

# A LATE FLANDRIAN TIDAL PALAEOCHANNEL AT HILLS FLATS ON THE AVON-GLOUCESTERSHIRE BORDER

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The rocky and wetland shores of the inner Bristol Channel and Severn Estuary appear to have experienced a significant erosional retreat over the last few millennia, under the impact of a continuing upward movement of relative sea level (Allen 1990). One consequence of this retreat is the exposure, in the modern intertidal zone, of extensive tracts of the Flandrian Wentlooge Formation (Allen and Rae 1987) and of the polygenetic bedrock surface it overlies (Allen 1987a). Networks of silted-up palaeochannels, testifying to the former presence of tidal wetlands with dendritic patterns of channels, creeks and gullies, are a ubiquitous feature of these exposures. Some of the channels have been the focus of human activity, and a few may have served as important gateways to the hinterland, especially for the purpose of trade by way of the estuary. Palaeochannels comparing in size with today's tidal pills, such as Berkeley Pill, Cone Pill, Cake Pill and Goldcliff Pill, have been recorded at Rumney Great Wharf (Fulford *et al.* 1994), Goldcliff (Bell 1993), and at Oldbury Flats (Allen and Fulford 1992), where the fill includes fresh Romano-British occupation debris. One is also reminded of the medieval quay at Woolaston (Fulford *et al.* 1992), lying beside a still-active pill, but well out in the modern intertidal zone, and the abandoned harbour works of Colhuw off a largely rocky coast at Llantwit Major (Davies and Williams 1991). Another major palaeochannel preserving evidence for human activities has recently been discovered at Hills Flats in the middle Severn Estuary on the Avon-Gloucestershire border.

Hills Flats (NGR SO 6297, 6397,

6398) is an extensive intertidal platform (Figure 11) situated on the left bank of the Severn Estuary between the Oldbury-on-Severn and Berkeley nuclear power stations (Figure 1). Its elevation ranges from about Ordnance Datum to a metre or two above, that is, about mid-tide level in today's terms. The outer part of the platform is underlain by red mudrocks of Triassic age, over large areas thinly concealed by stony mud and fields of active gravel dunes. The inner portion, extending up to the ragged cliff marking the edge of the surviving salt marshes, is underlain by the green silts and peats, which give rise on erosion to extensive ledges, of the middle Wentlooge Formation. We traced the palaeochannel for approximately 350m across the shore, from the edge of the marsh to the outer rim of the intertidal platform (Figure 11). For the first 50m or so outward from the marsh, its position is marked by discontinuous spreads of gravel trapped at a slight depression caused by the greater resistance to erosion of the peat, now exposed as an extensive ledge, cut by the palaeochannel. Over the next 100m or so, the lie of the palaeochannel is indicated by a few gravel patches but chiefly by low, elongated mounds, several of which are armoured by weed-covered stone blocks (see below) released by erosion from the channel-fill. On the outer part of the platform, the palaeochannel, cutting down into the bedrock, lies concealed at a shallow depth beneath a field of mobile gravel dunes, and can be proved only by digging. Its position is clear on air photographs, however, as an irregular line of perturbations in the crests and troughs of the gravel dunes that cross it (Figure 11).

The palaeochannel is 10-25m wide



Figure 11. Air photograph (area 525-800m) showing the intertidal zone and immediate alluvial hinterland in the vicinity of the mouth of Hill Pill. D - drain bottom; DF - field of gravel dunes; M - active salt marsh; P - arrowed line of palaeochannel; S - seabank.

at the level of erosion presented by the intertidal platform today. Arguably, the Wentlooge Formation to a thickness of several metres has been removed by erosion from above this level, suggesting that the channel when active was similar in scale to, for example, the modern Berkeley Pill or Goldcliff Pill, with a width at the rim of 25-50m. The fill of the palaeochannel consists of pale brown silts with little or no internal bedding, although there are indications that quantities of sediment, and occasionally slices of peat and root-bound silt from banks formed of the adjoining Wentlooge Formation, had collapsed toward the bottom of the channel. The basal part of the fill includes lenses of sand and local concentrations of subangular to well rounded turf and peat blocks, together with a little Triassic debris.

Along the northeastern margin of the palaeochannel, 50-140m from the marsh edge, can be seen nearly 200 blocks of quarried but undressed stone measuring up to 600x370x240mm. Some of the blocks are protruding to varying degrees from the silt filling the palaeochannel, whereas others have been fully released, but have remained nearby on the surface as an armouring and holdfast for weed. Also protruding from the infilling silt, and associated with a dense cluster of blocks, was an unworn fragment from the base of a large, externally glazed jug of the fourteenth century and probable Bristol manufacture. From elsewhere in the channel fill, about one-third of a well-sooted, sagging-bottom cooking pot of the twelfth to the fourteenth century was recovered. The petrography of its hard, mid grey, very sandy fabric points to manufacture in the Forest of Dean area. We also found in the fill a large section from a woven hurdle/fishing weir of hazel, dating by radiocarbon to the thirteenth/fourteenth century. Compositionally, the quarried stone blocks are chiefly of local Triassic sandstone (68.4%), but there is some

Lower Old Red Sandstone (21.9%), Lias (8.4%) and Upper Old Red Sandstone (1.3%), again outcropping locally. The freshness of these blocks, and their strict confinement to one side of the palaeochannel, suggests that the strew registers a simple landing place which had collapsed into the active channel. The local origin of the blocks, and their association with medieval pottery, point to a possible link with the well-preserved, medieval quay of stone and wood 3km away across the estuary at Woolaston (Fulford *et al.* 1992).

Allen and Fulford (1987) recorded that the surface of the peat ledge (30-35m to the northeast of the palaeochannel) is traversed by the long, sinuous trace of the bottom of a large field drain (Figure 11) cut down to a stratigraphical level a little below the base of the peat itself. The presence of the palaeochannel was not recognized at the time this record was made, but we now propose that the trace records the position of a large collecting ditch just inside a seabank that lay near the right bank of an active Hill Pill (Figure 11), at a time when the pill reached significantly further to the northwest than today; the palaeochannel clearly extends the general line of Hill Pill, the deflection of the present mouth toward the northeast being a feature of events of recent times. In preservation and general context, the drain therefore resembles the Romano-British ditches exposed intertidally at Rumney Great Wharf (Allen and Fulford 1986; Fulford *et al.* 1994). Indeed, the drain at Hills Flats and, by implication, the sea defence with which it was almost certainly associated, may also belong to the Roman period, for two Romano-British settlements are known on the reclaimed estuarine alluvium within 1km of the mouth of Hill Pill. By the mid seventeenth century, however, erosion had forced the resetting of the coastal seabank southeastward to its present position (Gloucestershire Record Office D272/1/2-4, D908) and destroyed the

lower reaches of Hill Pill and its adjoining wetlands, on which Romano-British (Copeland 1981; Allen and Fulford 1987) and medieval (see above) activity is intimated. Romano-British occupation debris is today widely and profusely dispersed in the intertidal zone, suggesting substantial losses from a settlement part of which remains preserved on the alluvium some 750m northeast of the mouth of Hill Pill.

In conclusion, like the shorter-lived palaeochannel at Oldbury Flats a few kilometres downriver (Allen and Fulford 1992), the silted-up channel detected at Hills Flats points to a significant inland erosional retreat, possibly over a substantial period, of the margin of the reclaimed wetlands that border the Severn Estuary. The possibility must be seriously entertained that this process brought to an end medieval trading into Hill Pill.

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