The Settlement and Drainage of the Wentlooge Level, Gwent: Excavation and Survey at Rumney Great Wharf 1992

M. G. Fulford; J. R. L. Allen; S. J. Rippon; J. P. Wild; S. H. R. Aldhouse-Green; S. Hamilton-Dyer; M. Keith-Lucas; M. Robinson; Rowena Gale

Britannia, Vol. 25. (1994), pp. 175-211.

Stable URL:

http://links.jstor.org/sici?sici=0068-113X%281994%2925%3C175%3ATSADOT%3E2.0.CO%3B2-Y

Britannia is currently published by Society for the Promotion of Roman Studies.

The Settlement and Drainage of the Wentlooge Level, Gwent: Excavation and Survey at Rumney Great Wharf 1992

By M.G. FULFORD, J.R.L. ALLEN and S.J. RIPPON

INTRODUCTION

The Wentlooge Level in SE Wales represents an extensive area of some 35 km^2 of alluvium reclaimed from estuarine saltmarsh from the Romano-British period onwards (FIGS 1–2).[1] As was noted by Allen,[2] the landscape is characterised at its southern and northern extremities by a pattern of small irregular fields, often fossilizing the meanderings of natural drainage channels (FIG. 2). This arrangement is typical of many of the reclaimed alluvial wetlands that fringe the Severn Estuary.[3] The remainder of the Wentlooge Level is distinguished by a very different landscape, comprising regularly planned blocks of long, narrow, and generally straight-sided fields, quite unique among the wetlands of the Severn Estuary.[4] At Rumney Great Wharf, north east of Cardiff, part of the latter field-system can be seen cut into a clay-peat shelf in the intertidal zone (see below), thus indicating a major episode of coastal retreat and the repositioning of the sea-wall across it;[5] similar evidence from the intertidal zone can be recognised as far to the north-east as Peterstone Gout.[6] An extensive spread of Romano-British pottery and primitive iron-making slag was associated locally with this field-system in the intertidal zone at Rumney Great Wharf, while survey of the adjacent mud cliff revealed at least one ditch, sealed by a buried palaeosol, which yielded stratified Roman material. Further erosion of the mud cliff revealed more ditches with Romano-British material, as well as other indications of settlement, and prompted a programme of survey and excavation grant-aided by Cadw and the National Museum of Wales in the spring of 1992.

PREVIOUS WORK

The Romano-British wetland site at Rumney Great Wharf was first discussed by Boon,[7] who drew attention to fragments of pottery, coal, and iron-making slag on the beach and in the

[1] J.R.L. Allen and M.G. Fulford, *Britannia* xvii (1986), 91–117.
[2] See also J.R.L. Allen, *Arch. Camb.* cxxxvii (1988), 135–40.
[3] S. Rippon, *Landscape Evolution and Wetland Reclamation around the Severn Estuary*, Unpub. Ph. D. thesis, Reading, 1993.
[4] Allen and Fulford, op. cit. (note 1), 108–11.
[5] ibid., 93–9.
[6] J.R.L. Allen, *Phil. Trans. R. Soc. Lond.* B 315 (1987), 165–7, fig. 3, pl. 4, no. 2.
[7] G.C. Boon, *Archaeology in Wales* xv (1975), 48–9.

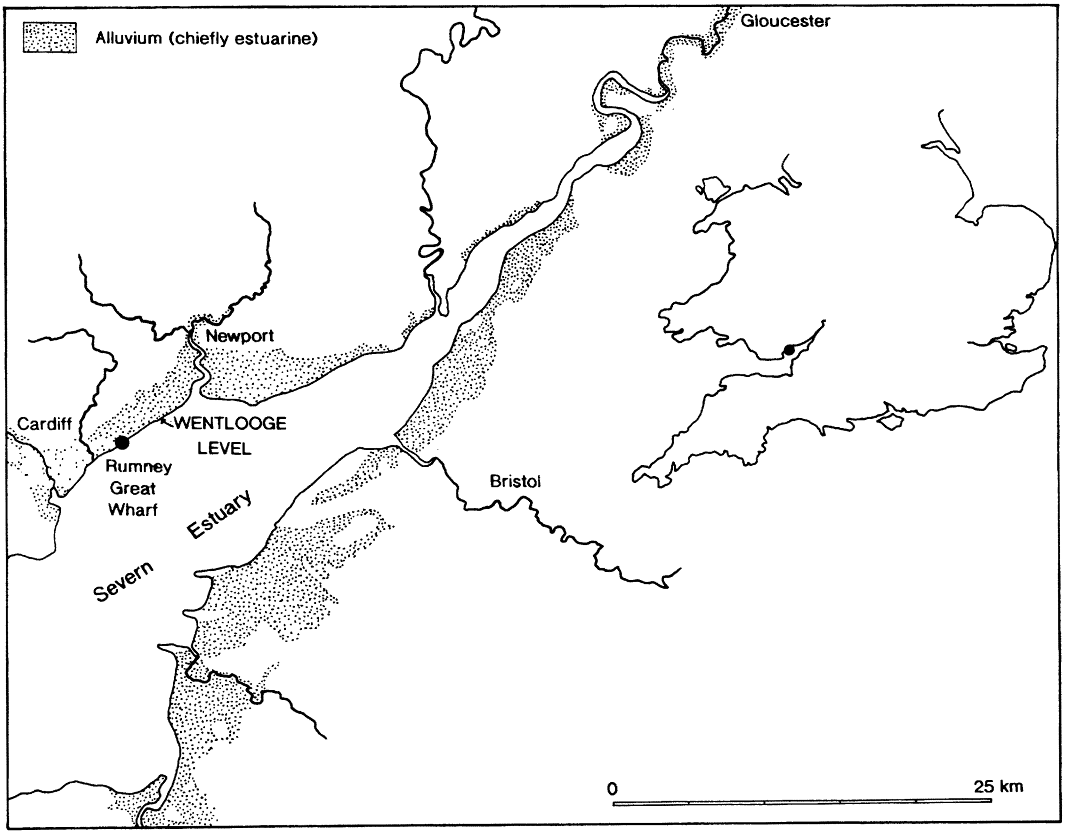


FIG. 1. Distribution of alluvium in the Severn Estuary and the location of Rumney Great Wharf.

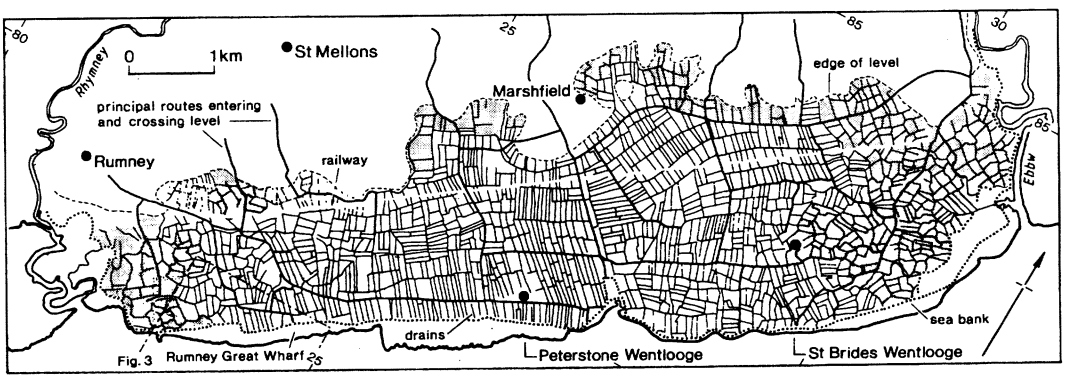


FIG. 2. The Wentlooge Level, to show the pattern of recently existing drainage ditches (reens) and field-shapes, the chief routeways onto and through the Level, and the location of Rumney Great Wharf and FIG. 3.

sediments of the modern salt-marsh. The date of the pottery ranged from the late Iron Age to the third or fourth century A.D., while the latest date among several coins recovered was of *c*.330.[8]

Later investigation revealed Romano-British pottery and other occupation debris in context; a ditch, observed in cross-section in the mud cliff, had been cut into and sealed by blue/grey alluvial sediments of the Wentlooge Formation.[9] This ditch yielded unabraded Roman pottery, fired clay, worked stone, broken/fire-fractured cobbles, iron ore, coal, and animal bone. Other Romano-British pottery, animal bone, and fired clay was recovered from the adjacent mud cliff, particularly from a buried soil (the Wentlooge palaeosol) that seals the ditch. This palaeosol was overlain by sediment of the Rumney Formation, deposited after the sea-wall had been set back to its present position, leaving part of the formerly reclaimed area, the Wentlooge Surface, open to estuarine inundation.[10]

In reviewing the overall stratigraphic sequence (FIG. 3A), it was also argued that the palaeosol seen in the mud cliff equated with the Wentlooge Surface (equivalent to the present ground surface) landward of the sea-wall; the significance of this was that the land beyond the sea-wall had not received significant alluviation since the Roman period. Developing from this, it was also argued that, although Allen and Fulford's Feature B1 appeared to run at right angles to those ditches which aligned with the reens behind the sea bank, it formed part of the same ditch/field-system as the regularly planned landscape behind the sea-wall, and a continuation of this system as exposed in the surface of the clay-peat shelf in the intertidal zone. As the filling of B1 was of Roman date, so, by extrapolation, was the field-system behind the sea-wall. Thus, on the basis of these observations, it was postulated that the planned landscape of the Wentlooge Level was laid out in the Roman period, the former salt-marsh being protected by a sea-bank from inundation by the sea, and drained by extensive ditches.[11]

Ditch B1 and a number of minor features observed in the mud cliff which contained Roman material, could not be seen in plan because, unlike many of the ditches sharing the same alignment as those beyond the sea-bank, they were not sufficiently deep to penetrate the peat bed. As a result, their relationship to the rest of the ditch system actually remained unresolved. Later fieldwork landward of the sea-wall appeared to cast some doubt on the Roman date of the Wentlooge Surface and the palaeosol recorded in the mud cliff. Parkhouse and Parry argued on the basis of a single, experimental, archaeomagnetic column that the Roman ground surface was around 1.5 m below the Wentlooge Surface behind the sea-wall, at roughly 4.6 m O.D.[12] There were thin peats just above and just below the postulated depth equating to *c.* 2000 B.P., but neither radiocarbon dates nor artefacts were obtained to confirm or refute the archaeomagnetic date. As a result of their placing the Roman ground surface at such a great depth, Parkhouse and Parry postulated a major phase of post-Roman flooding, during which it would have been impossible to have maintained any sort of field-system. Consequently, they argued, the present planned landscape and ditches in the intertidal zone must be post-Roman; and the stratified material from Ditch B1 – despite its demonstrably fresh condition – was regarded by them as redeposited and thus residual.[13] Thus, before the 1992 fieldwork,

[8] G.C. Boon, 'Caerleon and the Gwent Levels in early historic times', in F.H. Thompson (ed.), *Archaeology and Coastal Change*, Soc. Ant. London Occas. Paper (n.s.) i (1980), 25–6. Two coins in the National Museum of Wales have been identified by E. Besly: a sestertius of Antoninus Pius, possibly one of the 'provincial' series of A.D. 139 (worn), and Urbs Roma, Trier, A.D. 330–335 (worn) (NMW Acc. Nos 61.1, 61.3).

[9] Allen and Fulford, op. cit. (note 1), fig. 6, B1.

[10] Allen, op. cit. (note 6), 157–74.

[11] Allen and Fulford, op. cit. (note 1), fig. 6.

[12] J. Parkhouse and S. Parry, *Archaeology in Wales* xxix (1989), 38–9; J. Parkhouse and S. Parry, *Rumney Alternative Feeding Grounds: an Archaeological Assessment*, (1990), Test pit 108, figs 16 and 26.

[13] ibid., 78–80.

conclusive evidence of a Roman date for the present pattern of long, rectangular fields on the Wentlooge Level was still lacking. There were certain key issues that needed to be addressed by fresh fieldwork. Was Romano-British material recovered from other ditches and other features exposed in the mud cliff contemporary or residual? Were there Romano-British ditches in the mud cliff on the same alignment as those cut into the peat shelf and behind the sea-wall? Was the buried soil that of a salt-marsh or a reclaimed land surface? It was also desirable to obtain a larger assemblage of cultural material, as well as environmental data, in order to determine the economic status of the site, and to improve the chronology.

THE EXTENSIVE SURVEY (FIG. 3B)

We examined the mud cliff and high intertidal clay-peat shelf between the River Rhymney to the SW and Towick Reen to the NE, to relocate features recognised during an earlier air-photographic analysis and ground survey[14] and identify any that had since been exposed during the erosional retreat of the shore (rate up to 1–2 m annually) (FIG. 4). The winter storms had thoroughly cleaned the clay-peat shelf, while building up some of the pocket beaches, and far more ditches were found than had previously been recognised. The structures examined in detail are numbered in FIG. 3B. The figure shows, in addition, an important shore-parallel ditch previously recognised in the central part of the area; not shown are ditches mapped on a low salt-marsh to the SSW of the outfall of Towick Reen.[15]

a. Man-made ditches

The ditches occur in sub-parallel groups which differ in alignment (FIG. 3B), suggesting that, as in the central Wentlooge Level (FIG. 2), they also had been laid out in large blocks. One block appears to be represented by Ditches A1–A14, although the parallel features A11 and A12 suggest that a wide, green track or drove-way may have either penetrated it or formed a part of its boundary. Only Ditches A8 and A14 are (roughly) aligned on any extant drain visible behind the present-day sea defence. A second block appears to be represented by ditches A16–A26a, most of which are exactly or approximately aligned with surviving drains. The shore-parallel ditch A40 to which Features A16–A22 are joined probably bounded this block. Another block lay to the SE, for several ditches were earlier visible on that side of the shore-parallel feature.[16] Portions of blocks may be represented by the small groupings A26–A29 and A30a–A34, each including ditches apparently aligned on drains surviving in the extant reclamation. The parallel ditches A33 and A34 clearly extend a modern track lying within the sea defence. The long, shore-parallel ditch A39 separates a block to the NW from one to the SE, in which several lengthy parallel features were earlier recorded.[17]

Because of coastal erosion, and the need in medieval and early modern times to set back the sea defences of the Wentlooge Level at least twice,[18] the ditches shown in FIG. 3B are preserved in a variety of complex stratigraphic relationships which have already been illustrated.[19] There arose during the erosion a shore made up of broad, shallow embayments

[14] Allen and Fulford, op. cit. (note 1); Allen, op. cit. (notes 2 and 6).
[15] Allen and Fulford, op. cit. (note 1), fig. 4.
[16] ibid.
[17] ibid.; Allen, op. cit. (note 6), fig. 3.
[18] Allen and Fulford, op. cit. (note 1), 110–12; Allen, op. cit. (note 2).
[19] Allen, op. cit. (note 6).

