to facilitate correlation between sequences.

The magnetic susceptibility readings from Trenches 2, 6 and 7 and soil pit VI were compared. The results range from 2 - 19 SI/ Kg with significant variation between trenches. Trench 2 averaged 6.5 SI/ Kg (standard deviation of 1.8), Trench 6 averaged 9.9 SI/ Kg (standard deviation 1.2), Trench 7 averaged SI/ Kg 11.2 (standard deviation 2.5) and Soil Pit VI averaged 12.3 SI/ Kg (standard deviation 3.2).

The magnetic susceptibility results show only slight enhancements (Trenches 2, 6 and 7) with subdued peaks (see Figures 2, 3 and 5). No evidence of obvious occupation or stabilisation horizons was evident in this data. Some fluctuation in the profiles is present, and these match the sedimentary sequence enabling characterisation of each (*cf.* Allen, 1990).

Correlation

Neither major identifiable sediment facies nor peaks in the susceptibility results occur with which to correlate the sequences in Trenches 6 and 7 with any confidence despite the overall similarity of deposits exposed. The magnitude of values in both is similar, and a small enhancement in context 422 (between 3.85 m and 3.35 m AOD) in Trench 7 may correspond to a similar slight enhancement in context 410 and 416 (3.27 m to 3.47 m AOD) near the base of Trench 6. A subtle magnetic enhancement, overlaid by a gradual magnetic decay, was recorded in Trench 7 between approximately 3.35 m and 3.85 m AOD (context 422). Although this minor peak may to correlate with a similar sequence between 3.25 m and 3.55 m AOD in Trench 6 (context 410), we cannot correlate them with confidence.

The origin of this slight magnetic enhancement is unclear especially in view of the similarity of the particle size (finger texturing) of the deposits. It is possible that the area became drier at this time, perhaps allowing sufficient soil development for magnetic enhancement to occur.

There is no strong correlation between the southern trenches and Trench 2. Despite evidence of both stasis and possible occupation surfaces, there is little corroborative evidence from the susceptibility profile in Trench 2. Results are low throughout with troughs in susceptibility corresponding to sand lenses relating to the particle size of the material. A very slight enhancement is noted in contexts 211 and 212 which may be the remnant of a soil stabilisation layer.

Soil pit VI, excavated by Bell at the foot of the sand cliff some 100 m inland, revealed an alluvial/estuarine sequence to 3 m AOD, superficially similar to that seen in the excavations on the beach. The susceptibility results are consistently slightly higher in soil pit VI, probably because of its proximity to the base of the sand cliff and influx of enhanced terrestrial deposits. The resulting susceptibility profile is not, therefore, directly comparable with the estuarine sequences described above.

Conclusions

There is a slight hint from these four sequences that synchronous events have been magnetically preserved but the synchronous environments are not constant over the relatively small distance sampled, making firm correlation difficult.

The magnetic properties of saltmarsh sediments are poorly understood. A saltmarsh is a diachronous and graded ecosystem with halophytic vegetation dominant on the seaward side and freshwater species on the landward side (Allen and Pye, 1992). It is also a dynamic system which appears to grow vertically and horizontally through time (Pethick, 1992). Further, the saltmarsh may be separated from the open shoreline by a network of sand dunes, such as those at the present day saltmarsh near Berrow, south of Brean Down (see Willis, 1990). This means that a seaward occurrence of estuarine or minerogenic (sandy) sediments, such as those in Trench 2, 6 and 7, may not have been laid down at the same time as a sandy context further inland (such as soil pit VI). The alternating wet and dry conditions encountered in a saltmarsh, both tidally and seasonally, could have significant effects on the magnetic properties of the deposits. Further, recent work by Pethick (1992) suggests that the sediments within a saltmarsh may be periodically exchanged and reworked with material from seaward mudflats. This implies that stabilisation layers are unlikely to survive *in situ*. Therefore, until more research on modern saltmarshes can provide comparative models, the nature of the observed enhancement in the sequences will remain speculative.

GENERAL CORRELATION

The only sequences that can be related to the previous published work with any confidence are those in Trench 1, where the tail end of the sand cliff deposits are recorded below the present the beach about 34 m from the current exposed toe of that sequence. Here correlation is based on lithology, stratigraphic sequence and finds. The environmental data do not aid this correlation as, although they are sampling contemporaneous environments, they do not sample similar environmental habitats but differing local wetland environmental niches rather than the largely terrestrial sequences published previously (ApSimon *et al,* 1961; Bell, 1990).

The correlation of the estuarine deposits is more difficult, though they can be broadly correlated in sedimentological, rather than magnetic susceptibility, terms with the Wentlooge Formation (*cf.* Bell, 1990, p105; Allen, 1987; Allen and Fulford, 1986). In Trench 2 and the watching brief only Romano-British deposits have been identified. Elsewhere (Trenches 6 and 7) secure chronology cannot be ascribed but the limited environmental evidence may enable some tentative suggestions to be made. This is outlined in the discussion below.

RADIOCARBON DATE

A horse femur and tibia from context 210 in Trench 2 (at the time thought to be equivalent to Bell's Unit 5-6, i.e. Bronze Age) was submitted for radiocarbon dating. Although the bones were fragmentary and showed canid gnawing, the large size of the submitted element (*c.* 200+ mm x 80 mm) suggested that they were not residual but discarded from nearby occupation contexts.

Despite the large size of fragments, poor collagen levels meant that an AMS determination was required. The radiocarbon result gives a calibrated date of AD 420-660, equating this bone, and thus the horizon in which it lies, with the sub-Roman cemetery (Bell, 1990; 1991). In fact the result is statistically indistinguishable at a 95% confidence level (Ward and Wilson, 1978) from that obtained from skeleton 8 (context 213) in the cemetery excavated by Bell (1990); HAR-8548, 1550±80 BP.

lab no.	result	calibrated date (2δ)	δC13
AA-28729	1500±60 BP	cal AD 420-660	-24.9‰

FINDS

Finds were retrieved by hand excavation and from the flotation of environmental bulk samples. Pottery recovered from the GGAT evaluation trenches (Compton in GGAT, 1995) is included in this discussion.

POTTERY

The assemblage consists of just 22 sherds (1066 g) of pottery recovered during the watching brief and excavation and a further 11 sherds from the GGAT evaluation.

Beaker pottery (by Joyce Compton)

Eight sherds of Beaker pottery, all body sherds in good condition, were recovered from a humic sand horizon (GGAT trench 8, layer 020). A minimum of four vessels is represented and at least three fabrics can be identified (Figure 6). Illustrated sherds nos 1, 2 and 4 are decorated with paired-fingernail impressions; no. 4 is comb-impressed; all find parallels in published examples from the sand cliff (Harrison, 1990, no. B14; ApSimon *et al,* 1961, p112, no. 20) and at Gorsey Bigbury (Grimes, 1938, figure 18, no 38). A larger assemblage is reported from the sand cliff; two Beaker vessels were recovered from the beach by Taylor and Taylor (1948), 25 sherds were reported by ApSimon, *et al.* (1961) and a further 43 sherds were recorded during the 1985-7 excavations (Harrison, 1990).

Bronze Age pottery (by Emma Loader)

Two Early to Middle Bronze Age sherds were recovered from layers 108 and 109 in Trench 1. Both are in grog-tempered fabrics. One is a rim sherd from a Trevisker-style vessel with a flattened rim and traces of impressed cord decoration. The flattened rim is the most common form amongst the published Trevisker-style assemblage from Brean and the impressed cord decorative technique also finds parallels here (Woodward, 1990, p132, figure 91, nos 42 &

44). The other sherd is a plain undecorated, undiagnostic body sherd, though the grog-tempered fabric suggests a date of Early - Middle Bronze Age.

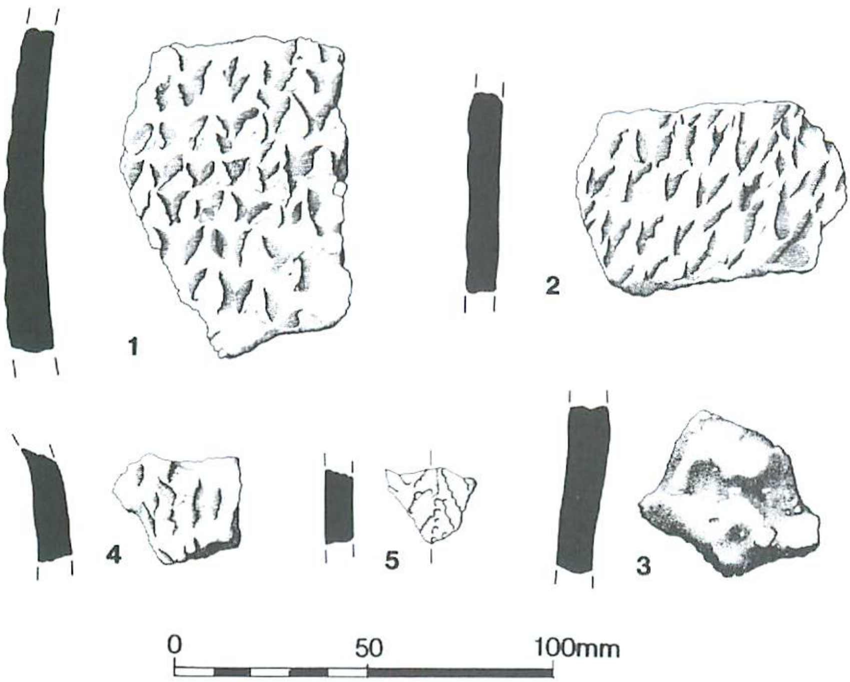

Figure 6. *Beaker pottery from GGAT evaluation trench 8, layer 020 (© GGAT 1995). 1. sherd with paired fingernail impressions (cf. Harrison 1990, p119, no. B15), 2. similar sherd, different vessel, 3. abraded sherd with possible ?fingernail impressions, 4. sherd with fingernail impressions, identical fabric to sherd 2, possibly same vessel, 5. sherd with comb-impressed decoration in chevron pattern (cf. ApSimon* et al, *1961, p112, no. 20).*

Roman pottery (by Emma Loader)

Twenty three sherds were recovered, of which 20 are early Romano-British (late 1st-2nd century AD). These comprise 15 sherds of coarse greyware, including one jar rim; one sherd of fine greyware; three sherds of samian (one of which is decorated and another is an obliquely-shattered base sherd from a Dr. 37 bowl, possibly a fairly early Lezoux product of about AD 120-150; P. Webster *pers. comm.*) and one sherd of Spanish Dressel 20 amphora. Of the greywares, four sherds are decorated with a lattice design. There are also three sherds of Black Burnished ware (BB1), two are plain body sherds and a flaring rim of a jar (Seager Smith and Davis, 1993, type 2 characteristic of the 2nd-3rd centuries AD.

Eleven of the 15 coarse greyware sherds are from ditch 312. The remaining eight sherds of greywares and one undecorated sherd of samian were recovered from layers 204 and 206 or their GGAT equivalent (GGAT layer 004).

OTHER FINDS

A single cortical flint flake (*ident.* Compton) was found in the Beaker layer (GGAT layer 020). Eighteen fragments (249g) of featureless and undiagnostic fired clay (*ident.* Emma Loader) were recovered from layers within ditch 312 in association with Romano-British pottery. They have an oxidised, fine quartz fabric, including one (context 309) with vegetation impressions in pale orange-pink colour. A metal nail (*ident.* Compton), probably Roman, was found in layer 004 (GGAT evaluation trench 1).

ANIMAL BONES
by Sheila Hamilton-Dyer

A total of 67 bones was recorded, recovered, by hand and from sieved samples, from the 1996-7 excavations. Bone recovered from the GGAT evaluation is recorded by Locock (GGAT, 1995) and is not integrated here, although some comment on that assemblage is included. The fragments vary in preservation, some are poor and very eroded but many are in good condition, if brittle. Where possible recently broken fragments were joined and recorded as single bones. Identifications were made using the author's comparative collection. Ovicaprid bones were checked for goat (Boessneck, 1969; Payne, 1985), none being identified. Several sheep bones were positively identified and it is assumed that most, or all, ovicaprid bones are of sheep. Small, unidentifiable fragments have been classed as cattle-sized and sheep-sized or mammalian only. The few measurements follow von den Driesch (1976). Archive material includes metrical and other data not in this text. In addition to the single dog bone some fragments showed signs of canid gnawing.

Beaker

No animal bone was recovered from the Beaker horizons, but the GGAT evaluation recorded sheep/goat, large mammal and the only record of pig from these excavations, although it was recorded in the Beaker Sand (Levitan, 1990).

Early Bronze Age

These contexts (108-113) offered 47 well preserved bones. Cattle (11 bones) and sheep (8 bones + 5 sheep-sized) were identified. The remaining 24 bones can only be classed as mammal. A sheep radius from 109 was unusually long but slim. Although it is gnawed and incomplete this bone must represent an animal with a withers height of over 0.62 m. An incomplete tibia from the same context has a distal breadth of 23 mm typical of the small prehistoric material; it is not possible to tell whether this bone is also long. A complete metacarpus from 108 gives estimated withers height of only 0.564 m, a size more expected from prehistoric material. A skull fragment from 109 indicates that horned animals were present. Both adult and young cattle are represented with a neonatal humerus in 111. A sheep jaw and a cattle humerus had been cut. Although no dog bones were recovered from these contexts gnawed bones were present in 109 and 113, these included a sheep phalanx from 113 with the appearance characteristic of partial digestion.

