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Soil Report on Beeston Castle, Cheshire

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Beeston Castle (Director, Peter Hough) was visited during the excavations of 1980, 1981, 1982 and 1983 (summer and autumn). During this period a clearer understanding of the nature of the soils and their archaeological significance has been gained than presented in the report of 1980 for example. This report therefore aims to summarise the previous findings (Macphail, 1980, 1981 and 1983), whilst combining them with the interpretation of deposits exposed in late 1983.

Description of late 1983 soil profiles (plan P14/15u):

This area exposed beneath the medieval ramparts, east of the gatehouse comprise the face and ramparts of the prehistoric defences. Three differing profiles were described, ignited and tested for pH: namely A, B and C (see Profile Description).

Testing for pH, once again revealed a superimposition of base-rich cations into the deposits which in most cases were originally acid. As in the soils beneath the square tower (Macphail, 1980) calcium ions had been received from mortar in the overlying or neighbouring medieval walls. Ignition, by the way it illustrates iron present in particular horizons, showed that the truncated humo-ferric podzol at C was in all ways comparable to the soil buried by the ramparts by the square tower (described in 1980, Macphail AMLN 3235).

At sections A and B slightly more ferruginous sand in the Ah and Ea horizons rest on more eluviated sands of the Ea2 horizon, perhaps indicating that the "colluvial sand" parent material was derived from a strongly leached upper soil source. In the section at A local puddling or the deposition of "fines" has produced less well drained conditions giving rise to a gleyed bAg horizon. Colluviated sands and weathered loamy sand parent material, weathered under imperfectly drained conditions merge towards the parent material proper, at depth.

It is here worth noting that section C rests on a probable natural berm and has developed, for all intents and purposes, vertically. At sections A and

B the soils have developed partially on the berm as related to phases of rampart construction, or occur on the slope, which increases from 10° to 28°. Hence the sequence of deposits cannot be described from vertical sections. Thus at section B the deposits are differentiated as they occur on the slope face. Horizons Ah, Ea and Ea2 have already been considered. These rest on a heterogenous dump of a mainly parent material origin. This dump overlies an earlier phase of colluvial bleached sand (2b Ea) accumulation - the gleyed bAg horizon relating to local pedogenic conditions. This 2b Ea horizon apparently post-dates areas of "burned bleached sand" containing much charcoal and "bleached sand" (not described) which occur to a shallow depth (see archaeological plans) over the yellowish red loamy sand parent material. Because of the slope these latter two deposits have little depth and have a plan, rather than vertical relationship, with the 2b Ea horizon upslope.

Discussion of area Plan P14/15u

The lowest bleached sand deposits probably relate to prehistoric strongly leached sand forming a cover to the eroded parent material (C horizon). A phase of anthropogenic activity gave rise to the charcoal rich "burned bleached sand". A later phase of colluvial sand produced the 2b Ea horizon, which was stable enough to allow organic matter laminations to form prior to the next on-site phase - ie the dumping of the reddish brown heterogeneous loamy sand. This phase was again succeeded by colluviation or dumping of leached sands, in the upper part of which a podzol Ah horizon developed prior to the latest phase of rampart construction using stone rivetting.

General Discussion

The 1980-1983 excavations have revealed a number of prehistoric activity phases. At both the square tower (Macphail, 1980) and at section C described above prehistoric rampart deposits (or colluvium) bury strongly leached in situ humo-ferric podzols developed in the natural Permo-Triassic deposits. It can therefore be safely assumed that Beeston Crag had a podzol cover by (- and if Iron Age this is quite usual on such parent materials (Macphail, in press) -) this period. Such soils eroded easily, which explains the shallow soils present in the Outer Ward (Macphail, 1980, 1981), and the many sequences of bleached sand present at the gateway sites either as natural colluvium or used as rampart material. Similar prehistoric erosion of bleached sand can be quoted from West Heath, West Sussex, for example (Macphail, 1981, Scaife and Macphail, 1983). The very

loose nature of such soils may indicate the need for wooden and stone rivetting and also the presence of a dump of more cohesive reddish brown loamy sand of parent material origin.