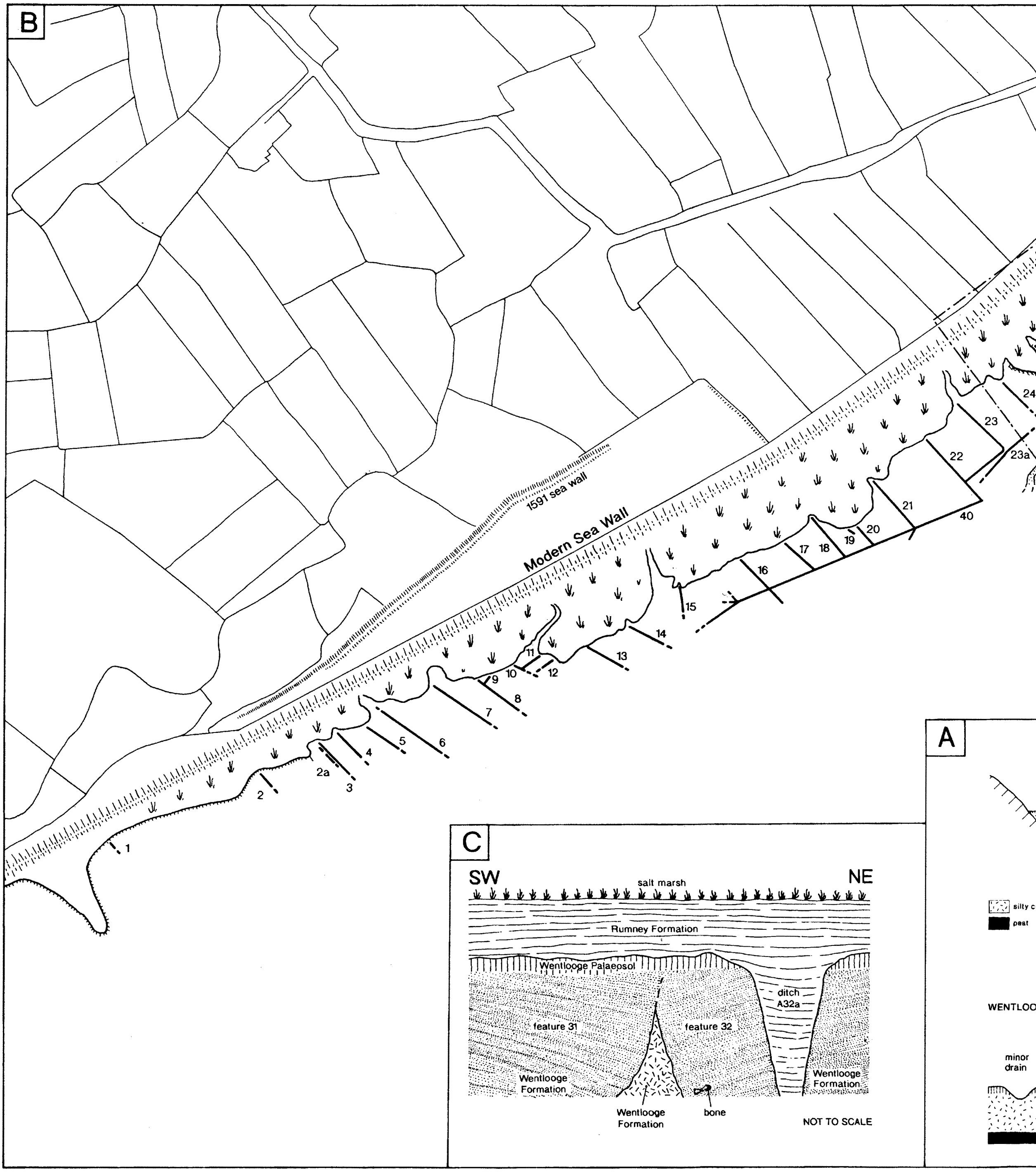
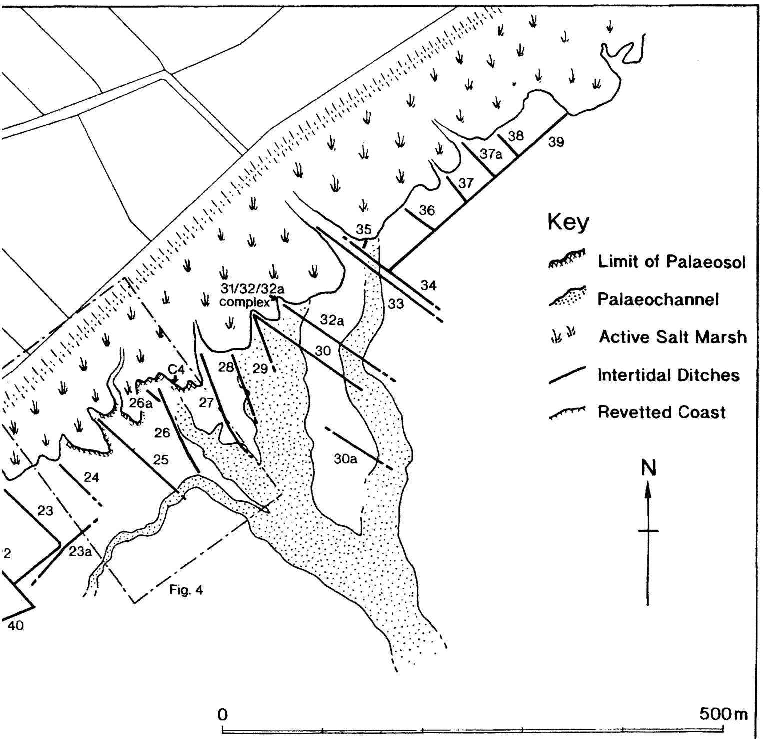
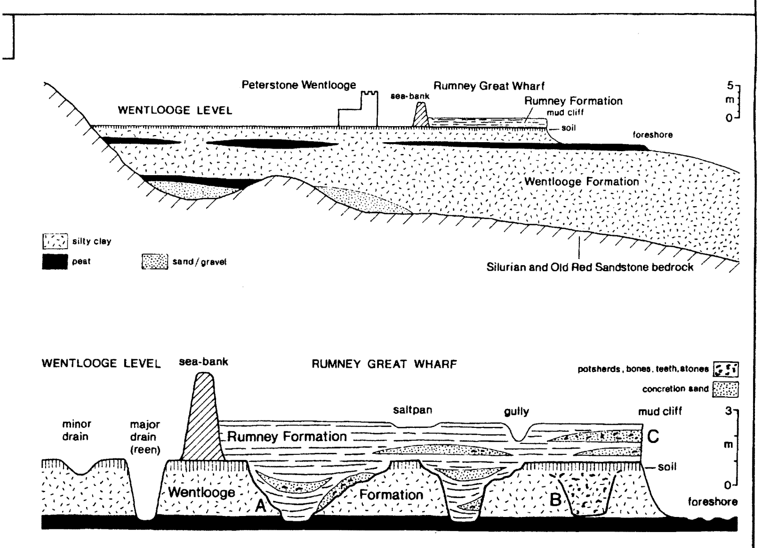


FIG. 3. A. Schematic summary of the geology of the Wentlooge Level. B. Rumney Great Wharf 1992: plan of ditches and palaeochannel re
Schematic section to show the relationship between natural Features 31 and 32, and Ditch A32a.





channel recorded during the extensive survey. For location of figure, see FIG. 2. C.

separated by flat-topped headlands capped by a resistant soil, which became the Wentlooge palaeosol. The setting back of the sea defences to their present line was followed by the burial of this coastal landscape under a thick blanket of fresh tidal silt (Rumney Formation) (FIG. 3A). Further erosion, continuing to the present day, is exposing a complex section through that masked landscape. There are four main contexts for the ditches.

A number (A1, A2, A2a, A3, A4, A15, A16, A23, A23a) are detectable only as straight to smoothly curving, sharp-sided features exposed only on the clay-peat shelf and cut down into or just below the peat. In width they range from 0.40–1.90 m. Their appearance in section, and the precise age of the infill, are generally unknown, because of the obscuring presence of either revetting against the mud cliff or a pocket beach which rises high against it, commonly filling an inlet focused on the ditch. In the case of Ditch A4, however, the filling was partly of pale brown silts attributable to the Rumney Formation. Ditch A3 was flanked by concentrations of reed stems and rhizomes which had grown in the green silts of the Wentlooge Formation that formed its sides.

Several ditches (A5, A7, A10, A19, A35) could be traced in profile on the mud cliff up to the Wentlooge palaeosol and were sealed by that material. In width, at the level of the clay-peat shelf, these ranged between 0.55 and 1.80 m. Ditches A5, A10 and A35 yielded flecks of charcoal; the silt infilling Ditch A35[20] was dark grey, containing fire-fractured pebbles, fragments of animal bone and fired clay, and conspicuous amounts of the iron phosphate vivianite in framboidal to vein-like masses. Three pieces of roundwood were recovered from the bottom of Ditch A5 where it crossed the peatshelf (two *Alnus*, the third possibly *Crataegus* sp., *Malus* sp., or *Sorbus* sp.). These afforded conventional (uncalibrated) radiocarbon dates of 2950 +/– 110 yrs BP, 2260 +/– 80 yrs BP and 2450 +/– 90 yrs BP.[21] In view of their ages, the wood was probably released from the peat when the ditch was dug, rather than being contemporaneous with or post-dating the construction of the feature. Like many of the ditches exposed on the shore, the sides of A10 revealed reed stems and roots.

Most of the ditches (A6, A8, A9, A18, A20, A21, A24, A26a, A27, A28, A29, A30, A32a, A36, A37a, A38, A39) can, like the previous group, be traced up to the level of the Wentlooge palaeosol, but are not sealed by it, being infilled with the brown silts and associated sandy sediments of the Rumney Formation.[22] In width, at the foot of the mud cliff, these features range from 1.1 m to about 3 m. The sides of many (A6, A8, A9, A18, A21, A24, A27, A28, A29, A30, A32a, A36, A39) are marked by the rhizomes and stems of reeds; closely spaced parallel fractures with vertically slickensided surfaces occur in the silts of the Wentlooge Formation near the sides of these ditches, pointing to a tendency to slumping. From low in the filling of Ditch A8 was recovered a piece of *Ulmus* sp. roundwood, affording a conventional (uncalibrated) radiocarbon date of 280 +/– 50 yrs BP,[23] consistent with the dating of the surrounding sediments (Rumney Formation), on the basis of pottery and documentary evidence, to the seventeenth century and later.[24] Ditch A32a, where it intersected the mud cliff, was closely associated with two other features which, after repeated examination, in order to secure the best exposure conditions, were interpreted as natural features (see below and FIG. 3C).

A modest number of the ditches (A11, A12, A13, A14, A17, A22, A33, A34) are visible towards the foot of the mud cliff as features picked out by erosion on the floors of embayments

[20] Allen and Fulford, op. cit. (note 1), fig. 4, Feature D.
[21] Respectively, Beta 61746, 61748, 61747.
[22] Allen, op. cit. (note 6).
[23] Beta 61749.
[24] Allen and Fulford, op. cit. (note 1), 107, 112.

in the buried coastline described above.[25] In width, on the clay-peat shelf, they range from 0.90 m to over 3 m. Ditch 17, with a width of 3.75 m on the shelf, is a particularly impressive structure, and clearly was a major collecting-drain. The stems and roots of reeds line the sides of A11, A13, A17, A22, and A34, and in some cases there are also signs of slumping. A number (A11, A12, A13) are infilled with sediments attributable to the Rumney Formation; silts closely resembling those of the Wentlooge Formation occur at the bottom of Ditch A14.

In summary, at least six (14.0 per cent) of the 43 ditches identified in the extensive survey (FIG. 3B) had become infilled (at least locally) by the time the sea defences of the Wentlooge Level were set back. Like the ditch from which Romano-British occupation debris was first recorded,[26] these drains are fully sealed by the Wentlooge palaeosol. They appear to have no preferred spatial distribution within the area covered by FIG. 3B, although the number concerned is small. A total of twenty (46.5 per cent) of the identified ditches are seen on the shore to be infilled with the pale brown sediments of the Rumney Formation and, consequently, were active at the time of the repositioning of the sea-walls; many of these have survived to the present day, as the alignments between features on the clay-peat shelf and extant drains demonstrate. Referable to this category are Ditches A25 and A26a at the excavation site described below.

b. Natural channels

One of the distinctive characteristics of salt-marshes are the meandering tidal channels and creeks which drain them. The identification of two palaeochannels closely associated with Ditch A32a where it intersects the mud cliff has been discussed above. These are better understood when considered in relation to the peat bed, the continuity of which, between 2 and 2.5 m stratigraphically below the top of the Wentlooge Formation, can be seen on the clay-peat shelf to be broken at a number of places by silted-up palaeochannels which represent former tidal drainage networks that extended into the wetlands. Perhaps the largest of these palaeochannels (FIG. 3B) occurs at the site of our excavations (see below), inviting questions about the extent to which the network was open, and could have been exploited, at the time of the Romano-British occupation. The full depth of the palaeochannel is unknown, but its sides can be traced downward across the mud cliff and the descending foreshore for a vertical distance of at least 7–8 m from a level close below the base of the Wentlooge palaeosol. On the outer foreshore, at about mid-tide level, the palaeochannel is a single feature some 60 m wide.

Traced inland, the palaeochannel divides into four unequal branches, one of which courses beneath the NE end of the excavation site and another underlies the sites of Ditches A29, A30 and A32a. Two shallow palaeochannels were encountered where A32a intersected the mud cliff (FIG. 3C). One of these, recorded as Feature A32 and trending 013°–193°, extended up from the level of the clay-peat shelf to within about 1 m below the top of the Wentlooge palaeosol. The steep and erosional SW margin is in sharp contrast to the much gentler NE side, underlain by laminated silts gently dipping to the SW, as on the inner bend of a tidal creek. Because of the likelihood of contamination, the conventional (uncalibrated) radiocarbon date of 980 +/– 60 BP[27] obtained from poorly preserved animal bone recovered from the lower filling of this feature is considered to provide a minimum age for the palaeochannel. Feature A32 is cut by the steep, sharply erosional NW margin of the second palaeochannel (A31), its gentle SW bank being formed of laminated silts inclined to the NE. Scattered flecks of

[25] Allen, op. cit. (note 6).
[26] Allen and Fulford, op. cit. (note 1), fig. 5, Feature B1 (= B4, below).
[27] Beta 62512.

charcoal and fragments of animal bone occur high up in the filling of this feature, just below the base of the Wentlooge palaeosol. Although Feature A31 cuts A32, the behaviour of meandering tidal creeks in a salt-marsh is such that the two features could have co-existed for a long period. Neither caused any disturbance to the level top of the Wentlooge palaeosol, and both must have been largely, if not fully, silted up by the time reclamation occurred. At the excavation site, however, a small palaeochannel (Feature C4, below and FIG. 5) about 1.25 m below the top of the Wentlooge palaeosol survived into the later Iron Age and, after further silting, as a shallow depression into Roman times, but it cannot be compared with its antecedent some 15–20 m wide and at least several metres deep (FIG. 3B).

THE MAIN EXCAVATION (FIGS 4–7, PLS XIV–XV)

The most intensive fieldwork at Rumney Great Wharf concentrated on features seen in the mud cliff around the headland of Ditch B4 (formerly Site B and Ditch B1[28]) and the embayment to the north, Site C. Where features appeared in the mud cliff, sections were cleaned, and a short length (<0.5 m) of each feature was excavated in order to determine its nature, orientation (if linear), as well as to obtain an assemblage of cultural material and palaeoenvironmental evidence. At Site C, the sand and gravel beach was partly cleared, revealing in plan several ditches and at least one probable natural creek (C5); all but the latter were sectioned for the same reasons as above. Except for Ditch A26a which was filled with the Rumney Formation, all other features contained sediments of the upper Wentlooge Formation.[29] Given the possibility of erosion of the surface of the palaeosol, the depth of each feature is given below the base, rather than from the top of the latter.

Site C (FIG. 5)

Ditch C1 was seen partly in plan on the beach (Layer 4), but largely in section in the mud cliff, which formed the northern side of the Site C embayment (FIG. 6, PL. XV A). It was partly sealed by the Wentlooge palaeosol layer (2), itself covered by the Rumney Formation (Layer 1). The southern side of the ditch was partly eroded away, so that the complete profile could not be excavated, but sufficient survived to estimate an original maximum width of around 3 m. It was 1.1 m deep, with steeply inclined sides and a flat bottom, 0.8 m below the base of the Wentlooge palaeosol at *c.* 4.56 m O.D. The fill consisted of fairly uniform, blue-grey silty clays (3, 6, 7), apart from a more organic layer (5), which contained abundant flecks of charcoal and pieces of fired clay.

The small stretch of this feature (7.5 m) that was excavated produced much material, including 390 fragments of stone among which were fire-cracked cobbles with soot adhering to the surface. The bone assemblage consisted of 126 fragments including a complete cow skull and a large number of teeth/jaw fragments, as well as several radii and the foot bones of horse. There was a large assemblage of unabraded and unweathered pottery, very many pieces of fired clay, a glass bead, three unidentifiable pieces of iron, a fragment of textile, a small piece of lead sheet, one fragment of window-glass, and one piece of coal. The pottery included several nearly complete vessels, which, along with the complete cow skull and the presence of soot adhering to pottery sherds and stone cobbles, shows beyond all reasonable doubt that this Roman material is contemporary with the filling of the ditch.

[28] Allen and Fulford, op. cit. (note 1), fig. 4.
[29] Allen, op. cit. (note 6), 162–3.

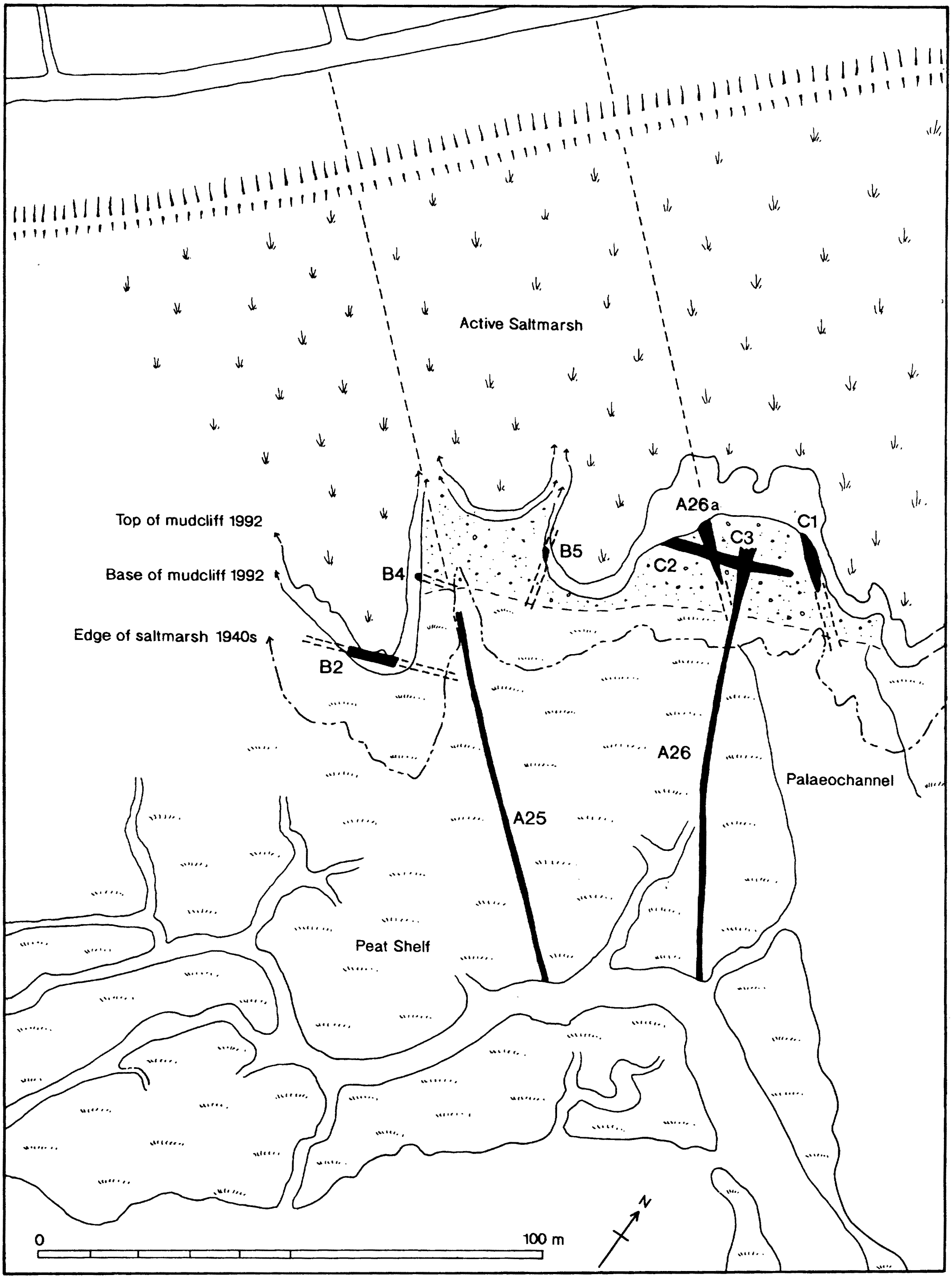


FIG. 4. Rumney Great Wharf 1992: the context of the excavation at Sites B and C and the plan of all ditches surveyed or excavated.

