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Tracing Transformations in the Built and Social Environment of Early Cypriot Communities

Marialucia Amadio

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Abstract

The study of architecture, from the selection, procurement and processing of raw materials, to the construction and use of buildings as spaces of action and interaction, can provide major insights into the social organisation of ancient communities. Architecture, as a way of organising space and encoding meaning, plays an active role in structuring movement and socio-cultural identities and provides a range of potential avenues for exploring social motivations and rationales in particular contexts and environments, both at the individual and community levels.
This book examines 'architecture' as key media for analysing socio-cultural narratives in prehistoric Cyprus and exploring the formation, reproduction and development of early Cypriot communities. In particular, the volume aims at moving beyond the classification of architectural forms and functions and exploring the social, ideological, economic and political transformations that characterised the Cypriot prehistory from the late Aceramic Neolithic until the advent of the Late Bronze Age (7000/6800-1750/1700 Cal BC) by using architectural evidence as the focal analytical data-set. The interest of this study is not only in how people constructed buildings but also in how buildings contributed to the construction and definition of new socio-cultural and economic identities during Cypriot prehistory. Through a detailed review of the existing architectural data-set available for prehistoric Cypriot settlements, the book aims to understand how the development of new concepts of architecture, and the increasing appearance of social, cultural and economic forms of complexity are mutually constituted.

Keywords Built environment. Architecture. Prehistoric Cyprus. Multiscalar analysis.

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“What this clay hides and shows is the passage of a being through time and space, the marks left by fingers, the scratches left by fingernails, the ashes and charred logs of burned-out bonfires, our bones and those of others, the endlessly bifurcating paths disappearing off into the distance and merging with each other. This grain on the surface is a memory, this depression the mark left by a recumbent body. The brain asked a question and made a request, the hand answered and acted”
(Saramago, J. *The Cave.* London: The Harvill Press, 2002, 68)

Preface

The present volume is the result of the research interests developed throughout my academic experience as a student and researcher. The arguments exposed in the three core chapters of the book are partially based on my doctoral thesis at the University of Reading entitled *Architecture and Urbanisation in Bronze Age Cyprus: Local and Regional Innovation in Materials, Technology and Social Representation*. In this thesis, I examined how the development of new forms and concepts of architecture and the increasing appearance of social, cultural and economic forms of complexity at the end of Prehistoric Bronze Age Cyprus, are mutually constituted. In this book, I have decided to expand the discussion presented in my doctoral research and include in my analysis the examination of the social and architectural transformations of the early communities in Cyprus from the Late Aceramic Neolithic until the end of the Middle Bronze Age. The idea, when I set up the arguments of the volume, was following the process of building construction, starting from the examination of building activities as key indicators of social practices until the analysis of building forms and settlement spaces as loci of encounters and interaction between social agents.

The discussions presented in this volume represent elements of a work in progress and should be considered a starting point more than a conclusive study of the built and social environment of prehistoric Cyprus. What it is important to stress is that architectural evidence has not been examined only as a collection of shapes and design. Instead, every section of the volume was animated by questions about social structures and domains of relationships between individuals and the natural and social environment they interacted with. As a cultural artefact, architecture was treated as a metaphor for human engagement and communication.

For the accomplishment of this book, I would like to express my sincere gratitude to my PhD supervisors, Wendy Matthews and Roger Matthews, for the fruitful discussion and their constructive feedback. Thanks to my PhD programme at the University of Reading I expanded the horizon of my research and I developed a strong interest in the study of the ancient built environment. My sincere thanks go to Luca Bombardieri, who encouraged me to complete this work and has supported my research since the very beginning of my academic experience. Thanks also to the members of the Erimi Archaeological project and to the colleagues and friends I met in Cyprus during these years; many ideas embedded in this volume have been stimulated by informal discussions with them. I am very grateful to the two reviewers who greatly helped to improve the arguments presented in the volume. I would like to thank Lindy Crewe, in particular, for having accepted to review the volume despite her work appointments. I am grateful to the community of scholars and researchers working in Cyprus, in particular to Jenny Webb, Diane Bolger and Stuart Swiny, who supportively granted me permission of using some of the photographs included in the book. I would like to thank also the Department of Antiquities of Cyprus, particularly the director Marina Solomidou-Ieronimdou. This book could not have been accomplished without the financial support of the Dipartimento di Studi Umanistici, Università degli Studi di Torino and the Dipartimento di Civiltà e Forme del Sapere, Università di Pisa, where I am currently working as a post-doc fellow. Finally, my sincere acknowledgements to the staff of the book series *Studi Ciprioti*, Edizioni Ca' Foscari, who assisted me in the making of this book.

Abbreviations used throughout the volume:

LAN = Late Aceramic Neolithic
CN = Ceramic Neolithic
EChal = Early Chalcolithic
MChal = Middle Chalcolithic
LChal = Late Chalcolithic
EC = Early Cypriot (Early Bronze Age Cyprus)
MC = Middle Cypriot (Middle Bronze Age Cyprus)

1 Introduction

Summary 1.1 Establishing the Contexts. – 1.1.1 The Theoretical Context. – 1.1.1.1 Architecture and Social Reproduction. – 1.1.1.2 The Social Lives of Buildings. – 1.1.1.3 Households and Communities. – 1.1.1.4 The Built Environment in Cypriot Studies. – 1.1.2 The Chronological Context. – 1.2 The Volume in Context.

1.1 Establishing the Contexts

The study of architecture, from the selection, procurement and processing of raw materials to the construction and use of buildings as spaces of action and interaction, can provide major insights into the social organisation of ancient communities. Architecture, as a way of organising space and encoding meaning, plays an active role in structuring movement and socio-cultural identities (Giddens 1984; Fisher 2007, 1-3; Robb 2007, 76) and provides a range of potential avenues for exploring social motivations and rationales in particular contexts and environments, both at the individual and community level (Steadman 2010). This book examines 'architecture' as key media for analysing socio-cultural narratives in prehistoric Cyprus and exploring the formation, reproduction and development of early Cypriot communities. In particular, the volume aims at moving beyond the classification of architectural forms and functions and exploring the social, ideological, economic and political transformations that char-

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acterised Cypriot prehistory from the Late Aceramic Neolithic until the advent of the Late Bronze Age (7000/6800-1750/1700 cal BC) by using architectural evidence as the focal analytical dataset. The interest of this study is not only in how people constructed buildings but also in how buildings contributed to the construction and definition of new socio-cultural and economic identities during Cypriot prehistory. Through this approach, the intangible aspects of society can be analysed beyond the examination of structural forms and designs (Given 2004, 105; Love 2010, 1). Architectural forms, in fact, are dictated by the social conventions and practical needs of their occupants and cannot be effectively treated as spatial, rather than social relations (Goodman 1999, 145).

Prehistoric and protohistoric Cypriot architecture has been often discussed in terms of its stylistic, functional, technological and chronological attributes and less as the product of human action and intention (cf. Karageorghis 1982; Hult 1983; Wright 1992). However, the agent-centred research applied to the study of ancient Cyprus over the last decades greatly contributed to overcoming the tradition of the culture-historical approach and to opening new research directions in support of the study of early communities on the island (cf. Bolger 2003; Fisher 2009b; 2014a; see also § 1.1.2). Following this research trajectory, this book aims to understand how the development of new forms and concepts of architecture, and the increasing appearance of social, cultural and economic forms of complexity during prehistoric Cyprus are mutually constituted. To accomplish this, I examine the role of architecture and material culture as media for expressing social reproduction and as the context for social action and interaction, through a multi-scalar and interdisciplinary analysis of architectural materials, forms and practices, and concepts and representations of built space. This will provide data to analyse the social, cultural and economic trajectories of prehistoric communities on the island.

In what follows, I examine the theoretical background through a review of previous approaches to the study of the built environment, with a particular focus on agent-centred theory as the built environment is a lived space imbued with identities and memories that acts as an active contributor in the production and reproduction of socio-cultural relationships and identities (Hodder 1992; Dobres 2000; Dobres, Robb 2000; Robb 2010). I then introduce the theoretical and methodological approaches to the study of the built environment in Cypriot regional studies to evaluate the strengths and limitations of previous research and to identify possible directions for further development. This is followed by a schematic presentation of the chronological context of this study. I finally describe the multi-scalar structure of this book, by briefly summarising the main arguments examined and discussed.

1.1.1 The Theoretical Context

1.1.1.1 Architecture and Social Reproduction

The terms ‘architecture’ and ‘built environment’ are generally interchangeably used in archaeological research. However, the latter describes more precisely the inter-relationship between humans and the environment and refers to any physical alteration of the natural environment. Hence, built environment is employed as an abstract concept to define all products of human building activity (Lawrence, Low 1990, 454).

Because built environments are viewed at a variety of scales, ranging from single buildings to neighbourhoods and settlements, the theoretical and analytical approaches to the study of built environments encompass both the concept of ‘households’ and ‘community’ and include the analysis of individuals and societies.

The following section is not intended to be an exhaustive review of studies on ‘architecture’ but rather a brief examination of previous approaches to framing the theoretical basis of this study, which recognises the built environment as a primary means by which social transformations occurred in past societies (Fisher 2009a; Parker Pearson, Richards 1994; Smith 2003).

1.1.1.2 The Social Lives of Buildings

Looking at built environments as lived spaces that play an active role in expressing and structuring social relationships, implies a divergence from the art historical approach, which tends to describe ‘architecture’ as an accumulation of materials, shape and design (Given 2004, 105) and to define buildings as static entities, characterised by stylistic features, construction techniques and functions (Fisher 2007, 3-4); 2023, 56-79). The stylistic classification of buildings, which is applied in studies that retain a predominant art-historical focus, in some cases does not fully acknowledge the dynamic role of the built environment as a socially constructed and meaningful context of human action and experience.

As advocated by Rapoport (1980; 1990) and Preziosi (1983) the relationship between human actions and their built environment is essentially dynamic and reflexive. According to this view, the built environment encodes and communicates meanings through variations in building forms and constitutive elements of architecture; therefore, it plays a fundamental role in structuring and routinising human practices and behaviour (Rapoport 1990). Buildings are constructed with purpose, intention and consideration of histories and are much more than an adaptation to the environment (Rapoport 1969). The relationship between human actions and the built environment is also complex as the effects of the environment are not direct, passive nor readily predictable (Parker Pearson, Richards 1994, 2). Social theorists such as Bourdieu (1977) and Giddens (1984) introduced a fundamental conceptual approach, by recognising the dialectical relationship between social structure and human actions (see Robb 2010, 494-6). Giddens' structuration theory retained the linkage between routine action and social reproduction developed by Bourdieu but expanded the concept of *habitus* (Bourdieu 1977), which refers to the routine actions of daily life within which people create and are at the same time structured by institutions and beliefs beyond their direct control. Giddens highlighted that human beings are knowledgeable agents, who have particular perceptions of the condition and consequences of their actions. By introducing the concept of *locale*, which is defined as "the intersection of the social, spatial and physical" (1984, 118), Giddens emphasised the central role of architecture in social reproduction, and as the context of social actions and interactions. As a result of structuration theory, spatial structures are not merely identified as areas in which social life unfolds, but rather as media through which social relations are produced and reproduced (Gregory, Urry 1985, 3).

The increasing recognition of the active role of material culture in the production of social life has stressed the importance of buildings in affecting human action and interaction.[1] Studies of Environmental Psychology further emphasised this concept, by demonstrating the importance of the affective relationships that people develop with places in which they live and have recognised the significant role of place attachment in identity formation and social reproduction (cf. Altman, Low 1992). According to this view, buildings have a social life that contributes and responds to the strategies and desires of individuals and communities (see Kearns 2011, 151). They are active creations that allow human possibilities for interaction, and that change over time as they are constructed, maintained and abandoned (Fisher 2007; 2009a). Like human actors, each building is characterised by a life history (Tringham 1995) or biography (Kopytoff 1986; Gosden, Marshall 1999), which is constituted in the meaning accumulated over the duration of building existence and in the memories held by its human occupants.

As stated by Fisher (2009a; 2014a), the recognition of built environments as active agents implies the distinction between 'space', as a static physical setting, and 'place', as a dynamic, socially constructed and meaningful context of human actions and experience. Built places are contexts for many fields of action, and, most impor-

1 Hodder 1982; 1992; 2012; Dobres 2000; Dobres, Robb 2000; Latour 2005; Robb 2010; Smith 2003.

tant, they are projects, which involve the engagement of individuals and communities and create an "exercise of social relatedness and endorsement" (Robb 2010, 509). Hence, built environments are lived spaces imbued with identities and memories that make them both products and facilitators of social life (Fisher 2014a).

Social approaches to the study of the built environment have stressed the fundamental role that small-scale everyday activities and routines have in social action and reproduction, as opposed to large-scale processes (Hodder 2005b; Kuijt 2000). As a consequence, houses and households have become the primary context to examine the everyday practices, experiences, ideologies, symbolism and economic and environmental contexts, and to analyse the formation of socio-economic relations and cultural identities at individual and community levels.

1.1.1.3 Households and Communities

There is broad recognition in archaeological studies of the complex relationships between what people do in the small space of their daily lives and the larger-scale dynamics of the social unit whether a family, household, neighbourhood or community (Matthews 2012, 560). As argued by Parker:

> households are not passive and static entities. Instead, they are the loci of actions where personal identities and economic, social and ideological interests of family groups intersect with and shape the trajectory of the communities, conditioning community participation in broader social process. (2012, 291)

Therefore, the analysis of households provides evidence with which not only to examine daily practices and everyday life but also to study wider social trends and the interplay between individual and communal concerns in any society or community.

Lévi-Strauss (1983), by introducing the 'house society' model, stressed the importance of the house as a form of spatial organisation. House members are bound together through their daily work and activities that contribute to the sustenance of the house and its members. According to this view, daily activities constitute both social and economic relationships within and between houses or other groups in the community. As Chesson (2003, 82) claims, drawing on Joyce's arguments (2000, 190), "viewing social relations as constituted through cooperative actions recognizes contemporary anthropological concerns of agency and practice".

Within the social archaeology framework, households are identified not only as analytical units representative of some set of behaviours but also as the result of social relations and interaction between individuals and larger social forms (cf. Dobres, Robb 2000; Hendon 2004). According to this view, the study of household production and social relations consists not only in the examination of household functions, but also in the analysis of practices carried out by humans and material agents, which contribute to shaping and embodying social identities and roles. In this perspective, the material form of households needs to be studied as a dialectic relation between material production and social reproduction (Dobres 2000, 126). Often, when we talk about archaeological records, including structures and buildings, objects and artefacts, we exclude individuals from the discourse (Tringham 1991). To avoid such a generalised approach, it is important to distinguish between the household 'type', which is a static category related to household forms, and the household 'phase', a dynamic concept which consists of the different phases of construction, maintenance, destruction, rebuilding during the entire household lifetime (Goodman 1999, drawing on Fortes 1958).

In this regard, structural remains have to be seen as participating in and reflecting the lives of prehistoric people. Within buildings and settlement, in fact, there is a "maze of spatial conventions" (Carsten, Hugh-Jones 1995, 4) through which economic and social relationships and organisation are represented and re-negotiated during the lifecycle and history of the settlement and each inhabitant (Parker Pearson, Richards 1994; see also Matthews, French 2005). Architectural forms and spaces, including buildings design, size, placement, are powerful media through which social relationships are expressed and materialised (Hendon 2004, 276; De Marrais et al. 1996). Similarly, architectural materials, as well as floors, occupation surfaces, furniture and artefactual and bioarchaeological remains, create and embody socio-cultural and political settings, boundary and events within buildings and the life histories of the individuals, household and communities associated with them (Matthews 2005a; Matthews et al. 2013; La Motta, Schiffer 1999).

According to this view, the household provides an effective framework that permits us to analyse a wide range of social processes, such as the definition of social identities and memories through the daily repetition of practices (cf. Hodder 2005b; Kuijt 2000; Tringham 2000), the creation of engendered activities and relations (cf. Kent 1990a; Meskell 1998; Webb 2002; Bolger 2003), the construction of rituals and symbolism in the deposition of household material culture, including symbolic closure of buildings (cf. La Motta, Schiffer 1999, 23-4; Stevanovic 1997; Cessford, Near 2005), the development of social complexity and socio-economic inequalities (cf. Chapman 2007; Knapp 1993). Therefore, the analysis of household contexts allows us to reconstruct complex social dynamics within buildings and settlements, by looking both at the self and at society at the same time (Souvatzi 2008, 39).

An additional consideration included in this volume is the manner in which individual and household actions are coordinated within communities over the long term, through the maintenance of common ways of creating and using settlement space. Households within a community must share a common ideology, which is shaped and created through patterned activities, including house building, maintenance practices and abandonment processes. For such patterns to be preserved over time the common knowledge of a community must be expressed in ways that serve to link household groups through consensual actions. In this way, acts are repeated not only within individual households but also in the social space between them (Hodder 1990; Goodman 1999, 151). Therefore communities, as well as households, are dynamic as their members are involved in diverse social relations that serve to structure and define the community identity, its economic base and its political organisation (Knapp, van Dommelen 2014, 395).

To analyse the social practices and relations within households and communities, it is essential to consider the interplay between micro- and macro-analytical levels (Birch 2013, 7-10; Düring 2006, 26-31). A multi-scalar approach would enhance and support the understanding and the resulting interpretation of the social aspects of the architectural units. The application of multi-scalar approaches, which are based on the integration of micro-scale analysis within buildings to study everyday practices and activities, meso-scale analysis of buildings' structural elements to study the meaning embedded in people movements and interactions within the built space, and macro-scale analysis of use and concept of buildings and settlement space to study social organisation and interconnections between the social agents, contributes to the production of more multi-proxy results with which to interpret and reconstruct the complex social dynamics of households and communities in any geographical and historical context (Matthews 2005a; 2005b; Boivin 2000).

