

## A RAISED BEACH IN WESTERN GUERNSEY: ITS ARCHAEOLOGICAL AND GEOLOGICAL SIGNIFICANCE



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Archaeological excavations directed by Heather Sebire for the Guernsey Museum Service at a development site off Route de Carteret in Guernsey, Channel Islands during 1998 revealed the presence of a raised sandy beach with embedded boulders at a height ranging between 8 and 9 m GD. The beach was directly overlain by sandy silts 0.3 – 0.4 m thick encompassing archaeological finds sealed in by the modern soil profile. A second excavation at the site in 2000, closer to the palaeo-cliff, revealed similar archaeological material beneath the present day soil but lying above at least 1.8 m of sandy silts. Detailed granulometric analysis of samples from this second area provide evidence for a beach overlain by variable thicknesses of colluvial sandy silts. On these deposits late Neolithic/Bronze age people established themselves.

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### INTRODUCTION

Within the context of an on-going project in Guernsey, both to provide geological input into the many archaeological site investigations of recent years and to elucidate the geological development of the island in Late Quaternary times, two adjacent sites (A and B at MR 05365488) off the Route de Carteret on the island's north west coast were examined and sampled (Figure 1). The sites lie between the low coastal plain of the Mare de Carteret marshland (Hocart, 1969) and ground rising to the island's plateau to the south (Figure 2). The lowest parts of the plain, now mainly consolidated and built upon, lie below the highest tide levels but are protected from tidal encroachment by the barrier dune and surmounting sea wall of Grandes Rocques and Cobo Bay. Between the marshland and the rise to the plateau is a gentle slope to the base of a fossil cliff line in granodiorite rocks at approximately 12 m GD (Guernsey datum) which has been extensively quarried in the past. The archaeological sites lie immediately to the north of and below the Route de Carteret which follows the base of the palaeo-cliff.

### SITE DESCRIPTION

Site A was a rescue dig opened in the spring of 1998 when work on the new housing estate being built was well under way. Figure 3 shows a cross section through the excavation at Site A which was terminated in a grey sand with some gravel pockets resting on and among sub-angular to sub-rounded boulders some of which were up to a metre in diameter. These are comparable with modern boulders found at mid to upper tide levels on the nearby beaches of Cobo and Grandes Rocques. The average level of the base of the excavation in the sand is 8.1 m GD. The top of the sand was an irregular surface on which rested some 0.1 m of orangey brown sandy silt. No archaeological remains were found in either sand or silt but the latter passed up into a brown mid grey silty-sand varying in thickness to a maximum on site of 0.35 m in which prehistoric pottery was found. However, the pottery recovered from this sealed context was not immediately diagnostic, having a possible range of later Neolithic through to Bronze age.