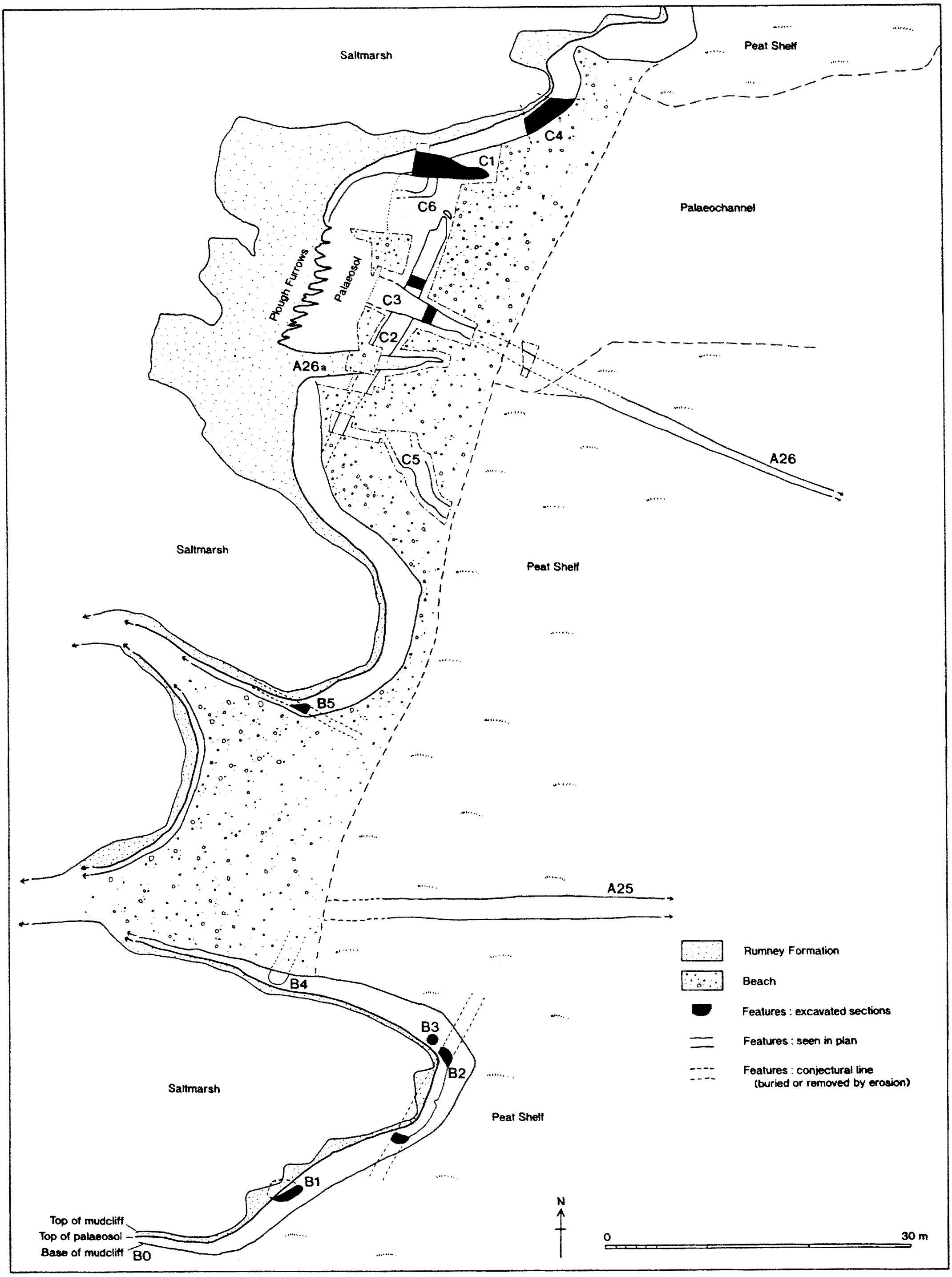


FIG. 5. Rumney Great Wharf 1992: plan of all features excavated and surveyed at Sites B and C.

Ditch C2 is a shore parallel ditch, appearing *c.* 1.1–1.7 m wide on the surface of the beach, though some of the upper fill has been lost to erosion (FIG. 7). In October 1993 it was seen to have a square butt end which did not reach C1. Its bottom is *c.* 0.8 m below the base of the Wentlooge palaeosol at 4.46 m O.D. The filling was a uniform blue-grey silty clay. Ditch C2 was at right angles to, and clearly cut by, Ditch C3. This does not preclude their having been initially contemporary, as C3 may simply have been recut after C2 had silted up. When sectioned, no datable material was produced; only four fragments of sandstone and very occasional flecks of charcoal were recovered.

Ditch C3 aligns with, and appears to represent a continuation of, Ditch A26 that cuts into the clay-peat shelf.[30] It forms part of the set A26–A29 (see above, p. 178–9) which share a different orientation to the majority of those ditches which run inland behind the sea bank, but at right angles to C2 (FIGS 4–5). At its western end, where it is approximately 3 m wide, it is sealed by the Wentlooge palaeosol. To the east, lower down the beach, the upper part of the fill has been lost to erosion, but, where sectioned, it was 1.7 m wide at the top, with a gentle U-shaped profile (FIG. 7). The bottom is *c.* 1.2 m below the base of the palaeosol at *c.* 4.06 m O.D. It was recut at least once; the earlier filling (2) consisted of a blue/brown silty clay with a few flecks of charcoal, the later filling (1) of a blue/grey silty clay with more frequent charcoal. Fill (1) contained a single fragment of sandstone, and several lumps of peaty material, one of which yielded a conventional (uncalibrated) radiocarbon date of 2800 +/– 80 years BP.[31] In view of this date, it is likely that the peat was derived from the bed which is now exposed on the clay-peat shelf.

Feature C4 was seen both in section in the the mud cliff (FIG. 7), where it is sealed by the Wentlooge palaeosol, and, to a limited extent, in plan on the foreshore. Its wide profile and steep, very irregular sides are suggestive of a palaeochannel. Time only allowed limited excavation of that part of the section which appeared in the mud cliff and the feature was not bottomed. There were three main fillings, all with very occasional flecks of charcoal: the uppermost (1) consisted of blue-grey silty clay, while the layer below (2) showed greater brown/grey mottling and contained two peaty lenses which yielded conventional (uncalibrated) radiocarbon dates of 2200 +/– 60 years BP and 2400 +/– 70 years BP.[32] The lowest layer (3) was mottled brown and possessed a sharp contact with (1) and (2). Several Romano-British sherds and pieces of iron-working slag came from the upper filling (1), suggesting the feature was at least partly open as a shallow depression during the Roman period, although the radiocarbon dates point to partial infilling in the early to mid-Iron Age. Other finds from the upper filling (1) consisted of 37 fragments of bone, eight pieces of sandstone, and several fragments of fired clay. Feature C4 may represent the terminal phase of the originally wide palaeochannel that cuts a wedge through the intertidal peat shelf (FIG. 3B; and see above, p. 180–1).

A second probable palaeochannel C5 was seen in plan but not sectioned (FIG. 5). It had a vague and meandering course but, as it rose up the beach, it disappeared at an elevation of *c.* 4.76 m O.D. and could not be traced to show a relationship with the base of the Wentlooge palaeosol at *c.* 5.26 m O.D. Since the base of the latter is the horizon from which the Roman features were cut, we conclude that C5 was sealed within the upper Wentlooge Formation, and so not exposed during the Roman period. This is supported by the failure of the feature to yield Romano-British material and charcoal. The surface of the uppermost surviving fill of a third

[30] Allen and Fulford, op. cit. (note 1), fig. 5, Ditch VII.
[31] Beta 61751.
[32] Respectively, Beta 61752 and 61753.

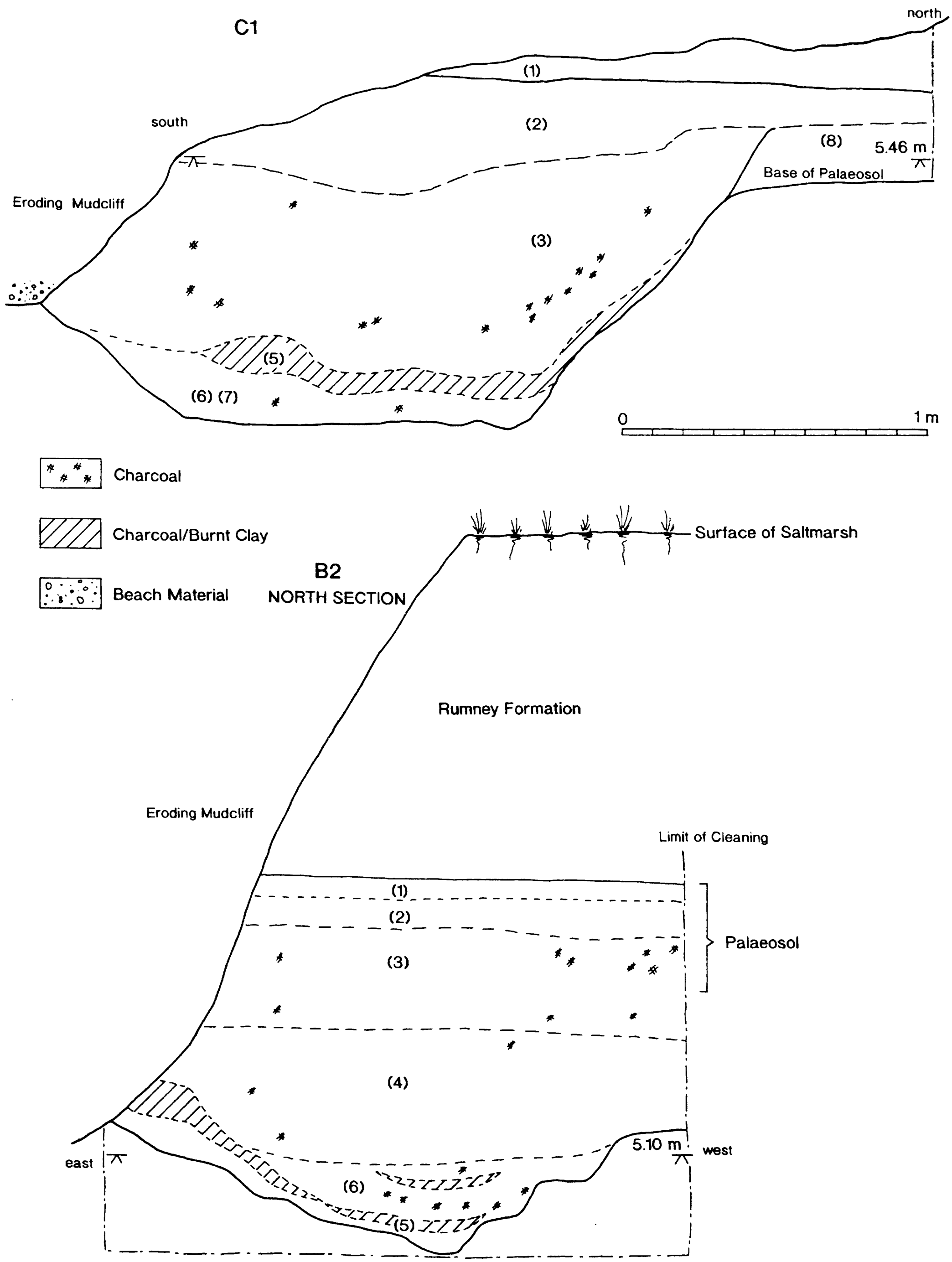


FIG. 6. Rumney Great Wharf 1992: sections of Ditches C1 and B2 (north).

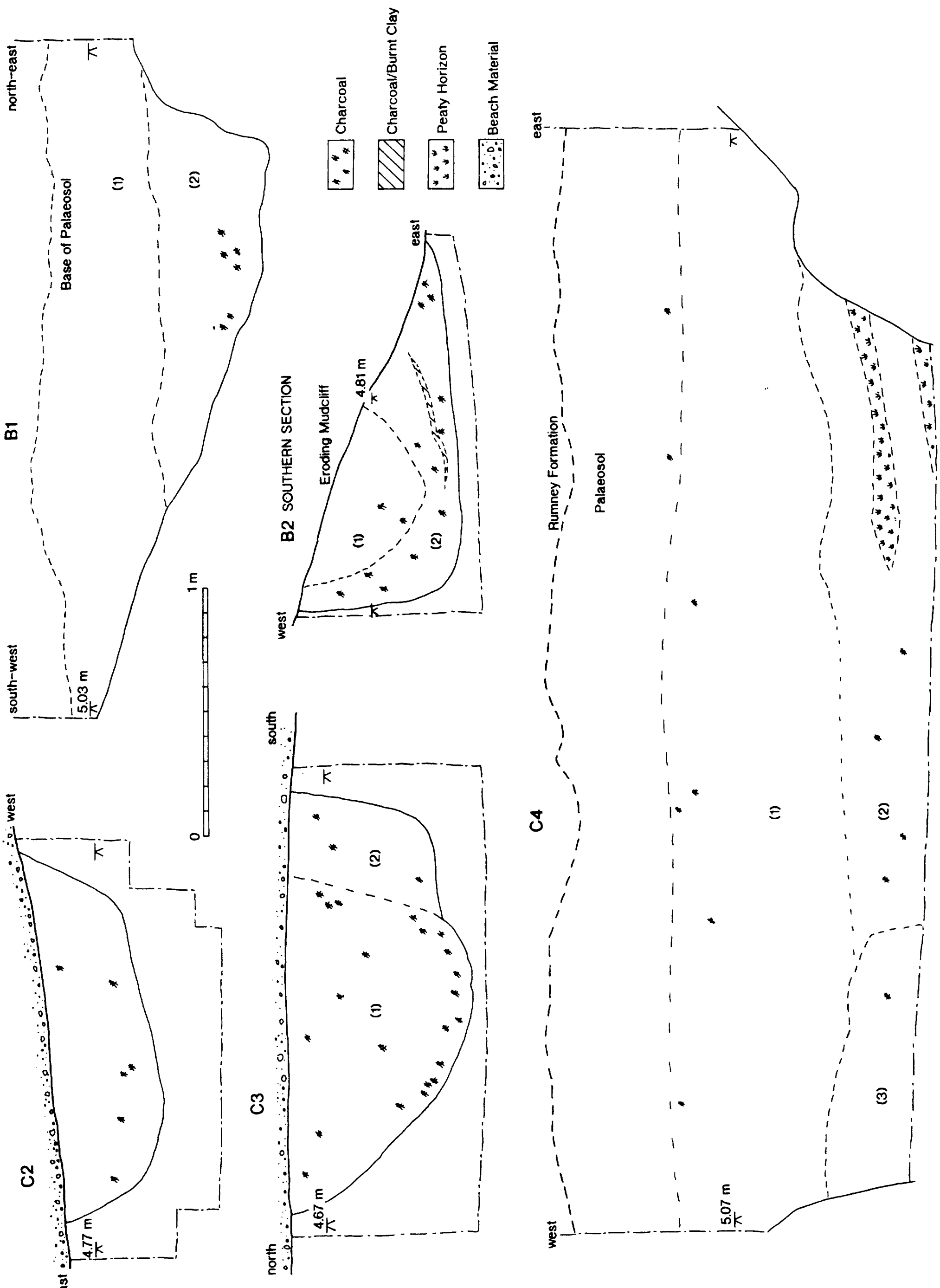


FIG. 7. Rumney Great Wharf 1992: sections of Features and Ditches B1, B2 (south), C2, C3, and C4.

possible palaeochannel C6 (FIG. 5) yielded a large fragment of a second-century mortarium (see below). This feature was seen in plan to be cut by the ditch C1, but was not otherwise excavated.

