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Ancient Monuments Laboratory
Report 106/89

SOIL REPORT: CROSSGATES FARM, SEAMER, N. YORKS.

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Summary

Buried soils associated with an early Iron Age square ditch barrow complex were examined. The uneven preservation of humose material was related to local variations in topography and the variable distribution of a clayey subsurface horizon associated with pro- or post-glacial depositional processes, rather than ground water effects. The humose infill of a ditch represented two phases, one of deposition followed by a period of stability which allowed colonization by plants. The function of the ditch could not be determined. Local wind blown sand has contributed to burial processes.

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CROSSGATES FARM, SEAMER (7.8.89)

SOILS REPORT
(Maureen McHugh, Department of Agricultural and Environmental Science, The University, Newcastle Upon Tyne, NE1 7RU - English Heritage)

The soils are developed in fluvio-glacial sands and gravels deposited during the late Devensian/early Flandrian. There are 6.7 m of sands and gravels overlying Corallion limestone at 25 m (taken from borehole data g.r. 032835, provided by Dr. Dominda Chada, the National River Authority, York). The present water table lies a few metres below ground surface.

1) SOILS

Two soil series are associated with deposits of this type (King, 1986):

i) Wick series

Wick soils are coarse loamy non-calcareous typical brown earths. Profiles are sandy loams, although sandy clay loam textures may occur at depth. They may be stony with small to medium quartzites and some fragments of reddish sandstone, rare pieces of coal and some locally derived Jurassic sandstones and limestones. Topsoils are brown to dark brown with medium subangular blocky structure. Subsoils are brown to light brown with medium or coarse angular or subangular blocky structure. Deeper drift layers are occasionally reddish. They are freely drained and may be ferruginous at depth.

ii) Arrow series

Arrow soils are coarse loamy non-calcareous gleyic brown earths. Stones include locally derived Jurassic sandstones and occasionally reddish Triassic sandstones, Jurassic limestones and coal. Topsoils are brown with moderately developed subangular blocky structure. Subsoils are brown to yellowish brown with ochreous or rusty mottles below 40 cm associated with ground water fluctuations.

2) CROSSGATES FARM

Soil variation on site is related to slope. Areas A and C are associated with Wick soils, Area B with Arrow soils. The following comments are based on field observations only, past ground water fluctuations are not known. Descriptions of each context are detailed in section 3.

Areas B and C

Contexts 27 and 3 are humose sandy silt loams. Both are cut by archaeological features and are considered to represent a buried occupation surface ie. they are buried topsoils. The morphology of underlying horizons and the absence of features indicative of persistent saturation suggest that these humose horizons are not the product of organic matter accumulation in permanently ponded depressions affected by groundwater, although ponding may have occurred seasonally. It is more likely that they are the remnants

of a more extensive soil and owe their preservation to a combination of local variations in topography and therfore proximity to the water table, and the moisture retention properties of their clayey subsoils. The latter would tend to retain surface water or periodically high groundwater and thus enhance wetness of the overlying organic horizons. This would inhibit erosion prior to burial and subsequent microbial oxidation, processes which might readily occur over sand and gravel subsoils. It is likely however, that soils were periodically wetter than present at some stage and humose topsoils widespread.

The origin of the reddish clayey drift is unknown. In the absence of archaeological evidence suggesting otherwise, its colour suggests derivation from i) reddish north sea drift or ii) weathered limestone (pre-glacial only). Both i) and ii) imply a pro-glacial or immediately post-glacial origin, deposition occurring preferentialy in slight depressions. In the absence of reported reddish subsurface horizons in soils developed over Corallion limestone upslope (King, 1986), overland transfer at some later stage seems unlikely.

In each case, material overlying archaeological features contains some rounded, polished and/or frosted sand grains suggesting a slight wind blown component. The wind blown fraction is not significant overall, suggesting that most hillwash can be attributed to normal colluvial processes possibly (or not) accelerated by erosion associated with agricultural practices up slope.

Area A

Contexts 27 and 28

Both horizons are coarse sandy silt loams with a largely unsorted gravel component. The humose and marginally humose nature of 27 and 28 respectively suggest a depositional sequence accompanied by the gradual colonisation of detritus by plants. As above the absence of features indicative of persistant saturation suggest that permanent groundwater ponding effects were unlikley, however the ditch probably acted as a trap for free surface water and any overland flow during the wettest times. In the absence of a clayey subsoil, preservation can be attributed to a degree of wetness associated with proximity to the groundwater table or a lack of biological activity following burial. Polished sand grains within the upper horizon suggest that wind blown deposition may have contributed to subsequent infilling of the ditch. Features associated with wind transport are generally of peri-glacial origin, though not always. Transport is however probably local.

Concluding remarks

The contexts examined in areas B and C represent buried soils which may have been subject to wetter conditions than present, although it is unlikely that they developed in standing water. The ditch material (area A) represents two phases, one of deposition followed by a period of stability which allowed colonisation by plants. The function cannot be determined from evidence presented here.

3) SOIL DESCRIPTIONS (after Hodgson, 1976)

Area A

Context 27
Very dark grey sandy to gravelly humose silt loam (10 YR 3/1); gravel, poorly sorted; moderately weak, compound, fine granular to medium angular blocky structure; moderately weak, slightly fluid, non plastic; few faint ferruginous mottles (10 YR 5/8, yellowish brown); boundary smooth and clear. The sand fraction contains some rounded, polished and frosted medium grains and therefore has a slight windblown component.

Context 28
Dark brown sandy to gravelly silt loam, possibly humose (10 YR 3/2); moderately porous though pores are devoid of roots; few samll subrounded limestones; gravel poorly sorted; weak, slightly fluid, non plastic, non sticky; very weak angular blocky structure.

Area B

Context 3
Very dark brown, homogeneous humose sandy silt loam (10 YR 2/2); slightly stony, stones < 0.5 cm include rounded unweathered limestones; moderately porous, very fine to fine pores, mostly devoid of roots; some earthworm burrows infilled with fine pellety material, may be contemporary; moderately firm, subangular to weak fine granular structure; slightly sticky, non plastic, slightly fluid; boundary clear and wavy.

Context 5
Dark brown sandy clay loam (10 YR 4/3): slightly porous, very fine to fine root channels, mostly void; few earthworm channels infilled with fine granular material; very firm when dry; coarse prismatic structure; few faint diffuse yellowish red mottles (5 YR 5/8) and black segregations (7.5 YR 2/0); pale diffuse light yellowish brown mottles (10 YR 6/4).

Area C

Context 56
Black to very dark grey humose sandy silt loam (10 YR 2/1 to 3/1); very slightly porous, very fine to fine pores devoid of roots; compound fine weak granular to weak medium angular blocky structure; fluid, slightly sticky, non plastic, moderately weak; boundary smooth and sharp.

Context 1000
Dark brown gravelly clay loam (10 YR 3/3); few small subangular stones; very weak; very slightly porous, very fine to medium pores; slightly sticky, slightly fluid, slightly plastic, massive to very weak medium angular blocky structure; few, fine strong brown mottles (10 YR 4/6).

Hodgson, J.M., 1976. Soil Survey Field Handbook. Technical Monograph No. 5. Harpenden.
King, S.J., 1986. Soils in North Yorkshire VIII. Soil Survey Record No. 96. Harpenden.