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THE COLONISATION AND SETTLEMENT OF CYPRUS

INVESTIGATIONS AT KISSONERGA-MYLOUTHKIA, 1976-1996

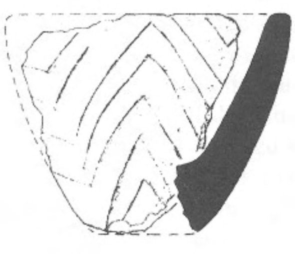
Edited by

Edgar Peltenburg

Diane Bolger, Sue Colledge, Paul Croft, Sherry C. Fox, Elizabeth Goring, Adam Jackson, Dororthy A. Lunt, Carole McCartney, Mary Anne Murray, Janet Ridout-Sharpe, Gordon Thomas and Marie E. Watt

with contributions by

Eleni Asouti, Ruby Cerón-Carrasco, B. Gratuze, D. Miles and Jenny Shiels



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PAUL ÅSTRÖMS FÖRLAG

Chapter 8: The Wood Charcoal Macro-remains: A Preliminary Report

by

Eleni Asouti

This report details the results of the microscopic examination of wood charcoal macro-remains from Neolithic and Chalcolithic Mylouthkia. Given the time constraints and the fact that the excavated deposits cover multiple phases of occupation, the analysis concentrated mainly on the wood charcoal assemblages retrieved from the earliest phases of the settlement, Periods 1A and 1B. The later occupational phases, Periods 2 and 3, which are characterised by more complex depositional contexts, have not been dealt with to the same extent.

§ 8.1 Sample selection and laboratory procedures

The Mylouthkia Cypro-PPNB deposits consist of a series of wells and pits associated with activity areas such as floors and hearths. For the purpose of this assessment, two wells (116 and 133) were targeted for analysis. Because well 133 had very poor charcoal preservation, archaeobotanical samples from another context (pit 338) were also included in the analysis. In an attempt to evaluate potential differences in taxonomic representation and preservation conditions between the aceramic strata and later (Chalcolithic) deposits, a number of samples were selected from the latter, including two Period 2 pits (100 and 108) and various sub-units from B 200 (Period 3).

Wood charcoal samples were first weighed on a high precision scale and then passed through a stack of laboratory test sieves (mesh sizes: 4 mm, 2 mm and 1 mm) in order to separate charcoal fragments into different size grades. All charred specimens smaller than 1 mm were generally excluded from further analysis. The remaining fragments were pressure-fractured with a razor blade in order to produce fresh, clean surfaces whenever possible in all three anatomical planes (transverse, radial longitudinal and tangential); they were then examined under a high power, epi-illuminating microscope at magnifications of x50, x100, x200 and x400. When available, specimens in the range of 4-2 mm were examined, whilst in a few instances those retained in the 1 mm mesh were also analysed to compensate for inadequate fragment numbers.

Identifications were made by comparison to fresh and charred specimens included in the C. A. Western wood reference collection held at the Institute of Archaeology (UCL), and to wood anatomical descriptions in Fahn *et al.* (1986) and Schweingruber (1990). The anatomical features used for the final identifications were those specified by Western (1969) for wood charcoal specimens deriving from trees and shrubs of the Eastern Mediterranean. Tables 8.1 and 2 summarise the taxonomic information available from the sampled contexts of Periods 1A-1B and 2-3, respectively.

§ 8.2 Taphonomic observations

Most samples from Period 1 yielded very few fragments larger than 2 mm (R372: 8, R373: 3, R375: 4, R392: 8, R393: 7, R398: 2, R400: 1, C532: 2). The overall low quantities of wood charcoals are, to some extent at least, reflected in the low charcoal weights recorded for the examined samples (for a full report and discussion of the densities of charred plant remains, see § 7 and 21. For well 116, well 133 and pit 338 the descriptions of the fill layers (silty infill with a substantial component of stones, cobbles and gravels) seem to suggest that a significant degree of charcoal breakage and loss must have occurred in the past as a result of discarding practices and post-depositional attrition (for example, through the process of infilling). Trampling, variations in surface exposure and sediment moisture, reheating and other physical processes might also have resulted in further breakdown of wood charcoals (cf. Lopinot 1984, 98).

Another factor affecting wood preservation could have arisen from the very nature of the fireplaces in use by the Neolithic settlers. Depending on the structure of the fire and the size of the consumed logs (i.e., shrubs and small branches as opposed to stem-wood proper) it is reasonable to infer that, for open fires at least, wood charcoals would be less likely to be preserved in large quantities due to the strongly oxidising heating environments (Smart and Hoffman 1988).