1.1.1.4 The Built Environment in Cypriot Studies

Before the 1990s, the architecture of buildings and settlements had rarely been explored in the analyses conducted by archaeologists working in Cyprus. Tombs and sanctuaries were the primary focus in archaeological examinations (cf. Lang, Poole 1878; Casson 1937; on this subject, see Fisher 2007, 35-8). Under the influence of the culture-historical and art-historical approaches, the first attempts in the analysis of the built environment and architecture of ancient Cyprus were based on the classification and description of architectural forms, building structures and settlement layout. These studies were characterised by a strong focus on the stylistic, morphological, and functional properties of buildings with little consideration of the complex interplay between society and space. As these examinations of ancient Cypriot architecture principally focused on chronological consideration and technological aspects of constructions, resulting analyses were descriptive rather than explanatory (cf. Hult 1983; Negbi 1986; Cook 1991). Buildings were considered static entities, and transformations and changes in building forms and layout as well as in social structure and organisation were typically described as unilinear processes.[2] In the first comprehensive survey of ancient Cypriot architecture by Dikaios (1961), the built environment was identified as the space in which socio-political actions occurred, and not as an active contributor and facilitator of social actions and relations. Under a similar perspective, Wright wrote the two volumes of *Ancient Building in Cyprus* (1992). By collecting a diverse range of data, including descriptions of building materials, construction techniques and architectural forms, the author presented an exhaustive account of ancient Cypriot architecture from the Aceramic Neolithic to the Roman Period. However, even in this case, the social significance of the transformations in materials, techniques and architectural forms identified and well-illustrated by the author was scarcely addressed. Early attempts to analyse the built environment in social terms have been conducted by Swiny in his paper "From Round House to Duplex" (1989). The architecture and spatial organisation of Early and Middle Bronze Age settlements in Cyprus were analysed in a preliminary attempt to examine and discuss transformations in the household organisation of prehistoric Cypriot Bronze Age societies.

As a result of post-processual critiques (see Knapp 1985), which emphasised the necessity to move beyond the limitation of functionalist-processual approaches, a growing emphasis in Cypriot archaeology is on social agency and on the role of the built environment as an active mediator of social relationships.[3] More recent studies on Cypriot architecture and the built environment have shifted the attention from buildings and settlements as standardised socio-cultural entities to households as dynamic agents, which are viewed as the basic socio-economic unit of societies and *loci* of actions, where personal identities and economic, social and ideological interests are reproduced and negotiated.[4] According to this research direction, households are not only functional units but also places of social relations, which are created through practices and interaction (Fisher 2014a, 400-2; see also Meskell 1998; Hendon 2004).

2 Cf. Jefferey 1918; Catling 1962; Astrom, Astrom 1972; few exceptions are represented by Stanley Price 1979 and Knapp 1986.

3 Cf. Peltenburg 1993; 1996; 2003; Webb, Frankel 1995; Bolger 2003; Knapp 2009.

4 Cf. Frankel, Webb 2006, 305-20; 2012; Webb 1999; 2009; Fisher 2007; 2009a; 2014a; 2014b; Kearns 2011; Manning et al. 2014; Papaconstantinou 2010.

Moving beyond the description and classification of art-historical approaches or the functionalism that often characterised processual-based investigations, the study of ancient Cypriot architecture – over the last decade – has seen an infusion of new data thanks also to the interdisciplinary scientific analyses applied to the study of the past built environment. Analyses based on high-resolution geoarchaeological techniques and archaeometric methods have significantly supported the study of ancient Cypriot societies through examinations of building materials and techniques as indicators of social organisation and political-economic transformations.[5] These analytical approaches have also supported the analysis of activities and the use of space within buildings and settlement areas as indicators of continuity and change in the use and perception of the built space.[6]

At a larger scale, the analyses conducted on settlements and regional contexts by Knapp (2003; cf. Knapp, Ashmore 1999) and Manning (cf. Manning, Crewe, Sewell 2006; Manning et al. 2014) have stressed the need of viewing built environments as part of the cultural landscape. According to this perspective, settlements are *loci* of social action, where identities, roles and statuses were negotiated and displayed. In their analysis of urban built environments, both Knapp and Manning identify urban structures and monumental architecture as active entities, which contribute to the structuration of social life and its reproduction (Knapp 1997; 2009; Manning 1998; Manning et al. 2014). Driven by analogous premises, Fisher (2007; 2009a; 2009b; 2011; 2014a; 2014b; 2023) analyses Late Cypriot urban architecture by applying an agent-centred approach. Fisher uses an integrative approach – based on access analysis and the examination of geometric, stylistic and symbolic characteristics of the built space – in order to examine how buildings structure movement and encounters, and, therefore, play a fundamental role in the organising and routinising of embodied practice through which the structural properties of the social system are produced, reproduced and transformed (Fisher 2014a, 400).

In the discussion concerning the built and social environment of ancient communities in Cyprus emerging and engaging topics are represented by the notion of 'community', which involves not just a specific space or settlement, but includes affiliations and relationships that engage the community in social negotiations within a broader framework of place (cf. Knapp 2003); the role of rural areas and non-elite population in the analysis and definition of the socio-economic and political dynamics of prehistoric and protohistor-

5 Cf. Thomas 2005a; 2010; Philokyprou 2012a; 2012b; Lorenzon, Iacovou 2019.

6 Cf. Mylona 2018; Mylona et al. 2017; 2021; Amadio 2018; Amadio et al. 2021; Dalton 2019; Gkouma et al. 2021; Klinkenberg 2021; Kulik 2021.

ic Cyprus (cf. Andreou 2018; 2019) as well as the role of gender and engendered practices in the Cypriot prehistoric built environment (cf. Smith 2002; Papaconstantinou 2002; Bolger 2003; Webb 2016). In these gender-centred researches, space is seen as a critical dimension of gender, and the built environment both shapes and is shaped by the society that produces it.

The brief overview presented in this section is indicative of the several approaches, which are being applied in studies of Cypriot ancient architecture, from contextual analysis at the household scale to the larger-scale analysis of settlement layout and regional contexts. Promising directions are emerging for the investigation of the ancient Cypriot built environment, which are bringing vital supporting data to the study of ancient communities and societies on the island.

1.1.2 The Chronological Context

The chronological span embraced by this research includes the period that goes from the Late Aceramic Neolithic, when the first evidence of more solid architectural structures appeared on the island (c. 7000 cal BC), until the very outset of the Late Bronze Age (Middle Cypriot III-Late Cypriot I, c. 1650 cal BC) **[tab. 1.1]**. The research does not include the architectural record pertaining to the first occupants of Cyprus, because of the more ephemeral nature of Epipalaeolithic and early Neolithic structures on the island, which limits the possibility to explore the potential of buildings and built forms as indicators of socio-cultural identities and roles.

The chronological span included in this research represents a crucial period during which Cypriot communities were transformed from small egalitarian villages to larger and more complex urban centres. The Late Bronze Age period (Late Cypriot I-III, c. 1700-1050 cal BC) **[tab. 1.1]** – which marks the end of the prehistoric period and the advent of the Protohistoric Bronze Age on the island (ProBA; Knapp 2013) – has been excluded by this study as it represents a period of profound and complex social transformations, which would deserve a separate analysis and discussion.

Prehistoric Cypriot society (focus of the narrative presented in this volume) was formed of relatively small, village-based subsistence-level communities. Although no marked evidence of social differentiation appeared in the structure and organisation of these agro-pastoral villages over the course of the prehistoric period – with few exceptions, e.g. Middle Chalcolithic Kissonerga-*Mosphilia* (Peltenburg et al. 1998a, 233-60) –, gradual socio-economic changes can be identified in households and communities' structure, in the material culture and in the systems of production and exchange. Relevant changes, especially from the Middle/Late Chalcolithic onwards, include the intensification of agricultural practices and metalworking – involving progressive exploitation of the island's rich copper resources – and the gradual specialisation of other productions, notably pottery and textile. This suggests organisational changes in society and political economy on the island thanks also to the increasing contacts and exchanges, in particular with the cultures of the Anatolian mainland, but also with the Levant and the Aegean (Knapp 2008, 350; 2013, 324). Archaeological data further attest to an increasing difference in wealth and prestige competition that becomes apparent in the mortuary record of new-established extramural cemeteries at the beginning of the Philia period **[tab. 1.1]**.[7] Social and economic changes are also indicated by the emergence of a transformative built environment characterised by the introduction of free-standing structures and multicellular architecture. Traditional roundhouse construction was abandoned and replaced by settlement plans comprising networks of rectangular buildings. This different spatial and social organisation of households and settlements reflects the gradual appearance of more complex social and economic relations. It is in the making of this built and social environment that new identities were created and reproduced, gradually transforming the household-based society of prehistoric Cyprus.

The main socio-economic features and changes in Cyprus from the Late Aceramic Neolithic until the end of the Middle Bronze Age are briefly addressed in this section.[8]

Late Aceramic Neolithic (LAN)

This phase, also known as Khirokitia culture/phase, stands at the end of the Aceramic Neolithic sequence and extends over a period of c. 1600 years **[tab. 1.1]**. Of the c. 30 sites attributed to this phase, Khirokitia-*Vouni* and Cape Andreas-*Kastros* are the most extensively investigated. Most of the LAN sites are distributed in territories, which guaranteed primary subsistence supplies (see § 4.1.1). LAN sites are regarded as agricultural villages, based on farming, herding, fishing and hunting.

Settlements and architecture: LAN villages are characterised by curvilinear or circular dwellings made of stone and earth. Evidence from Khirokitia-*Vouni* suggests that several of these curvilinear units could have formed a nuclear-family compound around unroofed courtyards, where grinding and other daily activities were conducted (Le

7 Keswani 2004, 83; Knapp 2008, 350; Manning 1993, 45-9; Peltenburg 1993, 20.

8 For a thorough discussion of the archaeology of prehistoric and protohistoric Cyprus, see Knapp 2013; for a detailed review of Middle Bronze Age Cyprus, see Webb, Knapp 2021.

Brun 2001, 115; 2002, 25). The presence of a substantial circuit wall at Khirokitia provides further evidence of changes in building technology and in the organisation of the settlement space (see Knapp 2013, 122-7).

Mortuary record: Burials occurred more frequently underneath the floor or occasionally out of doors. Typically, single inhumations in a contracted position were interred in shallow pits beneath the floors. Once the body was in place, the pit was filled with earth and covered with a layer of plaster, sometimes serving as a living floor (Le Brun 1994; 1997, 27-8).

Subsistence: The economy of LAN communities in Cyprus was based on domesticated sheep, goats and pigs. Cattle, which were present in the earlier prehistoric phases, had possibly died out during this period. Hunting deer continued to be practised and provided an important source of meat. Domesticated plants included wheat, hulled barley and pulses. Wild fruit and nuts were also part of the diet.

Material culture: Especially rich during this period, it includes – in addition to the repertoire of ground and chipped stone tools – ground stone vessels carved with elaborated geometric designs, several schematic anthropomorphic figurines carved in stone, picrolite, and fragments of painted plaster of the wall of some buildings at Khirokitia (Hadjisavvas 2007, 49).

Ceramic Neolithic (CN)

The emergence of pottery-producing cultures on the island and the extent of the Ceramic Neolithic in Cyprus (also known as 'Late Neolithic' or 'Sotira culture') present problems due to discontinuities in settlement patterns and occupation (see Knapp 2013, 158-62). Dates currently available suggest a duration of about 1000 years, from c. 5200/5000 to 4100/4000 cal BC.

Settlements and architecture: Buildings of Ceramic Neolithic settlements diverged from the circular plan of the dwellings constructed and occupied during the previous phase. The small Ceramic Neolithic villages were characterised by sub-rectangular, single-room structures. However, some of the Ceramic Neolithic settlements were constructed with different architectural characteristics. The structures of these settlements (e.g. Kalavassos-*Kokkinoyia*) consist of numerous pits and subterranean features (see Clarke 2007c).

Mortuary record: Limited, if compared to the richer evidence of the earlier Aceramic phase. Burials tended to occur in separate spaces outside buildings, in contrast with the practice of intramural burials.

Subsistence: Economic patterns based on the domestication of sheep, goats and pigs, the hunting of wild deer and the cultivation of cereals continued without consistent changes during the Ceramic Neolithic. Communities living along the coasts exploited marine resources also, as attested at Paralimni-*Nissia* (Flourentzos 2008). The abundant finds of mortars, pestles, pounders and grinders from Sotira-*Teppes* (Peltenburg 1978, 64), indicate that grain harvesting was a major occupation during this period.

Material culture: Similar types of stone and bone objects occurred commonly at various sites, including ground stone and chipped stone tools, stone bowls, and bone tools and ornaments. The initial pottery production ranges from a locally produced Coarse Ware to a dark and/or red burnished monochrome ware, to a ware with painted designs on a white background (Red on White) and to one with combed decoration (Combed ware). Pottery shapes and manufacturing techniques show close similarities in all excavated sites (Clarke 2007a, 100-1; Knapp 2013, 181). Figurines are rare and quite schematic, as the two phallic shape figures from Sotira-*Teppes* and Ayios Epiktitos-*Vrysi* (Knapp 2013, fig. 47; Peltenburg 1982, fig. 5.15).

Chalcolithic Period

The Chalcolithic period embraces a long-time span of the Cypriot prehistory from c. 4000/3900 to 2500/2400 cal BC. Throughout its long duration, the Chalcolithic communities on the island remained rural and self-sufficient. However, from the mid-4th millennium BC signs of social differentiation started to emerge, as demonstrated by data from the excavation conducted in the West of the island by the Lemba Archaeological Project (Peltenburg et al. 1985; 1991; 1998a; 1998b; 2003; 2019). The results coming from these analyses and the investigations conducted in other regions of the island (cf. Todd 1987; Todd, Croft 2004) have led to the division of the Chalcolithic into Early, Middle and Late phases (Bolger 2003, 219-20).

Early and Middle Chalcolithic

Settlements and architecture: During these phases, settlements in Cyprus expanded considerably. Site locations became much more diverse, especially in the south and southwest regions of the island, and most of the settlements were long-lived, e.g. Kissonerga-*Mosphilia* and *Mylouthkia*, Lemba-*Lakkous*, Erimi-*Pamboula*. The most significant change in architecture is the introduction of semi-subterranean structures during the Early Chalcolithic phase, as attested at Kissonerga-*Mylouthkia* in the West and at Kalavassos-*Ayious* in the South (cf. Knapp 2013, 199-204; Clarke 2007c, 124-6). Simultaneously, curvilinear/circular buildings with well-defined internal divisions of spaces diffused during this period and became the *loci* for new social practices (Peltenburg et al. 2003).

Mortuary record: Burial customs represent a continuation of earlier prehistoric traditions. However, the discovery of a cemetery separated from the settlement at Souskiou-*Laona* indicates profound changes within the social system of Chalcolithic communities (Peltenburg et al. 2019; 2006; see also Crewe et al. 2005).

Subsistence: Deer continued to be exploited and hunted during the Early Chalcolithic. However, in the Middle Chalcolithic phase, there is a rise in the consumption of pig at the expense of deer, and more generally a shift towards domesticated or herded livestock, which possibly reflects the increasing nutritional demand of an expanding population (Croft 1991, 71-3).

Material culture: Early phases of Chalcolithic represent a period of impressive developments in pottery production. The ceramic tradition involved the production of Red on White pottery executed in finer linear-based motifs. New forms were manufactured, including flasks with pointed bases and tubular spouted vessels. More important is the first recorded evidence of metalworking on the island (cf. Peltenburg et al. 2019, 231-2; Kassianidou, Charalambous 2019, 279-81). The extraction and crafting of picrolite increased during these early Chalcolithic phases. Anthropomorphic figurines and pendants were largely produced, especially in the Southwest of the island. Rich evidence comes from the site of Souskiou-*Laona*, indicating the 'specialised' character of this site, which was possibly a centre of production of picrolite objects (Peltenburg et al. 2019). The first evidence of whorls is attested in Middle Chalcolithic contexts (Muti 2020).

Late Chalcolithic

Settlements and architecture: This time is characterised by a general re-organisation of settlements. New buildings were constructed, still circular in plan, but smaller in size and with no or limited internal spatial division. At Kissonerga-*Mosphilia* evidence of social differentiation is attested in the so-called 'Pithos House' (Building 3), possibly an elite residence with bulk storage facilities (Peltenburg et al. 1998a, 252-4).

Mortuary record: Changes are evident in the mortuary practices of the Late Chalcolithic communities, including the appearance of chamber tombs, a decline in grave goods, and an increase in multiple interments and group burials (Knapp 2013, 258).

Subsistence: Agricultural production intensified, as attested by the large number of stone tools recovered within buildings – most of which were used in food production –, by evidence of pig-rearing and possibly by the appearance of centralised storage.

Material culture: Red on White pottery disappeared during this phase and a new standardised type of pottery was produced, the Red and Black Stroke-Burnished ware (Bolger 2007, 173), especially in the Southwest of the island. Elsewhere on the island, pottery types known as Red or Red and Black Lustrous were in use. Evidence of metal smelting is attested (on this point see Düring et al. 2021). The production of picrolite figurines declined.

Early Bronze Age (EBA)

Contacts between Cyprus and mainland Anatolia intensified at the end of the Chalcolithic period and influxes of foreign groups to the island during the second half of the third millennium BC appear to be attested in the archaeological record. Transformations in the economic practices – what has been termed the Secondary Product Revolution – are indicated by evidence attesting to the introduction of plough and traction animals. New technologies appeared during the beginning of Early Bronze Age Cyprus, including a new range of vessel shapes and increasing metallurgical developments. Substantial changes in architecture and buildings' spatial organisation characterised the settlements of this period. These technological innovations belong to a cultural phase defined as the 'Philia culture', which spans from c. 2400/2350 to 2250 cal BC (Webb, Frankel 2007, 193-204). The succeeding Early Bronze Age or Early Cypriot period (EC, 2250-1750/1700 cal BC) marks the beginning of what has been defined as the 'Prehistoric Bronze Age Cyprus' (Knapp 1994; 2013), a period of profound socio-economic transformations.

Settlements and architecture: Settlements expanded into areas which were less populated in the previous period. This is thanks to the new possibility given by the cattle plough of cultivating also marginal soils. The circular building module completely disappeared and it was replaced by a rectilinear multi-roomed architecture, with structures built of mudbricks on stone footings or walls made mostly of local stones, with semi-enclosed rectangular courtyards. The new architectural model is well represented by the buildings of Marki-*Alonia*, one of the most extensively investigated settlements of the Early Cypriot period (Frankel, Webb 1996; 2006a).

Mortuary record: Changes in mortuary practices include the appearance of large extramural cemeteries. Pit or rock-cut chamber tombs were the most common burial type. Burial goods were dominated by pottery – including small, finely decorated vessels –, shells or – less frequently – metal pendants, spindle whorls, and copper-based objects. Based on evidence recorded in many burial contexts of this period, it is possible to suggest that cemeteries became the focal point for competitive display, especially in settlements of the north region of Cyprus (Keswani 2005, 348-9).