It may be only coincidental that the two natural buried humo-ferric podzols at the square tower and at section C are both truncated at approximately the same level ie with 35-37cms of Ea horizon, as both occur on the same slope-unit, or it may suggest truncation took place at the same time?

One problem in interpreting the gateway deposits is the 40-50cms of brown to strong brown colluvium present below the approach-way. In 1981 (Macphail, 1981a) this was described as a natural colluvium, but subsequently features and artefacts were found within it. If this is prehistoric colluvium, does it predate podzolisation, - because it is not leached - or does it represent erosion of subsoil horizons from the Outer Ward area?

The presence of still acidic deposits in a deep ditch-fill sequence to the west of the gateway excavation area, should allow a dateable (as it contains an organic 2b Ah horizon suitable for a C^{14} assay) soil pollen profile to provide an environmental background to the soil developments occurring at Beeston (Macphail, 1983).

Refs

Macphail, R I 1980 Soil Report on Beeston Castle, Cheshire AMLR 3235.

Macphail, R I 1981a Soil Report on Beeston Castle, Cheshire AMLR 3565.

Macphail R I 1981b Soil Report on West Heath Cemetery (1980), West Sussex I and II AMLR 3586.

Macphail, R I 1983 Soil Report on Beeston Castle, AMLR

Macphail R I In press A Review of Soil Science in Archaeology in England. In 'H C M Keeley) Ed. A Review of Environmental Archaeology in England. HMSO.

Scaife, R G and Macphail R I 1983 The Post-Devensian Development of Heathland Soils and Vegetation. In (Burnham P) Ed. Soils of the Heathlands and Chalklands. Seesoil Vol I South East Soils Discussion Sp 70-99.

Beeston Castle (Plan P14/15): Soil Profile

Description

Horizon, depth cm.

Section A

Stone rivetting phase buries:

0-10 Ah — Very dark grey (5YR3/1) moderately weak humic sand. (pH7.7).

10-30 Ea — Brown (7.5YR5/2) moderately weak sand, common organic matter laminations (pH7.7).

30-43 Ea2 — Light brown (7.5YR6/4) loose sand (pH7.7) ("colluvial sand").

43-45 bAg — Reddish brown (5YR5/4) firm, loamy sand, with common faint mottles; common charcoal (pH7.8).

45-65 bBg/Cg — Reddish grey (5YR5/2) moderately weak loamy sand with few, faint mottles (pH7.9).

65-80+ bc — Yellowish red (5YR4/6) moderately weak loamy sand (pH7.9).

Section B

Stone rivetting phase buries:

0-3 ah — Very dark grey (5YR3/1) humic sand (H7.7)

3-25 Ea — Brown (7.5YR5/2) moderately weak sand, common organic matter laminations (pH7.7).

25-30 Ea2 — Light brown (7.5YR6/4) very weak sand (pH7.7) " ("colluvial sand").

30-50 "Dump" — Reddish brown (5YR4/4) loamy sand with few stones; hetergeneous; mixed soil material, charcoal (pH7.5).

50-52 bAg — Yellowish red (5YR5/3) firm, mottled loamy sand (pH7.8).

52-90+ 2b Ea — White (5YR8/1) loose sand with pinkish grey laminae (pH7.5) ("colluvial sand" 2).

(overlies "burned bleached sand" and "bleached sand" deposits resting on C horizon on the slope face).

Section C

Stone rivetting phase buries:

0-3(5) Ah — Very dark grey (5YR3/1) humic sand (pH7.7)

3(5)-15 Brown (7.5YR5/2) weak sand with organic matter laminations (pH7.7)
Ea

15-35 Reddish brown (5YR4/4) loamy sand with few stones; heterogeneous;
"Dump" soil material, charcoal (pH7.5).

Soil truncation level.

35-60 Light grey (5YR7/1) structureless loose sand (pH7.4).
bEa

60-80 Dark reddish brown (5YR3/2) and reddish brown (5YR4/4) firm,
bBhs & Bs massive sand (pH7.4).

80+ Sandstone and yellowish red loamy sand parent material (pH7.79).
bc