Ditch A26a, seen in plan and section, shares the same alignment as a modern ditch behind the sea bank (FIGS 3–4). It cut through the Wentlooge palaeosol and C2, and was filled with beach material and the Rumney Formation. Ditch A26a may have continued beyond C3, but the peat in this area has been eroded away by a palaeochannel. Interestingly, the edge of the clay-peat shelf here is remarkably straight and on the same line as A26a. Alternatively, the latter may have turned to take the line of A26.

Site B (FIGS 4–5)

Feature B0 was amorphous in character, and no clear edges could be identified. One pottery sherd and two fragments of bone were recovered. This could be a natural palaeochannel, or a ditch protruding from the sea-cliff at a very shallow angle.

In October 1993, after further erosion, Feature B1 was exposed as a sub-rectangular pit. The maximum depth of the excavated portion in the spring of 1992 was 0.9 m below the base of the Wentlooge palaeosol at *c.* 4.36 m O.D (FIG. 7). The upper filling (1) consisted of a blue/grey silty clay, whereas the lower filling (2) was mottled brown and contained very occasional flecks of charcoal. It produced a little pottery, five fragments of sandstone, and ten fragments of bone. A piece of waterlogged wood yielded a conventional (uncalibrated) radiocarbon date of 1680 +/– 60 years BP.[33] This is consistent with a late Romano-British context for the infilling of the feature.

Ditch B2 was a shore-parallel feature on the same orientation as C2 (PL. XIV B). It cut across the very end of a headland and was sectioned at both ends. The base, at *c.* 4.46 m O.D. to the south, and *c.* 4.76 m O.D. to the north, was *c.* 0.8 m below the base of the Wentlooge palaeosol. Both sections (FIGS 6 and 7) contained an upper filling of blue/brown silty clay with occasional flecks of charcoal (Layer 1 in the southern section and Layer 4 in the northern section), and a lower fill of a blue/grey silty clay with more frequent charcoal and lenses of organic material and burnt clay, reminiscent of Layer 5 in Ditch C1 (Layer 2 in the southern section and Layer 6 in the northern section). The longitudinal section, seen in the face of the headland, revealed a very uneven profile, reflected in the difference between the two excavated sections. A total of 46 fragments of animal bone were recovered, along with 22 fragments of stone, three pieces of coal and abundant pottery and lumps of fired clay. Although this material was rather smaller in quantity than that from C1, it was equally fresh (p. 189).

Feature B3 was a pit, circular in plan and 0.9 m in diameter with vertical sides (PL. XV B). The upper fill was a blue/grey silty clay to 1.1 m below the base of the palaeosol, with a more organic-rich layer below this. The bottom was not reached and excavation ceased at a depth of 1.4 m. An important plant-macrofossil assemblage was recovered (p. 202). Finds included just seven fragments of bone and 26, mostly small, pieces of stone, some pottery, and fired clay. The form of the feature and its organically rich fill strongly suggest that it served as a well.

Ditch B4 was first recorded by Allen and Fulford,[34] but time did not allow further excavation in 1992. However, observations of this feature over several years as the mud cliff has eroded away shows this to be a shore-parallel ditch running at right-angles to the inlet focused on Ditch A25. A pollen core was taken from the upper filling of Ditch B4 and the overlying Wentlooge palaeosol (p. 201). Subsequent erosion has revealed that this feature was butt-ended, and that it no longer (October 1993) survives.

[33] Beta 61750.

[34] Allen and Fulford, op. cit. (note 1), fig. 5, Feature B1.

Ditch B5 protruded obliquely from the mud cliff, but sufficient of its plan could be recovered to show that it was on the same orientation as Ditch C3. The profile showed it to have steep sides and a relatively flat bottom, around 1.2 m below the base of the Wentlooge palaeosol at *c.* 4.66 m O.D. The fill was of an homogeneous blue/grey silty clay with occasional flecks of charcoal. Finds were very sparse: a few pieces of burnt clay, just five fragments of bone, four pieces of stone and one piece of coal.

Plough furrows

The excavation, and the extensive survey, gave us an opportunity to re-examine features which Allen[35] had previously recorded in profile and interpreted as erosional in origin, from the interface between the Wentlooge palaeosol and the overlying Rumney Formation. The extensive survey confirmed that these furrows were widely present in a number of substantial groups along the mud cliff. They also occurred at Site C (FIG. 5), where we could examine them in plan as well as profile. Here the structures lie parallel to Ditches A25 and A26a, at a spacing of about a metre. Individually, they are a few decimetres wide and about 0.1 m deep, although some reach down for as much as 0.25 m below the top of the Wentlooge palaeosol. Many are asymmetrical in profile. The parallelism of these furrows, the similarity of their alignment to that of the ditches which appear to be projections of extant features behind the sea bank, and their asymmetry of profile suggest to us that these are plough furrows. They were perhaps cut into the soil at the time the sea defences were set back, in an attempt to 'warp' the land thereby abandoned to the sea, that is, to induce a rapid build-up of tidal silt.

THE FINDS

ROMANO-BRITISH POTTERY

Pottery was recovered, albeit in variable quantities, from all the features exposed in the mud cliff; those ditches (C2, C3, etc.) which were only exposed on the foreshore did not produce any certainly stratified material. The bulk of the pottery reported here, some 9841g, representing 695 sherds and 10.11 EVEs and accounting for between 90 and 95 per cent of the whole assemblage, was found in the ditch (C1) which ran out from the mud cliff towards the north of the intensively surveyed area. The total from all the other features (B1–5; C2, C4) amounted to only some 628g, representing 74 sherds and 0.51 EVEs. The condition of the material was, for the most part, excellent, particularly the well preserved group from C1. Among the individual fabrics there was some variation; BB 1, for example, tends to fragment more easily and suffer from more loss of surface than the sandy, grey wares.[36] The range of wares and forms was, by contrast, limited, with Dorset BB 1 and local grey wares accounting for over 95 per cent of the whole assemblage. Indeed, Ditch C1 was the only feature to contain pottery other than these wares.

The fabrics

Only the presumed local grey wares are described below. Although it might be expected that vessels would share the characteristics of the Caldicot and Llanedeyrn products, the most distinctive decorative element – the scored, wavy line – has not yet been directly associated

[35] Allen, op. cit. (note 6), 168–9.
[36] J.R.L. Allen and M.G. Fulford, *Arch. Journ.* cxlix (1992), 108.

with either of these workshops.[37] However, close parallels can be found among an unstratified collection about 100 m from the kiln at Llanedeyrn as well as among assemblages from settlement sites elsewhere in South Glamorgan (see below). No parallels have yet been found across the Estuary in Somerset or Avon for these grey wares.

1. Grey Sandy (GS) 1–3
Originally sorted as three separate wares on the basis of the variable presence of grog temper and colour range, GS 1–3 consists of a hard light grey fabric tempered with abundant, well sorted and rounded quartz sand (<0.5 mm) and sparse, but well sorted and rounded, inclusions of grey/black grog (<5 mm). Decoration is confined to overall smoothing with some light, diagonal burnishing over the body of cooking pots. A more distinctive characteristic is the presence of scored, wavy-line decoration beneath the rim of the cooking pot. Surface colour, sometimes perhaps attributable to the application of a wash, is usually grey, but black also occurs (FIG. 8, Nos 7, 9–14, 16–17).

2. Grey Sandy (GS) 4
A light grey ware tempered with abundant, fine, rounded (<0.5 mm) quartz sand and fine mica to give a distinct, micaceous appearance. Decoration is limited to the burnishing of the upper part of the body of cooking pots and the surface colour is grey. This ware is reminiscent of the micaceous Gloucester TF5 and its comparative scarcity (<4 per cent by any method of quantification) would be consistent with an origin further up the Severn Estuary (FIG. 8, No. 8).

3. Grey Sandy (GS) 5
A black sandy fabric tempered with moderately abundant, fine, rounded quartz sand (<0.5 mm) and with traces of an oxidised, red-brown surface. Occasionally sherds exhibit a red-brown core. Decoration consists of surface smoothing or light burnishing with a lattice pattern around the girth of cooking pots.

4. Miscellaneous Oxidised and Reduced Wares
A small number (32) of sherds in reduced or oxidised sandy fabrics did not clearly belong to the grey wares described above. For the purposes of this report they have been simply grouped according to the way they have been fired (FIG. 8, No. 15).

The pottery from Area B

Table 1 summarises the pottery from all the features of Area B. All the pottery exhibited fresh fractures and unweathered surfaces, even though the average sherd weight was low, particularly from the well B3. All the features contained BB 1, which, as in C1, was the most abundant ware, followed by Grey Sandy Wares 1–3. The only rims were from the shore-parallel ditch B2, which included fragments of everted rim jars and a flanged bowl dating within the range 250–400. Rim fragments of everted rim cooking pots were also recovered from the well B3, and the ditch B4. Thus, small though the assemblage is from all the features, it shares the major characteristics of the large group from C1. However, the lack of closely datable sherds urges caution on the question of comparability of date and it may be more appropriate to assign all these features the wider range of 250–400.

[37] C. Barnett, P. Stanley, R. Trett, and P.V. Webster, *Arch. Journ.* cxlvii (1990), 118–47; B.E. Vyner and G.C. Evans, 'Excavations of a Roman pottery kiln at Llanedeyrn, Cardiff', in G.C. Boon (ed.), *Roman Sites, Monographs and Collections* I (1978), 120–9.

TABLE I : POTTERY FROM SITES B AND C (EXCLUDING C1)

	BB 1					*GS 1–3*					*GS 4*				*GS 5*			
	Wt	*%*	*Nos*	*%*	*EVEs*	*Wt*	*%*	*Nos*	*%*	*EVEs*	*Wt*	*%*	*Nos*	*%*	*Wt*	*%*	*Nos*	*%*
B1	2		1															
B2	199	47.7	20	52.6	0.31	216	51.8	17	44.7	0.2								
B3	47	68.1	14	63.6		16	23.2	6	27.3		1	1.4	1	4.5	5	7.2	1	4.5
B4	6		1			29		3							12		4	
B5	2		1															
C2															11		1	
C4(1)	4		1															
C4(2)	72		1															
Total	332	52.9	39	52.7	0.31	261	41.6	26	35.1	0.2	1	0.2	1	1.4	28	4.5	6	8.1

	Misc. Oxidized							
	Wt	*%*	*Nos*	*%*	*Total Wt (g.)*	*Total Nos*	*Total EVEs*	*Sherd/Wt*
B1					2	1		
B2	2	0.5	1	2.6	417	38	0.51	11.0
B3					69	22		3.1
B4	4		1		51	9		5.7
B5					2	1		
C2					11	1		
C4(1)					4	1		
C4(2)					72	1		
Total	6	1.0	2	2.7	628	74	0.51	8.5

The pottery from Area C

The ditch C2 yielded one very abraded and weathered Roman sherd which would be typical of the sherds strewn across the beach. It is likely that this and a sherd of modern china were accidentally introduced during the excavation of the feature. The palaeochannel, C4, produced small quantities of unabraded BB 1, with fresh fractures, including the base of a straight-sided dish. The surface of C6 produced a rim fragment of a second-century mortarium, possibly produced at Shepton Mallet.[38] Only the upper and inner surface where it protruded above the surface of the uppermost filling of the feature showed some signs of edge and surface wear.

Ditch C1

Ditch C1 produced a large assemblage of coarse ware in good condition, particularly from the lower contexts, 4–7. Table 2 gives an indication of the quality of preservation through the filling of the ditch. The pottery from Layers 1–2 includes mostly sherds with varying degrees of surface and edge wear; the majority from Context 3, however, consist of sherds with fresh fractures and unabraded surfaces, but the average sherd weight is significantly less than that of the sherds from the lower fillings of the ditch. Apart from the excellent condition of the sherds which included the preservation of carbonised material beneath the rim of the BB 1 jars, as well as the presence of external sooting of these vessels, the group is striking for the lack of fine wares, the lack of typological range and the high proportion of the regional import, Dorset BB 1 (Tables 3–4). Of the first, while the samian sherds could be residual, the two sherds of Oxfordshire mortarium are undoubtedly contemporary; a possible sherd of a Caerleon Ware mortarium is also present. Even allowing for at least one large storage jar, one flagon and one possible lid not represented by measurable rims, the range of forms is limited to cooking

[38] cf. examples of similar form at Ilchester: P. Leach, *Ilchester.* 1. *Excavations 1974–5* (1982), fig. 68, nos 71, 85, 88.

pots/everted rim jars and this is equally so of both the BB 1 and the grey-ware vessels. While the proportion of BB 1 is remarkable, and more in keeping with the ratios recorded from settlements in Somerset and Dorset,[39] the high figure has to be seen in relation to the otherwise narrow range of other regional wares represented.

TABLE 2 : C1 : AVERAGE SHERD (g.) WEIGHT BY CONTEXT

Context	*Average All Wares*	*Average BB1*	*Average GS 1–3*
1	5.2	1.0	8.0
1/2	6.9	7.0	8.4
2	3.5	2.8	4.7
3	11.1	13.1	8.9
4	20.0	24.3	13.9
5	9.5	10.8	12.7
6	19.6	13.7	29.8
7	13.8	13.9	11.5
Total	14.2	14.5	14.3

TABLE 3 : C1 (ALL CONTEXTS)

Ware	*Wt (g.)*	*%*	*Nos Sherds*	*%*	*EVEs*	*%*	*Average Sherd Weight*
Samian (CG)	27	0.3	3	0.4	0.09	0.9	9
Oxfordshire	189	1.9	2	0.3	0.16	1.6	94.5
BB1	5833	59.3	402	57.8	6.32	62.5	14.5
GS 1–3	3291	33.4	230	33.1	2.96	29.3	14.3
GS 4	91	0.9	6	0.9	0.10	1.0	15.2
GS 5	203	2.1	22	3.2	0.29	2.9	9.2
Misc. Oxidised	69	0.7	16	2.3	0.05	0.5	4.3
Misc. Reduced	121	1.2	13	1.9	0.14	1.4	9.3
Other (Caerleon ?)	17	0.2	1	0.1	–	–	17.0
Total	9841	100.0	695	100.0	10.11	100.1	14.2

TABLE 4 : C1 : COARSE WARE VESSEL FUNCTION

	BB 1		*GS 1–3*		*GS 4*		*GS 5*		*Misc. Ox.*		*Misc. Red.*		*Total*	
FORM	*EVEs*	*%*	*EVEs*	*%*	*EVEs*	*%*	*EVEs*	*%*	*EVEs*	*%*	*EVEs*	*%*	*EVE*	*%*
Cooking Pot (Everted Rim Jar)	5.3	53.5	2.49	25.2			0.3	2.9	0.05	0.5	0.04	0.4	8.17	82.5
Pie Dish (Flanged Bowl)	0.33	33.3	0.2	20.2									0.53	5.4
Dish	0.69	7.0											0.69	7.0
Wide-Mouthed Bowl					0.1	1.0					0.14	1.4	0.24	2.4
Narrow-Mouthed Jar			0.27	2.7									0.27	2.7
Totals	6.32	63.8	2.96	29.9	0.1	1.0	0.29	2.9	0.05	0.5	0.18	1.8	9.9	100

[39] J.R.L. Allen and M.G. Fulford, *Antiq. Journ.* lxvii (1987), 282–4.

THE ILLUSTRATED SHERDS (FIG. 8)

The illustrated sherds are all from the lower contexts 4–7 of C1.

1. Oxfordshire Ware mortarium;[40] 2. BB 1 flanged bowl;[41] 3–6. BB 1 cooking pots;[42] 7. GS 2, flanged bowl with traces of a possible external slip; 8. GS 4, wide-mouthed bowl with traces of a possible dark grey wash outside; 9. GS 2, small jar with plain surfaces; 10–13. GS 2, cooking pots with scored wavy decoration below the rim and No. 13 also has broad bands of very light burnishing around the body (cf. at Llanedeyrn about 100 m from the kiln and in a similar fabric to that of the kiln products;[43] also at Biglis,[44] Ely,[45] Llandough,[46] and Whitton;[47] all of third- to fourth-century date); 14. GS 2, narrow-mouthed jar with plain surfaces; 15. Misc. reduced, wide-mouthed bowl in a grey-to-black sandy fabric with a black-burnished surface over the rim; 16. GS 3, lid (?) with burnished black exterior; 17. GS 3, cooking pot with black surface and burnishing on the upper part of the body.

Date

The Oxfordshire Ware mortarium points to a date in the second half of the third century for the primary filling of C1, and this is supported by the evidence of the BB 1 cooking pots and flanged bowl which lacks a prominent bead rim. Indeed the only example of a fully developed beaded and flanged bowl occurs in the upper layer (1/2). Thus the typological indicators point to a central date around the mid-third century and nothing in the group suggests a later date, i.e. in the fourth century.

None of the other features in Areas B and C with very small amounts of stratified pottery could be more closely dated than *c.* 250–400. While rim fragments of BB 1 cooking pots of third- or fourth-century date were recorded from most contexts, only B2 yielded one fragment of a developed beaded and flanged bowl in BB 1.

Discussion

The assemblages described here build substantially upon the material reported earlier.[48] Then only one closed group (from Site B1, renumbered here B4) with a date range of the mid-third to fourth century was recovered and reported. This compares well with the proposed date range for the adjacent ditch, our B2, but contrasts with the earlier, *c.* 250–300 range for Ditch C1. The condition of the pottery from the lower fillings of C1 is markedly better than that from all contexts in Area B, although the average weight per sherd is about half that recorded for the pottery from the palaeochannel at Oldbury.[49] Notwithstanding this, there is no doubt of the

[40] C.J. Young, *Oxfordshire Roman Pottery*, BAR 43 (1977), M19, 240–400.

