Marcham 2003: the 'amphitheatre', buried soils, general notes on the site, and report of soil micromorphology sampling

Dr. H. Lewis

Introduction

This report summarises observations from the first two weeks of the 2003 University of Oxford excavation season at Marcham regarding issues of geoarchaeological interest (primarily the relationship of the 'amphitheatre' to the 'palaeochannel' running from this to the River Ock), and outlines the motivation behind taking soil micromorphology samples from various on-site deposits. The geoarchaeological issues raised changed almost daily on site, both with new archaeological evidence uncovered and with the opinions of visiting experts, and a final model of the relationship of the Roman site to the river and other drainage features will undoubtedly need further investigation. However, a basic understanding of the natural drainage has been developed, and some model of how this might relate to Roman site location decisions, and possibly use of the 'amphitheatre', can be generated. In a different aspect to the project, several samples for micromorphological study were taken, primarily from buried soil profiles and from floor deposits. It is hoped that these samples will help to elucidate the longer-term history of the site, and to produce a better understanding of the purpose, use and histories of the Roman buildings under excavation.

Drainage and the proposed Roman amphitheatre

The large round building called the 'amphitheatre' is located in a slight topographic hollow, overlying the upper part of a channel identified on aerial photographs running from north of the building down to the floodplain of the River Ock. Previous excavations had hit water at the base of the 'royal box' (stone structure described by Hingley 1985) on the south side of the building, and the possibility that the site was located on a spring had been floated. Questions of whether the building was constructed on an active spring, or whether this water was simply the water-table, whether the palaeochannel was open during the Roman period, and what all of this means for our understanding of the 'amphitheatre' were focal issues for the 2003 season.

Part of my time on the Frilford Roman site was spent exploring the various trenches and talking to many people regarding the various hydrological issues. One of the 2003 versions of how the 'amphitheatre' relates to the River Ock will be described below. It should be noted that after I had left the site, further work was conducted on this issue by Mike Langford and Lorraine Lindsay, who also were on site for a consultation with Oxford University geologists, and their reports should be consulted regarding updated information. Mike Langford is also conducting a study of the river itself and its use during prehistoric and Roman times, which should provide a good background for the place of the river in the archaeological landscape over time.

<u>Was there a spring in the hollow where the 'amphitheatre' was sited?</u>

The 'amphitheatre' was built just at the 60m contour, directly over the location at which groundwater seeps out, possibly through some sort of aquifer activity. This exact location is a spot in the landscape where various parts of the Corallian Beds are

exposed near the surface, and where other over- and underlying geological sand and clay layers may also be exposed. The nature of all of the various geological beds seen in the excavation trenches is currently under investigation by Mike Langford (OUDCE) and the Oxford University Geology Department. Much discussion this year on site was focused on deciding whether a spring had been present here in the past. While there is certainly seeping ground-water, no spring deposits (fan deposits, travertine, etc) have been found on the site, unlike what is seen in other locations with more prominent topography at the edge of the Corallian Beds (e.g. Groundwell Ridge, Gianna Ayala, pers. comm.). The conclusion from all observations on site is that there was never a spring here, although two complicating issues remain unresolved. The nature of the leg of the palaeochannel running to the north and uphill of the amphitheatre has not been explored, and there has obviously been significant alteration of the hollow through construction (and reconstruction) of the amphitheatre itself. The building was not constructed directly over a spring, but whether there is or was a spring slightly to the north cannot be answered at this time.

Given that none of the deposits found underlying the amphitheatre could be attributed to a spring, the issue of the origin of the sands and clays became focal. Were these simply exposed geological deposits? Alluvial deposits related to the palaeochannel or even the River Ock? Or culturally deposited materials related to amphitheatre construction - local geological deposits appear to have formed a major part of the bank construction sequences; perhaps the Romans had laid sand to consolidate or drain the floor of the building? In addition, the origin of the water found to seep into deep excavation holes needed to be determined.