Lower Romano-British (context 210)

The two bones from this possible occupation layer are both of horse, a femur and tibia possibly from the same limb. Both bones had been heavily dog gnawed indicating that they had not been covered immediately. They provided a radiocarbon date of cal AD 420-660.

Upper Romano-British (contexts 204, 205 and 206) and ditch 312

There are 18 bones from these contexts. These are of cattle (3), sheep (2) and dog (1) together with several cattle-, sheep-sized, and unidentified mammal fragments (4+5+1). The fragment of dog pelvis is of 'average' size but is not a large animal. A small cattle astragalus was measurable with a value of 58.7 mm greatest lateral length. This falls in the range of most prehistoric and early historic material.

Comments

This is a very small multi-period collection. Information about the animal economy is limited but the identified mammal remains are almost entirely of the expected domestic ungulates cattle and sheep with some pig, horse and dog.

The substantial Bronze Age assemblage from Brean Down (Levitan, 1990) was predominantly of cattle and sheep, but also included horse and pig, and some remains of deer, birds and fish. Several of the bones had been gnawed and dog coprolites containing bone were recovered. The small assemblage of Romano-British material from Banwell, Kenn Moor, to the north-east, is similar to that here but also contained a few bones of horse, pig and hare (Hamilton-Dyer, *unpubl.*). The assemblage from the evaluation is similar in composition (Locock in GGAT, 1995). Across the estuary a Romano-British assemblage was recovered from excavations at Rumney Great Wharf on the Wentlooge Levels (Hamilton-Dyer, 1994). Here sheep were dominant but horse bones were also frequent, especially from ditches, and were more common than cattle. Pig was present but at low levels and some bones of dog, birds and fish were identified.

PALAEO-ENVIRONMENTAL EVIDENCE

A comprehensive series of samples was taken through the deposits to define the nature of environment of deposition and facilitate the reconstruction of the changing environment, to complement information previously acquired from the excavations within and adjacent to the sand cliff (Bell, 1990). Attempts were made in each case to correlate the results from the various trenches and episodes of work. It was hoped that the sampling of the estuarine deposits would enable a greater understanding of the fluvial and marine environments and would complement information from soil pit IV (Bell, 1990) and other sequences examined by Bell (1991 and *unpubl.*).

SAMPLES

A comprehensive suite of samples was taken from available sections of Trenches 1, 2, 6 and 7. These comprised nine 30-40 l bulk samples, three monolith tins and contiguous columns of samples primarily taken for mollusc analysis.

Bulk samples

Bulk samples were taken were taken from horizons of specific cultural interest in Trenches 1 and 2, i.e. those with artefacts. Smaller samples of about 10 l were taken from ditch 312. Two further samples were provided by GGAT following their initial evaluation. One was from a palaeosol formed in sand (layer 041, GGAT trench 7) and the second from the 'Beaker occupation' deposit (layer 20, GGAT trench 8) that had been sieved to 1 mm by GGAT. The dried residues were supplied.

Monolith samples

Three monolith tins were taken through the main sequence above the 'blue clay' in Trench 2 (Figure 3). Loose, unconsolidated sand horizons, some of which contained archaeological artefacts, could not be retained as monolith samples.

Contiguous columns of soil samples

The full sequence of sediment below the storm beach was sampled in Trenches 2, 6 and 7 at contiguous 0.1 m intervals, taking care not to cross horizon boundaries. These provided material for land snail analysis and subsamples for recording magnetic susceptibility. It also facilitated subsampling for the assessment of pollen, diatoms, foraminifera and ostracods.

ANALYTICAL PROGRAMME

Small subsamples were removed from the contiguous column of soil samples and from larger bulk samples for the assessment of pollen, diatoms, foraminifera and ostracods. Relatively poor survival of all of these microfossils did not require analysis of further closer-interval samples from the monoliths. Where further analysis was undertaken (foraminifera, ostracods and pollen) these too were subsampled from the contiguous column of soil samples.

Palynological investigation of the foreshore sediments
by Robert G. Scaife

Pollen investigations were conducted to ascertain if pollen was present in the long sub-beach sequences and to determine, if possible, the local environment contemporary with Bronze Age and Romano-British activity. Specifically, an important question posed was whether the sediments were deposited in a marine, brackish or freshwater environment. Pollen subsamples were examined: three spot samples from earlier Bronze Age contexts in Trench 1, 10 spot samples taken from Trench 2, four from Romano-British ditch 312 and 14 spot samples from Trenches 6 and 7, with specific interest given to the deeper sequence of Trench 2. In earlier excavations undertaken by Bell (1990; 1991), analysis was not carried out on the marine and/or estuarine sediments of prehistoric and Romano-British age which are present on the inter-tidal foreshore zone at Brean.

Methods and techniques

All samples were of an inorganic/minerogenic character and in some cases of raised alkalinity. Given these factors rigorous pollen extraction procedures were required and the high pH, especially, suggested that pollen might be poorly preserved or absent. Extraction procedures followed those outlined by Moore *et al.* (1991) but with the addition of micro-mesh sieving (10 μ) for removal of the clay fraction. Samples of 4 ml volume were decalcified with 10% HCL and deflocculated with 8% KOH. Coarse debris was removed through sieving at 150 μ and clay by micro-mesh (10 μ). Remaining silica was digested with 40% HF. Erdtman's acetolysis was carried out for removal of cellulose and expanding the size of pollen after extended HF treatment. The concentrated pollen and spores were stained with safranin and mounted in glycerol jelly. Pollen was identified and counted with an Olympus biological research microscope (with Leitz optics) with phase contrast facility at magnifications of x400 and x1000. Although successful, pollen preservation and absolute frequencies were poor in all samples examined. The raw pollen data obtained from counting are presented in Archive tables 1-3 deposited with the site archive. A preliminary pollen diagram has been constructed for Trench 2 using *Tilia* graph and *Tilia* Plot in the Quaternary Environmental Change Research Centre of the Department of Geography, University of Southampton. Pollen is calculated as a percentage of total pollen and spores as a percentage of total pollen plus spores. Taxonomy follows that of Stace (1991) and Moore *et al.* (1991) modified according to Stace/Flora Europaea (Bennett *et al.* 1994). It should, however, be noted that the pollen sum on which the calculations are made are, in the upper levels, inadequate to provide sound statistical information. Throughout all horizons, pollen preservation was poor with evidence of differential preservation in favour of those taxa with more robust exines.

Trench 1

Samples from contexts 112, 108, and 113 were analysed. The former comprised medium to coarse sand (beach?) in which pollen was totally absent. The latter (Early Bronze Age) produced 17 taxa but absolute pollen frequencies were low and a total of 60 pollen grains and 158 spores were identified/counted. Pollen comprises *Plantago lanceolata* (ribwort plantain; 18 grains), *Plantago media/major* type (5 grains), Poaceae (grasses; 6 grains) and Cyperaceae (sedges; 12 grains) together with Lactucae (dandelion type; 7 grains), a single grain of *Filipendula ulmaria* (meadow-sweet) and one unidentifiable pollen grain. A small number of tree taxa are sporadically present; *Pinus* (pine; 3 grains), *Quercus* (oak; 3 grains) and single grains of *Betula* (birch), *Fraxinus* (ash), *Corylus avellana* (hazel) and *Salix* (willow). Very large numbers of spores are present with *Pteridium aquilinum* (110) dominant, followed by *Polypodium* (26), *Dryopteris* type (18), and *Sphagnum* (2).

Although only a small number of pollen grains were recovered, it is tentatively suggested that the spectrum is indicative of a pastoral habitat. High values of spores are typical of fluvial depositional environments where flood conditions give an over-representation of Pteridophytes (Peck, 1973). Noticeably absent are pollen indicators of marine and brackish environments. Proximity of saltmarsh is likely to be indicated by Chenopodiaceae (goosefoots, oraches and glassworts), *Armeria* types (*Armeria*/thrift and *Limonium*).

Trench 2

A preliminary pollen diagram has been produced for the 10 levels examined for this section (Figure 7). As noted above, the data on which the pollen diagram has been calculated are less than desirable because of poor pollen preservation, in particular the upper levels, and resultant differential preservation. The sequence can be divided into two broad pollen zones; the lower (zone 1) encompasses the lower Romano-British contexts and undated (?Bronze Age) 'blue clay' and comprised contexts 209-212, the upper (zone 2) comprises Romano-British contexts 202-205 (see Figures 3 and 7).

Zone 1: Pollen preservation was significantly better in the lower contexts allowing pollen counts of 100 grains plus spores per level. Trees comprise *Quercus* and *Corylus avellana* type with sporadic *Betula, Pinus, Tilia* (lindens), *Alnus* (alder) and *Fagus* (beech). Herbs are dominated by Poaceae (grasses) and Chenopodiaceae. Other herbs are also present and include important halophytic indicators *Armeria* 'A' and 'B' lines (*Armeria,* thrift and *Limonium,* sea lavender), large Poaceae (?saltmarsh grasses such as *Glyceria* and *Elymus*) and *Plantago maritima* (sea plantain) type. Hystrichospheres are also noted. Terrestrial taxa include *Plantago lanceolata* and Poaceae undifferentiated. Some freshwater marsh types are present including Cyperaceae (sedges), *Typha/Sparganium* (reed mace and bur reed).

Zone 2: Pollen preservation was substantially poorer in the upper contexts of this section. Only small numbers of differentially preserved pollen were recovered and comprises *Pinus* and Lactucae (dandelion types) with an increase in the numbers of spores. In the upper three pollen levels (contexts 209, 210 and 211, above the 'blue clay') spectra are highly skewed in favour of these robust types and with low absolute pollen numbers, little interpretation is feasible. It is, however, noted that Chenopodiaceae and other halophytes are almost absent.

Detailed interpretation is difficult given the factors noted above. However, it is clear that the lower contexts have a strong saltmarsh element. The sediments are similarly diagnostic of saltmarsh deposits and concur with the foraminifera data obtained by Athersuch (below). Although reworking of older sediments is always a strong possibility when dealing with pollen assemblages from minerogenic deposits, the substantial numbers of Chenopodiaceae and the range of halophytic taxa are a strong indication of a saltmarsh community. Foraminifera provide a slightly clearer indication of the position of the sediment in the saltmarsh (i.e. lower to upper). The presence of *Armeria* types, *Aster* type and large numbers of Chenopodiaceae suggest a middle to upper saltmarsh range. Absence of *turfa* (i.e. organic sediments) may, however, cast some doubt on this; it may represent pollen and diatoms from the upper saltmarsh washed over mudflats.

Some evidence of background woodland communities is evident. *Quercus* and *Corylus avellana* type with small (under-represented) quantities of *Fagus* and *Tilia* may provide evidence of the (later?) Bronze Age woodland. *Pinus* is not considered a local element since over-representation of pine in marine sediments is a common phenomenon. This is enhanced by differential preservation in the upper zone. Quantities of *Plantago lanceolata* and Poaceae are comparable with the assemblage obtained from Trench 1 and may be evidence of local grassland/pasture.

Romano-British ditch

Pollen was generally poorly preserved and counts were only obtained with difficulty. Differential preservation is evidenced by large numbers of spores of *Pteridium aquilinum* (bracken), *Dryopteris* type (monolete fern spores), *Polypodium vulgare* (common polypody fern) and pollen of Lactucae. Arboreal and shrub pollen are only present in small numbers. *Plantago lanceolata* and Poaceae are also relatively important. Chenopodiaceae are present in small numbers. Detailed interpretation is not feasible and only broad suggestions can be made. Dominance of herbs and relatively few trees may suggest locally open landscape on drier land; pastoral ?Chenopodiaceae suggest some marine/saltmarsh influence, especially in contexts 310 and 312.

Trench 7 and 6

In Trench 7 sampling spanned the complete range of sedimentary units from a depth of 3.17 m to 5.59 m AOD (Figure 5). Pollen sampling was concentrated on the lower 1.5 m of grey, possibly saltmarsh, clay and silt. Pollen samples start from a depth of 4.83 m AOD (uppermost sample) to the basal level at 3.27 m AOD. A single level examined in Trench 6 (4.12-4.22 m AOD) contained pollen and spores with comparable preservation and pollen spectrum with those spectra from Trench 7.

Pollen was sparse but in many cases surprisingly well preserved with some thin exine types such as Poaceae and Cyperaceae present. Degraded and unidentifiable pollen was also found and results from the harsh taphonomic conditions of this sedimentary environment. A total of 35 taxa was recorded. Overall, there is little variation in the pollen spectra throughout and no zonation of the pollen diagram has been carried out. The characteristics of the pollen spectra are as follows:

Tree and shrub pollen: Average values of 40-50% of total pollen are present. There is some decline in tree/shrub values upwards in the profile. *Quercus* is dominant (30%). Other taxa comprise consistent but small percentages of *Betula*, *Pinus*, *Tilia*, *Ilex* (holly) and *Corylus avellana* type and *Alnus*. Alder has a single peak of 19% at 90 cm which give a single expansion in overall tree percentages. It is associated with lowland rivers or mires.

Herbs: Herbs are dominant with total percentages to 75%. There is a progressive but gradual increase in values upwards in the profile corresponding with the gradual decline of tree pollen percentages. Poaceae (grasses) are dominant (to 37%) with *Chenopodium* type to 37% which includes *Chenopodium, Salicornia,* and *Atriplex* spp. (goosefoots, glasswort and oraches) which are largely halophytes. Herbs can be divided largely into three groups. First, halophytes (i.e. saltmarsh taxa), which include the Chenopodiaceae noted as *Armeria* 'A' and 'B' lines, *Plantago maritima* and large Poaceae (various maritime grasses). Second are weeds of waste ground and agriculture include cereal grains in the upper levels, and *Plantago lanceolata.* The third category are wetland/freshwater marsh taxa. Cyperaceae are one of the dominant pollen taxa in the profiles. Also noted is *Sparganium* type (lesser reed-mace or bur reed). *Potamogeton* type may derive from *Triglochin* (freshwater or sea arrow grass or pond weed).