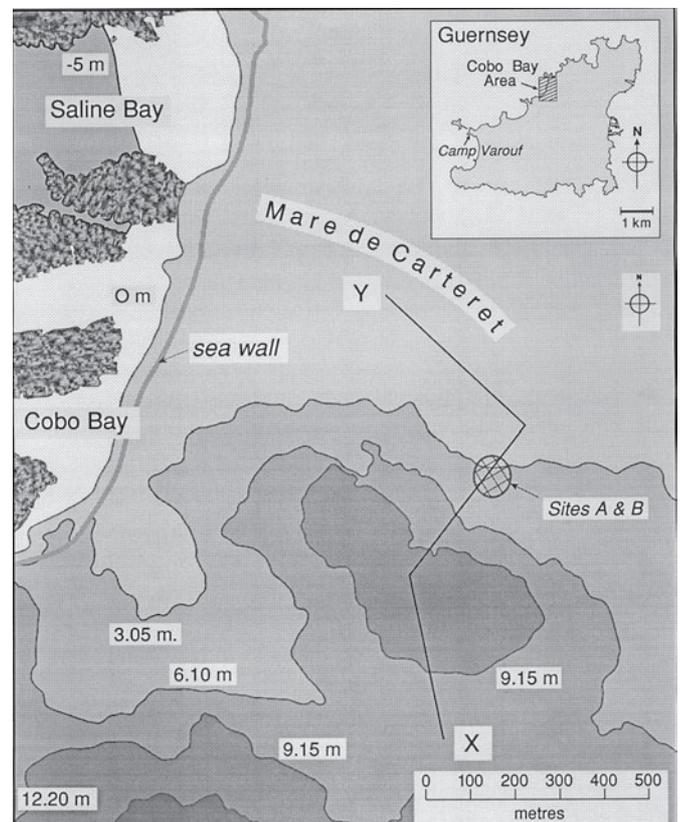


Figure 1. Contour and location map of the Cobo area and the Mare de Carteret to show the setting of sites A and B and the line of the profile in Figure 2 (All heights Guernsey datum, GD).

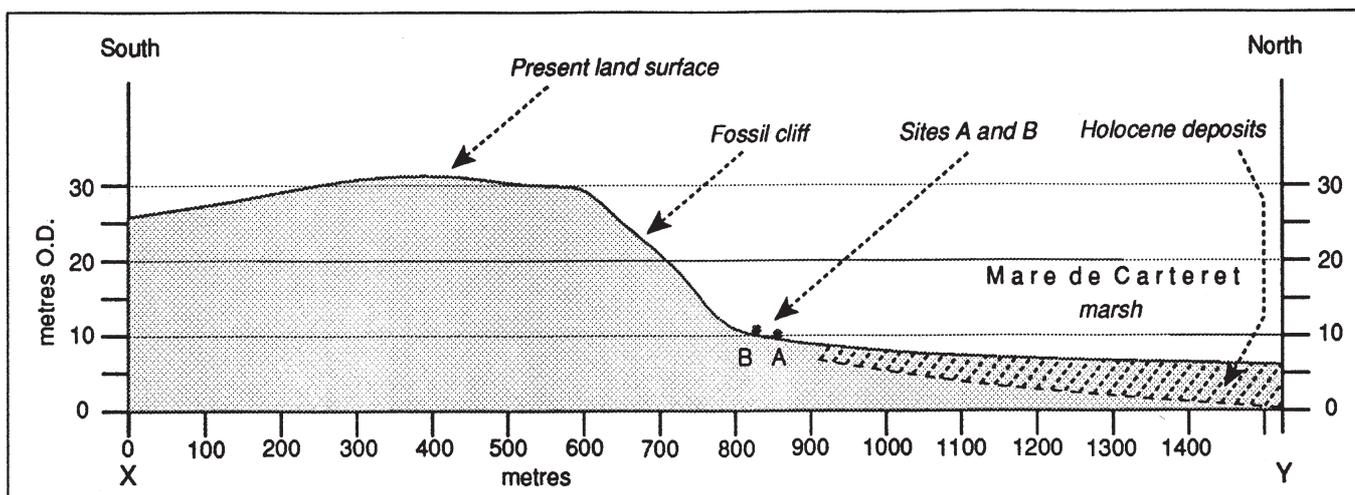


Figure 2. Sketch profile through sites A and B to show their position with respect to the palaeocliff and the Mare de Carteret lowland and sediment infill. See Figure 1 for line of the profile.

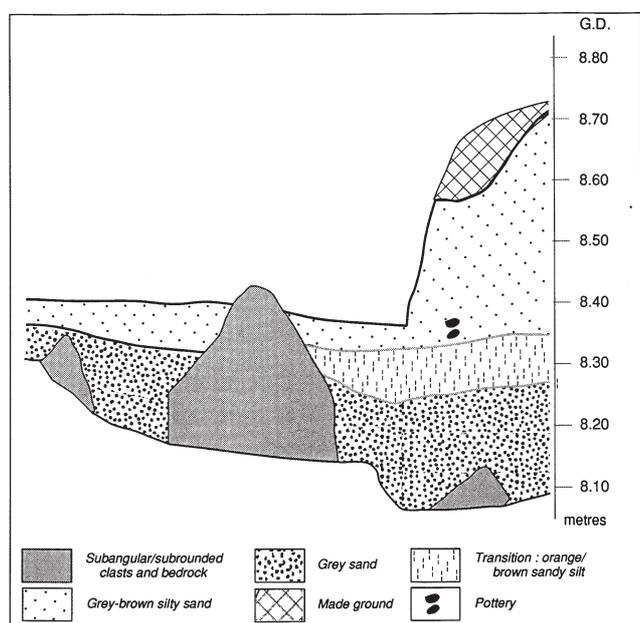


Figure 3. Sketch section of the deposits at Site A showing main layers recorded together with the pottery level and the embedded boulders at the base (all heights from Guernsey datum, GD).