[41] J.P. Gillam, *Types of Roman Coarse Pottery Vessels in Northern Britain* (3rd edn, 1970), Type 227, 210–300; J.P. Gillam, *Glasgow Arch. Journ.* iv (1976), 70–2, early to mid-third century.

[42] Gillam, op. cit. (note 41), (1973), Type 145, 230–300; (1976), 62–5, mid- to late third century.

[43] Vyner and Evans, op. cit. (note 37), fig. 5, no. 15.

[44] P.V. Webster in J. Parkhouse, 'Excavations at Biglis, South Glamorgan', in D.M. Robinson (ed.), *Biglis, Caldicot and Llandough. Three Late Iron Age* and *Romano-British Sites in South-East Wales. Excavations 1977–79*, BAR 188 (1988), fig. 15, nos 104 and 118–19.

[45] R.E.M. Wheeler, *Trans. Cardiff Nat. Soc.* lv (1922), fig. 13, no. 39.

[46] P.V. Webster in 'Llandough: The rescue excavation of a multi-period site near Cardiff', in Robinson, op. cit. (note 44), fig. 70, no. 21.

[47] M.G. Jarrett and S. Wrathmell, *Whitton: An Iron Age and Roman Farmstead in South Glamorgan* (1981), fig. 53, no. 181; fig. 60, no. 473.

[48] Allen and Fulford, op. cit. (note 1), 102–5.

[49] Allen and Fulford, op. cit. (note 36), 106–10.

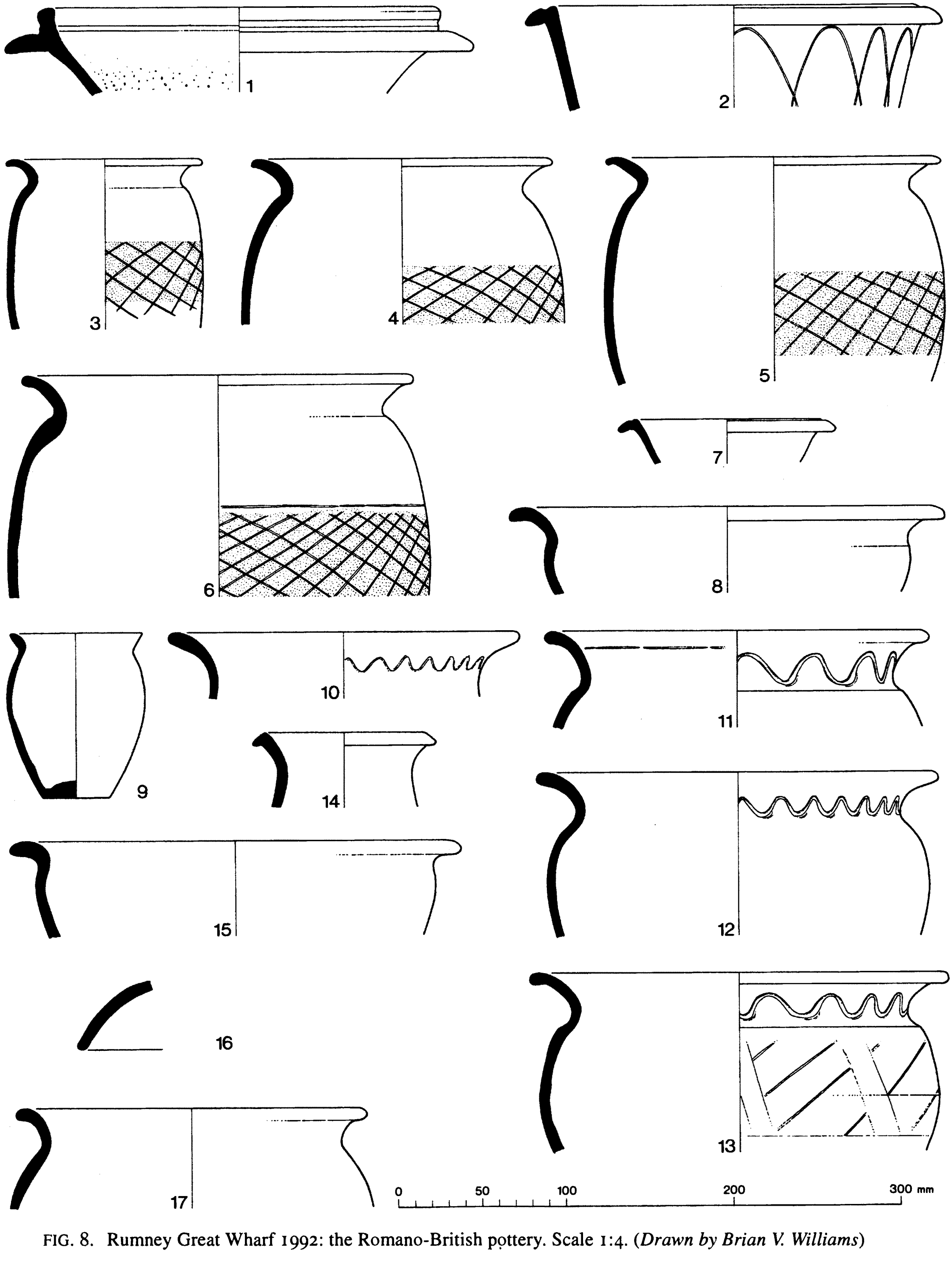


FIG. 8. Rumney Great Wharf 1992: the Romano-British pottery. Scale 1:4. (*Drawn by Brian V. Williams*)

freshness of the material in C1, which shows no signs of re-working, and the context at Oldbury provides a good parallel for Ditch C1 at Rumney. Lack of surface and edge wear is equally true of the pottery from B1–5, although average sherd weight is considerably less than that in C1 (Table 2). Fragmentation around Area B clearly occurred before deposition and before the pottery had the opportunity to weather and suffer surface and edge wear; the small sherds from the well (B3) probably resulted from the trampling of rubbish around the mouth while lifting water. Thus the size and weight of sherds otherwise in fresh condition reflects the different nature of activities around the site.

The pottery from C1 is distinguished by the high percentage of BB 1 and the limited functional range of vessels; although the ratios of major wares are mirrored in the material from B2 and B3, insufficient was recovered to comment on the typological range. This contrasts with the pottery published earlier where only 22 per cent could be confidently attributed to BB 1.[50] With hindsight and the understanding of how BB 1 tends to weather, the imitation (?) BB 1 can be confidently re-identified as BB 1, giving a ratio for Site B1 (our B4) of 33.4 per cent. Taking account of this, the ratio between BB 1 and local grey wares is reversed in C1, a difference possibly to be accounted for by the variation in date between the two groups.

The source of the local grey wares is unclear but the parallels cited above all derive from settlements in South Glamorgan. This observation is reinforced by the parallels for the decorated coarse wares reported in 1986.[51] These can now be found at Biglis.[52] Thus, as far as pottery is concerned, the site at Rumney appears to look across the Estuary to Somerset and westwards to South Glamorgan, rather than east towards Caldicot.[53] The proximity of a sherd with scored wavy decoration below the rim to the kiln at Llanedeyrn is suggestive of at least some production there. However, with the less distinctively decorated coarse wares which characterise the known production of Caldicot[54] and Llanedeyrn,[55] it is not easy to be certain about presence or absence at Rumney.

FIRED CLAY

Fragments of burnt or fired clay were recovered from all artificial features in Sites B and C, except B1 and C3. Unlike the pottery which, though variable in sherd size, was generally recovered in a fresh condition, the assemblage of fired clay was composed for the most part of small and abraded fragments; few pieces weighed over 5 g (Table 5, below). Despite the general condition of the material, a distinction could be made between B4 and C1 and the remaining features. Although the sample from B4 was small, it, and that from C1, contained a higher proportion of larger fragments than were recovered from elsewhere. The majority of this fired clay appeared untempered and ranged in colour from yellowish-grey to pink or red. It tended to weather less well than a second, smaller group, reddish-yellow in colour, which was tempered with organic material such as chaff and grass. This material also contained the impressions of larger twigs or small branches. Although the material is in general too fragmentary to interpret, the character of the larger pieces suggests that it originally served as daub.

50 Allen and Fulford, op. cit. (note 1), 104.
51 ibid., fig. 7, nos 13 and 15.
52 Webster, op. cit. (note 44), fig. 13, no. 96; fig. 16, no. 158; fig. 17, no. 213.
53 Webster, op. cit. (note 37).
54 idem.
55 Vyner and Evans, op. cit. (note 37).

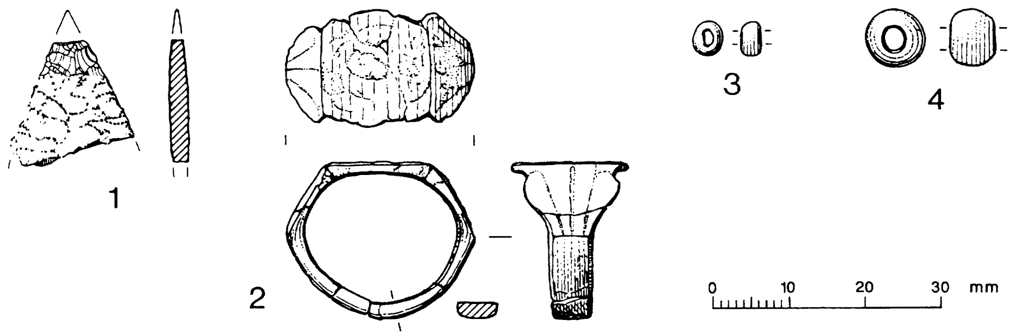


FIG. 9. Rumney Great Wharf 1992: (1) flint arrowhead; (2) bronze ring; (3–4) glass beads. Scale 1:1. (*Drawn by Brian V. Williams*)

TABLE 5: FIRED CLAY

Context	*Nos Frags*	*Wt.(g)*	*Wt/Nos ratio*	*Comment*
B2	81	304	3.75	some fresh & unabraded
B3	102	124	1.2	mostly small & abraded
B4	2	30	15.0	abraded
B5	3	3	1.0	abraded
C1	194	1019	5.3	fresher material from Layers 3 & 6; burnt material from Layers 4, 6, & 7.
C2	3	1	0.3	abraded
C4	7	7	1.0	abraded

OBJECTS OF METAL (FIG. 9)

Bronze: finger-ring with lightly engraved decoration on triangular shoulders; bezel missing; third-fourth century;[56] from the Wentlooge palaeosol between B3 and B4 (FIG. 9, No. 2).
Iron (by D. Richards): fragment of a knife blade, 85 mm long, with vestiges of a socketed handle; from C1(3). A second iron fragment from this layer could not be identified. A small fragment of iron nail shaft, square in profile, originally *c.* 70–80 mm long; from C1(6).
Lead: small chisel-cut fragment of cast lead-sheet carrying chisel marks also occurred in C1(6).

OBJECTS OF GLASS (FIG. 9)

Beads: two cylinder beads of green glass;[57] unstratified Site C (FIG. 9, No. 3); from C1(4) (FIG. 9, No. 4).
Window-glass: rim fragment; from C1(4).

[56] cf. R.E.M. and T.V. Wheeler, *Report on the Excavation of the Prehistoric, Roman, and Post-Roman Site at Lydney Park, Gloucestershire*, Rep. Res. Com. Soc. Ant. London IX (1932), 82 and fig. 16, nos 53–5, but particularly no. 55, of third-/fourth-century date; also N. Crummy, *The Roman Small Finds from Excavations in Colchester 1971–9*, Colchester Arch. Rep. 2 (1983), 49–50, fig. 52, no. 1791, from a fourth-century grave.

[57] M. Guido, *The Glass Beads of the Prehistoric and Romano-British Periods in Britain and Ireland*, Rep. Res. Com. Soc. Ant. London (1978), 95.

TEXTILE *By* J.P. Wild

A fragment of coarse fabric in plain tabby weave, now medium 'peat-brown' in colour, was recovered from C1(6). It was preserved by the anaerobic character of its micro-environment, impressed on the inside of a large pottery sherd. Its yarns are slightly flaccid, perhaps the result of water action. The woven structure is visible over the main surviving sections (*c.* 3 by 2 cm) which at one corner is pulled into a tail consisting largely of yarns of System 1.

System 1 : weak Z-spun, *c.* 6 threads per cm, maximum length *c.* 7 cm (of which *c.* 3 cm lie within woven section).

System 2 : weak Z-spun, *c.* 6 threads per cm, maximum length *c.* 3 cm.

The textile is associated with pieces of two small feathers. At first glance the fabric looked like wool; but as the fibre sample was being mounted it disintegrated into short lengths. Under the microscope the fibrous material was seen to have parallel striations internally, but no nodes. Identification as a plant fibre seems probable, but that in itself would be unusual; for plant fibres rarely survive in damp conditions, which favour the survival of wool and other animal fibres.

IRON SLAG

Iron-making slag is abundant on the beach at Rumney Great Wharf, particularly between our Sites B and C. The characteristics of this material have already been described.[58] Man-made features investigated in 1992 were equally devoid of slag; only in Layer 1 of C4 do small fragments of iron-making slag appear; none showed any signs of water wear.

FLINT ARROWHEAD *By* S.H.R. Aldhouse-Green (FIG. 9, No. 1)

Fragment of a bifacially flaked arrowhead of a translucent grey flint of leaf-shaped or barbed and tanged form was recovered from C1(4). Only the pointed end is present and the tip is missing. The slenderness of the fragment, together with the quality both of the flaking and of the flint, would favour identification of the artefact as part of a Neolithic leaf-shaped arrowhead. This find represents only the second Neolithic find, and the first arrowhead, from the Welsh side of the Severn Estuary.

UNWORKED STONE

All features sectioned produced at least a few fragments of stone, while C1 contained a very large assemblage. Twelve lithologies were present (Table 6).

Lower Old Red Sandstone: A red to purple, very fine to medium grained, slightly to abundantly micaceous, mainly flaggy quartz sandstone.

Upper Old Red Sandstone: Pink to red, very fine to medium grained, occasionally burrowed (pipe rock), quartzitic quartz sandstones.

Carboniferous A (Millstone Grit): Off white to pale grey, tough, mainly fine grained, generally massive quartzites, occasionally with carbonaceous rootlets.

Carboniferous B (Millstone Grit): Pale grey, occasionally pink, friable, medium to coarse grained, commonly pebbly, quartzitic quartz sandstone.

Carboniferous C (Coal Measures): Dark grey, medium grained, slightly micaceous, slightly feldspathic, flaggy quartz sandstones, occasionally with flecks of carbonaceous matter.

[58] Allen and Fulford, op. cit. (note 1), 106–7.

Carboniferous D (Coal Measures): Dull to bright coal in angular pieces.
Lias (Jurassic): Mid-grey, fossiliferous calcisiltites.
Cretaceous: Subangular to subrounded, grey to yellow, patinated pebbles of flint.
Others: Generally well rounded pebbles of vein quartz; tough white quartzite; microcrystalline felsic lava; grey-green greywacke.

The fragments of the first five categories are derived from moderately to well rounded, water worn pebbles and cobbles (possibly also some boulders) of the rocks in question. Most of the fragments are fire-fractured – the characteristic closely spaced, fluted fractures are especially well shown by the strongly cemented, fine-grained rocks of the first two categories – and it is common to find traces of soot-blackening.

TABLE 6 : STONE

Context	*LORS*	*UORS*	*Carb.A*	*Carb.B*	*Carb.C*	*Carb.D*	*Lias*	*Cret.*	*Other*	*Total*
B1	1	2	–	1	1	–	–	–	–	5
B2	7	6	5	1	2	1	3	–	–	25
B3	4	1	1	8	–	11	1	–	–	26
B5	4	–	–	–	–	1	–	–	–	5
C1 (1)	–	–	–	9	–	–	–	–	2	11
C1 (2)	–	–	–	7	2	–	–	–	1	10
C1 (3)	16	9	8	93	17	–	–	2	3	148
C1 (4)	12	–	9	37	5	–	–	–	13	76
C1 (5)	7	1	–	18	–	–	1	–	–	27
C1 (6)	7	–	13	48	4	–	–	–	6	78
C1 (7)	12	1	2	16	5	–	–	–	5	41
C2	–	–	–	3	1	–	–	–	–	4
C3	1	–	–	–	–	–	–	–	–	1
C4	–	–	2	1	1	–	–	–	–	4
C4A	–	1	–	1	2	–	–	–	–	4
Totals	71	21	40	243	40	13	5	2	30	465
%	15.3	4.5	8.6	52.2	8.6	2.8	1.1	0.4	6.5	100

The immediate source of these gravels was probably the beds and/or fluvial terraces of the nearby Rhymney and Ebbw rivers,[59] although the possible exploitation of similar deposits exposed intertidally in the Severn Estuary cannot be excluded.

THE ANIMAL BONE *By* S. Hamilton-Dyer

The animal bones recovered, though brittle and often excavated in pieces, were in good condition. After the reconstruction of several bones, the total recovered was 422 bones and bone fragments. This figure remains artificially high due to the large number of horse jaw fragments and loose teeth which could not be further reconstructed.