Spores: It is typical of fluvially derived mineral sediments that spores can be numerous (Peck, 1973). This is the case here with substantial quantities of *Pteridium aquilinum* (bracken), monolete spores of *Dryopteris* type (various 'typical' fern types) and *Polypodium vulgare* (common polypody). It is likely that these have been transported from upstream sources and over-represented through the effects of differential erosion of similarly transported taxa with thinner exines. Hystrichospheres are present.

Relationship of sequences in Trenches 6 and 7 to analysis of Trench 2

It is clear that the taphonomy of the recovered pollen is somewhat complex. Overall, it seems that the autochthonous plant community was possibly 'general saltmarsh' (GSM) (Chapman, 1964) with typical thrift, sea lavender, and Chenopodiaceae. This is in accord with the apparent sedimentology which comprises grey silt with clay and evidence of diatoms and foraminifera (see below). Also represented are transported elements representing inland plant communities that have probably been transported by streams draining into the catchment. It is implied from the data that the regional vegetation comprised oak and hazel woodland. Trees of entomophilous character (e.g. lime) which produce relatively small numbers of grains compared with anemophilous taxa (e.g. oak and elm) may not be represented even though growing in the environment. There is some indication of agricultural activity.

It is clear that the sequence described above correlates strongly with the lower section/contexts of the diagram from Trench 2 (Figure 7). With the exception of *Plantago lanceolata,* which exhibits far higher percentages in Trench 2, pollen ecological groups discussed above are identical with general saltmarsh elements, weeds of waste ground and agriculture, freshwater marsh/aquatic and the background oak/hazel woodland. In Trench 2, the upper levels contained very little pollen which was dominated by Lactucae. These are typically the last pollen grains to remain in extreme preserving environments.

Conclusion

All contexts in Trenches 1 and 2 contained some pollen and spores except two Early Bronze Age contexts from Trench 1 (108 and 110). Pollen preservation and absolute pollen numbers were, however, generally poor. This is attributed to the depositional environment, the minerogenic character and possibly some alkalinity caused by molluscs. Pollen obtained from the lower Romano-British contexts of Trench 2 provide the most useful data showing dominant local saltmarsh communities. Tentatively, a background vegetation of oak and hazel woodland possibly with lindens is suggested. Grassland is also indicated. Romano-British contexts provided only poorly preserved pollen with marked differential preservation evident. Perhaps surprisingly, there is little evidence of marine influence during this period.

Pollen data obtained from Trenches 2, 6 and 7 appear to contain similar pollen assemblages. These stratigraphical sequences are undated because of lack of organic material suitable for radiocarbon assay. However, cereal pollen in all profiles indicates a Neolithic or post-Neolithic age. The local habitat of deposition appears to have been middle (i.e. general) saltmarsh, a fact also confirmed by diatom and foraminifera analysis.

Foraminifera and ostracods
by John Athersuch

Forty seven samples were selected for examination for microfossils, principally foraminifera and ostracods from a series of spot samples taken from a contiguous sample column at 0.1 m intervals and other spot samples taken from larger bulk samples (see Figures 1, 2, 3 and 4).

The samples were prepared by drying at 100°C and then soaking for a few hours in dilute (5%) hydrogen peroxide, followed by sieving to provide a residue from which representative specimens were picked. All sample residues were scanned under a reflected light microscope to provide an assessment of the relative abundance of the species present, their preservation and palaeo-environmental signal (Athersuch *et al,* 1989; Henderson, 1990; Murray, 1979). Representative specimens were saved in cardboard slides for reference.

The relative sample positions and semi-quantitive distribution of the recovered microfaunas are recorded on the stratigraphic order in Table 3. The detailed results of analysis are presented in Table 3 and the ecology of the specimens encountered is presented below.

Ecology

Foraminifera: While marine foraminifera make up the bulk of the recovered microfauna, most are probably reworked either from older strata or transported from adjacent environments by river currents or in wind blown sand. Their occurrence should not, therefore, be relied on as indicative of prevailing marine conditions at this site. The most commonly reworked species in these samples is *Ammonia batavus* which is a typically a shallow marine to outer estuarine species. It is a resistant rounded species and specimens recovered in these samples are abraded and opaque indicating reworking probably inshore into an estuarine environment by tidal exchange.

There are a number of other exclusively marine species recovered in these samples, but these are probably all reworked. *Elphidium williamsoni* and *Protelphidium germanicum* are characteristic of brackish lagoons and estuaries. Most specimens appear to be relatively fresh and have probably not been transported far. *Nonion depressulus* is a marine species often found at the mouths of estuaries. *Ammonia limnetes* is typical of brackish estuaries and lagoons

Cibicides is an inner shelf species which is readily transported by currents into outer parts of estuaries. Other species which occurred rarely in these samples (*Ammodiscus* sp., *Lenticulina* sp., *Elphidium crispum, Elphidium excavatum*) are all probably reworked from contemporary or Tertiary sediments.

Ostracods: The delicate nature of the ostracods recovered indicates that there has been little or no *post mortem* transport. Consequently, where they survive they make excellent environmental indicators. *Ilyocypris* spp. inhabit sluggish freshwater streams and fresh to brackish pools. *Eucypris virens* inhabits ponds and small, often temporary, pools. *Candona neglecta* and *Potamocypris* spp. are typical of freshwater, either standing bodies of water of slow flowing streams, with soft muddy substrates. *Cyprideis torosa* is tolerant of a very wide range of salinities and is found in slightly brackish pools, estuaries and hypersaline lakes. *Leptocythere castanea* is an exclusively brackish water species found extensively in estuarine and saltmarsh environments associated with mud and algae. *Loxoconcha elliptica* is confined to estuaries, lagoons and pools associated with mud and algae. *Cythere lutea* is a shallow marine species often found in the outer reaches of estuaries. *Neocytherideis subulata* is a shallow marine species, and in these samples is probably reworked. *Bairdia* sp., another reworked marine form is also probably reworked in these samples.

Miscellaneous: Echinoid spines are present in many samples and are indicative of exclusively marine environments. In these samples they are certainly reworked. Charophytes are present and indicative of freshwater and brackish lagoons.

Trench 1

The paucity of data makes it difficult to suggest an environmental setting for samples in Trench 1. However, the presence of *C. lutea* does suggest influence from marine waters in context 113. The appearance of the specimens of the foraminifer *Ammonia batavus* in Early Bronze Age contexts 113, 109 and 108 suggest that they had been subject to reworking. Evidence of brackish water and estuarine conditions (*Elphidium* sp.), freshwater (bivlave) and dry land (*P. muscorum*) confirm this.

Trench 2

A sequence of 25 samples was examined from Trench 2 (Figure 3). The *in situ* (well preserved) element of the microfaunas from the lower Romano-British deposits (contexts 210 and 211) and 'blue clay' (contexts 212-218) is generally characterised by fresh and brackish water indicators, mainly ostracods (*Eucypris virens, Potamocypris* sp., *Ilyocypris* sp., *Leptocythere castanea, Protephidium germanicum* and *Neocytherrideis subulata*) but with some species of foraminifera (*Ammonia batavus, Elphidium willamsoni, Nonion depressulus,*) and numerous small freshwater snails throughout. The recovered faunas are not definitive enough to assign a particular environmental setting to each context, but it is clear that throughout both intervals a number or fresh and brackish environments, ranging from saltmarsh to freshwater pools, existed in the vicinity of the site.

The sample from context 213, a sand lens within the 'blue clay', is characterised by the absence of definitely *in situ* forms and yields a variety of reworked marine species (*A. batavus* together with *Lenticlina* sp., *Cibicdes lobatulus,* and *Elphidium crispum*). This may be interpreted as indicative either of a marine incursion or of a terrestrial setting.

The upper Romano-British deposit (contexts 202, 203 and 204) was mainly barren but a few samples near the base contained reworked marine microfaunas (including *A. batavus*).

This is not inconsistent with a terrestrial setting although a marine inundation at this level might be inferred.

Trenches 6 and 7 and Ditch 312

Most samples in the contexts from Trench 6 yielded mainly brackish to marine foraminifera (*E. williamsoni, P. germanicum* and rare *Ammonia* cf. *limnetes*) indicative of lagoons and estuaries. To what extent these microfaunas are *in situ* is difficult to say. All the samples from the blue grey clays of Trench 7 contained exclusively brackish to marine foraminifera indicative of lagoons and estuaries (*E. williamsoni,* and rare specimens of *P. germanicum* and *A. batavus*) together with freshwater snails. In addition, context 423 contained fresh to brackish water ostracods (*Ilyocypris* sp.). As with Trench 1 the paucity of data in ditch 312 makes it difficult to suggest an environmental setting. However, there is some evidence from contexts 310 and 312 to suggest areas of fresh (*?Eucypris virens*) and brackish water (*A. batavus*) existed in the vicinity of this site.

Correlation

There is no distinct correlation between the successions in each of the trenches based on the microfaunal evidence alone. However, there is some similarity between the faunal assemblages (a fresh to brackish fauna dominated by *Elphidium williamsoni*) of contexts 410, 411 and 413 in Trench 6, the entire examined succession in Trench 7 and from the Romano-British contexts 210 and below in Trench 2.

Diatom Assessment
by Nigel Cameron and S.J. Dobinson

Diatom assessment was carried out on 10 sediment samples taken from a contiguous sample column at 0.1 m intervals and other spot samples taken from later bulk samples from Trenches 1 and 2 as well as from the watching brief, and a further 14 samples from Trenches 6 and 7. Each sample was assessed to determine if diatoms were present or absent, the diatom valve concentrations, their state of preservation and the diversity of taxa. Diatom preparation followed standard techniques (Battarbee, 1986; 1988). Three coverslips having different concentrations of the cleaned solution were made. Microscopical examination of cleaned diatoms mounted on slides was carried out at magnifications of between x 300 and x1200 using a Leitz phase contrast research microscope.

Trench 1

A single sample from context 113 contains an identifiable diatom assemblage. This was poorly preserved and of low diversity. Two taxa are dominant, *Hantzschia amphioxys* and *Navicula cincta*. The former is often associated with terrestrial or semi-terrestrial habitats and reflects either frequent drying out or an input of eroded terrestrial material. *Navicula cincta* is a benthic, brackish water taxon. In addition the sample contains fragments of marine planktonic or semi-planktonic species (*Paralia sulcata, Actinoptychus undulatus, Rhaphoneis* sp.). This reflects a contemporary tidal input or the introduction of a marine component by sediment mixing processes. In addition a single valve of a marine/brackish water *Thalassiosira* sp. is present with freshwater *Pinnularia* sp. and *Nitzschia* sp. Chrysophyte cysts, probably of fresh or brackish water origin are also present.

Trench 2 and Romano-British ditch 312

Diatom valves and valve fragments are absent from seven samples; upper Romano-British contexts 204, 205, lower Romano-British contexts 210 and 211, the 'blue clay' (context 212). Indeterminate diatom fragments are also present in this context and in Romano-British context 203 in trench 2. Coccolith scales are present in most samples, reflecting the calcareous geology (Carboniferous Limestone) of the locality. Fauna was absent from context 307 of Romano-British ditch, 312, but a single chrysophyte cyst was recorded in the lower fill (310) and is indicative only of the presence of water (probably fresh or brackish).

Trenches 6 and 7

Diatoms are absent from all samples apart from 3006 (context 410, at 3.32 m AOD) from Trench 6. This sample had a single valve fragment which can probably be assigned to the brackish species *Cyclotella striata.* Unfortunately, the significance of this valve is questionable as a single fragment may not be a representative component of the former assemblage. Also, given the low concentrations of diatom valves, the likelihood of contamination increases.

Discussion

The absence, or poor preservation, of diatom valves in most samples probably reflects an unsuitable preservational environment for diatoms rather than an initial absence of diatoms from the sediments. In alkaline environments (pH9) silica dissolution is rapid and even in alkaline environments below this pH, silica dissolution occurs gradually. The likelihood of alkaline conditions is indicated by the survival of coccolith scales and proximity of Carboniferous Limestone to the site. Variable preservation of diatom assemblages was also found in samples examined by the locality in an earlier investigation (Crabtree, 1990).

Context 113 does however contain a diatom assemblage of limited diversity. The mixture of an aerophilous species (*Hantzschia amphioxys*) along with brackish (*Navula cincta*), marine (*Paralia sulcata*, *Actinoptychus undulatus*, *Rhaphoneis* sp.) and freshwater taxa (e.g. *Pinnularia* sp.) is comparable with the foraminiferal (Athersuch *vide supra*) and archaeological evidence for reworking.

No conclusions can be drawn from Trenches 6 and 7, nor could the sequence be related to each other or to Trench 2.

Mollusca

by Michael J. Allen

Several workers have conducted detailed molluscan studies on the terrestrial and aeolian sequences in the Brean Down sand cliff. Undergraduate dissertations by Vaughan (1976) and Spencer (1974; 1975) included samples from the sand cliff but the most rigorous and comprehensive analysis was that by Bell and Johnson (1990) which included a full stratigraphic sequence of the sand cliff. Only limited molluscan analysis was conducted on any similar deposits by Bell and Johnson from soil pit VI where only a proportion of the samples was analysed (1990, mf 1:G9). Low shell numbers were recorded from large, 3 kg, samples. The results presented below show the value of analysis of these sequences despite low shell numbers and these may be compared with analysis of samples taken from test pits excavated by Bell in 1989 and 1991 (Bell, 1991) which await future analysis.