Site B was opened in the late spring of 2000 (50 m south of A, from a ground level of 10.68 m GD) as a 3 m x 2 m section. Figure 4 shows a composite column of the total depth. Archaeological remains were found to a depth of 0.7 m from the surface with Neolithic / Bronze age pottery similar to that from Site A below the present day soil (i.e. between 0.5 and 0.7 m deep). Further investigations of the site late in 2000 resulted in finds of worked flint in the 0.25 m below the pottery bearing horizon. Twenty samples were taken for sedimentological investigation throughout the section at Site B and subjected to particle size analysis and magnetic susceptibility tests.

## RESULTS

### Particle size analysis

Particle size analysis was carried out using a Coulter LS particle size analyser (for the fine fraction < 1,500 mm only) and also by dry sieving. Figure 5 shows the distribution of particles < 1,500 mm into sand, silt and clay fractions as a percentage of the total volume of each sample, plotted against depth. Fine sand and loess fractions dominate throughout the deposits. Graphs were created

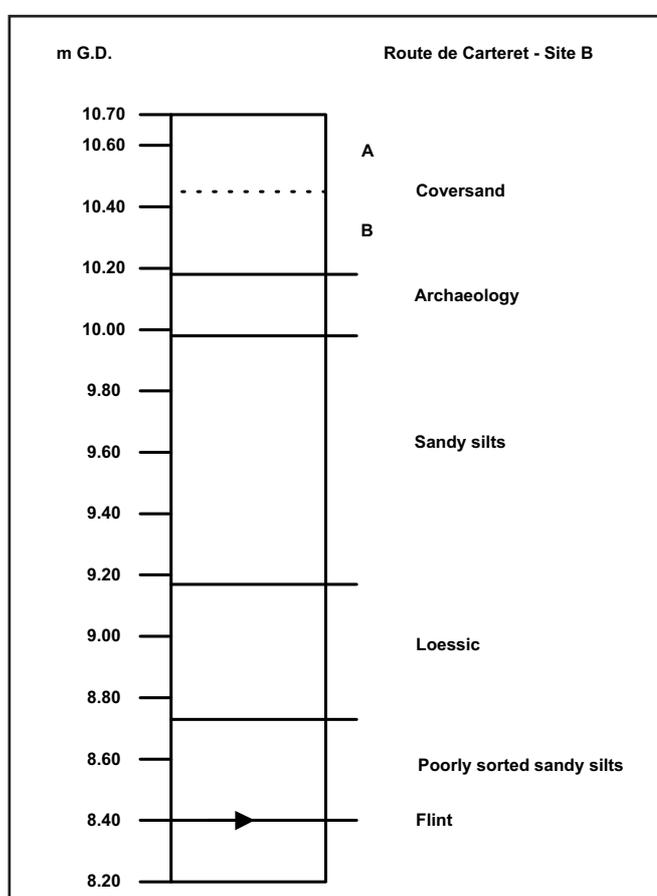


Figure 4. Sketch section of the deposits at Site B.

for each sample (Figure 6 is an example) to show the degree of sorting. Coupled with Figure 5 these were used to estimate likely origins for the sediments. Three different granulometric distributions were evident from the samples at Site B: At 40–60 mm, 200 mm and 1,000 mm. These were taken to represent three different facies of accumulation i.e. loess, coversand and beach sand respectively. For example, sample 9 is displayed as an individual graph (Figure 6) showing a good degree of sorting with a concentration of particles of 200 mm diameter which suggests a coversand event (Vandenberghe, 1992). The coarse silt fraction (40–60 mm is indicative of loess (Lautridou *et al.*, 1986) and the coarse sand fraction (1000 mm) is found within beach sand environments (Renouf and James, 2001). It would also appear