Subsistence: Evidence indicates a decline in the exploitation of deer, a rise in the use of cattle, the introduction of screw-horned goats and a general change in the way animals were integrated into the island's ideology and economy (Knapp 2013, 263; Keswani 1994). In addition, a large number of querns, grinders and pounders within courtyards and buildings and an increase in household storage capacity point to an intensification of an agro-pastoral economy over the course of the Early Bronze Age Cyprus. The use of the plough in agriculture produced more extensive cultivation and possibly resulted in an increase in settled areas within the island.

Material culture: The archaeological record attests to a rich production of diverse material types, *in primis* the introduction of new pottery production, the Red Polished ware, the most characteristic ceramic style of the Prehistoric Bronze Age Cyprus. A wide range of fabrics and many different types and shapes of vessels characterise this hand-made production. More particular shapes include bowls or jugs decorated with scenic compositions, zoomorphic vessels and elaborate composite vessels. Plank figurines of various types became the most common way of representing the human figure during Early Bronze Age Cyprus. Plank-shaped figurines are flat and rectangular, with a roughly human shape and a recognisable face, but often lack sexual characteristics (Campo 1994). The growing use of spindle whorls and loom weights (Crewe 1998) during this period indicates new types of textile production. Similarly, a variety of mould-cast copper tools, weapons and ornaments testify to increasing metallurgical production.

Middle Bronze Age (MBA)

Middle Bronze Age Cyprus or the Middle Cypriot (MC) period (c. 2100/2050-1690/1650 cal BC) has long been considered a period of 'stagnation' and 'isolation' from the more dynamic Eastern Mediterranean region. However, new ongoing excavations and a re-reading of legacy data are showing that a more transformative socio-cultural environment characterises the last phase of Prehistoric Bronze Age Cyprus. As recently argued by Webb and Knapp (2021), during this period, Cyprus was far from being egalitarian and isolated.

> The growth in foreign demand for Cypriot copper and its intensified production, together with the appearance of prestige goods within the political-economic and ritual spheres resulted in new social dynamics of interaction and communication. (Webb, Knapp 2021)

The social transformations that mark this phase, therefore, have to be seen as the antecedents of the profound socio-economic and political changes that characterise the Late Cypriot urban society.

Settlements and architecture: Middle Cypriot settlements still remain limited in number. There are no more than 11 sites, but only six of them have exposure of over 500 m^2 (Webb, Knapp 2021). While the majority of these Middle Bronze Age settlements were agropastoral in nature, resembling in part the architecture of the Early Cypriot sites, some of them show evidence of innovation in their spatial organisation, which reflects a renovated economic and ideological social structure. New formal workspaces or 'workshops' were established at Ambelikou-*Aletri* (Webb, Frankel 2013b), Erimi-*Laonin tou Porakou* (Bombardieri 2017), Kissonerga-*Skalia* (Crewe 2013; 2017; Crewe, Hill 2012), and presumably Pyrgos (Belgiorno 2000; 2004). These spaces involved a certain degree of organised labour and technical knowledge and contributed to promoting and sustaining wider social networks (cf. Bombardieri 2013; Webb 2012, 49-58; Crewe 2017).

Mortuary record: Most settlements during this phase were associated with multiple burial grounds, suggesting that burial location was always linked with subgroup affiliation (see Webb 2018). Larger and richer tombs are attested at many sites, e.g. Politiko, Pyrgos, Erimi, Lapithos and Deaneia, which may be interpreted as evidence of social differentiation. At Lapithos – in the north region of Cyprus –, the elaboration of tombs and of mortuary assemblage suggests a significant increase in wealth. Furthermore, some of these tombs appear to have been used after the final burial as a private space for ritual activities (Webb 2019).

Subsistence: Communities of skilled producers (of copper, pottery, textile etc.) distinguished by planned use of resources, a skilled labour force, and production and distribution networks embedded in wider systems of demand and exchange, characterised the economy of the Middle Cypriot period. According to Webb and Knapp (2021), exploitation and distribution of localised resources appear to have been crucial to sustaining small communities alongside larger entities located in more agriculturally productive areas.

Material culture: Many types of productions are attested during the Middle Cypriot period. Red Polished ware remained widely used during this period along with the increasing production and circulation of the White Painted ware (especially in the northern region of the island; see Knapp 2013, 323).

Table 1.1 Traditional and revised chronologies for Cypriot prehistory and protohistory

Chronological period	Culture/Phase	Revised chronology*	Dates (cal BC)
Epipalaeolithic	Akrotiri phase	Late Epipalaeolithic	11,000-9000
Early Aceramic Neolithic	Cypro-PPNB	Initial Aceramic Neolithic (IAN)	9000-8500/8400
	Cypro-EPPNB	Early Aceramic Neolithic (EAN)	8500/8400-7900
	Cypro-MPPNB		7900-7600
	Cypro-LPPNB		7600-7000/6800
Late Aceramic Neolithic	Khirokitia	Late Aceramic Neolithic (LAN)	7000/6800-5200
Ceramic Neolithic	Sotira	Ceramic Neolithic (CN)	5200/5000-4500/4000
Early Chalcolithic	Early Erimi culture	Chalcolithic	4000-3600/3400
Middle Chalcolithic	Middle Erimi culture		3600/3400-2700
Late Chalcolithic	Late Erimi culture		2700-2500/2400
Chalcolithic/Early Bronze Age	Philia phase	Prehistoric Bronze Age-PreBA1	2400-2350/2250
Early Bronze Age	Early Cypriot I		2250-2000
	Early Cypriot II		
	Early Cypriot III	Prehistoric Bronze Age-PreBA2	2000-1750/1700
Middle Bronze Age	Middle Cypriot I		
	Middle Cypriot II		
	Middle Cypriot III	Protohistoric Bronze Age-ProBA1	1750/1700-1450
Late Bronze Age	Late Cypriot I		
	Late Cypriot IIA	Protohistoric Bronze Age-ProBA2	1450-1300
	Late Cypriot IIB		
	Late Cypriot IIC	Protohistoric Bronze Age-ProBA2	1300-1125/1100
	Late Cypriot IIIA		
	Late Cypriot IIIB	Early Iron Age	1125/1100-1150

* Knapp 1994; 2013

1.2 The Volume in Context

Approaching prehistoric architecture necessarily implies considering different scales: the micro- and meso-scale of building construction practices and of building use and perception of spaces at the household level, and the macro-scale of settlement patterns and interaction at the wider-communal level. Giving attention to the different scales of the built environment contributes to a less static understanding of prehistoric architecture. A multi-scalar analytical approach provides, in fact, a more holistic framework, with which to examine patterns of architectural variability and constancy and to compare evidence from different spatial and temporal contexts. It is only by integrating insights from multiple spatial and temporal scales that it is possible to understand the relationship between long-term processes of social and cultural change and the lived experience of everyday life (Birch 2013, 8; Kuijt 2000; Trigger 1967).

By using this multi-scalar framework, this volume aims at examining the architecture of prehistoric Cyprus from the perspective that the built environment plays a direct and active role in the construction and reproduction of social relations and identities. The volume is articulated in three macro-sections. The role of architecture as media for expressing social reproduction and as the context of social actions and interaction is examined through increasing scales of analysis, from the microscopic analysis of buildings and households to the macro-analysis of settlements and communities. This structure is designed to examine arguments from smaller to larger research themes. The data are discussed presenting analogies and differences between architectural evidence from different prehistoric Cypriot contexts. Analyses and arguments presented in this volume are focused exclusively on settlements and building architecture. Funerary architectural evidence is excluded from the discourse presented because it would deserve a different discussion space.

In defining the way architectural materials and design encode meaning and express socio-cultural and economic relationships, the volume examines the following points.

In Chapter 2, building materials and techniques are analysed at the micro-scale. The evidence presented provides crucial data to discuss aspects of continuity and transformation in the inter-relationship human-environment; to analyse individual/communal choices in the selection, use and perception of natural materials; to examine aspects of labour organisation and technological development and related socio-cultural and economic practices (cf. Love 2013a; 2013b; Matthews et al. 2013).

The aim, in Chapter 3, is to conduct meso-scale examinations of architectural forms and installations within the built space of prehistoric settlements in Cyprus in order to analyse the formation of spatial conventions within households and communities of the island and to evaluate how these conventions may influence social actions and reproduction (Boivin 2000; Matthews 2005a; Souvatzi 2008).

Chapter 4 includes a macro-scale analysis of settlement layout and variation in the role and representation of settlement areas to examine the built environments of prehistoric Cyprus as spaces of action and interactions. The organisation of neighbourhoods, streets and open spaces is also taken into account in the larger-scale analysis of spatial conventions, in order to contribute to the identification of elements of transformation over the course of prehistoric Cyprus and therefore, to analyse related socio-cultural implications (Cutting 2003; Düring 2006; Fisher 2007; 2009a).

These discussion chapters are provided with supplementary boxes which have been included to give additional information to the reader about specific methodological and practical topics mentioned in the text.

The present book is not intended to be an exhaustive collection of data about the building tradition in prehistoric Cyprus, but a preliminary discussion structured in different themes, which can be used in support of future analysis and that can hopefully open further research directions in the study of ancient architecture in Cyprus.

2 Shaping the Built Environment
Transformations in Building Materials and Techniques

2.1 The Built Environment at the Micro-Scale

The act of building implies the choice of transforming the natural environment into a constructed environment. This means that a series of actions and processes are deliberately undertaken by social agents to shape their own living space. It is clear, therefore, that this 'space' reflects ideas, ideologies and relationships of individuals and communities, and it represents the arena within which social, economic and political relations are played out. This act of shaping the built environment is crucial for understanding the relationship between human actors and the physical environment they operated in. The built environment is an integral portion of the culture, and it represents not only the physical context within which the social interactions are enacted, but is also an active agent which contributes to structure social life.

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Watkins (2004; 2009) affirms that the built environment as a cultural construct emerged in Southwest Asia at the end of the Epipalaeolithic and the beginning of the Neolithic with the appearance of "villages with architecture". However, it is important to underline that the creation of a built environment does not imply necessarily an act of construction *sensu-stricto* – as a long-lasting project aimed at building permanent architectural forms (e.g. buildings, villages, necropolis etc.). Instead, it necessarily encompasses an act of transformation, which is aimed at modifying the physical environment to adapt it to human exigences. In this regard, open areas, cultivated fields or natural shelters can be classified as built environments (Lawrence, Low 1990).

The built environment – in all its forms – is highly informative of past societies that shaped and interacted within and with it. Therefore, shaping the built environment is an act of place-making, because the actions and interactions of individuals who built, organise and use that space contribute to making it a dynamic context of experience and memories (cf. Fisher 2009a; Ramussen 1962; Rapoport 1969; 1990).

To understand the processes that generated and created the built environment, we have to analyse and reconstruct its *chaîne opératoire*. The first step of this process includes those actions aimed at transforming the natural environment by interaction with the local physical environment, by selection and transformation of local resources and by use of specific expertise and application of certain technologies. In this chapter, this first step is examined by analysis of aspects of continuity and transformation in the use of building materials and techniques applied in the construction of prehistoric households and settlements in Cyprus, from the selection of raw materials to the construction of buildings as spaces of action and interaction. The aim is to discuss the way architecture configured social practices and enacted the formation, reproduction and transformation of identities, roles and statuses over the course of Cypriot prehistory in different regional contexts.

In Cyprus, the natural environment has always offered a vast range of materials and resources that have been exploited since early Prehistory. The construction of prehistoric building spaces on the island was presumably based on a well-defined set of technological principles which were most likely shared amongst the community and passed down from generation to generation, largely as technical knowledge (Clarke 2007c, 125). Despite close analogies in materials and techniques applied in houses and settlements construction can be noted in the architectural tradition of prehistoric Cyprus, transformations appear in the way prehistoric communities of the island organised and shaped their built environment through time. This is because changes in 'architecture' do not exist in a vacuum, but are inextricably linked to the dynamics of social interaction. In analysing aspects of continuity and change in the built environments of Cypriot prehistory, it is important to look at them as dynamic contexts and to examine transformations in the social environment, not as a unilinear process. Differences can be observed between sites, suggesting that communities in different parts of the island structured their social and economic practices in distinctive ways.

In this chapter, these aspects of continuity and transformation are analysed according to three lines of evidence, which have been organised into three discrete sections. In the first section, the role of the natural environment in the construction of the built space is analysed. The aim is to explore how natural environment and environmental changes have affected or constrained building practices and traditions. Raw materials procurement is examined, seeking to understand the local physical environment and how local and regional resources were selected and exploited. The second section is aimed at examining the paramount importance of technological processes in building construction in the analysis of the socio-cultural choices operated by individual and communal agents. Earthen materials and technologies, pyrotechnology of plaster materials, stone carving and dressing activities are taken into consideration as principal natural agents in the construction of the Cypriot prehistoric built environment. A final section is dedicated to the examination of gendered practices and strategies in technological and labour organisation, in order to analyse and discuss the role and involvement of men, women and other community members in the operation of buildings and settlements construction.

2.2 Environment, Ecology and Material Engagement

In this section, the relationship between climatic and environmental settings and the use of specific building materials and technology is explored in order to analyse the role of the natural environment in the formation and reproduction of socio-cultural identities and the wider ecological and social implications of this in the practice of building construction.

2.2.1 Climate, Environmental Changes and Building Tradition

The actual environmental condition of Cyprus, characterised by a summer-dry Mediterranean-type climate (Pantelas 1996; Androu, Panagiotou 2004), only partially corresponds to conditions characterising the island during prehistory. Paleoclimatic proxies from the Eastern Mediterranean point to a clear interruption of the warm and humid Early Holocene climate at about 6500 BP, when a process of aridification increasingly affected the entire region. Despite a possible phase of moister climate around 5000 BP, a long-term trend towards drier conditions possibly prevailed and a severe drought has been recorded at about 3200 BP in the whole Eastern Mediterranean (Robinson et al. 2006; Roberts et al. 2011). This period corresponds to the end of the Bronze Age and many authors have related this climatic shift to the Late Bronze Age crisis (Clarke et al. 2016, with references; see also Scirè-Calabrisotto et al. 2017). Following this climatic framework, we may assume that the recorded fluctuations between dry and wetter periods have strongly impacted on environmental conditions in the island and related socio-cultural and economic practices, including building construction activities.

In his analysis on cultural responses to aridity in the Middle Holocene, Brooks (2006) notes that there is widespread evidence that increases in social complexity during this period coincided with climatic and environmental deterioration. Far from arguing in favour of environmental determinism, he adopts a coevolutionist approach and sees the natural environment as the context within which social change occurs, providing both opportunities and constraints on social, cultural, economic and technological innovation (30). In the last few years, paleoenvironmental studies conducted in the Mediterranean region[1] have attributed to the Holocene natural environment a dynamic role, in contrast to the previously established view of a more stable and passive setting to cultural change.

The evidence available nowadays for Cyprus suggests that the entire archaeological record developed within a dynamic context of recurrent climatic and environmental change (Wasse 2007, 47-8; Hazell et al. 2022).

The more stable social and economic strategies between the 7th and the 5th millennium BC (Peltenburg 2004), changed at the end of the 5th millennium. According to Clarke (2007b) and Todd and Croft (2004), changes in climatic conditions might have been partially responsible for an interruption of the existing environmental condition, favouring social transformations and an increasing necessity of innovation and re-adaptation.

But how these climatic and environmental changes and related social dynamics have impacted on the prehistoric architecture of Cyprus? Is it possible to recognise any change of adaptation to new environmental conditions in the archaeological record of prehistoric Cyprus?

1 Cf. Bini et al. 2019; Burstyn et al. 2019; Dean et al. 2015; Kaniewski et al. 2018; Palmisano et al. 2019; Roberts et al. 2008.

A preliminary assumption is that changes in building materials and techniques are more gradual than in other evidence of material culture (cf. Clarke 2007c). This happens because knowledge of building construction becomes embedded in social practices, and it is perpetuated across generations in the long term with little variation (Gieryn 2002).

To examine the relationship between climate and the built environment in prehistoric Cyprus I apply a framework developed by Jennifer Moody (2009) for Aegean Bronze Age architecture, based on an earlier work by Baruch Givoni (1969) on architecture and climate. The framework is based on five variables: ventilation, insulation, shade, artificial heat, artificial cooling. Each of these variables may give indications to assess the climate suitability of ancient architecture. For example, the presence of multiple windows and doors can contribute to good ventilation within buildings (Givoni 1969), and it is a preferred building attribute in hot-humid environments, less in hot-arid ones where ventilation is undesirable as it brings hot air inside the structures; whitewashing exterior walls can reduce the absorption of thermal radiation by 85% and therefore it is desirable in buildings of hot and arid climates **[tab. 2.1]**.

A number of prehistoric Cypriot sites – from the Aceramic Neolithic until the Middle Bronze Age – are reviewed under this perspective by a collection of the building's main attributes, including the topographical position of the settlement, building form, building orientation and occurrence of doors and windows, wall thickness, building materials used etc. **[tab. 2.2: 'Attributes']**. Each of these attributes contributes to giving information on choices operated by prehistoric Cypriot communities when shaping their built environment by interacting with an existing natural environment. Therefore, any aspects of continuity or change in architectural materials and techniques applied in the contexts analysed can be indicative of possible changes in environmental and social settings.

Table 2.1 Architectural variables taken into consideration in the analysis of the prehistoric Cypriot built environment and their related building attributes and benefits

Variables	Building attributes	Benefit	Climate type
Ventilation	• Building orientation; • Door placement; • Presence of multiple windows and doors	Supports breeze circulation within the building structure	Hot-humid
Insulation	• Minimal or no windows; • Whitewash on the exterior/interior wall surface; • Thick walls; • Thick flat roof	Reduces sun penetration and helps thermal efficiency	Hot-arid
Shade	• Tall buildings; • Narrow paths/streets/passageways • Roofed courtyards	Creates shades and reduces sun penetration	Hot-arid
Artificial heat	• Occurrence of hearth/oven; • Small rooms	Helps to increase the temperature within buildings	Cold-seasonal
Artificial cooling	• Occurrence of wells/water channels; • Big rooms; • Occurrence of trees and gardens	Helps to maintain a pleasant temperature within buildings	Hot-humid and hot-arid

Analytical limitations are given by the fact that archaeological data available from prehistoric Cyprus are not always homogeneous. Some important sites were excavated in the mid- and post-war years and, despite these analyses were excellent for that time, they lacked details and quality of data of modern and contemporary examinations. Furthermore, for sites of the north region of Cyprus, we rely almost exclusively on data from excavations conducted prior to 1974 (cf. Clarke 2007c, 113). The second issue consists in the fact that at most sites only the ground floor of buildings is preserved and most walls stand less than one meter high, making the reconstruction of windows and roofs problematic.