The aim of analysis here was twofold. The main aim was to examine the environment of the sub-beach deposits which could be related stratigraphically and chronologically (pottery finds and radiometric dating) with the terrestrial environments to widen the picture of palaeo-environmental interpretation to beyond the confines of the excavated settlement site (Bell, 1990). Already Bell and Johnson's analysis (Bell and Johnson, 1990) has indicated highly localised variation, as one might expect from the ecotone (environmental/ecological boundary) at the foot of the cliff.

Secondly, limited sampling from the shallow tail end of the aeolian and terrestrial sand cliff sequence in Trench 1 would provide both additional information to add to the previous analysis, and provides the stratigraphic link between the sub-beach deposits (Trench 2), and those published from the sand cliff. Trench 1 revealed a number of units previously examined, but at a significantly lower level AOD than had been previously sampled. This enabled the examination of well-sealed deposits not subjected to the rigorous biotic disturbance which Bell suggested contributed to the inclusion and mixing of species.

In the absence of deep sequence to fully sample, analysis of Trench 1 was restricted to shells recovered from four very large (20 l) bulk samples. Excavations by Wessex Archaeology were not permitted to expose the key archaeological horizons (Beaker Sand and Beaker occupation level) within the scheduled area which had been demonstrated to exist at that location (GGAT, 1995; Locock and Lawler, 1996), so we are grateful to Martin Locock for supplying two samples from these contexts from the GGAT evaluation. A contiguous column of 34 samples was taken from Trench 2 at 0.1 m intervals through the 3.1 m of exposed deposits below the modern storm beach. Due to the low shell numbers in the 1.5 kg samples (Table 4) the shells from the series of large bulk samples were also examined. Shells from bulk samples taken from Romano-British ditch 312 were examined to augment the dated Romano-British contexts in Trench 2. Analysis was not conducted on the columns of contiguous samples from Trenches 6 and 7 because of the lack of shells and inability to confidently relate the two sequences chronologically.

All contiguous samples from Trench 2 were processed and analysed following standard methods described by Evans (1972). The large 20 litre bulk samples were processed in a flotation tank rather than laboratory, but both flots and residues were retained on a 0.5 mm mesh. The results are presented in Tables 4 and 5.

Trench 1 and GGAT evaluation trenches (Table 4)

Excavations at the foot of the present sand cliff exposed the tail-end of the terrestrial sand cliff deposits (Bell 1990; ApSimon *et al.* 1961) and the GGAT evaluations exposed limited sections of the deposits at deeper depths.

Beaker Sand and Beaker Occupation layers: The Beaker Sand (Bell, Unit 7) was only exposed in the GGAT evaluation, and bulk samples were taken in their trenches 7 and 8 from deposits thought to be equivalent to the Beaker Sand or Beaker occupation layer (ApSimon *et al,* 1961; Bell, 1990, layer 118). The sample from GGAT layer 020 had been sieved (not floated) to 1 mm which may account for the relatively few shells present. The small assemblage was wholly terrestrial with one fragments of limpet (*Patella vulgata*). The most common species (*Helicella itala* and *Vallonia costata*) indicate dry grassland, but the presence of *Clausilia bidentata* and *Discus rotundatus* which may indicate shadier conditions. Interestingly, the specimen of *C. bidentata* is clearly burnt. Despite the few shells, the assemblage compares well with that recovered from the corresponding deposits by Bell and Johnson (Bell and Johnson, 1990).

A second sample (GGAT layer 041 at *c.* 3.25 m AOD) was processed at Wessex Archaeology following standard procedures and was more productive (Table 4). It contained a predominately terrestrial assemblage, though a few *Hydrobia* species were present indicating

Phase/Unit	7	7	6 (8b)	6	6	5d	R-B	R-B	R-B	R-B
Trench	1	1	1	1	1	1	3	3	3	3
Feature							[———ditch 312———]			
Sample	G002	G003	1003	1002	1001	1000	3002	3003	3000	3001
Context	020	041	113	112	109	108	313	314	307	310
Depth (cm)	spot	spot	spot	spot	spot	spot	spot	spot	spot	spot
Wt (g)	1500	2000	20 L	40 L	20 L	20 L	8 L	7 L	6 L	6 L
MOLLUSCA										
Pomatias elegans (Müller)	+	-	+	-	+	+	-	-	-	-
Carychium minimum Müller	-	3	-	-	-	-	-	-	-	-
Carychium tridentatum (Risso)	-	3	-	-	-	-	-	-	-	-
Succinea/Oxyloma spp.	-	1	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	8	-	-	-
Cochlicopa spp.	-	-	-	-	-	+	13	-	-	-
Vertigo antivertigo (Draparnaud)	-	3	-	-	-	-	-	-	-	-
Vertigo pygmaea (Draparnaud)	-	2	-	-	-	-	3	1	-	-
Vertigo moulinsiana (Dupuy)	-	-	-	-	-	-	-	-	-	-
Vertigo spp.	-	-	-	-	-	-	-	-	-	1
Pupilla muscorum (Linnaeus)	1	1	+	-	-	1	4	-	-	1
Vallonia costata (Müller)	4	4	-	1	-	-	16	-	1	2
Vallonia pulchella (Müller)	-	2	-	1	1	-	1	6	2	1
Vallonia excentrica Sterki	-	4	-	1	-	-	191	12	16	5
Vallonia spp.	-	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	-	9	-	-	-
Discus rotundatus (Müller)	1	-	-	+	-	+	-	-	-	-
Vitrina pellucida (Müller)	-	-	-	-	-	-	1	-	-	-
Aegopinella pura (Alder)	-	-	-	-	-	-	-	-	1	-
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	-	-	-
Limacidae	-	6	1	2	-	-	61	12	-	-
Cecilioides acicula (M üller)	-	-	-	-	-	-	-	-	1	-
Clausilia bidentata (Ström)	1(b)	-	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	4	-	-	1	3	5	3	+	-	-
Trichia hispida (Linnaeus)	-	-	-	-	-	-	369	33	13	4
Helicigona lapicida (Linnaeus)	+	-	-	-	-	-	-	-	-	-
Cepaea spp.	+	-	-	-	-	-	-	-	-	1
Cepaea/Arianta spp.	-	1	-	+	-	+	29	+	-	-
FRESH WATER										
Lymnaea truncatula (Müller)	-	-	-	-	-	-	1	-	-	1
BRACKISH WATER										
Valvata piscinalis (Müller)	-	-	-	-	-	1	-	-	-	-
Hydrobia ventrosa (Montagu)	-	2	-	1	-	-	-	-	-	6
Hydrobia ulvae (Pennant)	-	1	-	1	-	-	-	-	-	16
Hydrobia spp.	-	-	-	-	-	-	6	-	-	-
Leucophytia bidentata (Montagu)	-	-	-	-	-	-	-	-	-	-
MARINE										
Macoma balthica (total valves ÷ 2)	-	-	1	-	-	1	-	-	-	-
Patella vulgata.	+	-	-	-	-	-	-	-	-	-
Littorina sp.	-	-	-	-	-	1	-	-	-	-
Retusa cf. *retusa.*	-	-	-	-	-	-	-	-	-	-
cf. *Cersatoderma* sp.	-	-	-	-	-	-	-	-	-	-
TOTAL Land molluscs	**11**	**30**	**1**	**6**	**4**	**6**	**708**	**64**	**33**	**15**
TOTAL Freshwater molluscs		**2**					**1**			**1**
TOTAL Backish molluscs		**1**		**2**		**1**	**6**			**22**
TOTAL Marine molluscs	**+**		**1**			**2**				

Table 4. *Land mollusc data from bulk samples from GGAT evaluation, Trench 1 and Romano-British ditch 312.*

brackish water or saline muddy conditions. The terrestrial assemblage was not large, but 11 taxa were recorded including several of which were not previously recorded from subfossil assemblages at Brean. Although the presence of the *Vallonia* species and *Vertigo pygmaea* indicate the drier conditions seen in samples from Unit 7 higher upslope (Bell and Johnson 1990, 247 and mf 1G:7-9), damper conditions are indicated here by *Carychium minimum, Succinea/Oxyloma* sp., *Vallonia pulchella* and more specifically three specimens of the marsh species *Vertigo antivertigo.* This contrasts with previously published assemblages from the same unit (Bell and Johnson 1990) but is probably accounted for by the considerably lower altitude of the sampled layer at this point (3.5 m AOD here), as opposed to *c.* 9 m AOD previously (Bell, 1990, fig. 15). This might suggest that about 30 m from the toe of the present sand cliff, moist lowland habitats, possibly saltmarsh, existed in the Early Bronze Age (Beaker phase).

Contexts 113, 112 and 109 (equiv. Unit 6): Few shells were present, and context 113 produced the marine shell *Macoma balthica.* The most common species were *Helicella itala* and the *Vallonia* species indicating dry open conditions. None of the marsh, wetland or moist ground species (*V. antivertigo, C. minimum* or *Succinea/Oxyloma* sp.) seen in the Beaker horizons were present. No specimens or fragments could be ascribed to *Lauria cylindracea* which 'overwhelmingly dominated' this unit where sampled by Bell and Johnson in the collapse of structure 57 (Bell, 1990).

Context 108 (equiv. Unit 5d): One sample from this virtually sterile blown sand produced very few shells. *H. itala* was most common and this mirrors previous work (Bell and Johnson, 1990). Specimens of both *Macoma balthica* and *Littorina* sp. were also present.

Trench 2 (Table 5)
Context 215, 218 214, 217 and 216: 'blue clay': The 'blue clay' below the sand lens (213) is low in shell numbers. Those present are virtually all brackish-water species. *Hydrobia ventrosa, H. ulvea* show a slight increase upwards to the detriment of the few specimens of the semi-marine species *Leucophytia bidentata.* No marine shells, even in fragmentary form, were present. Rare presence of *Pupilla muscorum* and *Cepaea* spp. indicate the presence of dry land in the vicinity.

Context 213: sand: A large increase in the presence of *Hydrobia* species is associated with this sand lens. The few land snails present are all dry open country species (*P. muscorum, Vallonia excentrica*) provide some evidence of reworking or mixing of the deposits. Fragments of single valves of *Macoma balthica* were the first marine shells to be present in this sequence, it is a mud dweller, which is present at Brean in large numbers today (Boyden and Little, 1973). This may tentatively indicate marine incursion.

Context 212: upper 'blue clay': Although a finer deposit than the sand in 213, the mollusc assemblages from the five samples are similar; they are dominated by *Hydrobia.* The most significant difference is the presence of the rare, but not obligatory, marsh species *Vertigo angustior* (not previously recorded as a subfossil from Brean Down; Bell and Johnson, 1990) among the few terrestrial, essentially dry ground, species (*P. muscorum, V. excentrica, Vitrina pellucida*). *V. angustior,* is not confined to marsh habitats and notably has been recovered from dunes at Northton, Outer Hebrides (Evans, 1972, p146) and Oxwich in the Gower (Quick, 1943, p8, cited by Evans, 1972, p146).

Context 211 (sand loam), 210 and 209 (silty clay): lower Romano-British: Hydrobia species still predominate, but there is an increase in the presence and diversity of terrestrial species; in particular Limacidae, *H. itala* and *V. excentrica.* The terrestrial assemblage is dominated by *Vallonia excentrica, V. pulchella,* Limacidae and *V. pygmaea.* This suggests stabilisation and more locally terrestrial environment, perhaps a land margin with the fresh and saltwater marsh dating to AD 420-660. An influx of freshwater in context 210 is indicated by the large number of *Lymnaea truncatula* which are almost confined to just this layer. The semi-marine species *L. bidentata* is also present throughout this layer confirming the reduction of the maritime influence. This is accompanied by a continued increase in the number and range of terrestrial species.

Context 209, although a very similar deposit to 210, produced lower numbers in which *L. bidentata* is absent and the freshwater species *L. truncatula* in particular decreases. Rather incongruously with a reduction of freshwater species and increase in *Hydrobia* (brackish-water) species, is the single presence of the only planorbid recovered in the study, *Gyraulus cristata,* a freshwater calciphile species living on plants. The terrestrial component continues to be dominated by species of dry habitats.

Context 207: sand: This sand lens contains fewer terrestrial shells and larger numbers of *Hydrobia* suggesting that this may be waterlain. The few terrestrial species represent shells eroded from habitats like those represented in the underlying layer (context 209).

Context 205 (clay loam), 204 (silty sand) and 203 (silty clay): upper Romano-British: Continued brackish conditions are represented by the *Hydrobia* species and a decrease in the freshwater influence by the lack of *L. truncatula. Macoma balthica* is present and the only fragments of cockle (*Cerastoderma* sp.) recovered from this work. A single specimen of *Retusa* cf. *retusa* is present; a bubble shell common on muddy ground. The small terrestrial component indicates the presence of dry ground. This deposits probably represents the dry land on the edge of saltmarsh and estuarine habitats.

