

REPORT ON A SOIL IN A ROMANO-BRITISH CONTEXT AT LLOYDS MERCHANT BANK

LONDON (LLO 78)

During the renovation of Lloyds Bank a number of Romano-British pits and other features were excavated by the Department of Urban Archaeology (site supervisor, Mr. K. Flude) beneath the basement floor. The natural soil material comprised a metre of "brickearth" over gravels, and exhibited very pale colours in its upper part. This pale colour, rather than relating to any diffusion of mortar from above, showed that truncation of the original soil profile had removed only the A horizon of a degraded argillic brown earth (sols lessivé). To find any preserved soil profile in an urban context is unusual, but to discover one showing such strong profile development made it even more important that it should be investigated thoroughly as modern "brickearth" profiles have tended to be altered by more recent land-use changes. The profile was thus described, analysed for texture and organic carbon, and thin sections were made to try and quantify differences within the microfabric of the various horizons. Samples were also ignited to reveal any variation in iron content.

Textural analysis was complicated by chemicals introduced from the overlying cement, for these gave false clay readings, especially in the Eb horizon. Nevertheless, movement of clay from the Eb horizon into the Btg horizons can still be demonstrated (see data). In addition, textural analysis shows that perhaps an aeolian loam has been reworked with a more sandy deposit. Alkali extractable humus is very low throughout the profile due most probably to oxidation, yet even so the Eb horizon is characterised by higher amounts of organic matter. The Eb horizon has apparently lost iron as well as clay, as illustrated by the soil ignition analysis, and this loss is likely to have contributed to the large numbers of ferri-argillans present in the microfabric of the Btg2 horizon.

The micromorphological study (see Micromorphology) amply confirmed the soil description and horizon notation, and additionally revealed the nearly total absence of illuvial clay in the Eb horizon. This eluvial horizon exhibits a very high bulk

density, that is believed to be a natural soil characteristic, and has resulting poor porosity and structure.

In contrast, the Btg2 horizon has a well structured fabric with well developed voids and channels. However, much of the ferri-argillans tend not to be associated with this present day void-system, but occur within the peds suggesting at least two phases of soil formation. The earliest phase of lessivage is represented by intrapedal ferri-argillans and papules, while secondary clay movement is recognised as coatings within the present-day porosity of the profile. There is some evidence in the literature that there was little clay eluviation during the historical period (Roman to present), and so the basic fabric of the Btg2 horizon most probably was produced prior to this period. In this sense, although there is insufficient archaeological evidence to suggest soil formation ceased during its occupation in AD 65-70, the fact remains that the soil as we see it now was most probably very similar to how it was when first settled. Additionally, some voids contain unorientated iron-clay complexes which may possibly be associated with late soil disturbance, perhaps after the area was cleared for farmland; for continental micromorphological research has shown how much less resistant to slaking are agricultural soils as compared with those under forest (Imeson and Jungerius, 1976).

The soil itself may be described as a gleyic argillic brown earth, in so far as the B horizons are gleyed, and this may relate to both water table movements within the underlying gravels, or to drainage impedance within the B horizons. The infilling of pore-space with ferri-argillans (see Micromorphology) certainly may have led to the latter. Further, the loss of iron from the Eb horizon is a gley characteristic especially when this iron is apparently redeposited in the ferri-argillans. The Eb horizon itself, through its poor porosity and dense fabric, suggests lateral soil water flow in a gleyed zone, as recognised on certain slope units by Connacher and Dalrymple (1977). Briefly, they suggested that the loss of clay due to lessivage allowed the soil to become very dense through repeated wetting and drying.

We may therefore suggest that this truncated soil is evidence of a gently (2-3°) sloping area, which was under mature woodland during the major period of pedogenesis, and suffered some disturbance during the time of its settlement later in its history.

Micromorphology: Argillic brown earth

Three thin sections of both the Eb horizon and the Btg2 horizon were examined. The Eb horizon is homogenous, with a dense grey brown (Plane Polarised Light, PPL) plasma. It is apedal, with little void space (1-2%), which comprises intrapedal metavughs and fine channels. Organic matter is not apparent. Skeleton grains include few rounded medium quartz grains, but with mainly fine angular sand, and much silt. Sesquioxidic glaeboles are common and include a large (1-2mm) nodule with inclusions of medium sand. Few fine ferro-manganese glaeboles occur. Rare reddish-brown (PPL) ferri-argillans are present, both as grain and channel coatings. The horizon has a silasepic, porphyroskelic fabric.

The Btg2 horizon is homogenous, and has a well developed subangular blocky structure, and is generally brown in colour (PPL). Voids equal 11% and comprise intrapedal metavughs with compound packing, and mainly intrapedal single and anastomosing channels. Related skew planes are present, as well as some vessicular vughs, although the latter may be artefacts. Minerals are mainly quartz in the form of few rounded medium sand grains, and angular fine sand and silt. In general, silt comprises 35% and sand 14% of the whole fabric. Organic matter is not apparent. Relatively common (3%) nodules are mainly sesquioxidic with few fine ferro-manganese glaeboles. Up to 18% reddish-brown ferri-argillans were counted, and include many void (metavughs and channel) ferri-argillans; few to many of which are zoned. Fine channels are present in many of these ferri-argillans. The count also involved few papules, common irregular and linear intrapedal ferri-argillans and rare strongly embedded grain ferri-argillans. Some voids contain unorientated iron-clay complexes (3%). The horizon has a masepic, porphyroskelic fabric.

With the Btg2 horizon some features, including ferri-argillans, may be over-estimated in the count (604 points) through secondary mobilisation of material during thin section manufacture.

Analytical Data

Horizon	Cl	F.Z.	M.Z.	C.Z.	F.S.	M.S.	Alk. Ext. Humus (mgms per 100 gms soil)
Eb	0.5(4)	5	9	26	49	11	9.9
Btg	8	6	8	23	45	17	5.4
Btg2	8	4	6	14	50	17	4.3

Soil Ignition

Eb	Eb
Btg	Btg
Btg2	Btg2

References

- Connacher, A. J. and Dalrymple, J. B. 1977 The nine-unit landsurface model: an approach to pedogeomorphic research. Geoderma, 18, 1, 1-154.
- Imeson, A. C. and Jungerius, P. D. 1976 Aggregate stability and colluviation in the Luxembourg Ardennes; an experimental and micromorphological study. Earth Surface Processes, 1, 259-271.

Profile Description (Context No. 18).

Soil subgroup: Argillic brown earth

Location: 533143 181056

Site: Lloyds Bank London

Altitude: 11.07-11.27 O.D.

Parent material: Alluvial loam (Flood plain deposits)

Horizon, cm. truncated

- 0-19(41) Brown (7.5YR5/4) (dry, pinkish grey 7.5YR7/2) fine sandy loam, massive very firm; very slightly porous (0.5%); rootless; few stones; gradual, irregular boundary.
Eb
- 19(41)-52(68) Yellowish red (5YR4/6) (dry, strong brown 7.5YR5/6) very firm fine sandy loam, with few distinct coarse mottles; well developed coarse prisms; very slightly porous (2%); rootless; stoneless; manganese present; ^{common argillans} gradual, irregular boundary.
Btg
- 52(68)-107 Reddish brown (5YR5/4) (dry colour brown 7.5YR5/4) very firm fine sandy loam; with many distinct coarse mottles; well developed coarse prisms; very slightly porous (4%); stoneless manganese present, and associated with ^{common argillans} root traces; clear, irregular boundary.
Btg2
- 107-144 Brown (7.5YR5/4) moderately firm, structureless gravel with sub-angular and rounded flints.
2C

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