Table 2.2 reports the main data collected in this analysis. For each of the six archaeological periods analysed – Aceramic Neolithic, Ceramic Neolithic, Early Chalcolithic, Late Chalcolithic, Early Bronze Age, Middle Bronze Age – two representative settlements have been selected **[tab. 2.2]**.

Table 2.2 Building attributes analysed in the prehistoric Cypriot settlements examined, and evaluation of five variables

	Aceramic Neolithic		Ceramic Neolithic		Early Chalcolithic	
Attributes/Variables	**Khirokitia**	**Cape Andreas**	**Epiktitos**	**Sotira-*Teppes***	***Ayious***	***Mylouthkia***
TOPOGRAPHY	On the slopes of a prominent hill	On a rocky spur	On a headland	On a high promontory	On a high plateau	On a coastal plain
BUILDING FORM	Circular	Circular	Sub-rectangular/ Semi-subterranean	Sub-rectangular	Semi-subterranean structures and pits and tunnels	Semi-subterranean structures (wider than Ayious)
Variable 1: VENTILATION	POOR	POOR	POOR	POOR	VERY POOR	VERY POOR
Building orientation	Any direction?	Any direction?	Any direction?	Long axis directed east-west; or SE/NE orientation	Any direction?	Any direction?
Windows	Small windows (?)	One?	One?	-	-	-
Doors	One (0.5 m wide)	One	One, narrow entranceway	One, of ~0.70 m, on the south	One	One
Variable 2: INSULATION	GOOD	MODERATE	MODERATE	MODERATE	-	MODERATE
Wall thickness	0.40-0.50 m	< 0.40-0.40 m	-	0.40-0.50 m	-	-
Building materials	Limestone blocks and mud walls	Limestone blocks and mud walls	Limestone slabs or rubble foundation with mud plaster/pisè wall	Rubble foundation with mud plaster wall/wattle and daub	Mud and timber	Mud and timber
Whitewash on the external wall	Internal and external surfaces were covered with havara plaster	No	No	No	No	Frequently in mud plaster
Roof	Flat roof of timber and reeds	-	Flat roof of timber, reeds and mud	Flat roof of reed and mud roof	-	-
Variable 3: SHADE	MODERATE	POOR	GOOD	MODERATE	-	-
Building elevation	One floor	One	One-two (?) floors	One floor	One floor	One floor
Proximity to other structures	Narrow passageways. Buildings very close to each other	Wide passageways. Building more distant	Narrow passageways. Buildings close to each other	Wide passagewas. Buildings close to each other	-	-
Courtyards and open spaces	Small courtyards and rare open areas	Frequent open areas	Small open areas	Some building had courtyards	None	None
Variable 4: ARTIFICIAL HEAT	GOOD	MODERATE/ GOOD	GOOD	GOOD	MODERATE/ GOOD	GOOD
Small building/rooms	Yes	Yes	Yes	Yes	Yes	Yes

	Aceramic Neolithic		Ceramic Neolithic		Early Chalcolithic	
Attributes/Variables	**Khirokitia**	**Cape Andreas**	**Epiktitos**	**Sotira-*Teppes***	***Ayious***	***Mylouthkia***
Hearths/oven	Yes	Indoor hearths are rare. Generally, they are placed in open areas	Yes	Yes	Rare	Yes
Variable 6: ARTIFICIAL COOLING	POOR	POOR	POOR	POOR	POOR	POOR
Big rooms	No	No	No	No	No	No
Water channels	No	No	No	No	No	No

	Middle/Late Chalcolithic		Early Bronze Age		Middle Bronze Age	
	Laona	**Mosphilia**	**Marki**	**Kaminoudhia**	**Alambra**	**Erimi-*LtP***
TOPOGRAPHY	On a prominent, narrow ridge, near the Dhiarizos River	On a gently slope, 1 km from the coast	On sloping fields south of the Alykos River	On a promontory	On the flank of a ridge	On a terraced hill on the eastern bank of Kouris river
BUILDING FORM	Circular	Circular	Rectangular	Rectangular	Rectangular	Rectangular
Variable 1: VENTILATION	MODERATE/ POOR	MODERATE/ POOR	MODERATE/ POOR	MODERATE/ POOR	MODERATE/ POOR	MODERATE
Building orientation	Mostly NE/SW	Mostly NE/SW	Any direction?	Any direction?	Any direction?	Mostly N/S
Windows	-	-	-	-	-	Possibly on the roof?
Doors	One with a preferred SW or W/NW orientation	One, generally with a preferred S/SE orientation	One. The majority of doorways are ~0.60-1.10 m	One	One, generally measuring 0.6-1.3 m	One, rarely two
Variable 2: INSULATION	GOOD	GOOD	GOOD	GOOD/ MODERATE	GOOD/ MODERATE	GOOD
Wall thickness	0.50-0.75 m	0.40-0.75 m	~0.50 m	~0.50 m	0.47-0.68 m	0.50 m
Building materials	Base of blocks of local stone and mud/daub superstructure	Generally stone footing and mud superstructure. Other wall types also occur	Stone footing and mudbricks superstructure	Stone footing and possible mudbrick superstructure	Stone footing and possible mudbrick superstructure	Stone footing and mudbricks superstructure
Whitewash on the external wall	Yes, mud or pulverised havara/kafkalla in the inner and external wall surface	Yes, mud renders, clay renders and lime plaster renders were applied on the external wall surface	Yes, layers of clay and lime plaster on the exterior wall surface	No	No	Yes
Roof	Flat roof of timber and reeds?	Flat roof of timber and reeds?	Flat roof of timber and reeds?	Flat roof of reed and mud roof?	Flat roof of reed and mud roof?	Flat roof of reed and mud roof?
Variable 3: SHADE	MODERATE	MODERATE/ GOOD	MODERATE/ GOOD	MODERATE/ GOOD	MODERATE/ GOOD	MODERATE/ GOOD
Building elevation	One floor	One floor	One floor	One floor	One floor	One floor

	Middle/Late Chalcolithic		**Early Bronze Age**		**Middle Bronze Age**	
	Laona	**Mosphilia**	**Marki**	**Kaminoudhia**	**Alambra**	**Erimi-*LtP***
Proximity to other structures	Buildings close to each other	Buildings close to each other	Narrow passageways. Buildings close to each other	Buildings close to each other	Buildings close to each other	Passageways are wide, even if buildings are close to each other
Courtyards and open spaces	Open spaces	Communal courtyards	Courtyards are very frequent	Open spaces are rare	Courtyards are very frequent	Large open spaces, sometimes roofed
Variable 4: ARTIFICIAL HEAT	GOOD	GOOD	GOOD	GOOD	GOOD	MODERATE
Small building/rooms	Relatively small buildings (internal diameters 3.8-6 m)	Relatively small buildings	Yes	Yes	Relatively small buildings	Large
Hearths/oven	Yes	Yes	Yes	Yes	Yes	Very rare
Variable 5: ARTIFICIAL COOLING	POOR	POOR	POOR	POOR	POOR	GOOD
Big rooms	No	No	No	No	No	Yes
Water channels	No	No	No	No	No	Yes

Data collected point to a consistency in building materials and techniques over the course of Cyprus prehistory with no abrupt change. On the basis of the five variables analysed, the solutions adopted for the construction of these prehistoric settlements are those typically used in construction techniques in Mediterranean hot-arid climate areas (Givoni 1969, 328-40).

In Cyprus, where hot days alternate with cool nights, a characteristic building form is one that takes advantage of the heat-retention qualities of heavy masonry (Philokyprou 2015). As we can see from table 2.2, the insulation rate in all the settlements analysed ranges from moderate to good **[tab. 2.2]**. Prehistoric buildings in Cyprus were constructed with thick walls of 0.40-0.50 m, with few rare exceptions as at Cape Andreas-*Kastros*, where wall footings are reported to be less than 0.40 cm in width (Le Brun 1985). The hypothesised thick flat roofs made of layers of reeds and mud (cf. Thomas 1995) further contributed to insulating the structures. Roof, in fact, is the building element that mostly receives the impact of the midday sun and therefore construction techniques were adopted in the past to permit the roof to have heat-retention characteristics similar to the walls (Lapithis 2018, 97-8). The application of layers of white plaster or whitewash in the interior and exterior wall surfaces of buildings in most of the settlements analysed **[tab. 2.2]**, and the frequent use of white calcareous stones for the construction of buildings wall bases – especially in those settlements located in the Circum-Troodos Sedimentary Succession region, where calcareous stones are abundant, such as the Neolithic Sotira-*Teppes* and the Early Bronze Age Sotira-*Khaminoudhia* and Middle Bronze Age Erimi-*Laonin tou Porakou* (henceforth Erimi-*LtP*) **[fig. 2.1]** – also contributed to maintaining internal spaces well insulated from the hot air of the day. A concomitant factor ensuring thermal comfort to buildings was the recurrent presence of shades, obtained by the construction of narrow passageways between structures and presumably roofed courtyards

Ventilation instead was not taken into great consideration. In fact, according to archaeological reconstructions, most of the prehistoric buildings in Cyprus were presumably constructed with one main door and small windows. However, it is important to underline that data concerning original building openings are only hypothesised.

While no direct evidence of artificial cooling solutions can be identified based on available data, the presence of indoor and sometimes outdoor fire installations in most of the contexts examined is indicative of the importance of a heating source for food processing but also for warming up.

Temperature fluctuations across the entire prehistoric period on the island might have favoured adaptations in the materials and techniques used in building construction. As indicated by data collected in table 2.2 and as also suggested by Thomas (1995, 178), it is possible that the increasing use of stone and the decreasing use of timber – especially from the Late Chalcolithic onwards – may reflect denudation of the landscape both for erosion by human use and climate change, and maybe restricted access to local resources (see also Peltenburg et al. 2003, 273) **[tab. 2.2]**.

Data analysed indicates that at the transition between the Ceramic Neolithic and the Early Chalcolithic, there is a shift to timber-frame semi-subterranean structures, as shown by evidence from Early Chalcolithic Kalavassos-*Ayious* and Kissonerga-*Mylouthkia*. Similar post-frame subterranean structures have been also identified at the Ceramic Neolithic Kalavassos-*Kokkinoyia* (Clarke 2004; 2007b; 2016) and Philia-*Drakos* (cf. Knapp 2013, 171, with references). This shift, which represents just a short parenthesis in the stone and mud building tradition of prehistoric architecture in Cyprus, has been interpreted by Peltenburg as a practical solution to the emergence of new settlements in heavily wooded environments (Peltenburg et al. 2003, 272-5). Clarke, instead, suggests that the shift to timber-frame subterranean structures was favoured by climatic deterioration (2007b). This may have led to deep changes in social practices, possibly introducing a change to a more mobile existence based on hunting and the concomitant transition to less complex building methods.

In this regard, it is interesting to mention a study by Zhai and Previtali (2010) on the environmental evaluation of vernacular architecture in different locations and climates around the world. The study reveals that fully or partially subterranean dwellings are more frequently observed in cold and hot climates, never in humid climates; the total absence of ventilation in subterranean structures would cause excessive dampness in humid-climate areas creating an uncomfortable and unhealthy building space. Among the advantage reported by Malaktou et al. (2016) in a study on thermal assessment of vernacular sub-terranean dwellings in Cyprus, this type of building requires minimum maintenance, and guarantees higher static performances during earthquake events and better thermal behaviour (a difference of 4.5 °C, according to Kharrufa 2008) compared to above-ground structures.

Looking at the Early Chalcolithic contexts, it is possible to argue that the shift to semi-subterranean structures may be possibly seen as a tentative adaptation to a more arid climate, as a consequence of the increasing drying after ~7000 cal. yr. BP (Palmisano et al. 2021; Clarke et al. 2016; Wasse 2007). The appearance of these subterranean structures in the architectural record of prehistoric Cyprus presumably responded to changes in social strategies and use of space; changes that were possibly driven also by different climatic and environmental patterns on the island (for a detailed discussion on this point see Knapp 2013, 192-4).

The second major change identified in the prehistoric archaeological record examined is represented by the passage to rectilinear and then rectangular architecture, which completely replaced the circular architectural module at the beginning of Prehistoric Bronze Age Cyprus. This fundamental shift in building technology reflects crucial transformations in household and community structure during the Early and Middle Bronze Age periods, and possibly was favoured by more stable climatic and environmental conditions on the island, as reported by paleoclimatic proxies from the Eastern Mediterranean (Palmisano et al. 2021). Local communities became more adaptive to climate change thanks also to technological advancement, subsistence strategies and social organisation. The rectangular model therefore evolved 'naturally' from the climate conditions, the needs of the household and the social structure of the community (see also § 3.1.1). A representative element of this gradual transformation of the building form is the courtyard, which became a constitutive component of the 'house' in Prehistoric Bronze Age Cyprus. The 'courtyard house', which Gjerstad (1926) first identified at Alambra in 1924, become progressively more common from the Philia period onward, as attested at Early Bronze Age Marki-*Alonia* and Middle Bronze Age Alambra-*Mouttes*, Erimi-*LtP*, Kalopsidha (Webb 2009). Courtyards have social but also ecological functions. They guarantee additional space for activities and interaction in the building structure and offer a sense of enclosure to the household members (Abass et al. 2016). In this perspective, the courtyard works as an extension of the house, and – as underlined by Webb (2009) – the different use and functions of courtyards during the occupation of Early Bronze Age Marki-*Alonia* reflects the transformation of household groups and their dynamic relationships during the entire settlement lifespan. In this discussion, it is important to underline that courtyards provide also climatic benefits. According to studies on the Mediterranean vernacular architecture, they are microclimate changers due to their ability to mitigate high temperatures, channel breeze and adjust the degree of humidity within buildings (Philokyprou, Limbouri-Kozakou 2012). Courtyard houses possibly responded also to the exigence of improving the thermal efficiency of the structures; a fundamental benefit that was not fully provided by circular buildings of the early prehistoric period (on the thermal efficiency of circular *vs.* rectangular structures, see Sok Ling et al. 2007; Raof 2017). The use of lime plaster materials also contributed to reducing humidity levels within buildings, and this would have guaranteed better preservation conditions for stored products within rectangular structures (Amadio 2018; see also Duru et al. 2021). This would have had implications for building longevity.

2.2.2 Natural Environment and Procurement Strategies

This section aims to analyse the relationship between the natural environment and the practice of selection and procurement of building materials; in particular, the intention is to discuss and understand if the natural environment dictated the choice of building materials or if culture had an impact on selection processes. Analyses of prehistoric architecture sustain the existence of a direct relationship between the availability of natural resources and the choice and use of specific building materials (cf. Braidwood, Braidwood 1982; Duru 2002; Woldring 2002). However, more recent studies on prehistoric earthen architecture (Love 2013a) have demonstrated how, in some cases, informed choices prevailed over pragmatic explanations for the selection of building materials. By analysing a group of prehistoric Anatolian contexts, Love suggests that materials employed in construction are not only indicative of what resources were available in the local natural environment, but also illustrate how culture has a significant impact on the choice of materials.

In studies of prehistoric Cypriot architecture, the common assumption is that the types of materials and technologies used in building construction are a direct result of the local environment.[2] This is certainly correct, since the selection and use of materials for

2 Cf. Wright 1992; Coleman et al. 1996, 23-4; Mantzourani 2003; Swiny, Rapp, Herscher 2003, 59; Frankel, Webb 2006a, 7.

buildings construction, both in antiquity and in vernacular traditional architecture, mostly respond to functional and practical drives (Oliver 2006, 129-40). Nevertheless, archaeological examples illustrate that the choice of building materials is not only environmentally determined by resource availability. In some cases, accessible materials were just one of the factors which determined the set of possibilities available to the builders.

The selection and procurement of materials for building construction in Cyprus was favoured, since the early prehistory, by a geological diversity and variable geomorphology, both of which created a unique landscape and natural environments. The Troodos Mountain Range is the main geomorphological feature of the island **[fig. 2.1]**. This area forms the central bedrock unit of Cyprus – the Troodos zone –, which consists of a stratified ophiolite complex, characterised by a sequence of plutonic rocks (i.e. basalt, gabbro and dolerite), overlaid by a sheeted dike complex and pillow lavas topped with iron and manganese-rich sediments (Zomeni 2012a). Available raw materials used in construction practices from the prehistory until the present days include a range of volcanic and metamorphic rocks, notably harzburgite, diabase and gabbro (Philokyprou 2015, fig. 2), and deposits of bentonitic clays (sodium montmorillonite; cf. Atalar, Kilic 2006), along with several pigments applied as ancillary decorative materials in building surfaces, including umber, ochre and terra verte (Cullis 1924). Around the Kyrenia mountains outcrops – in the Northeast of the island –, the so-called 'Pantadaktylos Zone' consists of gravel, conglomerates, marl, and mostly abyssal turbidites with shallow environmental chalk, marl, limestone, and gypsum finishing. In this area, dolomitic limestone and gypsiferous bentonite have been the most exploited materials in construction activities. The Mesaoria Group is located between the Kyrenia and Troodos ranges and consists of rocks of the deep and shallow marine environment of marl, sandy marl, conglomerates of gypsum and fluvial deposits. Swelling clays of the Mesaoria Group also occur as a result of the alteration of the Troodos ophiolite. Holocene alluviums, which are widespread in the Mesaoria plain, and at the east and west coasts as well as at the stream beds all over the island, contain gravel, sand, and silt – which have been largely used as aggregates materials in the manufacture of different products, including mudbricks – as well as alluvial montmorillonite clays. In the Southwest part of the island, the Mammonia terrane represents a complex of igneous, sedimentary and metamorphic rocks. Limestone, mudstone, quartzitic sandstone, together with rich clay melanges have always represented important sources of raw materials. In the South of Cyprus, sedimentary rocks, ranging in age from Upper Cretaceous to Miocene, are extensively exposed in an area extending between the south of the Troodos ophiolite and the south coast from Larnaka in the east to Paphos in the west. This

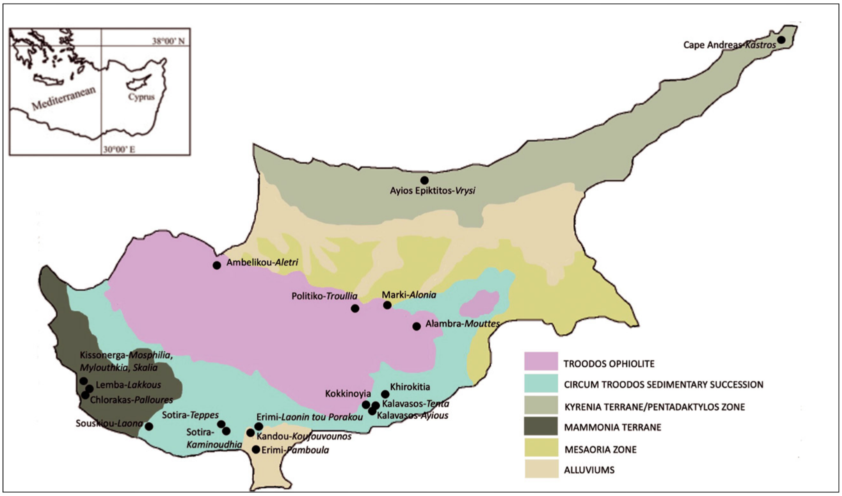

Figure 2.1 Geological map of Cyprus with the sites analysed and mentioned in the text

zone is composed of mostly chalks, marl and gypsum and montmorillonite clays. These carbonates have been source rocks for building materials on the island since Early Prehistory (Zomeni 2012b).