The preservation of shell is patchy in contexts 204 and 203, with *Hydrobia* species being much reduced, freshwater species are present in low numbers. The dominance of *Trichia hispida* and the *Vallonia* species with *V. pygmaea* and *H. itala* tend to suggest a more mature fauna, probably presenting open pasture, with some wetter ground represented by the obligatory marsh species, *Vertigo moulinsiana.*

Context 202 and 200: These upper deposits below the modern beach contained very few shells; only *Hydrobia* species and *Lymnaea truncatula.*

Ditch 312 (Table 4)

Four large bulk samples of 6-8 l were processed from various sections through ditch 312 at about 5 m AOD. Two were grab samples from the main fill of the ditch at different locations, but samples from bay 12 sampled the middle (context 310) and the upper fills (context 307; see Figure 4).

The samples show the patchy preservation of shells within the ditch with samples producing between 89 and 5 shells per litre. No marine shells were recovered. All samples from the main fill were dominated by terrestrial species (*T. hispida, V. excentrica,* Limacidae and *V. pulchella*). A single shell of the freshwater species *L. truncatula* was present. This suggests that the ditch was cut through terrestrial albeit possibly saltmarsh, environment. The sample

	trench	Trench 1				Trench 2																									Trench 6							Trench 7							Ditch 312			
		EBA	Bronze Age			'Blue Clay'							sand	'Blue Clay			lower Romano-British						sand	upper Romano-British																								
	context	113	112	109	108	215	215	215	218	214	217	216	213	212	212	212	211	211	210	210	209	209	207	205	204	204	204	203	203	202	410	411	411	412	412	413	415	426	424	424	423	422	422	421	314	312	310	307
	species sample	1003	1002	1001	1000	2026	2023	2021	2020	2019	2017	2016	2038	2037	2035	2033	2032	2031	2030	2029	2028	2027	2050	2049	2048	2047	2046	2045	2044	2043	3006	3010	3012	3015	3017	3019	3024	3046	3042	3040	3038	3036	3034	3031	3003	3002	3001	3000
shallow marine undifferentiated																																																
FO	*Ammodiscus* sp.																						+																									
FO	*Cibicides lobatulus*												+																																			
FO	?*Cibicides* sp.																																					+										
FO	Miliolid sp.																	r														+																
FO	*Elphidium crispum*												+						+																													
FO	*Elphidium excavatum*																						?+																									
FO	*Elphidium* sp.			+								+																																				
FO	*Lenticulina* sp.												+						+																			+										
FO	*Nonion depressulus*										r		?+			C			C	r																												
FO	*Rosalina* sp.																															r																
FO	Nodosariid sp.													+																																		
FO	*Trochammina* sp.																									B			B		+				B													
OS	*Bairdia* sp.																																					+										
OS	*Neocytherideis subulata*																			+	+		+																									
MM	Echinoid spine											+		+			+			r		r	+	r		A			A						A									r	+	+	+	
MO	*Patella* sp.																																														+	
shallow marine outer estuary																																																
FO	*Ammonia batavus*	+		r	r	+		+	+		+	r	C	C	r	r	C	A*	C	A*	C	C	A*	A*	r	R			R			+		+	R			r	+					r	r	C	C	C
OS	*Loxoconcha elliptica*																	+																														
OS	*Cythere lutea*	+																																														
brackish lagoons and estuaries																										R			R						R													
FO	*Ammonia* cf. *limnetes*																														r			+			+			+								
FO	*Elphidium williamsoni*					r	r		+					C	C	D**	r	C		r	r	C		+							r	r	C			C		r	r	D**	A*	A*	A*	A*		+		
FO	*Protelphidium germanicum*															?+				+						E			E		r	+	+	A*	E	+						r	r	+				
OS	*Cyprideis torosa*								?+			+																																r				
OS	*Leptocythere castanea*														+	+																																
OS	*Leptocythere* sp.																									N			N						N						+							
fresh/brackish pools/streams																																																
OS	*Ilyocypris* sp.								+	+	C	C			r		+			r																					+							
OS	*Candona neglecta*																					r																										
OS	*Potamocyrpis* sp.																			+	r	r																										
AL	Charophyte sp.															+																																
MO	freshwater snail							+	r		r	+	r	C	C	+	r	r	r	r	C	C	r	r	r														C	C	r	+	A*	C			r	
MO	freshwater bivalve		+																				r	r														+										
small temporary ponds																																																
OS	*Candona* sp.																																															
OS	*Eucypris virens*																		?+	?r																										?r		
land snails																																																
MO	*Trichia* sp.																										r										?+											
MO	*Vallonia* sp.																		?+	r	C	C	r	r																					r	?r	?r	
MO	*Pupilla muscorum*				+										+																																	

Table 3. *Distribution of microfossils. Key: FO: Foraminifers; OS: Ostracods; AL: Algae (calcareous); MO: Molluscs; MM: Miscellaneous. +: present (1); r: rare (2-5); C: common (6-15); A*: abundant (16-50); D**: dominant (50+).*

Phase/Unit																			BA	BA	6-5	BA	BA	6-5				RB	R-B	RB	RB	RB	R-B	RB	RB	R-B			
Sample	2026	2025	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2038	2037	2036	2035	3034	2033	2032	2031	2070	2030	2029	2071	2028	2027	2050	2049	2000	2048	2047	2046	2002	2045	2044	2001	2043	2042	2041
Context	215	215	215	215	215	215	218	214	217	217	216	213	213	212	212	212	212	212	211	211	211	210	210	210	209	209	207	205	205	204	204	204	204	203/6	203/6	203/6	202	201	201
Depth (m OD)	2.84-	2.94-	3.04-	3.14-	3.24-	3.34-	3.40-	3.49-	3.58-	3.67-	3.77-	3.86-	3.90-	4.00-	4.10-	4.20-	4.30-	4.40-	4.45-	4.55-	spot	4.65-	4.75-	spot	4.87-	4.97-	5.11-	5.21-	spot	5.31-	5.41-	5.44-	spot	5.55-	5.65-	spot	5.78-	5.85-	5.95-
	2.74	2.84	2.94	3.04	3.14	3.24	3.30	3.40	3.49	3.58	3.67	3.77	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.45		4.55	4.65		4.75	4.87	5.01	5.11		5.21	5.31	5.41		5.45	5.55		5.65	5.78	5.85
Wt (g)	1500	1250	1500	1500	1500	1250	1000	1000	1250	1250	1000	1500	1500	1250	1500	500	900	500	1000	1250	20 L	1250	1000	20 L	1000	1000	1500	1500	20 L	1500	1500	500	20 L	1500	1250	20 L	1250	1500	1500
LAND MOLLUSCA																																							
Succinea pfeifferi (Rossmässler)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-	-	-	6	-	-	-
Cochlicopa spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	2	1	-	-	-	-	-	-	13	-	-	16	-	-	-
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	18	-	-	1	-	3	1	-	-	9	-	-	23	-	-	-
Vertigo moulinsiana (Dupuy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Vertigo angustior Jeffreys	-	-	-	-	-	-	-	-	-	-	-			-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vertigo spp.	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1	2	5	17	1	1	-	-	-	-	-	-	-	+	-	4	-	-	-
Pupilla muscorum (Linnaeus)	-	-	2	-	-	-	-	-	+	-	-	1	-	1	1	1	-	-	-	1	1	1	-	13	3	-	-	-	11	-	-	-	9	-	-	10	-	-	-
Vallonia costata (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	7	-	-	-	-	-	-	-	-	1	-	-	3	-	-	-
Vallonia pulchella (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	4	-	2	43	2	7	1	5	4	-	-	-	181	-	-	222	-	-	-
Vallonia excentrica Sterki	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	7	2	1	121	2	1		7	2	-	-	-	209	-	-	123	-	-	-
Vallonia spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	17	11	33	24	2	-	-	5	-	-	69	-	-	112	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	11	1	1	-	-	-	-	-	-	-	-	-	3	-	-	-
Vitrina pellucida (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	4	-	-	-
Limacidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	21	-	-	38	-	-	-	-	4	-	-	-	54	-	-	89	-	-	-
Clausilia bidentata (Ström)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	9	-	1	5	-	1	-	-	1	1	-	-	31	-	-	31	-	-	-
Trichia hispida (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	9	7	4	5	+	4	3	-	-	317	-	-	372	-	-	-
Cepaea spp.	+	-	-	+	-	-	-	-	-	-	-	1	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cepaea/Arianta spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	+		1	-	-	-	-	1	-	-	-	+	-	-	2	-	-	-
FRESH WATER																																							
Lymnaea truncatula (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	63	41	142	-	1	1	-	-	-	-	-	5	-	-	2	-	1	-
Armiger crista (Linnaeaus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BRACKISH WATER																																							
Valvata piscinalis (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrobia ventrosa (Montagu)	-	3	-	-	-	-	-	1	4	8	5	19	12	58	37	6	6	13	4	4	59	4	4	71	3	5	8	-	20	-	-	-	9	-	-	13	-	-	-
Hydrobia ulvae (Pennant)	-	4	-	-	-	-	1	-	4	3	6	54	9	42	78	14	136	3	8	21	19	9	3	49	6	5	-	-	103	-	-	-	2	-	-	3	-	-	1
Hydrobia spp.	-	-	2	-	1	+	-	2	-	1	5	60	29	12	23	7	62	15	18	23	-	18	7	-	10	2	27	-	-	-	-	-	-	-	-	4	-	2	-
Leucophytia bidentata (Montagu)	-	2	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MARINE																																							
Macoma balthica (total valves ÷ 2)	-	-	-	-	-	-	-	-	-	-	-	1	+	1	-	-	-	-	1	+	2	+	-	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
Patella vulgata.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Littorina sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Retusa cf. *retusa*.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
cf. *Cersatoderma* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
TOTAL Land molluscs	+	**0**	**2**	+	**0**	**0**	**0**	**0**	+	**0**	**0**	**2**	**2**	**2**	**2**	**2**	+	**1**	**4**	**6**	**43**	**14**	**31**	**303**	**51**	**42**	**9**	**12**	**30**	**11**	**0**	**0**	**897**	+	**0**	**1022**	**0**	**0**	**0**
TOTAL Freshwater molluscs																					**2**	**63**	**41**	**6**	**1**	**1**	**1**						**5**			**2**		**1**	
TOTAL Brackish molluscs		**9**	**5**	**1**	**1**	+	**1**	**3**	**8**	**12**	**16**	**133**	**50**	**112**	**138**	**27**	**204**	**31**	**30**	**48**	**81**	**32**	**16**	**124**	**19**	**12**	**35**		**123**				**11**			**20**		**2**	**2**
TOTAL Marine molluscs												**1**	+	**1**					**1**	+	**2**	+		**1**					**4**										

Table 5. *Snail data from the full sequence of samples through Trench 2.*

from the upper fill only produced 38 shells, but was significantly different. It contained a mixed assemblage, mainly *Hydrobia* species but the remain assemblage is one of dry land (*V. excentrica, T. hispida,* and *P. muscorum*).

Discussion and chronology

Beaker and Bronze Age sequences extend to the east of the deposits exposed in the sand cliff where they occur in sub-beach profiles. Analysis of the snails indicates terrestrial habitats, though the Beaker layer at the lowest altitude (*c.* 3.25 m AOD) indicates a dryland, saltmarsh margin. The presence of burnt shells probably indicates settlement activity extending beyond the cliff exposure too.

The undated 'blue clay' sequence (Trench 2) indicates an outer estuary mudflat environment. These may have been fairly extensive because although brackish conditions are present (*Hydrobia ventrosa* and *H. ulvae*), there is no evidence of direct maritime environments indicated by other marine shells. The presence of dry land in the vicinity is indicated by the waterlain sand lens which contained shells reworked from dry open grassland. The waterlain sand may derive from incipient dune bars to the west, and it might be significant that the first occurrences of marine shells (*Macoma balthica*) are present here, possibly indicating a marine incursion. The occurrence of terrestrial shells, however, suggests that these are derived from drier ground probably to the north or east.

In the upper 'blue clay' (context 212) there is evidence of marsh and drier ground close to the estuarine mudflats. Tentatively we can suggest that this may broadly equate with the sub-beach Bronze deposits near the sand cliff (GGAT evaluation and Trench 1) indicating saltmarsh communities. These are inundated by sands which can be directly related to the sand cliff sequence (Bell, 1990) and indicate drier open grassland.

Returning to Trench 2, further west and south, more stable terrestrial conditions are prevalent through the basal sand loam and silty clays (contexts 211 and 210 at 4.4 - 4.75 m AOD) where terrestrial shells increase and suggest the presence of saltmarsh land and their is an influx of freshwater, suggesting a reduction in martime influence. Animal bone from these deposits indicates a date of cal AD 420-660. No comparable deposits are seen in Trench 1, but Romano-British deposits were recovered in the GGAT evaluation trenches (GGAT 1995; Locock and Lawler, 1996).

Following this episode of saltmarsh and freshwater with limited evidence of localised human activity (Trench 2), a renewed maritime influence is seen locally with increased salinity and the reduction of freshwater species (context 209). Indeed this increase in maritime influence may in part be the movement of the shifting incipient dunes to the east as a further sand lens (context 207) is deposited. The silty clays which contain Roman pottery (context 205), represent the drying out of the saltmarsh to form more stable drier pasture land on the margins of the estuarine environment. This may be why settlement is seen here, or may represent local saltmarsh reclamation.

The Romano-British ditch 312 seen *c.* 50 m to the south, seems to confirm a terrestrial largely dry, low-lying environment with the ditch containing habitats for brackish-water species. This probably represents low-lying pasture or possibly saltmarsh fringes. The upper deposits in Trench 2 contain small sherds of Romano-British pottery and become less influenced by water-lain dune sand and more low-lying terrestrial environments with localised (?freshwater) marsh. This indicates the drying out of the saltmarsh and a site separated from the sea. As the assemblages from this ditch probably relate to the upper Romano-British sediments in Trench 2 and together they indicate both significant changes in coastal and terrestrial morphology in this time, with considerable shoreline retreat since the Romano-British period.