Although we can only speculate as to how frequently the Neolithic inhabitants of Mylouthkia cleaned their fireplaces, it seems plausible that disposal of firewood refuse was more or less unstructured. Empirical observations on the state of preservation of wood charcoals in open fires suggest that for the most part very little will remain in the form of sizeable fragments unless hearths are regularly cleaned and their contents disposed of in specific dumping locations away from the main activity areas. It has also been demonstrated ethnographically that in open-air hearths associated with activity areas, the cooking of plant and animal foods may lead to considerable intermixing of the basal deposits and the displacement of cinders, ash and fire-cracked stones due to the constant searching in the ashes for roasted foods (Binford 1983, 157). The effects of these processes on charcoal fragmentation and loss can be further heightened, as fires are re-kindled on a daily basis and the same routines repeated over long periods.

A quite different situation was encountered with samples deriving from pits 100 and 108 (Period 2) and B 200 (Period 3). Although the examined samples are too few to permit viable working hypotheses concerning taxon representation, they are nonetheless meaningful in terms of formation processes and the archaeology associated with these particular features. Pit fill 100.02 was cut in by a shallow, flat-bottomed ditch with post emplacements on a ledge, whereas pit 108 truncated another pit (109) partially filled with decayed building material. Both deposits gave the largest assemblages retrieved so far anywhere on the site, a fact perhaps not unrelated to their association with building materials and potentially the remains of structural timber (see Table 8.2; deciduous oak and pine, which dominate these particular assemblages, are both suitable candidates).

On the other hand, the wood charcoal assemblages retrieved from B 200, despite their apparently higher densities (mean weight value of 8.072 g compared to 0.743 g for the samples examined from Periods 1A-1B), were very poor in wood taxa. Indeed most of the fragments were completely unidentifiable, irrespective of the size of individual specimens. Sectioning and subsequent microscopic examination showed that wood charcoals were almost in a state of fossilisation . Pores, vessel elements, fibres and rays were covered and/or substantially deformed by thick layers of carbonates and mineral inclusions. This was particularly obvious amongst the more sizeable fragments (> 4 mm) that predictably offer the largest surface area amenable to such transformations. This phenomenon offers an adequate explanation as to the high charcoal weights recorded for these samples. It may also explain why these weight values were not matched by equally high fragment counts: it has been observed that wood charcoal assemblages subjected to similar post-depositional alterations face the risk of loss of material due to excessive breakage caused by the over-concentration of mineral inclusions and precipitates (Greenlee 1992). Units 200.155, 159, 168, 293, 172 and 293 yielded as a whole only four identifiable fragments. These contexts (apart from 168, a potspread) comprised fill layers consisting mainly of whitish silts, yellowish ashes, mud wash and plasters (see § 13). Such sedimentary matrices are apparently responsible for the very poor preservation of charcoal remains in these deposits. Charcoals from units 200.276, 283 and from wall 277 were only marginally better preserved. These units represent floors (200.276, 283) and wall segments (277) that maintained traces of a former timber frame, as evidenced by the occurrence of postholes. The presence of *Pistacia* wood fragments on floor 200.283 is extraordinary compared to the other contexts analysed, andit is therefore possible that *Pistacia* logs and/or round-wood were used in the timber structure of the building. However, in principle, the same observations apply to these contexts as to the rest of the material examined from B 200.

§ 8.3 Reconstruction of past vegetation and human activities

The results produced by this preliminary assessment are not detailed enough to allow a comprehensive reconstruction of past vegetation and wood use. Based on the published information from this and other Aceramic Neolithic sites (van Zeist 1981, Miller 1984, Renault-Miskovsky 1989, Hansen 1991, § 7) it seems certain that the Neolithic inhabitants of Mylouthkia lived in a landscape characterised by typical Mediterranean woodland vegetation. The charcoal data point to the presence of a broad range of Mediterranean taxa such as evergreen and deciduous oak (*Quercus*), lentisk (*Pistacia*), wild carob (*Ceratonia*), fig (*Ficus*), honeysuckle (*Lonicera*), cherry (*Prunus*), strawberry-tree (*Arbutus*), tree-heather (*Erica*), various mints (*Salvia*, *Phlomis* and other members of the Lamiaceae family), legume, shrubs (Fabaceae indet., *Retama*, *Anagyris*), buckthorns (*Ziziphus*/*Paliurus*), chenopods (*Atriplex* type), cistus (*Cistus*), olive (*Olea*) and pine (*Pinus*).

It is difficult to delineate the specific vegetation catchments frequented by the Neolithic group during their firewood trips. The absence of hygrophilous elements (as for example tamarisk), if not accidental, is certainly instructive. Some of the shrubs found amongst wood charcoals (i.e., Lamiaceae, *Cistus*, chenopods) do thrive in dry, saline soils but they can also occur in woodland openings and/or drier patches of land. The co-occurrence of deciduous and evergreen oaks alongside the rest of the trees and shrubs reported here indicates a more or less dense woodland/forest cover, possibly of the *maquis* type (cf. Christodoulou 1959, 45-51; Zohary 1973, 154-155).