As illustrated in figure 2.2, almost all the prehistoric Cypriot settlements were constructed exploiting the natural bedrock, both by using it as a stable foundation for the upper-standing structures or by using its derived materials – field stones and stone blocks – to construct wall footings and walls **[fig. 2.2]**. Few exceptions are represented by the Neolithic sites of Khirokitia-*Vouni* (henceforth Khirokitia), where structures could also be entirely of mudbricks, by rare examples of mud architecture with post-infrastructure as at House 24 in Sotira-*Teppes*, and by the timber-framed semi-subterranean structures of the Early Chalcolithic sites of Kalavassos-*Ayious* and Kissonerga-*Mylouthkia*. Locally available stone materials were preferred for building construction – e.g. diabase and other igneous and metamorphic rocks were chosen in settlements at the foothills of the Troodos, calcarenites and limestones were adopted in settlements of the Circum Troodos Sedimentary Succession region – in order to limit the effort and labour necessary to transport heavy stone materials from a distant location. However, according to Peltenburg (1998, 244), the footings of the buildings of the Ceremonial Area at Chalcolithic Kissonerga-*Mosphilia* (Buildings 2, 4, 100, 206) were built with imported calcarenites, and not with local fieldstone. Possibly, Buildings 1, 2, 3 at Late Chalcolithic Chlorakas-*Palloures* were constructed with imported calcarenites as well (Schubert 2018, 77-8). Similarly, at the Early/Middle Cypriot site of Marki-*Alonia*, large cal-

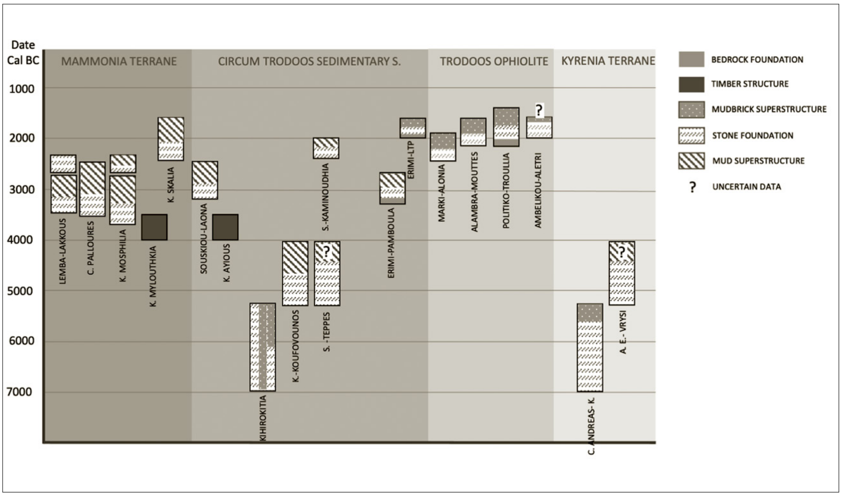

Figure 2.2 Building materials and techniques in analysed prehistoric contexts

carenite blocks were used for footing, mostly in the later stage of construction at the site. These blocks were brought from a considerable distance. According to Xenophontos, they derive from the Athalassa formation exposed some 10 km north and northeast of Marki (Xenophontos 1996, 18; Frankel, Webb 2006a, 7).

Considering that this coarse-grained yellowish stone is not of particularly high quality and does not weather well (Frankel, Webb 1996, 56), and assuming that other stone materials were easily available in the surrounding landscape at these sites, the preference in the selection of this material for footing construction must have been based on cultural factors rather than on functional choices.

The primacy of material choices and agency over resource availability is further attested at Sotira. Both the Neolithic settlement (*Teppes*) and the Early Bronze Age site (*Kaminoudhia*) are located close to water springs. Calcareous colluvial soils are also plentifully available in the settlements' area. However, unlike the majority of the prehistoric settlements in Cyprus, mudbricks and mud walls are scarcely attested. The limited occurrence of earthen materials in these contexts has to be primarily related to erosion and preservation issues – which generally affect semi-arid areas in the Mediterranean region (Friesem et al. 2011) –; however, comparing the architecture of Sotira-*Teppes* and *Kaminoudhia* with those of other prehistoric Cypriot contexts, appear evident that, in these two settlements, building with stone prevailed over building with earth. Selection dictated by socially constructed choices is also indicated by the fact that coeval settlements located in the same region with similar resources available, may adopt different materials and techniques in building construction. Neolithic Sotira-*Teppes* and Kandou-*Koufouvounos*, are less than 8 km distant from each other and are characterised by similar morphological and geological formations, dominated by chalk and marl **[fig. 2.1]**. Despite the similarities in natural resources, the two sites were constructed using different materials and techniques. At *Teppes*, most walls were founded directly on bedrock or on sterile eroded material overlying the latter. Calcareous fieldstones were the principally attested material in wall construction (Dikaios 1961, 155-6). At *Koufouvounos*, instead, earthen materials and mudbricks appear to have been more largely employed (Mantzourani 2000; 2003; 2009, 221-3).

Also interesting is the permanence, within circumscribed regional contexts, of specific building techniques adopted over a long-time span, suggesting that technical knowledge was possibly circulating between community groups over the course of generations, possibly fostered by marriages and trade contacts. This was identified in the Kouris Valley area, where settlements adopted the techniques of building walls by carving the calcareous bedrock floor in order to obtain semi-sunken buildings with stable foundations. This foundation type is scarcely attested in other contexts with similar geomorphological characteristics, except for a few buildings at Chalcolithic Souskiou-*Laona* ('dished hollow' foundation type; cf. Peltenburg et al. 2019, 76-8). The described technique has been observed at Chalcolithic Erimi-*Pamboula* (Diakaios 1961; Bolger 1988), at Middle Bronze Age Erimi-*LtP* and at the Late Bronze Age *Pamboula*. Here Weinberg (1983, 54) reported that structures were constructed almost entirely into the bedrock floor "leaving a base where the wall foundation was laid" (pl. 12 a). The choice of building structures by carving the bedrock to create semi-sunken floors to provide an integral wall base for wall superstructure might be interpreted in practical and ideological terms. From a functional point of view, the technique of construction using the limestone bedrock as foundation provided greater stability to the structures and improved insulation against hot summer temperatures, water ingress and dampness and humidity during rainy winters, increasing life-quality conditions (Thomas 2005b, 187). From an ideological perspective, the practice of constructing on the calcareous bedrock is likely to have contributed to creating a sense of immutability, which possibly fostered the formation of community identity and memory (Knapp 2009). In addition, as stone embodies permanence, the community likely used this to communicate social order and to negotiate power (Fisher 2009b, 192-3; Bukach 2003, 21). The recurrence of this practice might suggest that – within regional contexts – communities developed knowledge across generations about landscape advantages and limitations, and selected materials and techniques according to the perception of the natural environment, cultural choices, and social restraints (Arnold et al. 1991, 88;

Neupert 2000). Available building materials were considered as a set of resources, not as a set of limitations (Johnson 2010).

2.3 Integrating Analysis of Socio-Economic and Technological Choices and Practices in Building Construction

Understanding the technology of building construction is fundamental to the analysis of the socio-cultural choices operated by individual and communal agents and therefore to reconstructing the socio-cultural context in which these agents acted and influenced (Sillar, Tite 2000). The recognition of the active role of material culture in the construction and reproduction of social relations and cultural values has the potential to enhance the analysis of past societies, through the examination of material choices, labour investment, craft specialisation and level of technical knowledge (Bourdieu 1977; Hodder 1986; Lemonnier 1992; van der Leeuw 1993). Analysing the choices involved in architectural material manufacture enhances the knowledge of the social processes involved in house construction. Even in environments where there are limited choices and resources, materials will gain significance from the specific circumstances of their selection, manufacture and placement. Building materials express and materialise social relationships (De Marrais, Castillo, Earle 1996; Hendon 2004, 276; Matthews 2012, 183-5), therefore their analysis and the resulting examination of practices related to their selection, procurement and processing may offer interesting insights into the interrelation of past societies with their natural environment, and may contribute to shed new light into the socio-cultural developments behind the complex organisation of architectural practices.

2.3.1 Earthen Architecture Practices

Earthen architecture is one of the most impressive expressions of the human ability to create a unique built environment from modest natural resources. Because earthen building forms and materials are the results of assimilation between the natural and built environment, their analysis may shed light on community strategies of adaptation to natural resources and their transformation into material culture. In prehistoric Cyprus both the favourable climatic condition – characterised by mild winters and hot summers – and the abundance of natural resources, including water, wood and suitable soil sources, certainly supported the development of an earthen architecture tradition. However, the identification of earthen products in archaeological contexts of prehistoric Cyprus may be challenging. Earthen architectural products are sun-dried, therefore when a building is abandoned, they progressively degrade and dissolve in earthen debris. Only in some exceptional instances, when fire destruction occurs, substantial remains or earthen walls are preserved (Friesem et al. 2011; 2014; Lorenzon 2021). Due to their limited preservation, earthen materials are often dismissed from systematic studies on Cypriot architecture and are barely mentioned in excavation reports and publications. Even though they rarely receive as much attention as other material assemblages, such as ceramic or lithics, there is growing recognition in geoarchaeological studies on the island of the importance of earthen materials in the analysis and reconstruction of archaeological contexts.[3]

In prehistoric Cypriot architecture, destruction layers generally comprise different types of evidence illustrating the various uses to which earth was put in construction techniques **[box 2.1]**. These include intact, fragmented or degraded mudbricks; fragments of roofing materials and samples preserving the impression of wooden elements – possibly related to roofing structures, door or window infrastructures, and shelves – and mud coating. Given the limited data available, the discussion in this section will be mostly based on mudbrick materials, since these are the most easily identified and recorded materials in prehistoric contexts of the island.

In Cypriot prehistoric architecture mud or mudbrick walls are generally laid on top of a stone footing made of rubble or blocks of local stones **[fig. 2.2]**. This technique prevents erosion and protects mud of mudbricks superstructure from potential floods. Wall erosion is also prevented by the coating of the wall with mud plaster and by its regular maintenance (Aurenche 2003; Wright 2005; Devolder, Lorenzon 2019). Rarely the stone socle is absent; in this case, the earthen wall is set directly on a low foundation course as attested at Late Aceramic Neolithic Khirokitia (Le Brun 1984, 20-3).

The first point of discussion pertains to the appearance of mudbrick technology in Cyprus. One common assumption is that mudbrick production progressively emerged in the passage from circular to rectangular architecture, which in Cyprus occurred at the beginning of the Philia phase. In examining the architecture of prehistoric Cyprus, Wright (1992) argues that the transition from circular to rectangular structures afforded a change in building materials. However, recent studies on near eastern and Anatolian architecture indicate that the shift from circular structures to rectangular does not directly correlate with the adoption of mudbrick technology (Aurenche 1993; Love 2013a). As argued by Rapoport (1969), construction and materials have relatively little effect on the ultimate form

3 Cf. Thomas 2005b; Mylona et al. 2017; Philokyprou 2016; Lorenzon, Iacovou 2019; Amadio, forthcoming.

of a building. In Cyprus, this is well demonstrated by the early production and use of mudbricks – despite being hand-made – in the Early Aceramic Neolithic circular structures at Kalavassos-*Tenta* (Todd 1987) and Akanthou-*Arkosykos* (Sevketoglu, Hanson 2015), and successively in the Late Aceramic Neolithic Khirokitia (Le Brun 1984, 23) and Cape Andreas-*Kastros* (Le Brun 1981; 1985).

Hand-shaped mudbricks coexisted – well into the Chalcolithic period – with mud wall construction; a technique consisting in the super-imposition of successive layers of mud fashioned directly in position on the wall (also known as 'cob', see Wright 2005; this technique is frequently confused with *pisè*, see Thomas 2005a, 22) **[box 2.1]**.[4] According to the analysis conducted by excavators, these early mudbrick prototypes were characterised by an irregular loaf shape and inconsistent proportions (Le Brun 1984, 31; 1981, 81) **[tab. 2.3]**. Local calcareous sediments were used in their manufacture; calcium carbonate represents the principal component in these early bricks (Le Miere 1984). The addition of vegetal matter is also attested in all the mudbricks recorded in these Neolithic contexts (Le Brun 1984, 31; 1981, 81), possibly to compensate for the low malleability of these high calcareous sources and to prevent shrinkage during drying (cf. Amadio 2018). It is important to stress that vegetal tempers are key components in the *chaîne opératoire* of mudbrick manufacture. They play a structurally important role with regard to material performance and preservation (Lorenzon 2021). Vegetal inclusions – straw especially – help to conduct water out of the brick matrix and to distribute stress over the whole material (Devolder 2009).

Mud wall constructions occurred throughout the entire Chalcolithic period in Cyprus. The choice of building with mud instead of mudbricks, however, should not be seen as an involution but as a choice dictated by cultural and functional reasons. As argued by Thomas (2005a, 186-7), mud-built walls were not simple achievements. They required high expertise and skills, as demonstrated by the well-built structures of Kissonerga-*Mosphilia* (e.g. B3 or B206; Peltenburg 1998) or by the mudwall houses of Area 1 at Lemba and roundhouses of Souskiou-*Laona* (Peltenburg 2019, 76-80). The shift to a built-stone foundation and mudwall during the passage to the Middle and Late Chalcolithic, may also be seen as a form of improvement in which greater care and skills are being expressed and demonstrated (Thomas 2005a, 187).

Mudbrick technology was more widely adopted at the beginning of the Philia period and mostly during the Prehistoric Bronze Age. The diffusion of mould-shaped prototypes is attested at many Early and Middle Bronze Age sites, including Marki-*Alonia* (Frankel, Webb 2006a, 7; 1996, 55-6), Alambra-*Mouttes* (Coleman 1985, 132;

4 See also Thomas 1995, 23-5 and Philokyprou 2016.

Coleman et al. 1996, 24-5), Politiko-*Troullia* (Fall et al. 2008), Erimi-*LtP* (Bombardieri 2017, 11; Amadio 2017, 265; Amadio, forthcoming), Ambelikou-*Aletri* (Webb, Frankel 2013b, 184-5, fig. 8.15) and possibly Kissonerga-*Skalia* (Crewe 2013; 2014) and Sotira-*Kaminoudhia* (Swiny, Rapp, Herscher 2003, 59). Where intact mudbricks were recovered, the consistency in size and shape suggested that wooden forms were used for their manufacture (Frankel, Webb 2006a, 8; Bombardieri 2017, 11) **[tab. 2.3]**.

At Erimi-*LtP*, I conducted a more in-depth study of mudbricks recovered at the site in order to collect data about the manufacturing processes applied for the production of these building materials. Philokyprou (2016) reports two methods in the manufacture of mould-shaped mudbricks, which were used both in ancient and traditional architecture. The first involved placing the mould on the ground, which was then filled with clay, smoothing the upper surface, and leaving the mixture to dry; the second involved placing an amount of wet mixture by hand on the ground, before pressing a rectangular mould on top of it to remove the extra material. Intact mudbricks examined at Erimi-*LtP* show a typical section characterised by a pinched edge in the upper surface and a rounded profile in the basal edge **[fig. 2.3]**. This specific morphology may be indicative of the practice of patting mud into the mould and not completely filling the right-angle corners at the bottom (cf. Nordarou et al. 2008), hence suggesting that the first method described by Philokyprou was used. The length, height and width of intact mudbricks analysed are consistent. Macroscopic observations indicate that they measure 40 × 14 × 12 cm, with minor variations of 1-2 cm **[tab. 2.3]**. Considering that the width of the limestone wall bases in the buildings analysed at Erimi-*LtP* is approximately 50 cm, it is possible that mudbricks were laid with their long axis transverse to the wall in order to make a thick structure with a single set of bricks (Nodarou et al. 2008). Furthermore, examinations of intact portions of collapsed limit walls indicate that mudbricks were laid according to the running bond technique (Lorenzon, Iacovou 2019; Wright 2005, 104). In a single case, the English bond technique was noted in a small partition wall of Area A (Building-Unit SA IV-Area A) **[fig. 2.4]**.

So far, fired bricks are attested at Early Bronze Age Marki-*Alonia*, presumably pertaining to a building of Phase C, corresponding to the Early Cypriot I-II or Philia occupation phase (Frankel, Webb 2006a, 8), and Middle Bronze Age Ambelikou-*Aletri* (Webb, Frankel 2013, 185). They are characterised by smaller sizes than sun-dried prototypes **[tab. 2.3]**. The lack of pyrotechnological prototypes at other Prehistoric Bronze Age Cypriot contexts should not be connected to the lack of technological skills, as developments in technology are not necessarily of unilinear evolution (Matthews et al. 2013, 125-8), but may be affected by many variables including social, environmental and technological choices (Arnold 2000, 361-5). This lack may be explained by the fact that there was no need for baked mudbricks as sun-dried materials were resistant enough (Rosenberg et al. 2020). The choice of producing sun-dried mudbricks had advantages, including saving energy required for fuel collection and the burning, but also disadvantages, *in primis* the necessity of regular maintenance practices including frequent re-plastering of walls external surfaces to prevent decay (Keefe 2005).