Following much discussion and consultation, it has been agreed that the thick sand layer (part of which is currently waterlogged) found under the amphitheatre is probably the same as that found underlying the Corallian limestone in Trench 14, *i.e.* that it is a geological deposit. This was suggested by its clean nature, and by the presence of fossil shells within the sands, but work in Trench 9 extension threw some doubt on the geological interpretation when oyster shells and well-preserved wood were found in one waterlogged part of the sand deposit. (Perhaps a feature cut into the natural sand was missed due to the small area of excavation and the high water table?)

The nature of all of the sand and clayey layers underlying the amphitheatre and its colluvial infill soil profile greatly needs to be clarified and compared to known samples from the geological beds and the river floodplain. Part of Mike Langford's MSc project will aim to distinguish the geological and alluvial deposits in the area of the site, and develop an understanding of river and valley history. It is hoped that his work will confirm the on-site conclusion that much of what underlies the built archaeology is geological in origin.

Regarding the water, we currently believe that this seepage is related to some weak aquifer activity at the disjuncture in the geological strata, although groundwater table has yet to be ruled out (a survey measuring the real depth of groundwater across the site was to be carried out in the last two weeks on site; and see 'post-abandonment deposits' below). This 'wetness' has obviously been ongoing for some time, and presumably is related to the subsoil channel seen on the aerial photographs. The area is still very wet today, and there is no suggestion of water table change between now and the Roman period in this location (Mike Robinson, pers. comm.), so it is probably

a fair bet that the hollow was damp in the Roman period. The issue of why the Romans chose to construct this building at such a location is one of the major issues of the site. It is possible that, despite the apparent lack of spring, the same basic idea underlay this choice of location as seen at the 'nymphaea' mentioned above.

What is the 'palaeochannel' visible on aerial photographs?

As mentioned above, the physical relationship of the amphitheatre with the so-called palaeochannel appears to be very significant, and warrants further exploration. Initial investigations, in the form of trenches dug into the edge of this 'channel' exposed both oxidised and reduced clay and sand layers overlying bedrock. Perhaps the most telling exposure of the palaeochannel was one south of Trenches 8a/b, which was located to be within the proposed channel. No evidence of open channel deposits (silts, gravels, laminated fine layers) was seen in this trench. An oxidised clayey layer underlying the deep colluvial soil in this location might relate to some alluvial or seepage activity, but probably relates weathering of the bedrock on which it rests than to any other depositional process. There was standing water at the base of the trench, and it was apparent that water erosion of the bedrock was ongoing.

Mark Robinson, on his site visit, suggested that this channel probably dated to early Holocene times, although it may still serve as a subsurface drainage path for water from further upslope. The channel was probably never an open channel, but a seepage route; it certainly does not appear to have been an open water feature during the Roman period. However, there remain some enigmatic anomalies on the aerial photographs and the geophysics plots, possible cultural features demarcating the sides of the channel at various locations. Perhaps this subsurface flow route was altered by Roman activity in these locations? The evidence of the drains in the 'amphitheatre' (see below) shows that the creators of this building were certainly aware of the need for drainage, and the path they chose follows the direction of the channel. Investigation into the nature of the anomalies associated with the channel would help elucidate whether and how the Romans manipulated this natural drainage. Further information on the 'palaeochannel' should be forthcoming from Mike Langford's report on augering, and from the report on geophysical survey of the river valley and amphitheatre carried out by Brian Molyneaux.

Was the 'amphitheatre' a nymphaeum?