The majority of the identified fragments are of horse, cattle, and sheep. Unidentified fragments of small artiodactyl size are probably mostly sheep, as pig bones were present in only small numbers. The larger fragments have been classified as large ungulate, since small

[59] H.C. Squirrell and R.A. Downing, *Geology of the South Wales Coalfield.* Part I. *The Country around Newport (Mon.)* (3rd edn, 1969); R.A. Waters and D.J.D. Lawrence, *Geology of the South Wales Coalfield.* Part III. *The Country around Cardiff* (3rd edn, 1987).

fragments of the skulls, ribs, and limb bones of cattle and horse are very difficult to separate. There are other small fragments which have only been identified as mammalian. In addition to the main domestic animals, there is a small eroded fragment of red deer antler, a dog tooth, a large cod vertebra and several bird bones including those of goose and duck (Table 7).

The extensive survey: Features A31 and A32
Two contexts outside the main study area, Features A31 and A32, were surveyed and three bone fragments recovered. Feature 31 contained the red deer antler fragment, the only deer bone from the site. Feature 32 contributed part of a cattle pelvis and sacrum. Measurements of the acetabulum are kept in the archive.

The main excavation: Areas B and C
Overall, sheep/goat bones were the most numerous and the most frequent. Some bones could be positively identified as sheep[60] whereas none were identified as goat, and it is assumed that most, if not all, of the remaining sheep/goat bones are of sheep. Horse remains were more numerous than cattle but were recovered from fewer contexts, and their number is inflated by the number of loose teeth and jaw fragments from Layer 6 in C1. Pig bones were infrequent, numbering just eight, less than 4 per cent of the horse/cattle/sheep/pig total.

Few of the fused sheep bones were sufficiently complete for measurement. The animals seem to have been typically small in comparison with most modern breeds. No butchery marks were observed on any of the fragments. Many of the bones are from the major meat areas, though jaws are also well represented and there are some foot bones. Animals of several different age-groups are present including neonates, lambs of the first year, and those with full adult dentition. One of the jaws was anomalous with the second molar impacted onto the third. Grant noted similar crowding of sheep jaws at Porchester.[61]

One of the cattle lower third molars was also anomalous, having no third cusp and an unusual wear pattern, probably a result of overwear of the corresponding upper tooth. Like the sheep, the cattle fragments were a mixture of head, foot, and major meat bones. Calf bones were present as well as those from more mature animals. Again, few bones were measurable, but a complete femur in Ditch C1 gave an estimated withers height of 1.02 m.[62] This is small in comparison with some from Roman Britain but fits inside the range reported from first-century Frocester[63] and pre-Roman Iron Age Gussage All Saints.[64] A large portion of a horned skull from Layer 4 of Ditch C1 was also measurable. This was a mature animal with the upper molars in full wear. The length of the horn cores was in the region of 155 mm, bringing them into the medium category. The maximum basal breadth was 50.4 mm. Other measurements are in the archive. The size, shape, and texture of the horn cores suggests the animal had been a castrate. Butchery marks were present on seven cattle bones. These consisted either of chop marks made during excision of the limbs, across the proximal femur for example, or are knife

60 J. Boessneck, 'Osteological differences between sheep (*Ovis aries* Linné) and goat (*Capra hircus* Linné)', in D. Brothwell and E.S. Higgs (eds), *Science and Archaeology* (1969), 331–58; S. Payne, *Journ. Arch. Science* xii (1985), 139–47.

61 A. Grant, 'The animal bones', in B.W. Cunliffe, *Excavations at Portchester Castle. I. Roman*, Rep. Res. Com. Soc. Ant. London (1975), 377–83.

62 A. von den Driesch and J. Boessneck, *Kritische Anmerkungen zur Widerristhöhenberechnung aus Längenmaßen vor- und frühgeschichtlicher Tierknochen*, Säugetierkundliche Mitteilungen XXII (1974), 325–48.

63 B.A. Noddle, *Trans. Bristol and Glos. Arch. Soc.* xlvii (1979), 51–61.

64 R.A. Harcourt, 'The animal bones', in G.J. Wainwright, *Gussage All Saints: An Iron Age Settlement in Dorset*, Dept. Environment Arch. Rep. X (1979), 150–60.

marks made while stripping the meat from the bones. The knife marks along the spine of a scapula in Layer 7 of Ditch C1 are a good example of this type.

Horse bones consisted mainly of jaw fragments and loose teeth from Layer 6 in Ditch C1, but there were also radii and foot bones from this and other features. Although the jaws could only be partly reconstructed, it is clear that they represent three animals with another in Layer 7. There was a further collection of teeth from B1. The remains from this feature were from both sides of the maxilla, now badly fragmented. All the molars were in wear but the first molars were pathological, having caries involving the infundibulae. This is thought to be associated with incomplete cement formation.[65] Ageing these teeth from the crown heights[66] gives an age of ten to thirteen years on the second and third molars, but considerably older from the anomalous first molars. Estimated ages from the lower teeth in Ditch C1 were seven to eight, nine to ten, and four to five.

The first phalanx from Layer 7 of C1 was pathological with exostoses and perforations around, but not involving, the distal joint surface. Three bones were measurable including this phalanx, another from C4, and a complete metacarpus from C1 Layer 6. The two phalanges were small, but of the breadth associated with a horse rather than donkey. The metacarpus was also small, total length 207 mm, lateral length 201 mm. The lateral length can be converted into an approximate withers height of just 1.29 m. This bone has a slenderness index of 13.5 and a concave distal posterior shaft, features more commonly found in a donkey. The proportion of the total length to distal width is, however, within the range for a horse. Though unusual in recent horses these slender proportions have been found in Iron Age material across Europe.[67] None of the bones showed any evidence of butchery but several had been gnawed.

Although there were very few pig bones, two of the eight showed butchery marks, on an axis and on skull fragments which had been axially split. There were three other bones from the same context, Layer 4 in C1, including the upper canine of a boar, and they may represent a single head. Layer 5 contained a neonatal ulna.

Dog is not only evidenced by the first molar from B2, but also from the high number of bones from B2, C1, and C4 with clear gnaw marks. A few have the etched appearance associated with canine digestion.[68] In total 36 bones have been damaged. Not only does this reduce the amount of metrical and ageing information, but there are several bones which can no longer be identified and presumably there were some which have been totally destroyed or voided elsewhere. Particularly at risk are bones of young animals and small elements such as foot bones.

It is interesting to note that all but one of the bird bones are from the shore parallel ditch B2, but most of these may have been from a single individual. The bones have been identified as a goose, probably Brent, *Branta bernicla,* which overwinters in Britain. The other bird bone from B2 is of a very small wader comparable with Jack Snipe, *Limnocryptes minimus,* which also overwinters here. The well B3 also contained the fragment of ulna which could not be identified further than small goose or large duck. None of the bird bones had butchery marks.

[65] S. Hillson, *Teeth* (1986).

[66] S.Bököni, 'Appendix A: Once more on the osteological differences of the horse, half-ass and the ass', in L. Firouz, *The Caspian Miniature Horse of Iran* (1972), 12–23.

[67] M.A. Levine, 'The use of crown height measurements and eruption-wear sequences to age horse teeth', in B. Wilson, C. Grigson and S. Payne (eds), *Ageing and Sexing Animal Bones from Archaeological Sites*, BAR 109 (1982), 223–50.

[68] L.R. Binford, *Bones: Ancient Men and Modern Myths* (1981); S. Payne and P.J. Munson, 'Ruby and how many squirrels? The destruction of bones by dogs', in N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph, *Palaeobiological Investigations: Research Design, Methods and Data Analysis*, BAR (1985), 31–41.

TABLE 7 : ANIMAL BONE SPECIES DISTRIBUTION

Context	*horse*	*cattle*	*sheep*	*pig*	*red deer*	*LAR*	*SAR*	*dog*	*mammal*	*bird*	*fish*	*Total*
A31	–	–	–	–	1	–	–	–	–	–	–	1
A32	–	2	–	–	–	–	–	–	–	–	–	2
B0	–	–	–	–	–	3	–	–	12	–	–	15
B1	5	1	2	–	–	3	–	–	10	–	–	21
B2 south	–	1	5	–	–	7	1	–	6	1	–	21
B2 north	–	2	4	1	–	5	10	1	–	6	–	29
B2 general	–	1	5	–	–	6	1	–	5	3	–	21
B3 (1)	–	–	1	–	–	5	–	–	4	1	–	11
B3 (2)	–	1	–	–	–	–	–	–	–	–	–	1
B5	–	2	–	–	–	6	–	–	–	–	–	8
C1 (1)	–	–	1	–	–	–	1	–	–	–	–	2
C1 (2)	–	–	3	–	–	2	5	–	–	–	–	10
C1 (3)	1	4	10	–	–	15	17	–	12	–	1	60
C1 (4)	–	8	9	5	–	9	15	–	17	–	–	63
C1 (5)	1	–	3	1	–	8	7	–	–	–	–	20
C1 (6)	57	5	3	–	–	1	3	–	–	–	–	69
C1 (7)	4	13	12	1	–	3	–	–	–	–	1	34
C4 (1)	–	3	6	–	–	–	2	–	–	–	–	11
C4 (2)	3	7	14	–	–	–	–	–	–	–	–	24
Total	71	50	78	8	1	73	62	1	66	11	2	423
%	16.8	11.8	18.4	1.9	0.2	17.3	14.7	0.2	15.6	2.6	0.5	

LAR = large ungulate (probably mostly cattle but may also include horse and red deer)
SAR = small artiodactyl (probably mostly sheep/goat)
mammal = unidentified bone, probably SAR and/or LAR

This small assemblage has several interesting elements. Firstly, several of the young sheep bones appeared to be associated, suggesting that the ditches were used as a convenient dump for mortalities. Secondly, the amount of canid damage implies that many of the bones were not disposed of immediately after death or slaughter of the animals, but were available to dogs for some time.

Thirdly, horse bones are more numerous than on many sites, considering the small size of the assemblage. Romano-British assemblages often have wells which contain horse bones,[69] though not here at Rumney. Indeed, there were only twelve fragments of bone from the well, including one sheep, one cattle and one goose or duck, with unidentified fragments. Frequent finds of horse skulls have been suggested as votive offerings.[70] It is interesting to note that some of the jaws belong to animals at the peak of their working life, although the pathological toe indicates that one animal was probably lame. Their small size would perhaps relegate them to the class of child's pony today, but native ponies, such as the Exmoor, are strong enough to carry adults. Animals of this size would have been useful as pack animals.

Fourthly, pig bones are infrequent. Whether this is a result of disposal practices or a true reflection of paucity is difficult to establish with such a small assemblage. Small amounts of pig together with large cattle and horse fragments, particularly skulls, may indicate dumping on the periphery of a settlement.

[69] R.M. Luff, *A Zooarchaeological Study of the Roman North-western Provinces*, BAR Int. Ser. 137 (1972); J.M. Maltby, *Proc. Hampshire Fld Club & Arch. Soc.*, forthcoming; S. Hamilton-Dyer, 'The animal bones', in G.R. Burleigh, *Baldock: the Excavation of a Roman and Pre-Roman Settlement (Upper Walls Common)*, V, *The Settlement*, forthcoming.

[70] Luff, ibid.

ENVIRONMENTAL EVIDENCE

THE POLLEN *By* M. Keith-Lucas

Samples were taken from a monolith at depths of 1.25, 1.50 and 1.60 m below the salt-marsh surface directly above Ditch B4.[71] Depth 1.60 m was within the blue/grey silty clay of the upper Wentlooge Formation which filled this feature. The lower, darker, horizon of the palaeosol containing Roman artefacts, spanned 1.56 to 1.40 m, which therefore included the sample taken at 1.50 m. Depth 1.25 was within the pale upper horizon of the palaeosol. Samples were prepared using hydrofluoric acid and standard acetolysis techniques. All the samples were non-calcareous silty clays.

The pollen was somewhat corroded, but certainly no worse than in typical riverine alluvial sediments. Most of the pollen was clearly identifiable, and this included many species of which the pollen or spores are known to deteriorate quite readily, such as Cyperaceae or *Sphagnum*. All the samples contained abundant wood ash. The preliminary counts are low (about 200 grains per sample) and are expressed as percentages of total pollen and spores.

TABLE 8 : POLLEN

	Depth Below Saltmarsh Surface		
	1.60 m	*1.50 m*	*1.25 m*
Betula	0.7		
Pinus sylvestris	1.4	0.6	1.7
Quercus	1.4	1.9	3.3
Alnus	2.1	0.6	2.5
Total Tree Pollen	5.6	3.1	7.5
Corylus avellana		1.2	2.5
Salix			1.7
Total Shrub		1.2	4.2
Gramineae	23.6	21.7	20.0
Cereal-type	2.8	4.3	0.8
Cyperaceae	2.1	3.1	7.5
Chenopodiaceae	9.0	4.3	9.2
Compositae: Liguliflorae	8.3	13.0	4.2
Artemisia	0.7		
Aster-type	0.7	1.9	5.0
Cruciferae	0.7	2.5	20.0
Lamium-type		0.6	0.8
Lotus-type	0.7	0.6	
Plantago coronopus		1.2	
Plantago lanceolata	24.3	19.9	1.7
Ranunculus acris type		0.6	0.8
Filipendula	4.9	11.0	
Potentilla		0.6	
Rubiaceae			0.8
Rumex		0.6	
Umbelliferae		0.6	
Urtica		0.6	
Total herb	77.8	87.0	70.8

[71] Allen and Fulford, op. cit. (note 1), Feature B1.

TABLE 8 : POLLEN (CONTD)

	Depth Below Saltmarsh Surface *1.60 m*	*1.50 m*	*1.25 m*
Potamogeton	0.7		0.8
Total aquatic	0.7		0.8
Dryopteris			0.8
Polypodium	2.1	1.9	1.7
Pteridium	9.7	5.0	7.5
Filicales undiff.	3.5	1.2	5.0
Sphagnum	0.7	0.6	1.7
Total spore	16.0	8.7	16.7

The samples reflect a largely open landscape, with herb pollen contributing more than 70 per cent of the total in all samples. The source of the pollen influences the interpretation and it is assumed that the bulk is local, but a small percentage will have been blown in from adjacent habitats or have been eroded into the Severn catchment and been deposited within the silt. If this is the case, then the site has been a non-saline, non-calcareous, pasture with Gramineae, Compositae : Liguliflorae, Cruciferae, and *Plantago lanceolata* throughout the period investigated, these together forming more than 50 per cent of the total pollen plus spores. Pollen of Chenopodiaceae could derive from nearby salt-marshes or from weeds as a result of arable disturbance on or close to the site. The presence of cereal pollen suggests cultivation nearby. The three horizons sampled differ in minor details, and it is difficult to assess how much significance to attach to these.

Pollen of *Plantago lanceolata* is particularly abundant in the lowest sample. In the lower horizon of the buried soil (at 1.50 m), Cereal-type, Compositae: Liguliflorae and *Filipendula* peak, and pollen of probable weeds of agriculture such as *Rumex*, Umbelliferae and *Urtica* appear. In the upper horizon, pollen frequencies of trees and shrubs, Cyperaceae, Chenopodiaceae, *Aster*-type and Cruciferae all peak. What species the pollen of Cruciferae represent could only be ascertained by macrofossil analysis, but the implications are that the soils were still being disturbed locally, and this might account for the concomitant decline in pasture species such as Compositae : Liguliflorae and *Plantago lanceolata*.

The spores are all assumed to have blown in, but ferns might have been growing along hedgerows or ditches and thus have been comparatively local. The rather high frequencies of bracken spores (*Pteridium aquilinum*) also suggest that it was growing nearby.

In summary, the pollen assemblage from the upper fill of Ditch B4 suggests the local environment supported pasture with any cultivation probably some distance away. During the phase represented by the lower horizon of the palaeosol, there is evidence for more disturbance and arable farming, though the site still supported pasture. After this phase, there appears to have been a decline in pasture and more disturbance, though not necessarily arable in nature. This could possibly be accounted for by flooding.

PLANT MACROFOSSILS *By* M. Robinson

A sample of 5 kg of grey organic clay from the bottom of the well B3 was sieved down to 0.2 mm and the residues examined for biological remains. These proved to be sparse, but sufficient waterlogged seeds were present for more detailed investigation. The results from the analysis of 2.5 kg of the sample are given in Tables 9 and 10. Insect remains were extracted from the full 5 kg sample but even so, there were insufficient for detailed interpretation.

Over 90 per cent of the seeds were from plants which can belong to either of two communities: upper salt-marsh/transitional grassland or annual weeds of damp nutrient-rich disturbed ground. The only obligate halophyte amongst the plants from the site was *Juncus gerardii* (salt-marsh rush). The other possible saltmarsh plants, such as *Eleocharis S. Palustres* sp. (spike rush) and *Potentilla anserina* (silver weed) can also occur in a variety of non-brackish marsh and grassland habitats. A full salt-marsh vegetation,[72] which occurs below the level of high spring tides, was absent. *J. gerardii* itself occurs in salt-marshes from just below the high-water mark of spring tides upwards and can be locally dominant in communities.[73] Its seeds are minute and prolifically produced. It is likely that the seeds would become dispersed in quantity and over a wider area than the other seeds listed in Table 9. Most, if not all, the annual weeds from the site, such as *Atriplex* sp. (orache) can tolerate somewhat saline conditions. *Ranunculus sardous* (hairy buttercup) is most common near the coast but also occurs in inland localities.[74] However, they do not comprise a flora of the muddy margin of a salt-water creek or high strand line debris. The most numerous annual weed-seeds were *Chenopodium ficifolium* (fig-leaved goosefoot) and, while several members of this genus occur in just such saline habitats, *C. ficifolium* is not one of them.