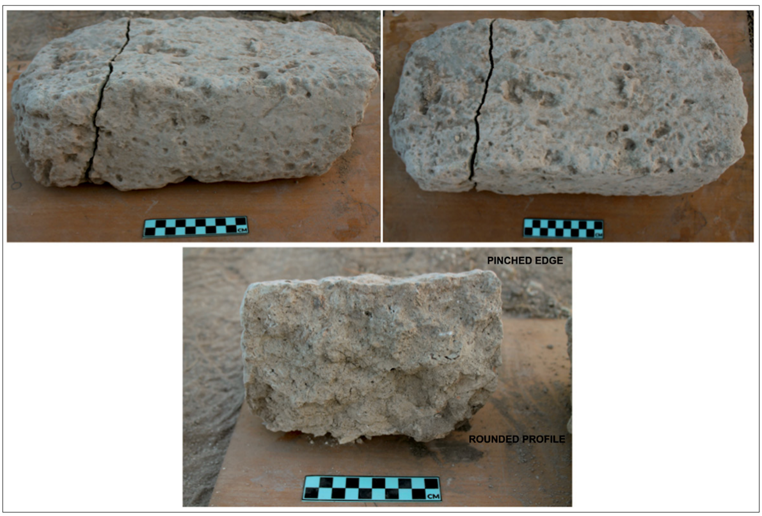

Figure 2.3 Example of intact mudbrick recovered at Middle Bronze Age Erimi- LtP from the destruction sequence of building-unit SA XII- Workshop Complex. Note the pinched edge and the rounded profile visible in the section (Photograph by the Author)

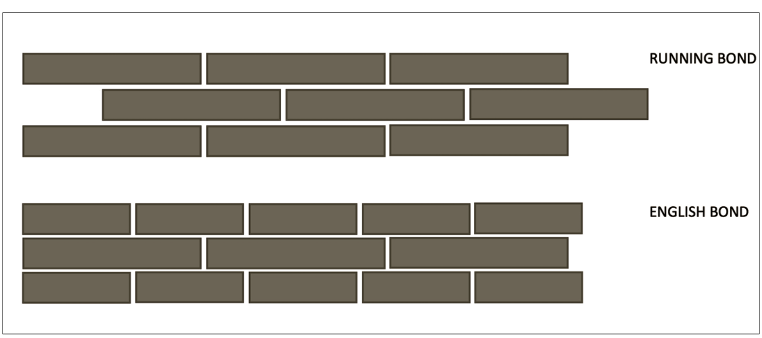

Figure 2.4 Mudbrick masonries identified at Erimi-LtP

Table 2.3 Mudbricks technologies and measures at prehistoric Cypriot settlements

Site	Mudbrick technology	Measures (cm)
Khirokitia-*Vouni*	Hand-shaped	c. 35 × 20
Cape Andreas-*Kastros*	Hand-shaped	c. 30 × 15 × 8.5
Marki-*Alonia*	Mould-shaped Fired	60 × 10 24 × 14 × 8.5
Alambra-*Mouttes*	Mould-shaped	70 × 32
Erimi-*LtP*	Mould-shaped	40 × 14 × 12
Ambelikou-*Aletri*	Mould-shaped (?)	Approximate size: 18 × 10 × 15 10 × 16 × 10 (not complete examples)

Data available for prehistoric earthen architecture in Cyprus indicate that raw materials used for mud walls and mudbricks manufacture were preferentially selected locally (Thomas 2005a, 186-7). Micromorphological analysis conducted on mudbrick samples from Erimi-*LtP* suggests that sediments and tempers were selected by builders on the basis of expertise and perception of practical and functional choices (cf. Amadio 2017, 225-6; Amadio, forthcoming; for general references, see Arnold 2000, 341-57; Sillar, Tite 2000). For instance, red-brown calcareous soil – formed by the slow weathering of limestone with enrichment of Fe_2O^3 – was selected for mudbricks production as naturally rich in carbonate rock inclusions, which contribute to preventing cracks and rapid degradation (Hoard et al. 1995). This aspect demonstrates a profound knowledge of the local material properties and an engagement with the natural resources, validating the idea of the established human-environment interrelationship. The dataset examined at Erimi-*LtP* further revealed that mudbricks were manufactured according to different recipes (cf. Amadio 2017), and these different mudbrick types were recurrently used in many buildings of the Workshop Complex and of the domestic units. Considering this, one possible explanation would be that mudbrick production and construction was a communal task where recipes were shared by the whole community and possibly perpetuated by transmission (Rosenberg et al. 2020); alternatively, this may possibly indicate that different groups of builders prepared mudbricks according to their knowledge and experience, then these multiple batches were used for communal constructions (Lorenzon, Iacovou 2019).

The limited data available for prehistoric earthen architecture in Cyprus does not make it possible to assess the scale of production of these products. That prehistoric people were well acquainted with earthen building techniques seems clear – this is well demonstrated by the large production of earthen products and the expert use of earthen building techniques –, but it is not possible to infer whether or not they were specialists. Extensive use of mudbricks, especially during the Prehistoric Bronze Age period, must have contributed to the development amongst community groups of the practical knowledge necessary to produce structurally efficient mudbrick walls, skills that were possibly acquired through the observation and direct participation in building projects (Devolder, Lorenzon 2019; Palyvou 2005).

The production of earthen materials, mudbricks mostly, was very presumably a part-time occupation for these prehistoric communities; especially because the production could have been conducted only in certain periods of the year – mainly during hot and less-rainy summers (Norton 1986). However, it is further possible that – with the emergence of supra-household forms of labour organisation during Middle Bronze Age Cyprus (cf. Webb, Knapp 2021; Crewe 2017, 149) – this production could have become a full-time or semi-full-time occupation for a sector of the population. Data from Erimi-*LtP* demonstrate that – at least for the construction of the communal productive area of the settlement, the so-called 'Workshop Complex' (Bombardieri 2017) – the mudbrick manufacture was at supra-household level, possibly conducted by semi-specialised workers, as indicated by the circulation of recipes and the consistency in shape and size of mudbricks recovered and analysed at the site (Amadio 2017; Amadio, forthcoming).

Box 2.1
The Earthen Architecture Tradition in Mediterranean Prehistory

Earth is the most accessible and versatile resource used in architecture. For its easy accessibility and the low energy consumption required for its extraction, earth has been chosen by ancient communities to create and shape their built environment since the first appearance of more permanent settlements (Berge 2009, 120). Depending on its natural characteristics, earth can be sourced, manipulated and transformed into a building material (Keefe 2005, 51-8; Norton 1987, 9-19). However, the diverse use of available natural resources is the result of human choices, based on practices and experiences. It is the synergic action of exogenous and endogenous factors, given by a combination of environmental settings and socio-economic conditions, which contributes to creating the basis of empirical knowledge and generates a variety of earthen products and earthen building techniques.

The favourable climatic conditions of the Mediterranean region have favoured the development of building techniques based on the manipulation of raw earth. On one hand, the hot summer sun helps the earth product to easily indurate; on the other hand, the mild winters limit the erosive process of heavy rains and winds, consequently reducing time-consuming maintenance activities and ensuring good preservation to earthen structures. The tradition of building with earth in the Mediterranean region has endured since the prehistoric period, and it is so deeply rooted in the Mediterranean culture that it has become part of the local identity (Pica 2017; Guillaud, Alva 2003).

Used mainly as a solid constructional element in the formation of building walls, earth can be manipulated and shaped according to different methods and technologies. This variety illustrates the many properties and potentialities that this material can offer. Before discussing the various methods and products of earth construction, it is useful to briefly mention the main practices operated by builders to give the necessary strength to this material.

a) Dry Earth Construction: The simplest way to give earth some coherence is by compacting and compressing it. This practice contributes to diminishing the volume of the material and increasing its density. Denser and more compact the earth is, stronger and more coherent the earthen product will be (Wright 2005, 86-7; Norton 1986, 24).

b) Mud Construction: Earth can be consolidated to a greater or less degree by using water. The practice of mixing earth with water brings the clay particles close together. While the water remains in the mixture, the aligned clay particles slide easily across one another conferring plasticity to the earthen product (Wright 2005, 86-7). When the earthen product is subjected to heat, the water evaporates, the aligned clay particles bond together and the material hardens. If the mixture is burnt at high temperature, the water is driven out and chemical reactions, including the melting of some elements, contribute to transforming the mixture into a strong solid product (for an in-depth explanation of transformations occurring on heated clay materials, see Weiner 2010, 92-7, 194-206).

a. Dry Earth Construction

Pisè de terre/Rammed Earth

The term *pisè* is frequently employed – erroneously – by archaeologists to indicate any kind of mud superstructure (Aurenche 2004, 138-9; Wright 2005, 87-8; Thomas 2005a, 19-21). However, the etymological sense of the French words is 'to tamp/ram' (to compress) and this is the valid use of the term. The basic procedure of *pisè* includes the compaction of earth in a dry or very low humid state, between two pieces of wooden forms which are held firmly in position upon the wall being constructed (Gandreau et al. 2021, 6). Each time the space between the forms is filled up with earth and compacted, the formwork is dismantled and moved to the next section of the wall to be built **[fig. 2.1.1]**. Rammed earth walls are monolithic. The width of the wall may vary according to the intended height of the wall and the quality of the soil (Norton 1986, 35). However, generally, walls are between 0.40 and 0.50 m in thickness, as this seems an optimum width which is both thick enough to provide a large mass of earth for compaction to be achieved, but not so thick as to produce internal stress and collapse (Thomas 2005b, 21-5). This is a technique that certainly requires skills and equipment, more than mudbrick manufacture for example. In archaeological contexts, the identification of rammed earth constructions may be challenging. Prehistoric structures in rammed earth are better preserved in arid and semi-arid areas of the Mediterranean region (Friesem et al. 2011).

b. Mud Construction

The difference with the previous method consists in the addition of water to form the mud.

Wattle and Daub

This is one of the simplest and cheapest forms of wall construction. The structure of the wall is provided by a framework of vertical posts set into the ground. Branches or reeds are woven horizontally between the posts to form a lattice. Mud is applied to the framework on both the inside and the outside, at a sufficiently wet consistency for the mud to be applied between the branches **[fig. 2.1.1]**. Mud is applied in layers, and cracks which can occur in earlier layers during construction can be subsequently filled in. A range of different aggregates can be mixed to the soil to improve its binding properties; these may include vegetal fibres, straw, animal hair (Norton 1986, 25). Walls are usually thin, < 0.50 m. This technique has many advantages: little skills are required; relatively small amounts of earth are needed, making it a technique suitable also in contexts where suitable soil is not available on-site; framework can be obtained also with irregular pieces of wood; the framework provides resistance to the collapse in case of earthquakes. Wattle and daub walls, however, require constant maintenance. Unfortunately, evidence for the use of daub on most sites is very poor. In archaeological contexts, it is more frequent to find deposits of degraded clay materials in the abandonment layers of the structure. More fortunate situations are represented by contexts destroyed by fire: in this case, it is possible to retrieve heat-consolidated daub fragments which preserve the impression left by the wooden post **[fig. 2.1.2]**.

Mudwall/Cob
One of the lesser-known methods of wall construction. Present in many parts of the world, it is often confused with rammed earth constructions. The characteristic feature of a mud wall is that it is a monolithic construction fashioned directly in position on the wall. Earth, in a plastic state, is piled, shaped and compacted by hand without the use of any framework **[fig. 2.1.1]**. The materials from which mud wall is constructed vary considerably from region to region and through time. Clay is an important component in providing the cohesion and stability of the structure. Aggregates also play a fundamental role in ensuring strength to the final product. Despite the simplicity of this technique, its major disadvantage is represented by the fact that large quantities of earth and water are needed. If the wall is not preserved *in situ*, it is extremely difficult to identify it in archaeological contexts.

Mudbricks/Adobe
Mudbricks represent one of the most versatile ways of using earth for construction. Mudbricks have been used since early prehistory to build almost every type of domestic and public building. The earliest type of mudbricks was hand-modelled out of plastic earth in the proportion of 40-75% sand, 10-30% silt, 15-30% clay (Norton 1986; Keefe 2005). Mould shaped mudbricks are contemporary to the first type. In this case, mud is pushed or thrown into a mould; the mould is then removed and the brick is left to sun-dry **[fig. 2.1.1]**. The size of the mudbrick is chosen to suit the way brick material will be used in the wall. Mudbricks can be square or rectangular, according to local building tradition and practical and functional choices. An advantage of mudbricks is that they can be made directly at the source of raw materials and then moved to the building site; this is much more economical than moving loose earth and water. Another advantage includes the fact that a minimum of equipment is required to produce high-quality mudbricks. Finally, they allow great flexibility in the size and shape of the walls. The identification and excavation of mudbricks in archaeological contexts can be difficult, often requiring a good knowledge of local sediments and environmental conditions. This is even more problematic for early prehistoric architecture, in which sun-dried and irregularly shaped bricks were being used (Thomas 2005, 23-5).

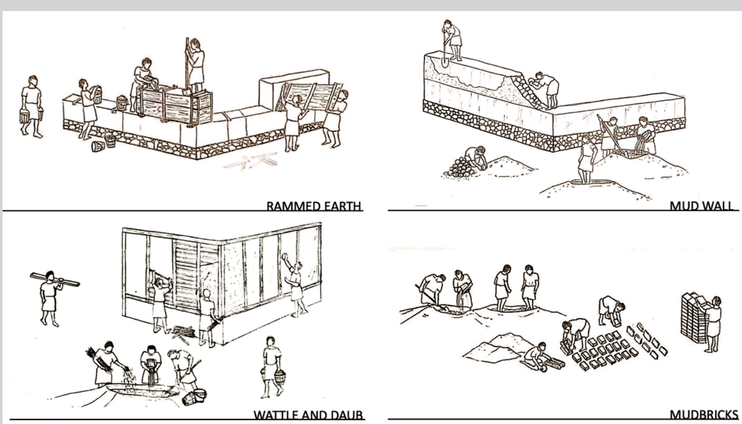

Figure 2.1.1 Methods of construction with earth. © After Gandreau et al. 2021, redrawn by the Author

Figure 2.1.2 Fragments of clay applied on the roofing structures in Building SAIII-Workshop Complex at Middle Bronze Age Erimi. Impressions left by wooden posts are evident

Several research programmes and platforms have been set up in order to disseminate scientific data, research initiatives and information about earthen architecture, focused both on archaeological and vernacular structures. Here is a list of the main European associations and platforms:

- **CRAterre**. Association and Research Laboratory of the École Nationale Supérieure d'Architecture de Grenoble: http://craterre.org.
- **RÉSEAU TERRE**. This association has the aim of promoting and developing the research about earthen architecture, from prehistory until the present day: https://reseauterre.hypotheses.org.
- **EARTH ARCHITECTURE**. Web site and Blog which focus on all aspects of humankind's relationship to making things with earth: http://eartharchitecture.org.
- **CITTÀ DELLA TERRA CRUDA**. Association aimed at promoting and protecting the earthen architecture heritage of the Mediterranean region: https://www.terracruda.org/it.
- **UNI TERRA**. Networking platform for the global exchange of information, experience and know-how in earth architecture and building with earth at an academic level: https://www.uni-terra.org.

2.3.2 Plaster Production and Pyrotechnology

The analysis of plaster making, including the selection and use of materials and the technology applied in plaster manufacture, has been shown to provide key evidence with which to examine the social processes involved in building construction and maintenance.[5] The examination of plaster manufacture, likewise mudbricks production, represents a significant source of data to reconstruct individual and communal practices in prehistoric communities and to study processes of social, cultural and economic transformations.

When we refer to plaster, we indicate a prepared plastic product which is applied in the construction of horizontal (floors) and vertical (walls) surfaces, but also as coating of installations such as basins and channels. In Cypriot prehistory, a range of different products was used in plaster production, notably mud and/or dung, lime and gypsum. Mud plasters and lime/gypsum plasters existed side by side since early prehistory. They both served the same functions of protecting vulnerable building elements, providing durable floor surfaces and enabling more elaborate architectural detailing. However, the preparation of these products required different technologies. While mud plasters were easily produced by combination and mixing of clay-rich sediments, aggregates of organic (i.e. dung, chaff, straw) and inorganic origin (i.e. sand-size rocks, sand-seize quartz) and water, the production of plasters made of lime or gypsum involved more sophisticated technologies, based on different stages of preparation and pyrotechnological processes (Wright 2005, 143-50; Artioli 2010) **[box 2.2]**. The knowledge to produce these synthetic materials is one of the several important trajectories in the technological evolution of human history (Friesem et al. 2019). The conditions for producing lime and gypsum plasters differ radically, and each of these methods has advantages and limitations. Temperatures ranging from 800-1000 °C are required to produce lime plaster. This implies a good supply of fuel and preferably some arrangements to conserve the heat generated. Gypsum, instead, can be burned at lower temperatures of 100-200 °C. The produced plastic materials differ in their mode of setting: gypsum set very quickly, lime – instead – takes considerably longer to set and shrinks during the process. The final products are obviously different. Lime plaster is a hard and durable material, while gypsum plaster is less resistant and more subjected to degradation and dissolution in water (Wright 2005, 143-5; Thomas 2005a, 26-7).

As Thomas (2005a, 25-6) claimed, it is extremely important to understand the nature of plaster materials in order to examine their

5 Cf. Clarke 2012; Garfinkel 1987; Goshen et al. 2017; Karkanas, Efstratiou 2009; Miriello et al. 2011; Matthews et al. 2013; Philokyprou 2011.

socio-cultural significance. Achieving a complete characterisation of plaster products in archaeological contexts may be challenging, and without micro-analytical examinations it is difficult to recognise lime and gypsum plasters and distinguish them from mud plaster materials **[box 2.2]**. Given this difficulty, references to plaster or lime plaster in reports and descriptions of prehistoric Cypriot architecture are sometimes vague, because they are based only on generic observations conducted in the field with the naked eye. Furthermore, the attested use – both in ancient and traditional architecture (Thomas 2005b; Ionas 1988) – of plasters made of pulverised chalk or local *havara* mixed with water makes the identification even more complicated. In fact, the resulting plaster material shows the same morphological (colour and strength) and chemical composition as lime plasters (when referring to lime plasters. The definition 'lime plaster' is used in this volume to indicate a material produced by a pyrotechnological process. Only the combination of macroscopic and microscopic analyses can support a valid examination and characterisation of these materials **[box 2.2]**. For this reason, the present discussion will be mostly based on data deriving from more detailed analyses, which integrate macro-examinations and micro-analytical techniques.

