AML Report 4498 728

FH4AMW(5P)985

REVIEW OF DR I CORNWALL'S THIN SECTIONS FROM CAESAR'S CAMP, KESTON

R. I. Macphail September 1985

Dr I Cornwall's thin sections from Caesar's Camp Keston, Kent, were reviewed. Microfabric characteristics of the Iron Age buried humo-ferric podzol which had developed under an oak woodland cover, are compared with an immature Iron Age soil formed prior to a second phase of rampart building, and the modern humo-ferric podzol present on the site. A primary argillic fabric had formed under the oak cover before increasing soil acidity under this vegetation gave rise to podzol development. However, oak woodland produced a less acid, and more biologically active podzol than that developed under Calluna which succeeded it. Four colour plates of the Iron Age Ah and Bh horizons are included.

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The Review

At this classic example of early interdisciplinary palaeo-environmental study of a multi-phase Iron Age Camp, Cornwall (1958) analysed i) the buried soil, ii) the soil formed on the 1st phase of rampart construction, and iii) the modern soil developed on the final rampart (Table 1.).

The Iron Age ramparts bury a humo-ferric podzol developed on the Blackheath Pebble Beds. Silt and very fine sand present in the leached bAh (No 4, A1) and bEa (No 3, A2) horizons but absent from the illuvial bBh (No 2, 8) and bBtsm (No 1, B or B/C) horizons may be a loessial component in soils developed on this substrate (Burnham and McRae, 1974).

The poorly humified mainly brown organic matter of the modern topsoil contracts with the well humidified black amorphous organic matter of the Iron Age bAh (No 4, A1) horizons. Similar comparisons have been made between buried Ah horizons from Bronze Age soils at West Heath, Sussex, and the Ah horizons examined from beneath the Experimental Earthwork, Wareham, Hampshire (Fisher and Macphail, 1985).

Soil pollen is of major importance at Caesar's Camp because it reveals that the humo-ferric podzol developed directly under oak woodland without an intermediary heath phase (Dimbleby, 1962). The thin sections also show that much charcoal was incorporated into the buried Ah (No 4, A1) horizon (Plates 1 and 2) when the oak woodland was cleared to make way for the earthworks. It may be argued that the first illuvial phase of clay coatings in the b Btsm (No 1, B or B/C) horizon occured under the oak woodland cover, but that continued acidification led to clay destruction in the upper soil and podzolisation of the profile. The buried Bh (No 2, B) horizon (Plates 3 and 5) appears less well developed than the modern Bh horizon, but Cornwall (1958) suggests some iron loss to the Blackheath Beds parent material. Also the modern soil has had 2,000 years to form, whereas humus illuviation in the Iron Age soil may have been of shorter duration, and under less acid contions than that prevalent under later heath (Simmons and Tooley, 1981). Biological activity, as represented by probable biopores in the bAH (No 4, A1) horizon appears to have been higher under the Iron Age oak woodland cover than under Calluna heath. Similarly high biological activity was noted at Hengistbury Head, Dorset under Late Bronze Age/Early Iron Age oak woodland (AMLR. Macphail, in prep). Equally, the ("active" - De Conink and Righi, 1983) polymorphic fabric (Plates 3 and 4) of the bBh (No 2, B) horizon may relate to forest covers in general giving rise to more rapidly biodegradeable organic compounds than under heath (Guillet, 1982).

Cornwall (1958) suggests that the intermediate immature soil profile formed between the 1st and later rampart construction phases developed over decades or a century. This soil developed under an only partially cleared woodland cover (Dimbleby, 1962). The bB(s) horizon (No 2 B, 1st Rampart phase) contains dusty clay infills, presumably related to soil disturbance and slaking during rampart construction (Romans and Robertson, 1983) rather than to a phase of lessivage.

Conclusions

The review shows that a primary argillic fabric formed under the oak cover, before increasing soil acidity converted the profile into a humo-ferric podzol. Nevertheless, soil acidity remained less harsh than under the ensuing post Iron Age Calluna heath, as reflected in the buried soil displaying high levels of biological activity , in the bAh horizon and the polymorphic Bh horizon.

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Caesars Camp Keston, Kent Cornwall, 1958

Table 1

Soil Sample	pH	Alklali Soluble Humus*	Iron as Fe_2O_3*	Micromorphology**
Modern Soil on Rampart				
8 A1 (humic)	5.4	1.8	235	Poorly himified organic Ah
7 A2	5.5	0.3	90	Strongly eluviated Ea.
6 B1+2	4.5	2.2	875	Dark brown polymorphic and monrmorphic Bh with relic b Btsm fragments.
5 B/c	4.7	0.25	300	Cemented, sesquioxidic, in part relic (b Btsm) dumped parent material.
1st Rampart Phase Soil				
4 A1 (humic)	4.1	2.8	435	Well humified organic bAh.
3 A2	5.1	0.17	455	Partially eluviated bEa.
2 B	4.7	0.5	610	Poorly developed bB(s), with dusty clay coatings.
Iron Age Soil				
4 A1 (humic)	5.7	0.4	90	Well humified organic bAh, abundant charcoal. (Plates 1 and 2)
3 A2	6.2	0.02	90	Strongly eluviated bEa.

Soil Sample	pH	Alkali Humus*	Soluble Iron as Fe_2O_3	Micromorphology
2 B	5.2	0.34	90	Brown polymorphic bBh. (Plates 3 and 4)
1 B or B/C	4.4	0.05	475	Sands cemented by clay coatings and ssquioxides - bBtsm.

(*mgms./100gms. dry soil; ** detail includes review of thin sections at Institute of Archaeology, London with kind permission of Dr Cornwall).

Plates	Captions
1.	Photomicrograph: Keston; site 2, Iron Age soil (4, Al humic); Ah horizon containing large quantities of humified organic matter and charcoal; note channel porosity pattern. Plane Polarized Light (PPL), frame length is 5.225mm.
2.	As 1, Oblique Incident Light (OIL).
3.	Photomicrograph: Keston: site 2, Iron Age soil (2,B); Bhs horizon with well developed polymorphic organic (and sesquioxidic) microfabric. PPL, frame length 5.225mm.
4.	As 3, OIL.