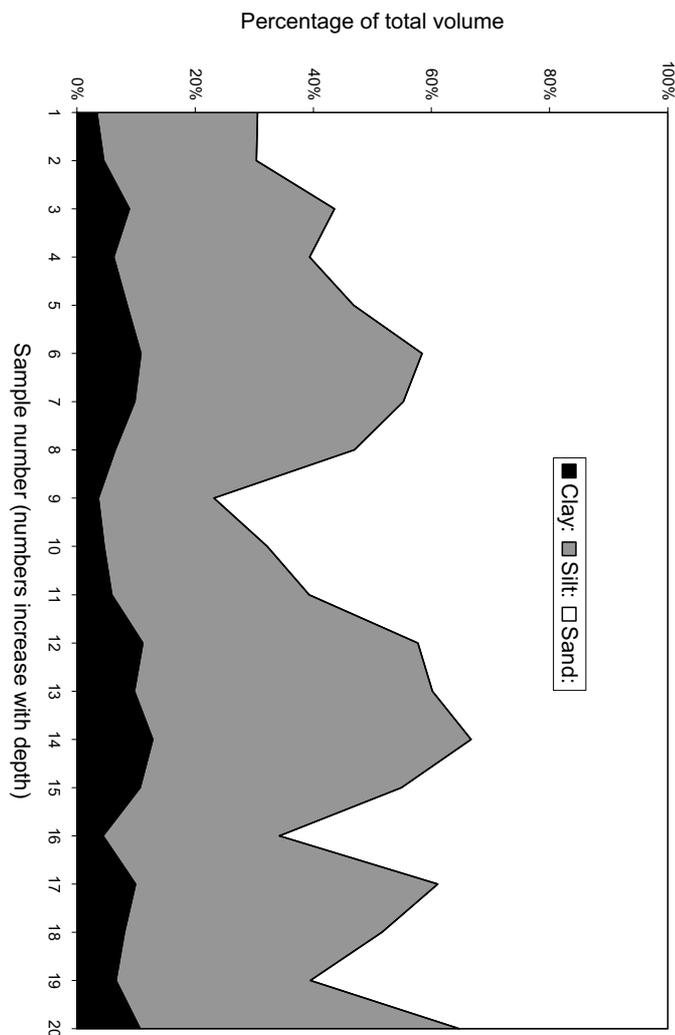


Figure 5. Proportion of sand silt and clay sized particles (by volume) at each sampling depth at Site B for the fraction finer than  $-0.5 \phi$ .

that the present day soil is developed in coversands which have sealed in the archaeological layer.

Despite the fact that post depositional processes (mobilisation, translocation and redeposition) have occurred leading to horizon development, this has not disturbed the original granulometry sufficiently to invalidate the conclusions drawn. In addition to laser granulometry the range of particle sizes was ascertained as a proportion of the total weight of each sample by dry sieving (Figure 7). These data were used to confirm the proposed depositional events inferred from the analysis of particles  $<1,500$  mm. Details of the coarsest material were recorded. Rare pale honey coloured worked flints were found at depths between 70 - 90 cm. A 50 cm diameter sub-rounded boulder was found at about 9.50 m GD in further excavations on Site B and resembles an exfoliated rock which might have rolled down into its present position in the fine sandy silt in which it is now found.

### Magnetic susceptibility

Magnetic susceptibility tests can record the response of a sediment sample to an applied magnetic field. Magnetic minerals produced or enriched through pedogenic processes generate characteristic magnetic signals in response to applied magnetism (Thompson and Oldfield, 1986). Tests can therefore be used to suggest buried soils or landsurfaces which have undergone magnetic mineral formation associated with pedogenesis.