Box 2.2
The Lime Cycle. Analytical Techniques to the Study of Ancient Plaster Materials

'Plaster' is a general term that refers to prepared plastic products which can be made of mud, dung, gypsum, lime or mixtures of these materials (Goshen et al. 2017). While mud and dung attain plasticity when wet without specific pre-treatment, gypsum and lime acquire plasticity following specific pyrotechnological processes that include heating, slaking, aging and application (Artioli 2010). The production of these pyrogenic products requires organisation strategies and investment of work for quarrying of raw materials, fuel supply and craft expertise, therefore – in archaeological contexts – plasters are considered key materials to study evolution in technology, production and labour organisation in early communities (cf. Clarke 2012; Thomas 2010; Matthews, French 2005). In Cypriot prehistoric architecture, mud, gypsum and lime plasters were extensively used since the Neolithic (Philokyprou 2012a), and were produced either for building purposes (for the construction of floors, for coating walls and installations) and for decoration. According to Philokyprou (2012b), lime is the preferred pyrotechnological product used in the production of plaster materials in Cyprus since early prehistory. This is possibly due to the fact that, despite the production of lime plaster requires more sophisticated procedures – including higher firing temperatures –, the end-product is much more resistant than gypsum plaster (Wright 2005; Artioli 2010).

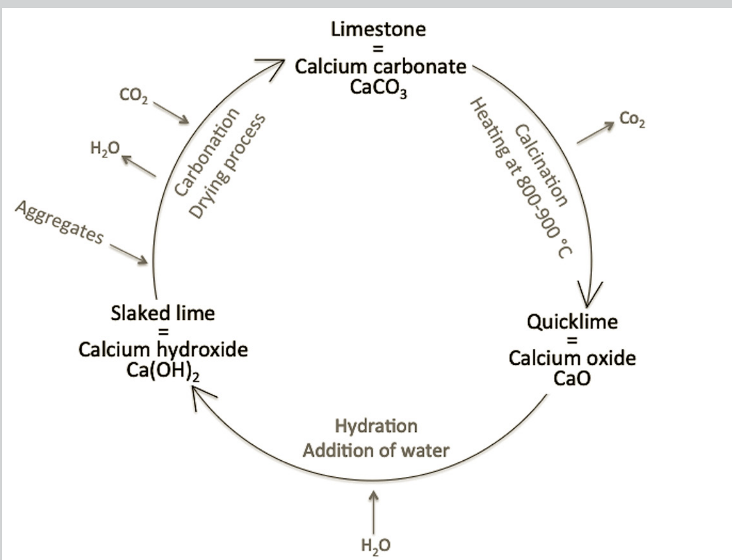

Figure 2.2.1 Lime cycle showing the processes of calcination, hydration and carbonation and the relative chemical reactions which occur during these three processes (re-adapted after Thomas 2010; Leslie, Hughes 2002)

From a technological point of view, lime plaster is the result of chemical reaction of heated calcium carbonate ($CaCO_3$) – generally limestone, marl or chalk – which is fired at high temperatures (700-900 °C) for a prolonged time, transformed into calcium oxide (CaO), and slaked with water forming a putty of calcium hydroxide ($Ca[OH_2]$) in order to produce a material that, once dried under atmospheric condition, re-establishes the same morphological, chemical and mineralogical composition of the parent material (Thomas 2010, 117-18; Leslie, Hughes 2002; Philokyprou 2012a) [fig. 2.2.1]. However, while geogenic calcium carbonate of the parent material is characterised by atomic ordered calcite, the rapid formation of pyrogenic calcium carbonate results in a microcrystalline and highly atomic disordered calcite (Chu et al. 2008; Kingery, Vandiver, Prickett 1988; Poduska et al. 2011; Regev et al. 2010; Shoval, Yofe, Nathan 2003; Shoval, Yadin, Panczer 2011; Weiner 2010). Thus, the atomic order/disorder of calcite serves as an important indicator for the formation processes of the calcite and offers reliable data to study the pyrotechnology involved in the production of calcite-based plaster materials.

Table 2.2.1 Strengths and limitations of methodological approaches used to analyse plaster materials and calcite formed by different mechanisms

Technique	**Strength**	**Limitation**	**References**
SEM-EDX	Identification of morphological and chemical composition. May support the distinction between lime and gypsum plaster	Does not identify crystalline mineral components. Does not support the identification between fired and unfired lime	Kingery, Vandiver, Prickett 1988; Gourding, Kingery 1975
Micromorphology	Identification of microstructure, inclusions, nature of aggregates and mineralogy	With no experimental comparisons, the identification of fired lime can be challenging	Goren, Goldberg 1991; Matthews et al. 1996; Karkanas 2007
FTIR	Identification of mineralogical composition. Supports the distinction between geogenic, biogenic and anthropogenic calcite using the analysis of ratio between main calcite peaks heights	Results depend on grinding setting	Chu et al. 2008
FTIR-grinding curve	Identification of mineralogical composition. More reliable distinction between geogenic, biogenic and anthropogenic calcite, as calcite peaks height analysis in not affected by grinding	Results may be altered by post-depositional calcite	Regev et al. 2010
FTIR grinding curve + angle dependant XRD peaks width	More informative than previous methods as it integrates FTIR with XRD	Less reliable results in calcite-rich environments such as caves	Xu et al. 2015

Analyses conducted by Philokyprou (1998; 2012a; 2012b) indicate that during prehistoric Cyprus mud plaster was extensively used both in the construction of floors and as an external coating for protecting walls. Local resources were selected and skilfully mixed to obtain resistant plaster materials. The combination of raw materials changed according to the function of the final products; for instance, mud plasters applied on the wall surfaces were richer in organic tempers and therefore more plastic than floor plaster; mud plaster floors, instead, were generally mixed with inorganic aggregates as sand-gravel size rock inclusions in order to result more resistant to mechanical stress (Artioli 2010). As observed at the Late Aceramic Neolithic Khirokitia, wall and floor plasters were often set in thin successive layers; a practice which was observed also in the Near East and Anatolian prehistoric contexts (Philokyprou 2012a). The placement of successive thin layers on the walls' external surfaces was made to avoid collapsing under excessive plaster weight. The vertical plaster surface was generally burnished to make it denser and harder as the more fine-grained particles were transferred to the surface layer (Philokyprou 2012a) **[fig. 2.5]**. This practice also ensured to wall plasters a better performance against dissolution and erosion by closing the voids of the plaster matrix, thus limiting water infiltration and successive cracks (Norton 1986; Keefe 2005). Floors could also have been applied in different layers. Generally, a thin layer of finer plaster was laid on top of a coarser constructional packing in order to have a more resistant floor surface. Floor layering could also be the result of frequent replastering. This maintenance practice was especially adopted when burials were placed under the floor level of houses, as widely attested at Khirokitia (Knapp 2013, 137-47; Philokyprou 1998). The practice of levelling and compressing the plaster floor before drying also created a characteristic separation of coatings in successive layers, with the finest particles on the surface and the coarser material at the bottom (Thomas 1995).

Another common practice was to plaster the interior wall and the floor of buildings at the same time, using the same material. Rounded pebbles were set in the lower part of the wall, between the vertical surface and the floor **[fig. 2.6]**, in order to make the application of the plaster layer easier, but also to possibly increase water tightness within the building and/or to avoid rodent activities inside the building (Amadio 2018; Philokyprou 2008; 2011; Matthews et al. 1997). This practice has been recorded in several prehistoric contexts, including Chalcolithic Kissonerga-*Mosphilia* and Middle Bronze Age Alambra-*Mouttes* and Erimi-*LtP* (Philokyprou 2011; 1998, 234-47; Amadio 2017, 127-8), suggesting that similar techniques were widespread in different regions of the island.

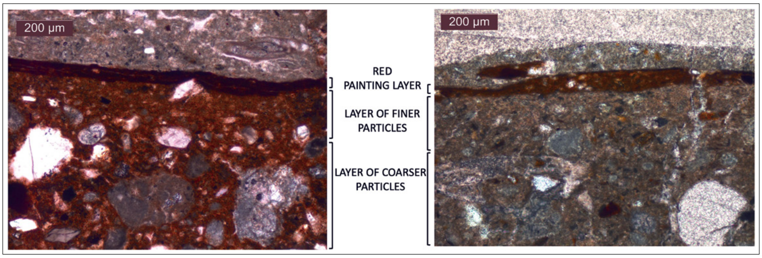

Figure 2.5 Photomicrographs (in plane-polarized light -PPL) of mud plaster applied on the external wall surfaces at Middle Bronze Age Erimi-LtP. Note the layer of finer particles closer to the surface (just beneath the red painting layer) as a result of burnishing. © Author

Figure 2.6 Technique used in the application of plaster on wall and floor surfaces at Middle Bronze Age Erimi-LtP. Pebbles (on the bottom left of the image), were set at the conjunction between the floor and the vertical surface of the wall. © Author. Courtesy of L. Bombardieri

Lime and gypsum plasters are both attested in Cyprus, confirming the simultaneous circulation of different technologies during the entire course of Cypriot prehistory. Very early evidence of lime plaster industry has been documented at the Early Aceramic Neolithic site of Akanthou, on the north coast of Cyprus. This seems to predate the appearance of pyrotehcnology in the island at the 9th millennium BC (Sevketoglu 2000; Sevketoglu, Hanson 2015). Confirmation of these data (Sevketoglu, Hanson 2015) implies that Cyprus was at the forefront of the adoption and development of lime plaster technology in the Eastern Mediterranean (the earliest evidence for the use of lime – even if sporadic – was reported from the Middle and Late Epipalaeolithic in the southern Levant).[6]

Lime plaster prevailed over gypsum plaster production during the Late Aceramic Neolithic period, as reported by analysis conducted by Philokyprou (2012a) and, according to present data, continued to be attested as the main plaster material even in the later prehistoric period (1998; 2012b). According to Philokyprou (2012b), this is surprising considering that the island has the most notable deposits of gypsum, and many prehistoric settlements are situated in the proximity of gypsum quarries. The preferred production of lime plaster appears peculiar also thinking about the easier procedures involved in the manufacture of gypsum plaster, as discussed earlier. An explanation is possibly identifiable in the longer durability and resistance of lime products compared to gypsum plasters.

A hiatus exists in the record of Early Chalcolithic Cyprus, where there is an absence of evidence pertaining to the production of lime plaster – with the possible exception of Kissonerga-*Mylouthkia* (Croft, Thomas 2003, 107-27). Plaster industry re-emerges at a large scale during the Middle Chalcolithic (Thomas 2005a, 187), as indicated by the occurrence of frequent lime plaster surfaces at Kissonerga-*Mospihilia* (Philokyprou 2012a; Thomas 1995, 40; 2005a, 187), and by evidence from Lemba-*Lakkous* (Thomas 2005a, 187; Peltenburg 1985), Souskiou-*Laona* (Dalton 2019, 91-6) and Chlorakas-*Palloures* (Klinkenberg 2021, 32-49). Thomas (1998; 2004; 2005a) examining this lack, discards the possibility that the diffusion of lime plaster during the later phases of Chalcolithic Cyprus was the result of internal developments deriving from increasing contact with the Levant – contact between the two countries, in fact, is attested since the Early Chalcolithic. That the decrease in lime plaster production during the Early Chalcolithic has to be connected to a lack of fuel resources – as a consequence of progressive deforestation on the island – is also incorrect. Experimental analysis conducted by Thomas well demonstrated that the production of lime plasters does not require a large amount of wood (2005a). Furthermore, experimental analysis conducted on fuel sources indicates that wood is not the preferred material to maintain high temperatures – as those required for lime calcination – over a prolonged time; dung instead is much more effective (Braadbaart et al. 2012; see also Gur-Arieh et al. 2014, with references). The absence of plaster may be possibly connected to the more ephemeral character of Early Chalcolithic timber-framed structures. The possible seasonal nature of these structures (Clarke 2007c, 124-6) maybe did not require the use of long-lasting materi-

6 Cf. Bar-Yosef, Goring-Morris 1977; Goring-Morris et al. 1997; Kingery, Vandiver, Prickett 1988; Valla et al. 2007.

al, such as lime plaster. We can speculate that the production of lime returned to be on a larger scale with the emergence of more 'stable' structures during the Middle and Late Chalcolithic. While this remains a possible explanation, it is prudent to await further evidence to validate this assumption.

The large diffusion of lime plaster industry at the end of Chalcolithic contrasts with data from Prehistoric Bronze Age Cyprus. Optical microscopic analysis conducted on plasters from Early and Middle Bronze age Cypriot settlements indicates that during this period, mud plaster was more commonly attested than lime plaster (Philokyprou 1998; 2012a; 2012b). The use of lime plaster is confirmed at Early Bronze Age Marki-*Alonia*; however, this material was not frequently applied in floors construction (Frankel, Webb 1996, 56; 2006a, 10-11; Philokyprou 2012a). At Early Bronze Age Sotira-*Kaminoudhia*, the identification of lime plaster is based on macroscopic analysis only. Evidence indicates that the use of what was recognised as lime plaster was restricted to the manufacture of circular and rectangular bins; less frequently it was applied as wall render and as flooring materials (Swiny, Rapp, Herscher 2003, 59-61). In many buildings at Sotira-*Kaminoudhia*, the foundation bedrock was used directly as a floor without any plaster application, even if the calcareous geology of the area provided abundant raw materials and the natural environment offered easy access to water and wood resources (Swiny, Rapp, Herscher 2003, 60-1). The preferential use of mud plaster in floors and wall surfaces at Middle Bronze Age Alambra-*Mouttes* constitutes further evidence of the presumed decrease of lime plaster application (Coleman et al. 1996, 25; Philokyprou 2012b, 187). The use of lime plaster for specific buildings or installations, however, highlights the importance of this material in specific contexts, as identified by Gjerstad, who reports the occurrence of a lime plaster floor in Room 6 at Middle Bronze Age Kalopsidha (1926, 22-9; Frankel, Webb 2006a, 10-11), but as also recorded at Amebelikou-*Aletri*, where lime was applied only for the construction of a circular hollow in Unit 1 (Frankel, Webb 2014). While we do not yet have any definitive data about the nature of plasters produced at Middle Bronze Age Kissonerga-*Skalia* and Politiko-*Troullia*, recent analyses conducted at Erimi-*LtP* indicate that both mud plasters and lime plasters were used at the site (Amadio 2018; 2021).

Combined macroscopic, micromorphological, spectroscopic (FTIR) and elemental (SEM-EDX and XRF) analyses revealed the occurrence of different recipes in the manufacture of plaster materials. The identification of specific recipes in plaster production, the use of selected tempers to obtain diverse plaster types, and the repeated occurrence of specific floor plaster types in particular areas and building units of the settlement, suggest that the production at Erimi-*LtP* was most probably carried out by workers specialised in building tasks, and the recurrence of this practice across the settlement suggests that this was organised at a communal level. In fact, if the production of plaster was conducted at a household scale, we may expect to find a specific plaster type spatially limited to one building unit or a few related buildings. On the contrary, plasters appear to have been produced depending on specific uses of buildings and spaces where they were applied. The evidence of community-wide use of specific resources for material contexts and functions might endorse the assumption of the possible existence of cooperative forms of labour and specialised or semi-specialised work (Arnold 2000, 341-57) at this site (cf. Amadio 2018; 2021).

Evidence of plaster tempered with crushed ceramic was also identified at Erimi-*LtP* **[fig. 2.7]**. This plaster type is repeatedly applied as a coating for mortar installations (Bombarideri 2017; Amadio 2017). Analysis conducted indicates that the specific use of crushed ceramic aggregates within a lime binder can improve both the mechanical and hydraulic performance of the material (Turco et al. 2016; Amadio 2017, 230). Similar examples have not yet been identified in prehistoric contexts, while they appear to be attested in Late Bronze Age urban centres such as Kition, Hala Sultan Tekke, Maroni-*Vournes* and Kalavassos-*Ayios Dhimitrios*, where these plaster types have been interpreted as innovative products of specialised labour of the more complex urban societies of Late Bronze Age Cyprus (Philokyprou 2012a). The production and application of these plaster materials at Erimi-*LtP* suggest a degree of expertise and labour organisation likely to have involved authority and decision-making at the supra-household level (Amadio 2018; 2021).

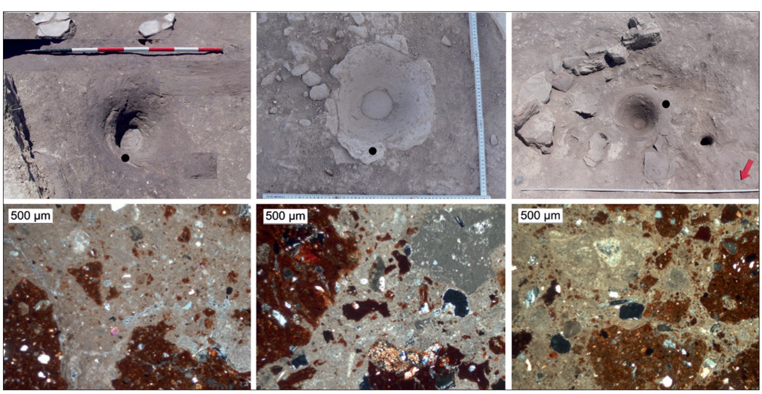

Figure 2.7 Photomicrograph (in crossed polarized light- XPL) of plasters tempered with crushed ceramic and the mortar installations where samples were taken from (the black dots mark the area where plasters were sampled) – Middle Bronze Age Erimi-LtP. Samples were taken from mortars of building-units SA I- SA IIB- SA IIa respectively. Note how the majority of ceramic inclusions have sharp edges and angular shapes, suggesting that a fired-hard material was crushed and used as temper, possibly pottery (see Amadio 2017, 92-3). © Author

It is important to stress that the production and frequent use and application of mud plasters at these Prehistoric Bronze Age contexts should not be interpreted as a lack of technical skills, but should be considered a deliberate choice operated by builders on the basis of practical reasons: plasters made of local calcareous sediments or crushed *havara*/chalk obtained a resistant product with less effort in terms of time and labour investment. In fact, examinations of experimental plasters demonstrate that materials made of crushed and pulverised *havara*/chalk mixed with water are robust and rather impermeable to liquids (Amadio 2021b). Pyrogenic lime plaster certainly required more labour investment with regard to raw material collection, fuel supply and craft expertise. Although considerable quantities of lime can be produced without a very large work investment, 4 tons – c. 3600 kg – of plaster surface can be produced by 20 workers for about five days using four burning sessions within pit-kilns, according to the calculation by Goren and Goring-Morris (2008); the vast production of pyrogenic plaster as identified at Middle Bronze Age Erimi-*LtP* demanded a whole different set of knowledge, from quarrying of suitable carbonate rocks to construction and operation of kiln/hearth, including manipulation of large quantities of quicklime (an extremely hazardous material), as well as the use of proper fuel in appropriate amounts. This multi-task organisation reinforces the idea of consistent skills and knowledge by craft people or workers who become increasingly more specialised (Matthews, French 2005, 127; Özdogan 1999, 230-2).

