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TITLE Flandrian sediments of the Chelmer Valley, adjacent to the Springfield Barns site, Essex.
A preliminary assessment

Flandrian sediments of the Chelmer Valley, adjacent to the Springfield Barns Sites : A preliminary assessment (Essex)

Introduction

Preservation conditions for biological remains are likely to be fairly poor at the Springfield Barns sites, since the soils of the area are generally well aerated and decalcified. The environmental information which the excavations will produce may consequently be of limited value. However it seems probable that an examination of the postglacial alluvial sediments of the river valley close to these sites will produce additional information relating to early landscape history. The purpose of this report is to outline the data on these valley sediments already available in the form of borehole logs, to offer an interpretation of the sequence of sediments, and to suggest some potentially profitable lines of study.

Borehole logs from the Chelmsford area, kept at the Institute of Geological Sciences, have been examined. Of these, the most useful are the logs recorded during the site investigations for the Chelmsford By-Pass, which provide an oblique, curving transect across the river valley between 72260661 and 71970600. These are summarised in the attached section. The vertical relationships of the sediments are shown accurately, but the boreholes were not, as shown here, equidistant nor were they all on the same line. The section is therefore schematic.

The valley sediments: a tentative interpretation.

The sand and gravel deposits of the valley slopes are overlain by finer textured sediments described, for example in logs 240 and 241 as 'form pale brown sandy clay with some gravel'. Unfortunately the terminology used in these borehole logs does not conform with that of the Spil Survey of Great Britain (Soil Survey Staff 1960). In fact, during the 1979 excavation at the cursus, the sediments overlying the sands and gravels in this area clearly contained a significant proportion of silt.

This silt-rich horizon is thought to be cover loam, a deposit representing the weathered remnants of loess deposited in the late Devensian, mixed by cryoturbation and by more recent processes with the subjacent sands and gravels (Corbett and Tatler 1974, 17). Loess-containing soils in Essex are largely confined to the river valleys (Catt 1978, 15).

The thickness of finer textured sediments increases from 0.6m in borehole 241 to 2.2m in borehole 240, suggesting that much of the material in 240 has been redeposited after local movement from further upslope. This could have occurred under periglacial conditions or by ploughwashing after the deforestation of the valley sides. The possibility that fossil soils may be present beneath or within this colluvial deposit should be borne in mind.

The boreholes at the base of the valley floor show the underlying gravel surface to be irregular, varying from 2.0m (235) to approx. 3.25m (236) below the present surface. Peat deposits appear to occur only where there are depressions in the gravel surface. Borehole 236 is of particular interest. Between 2.5 and 6.0 m depth, the sediments are as follows:

2.5–2.6 m	Soft grey-brown peat
2.6–2.75 m	Very soft grey silty clay
2.75–3.25 m	Gravel, with some grey sandy clay
3.25–6.0 m	Dense sand and gravel

This appears to show a steady change from high to low energy fluvial sediments, very much the sequence of sediments that might be expected to form in an abandoned river channel. It seems possible that all these depressions in the gravel surface may be interpreted as river channels. These could possibly be part of a braided river system tentatively datable to a period before extensive deforestation.

The mineral alluvium overlying these peats is variable in character. The bore logs describe the alluvial sediments as firm or soft mottled pale brown

and grey silty clay or sandy clay with pockets of sand and sometimes some decayed vegetable material. The deposition of thick alluvial deposits is considered to have begun with the onset of extensive deforestation and arable expansion, which led to an increase in the sediment load of rivers (Limbrey 1978). Continued deposition of this alluvium has led to the development of the modern flood-plain, which between bores 231 and 238 varies in elevation only between 21.69 and 21.82 m AOD (apart from bore 234, which appears to record part of an artificial embankment).

Suggestions for future work.

In order to test the validity of this tentative interpretation of the valley sediments two things are required: dating evidence and environmental information. Specifically this would involve the following:

1. C-14 dating of the peat deposits. This could be particularly valuable in providing a terminus post quem for the beginnings of mineral alluvium deposition. The interface between the peat and the alluvium would need to be examined particularly carefully for any sign of peat erosion.

2. Examination of sections through the deposits interpreted as cover loam and redeposited cover loam for any buried soil profiles or artefacts.

3. Pollen and analysis and the examination of plant macrofossils and insects from the peats.

4. Analysis of molluscs from the peats and alluvium. Although aquatic molluscs will, of course, predominate, alluvial deposits commonly contain land snails which could be used to give a coarse impression of the degree of forest cover within the catchment area of the river at different periods. (The presence of shells is noted in several of the bore logs).

Some of these aims can be achieved by augering, though lateral variations in sediments may cause some inconvenience. Others cannot. For the detection of buried soil profiles and of signs of peat erosion an open section would be necessary. It is therefore important that any exposures in this area should be inspected.

Acknowledgement.

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References.

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