Waterlogged and charred plant macrofossils
by Julie Jones

Five samples were examined for plant macrofossils. A single sample from the Beaker layer (41) in the GGAT evaluation produced waterlogged plant macrofossils. Two samples from Romano-British layers in Trench 2 and two from Romano-British ditch 312 produced predominantly charred remains (Table 7). These samples were processed by flotation with flots retained on a 500 μ mesh and residues on a 1 mm mesh. Smaller subsamples (Table 6) were processed by laboratory flotation for the recovery of waterlogged remains; only one sample from ditch 312 and that from the Beaker layer were waterlogged. These flots were sieved to 250 μ and the residues to 500 μ. The results of the analysis are shown in Table 6 which also details sample and flot size. Nomenclature and habitat information is based on Stace (1991) and grain and chaff determinations are based on Jacomet (1987).

Beaker deposit (GGAT Context 041)

The 0.05 m thick layer of very dark grey organic silty sand (context 041) was interpreted as a weakly developed palaeosol, marking a temporary vegetated surface within deposits of wind blown sands. The sample produced a mixed assemblage of waterlogged plant macrofossils typical of several habitat groups. Species such as sedges (*Carex* spp) and rushes (*Juncus* spp) are most commonly represented and are typical of wet places such as marsh, alongside rivers and streams and damp grassland. Gipsywort (*Lycopus europaeus*), seeds of which were very abundant, marsh pennywort (*Hydrocotyle vulgaris*), and celery-leaved buttercup (*Ranunculus sceleratus*) also grow in these types of habitats. Other plants more typical of grassland include buttercups (*Ranunculus acris/repens/bulbosus*), docks (*Rumex* spp), selfheal (*Prunella vulgaris*), and cowslip (*Primula veris*), although these would also tolerate damp, but not waterlogged conditions. There is also a limited assemblage of hedgerow/scrub shrubs such as bramble (*Rubus* sect *Glandulosus*), elder (*Sambucus nigra*), achenes and thorns of the rose family (*Rosa* spp) and a single nut fragment of hazel (*Corylus avellana*). A disturbed ground element is indicated by the presence of knotgrass (*Polygonum aviculare*), chickweed (*Cerastium* sp) and oraches (*Atriplex* spp). Many species of orache are commonly found in coastal locations and the presence of annual seablite (*Suaeda maritima*) and sea aster (*Aster tripolium*), both saltmarsh plants, suggest the presence of saltmarsh nearby. There is also an indication of heathland with the recovery of a single seed of bell heather (*Erica cinerea*), as well as tormentil (*Potentilla erecta*), although the latter can also grow in grassy places. Common nettle (*Urtica dioica*) will thrive in many of the habitats described.

If this deposit represents a temporary vegetated surface, the mixed plant assemblage represented here would appear to suggest the development of a damp grassland. The presence of saltmarsh taxa suggests this lay close to the upper limit of saltmarsh development but would not, itself, have been affected by any tidal influence or brackish waters, as the majority of the plants represented here would not tolerate these conditions. Areas of more scrubby ground could have developed with brambles, elder and nettles becoming established fairly quickly. Recovered charcoal also points to a fairly scrubby or open type of woodland environment (below).

			Ditch 312	
		Beaker	R-B	
	Context	41	307	HABITAT
	Sample	0003	3000	
	Sample Size (Kg or Litres)	3.75Kg	6 L	
	Flot size (ml)	78	5	
Ranunculus acris/repens/bulbosus	Buttercup	74	-	DG
R. sceleratus L.	Celery-leaved Buttercup	2	-	MPR
Urtica dioica L.	Common nettle	74	-	DGHWp
Corylus avellana L. (nut frags)	Hazel	1f	-	HSW
Atriplex spp	Orache	32	-	CDn
Chenopodiaceae indet		8		
Suaeda maritima (L.)Dumort	Annual Sea-blite	4	-	mid/low saltmarsh
Stellaria media (L.)Villars	Common Chickweed	1	-	CD
Persicaria maculosa Gray	Redshank	2	-	CDo
Polygonum aviculare L.	Knotgrass	3	-	CD
Rumex spp	Dock	34	-	DG
Hypericum sp	St. John's Wort	4	-	
Salix sp (bud)	Willow	1	-	w
Erica cinerea L.	Bell Heather	1	-	Ed
Primula veris/elatior	Cowslip/Oxlip	12	-	Gl/W
Potentilla erecta (L.)Raeusch	Tormentil	7	-	EGa
Potentilla spp	Cinquefoil	25	-	
Rosa sp	Rose	1	-	HSW
Rosaceae indet (thorn)	Rose family	6	-	HSW
Rubus sect *Glandulosus* Wimmer & Grab	Bramble	52	-	DHSW
Hydrocotyle vulgaris L.	Marsh Pennywort	2	-	FM
Umbelliferae indet		1	-	
Lycopus europaeus L.	Gipsywort	268	-	FRw
Prunella vulgaris L.	Selfheal	4	-	DG
Plantago major L.	Greater Plantain	29	-	CDGTo
Sambucus nigra L.	Elder	8	-	DHSWn
Aster tripolium L.	Sea Aster	1	-	saltmarsh
Lapsana communis L.	Nipplewort	1	-	DH
Juncus spp	Rush	200+	freq	GMRw
Carex spp		132	-	GMRw
Eleocharis palustris/uniglumis	Spike-rush	4	-	MPw
	Total (minimum)	**993**		

Table 6. *Waterlogged plant remains. KEY: Habitats: C: Cultivated/Arable; D: Disturbed; E: Heath/Moor; F: Fen/Bogs; G: Grassland; H: Hedgerow; M: Marsh; P: Ponds, ditches - stagnant/slow flowing water; R: Rivers/streams; S: Scrub; T: Paths/Gateways; W: Woodland; a: acidic; l: light soils; n: nitrogen rich soils; o: open habitats; p: phosphate rich soils; w: wet soils; f = fragments.*

Romano-British deposits
Trench 2 (Context 203/6, and context 204): These two layers, both at approximately 2 m beneath the modern beach material, contained Romano-British pottery, animal bone and a limited assemblage of charred cereal remains. Grains of wheat (*Triticum* sp) and barley (*Hordeum* sp), with some unidentifiable cereal grains were present in context 204 and were in very poor condition, having much of their outer surface burnt away. Unfortunately, the wheat chaff also was not well enough preserved to determine whether spelt wheat (*Triticum spelta*) was represented. The few weed seeds present (black bindweed (*Fallopia convolvulus*), wild radish (*Raphanus raphanistrum*) and orache), are typical arable weeds which would have been growing with the crops, with a few indicators of more grassy conditions including vetches (*Lathyrus/Vicia*) and clover/medick (*Trifolium/Medicago*).

Ditch 312 (context 307 and context 310): Charred cereal and weed remains were recovered from both contexts which also contained 3rd-4th century pottery, although the lower fill (context 310) was richer with 321 items of grain, chaff and weeds recovered, compared with only 60 from the upper fill (context 307). Wheat, barley and oat (*Avena* sp) grains occur with *Triticum spelta* glume bases and a single spikelet fork. Two free-threshing internodes confirm the presence of a hexaploid bread wheat type. The barley chaff is limited to a few rachis internodes and internode bases, although the characteristic horseshoe-shaped oat floret bases confirm some of the oats were wild and likely to have been growing as arable weeds. Frequently occurring silicified awns of wheat/barley suggest burning in high temperature oxidising conditions and may indicate the use of cereal chaff as fuel. Similar high temperature conditions may also account for the poor condition of the limited number of grains present, which had lost much of their outer surface and were fairly distorted.

157 weed seeds were also recovered from the lower fill, with only 11 from the upper. Some of these are typical arable weeds (orache, chickweed, black bindweed, brome (*Bromus racemosus/hordaceus/secalinus)*, scentless mayweed (*Tripleurospermum inodorum*)), but many are more typical of grassy places. These include lesser trefoil (*Trifolium dubium*), clover/medick, ribwort plantain (*Plantago lanceolata*) and buttercup, as well as grasses such as meadow grass/cat's-tail (*Poa/Phleum* spp), crested dog's-tail (*Cynosurus cristatus*) and other unidentified grass species. These could have been growing on the grassy margins of the arable fields and harvested with the crop, or represent sweepings of animal fodder which had become charred.

The charred assemblages from the Romano-British horizons are very limited; few cereal grains were recovered. While both wheat and barley were in use, it is difficult to say whether the crops were being grown locally or were brought in from elsewhere. If the crops had been imported onto the site, they would have been in a processed or semi-processed form and therefore the presence of a fairly substantial range of weeds in one of the samples may suggest local cultivation and processing, the chaff and weed 'waste' being used as a fuel. This would also explain the paucity of charred cereal grains. 'Celtic fields' are present on the top of the Down, which although undated are assumed to be Iron Age and it may be possible that cultivation continued into the Romano-British period. Small scale cultivation could also have occurred in other areas, such as on the southern slopes of the Down, which as Straker (1990, p219) points out were used as allotments in the last century. The abundant waterlogged seeds of rushes (*Juncus* spp) may suggest that the ditch was wet when the charred material was deposited into it

No Romano-British horizons were found in the main sequence of the Brean sand cliff but parallels can be drawn with the sequence in soil pit VI. Context 204 in Trench 2 may equate

		Trench 2		Ditch 312		
		Romano-British				
	context	203/6	204	307	310	
	sample	2001	2002	3000	3001	
	sample size (litres)	20 L	20 L	6 L	6L	
	flot size (ml)	13	1	5	22	HABITAT
Triticum sp grain	Wheat	-	1	2	3	
(glume base)		7	10	33	75	
.(spikelet fork)		5	7	11	29	
(rachis internode base)		-	2	-	11	
Triticum sp (free-threshing internodes)	hexaploid bread wheat	-	-	2	5	
cf *Triticum* sp grain	probably wheat	-	-	-	3	
Triticum spelta (glume base)	Spelt Wheat	-	-	-	13	
(spikelet fork)		-	-	-	1	
Hordeum sp grain	Barley	-	2	-	3	
(rachis internode)		-	-	1	4	
(rachis internode base)		-	-	-	5	
Triticum/Hordeum sp (awns - silicified)	Wheat/Barley	-	-	-	freq	
Avena fatua (floret base)	Wild oat	-	-	-	2	
Avena sp grain	Oat	-	-	-	6	
(floret base)	Oat	-	-	-	-	
(awn)		-	-	occ	freq	
Cereal indet grain		-	5	-	4	
	Total (grain)		**8**	**2**	**19**	
Weeds						
Ranunculus acris/repens/bulbosus	Buttercup	-	-	1	1	DG
Corylus avellana L. (nut frags)	Hazel	1f	-	-	-	HSW
Atriplex spp	Orache	-	1	-	6	CDn
Chenopodiaceae indet		1	1	-	3	CDn
Cerastium sp	Chickweed	-	-	-	1	CDG
Silene latifolia/dioica	White/Red Campion	-	-	-	1	CDlo/WH
Fallopia convolvulus (L.)A.Love	Black-bindweed	-	1	-	-	CD
Polygonum aviculare L.	Knotgrass	-	-	-	2	CD
Rumex sp	Dock	1	1	-	10	DG
Brassica nigra (L.)Koch	Black Mustard	-	-	-	1	DRWs
Raphanus raphanistrum spp *raphanistrum*	Wild Radish	-	1+f	-	-	CD
Lathyrus/Vicia spp	Vetch	-	5	-	6	DG
Trifolium/Medicago spp	Clover/Medick	-	4	4	9	CDG
Trifolium c.f. *dubium* Sibth	Lesser Trefoil	-	-	4	52	Go
Plantago lanceolata L.	Ribwort Plantain	-	-	1	5	G .
Plantago major L.	Greater Plantain	-	-	-	1	CDGTo
Galium aparine L.	Cleavers	-	-	-	2	CHSo
Tripleurospermum inodorum (L.)Schultz. Bip	Scentless mayweed	-	-	-	2	CD
Carex spp	Sedge	-	-	1	3	GMRw
Eleocharis palustris/uniglumis	Spike-rush	-	-	-	1	MPw
Bromus racemosus hordaceus/secalinus	Smooth/soft/rye brome	-	-	-	8	DG/DG/CD
Cynosurus cristatus L.	Crested Dog's-tail	-	-	-	1	G
Festuca spp	Fescue	-		-	11	G
Poa/Phleum spp	Meadow-grass/Cat's-tail	-	-	-	13	G
Poaceae indet	Grass	2	5	-	18	G
	Total (weeds)	**4**	**19**	**11**	**157**	

Table 7 (opposite). *Charred plant remains. KEY: Habitats.C: Cultivated/Arable; D: Disturbed; G: Grassland; H: Hedgerow; M: Marsh; P: Ponds, ditches - stagnant/slow flowing water; R: Rivers/streams; S: Scrub; T: Paths/Gateways; W: Woodland; l: light soils; n: nitrogen rich soils; o: open habitats; s: coastal; w: wet soils. f = fragments.*

with Bell's context 230 where a greyish brown silt was seen to contain charcoal flakes as well as a few animal bones and fragments of burnt clay. The material recovered from the 1996-7 excavations therefore provides evidence of agricultural activities at Brean to add to the substantial evidence of earlier occupations found by Bell.