The regime of the site seems to have been primarily non-brackish. The annual weed-seeds are likely to have had a more local origin than the rush-seeds and therefore give the best indication of conditions around the top of the well. The rush-seeds could have been derived from more distant salt-marshes, either windblown or brought in as fodder, or *J. gerardii* could have persisted following the reclamation of the land. It does not require inundation by the sea for its survival.

The upper salt-marsh/transitional terrestrial vegetation is likely to have comprised *Potentilla anserina* (silverweed) and various grasses on the drier areas grading into stands of *J. gerardii* (salt-marsh rush) where the soil was brackish and *Carex* spp. (sedges) where there was non-saline waterlogging. Such vegetation perhaps shows some similarities to the *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland (MG11) of the National Vegetation Classification.[75] *J. gerardii* occurs in this community under maritime conditions. It is frequently used as pasture and indeed the insect remains from the well include species of scarab dung beetles from the genus *Aphodius* which favour the droppings of large herbivores on grassland.

The most numerous annual weed seeds were from *Ranunculus sardous* (hairy buttercup), *Chenopodium ficifolium* (fig-leaved goosefoot) and *Atriplex* op. (orache), with *Sonchus asper* (sow-thistle) also well represented. Together, they comprise a Polygono-Chenopodietalia community;[76] weeds of spring-sown arable and nitrogen-rich disturbed ground, for example around settlements. The only potential crop remain was a single damaged seed of *Linum usitatissimum* (flax), so it seems more likely that the seeds were from weeds growing on the site rather than the results of crop processing. Some of the beetles, including *Cryptopleurum minutum* and *Megasturnum obscurum,* live in various other categories of foul organic material as well as the droppings of domestic animals in pasture. An accumulation of dung or refuse and disturbance of the ground in the vicinity of the well would provide a suitable nutrient-rich habitat for the weeds.

[72] A.G. Tansley, *The British Islands and their Vegetation* (4th edn, 1965), 821–4.
[73] A.R. Clapham, T.G. Tutin, and D.M. Moore, *Flora of the British Isles* (3rd edn, 1987), 545–6.
[74] ibid., 42.
[75] J.S. Rodwell, *British Plant Communities. Final Report of the National Vegetation Classification*, forthcoming.
[76] A.J. Silverside, *A Phytosociological Survey of British Arable-weed and Related Communities*, unpub. Ph.D., Durham, 1977.

There was a little evidence for other habitats. The *Plantago major* would have been favoured by trampling of moist ground around the top of the well. A *Rosa* or *Rubus* (rose or blackberry) prickle and stones of *Crataegus* sp. (hawthorn) and *Cornus sanguinea* (dogwood) could have been derived from scrub or hedges. The flax seed and a shell of *Corylus avellana* (hazel) were perhaps food remains; it would probably have been possible to grow flax on the reclaimed land. Finally, the charcoal suggests that *Quercus* sp. (oak) wood was brought to the site as fuel.

In conclusion, the vegetation of the site seems to have been damp pasture which, although showing maritime influence, was not full salt-marsh. Nutrient-rich disturbed ground was also present, perhaps locally around the well and any building. Conditions on the site were perhaps similar to those around the early first millenium A.D. settlement at Feddersen Wierde on the NW German coast.[77] On this site, dung was found from domestic animals which had grazed on grassland containing *Juncus gerardii*, *Eleocharis S. Palustres* sp., and *Potentilla anserina*. Such vegetation in the region is only occasionally reached by storm floods. In places, this land was cultivated and the crops grown included flax.

TABLE 9 : WATERLOGGED SEEDS

Ranunculus cf. *repens* L.	Creeping Buttercup	1
R. sardous Crantz	Hairy Buttercup	105
R. sceleratus L.	Celery-Leaved Crowfoot	1
Chenopodium ficifolium Sm.	Fig-Leaved Goosefoot	239
Atriplex sp.	Orache	102
Chenopodiaceae indet.		14
Linum usitatissimum L.	Flax	1
Potentilla anserina L.	Silverweed	21
Crataegus sp.	Hawthorn	1
Cornus sanguinea L.	Dogwood	1
Hydrocotyle vulgaris L.	Marsh Pennywort	1
Polygonum aviculare agg	Knotgrass	1
Rumex sp.	Dock	3
Urtica dioica L.	Stinging Nettle	2
Corylus avellana L.	Hazel	1
Hyoscyamus niger L.	Henbane	1
Mentha sp.	Mint	1
Lamium sp.	Dead-nettle	6
Plantago major L.	Great Plantain	17
Senecio sp.	Ragwort	1
Carduus sp.	Thistle	18
Sonchus asper (L.) Hill	Sow-thistle	33
Juncus gerardii Lois.	Saltmarsh Rush	478
Juncus sp.	Rush	31
Eleocharis S. Palustres sp.	Spike Rush	8
Carex spp.	Sedge	40
Cyperaceae indet.	Sedge etc.	3
Gramineae indet.	Grass	157
Ignota		2
Total		1290

[77] U. Körber-Grohne, *Geobotanische Untersuchungen auf der Feddersen Wierde*, Band 1 (1967).

TABLE 10 : OTHER PLANT REMAINS

Gramineae indet.	Grass	Charred seed	1
Quercus sp.	Oak	Charcoal	frags.
Rosa or *Rubus* sp.	Rose or blackberry	Prickle	1
Trifolium sp.	Clover	Flower	1

CHARCOAL AND WOOD *By* Rowena Gale

Thirty two samples of waterlogged wood and charcoal were examined. The structural condition of the waterlogged wood was very degraded, and, in some cases, compressed. In some samples, insufficient diagnostic features were present for identification. The charcoal was generally very well preserved, although the structure of some fragments was contaminated with extraneous material.

The sections of waterlogged wood were taken in the transverse, radial longitudinal, and tangential longitudinal planes, and mounted in glycerol on microscope slides. These were examined using a transmitting-light microscope at magnification up to × 400. The charcoal was fractured to expose clean, flat surfaces in similar orientations and mounted in sand. The charcoal fragments were examined using an incident-light microscope. The samples were compared to authenticated reference material and identified as follows:

TABLE 11 : WOOD AND CHARCOAL

Context	*Material*	*Identification*	*Comments*
A5 (1)	wood	*Alnus* sp., alder	1 frag., R/W diam. *c.* 6 cm
A5 (2)	wood	?*Crataegus* sp., hawthorn, *Malus* sp., apple, *Pyrus* sp., pear, *Sorbus* sp. rowan, whitebeam and service tree (closely related genera, anatomically very similar).	1 frag., R/W
A5 (3)	wood	*Alnus* sp., alder	1 frag., R/W diam. *c.* 2.5 cm.
A8	wood	*Ulmus* sp., elm	1 frag.
B1	wood	?*Alnus* sp., alder/*Corylus* sp., hazel	1 frag., R/W, compressed
B1	wood	*Corylus* sp., hazel	2 frags, R/W, A/R 5+
B1	wood	*Corylus* sp., hazel	1 frag.
B1	wood	unidentified	1 frag.
B3 (2)	wood	Bark, unidentified.	Cork cells and cortical cells with groups of fibres.
B3 (2)	charcoal	*Quercus* sp., oak	several frags
C1 (3)	charcoal	*Prunus* sp., blackthorn, wild cherry or bird cherry	4 frags, R/W, diam. 3 cm, A/R 11+
C1 (5)	charcoal	*Corylus* sp., hazel	4 frags, R/W
		Ulex sp., gorse	1 frag., R/W
C1 (6)	wood	Unidentified	Thin sliver of wood attached to clay.
C1 (6)	charcoal	*Euonymus* sp., spindle	3 frags, R/W
C1 (6)	charcoal	*Ulex* sp., gorse	1 frag., stem diameter 0.6 mm.
C1 (6)	wood	*Alnus* sp., alder	1 frag.
C4 (1)	charcoal	*Alnus* sp., alder	1 frag., R/W
C4 (1)	wood	? herbaceous dicotyledon	Small frag., ?stem, very collapsed, compressed with little structure.
C4 (2)	wood	*Quercus* sp., oak	1 frag., R/W diam. *c.* 3 cm, A/R 11
C4 (2)	wood	?*Salix* sp., willow/*Populus* sp., poplar	1 frag.
C4 (2)	wood	? *Acer* sp., maple	4 frags, R/W diam *c.* 2 cm

R/W = roundwood; A/R = annual growth rings

The majority of the species from the Roman contexts of Sites B and C are likely to have grown locally on the reclaimed wetland; only the oak and the spindle might have been sought from further afield. Spindle is normally associated with calcareous soils such as the Carboniferous Limestone of South Wales, and another example has also been identified further up river in association with the Romano-British villa and iron-making site at Woolaston, Glos.[78]

DISCUSSION

Although the principal objectives of the project were the further investigation of the Romano-British settlement at Rumney Great Wharf and an extensive survey of field-ditches where they were exposed, either on the clay-peat shelf or in the mud cliff, some evidence of earlier activity also emerged. We would note the Neolithic arrowhead, presumably residual in Ditch C1, and the evidence for the early-to-mid Iron Age filling of the head of the palaeochannel (C4) which forms the northern limit to the Romano-British settlement. Otherwise the earliest evidence derived from our fieldwork concerns that for the Romano-British settlement and its associated ditch-systems.

THE ROMANO-BRITISH SETTLEMENT

Ditches and other features from which Romano-British pottery and other datable material were recovered extend over some 130 m of the present mud cliff. Features to the south contained rather little material and a radiocarbon date was helpful in confirming the most southerly feature (B1) as Romano-British; only C1, at the northern end of the site, contained large quantities of pottery, bone, and other material. With the exception of the latter ditch, the impression gained is that what still survives preserved beneath the Rumney Formation represents the outer (and inland) limits of a settlement which has otherwise largely been lost to the sea.[79] Although the mud cliff offers a very poor opportunity for identifying small features in plan, the pit and the well (B1, B3) represent the only features which are not certainly ditches. At the same time, ditches recorded in 1992 or earlier, such as our B4 which has been observed for almost a decade, are no longer discernible in the mud cliff, presumably because they have been completely eroded away. Moreover, to reinforce the view that what we have recorded represents the margins of settlement, only one of the features reported here or in 1986 (the palaeochannel, C4) has produced iron-making slag; yet the latter is by far the most abundant material to be found on the foreshore. A further indicator is provided by the suggestion that the ditches had been used to dump young-animal mortalities which had also been available to scavenging dogs for some time before being sealed by ditch silts. Such practice could be regarded as more likely at the periphery, rather than at the centre, of a settlement.

There can be no question of the contemporaneity of the Romano-British material and the filling of the ditches; although variable in size, the pottery from all the features where it was found exhibited fresh fractures and unweathered surfaces, often with traces of sooting attached. Similar characteristics, such as the presence of sooting on stone, or the completeness of animal bone, were associated with other categories of material. The large assemblage from Ditch C1 is particularly important for the quality of its preservation, while, at the same time,

[78] I. Figueiral, *Britannia* xxiii (1992), 189–90.

[79] Allen and Fulford, op. cit. (note 1), 112.

the size of the pottery assemblage allows a reasonable measure of precision over the date of infill, *c.* 250–300. Elsewhere the quantities and potential dating limits of the pottery point to a more general date range for the infilling of features between the mid-third and the mid-fourth century.[80] While no pottery which need be later than the mid-fourth century has been recovered from ditches or the foreshore, the quantity of samian of Antonine to early third-century date, and the second-century mortarium might suggest a start for the settlement in the later second or early third century, but samian is notorious for the regularity with which it occurs residually in late Roman assemblages.

The study of the environmental evidence and the animal bones allows us to reconstruct a fuller picture of the economy of the settlement than was previously possible.[81] While the local evidence of the seeds from the well B3 confirms an absence of a full salt-marsh vegetation, it does suggest an environment of damp pasture. A potential difficulty is posed by the presence of numerous seeds of the salt-marsh rush, *Juncus gerardii*, but this is the only obligate halophyte in the whole assemblage, and no other was recorded from among the pollen. However, it could be a survivor of the pre-reclamation salt-marsh, as, once established, it does not require a saline environment in order to grow, and would only slowly have been displaced by other vegetation. Alternatively, given their small size and abundance, the seeds may have been wind-blown on to the settlement, or the rush may have been brought in as fodder for animals. Besides rich pasture for grazing, there is evidence for the arable cultivation of the wetland, but it is not unambiguous. Although the seeds of weeds associated with spring-sown arable are present, these are also typical of nitrogen-rich disturbed ground, such as one might expect to find around a settlement. The only potential macroscopic crop remain was a single seed of flax. However, the evidence of the pollen for the wider landscape suggests that cereal cultivation was more important than the seeds from B3 would indicate. Nevertheless, while it is difficult to define the catchment area of the pollen, the latter does point to an open and predominantly pastoral landscape with some cereals and weeds associated with arable, an environment which is consistent with the way a newly reclaimed wetland might have been exploited.

The evidence of the animal bones is particularly helpful in reconstructing the exploitation of the pasture. The presence of both lambs and calves is strongly indicative of both sheep and cattle husbandry, while the raising of horse is supported by the high proportion of their bone. The lush grasses of the reclaimed wetland provide an ideal environment for the raising of horse; indeed it has been speculated that the provision of horses to the Roman army was a powerful reason behind the initiation of the reclamation of the Wentlooge Level.[82]

Apart from four small pieces from the upper filling of the palaeochannel C4, the 1992 excavation provided no obvious context for the iron-making slag which is so abundant on the beach. Nevertheless, the overall association with Romano-British pottery argues for a Roman date for this activity; moreover a TL date of 2075 BP for a piece of furnace lining is also consistent with a Roman date for iron-making.[83] Unfortunately, we have no easy way of estimating the scale of iron-making at Rumney, but the total quantities of slag can be estimated in tonnes, rather than tens of tonnes. As elsewhere along the wetlands of the Estuary,[84] iron-

[80] Allen and Fulford, op. cit. (note 1), 102–6.
[81] ibid., 112–13.
[82] ibid., 114–16.
[83] ibid., 107.
[84] Allen and Fulford, op. cit. (notes 36 and 38); J.R.L. Allen and M.G. Fulford, *Antiq. Journ.* lxx (1990), 288–326; *Trans. Bristol and Glos. Arch. Soc.* cviii (1990), 17–33.

making can be considered as one component of a diverse subsistence strategy, exploiting a particular opportunity, and need, that is associated with the late Roman, but not the medieval period.

The success of this diverse economic regime at Rumney can, perhaps, be seen in the evidence of the pottery, the most abundant artefact from the site. It is difficult to explain the overwhelming predominance of Dorset BB 1 unless it was imported direct across the Estuary from north Somerset.[85] Certainly its comparative rarity in Cornwall and the Isles of Scilly argues against direct shipment from the south coast. Had the BB 1 arrived at Rumney from an intermediate source on the Welsh side, perhaps via the fort at Cardiff, we might have expected the relationship with the local wares to have been reversed. Given the incidence of decorated sherds, which compare closely with material found on settlements in south-east Glamorgan as well as with probable products from the Llanedeyrn kilns, it would seem that the emphasis of Rumney's links with South Wales lie westwards towards the Rhymney, Cardiff, and South Glamorgan, rather than eastwards towards the Usk, Caldicot and Caerwent. Only the sherds of Oxfordshire Ware and the possibility of an origin for the iron ore in the Forest of Dean rather than the south-eastern margin of the South Wales coalfield[86] argue for links up the Estuary as well as across it to north Somerset.

Despite the diversity of the economy of the settlement and its local and regional links, there is little evidence of wealth. The absence of building materials (either stratified in the ditches or loose on the foreshore), such as mortared stone or brick and tile, combined with the presence of quantities of burnt clay or daub suggest timber-framed buildings with wattle and daub infill and thatched roofs. Apart from the pottery (which itself contained very little fine ware), the site has yielded very few coins or other artefacts such as personal ornaments or tools. Indeed the 1992 excavation only yielded stratified finds of one glass bead and one fragment of window glass. The lack of finds other than pottery and bone, and the correlative narrow range of material culture, are very reminiscent of the assemblage derived from the channel at Oldbury, Avon.[87] One other possible indicator of the comparative poverty of the site is, perhaps, signalled by the small size of animals present.

THE ABANDONMENT OF THE SETTLEMENT

The evidence from all the features of Romano-British date is that they filled with Wentlooge sediment and that they were sealed by a further horizon which we have described as a fossil soil.[88] Although there is no material certainly later than about the mid-fourth century from the ditches or the foreshore, pottery unequivocally dating after 350 is rare in SE Wales.[89] Thus the possibility of continuing, but aceramic occupation into the fifth century cannot be ruled out.