Figure 8 shows magnetic susceptibility for Site B. The contemporary soil (samples 1 and 2) had a susceptibility of over 8. Such a level is not matched again until reaching samples 18 and 19 at the base of the excavation. The data reveals a palaeo-landsurface at this depth (8.4–8.3 m GD) as indicated by the high

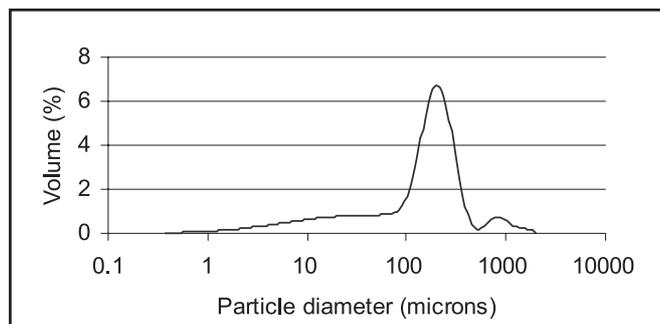


Figure 6. Laser granulometry of sediment finer than  $-0.5 \phi$  at sample point 9 (8.9 m GD, Site B) interpreted as a coversand event.

magnetic susceptibility readings (Thompson and Oldfield, 1986). The worked flint in sample 18 (8.4 m GD) may therefore have been dropped on this palaeo-land surface.

### DISCUSSION

Drawn together the evidence from sites A and B reveal beach sand with embedded boulders, a sequence of variable thickness of sandy silts overlain by an archaeological deposit of late Neolithic / Bronze age material sealed by the modern soil developed in coversands. The height of the raised beach at 8.1 m GD upslope from the thick Holocene deposits of the Mare de Carteret marsh precludes its assignment to the post glacial i.e. Holocene (Keen, 1978). Near the base of the succession at Site B (c. 8.25 m GD - samples 18 and 19) the magnetic susceptibility results suggest past pedogenic activity. The granulometry of these samples is distinctive, with clear peaks at 1,000 mm. This coarse to very coarse sand size may indicate littoral derivation. A regressive phase of late last interglacial age is the likely link between the beach at A and the palaeosol at B.

The sandy silts above the raised beach and the horizon from which samples 18 and 19 were taken are interpreted as a loessic input for the silt, with the sand component probably derived from the nearby beaches by aeolian action. It is possible that the sandy silts are not all *in-situ* but are colluvial deposits of Last Interglacial or early post-Glacial times, perhaps with loess spreading down the hillside as surface wash mixed with sand blown from the exposed last Interglacial beach deposits. At the top of the sandy silt succession at Site B worked flints, presently undiagnostic, were found in a bleached horizon. The deposits at Site B have the same pottery bearing archaeological horizons as at Site A though with a base about a metre higher (c. 10.0 m GD). The archaeological material was found within an area believed to have been cultivated in Medieval times as evidenced by a ridge and furrow pattern. Above this lies the present day soil developed in coversands, which must therefore be Medieval or more recent.

### CONCLUSIONS

Many thin sedimentary sequences linked to archaeological finds around the coasts of Guernsey fall within the height bracket between Guernsey Datum at mid tide levels and some ten metres above this. Examples are Patton (1992) for the Neolithic, Burns (1986) for the Iron Age, Monaghan (1998) for the Gallo-Roman and Sebire (1988) for the Medieval. The current excavations by Guernsey Museums Service at the site of the recently demolished Royal Hotel on the St. Peter Port seafront have added an important early Neolithic dimension. Campbell's work (2000) on the peat units found within the lowland coastal sediments in Guernsey has also contributed to an understanding of the changing Holocene palaeoenvironments of the area. The work presented here is an attempt to study the sediments with anthropogenic features (e.g. artifact - bearing soils) so as to contribute to a greater understanding of their significance for the archaeology. The second aim is to develop a better understanding of the age and nature of the sedimentary sequences as a whole since these have