Charcoal

by Rowena Gale

Charcoal of Early Bronze Age and Romano-British date was recovered from samples from Beaker contexts in the GGAT evaluation trenches, and Trenches 1 and 2. Despite the poor preservation in some samples, the charcoal was identified to genus level and the combined results compared to those from the earlier environmental studies of the 1980s (Bell, 1990).

Bulk soils samples were processed by flotation and sieving, and the charcoal separated from the seed and plant macrofossils. One sample was processed by GGAT by sieving and no flot retained, the mesh size is unrecorded. The preservation of the charcoal varied from poor in samples from Bronze Age context 112 and Romano-British context 204 to firm in samples from Beaker contexts e.g. Beaker Sand (GGAT sample 0003), Beaker occupation context (GGAT sample 0002); the sample from Romano-British context 210 contained insufficient material for identification. Charcoal was prepared for examination using standard methods. The fragments from each sample were fractured to expose fresh transverse surfaces and sorted into groups based on the anatomical features observed using a x20 hand lens. Representative fragments from each group were selected for further examination under high magnification. Freshly fractured surfaces were prepared in the transverse, tangential and radial planes. Fragments were examined using an incident-light microscope at magnifications of up to x400 and anatomical structure was matched to reference material.

Where possible the maturity (i.e. sapwood/ heartwood) of the wood was assessed and the number of growth rings recorded. It should be noted that the measurements of stem diameters are from charred material; when living, these stems may have been up to 40% wider.

The anatomical structure of the charcoal was consistent with the taxa (or groups of taxa) given below. It is not usually possible to identify to species level. The anatomical similarity of some related species and/or genera makes it difficult to distinguish between them with any certainty, e.g. members of the Pomoideae, Prunoideae and Salicaceae. Some unrelated taxa, e.g. *Cornus* and *Viburnum*, can appear similar when the wood structure is poorly preserved or degraded. Classification is according to Flora Europaea (Tutin, Heywood *et al*, 1964-80).

Broadleaf taxa:

Aceraceae *Acer* sp., maple

Caprifoliaceae *Viburnum* spp., guelder rose and wayfaring tree and/or Cornaceae. *Cornus* sp., dogwood (see note above)

Corylaceae *Corylus* sp., hazel

Fagaceae *Quercus* sp., oak

Oleaceae *Fraxinus* sp., ash

Rosaceae.
Pomoideae: *Crataegus* sp., hawthorn; *Malus* sp., apple; *Pyrus* sp., pear; *Sorbus* spp., rowan, service tree and whitebeam. These genera are anatomically similar.
Prunoideae: *Prunus* spp., which includes *P.avium*, wild cherry; *P.padus*, bird cherry; *P. spinosa*, blackthorn. Diagnostic anatomical features of these species are overlapping and it is sometimes difficult or impossible to differentiate between the species.
Salicaceae *Salix* sp., willow; *Populus* sp., poplar. These genera are anatomically similar
Conifers and taxads:
Taxaceae *Taxus* sp., yew

Beaker Sand and 'occupation layer'

The charcoal from GGAT layer 41 was scanty and consisted of 5 fragments of sap- and heartwood of ash (*Fraxinus*), one fragment of hazel (*Corylus*), one of hawthorn type (Pomoideae), and one of dogwood or wayfaring tree/guelder rose (*Viburnum*). Some fragments contained slow-grown wood. GGAT layer 20 was more abundant in charcoal which was reasonably well preserved. A wide range of taxa was identified including yew (*Taxus*; 21 fragments), ash (24 sapwood fragments), hazel (12 fragments), blackthorn/cherry (*Prunus*; 12 fragments), hawthorn type (10 fragments), oak (5 sap- and roundwood fragments), maple (*Acer*; 1 fragments) and willow/poplar (Salicaceae; 1 fragment). Some pieces of ash measured up to 8 mm in radial cross-section and although none contained a complete radius, it was evident that periods of rapid growth had occurred, e.g. growth ring widths of 5 mm (after charring). The oak included young sapwood, with some from very narrow twigs (diameter 5 mm).

Trench 1

This exposed the margins of the terrestrial sequences reported by Bell (1990). Context 112, below layers which contained Early Bronze Age pottery, equates with Unit 6. Charcoal from this context, was sparse and consisted of a few very small and poorly preserved fragments. These were heavily contaminated by extraneous deposits which had blocked vessels and coated cell walls. A single fragment each of oak and dogwood were identified.

Trench 2

Context 204 contained Roman pottery and broadly equates with Bell's layer 230 in soil pit VI. A few tiny scraps of very degraded charcoal were found and tentatively identified as ash.

Discussion

The charcoal mainly occurred in layers which were probably associated with occupation. Charcoal from the earlier sequences, i.e. the Beaker period, may, as suggested by Straker (1990), have resulted from land clearance. Alternatively it could implicate spent fuel deposits. The associated artefacts, charred grain and chaff which occurred in some contexts tend to suggest fuel debris as the more likely source for the charcoal.

Charcoal was more abundant and better preserved in the lower sequences dating to the Beaker period than the later material and a wider range of species was identified, particularly from GGAT layer 20, the possible Beaker occupation horizon. This included taxa broadly comparable to those identified by Straker (1990), and differed only in the presence of poplar/willow and dogwood/wayfaring tree/guelder rose and the absence of purging buckthorn (*Rhamnus cathartica*) in the present study. Charcoal from other contexts in Trench 1 and 2 was extremely sparse and apart from recording the presence of dogwood/wayfaring tree/guelder rose and oak in the Early Bronze Age and possibly ash from the later phase, this data was of limited interpretative value.

Yew, dogwood and wayfaring tree are characteristic of alkaline soils and quite probably flourished on the limestone promontory. The remaining taxa identified here, maple, hazel, ash, oak, hawthorn group, willow/poplar and possibly guelder rose (which prefers damper soil to wayfaring tree), could have grown equally well either on the elevated land ridge or on the lower sandier soils.

The density and distribution of woodland components are impossible to assess from so few samples of charcoal. The close correlation, however, of the results from this study with data from Straker's work (1990) endorses the evidence for a fairly scrubby or open type of woodland environment in the Beaker period. In common with other low-lying coastal areas in the region, ancient woodland at Brean may have extended out well beyond the present coastline. Numerous examples of bedrock islands and woodland peats supporting often mature woodland in the late prehistoric period have been recorded from the foreshore of the inner Bristol Channel and Severn estuary (Allen, 1992). Although exposure to maritime conditions may have produced stunted growth (indeed some charcoal indicated slow-growth patterns), evidence of rapid growth in some ash fragments was also noted, perhaps implying trees growing in more sheltered positions.

LIVING ON THE EDGE: INTERPRETATION, DISCUSSION AND CONCLUSIONS

These investigations have provided us with some evidence of the changing shoreline at Brean from the Bronze Age to at least the Romano-British period. The shoreline was not as well defined in prehistory as it is today (Bell, 1990, p257) as the expanse of land now recognised as the Somerset Levels would have been subject to frequent and fluctuating marine inundation. There are, unfortunately, no deposits investigated here which originated in the coastal margin and that can be directly related to sea-level rise.

Despite the major sequences of Bronze Age deposits within the sand cliff itself, few of the deposits exposed in this study can be related to this sequence. Only the deposits from Trench 1, about 35 m from the toe of the sand cliff, revealed contexts which can be related to previous published work. Most of the alluvial horizons that may have existed above beach level have been removed making it difficult to relate these deeper sequences with those excavated by Bell to the south of the sand cliff (Bell 1990; *unpubl.*). It is not the place here to make detailed comparison between the two; the last episode of Bell's work is yet to be fully published.

Our investigations exposed the southernmost extent of the terrestrial postglacial deposits preserved beneath the current storm beach. None of the deposits are deep marine deposits but, significantly, they did produce evidence of environments which contrasted with the terrestrial environs determined from the sand cliff itself. This discussion is largely in two parts following the chronological distinction of the sediments; the Bronze Age landscape and Romano-British activity.

PRE-BRONZE AGE

There is no evidence of any of the Pleistocene deposits to be seen against Brean Down in the sub-beach profiles examined down to depth of -1 m AOD. Such deposits seem to be restricted to a skirt along the southern edge of the Carboniferous Limestone of the Down, or perhaps their extension is at a lower level than reached by these investigations (Figure 8).

Neolithic *Phragmites* peat occurs locally on the foreshore about 0.5 km from the coast, its base, on blue silty clays, at an altitude of 0.15 m and -0.15 m AOD (Bell, 1990, p103, p203). This has been dated to 4730 - 4330 cal. BC (HAR-8546; 5620 ± 100 BP) and indicates the presence of saltmarsh or saltflats that were formed under essentially freshwater conditions with some occasional saltwater inundation. No comparable deposits were encountered in any of our investigations, nor in boreholes down to -1 m AOD within Trench 1.

Blue Clay

The main facies, seen across all of the sub-beach profiles is the 'blue clay' facies, sometimes containing discrete sand lenses. These occur from at least 2.68 m to 5.03 m AOD.

The undated 'blue clay' belongs to the post-Neolithic and, probably, pre-Roman periods and can generally be broadly related to the Wentlooge Formation (Allen, 1987). Although we cannot be sure that the 'blue clay' here is chronologically as distinct as that in the Wentlooge sequence. Where analysis has been conducted it indicates that the 'blue clay' was not laid down in marine conditions but in brackish lagoonal and estuarine conditions with evidence of some fresh water either as pools or from a freshwater river. These inner estuary conditions supported saltmarsh with halophytic taxa including reeds, sedges *Armeria* types, *Aster* type and large numbers of Chenopodiaceae.

There is little marine influence in this deposit although most microfauna recovered indicate some evidence of reworking. Indeed, the terrestrial forms of land snail had probably eroded from drier land adjacent to the saltmarsh estuarine conditions. Altogether, this evidence suggests a middle to upper saltmarsh range.

The sand lenses within the 'blue clay' are undoubtedly waterlain rather than windblown. They may indicate a marine incursion and originate from incipient sand bars thought to exist further out on the shore during the Bronze Age (Bell, 1991), or even to have eroded from large deposit of Devensian sand (ApSimon's 'main sand') which comprises the single biggest facies in the sand cliff deposits. Sand lens 213 also contains fragments of the baltic tellin (*Macoma balthica*), possibly confirming its offshore or nearshore marine origin.

The upper 'blue clay' has subtly different microfloral and faunal assemblages; pollen indicate a decline in Chenopodiaceae and other halophytes. The molluscs record the presence of the obligatory marsh species (*Vertigo angustior*) and dry ground fauna. This either infers more significant reworking of drier habitats or, more likely, the drying out of the local habitat. Significantly, this change was only recorded in Trench 2 in the most northerly record of the 'blue clay' in this work and about 35 m from the toe of the sand cliff.

Whether any of these deposits relate to Bronze Age deposits recovered here and excavated in the sand cliff is unclear, but this is discussed in more detail below. Nevertheless, the presence of the deposits extending for more than 1.2 km south of Brean Down itself indicates widespread saltmarsh and estuarine conditions along this coastline in prehistory.

BRONZE AGE

The only secure contexts of Bronze Age date are those relating to the toe of the sand cliff. These deposits are distinctly terrestrial and the molluscan fauna and pedological evidence from the sand cliff excavations (Bell, 1990) confirm a very dry open environment. The lowest of the Bronze Age facies, the Beaker Sand, was recorded in the investigations reported here, however, it was sampled at more than 4 m AOD lower than previously analysed. The lower stabilisation horizon, humic lens (040), within the Beaker Sand produced a snail fauna which was predominately terrestrial but the presence of *Hydrobia* suggests brackish water and saline muddy conditions locally and damper conditions are also indicated in the plant remains by the presence of sedges and rushes amongst a damp grassland flora. The upper stabilisation horizon, humic lens (020), was about 0.5 m higher and produced a wholly terrestrial assemblage similar to that reported from the main sand cliff excavations, indicating open grassland and some scrub or open woodland. The latter is evidenced in the charcoals. The presence of charcoal and a burnt shell we tentatively suggest points to the human activity known to occur during this period.

The Early Bronze Age deposits (contexts 113, 112 and 110) which can be equated to Unit 6, all consistently provide evidence of local wetland margins comprising bracken, rushes, sedges and other halophytes, probably representing a saltmarsh community in estuarine and semi-terrestrial conditions with small pools and lagoons of brackish water, fed with streams of freshwater. The marine input is minimal, though marine shells are present in the sandier facies (in particular context 112). There is, however, evidence of reworked marine microfossils, probably resulting from tidal wash. The area investigated, therefore, represented the terrestrial margin of dry grassland and dispersed trees to the north on the sand cliff, with the saltmarsh which further south opened out into muddy estuarine conditions with saltmarsh islands and dissected by numerous small rivulets and leets. There is no evidence of permanent marsh faunal (snail) or floral (pollen) communities indicating the unstable nature of this constantly changing mobile habitat.

ROMANO-BRITISH

The evidence from the dated Romano-British contexts in Trench 2 and the ditch 312 indicate a locally changing environment.

The lower Romano-British contexts (4.43 - 4.78 m AOD) in Trench 2 indicate temporary stasis; herbs and grasses are evident with halophytic indicators such as *Ameria* and saltmarsh grasses. The *in situ* nature of the microfauna indicates deposition under brackish conditions associated with mud and algae. Local flooding or tidal ingression is evidenced by the reworking of marine shells and semi-marina fauna. Romano-British activity is evident in the form of pottery and bone, perhaps indicating activity on the 'dry-land' estuary edge. Although there is a brackish tidal element, some of the water was freshwater from streams debouching into the estuary. No significant channel was recovered to indicate the former course of a river as large as the Axe or Brue, but a number of smaller streams seem likely. This locality was subject to fluctuating changes as indicated by the gleyed, artefact-free, clay rich horizon that sealed it. Locally increased salinity is indicated and the overlying waterlain sand lens (207) suggests movement of a sand bar or reworking of the sand cliff deposits by tidal and wave action.