At the Roman site the Wentlooge palaeosol can clearly be seen to consist of two parts: the upper, pale blue/grey horizon (0.15–0.30 m thick) contains numerous fine rootlets, while the lower brown/grey horizon (0.2–0.4 m thick) contains fewer, but larger rootlets along with frequent, small abraded pieces of burnt clay, pottery, bone and stone as well as occasional flecks of charcoal. The palaeosol was sectioned in two places in the 1992 season (FIG. 6): Ditch C1 cut through the darker, lower horizon (8), but was sealed by the lighter, upper horizon (2); Ditch B2 appeared to be sealed by both the lower and upper horizon. The latter

[85] Allen and Fulford, op. cit. (note 38), 282–4, fig. 20.
[86] Allen and Fulford, op. cit. (note 1), 101.
[87] Allen and Fulford, op. cit. (note 36).
[88] Allen, op. cit. (note 6); Allen and Fulford, op. cit. (note 1), 95.
[89] D.M. Robinson, in Robinson, op. cit. (note 44), vii–xxiv; Rippon, op. cit. (note 3), 283–4.

could be further subdivided: the upper component (1) being light blue/grey, with some brown mottling below. The lower, darker horizon (2) could confidently be identified as a buried soil, but there was insufficient material to make a quantitative molluscan analysis, though the meadowland snail *Cepaea nemoralis* was recovered from here, as well as from several of the Roman ditches and the little creek or palaeochannel C5. The upper, paler horizon without charcoal and Roman artefacts is more suggestive as representing a very brief episode of inundation. This is supported by the pollen analysis which shows a slight decline in the species indicative of pasture, and an increase in Chenopodiaceae.

THE ROMANO-BRITISH SETTLEMENT AND THE WENTLOOGE LEVEL

The question of the relationship of the Romano-British ditches with the system of ditches behind the sea-bank is crucial for determining the extent of Romano-British reclamation across the Wentlooge Level. Our findings have certainly strengthened the case for a Romano-British initiation of reclamation and there can be no doubt that the ditches and other features of Sites B and C relate to a ground surface which equates with the Wentlooge palaeosol and the present ground surface inside the sea defences. The case for a Romano-British ground surface some 1.5 m below the Wentlooge surface as argued by Parkhouse and Parry, and thus for substantial post-Roman inundation, can be dismissed.[90]

Our next requirement is to link the evidence from the artefact-rich contexts associated with settlement to the artefact-free and, generally, undateable contexts of the wider landscape in order to consider the extent of primary reclamation. The problem can be summarised in this way: by their very nature the ditches with Romano-British material in fresh condition are those that were not selected for recutting; by the same token ditches recut over many generations will not contain Romano-British material in fresh condition. It is not surprising to find a large number of ditches, showing no sign of recutting associated with an abandoned settlement. These will have been superfluous to the need to keep the wider landscape drained; as the ditches are intricately interconnected, some sections could locally have been sacrificed. We have also seen to the north and south of the settlement, that there is a very sharp drop-off in artefacts with distance from it. Nevertheless we can show that some of our filled ditches do share the same orientation as the ditches beyond the sea-bank. Here it is helpful to summarise the evidence from the extensive survey along with that from the areas of the excavation.

Firstly, while none of the ditches from Sites B and C with Romano-British material exceeded 1.1 m in depth below the palaeosol, or cut into the clay-peat shelf, it is possible to make a strong case for C3 representing a continuation of A26 which can be traced across the clay-peat shelf. Ditch C3/A26 is sealed by the palaeosol, but it does turn to share the same trend of alignment as Ditches A27–A29 which are filled with the Rumney Formation, and thus were active at the time the sea defences were repositioned. A27 also shares the same alignment as one ditch behind the sea bank. Besides orientation connecting C3/A26 with a larger group of adjacent ditches, so too does the fact that, like all the features of Roman date from Sites B and C, it is sealed by the Wentlooge palaeosol. This thereby links it stratigraphically with Ditches A5, A7, and A10 beyond the excavation area to the south (FIG. 3B). Like A26, the latter group is also traceable on the clay-peat shelf. In the case of C1, while it does not itself align with a reen beyond the sea-bank, it does share the same orientation as A25 and A26a, the former also visible on the clay-peat shelf. Although in the context of a developing settlement, it might be inappropriate to expect regularities in the layout of ditches and enclosures, it is possible to

[90] Parkhouse and Parry, op. cit. (note 12).

argue for two phases of ditches at the settlement site on the basis of the trends in their orientation as derived from the short lengths excavated. One, comprising C2, C3/A26, B2, B4, and B5, has a north-east/south-west orientation; the other, consisting of C1, A25, and A26a, is oriented on the cardinal points. While the archaeological evidence does not allow us to distinguish between the dates of infill of any of these ditches, the fact that A25 and A26a are aligned with extant reens beyond the sea-bank suggests that these belong to a secondary phase.

The combination of stratigraphic evidence, the associations with freshly discarded Romano-British material, and shared orientation allow us to reach out tentatively to the wider Wentlooge Level and to see the evidence of the ditches at the settlement site in their landscape context (FIG. 2). In this way we have tentatively linked A5, A7 and A10 to the Roman settlement. The characteristics of these ditches and their orientation are typical of those visible in the intertidal zone and in the central Wentlooge Level. The latter, with its distinctive system of long, rectangular fields, represents a unique landscape in the context of all the wetlands of the Severn Estuary. At the southern end of our survey area, with the possible exceptions of A8 and A14, the ditches that we surveyed, and which share a common orientation, do not have corresponding partners behind the sea bank. Indeed the pattern of small irregular fields is distinctly different from that of the central part of the Level. Here it is tempting to see a re-ordering of the landscape, perhaps in the aftermath of localised inundation. Although this hypothesis remains to be tested, it suggests, *a priori*, an earlier date for the system of rectangular fields. Interestingly, test pitting by the Glamorgan-Gwent Archaeological Trust to evaluate a possible location for an alternative bird-feeding site inside the sea bank at the southern end of the area of the extensive survey, revealed the existence of ditches of unknown date and orientation sealed beneath up to about 1.0 m of alluvium.[91]

While the three ditches (A5, A7, A10) are related by the fact that they are filled and sealed with the Wentlooge Formation, we can also point to the group of Ditches A27–A29 which share a different orientation, but which are linked to the Roman settlement through C3/A26 where we have already argued for two possible phases of ditches. The difference in orientation of blocks of ditches draws our attention to the variety of shared orientations among the ditches recorded during the extensive surveys (FIG. 3B). Possible explanations for the patterning may be sought in the different customs of individual landholders, or with different phases of reclamation; land only being claimed periodically when it was required. Such an interpretation should not be seen to conflict with the idea of an over-arching plan for the reclamation of the Level as a whole.[92] Thus the combination of detailed survey and excavation within a limited area of settlement (Sites B and C), and the results of the more extensive survey, allow us to both strengthen our claim for the Roman origin of the Wentlooge Level, and also frame an hypothesis for the manner of its drainage.

ACKNOWLEDGEMENTS

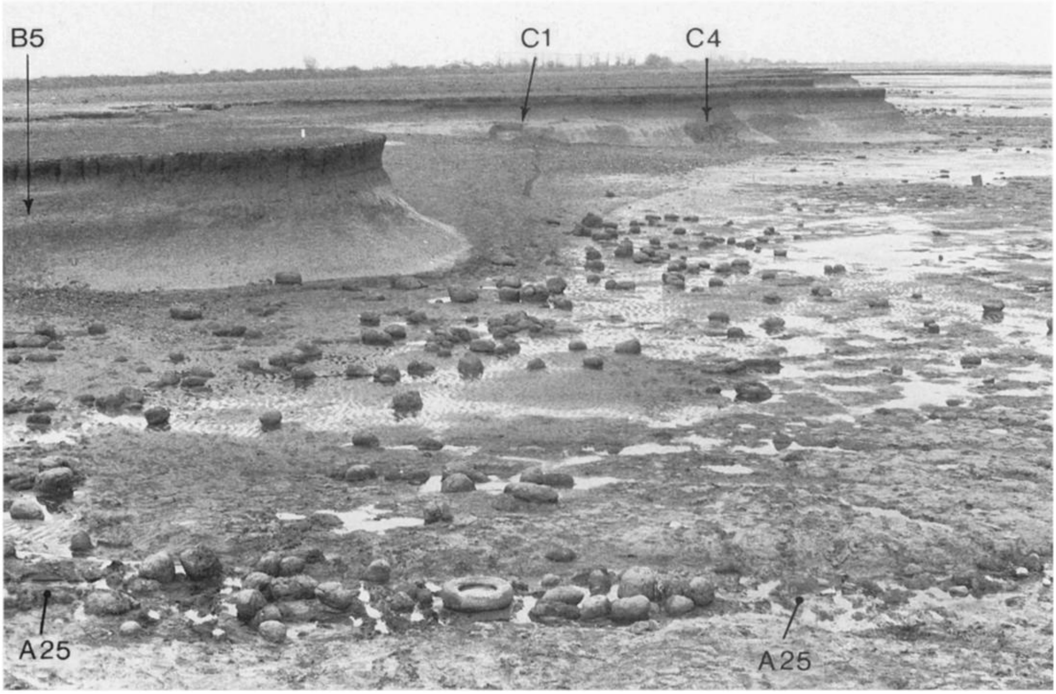
We wish to thank all the students who participated in the fieldwork under very difficult conditions, and Margaret Mathews who assisted with the surveying, particularly the extensive survey. The project was grant-aided by Cadw and the National Museum of Wales and we would wish to record our thanks to these organisations, as well as Dr Stephen Aldhouse-Green, Edward Besly and Richard Brewer of the National Museum of Wales, and Richard Turner of Cadw for their help in setting up the project and seeing it through to completion. We would also thank Mr Richard Jones of the Countryside Commission for

[91] e.g. Trial pits 111 and 105, ibid., 30–2; 53–4.
[92] Allen and Fulford, op. cit. (note 1), 113–16.

Wales, Mr Colin Green of the National Rivers Authority in Monmouth, and Mr Nigel Nayling of the Glamorgan-Gwent Archaeological Trust for their help and advice in the field. We are very grateful to Lynne and Tony Samuel for accommodating us and our mud at Woolaston Grange. We thank Brian Williams who contributed FIGS 8 and 9. The finds and archive will be deposited with the National Museum of Wales, Cardiff.

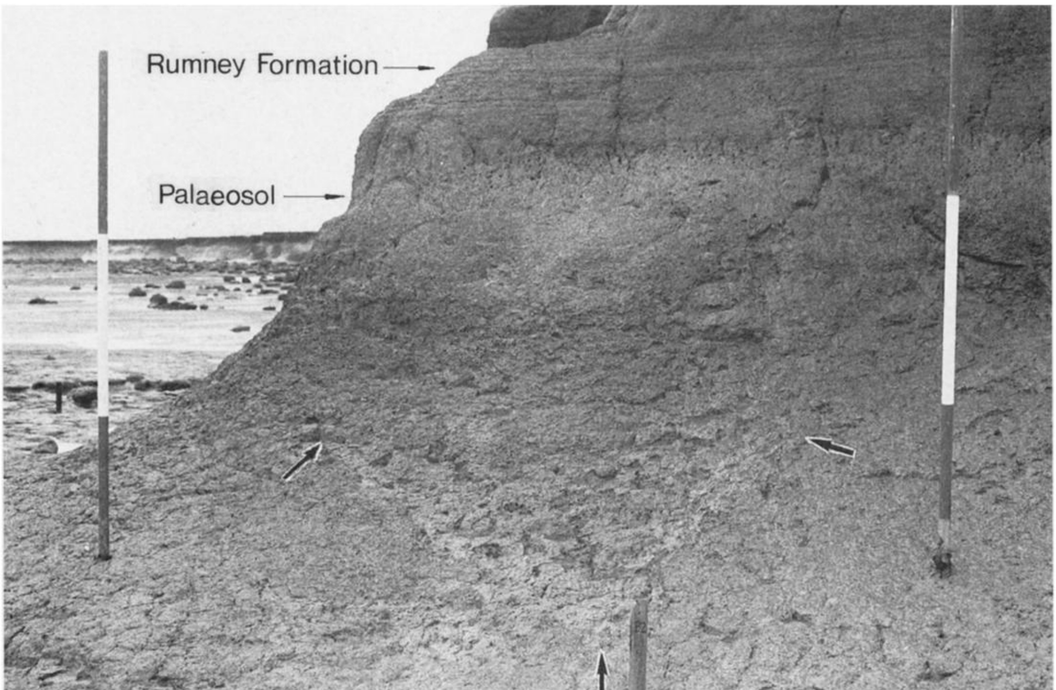
Department of Archaeology, University of Reading

This paper is published with the aid of a grant from Cadw



(*Photo: authors*)

A. Rumney Great Wharf 1992: the general setting; view north across peat-clay shelf from Site B towards Site C. (p. 181)

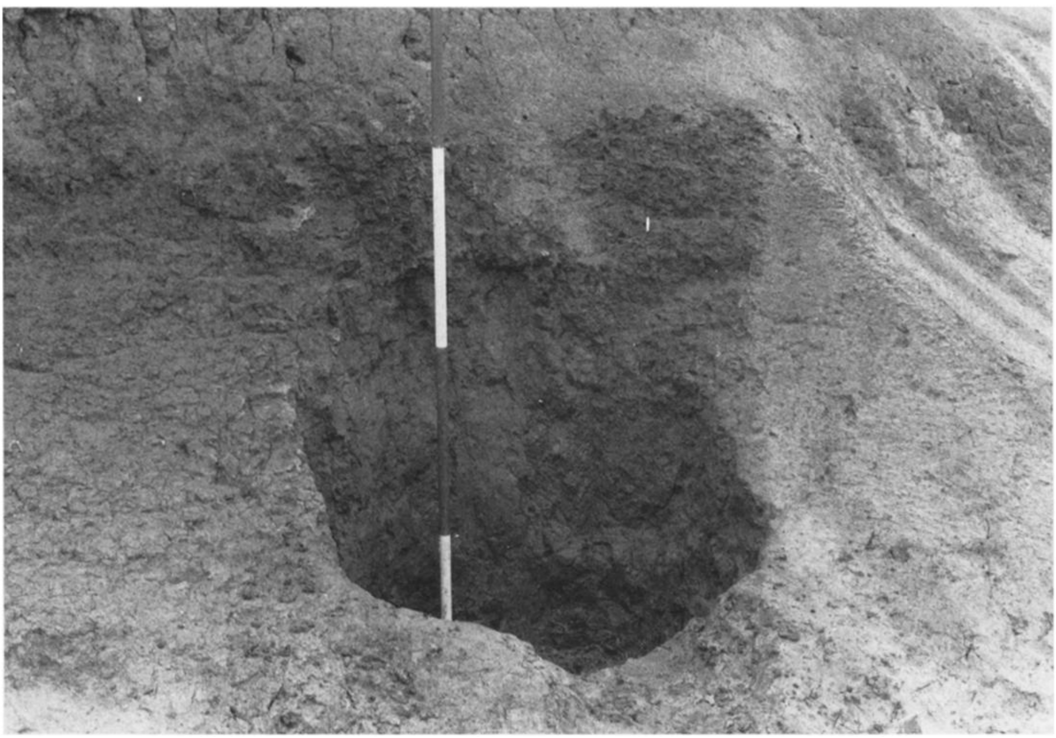


(*Photo: authors*)

B. Rumney Great Wharf 1992: shore-parallel Ditch B2; view to south before excavation; arrows indicate the edge of the ditch. (p. 187)

(*Photo: authors*)

A. Rumney Great Wharf 1992: excavated section of Ditch C1. (p. 181)



(*Photo: authors*)

B. Rumney Great Wharf 1992: the well B3 in course of excavation. (p. 187)

LINKED CITATIONS

You have printed the following article:

The Settlement and Drainage of the Wentlooge Level, Gwent: Excavation and Survey at Rumney Great Wharf 1992
M. G. Fulford; J. R. L. Allen; S. J. Rippon; J. P. Wild; S. H. R. Aldhouse-Green; S. Hamilton-Dyer; M. Keith-Lucas; M. Robinson; Rowena Gale
Britannia, Vol. 25. (1994), pp. 175-211.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281994%2925%3C175%3ATSADOT%3E2.0.CO%3B2-Y

[Footnotes]

[1] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[4] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[5] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

NOTE: *The reference numbering from the original has been maintained in this citation list.*

LINKED CITATIONS

[9] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[11] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[14] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[15] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[16] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[17] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

NOTE: *The reference numbering from the original has been maintained in this citation list.*

LINKED CITATIONS

[18] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[20] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[24] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[26] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[28] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[30] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

NOTE: *The reference numbering from the original has been maintained in this citation list.*

LINKED CITATIONS

[34] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[48] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[50] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[51] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[58] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[71] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

NOTE: *The reference numbering from the original has been maintained in this citation list.*

LINKED CITATIONS

[78] **Iron-Making at the Chesters Villa, Woolaston, Gloucestershire: Survey and Excavation 1987-91**
M. G. Fulford; J. R. L. Allen; C. Gaffney; J. Gater; George C. Boon; Isabel Figueiral
Britannia, Vol. 23. (1992), pp. 159-215.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281992%2923%3C159%3AIATCVW%3E2.0.CO%3B2-3

[79] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[80] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[81] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[82] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[83] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

NOTE: *The reference numbering from the original has been maintained in this citation list.*

LINKED CITATIONS

[86] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[88] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X

[92] **The Wentlooge Level: A Romano-British Saltmarsh Reclamation in Southeast Wales**
J. R. L. Allen; M. G. Fulford
Britannia, Vol. 17. (1986), pp. 91-117.
Stable URL:
http://links.jstor.org/sici?sici=0068-113X%281986%2917%3C91%3ATWLARS%3E2.0.CO%3B2-X