The idea that the amphitheatre was, in its earlier history associated with water and some sort of water feature was explored through the geoarchaeological investigation on site. However, it is mainly evidence from a later construction phase that suggests active water management in the structure as a whole, and possibly the creation of a small pool in one part of Trench 1. One key question regarded the purpose of the 'emperor's box' in Trench 9. This square structure was clearly part of a second phase of building (possibly contemporary with the (re)construction of the entranceway in Trench 1). It has no entrances, and my first impression of it was that is was some sort of cistern. Excavation into the floor of the structure supports the idea that it was related to drainage in some way, as it has apparent drain holes at the base of the walls, and later a complete Roman drain was exposed running through the structure. I cannot remember whether this drainage system works with the slope of the hollow (*i.e.* bedding down into the centre of the amphitheatre), or to take water from the hollow downslope to the river. This obviously is vital to understanding whether the 'amphitheatre' at this phase was mainly a dry construction or a construction related to

water retention. The function of the box is still uncertain, but there was no obvious ponding deposit (as when open water would stand in a pool) nor a great number of 'votive' artefacts found by the time I left the site, possibly suggesting that this box was not a 'nymphaeum' in the sense of others located along spring lines in the region (e.g. Groundswell Ridge & Blunsdon, near Swindon). Most of the deposits in the centre of the amphitheatre also do not suggest any phase of standing water (except as ground-water table – see below), although the degree of alteration of these after the building went out of use is unclear. Given this, and the arguments above for lack of a spring or surface pond, it seems fairly clear that the building as a whole was not entirely or only a nymphaeum.

However, just inside the entranceway in Trench 1, a black silty organic typical pond deposit was found. This deposit was different from all others located in the amphitheatre trenches, and was typical of basal deposits in ponds or pools (organic sludge). This means that at this phase (which post-dates the construction of a ramp underneath (and associated with?) the entranceway), not only was there water in this part of the building, but that it was somehow contained, and deep enough to develop these types of deposit, *i.e.* there was standing water here. Further excavation is required to understand how water was held in this location, how big this ponding was, whether or not this relates to the drainage features at the other side of the building (Trench 9), and to the entranceway adjacent to it. What does this pool mean in the history of the later use of the building?

Is the 'amphitheatre' an amphitheatre?

As noted by the excavators in previous seasons, there do seem to be two clear major construction phases: 1) the construction of the circular walls; 2) the construction of the 'royal box' (?and its elaborate drain), and creation (or reconstruction?) of an entranceway in Trench 1, with the later laying of a mortar floor (as found in Trenches 1 & 9). It is possible that these phases are separated by some sort of destruction phase: stratigraphically underneath the thick white mortar floor layer were found several layers containing roofing tiles, large stones (presumably from a wall), pottery, and burnt stones. Burnt stones were also noted in the second-phase constructions (the 'royal box', for instance) – possibly these were re-used from some destruction of the building itself? In Trench 9 a layer apparently containing industrial remains (possibly slag of some sort), along with tile, stones and charcoal was also located within this pre-laid floor sequence. Whether these remains point to destruction of some superstructure over the building at some point, or relate to nearby burning &/or industrial activity should be investigated. It should be noted that the large rectangular/cruciform structures (Trenches 2 & 18) to the south also have major burning horizons; the evidence for burning across the site obviously needs to be phased in some way. At the moment, I think that the second phase of building took advantage of the destruction of some building (possibly part of this one), re-using building materials to both raise the floor by some 20+ cm, and to construct a new entrance and the 'royal box' at the very least. So there appears to be some function that requires 1) a relatively dry floor, 2) a laid floor and 3) an entrance into the circle. This could be an 'amphitheatre' or similar type of structure. Further support for the 'amphitheatre' interpretation is said to come from the banks surrounding the building, (but see below).

The excavators believe that the wide banks found around the building fit with construction phase 1, but this was not clearly evident this year on site in any location.

The banks in Trench 1 were certainly either constructed alongside the entranceway, or cut through & remodelled when the entranceway was built. This entranceway (pathway) ran from the building itself all the way to the north edge of Trench 1 (in no place did we go outside of the banks/entranceway to the building). At the moment, it appears to be second phase, and there is no evidence of an earlier entranceway at this point. The construction of the entrance was complex: there is at least one fine layer of orange sandy clay underlying a large stone ramp (possibly constructed with stones from where the wall was broken through to create the entrance), which in turn was overlain both by the 'step' at the wall of the building, and by several layers of soil, including a further layer of orange sand with frequent pink wall plaster inclusions. The relationship of pink plaster to the building walls was still unclear when I left the site (i.e. was this related to Phase 2 rebuilding; or Phase 1, before possible 'destruction'; or does this plaster come from elsewhere completely?).

