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Soil Report on Brayfords Warf, Lincoln

R I Macphail, March 1984

During the spring of 1982, a trench was excavated (Lincoln Arachaeological Trust) through deposits on the east bank of the River Witham at Brayfords Warf, Lincoln. The trench exposed pre-Roman water-lain sediments, a Roman occupation/dump deposit, a narrow peaty horizon, and lastly late Saxon occupation/dump deposits (Tony Wilkinson, pers. comm). Environmental interest lay in the narrow peaty horizon because it represented soil/peat formation between the 4th and 10th centuries AD.

An undisturbed monolith for thin section analysis was taken, together with a bulk sample for standard test for pH, loss on ignition and organic carbon (Avery and Bascomb, 1974). Thin sections were described according to Bullock, et al (in press). Results are presented in the Micromorphological Description and Table 1.

Discussion The trench excavation of Brayfords Warf revealed a narrow (3-4 cms) peaty very dark brown (10YR 2/2) horizon apparently running the whole length of the waterfront over Roman dumped deposits. Immediately below this level greyish brown (10YR 5/2) mottled sands occur wich contain freshwater molluscan shells (Charles French, pers. comm). The peaty horizon is itself buried by late (10th century) Saxon dumped deposits, and therefore apparently represents a 4-500 year timespan.

The deposits overall show evidence of intermittent waterlogging producing the post-depositional affects of mottling and replacement of some organic fabrics (hence rather low organic matter content) with iron hydroxide. A comparison with dumped Saxon deposits from Whitefriars, Norwich (Macphail, in Ayers and Murphy, 1983; Macphail, 1983) reveal that at Braysford Warf the peaty horizon is not part of a dumped sequence and bears no resemblence to "Dark Earth" - waterlogged or otherwise. Nevertheless the peaty horizon at Brayfords Warf does not represent 500 years of steady peat and alluvium deposition. Rather it apparently contains:- mixed (probably bioturbated) material of high organic content, sands, possible fragments of mortar (probably reworked from material below), shell fragments, charcoal and probably near in situ fragments of fen and peat deposits.

Although the whole deposit is somewhat heterogeneous it can be roughly stratified into a rather more sandy lower part, a more calcareous (fen) middle part, while the upper most zone contains fragmented but still horizontally oriented peats of about 2mm in thickness. It is hard to envisage this 4cm thick deposit representing 500 years of accumulation. Certainly, it has none of the features of "rolled clay" and overall uniform horizonation of overbank fen alluvial deposits seen in thin sections from Borough Fen and Haddenham Cambridgeshire (French, in preparation). Rather it seems to represent phases of very gently "sitting up" and peat formation in a fen (which produces a calcitic microfabric) environment.

Some sedimentary sequences can be highlighted. One phase commences with 400μm of calcitic fen deposit containing organic matter, fine sand and silt. This is followed by 500μm of an organo/clay sediment with rare silt. The sequence ends with an almost pure peat deposit 1,000μm in thickness. It is difficult to suggest whether this sequnce represents a seasonal or historic trend-although it is more likely to be a seasonal trend as the laminae are so thin. These sediments demonstrate the very slow or low energy "sitting up" of this backwater. Although this deposit may only represent a short period, it does indicate the type of environment - even with phases of bioturbation - prior to Saxon dumping.

Conclusion The peaty horizon at Brayfords Warf is not a soil - although there is evidence of an in situ root and bioturbation - but may represent a period when very gentle "silting up" and peat formation occurred in a backwater. It is unlikely that the deposit represents 500 years of steady accumulation; it is more likely to have developed over the last decades prior to Saxon burial, possibly as river levels dropped sufficiently for peat to develop in situ.

References

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Brayfords Warf, Lincoln

Peaty layer (by Feature 44)

Structure: fine subangular blocky to granular: channel to intergrain channel microstructure:
Porosity: 25-30%: dominant compound packing pores/medium (450μm) semi-interconnected channels: dominant very fine (30μm) intragranular channels: Mineral: coarse/fine, limit 10μm. C/F 85/15: Coarse: very dominant fine, medium, and coarse sand size quartz; common rounded-subrounded, frequent subangular; poorly sorted: few very coarse to gravel size flint: very few shell (calcite/aragonite) fragments: very few mortar fragments: Fine: a) few dark reddish brown, black (PPL); bright orange (RL); opaque: b) very dominant very dark brown to brown (PPL); c) common pale grey (PPL); pale grey (RL); speckled yellow brown to brown (RL); speckled Organic Coarse: few charcoal; plant fragments; fine (60μm) root semi in situ: fine: very dominant: very dominant dark brown to black, few yellow and few red (iron replacement) amorphous organic matter; frequent charcoal; possible organo-(iron) phosphate material present, rare phytoliths: Groundmass: a) opaque; porphyric: b) low birefringence speckled; (crystallic), porphyric: c) moderate to very high birefringence; crystallic-speckled; porphyric; Pedofeatures: Crystalline: few calcite neo-formation-cell pseudomorphs; common fine calcite impregnation of fine fabric b) and in inter-ped space - fen or possibly wood ash origin in places: Fabric: poor overall layering: eg lowest 1cm contains both areas of fine sand, and pure organic matter (iron replacement); very dominant organic fine fabric, with fragments of finely laminated organic matter and silts, with calcitic bands (fen influence?): interior 3cms; mixed areas of calcitic mineral/organic fabric; black amorphous organic matter, pale brown (iron replaced) amorphous organic matter and various inclusions of coarse material: upper most 1cm contains eg disrupted; narrow (2mm) horizon of very finely banded (20-50μm) amorphous "peaty" organic matter containing clay and very fine silt, with rare fine sand grains and plant fragments: Amorphous: frequent pseudomorphic iron hydroxide replacement of amorphous organic matter plasma.

Table 1

pH	% loss on ignition	% organic carbon
7.8	10.14	3.10