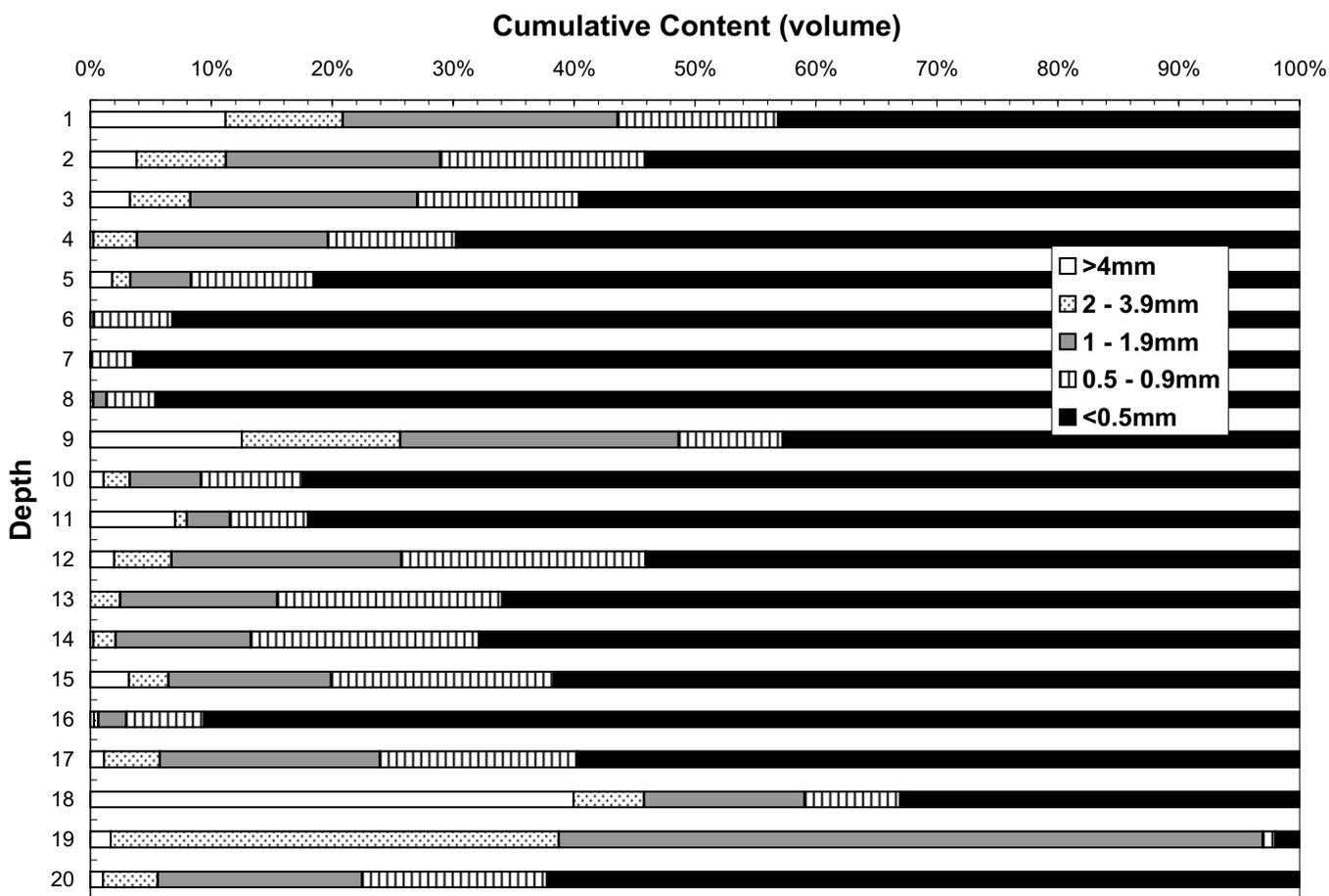


Figure 7. Particle size analysis for all samples (by weight) from dry sieving at Site B.