What was going on before the amphitheatre was built?
A complete, but thin, brown soil buried soil profile survives under the banks in Trenches 1 and 9. This comprises the following horizons:

Buried Ah	Turf line is visible as compacted layer 1-2cm thick with oxidation mottling of roots apparent, over greyish brown sandy buried topsoil, 15-25cm thick.
b A/B or Bw	Brown to reddish brown clay loam with blocky structure and few limestone pebbles, mainly at base; 5-15cm thick
C	Weathering Corallian limestone with reddish brown clay loam
R	Massive Corallian limestone

This profile is essentially the same as that seen today on the limestone (e.g. as exposed in Trench 14), except that the Ah horizon is currently an Ap (tilled). No chemical or detailed textural studies were carried out, but this profile appears to be a type of brown calcareous soil, similar to the description of the modern Marcham series (Soil Survey of England and Wales, 1971). These soils are typically formed over Jurassic limestones in Britain, are assumed to usually have been fairly shallow, at least in the more recent past, and are related in terms of placenames and historic land use to scrub woodland and heath, becoming used for arable farming only in relatively recent times (Bridges 1978, 92-3). In this location, before the amphitheatre banks were constructed, the area immediately around the site appears to have supported some sort of grassland, given the clear turf line visible in the sections. Presumably this would have been pasture; given the presence of the hollow, and its location in the landscape, it may have been wet pasture. There were no clear indicators of other land cover (scrub, trees), and the lack of rock fragments in the mainly stone-free buried A horizon suggests there was no major, extended or deep arable land use prior to building construction. If there had been cultivation here, one might expect limestone fragments from the highly weathered C horizon to be found throughout the profile. In addition, the soil characteristics are of a type that might preserve features of cultivation such as ard marks (sandy clay soil, iron-rich, in a leaching environment). Instead, the horizon is basically free of rock fragments, especially larger ones, is very well sorted overall, and shows no macroscopic

structural or textural signs of significant disturbance. Despite no obvious tree presence at this location, Trench 1 (nearer the river) did contain apparently ancient tree bowls, suggesting some micro-variation in groundcover across the site in the Iron Age, at least.

Post-abandonment deposits

The centre of the amphitheatre appears to have been filled mainly with colluvial material (>1m thickness in all locations within the inner walls). This appears to be originally topsoil material, presumably mainly moved downslope from the north under the influence of historic ploughing (possibly relatively recent ploughing; the only datable finds at the time I left were rare fragments of Medieval pottery). It was unclear to me at the end of the season whether the amphitheatre had been partially filled in: the sections at Trench 9 extension showed a very thick colluvial soil profile, with no obvious underlying or intermixed 'infilling' material of any kind. In this location the soil profile differs from that described above, coming off onto waterlogged (gleyed) sand over the Corallian (see Mike Langford's report for details of this profile).

This is a ground-water gley soil. There is no well-developed Ea/Eb horizon, there are no indications of an impermeable horizon in the exposed profile, and the profile has a thick mottled zone of permeable soil and sand above the saturated grey sand that was at the base of the trenches. Its location in the lower part of the landscape also fits with a ground-water gley. Nearby loamy ground-water gleys include soils of the Kelmscot Series (Soil Survey of England and Wales, 1971); since our profile has such a major colluvial component, and we have done no detailed study yet on either the soil or the sand underlying it, I would hesitate in comparing it directly to the any of the gley series described in the soil survey. Although presumably it would fit with one of them regarding parent material and location, it is unclear to me from the maps available, which one of these this would be. The general profile (from memory only) is:

Ap/A	20-40cm deep, brown sandy loam with moderate to frequent 2-10cm gravel inclusions (colluvial soil)
	(Water-table in wet season)
Bg	30-40cm deep, grey brown mottled sandy loam (becoming sand with depth), zone of alternating water-table
	Water-table in dry season (permanent)
Cg	>40cm exposed, grey saturated sands and gravels below water-table level