Although the available quantitative data do not warrant any firm conclusions as to which, if any, were the preferred firewood species, the overall impression is that wood (deriving from a wide range of taxa) was probably the main type of fuel in use by the Neolithic people at Mylouthkia, with pine and oak as the principal building timbers during later periods. It has been already pointed out how taphonomic processes (burning conditions, use and properties of wood, discarding practices, depositional environments and post-depositional transformations) may have impacted on the actual quantities and the fragmentation status of the charcoal assemblages recovered from both the Cypro-PPNB and later deposits. Elsewhere, it has been suggested, with reference to the archaeobotanical evidence from Khirokitia, that very small quantities of charcoal remains both in absolute terms and in their relative proportions to seeds, may indicate the use of dung instead of wood as the primary source of fuel (see Miller 1984). It is the opinion of this author that unless the site and context-specific formation processes are accounted for, statements about the intensity of use of plant resources, especially wood, based solely on density measurements (e.g., weights and/or counts), are at best ambiguous.

§ 8.4 Conclusions

The initial results from the laboratory examination of the wood charcoal macro-remains from Kissonerga-Mylouthkia have been very promising. In total, twenty-one taxa were recovered, thus allowing a tentative assessment of woodland composition in what concerns the earliest phases of the settlement. More importantly, perhaps, the evaluation of the various ways through which multiple taphonomic factors may have affected charcoal preservation and taxon representation offers a sound basis for addressing questions of wood utilisation (as fuel and timber) by the prehistoric communities living in this area. Future investigations could concentrate on the systematic sampling and retrieval of wood charcoals from a broader range of contexts and chronological periods in order to obtain a more complete picture of past vegetation, the local strategies of woodland exploitation and their impact on prehistoric environments.

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Table 8.1. Taxonomic frequencies for Periods 1A and 1B

Feature	*116*	*116*	*116*	*116*	*116*	*166*	*116*	*116*	*116*	*116*	*116*	*133*	*133*	*338*	*338*	
Unit	*114*	*114*	*123*	*124*	*124*	*124*	*124*	*125*	*191*	*191*	*192*	*260*	*264*	*352*	*354*	
Sample	*R372*	*C481*	*R373*	*R375*	*R392*	*R393*	*C517*	*C482*	*R396*	*R398*	*R400*	*C530*	*C531*	*C541*	*C542*	
Charcoal weight (g)	*0.752*	*0.142*	*0.704*	*1.143*	*1.792*	*0.231*	*0.175*	*0.180*	*1.079*	*0.436*	*3.460*	*0.282*	*0.338*	*0.172*	*0.255*	
Quercus (evergreen)	-	-	-	-	-	-	-	1	11	-	2	-	1	4	13	32
Quercus (deciduous)	-	-	-	-	-	-	-	-	-	-	5	-	1	-	-	6
Pistacia	12	2	11	-	1	-	13	13	1	-	44	3	5	3	-	108
Arbutus	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	2
Erica	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Ficus	-	-	-	6	4	6	-	-	-	-	1	-	-	-	-	17
Prunus	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Lonicera	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Zizithus/Paliurus	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Fabaceae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Ceratonia	-	-	-	-	-	-	-	1	-	-	-	1	4	3	-	9
Cf. *Retama*	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Lamiaceae indet.	-	-	8	-	1	-	-	-	-	-	-	-	-	-	-	9
Salvia	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Cf. *Phlomis*	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cf. *Atriplex*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Cf. *Cistus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Graminae indet.	-	-	-	-	-	1	7	5	-	-	-	-	3	1	-	17
Indet.	16	14	3	3	57	29	10	31	8	12	24	26	14	9	14	270
Total	28	20	22	9	63	36	30	55	20	12	77	30	30	20	30	482

Table 8.2. Taxonomic frequencies for Periods 2 and 3

Feature	*100*	*108*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*	*B200*		
Unit	*2*	*2*	*155*	*155*	*159*	*159*	*168*	*168*	*172*	*172*	*276*	*283*	*293*	*277*	
Sample	*R414*	*R415*	*R384*	*R386*	*R378*	*R379*	*R382*	*R387*	*R381*	*R385*	*R417*	*R428*	*R424*	*R418*	
Charcoal weight (g)	*11.163*	*46.607*	*5.281*	*4.041*	*1.149*	*15.177*	*3.958*	*2.781*	*8.561*	*8.261*	*0.102*	*1.640*	*1.112*	*2.588*	
Quercus (evergreen)	-	-	-	2	-	-	-	-	-	2	9	-	-	-	13
Quercus (deciduous)	77	-	-	-	-	-	-	-	-	-	-	-	-	-	77
Pistacia	2	-	-	-	-	-	-	-	-	-	-	27	-	6	35
Olea	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Pinus	-	87	-	-	-	-	-	-	-	-	-	-	-	-	87
Cf. *Anagyris*	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Indet.	20	13	3	12	4	35	56	17	29	24	13	3	3	3	235
Total	100	100	3	14	4	35	56	17	29	26	22	30	4	9	449