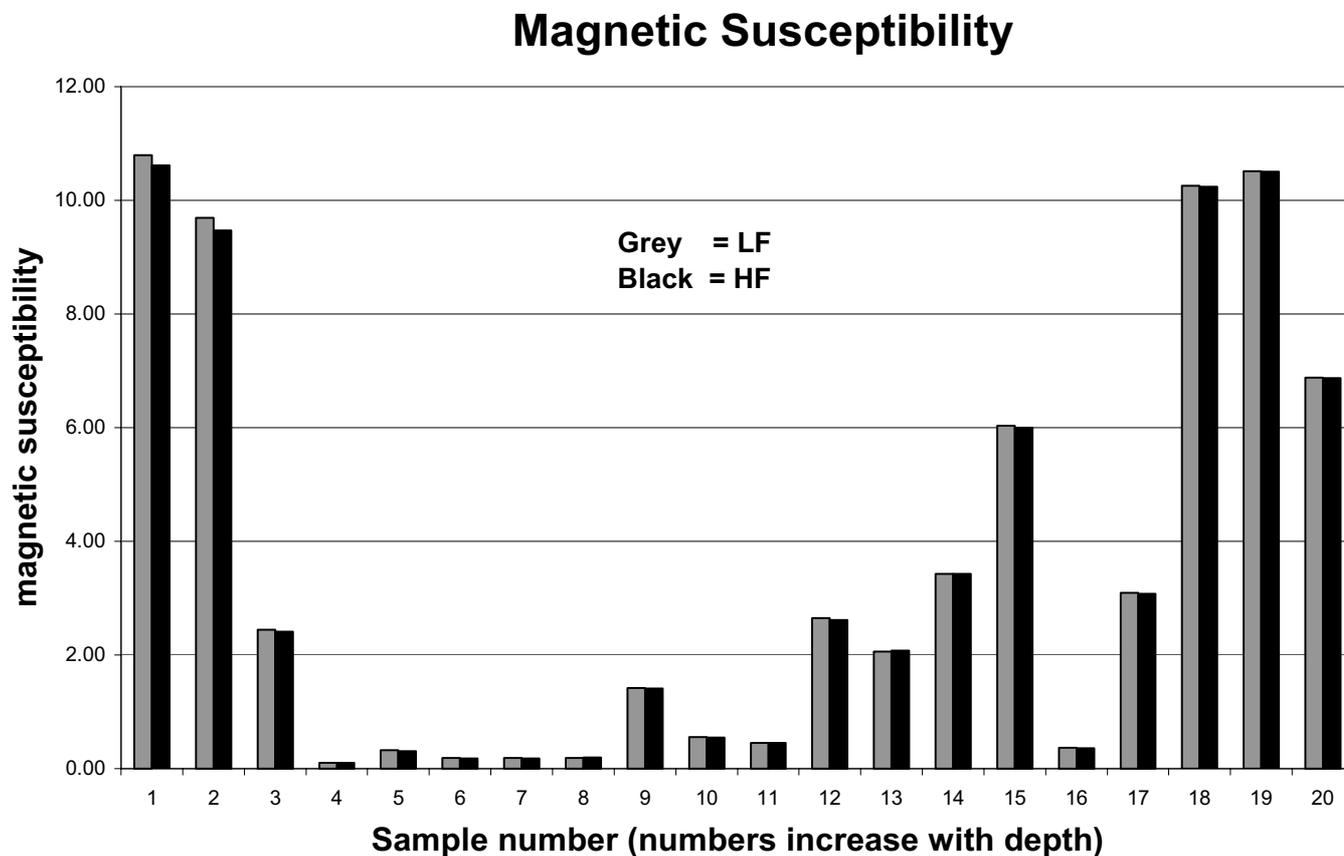


Figure 8. Magnetic susceptibility for the 20 samples at Site B.

not often been covered in archaeological investigations when they extended down into archaeologically sterile ground.

At the Route de Carteret sites A and B it has proved possible to identify a last Interglacial (Ipswichian) beach sand with subrounded boulders. Above this, the last Cold Stage is represented by a sequence of sandy silts of largely aeolian origin (loess, blown sand), possibly with colluvial activity, the latter particularly well developed at Site B. It is likely that the lowest sandy silts were formed in the late Devensian with soil formation occurring at some stage subsequently but before thick loessic deposits formed higher up the slope. These loessic deposits were then washed down slope receiving continual input of blown sand from exposures of the Interglacial beach exposed perhaps as little as a few tens of metres away but which might have extended well northward into what is the present reclaimed marsh area. The same pottery bearing archaeological horizons dating to the late Neolithic or Bronze Age are found at both sites, sealed in by the present soil.

This situation is not unlike that on the edge of the southern embayment of L'Érée at the Camp Varouf in western Guernsey. Here almost a metre of rather gravelly loess underlies a similar archaeological horizon which in turn rests on a presumed last interglacial beach, exposed a short distance away.

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