It should be noted that in other locations the exposed geology shows limestone overlying yellow (oxidised) sands. Indeed, the exposed geology across the site is relatively permeable (Corallian limestone, sand layers – even where clay was found just at the water table, e.g. Trench 8a/b area, this was not waterlogged), suggesting that this gleying may be relatively localised; perhaps this part of the site overlies some relatively impermeable substrata/um at depth? Microtopographic study would help elucidate whether this variation relates more to depth of exposure (*i.e.* ground water-table level across the site), localised presence/absence of permanently seeping water

(*i.e.* over the palaeochannel), or to the presence/absence of an impermeable stratum at different locations.

Future directions

The variation in water impact appears to relate mainly to micro-topographic factors (including level of exposure, ground-water table level, and location of specific geological deposits and exposures in the immediate landscape). A working model, with great room for qualification, has been developed regarding the various waterlain deposits and channel features underlying the amphitheatre building; this will undoubtedly be greatly refined and altered through the on-going studies mentioned above. Regarding choice of this location to build a large circular structure, while the nymphaeum theory has not been proved, there are indications that whatever was happening in this building, water and water management were very important. In addition, this management did not simply involve draining water away from the centre of the building, or building well over the water-table, at least not until the very latest phase of its history, but seems to suggest taking advantage of the wetness of this landscape location for some unknown purposes. Further investigation into the extent and nature of the various drain constructions, as well as the ponding deposit identified would greatly help in understanding how this building worked in its environment, because it obviously was very carefully designed specifically for its exact location in the landscape. Although the interpreted relationship between the ancient palaeochannel and the amphitheatre appears at the moment to be mainly spatial, this proposed seepage route was obviously important enough for the Romans to construct upon it, to become involved in its drainage, and possibly to interfere with it along its channel. This needs investigation through excavation of known anomalies along the channel. While this season's excavations obviously revealed a great deal more about how this building was made, there are still many mysteries about its construction and use. On top of the issues of choice of location, water-retention & drainage, and phasing, the possibility of destruction, of variable use of different locations within the 'amphitheatre' both within and between phases of use/construction, and the relationship to nearby buildings all need serious consideration. In addition, it would be good to get a better understanding of the end of the building's life, and to try to sort out what was going on in its centre. One obvious issue is the dating and nature of the amphitheatre 'fill'; it is hard to believe that this building filled in slowly by hillwash over hundreds of years and maintained its structure in such good form as seen today. Was it deliberately filled in? And if so, when did this happen, and what deposits represent this action? It is possible that historic land use documents (Medieval and post-Medieval sources/maps) could provide clues to this.

Soil micromorphology samples

Block samples for soil micromorphology were taken from several contexts (Table 1 & Appendix). First, a set of samples was taken from floor layers in the large Roman building (Trench 18), and from the laid floor in amphitheatre Trench 1. It is hoped that microscopic study of floor construction sequences, materials, and evidence of type of use from microstructure and inclusions will help us to better understand how these buildings were used over time. Several micromorphological studies of ancient floor layers and building construction/destruction sequences have been conducted (e.g. Matthews *et al*. 1996; Ge *et al*. 1993; Boivin 1996 & 2000; Wallace 2000), providing a good basic approach to floors in general, and some general comparative information. These have included microscopic studies of certain materials expected

or known to be included in floor and construction/destruction sequences, such as plaster, daub, and paint.