Semi-terrestrial conditions and stasis were again evidence in the silty sands of the upper Romano-British sequence (5.11 - 5.45 m AOD), where there is evidence of slight *in situ* pedogenesis and, once again, artefacts are present. The re-commencement of activity here seems to have been on a drier grassland pasture than previously with freshwater marsh nearby. The main local environment was still dominated by saltmarsh and brackish estuarine conditions. The presence of charred cereals and weed seeds indicates that some land in the vicinity was suitable for tillage, perhaps on the southern slopes of the Down.

The ditch, 312, was further from the Down than Trench 2, and well into the low-lying estuarine clay Levels. On balance, the environmental evidence seems to indicate a drainage ditch with rushes, perhaps draining fresh and brackish water from the saltmarsh which was subject to occasional tidal influx. Certainly the ditch seems to have cut through a relatively dry, though probably seasonally inundated, landscape with both fresh and saltwater marsh. This, and the very limited marine influence at this stage, may infer well managed land and a well defined shoreline, or one which was much further westwards in the Roman period than present. The pottery indicates Roman activity in the vicinity and is corroborated by the recovery of charred wheat and barley; the accompanying weed seeds being those typical of grassy margins of arable fields.

LAND RECLAMATION AND SEA LEVEL CHANGE

None of the deposits recorded is directly related to former sea levels; even the compressed laminated *Phragmites* peats at -0.15 m/+0.15 m AOD on the foreshore do not provide definite evidence for sea level at about 4500 cal. BC. The investigations of the sub-beach sequences were not able to find the peats recovered elsewhere in the Wentlooge Formation, which were sealed by silts of a major marine incursion at *c.* 2450 BC (Allen and Rae, 1987). Nor did these investigations reveal evidence of the marine incursion of 2850 and 2500 BC recorded by Housley (1988) for the Axe valley. The lack of evidence here does not refute those incursions, it merely indicates that suitable deposits or subfossil bearing sequences were not investigated.

Estuarine saltmarsh and salt flats represented by 'blue clays' seem to be evident from the Neolithic (Crabtree, 1990) and large expanses of saltmarsh and mudflats are present in the Bronze Age. Only in the Romano-British period is there consistent evidence of the drying-out of this habitat.

The 'blue clay' may be related to the Wentlooge Formation and it is interesting to note that more stable environments occur over these deposits in the Romano-British period; i.e. Allen and Fulford's Wentlooge surface (1996; 1997). These subsequent deposits are differentiated from the 'blue clay' by a decrease in clay content and increase, in particular, of sand, by a brownish hue and by the presence both of artefacts (pottery, animal bone, charcoal) and of archaeological features (ditch 312). Whether the change in the local low-lying Levels, which facilitated activity and the creation of pasture, was entirely due to 'natural' change as a consequence of relative sea level changes, or to formal land reclamation as Allen and Fulford (1986; 1997) have suggested for southern Wales, and as Rippon (1997) has suggested for elsewhere in Avon, cannot be determined. Many of the major features, rhines and dykes, that exist in the Gwent and Caldicote Levels - are not present in the Levels to the south of Brean Down but the presence of the Romano-British ditch suggests drainage which, while possibly not as developed as the systems at Rumney, Wentlooge Levels, Gwent, certainly indicates considerable modification and use of the landscape at this time. Indeed the Roman temple on Brean Down itself is testimony to the importance of the surrounding low-lying landscape.

THE FORMER COURSE OF THE AXE

One of the aims of this fieldwork was to attempt to record the former course of the Axe which debouched to the south of Brean Down in prehistory. Indeed, a larger channel is recorded on the foreshore (Bell, 1990, p104) but, despite the optimistic record of a possible palaeochannel in the GGAT assessment (GGAT, 1995, trench 1), subsequent more detailed fieldwork failed to confirm this. The combination of machine cut trenches and watching brief stretching for nearly 1.4 km from the sand cliff failed to record any major palaeo-channel that might be ascribed to the former course of the Axe. The area between the detailed watching brief and Trench 6 was not constantly monitored by an archaeologist but the engineers did not record any significant difference in the consistent 'blue clay' over this 1.2 km stretch (Roseveare *pers. comm.*). It is conceivable that palaeo-channels may exist buried beneath the 'blue clay'. We cannot, therefore, further the arguments of whether or not Brean Down was an island during the Bronze Age occupation.

LIVING ON THE EDGE: PREHISTORIC AND ROMAN ACTIVITY ON THE LEVELS

Prehistoric and Romano-British activity are well attested on the Down itself and within the sand cliff. Evidence for the Levels is more tenuous and less accessible. The excavations reported here and soil pits excavated by Bell (1991), however, indicate episodic localised activity on the edges, at least, of the Levels.

Stratified evidence of Beaker activity was found in the sand cliff. On the beach, a pit containing Beaker pottery was found cut into the Red Loam palaeosol and the Upper Breccia at current beach level (Taylor and Taylor, 1949) at *c.* 4 m AOD (Bell, 1990, p103). The strongly dipping Breccia and palaeosol are ovelapped by estuarine deposits between the sand cliff and Trench 1. The Beaker Sand facies (Unit 7), however, can be traced in Trench 1 but has not been positively identified beyond this point. Beaker activity is attested within these sands by pottery and charcoal (GGAT context 020) at 4.20 - 4.28 m AOD. The environmental evidence at this point indicates a continuation of dry grassy scrubland as recorded within the sand cliff. Fragments of marine shell are the only indication of the proximity of the sea. Bell (1990, p27) concluded that the focus of Beaker activity may have been seaward of the present coastline and argued that most of sherds in the sand cliff represent manuring. The recovery of eight sizeable sherds in the evaluation may suggest that the focus of Beaker activity was only just seaward of the present shoreline.

By the earlier Bronze Age (Unit 6 and 5d), however, the sub-beach deposits at the toe of the cliff indicate that they are situated on the edge of the dry grassland, the saltmarsh and estuarine salt flats. Indeed the environment to the south is likely to have been saltmarsh and muddy estuarine saltflats and saltmarsh islands and dissected by numerous small rivulets.

There is no evidence that either the Early - Middle Bronze Age or Late Bronze deposits extended much further south (see ApSimon *et al,* 1961, figure 21, sheet V). They are present on the landward side of the seawall in soil pits at the foot of the sand cliff (Bell, 1991, *unpubl.*) but may have been removed on the seaward side of the seawall. Despite the evidence of Iron Age activity on the Down and stray potsherds in the sand cliff, there is no evidence of such activity in the sub-beach deposits. Admittedly the blue clay beneath Romano-British horizons remains undated, but no pottery or artefacts were found in it despite the excavation three large-scale trenches. Perhaps we can take this as evidence of the reduction of the usable and exploitable semi-terrestrial zone at the foot of the Down, and that muddy estuarine conditions prevailed almost to the toe of the sand cliff.

Romano-British evidence is more widespread. Two phases of activity have been discerned in Trench 2 and evidence of field drainage ditches south of the Squire's Gate slipway indicates the presence of tenable land. There seems, therefore, to have been a drying-out and consolidation of the estuarine clays and the Levels. Management by drainage of the low-lying land enable more widespread passage and increased importance of the area in facilitating use of the land for both cultivation and pasture. We recognise that drainage and management of the low-lying areas have much wider implications relating to development and use during the Roman period which are not dealt with in this paper.

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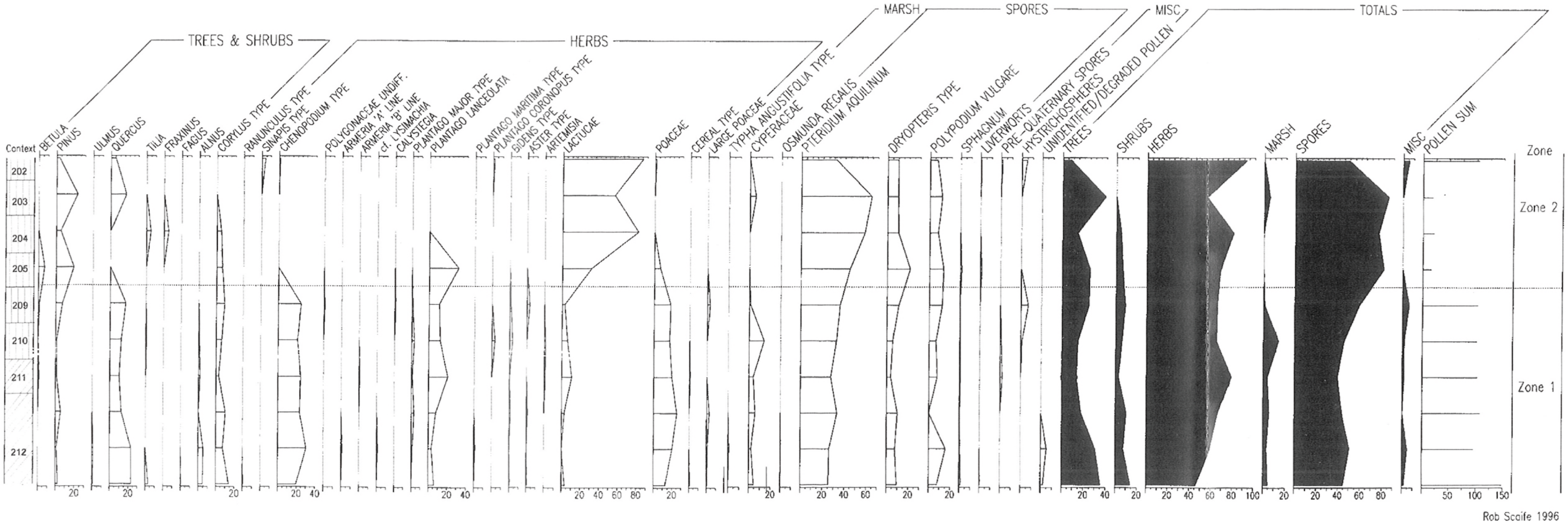

Figure 7. *Composite pollen diagram, Trench 2.*

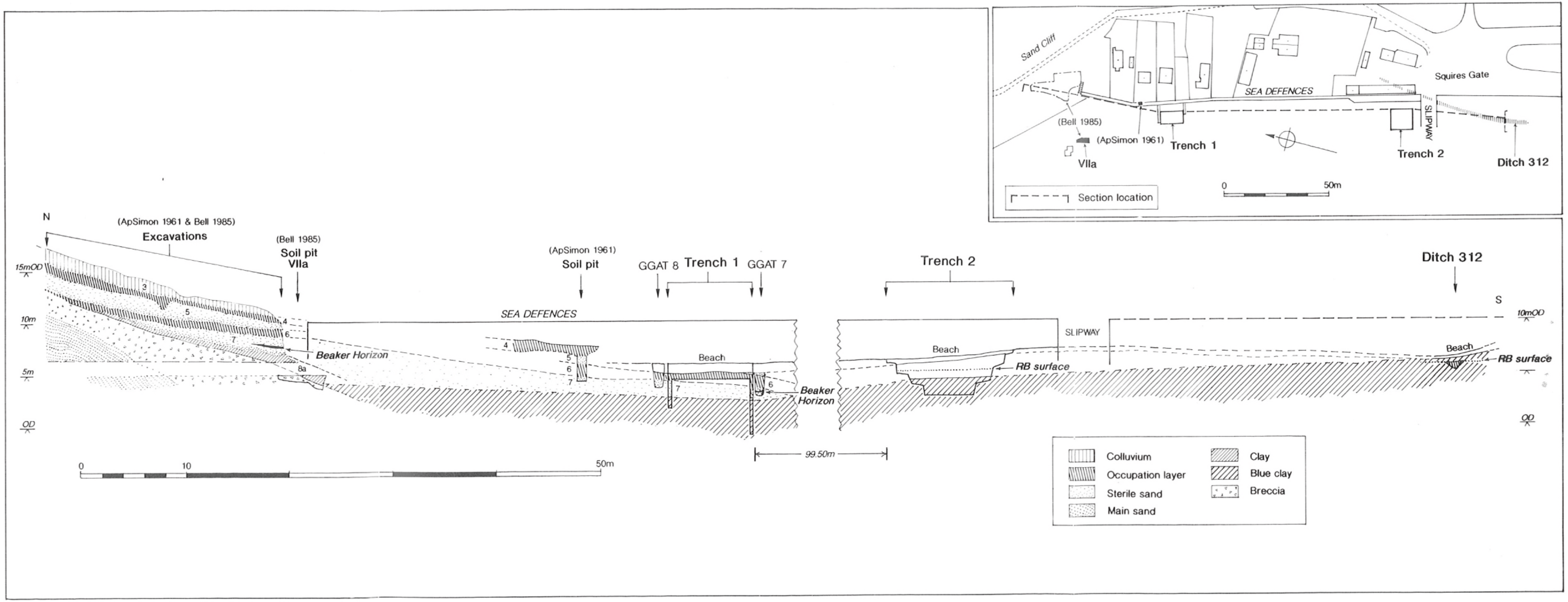

Figure 8. *Schematic section of the sand cliff and alluvial sequences (based on data from Apsimon,* et al. *1961; Bell, 1990; 1991 unpubl. and this report).*

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