Table 1 List of samples and their contexts

Sample	Contexts	Description
1.11	1162, 1163	Ponding deposit, 'amphitheatre' entrance, Trench 1
1.12	1189, 1163	White floor layer of 'amphitheatre', Trench 1
1.13	1185, 1153	Lower bank & upper buried A horizon, Trench 1
1.14	1185, 1153	As 1.13
1.15	1153	Lower buried A & upper B horizons, Trench 1
1.16	1184, 1183, 1185	Turf horizon in bank deposits, Trench 1
9.25	9057, 9064	Turf horizon in bank, upper buried A horizon, Trench 9
18.09	18101, 18013, 18102	White mortar floor, soil layers, Roman building, Trench 18
18.10	18101, 18102	As 18.10
18.11	18026, 18027, 18050, 18051	Mortar floor, soil layers, burning, Roman building, Trench 18
18.12	18052, 18053	Red stony layer, 'soil' in large Roman building, Trench 18

A second group of samples was taken from the buried soil and soil layers in the bank sections in Trenches 1 & 9. These should enable further characterisation of the pre-amphitheatre soils and land use practices on the site, which will allow us to begin to address issues of longer-term history in the locality. Buried soils have been a frequent focus for archaeological study (e.g. Bryant & Davidson 1996, Macphail *et al*. 1987 & 1990; Lewis 2002), providing information on ancient environments as well as cultural activities in the landscape before, during and after construction and use of monuments. Soil construction layers in monuments are also very informative regarding environment and land use practices, as well as giving us an insight into monument construction practices and decisions (e.g. French *et al*. 2001).

Finally, one sample was taken through the 'ponding' deposits next to the amphitheatre entranceway in Trench 1. This sample was taken for comparative purposes, to be examined in light of findings from other environmental approaches (mainly archaeobotanical). These deposits represent the only context found to date on the entire site where open water (possibly some sort of pool) can be demonstrated to have been present.

The samples are currently at the McBurney Laboratory for Geoarchaeology, University of Cambridge, where they will be processed and thin sections produced (funded by the Institute of Archaeology at Oxford University). At the moment it is uncertain who will do the soil micromorphology study of the floors, which would make a good student project, given the small number and relatively simple deposits and questions. Unless an Oxford student comes forward, there is potential to get this set of samples done as a small research project by either an MPhil or third year undergraduate archaeological soil micromorphology student at the University of Cambridge, or possibly at Reading University. In addition to the author's help, a student at Cambridge would have supervision from Dr. Charles French, and possibly Dr. Nicole Boivin. At Reading, micromorphology students are supervised by Dr. Wendy Matthews. The buried soil and ponding samples from Frilford will be analysed by the author, who has a decade of experience exploring ancient land use practices from buried soils, and depositional contexts in archaeological features in the field and in thin section. If the samples can be made within the next academic year, it is anticipated that final reporting would occur by September 2004.

Acknowledgements
Thanks to Chris Gosden, Gary Lock, Mike Langford, Hannah Fluck, Lorraine Lindsay, Mark Robinson, Jen Heathcote, Gianna Ayala, Dave Bukach, Patrick Daly, Stephen Yeates, Dave Griffiths, Carole Wheeler, Paula Levick, Sheila Raven, Richard Bailey, Charles French and Miranda Semple for their help and consultation.

Bibliography

Anon. 2002. *The Ridgeway and Vale Project: Excavations at Marcham 2001-2002*. Unpublished report.

Boivin, N. L. 2000. Life rhythms and floor sequences: excavating time in rural Rajasthan and Neolithic Catalhoyuk. *World Archaeology*, 31 (3), 367-388.

Boivin, N. L. 1996. *The micromorphological analysis of a Hellenistic to Roman period occupation sequence from the Souks site in Beirut, Lebanon.* Unpublished MPhil dissertation, Department of Archaeology, University of Cambridge.

Bridges, E. M. 1978. *World Soils*, 2nd edition. Cambridge: Cambridge University Press.

Bryant, R.G. and Davidson, D.A. 1996. The use of image analysis in the micromorphological study of old cultivated soils: an evaluation based on a case study from the island of Papa Stour, Shetland. *Journal of Archaeological Science*, 23, 811-822.

French, C. A. I. 1997. Micromorphological analysis of the buried soils. In Malim, T. New evidence on the Cambridgeshire Dykes and Worsted Street Roman Road. *Proceedings of the Cambridgeshire Antiquarian Society*, LXXXV, 90-95.

French, C. A. I. 1999. Star Carr: the micromorphological analyses of the old land surface. In Mellars, P. A. and Day, P. (eds.) *Star Carr in Context*, 80-82. McDonald Institute for Archaeological Research Monograph.

French, C. A. I., Lewis, H., Allen, M. and Scaife, R. 2001. Palaeoenvironmental and archaeological investigations on Wyke Down and in the upper Allen valley, Cranborne Chase, Dorset, England: Interim Summary Report for 1998-9. *Proceedings of the Dorset Natural History and Archaeological Society*, 122, 53-71.

Ge, T., Courty, M.-A., Matthews, W. and Wattez, J. 1993. Sedimentary formation processes of occupation surfaces. In Goldberg, P., Nash, D. T. and Petraglia, M. D. (eds.) *Formation Processes in Archaeological Context*. Monographs in World Archaeology 17. Prehistory Press.

Hingley, R. 1985. Location, function and status: a Romano-British 'religious complex' at Noah's Ark Inn, Frilford (Oxfordshire). *Oxford Journal of Archaeology*, 4 (2), 201-214.

Lewis, H. A. 2002. 2002. An investigation of the ancient cultivation remains at Hengistbury Head Site 6, Christchurch, Dorset. *Proceedings of the Prehistoric Society*, 68.

Macphail, R. J., Romans, J. C. C. & Robertson, L. 1987. The application of micromorphology to the understanding of Holocene soil development in the British Isles; with special reference to early cultivation. In N. Fedoroff, L. M. Bresson & M. A. Courty, eds. *Micromorphologie des Sols—Soil Micromorphology.* Plaisir: AFES, pp. 647–656.

Macphail, R. J., Courty, M. A. & Gebhardt, A. 1990. Soil micromorphological evidence of early agriculture in north-west Europe. *World Archaeology,* 21, 54–69.

Matthews, W., French, C. A. I., Jones, M. K., Cutler, D. F. and Lawrence, T. 1996. Multiple surfaces: the micromorphology. In Hodder, I. (ed.) *Catalhoyuk : The surfaces of things*, 301-342. British Institute of Archaeology at Ankara Monograph No 22. Cambridge: McDonald Institute.

Soil Survey of England and Wales. 1971. Sheet 253, Abingdon, 1 inch:1 mile.

Wallace, G. 2000. Microscopic Views of Swiss Lake Villages. *Antiquity*, 74, 283-284.

Appendix

Field descriptions of contexts sampled for soil micromorphology:

1153 Buried soil profile (horizons bA & bB), friable reddish brown sandy loam with very few small stones, 30cm thick

1162 Ponding deposit at amphitheatre entranceway, compact black clay, 10-15cm thick, flotation produced no organic remains

1163 Loose greyish gritty sandy loam, with some small stones, charcoal flecks and plaster fragments

1183 Turf layer in bank, compact mid-grey gritty sandy loam with no inclusions, 5-20cm thick

1184 Bank material, compact mid-yellowish brown sandy clay with limestone fragments, up to 40 cm thick

1185 As 1184

1189 Laid floor of amphitheatre, gritty whitish/grey ?mortar, up to 15cm thick next to walls

9057 Turf layer at base of bank, loose to friable yellow/greyish brown sandy deposit with iron flecking and few very small pebbles, 15-30cm depth, with a 1-2cm thick layer of iron flecking

9064 Upper buried A horizon under bank, friable mid-grey brown sand with occasional charcoal flecks and tile/brick fragments, 20-30cm exposed

18101 Tightly packed white mortar floor layer

18102 Friable reddish-brown silty clay ?floor

18013 Mid-brown silty loam

18026 Loose, light-mid yellow loam, ?floor layer

18027 Yellowish grey sandy deposit with limestone inclusions, ‘floor’

18050 Dense burnt layer, friable and black, with few inclusions

18051 Compact loam; red brown ?floor level

18052 Dark brown loam; reddish stony layer

18053 Described in field as ‘soil’