2.3.2.1 Carving and Dressing Stone

Stone represents one of the primary choices in building construction of prehistoric Cyprus. The wide use of stone for walls and wall footings was not only related to the easy accessibility of stone materials in the Cypriot landscape, but also and mostly to the advantages of stone architecture, including the capability to improve the static performance of the structure and to enhance the aesthetic appearance of the building (Philokyprou 2011).

Rubble stones were mostly used in Neolithic Cypriot architecture. Limestone rubble and boulders were simply collected from the bedrock. They were used with minimal or no working and were naturally irregular in shape, although in some cases the natural breakage pattern of the stone produced flat surfaces (Dimou et al. 2000). Evidence of worked blocks emerged during the Chalcolithic (Thomas 2005a, 186-7). The progressive diffusion of semi-subterranean and subterranean dwellings during Chalcolithic Cyprus and of rock-cut tombs during Prehistoric Bronze Age Cyprus indicates the increasing development of carving and dressing operations among prehistoric communities on the island. The processes of carving and dressing did not demand sophisticated tools or technologies (Wright 1992, 362). In fact, it was possible to carve and dress stone with hard stone implements (dolerite, basalt, granite and chert are the most common), and metal tools were not essential (Blackwell 2020, 215-16). However, the operational sequence behind stone-working, from extraction to final crafting, involved strategic choices, including anticipating the scale of the final project, estimating the working affordance of raw materials, assessing the availability and suitability of specific tools; all aspects which demanded a level of organisation of labour and workforce likely involving decision-making at the supra-household level (Wright 1992, 363; 2005, 33-4).

Despite no prehistoric quarries have been identified in Cyprus – most probably because more ancient quarry sites were re-exploited in later periods (Fisher 2020) –, it is possible to reconstruct the basic operations of ancient carving practices by looking at best-documented examples from more recent periods; stone carving, in fact, is generally a conservative technology (Wootton et al. 2013). The practice of carving involved distinct operations, consisting of procuring the stone – in Cyprus the local soft limestone and sandstone were preferred (Philokyprou 2011) – by cutting channels around the blocks using picks. Once the block's lateral faces were freed, it was retrieved by splitting off its lower face from the bedrock using a pick and a lever in combination with wetted wedges and a hammer (Wright 1985; 1992). This method allowed for the production of pieces of regular shape, thus permitting masons to regularise the carving process and to exploit the carved stone as much as possible in building construction (Devolder 2017). Sometimes, natural planes in the source materials likely determined the size of many blocks (Fisher 2020, fig. 11.3). According to Philokyprou (2011, 40), discontinuities in the Pachna formation facilitated the removal of rectangular pieces of stone, thus reducing the work effort necessary to conduct such demanding operations.

The basic types of mason's tools are likely to have remained constant from ancient times until the present day (Wootton et al. 2013). Wright (1992, 366) indicates two main categories of tools for stone dressing: the striking percussion tools, such as hammer, pick, axe, adze, and the struck percussion tools, like chisels and points. A further category includes non-percussion tools, like saw, drill, rasp and polisher which are not always included in the masons' toolkit according to archaeological data recovered in the Eastern Mediterranean. Uses of specific tools and technology may vary from region to region and across time, depending on different variables including the stone being worked, the final effect sought and the worker's skills and experience (Wootton et al. 2013). The architect Jeffrey (1918, 169) noted, for example, that the traditional village masons in Cyprus did not make use of the chisels – as expected after the influence of roman building methods on the island –, but carried out all work by a combination of pick and axe/adze, according to the Levantine tradition (Wright 1992, 367).

Reconstructing dressing technology and tools which may have been used by prehistoric Cypriot masons is challenging, due to the lack of archaeological evidence. The difficulty is given by the multifunctional character of these stone and metal tools, which limits the possibility to indicate with absolute certainty their exclusive use in masonry activities. In this regard, it is important to stress that multifunctional objects can be reshaped and reused until exhaustion (Boleti 2020, 246). Certain tools can also be shaped into other types of tools, as required. A flat chisel, for instance, can be shaped into a round-headed chisel by cutting its corner, according to evidence collected by traditional stone carvers (cf. Wootton et al. 2013). A general agreement (cf. Boleti 2020, with references) is that stone tools were often preferred to metal tools because of their physical and mechanical properties, mainly hardness and durability. This assumption appears to be confirmed by the persistent use of stone tools also during the later Iron Age and Greco-Roman periods (Boleti 2020, 242).

Within the category of masonry tools, chisels and flat axes are the objects more securely related to dressing activities. Stone chisels of diverse types – cigar-shaped with convex sides or with flat faces; plano-convex – have been identified at Chalcolithic Souskiou-*Laona* (Peltenburg, Bolger, Crewe 2019, 250-60) and Kissonerga-*Mosphilia* (Peltenburg et al. 1998a, 171). Most of them were recovered in settlement areas and many appear to have been hardly used (cf. Peltenburg, Bolger, Crewe 2019, pl. 111.10). Whilst the worn surface of these objects suggests that constant force was applied on these stone implements, possibly during repetitive actions like stone working (Deckers, Sewell 2019, 47-52), it is important to stress that they could have absolved also other utilitarian functions, including wood cutting and shaping and that multi-functional analyses are required to obtain more reliable data. Metal chisels are scarcely attested in the archaeological record of prehistoric Cyprus. A few examples are represented by the chisels from Chalcolithic Erimi-*Pamboula* (however fragmentary; Dikaios 1936, 50) and Lemba-*Lakkou*s (within Building 3; Slater 1985, 40-1), from the Philia burial context of Vasilia (Karageorghis 1960, 244), and from many Early and Middle Bronze Age contexts, including Vounous (Stewart, Stewart 1950, 125; Stewart 1962, fig. 100.25), Lapithos (Sjoqvist 1934; Catling 1964, fig. 4.11), Sotira-*Kaminoudhia* (Swiny, Rapp, Herscher 2003, 374-5) and Pyrgos-*Mavroraki* (Tomb 21; Giardino et al. 2002, 39). They are characterised by a long shaft with a square or rectangular cross-section, tapering butt and flaring cutting edge. Bone handles were preserved in some cases (Balthazar 1990, 377). Blackwell affirms that the dominant form in the repertoire of masonry tools – especially during Prehistoric Bronze Age Cyprus – is the single flat axe. These objects are widespread, particularly in Middle Bronze Age contexts such as Pygos-*Mavroraki*, Alambra-*Mouttes* (Blackwell 2011, 205, tab. 4:25). Pierced axes are also characteristic of the archaeological record of this period (MC I-II) (Catling 1964, 86; Balthazar 1990, 360). Flat axes were probably hafted; however, no remains of hafting materials have been found in Cyprus due to the perishable nature of the presumed handle (Coleman et al. 1996, 139).

Given the limitation of the available evidence, a further direction to the study and reconstruction of carving and dressing operations in prehistoric contexts of the island is constituted by the analysis of tool marks. Stone materials, especially when soft and porous such as limestone, tend to preserve marks left by implements when used to shape the stone surface. However, tool marks can be easily obliterated because of anthropic action, including finishing and smoothing practices, and natural erosion by wind and rain (Blackwell 2020, 217).

Due to this reason, tool mark analysis has rarely been conducted in the examination of prehistoric contexts in Cyprus. To date, limited evidence is available, but this can represent an interesting starting point for future, more systematic investigations. Analysis conducted at the Laona cemetery revealed the occurrence of tooling marks on the internal wall of the rock-cut tombs (Peltenburg, Bolger, Crewe 2019; Crewe 2019, 102-28). These consist of vertical, semi-circular grooves running parallel to one another down the tombs' walls. Variation exists in that some grooves run from left to right and others right to left; however, all marks have a similar direction and dimensions (similar width and depth). According to Robertson (2004), the carving process was achieved through the use of antler, as possibly demonstrated by experimental analysis which indicated that 10 hours of work were needed to carve a rectangular tomb of 34 × 21 × 15 cm simply by hammering by hand of an antler pick. The consistency in the direction and dimension of marks analysed in the Laona tombs suggests that these structures have all been constructed using the same (or very similar) techniques and tools. This uniformity is seen as a possible indication of craft specialisation, and the recurrence of this technique across a long-time span implies that knowledge was transmitted to successive generations. Robertson (2004) claims that this might suggest the existence of significance attached to this carving process, beyond strictly functional considerations.

Preliminary analysis on tooling marks has been also conducted at Middle Bronze age Erimi-*LtP*, focusing on marks left on the calcareous bedrock floor of the productive area of the settlement, the Workshop Complex (Amadio, Chelazzi 2013). The tool marks identified at the site were divided into three different categories on the basis of tools and techniques used, which reflect specific building practices. Group 1 comprises the signs left by a tool as a punch or a point which was used to scrabble the surface of the bedrock and to roughly dress the limestone foundation bases of building units [fig. 2.8a]. Group 2 comprises broken furrows left by a pointed tool, which was used to shape bedrock surfaces and corners of building units [fig. 2.8b]. Group 3 comprises tooling marks left by chisels; they have been divided into two sub-groups. Group 3a includes parallel vertical line marks, which are resulting from the hard striking of a chisel with a small tip; these signs are attested in vertical walls of carved basins [fig. 2.8c]. Group 3b comprises very close hatchings, which were obtained through the use of a chisel with a wide tip; this tool was used to smooth the limestone surfaces of channels, possibly to facilitate the flow of liquids (Amadio, Chelazzi 2013, 323-4) [fig. 2.8d].

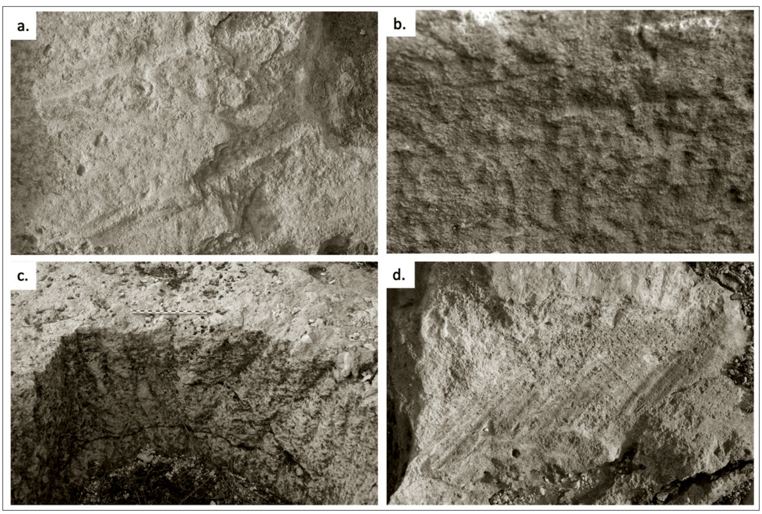

Figure 2.8 Tool marks identified on the bedrock floor at Middle Bronze Age Erimi-LtP: a) marks left by a punch or point; b) broken forrows left by a pointed tool; c) vertical line marks left by a chisel with a small tip; d) close hatching left by a chisel with a wide tip. © Amadio, Chelazzi 2013, 323-4

The evidence analysed suggests that a wide range of tools was used for carving and dressing limestone. The application of different tools and techniques according to specific building requirements is a possible indicator of specialised skills. As it was already stressed, carving and dressing stone did not require sophisticated tools; however, the conducting of these operations demanded specialised labour and the competence to organise these activities (Wright 1992, 362). At Erimi-*LtP*, the entire settlement was constructed by extensively carving the calcareous bedrock floor in order to create an organised layout, with buildings distributed on the terraced morphology of the hill. The extensive cutting of the calcareous bedrock involved in the settlement design and construction suggests advanced organisational and technological skills from the outset at the first stages of settlement construction, and presumably a degree of labour organisation at the supra-household level. The accomplishment of such an ambitious plan provides an indication of the amount of labour invested. Trigger (1990, 128-9) argues that the ability of individuals to engage in conspicuous consumption of energy and labour may be representative of power and control over natural and human resources and may therefore demonstrate a more complex social organisation. Evidence from the analysis of stone dressing at Erimi-*LtP* also indicates that a progressive development in stone working techniques was achieved during the later occupation phase of the settlement, at the end of the Middle Cypriot period. The best example of technological development in stone working is represented by the high-level technique in carving monolithic thresholds (see also § 3.1.2.1), as identified both in the productive and domestic areas of the settlement. These represent a great enhancement in the architectural elaboration and marking of boundaries of buildings, suggesting that a degree of expertise and labour organisation likely to have involved authority and decision-making at the supra-household level was emerging at the site during the course of the Middle Bronze Age Cyprus.

In this regard, it is important to consider that the creation of tools and the exchange of methods and techniques inevitably created networks of interdependence whereby people were producing things that effectively embodied themselves, through their labour and their relationships with others. The extraction of the monolith from the parent rocks, despite not requiring sophisticated technology, may have taken considerable time and a substantial group of people involved. These actions necessarily imply the need for planning, organisation and coordination, and at the same time the establishment of social roles in the project (Richards 2010). The construction of a built environment is a long-term project and the task of building large projects requires a long-term commitment as well as the ability to control resources and to coordinate substantial investment of labour. As claimed by Knapp (2009, 47), these undertakings cannot have failed to create a sense of group identity. I argue that carving and dressing operations, as well as other practices involved in building/settlement construction had, together with functional purposes, ideological implications associated with the sense of immutability and continuity, but also of strength and power, which possibly fostered the connection among community members and the natural environment (Altman, Low 1992), playing an important role in shaping socio-cultural identities and statuses within prehistoric Cypriot communities (Tilley 1996; 2004, 1-33).

2.4 Who Were the Actors? Labour Organisation, Gender and Social Agency

In the previous sections, materials and techniques adopted in construction activities by prehistoric Cypriot communities were presented with the aim of shedding light on socio-cultural dynamics, like the circulation of knowledge and the organisation of labour. In these discussions, I referred to people involved in these operations as 'builders', 'workers', 'masons'. But who were they? Who were the actors involved in these construction activities?

The study of social agency in technological and labour organisations cannot preclude the examination of gendered practices and strategies (Dobres 1995). Technology, indeed, serves as an arena in which social interactions in the planning, production, use and repair and discard of material culture are defined, expressed and negotiated (Dobres, Hoffman 1994, 224). In the analysis of architectural practices and processes, archaeologists often tend to overlook the role of women. The idea of house construction is generally perceived as solely a male activity, with the consequence that little is known about those involved in all the stages of building practices, from raw material collection to wall construction. As properly pointed out by Lorenzon (2020, 13-26), this male narrative, which is still dominant in archaeological research, is partly a consequence of the fact that architecture is still too often treated as the setting, rather than as an active agent in social life. The resulting 'faceless' reconstructions (cf. Tringham 1991) lack in identifying and recognising gendered social roles and identities, thus limiting the potential of archaeological research for understanding and reconstructing social behaviour and activities, including building construction practices.

A common misconception concerning gender in ancient societies is the idea of a different involvement of men and women in technology, production and exchange (Bolger 2003, ch. 3; 2010, 157). Traditional views of past societies have often relegated the role of women within the household space, and have limited women's practices to household-based activities, for example food processing and pottery production (on this argument see Bolger 2003). Instead, in the process of house construction, the labour of men, women and children is crucial at stages such as the acquisition of raw materials and the actual building construction and completion. Ethnoarchaeological analyses,[7] confirm this assumption and indicate that despite gendered roles in construction activities may vary across cultures and within groups in the same culture, the operational sequence of house and settlement construction is generally conducted both by men and

7 Cf. Blier 1981; Dalton 2017; Elcheikh 2018; Eyifa-Dzidzienyo 2012; Prussin 1969.

women of the community. Modern examples also suggest that in construction activities division of labour between males and females is often based on socio-cultural conventions and the assignment of tasks is generally related to the preconception that women can conduct 'simpler' activities (e.g. raw materials collection; flooring and wall plastering), while men can handle harder activities (e.g. carving and dressing operation, wall and roof elevation and construction) due to their innate and biological characteristics. In some cases, the attribution of particular tasks to women, for example the selection and collection of clays and the preparation of mixtures for plastering and decoration, is due to their greater ability to accomplish assigned responsibilities and to conduct precision work (Eyifa-Dzidzienyo 2012). While these data from modern contexts can provide a framework for examining past social systems, they cannot be directly applied to the past, since past societies have a high degree of flexibility and variability and they do not necessarily reflect the organisation of modern societies (Bolger 2013, 175; Sinopoli 1991, 169).

Going back in time to prehistoric Cyprus, studies conducted by Diane Bolger on engendered materials and spaces have demonstrated that there is little evidence for polarised gender categories during the earlier phases of Cypriot prehistory (Bolger 2010, 162-3; on this topic see also Douglas 2020). This argument is well exemplified by the results of the experimental work with the use of 'clays' in chalcolithic pottery conducted at the Lemba village (Shiels 2003; Bolger 2003), which indicates that the organisation of working practices, especially if they require complex operational sequences, are likely to demand the collective and collaborative efforts of men, women and even children.

In support of this argument, three examples are presented concerning building operations that in modern contexts are considered 'women tasks' (cf. Eyifa-Dzidzienyo 2012; Elcheikh 2018): raw material collection, plastering and surface decoration. By reviewing them from the perspective of prehistoric Cypriot communities, it appears that forms of collaborative labour, possibly involving the flexible arrangement of tasks, occurred in these village-based communities.

Raw material collection is generally believed a 'women activity' because it can be carried out despite interruptions and in combination with other household tasks (cf. Lorenzon 2020). However, experimental analysis of technological practices (Thomas 2005b) has demonstrated that the selection and collection of raw materials is an operation that needs care, acquired skills and a considerable amount of time (see also London 2002). If it is true that most of the raw materials for building construction are preferentially collected in the proximity of the settlement area, at the same time the production of building materials, such as mudbricks or plasters, requires a combination of different resources, including sediments, tempers, water, wood – as it was also stressed in the discussions presented in the previous sections. The procurement of these materials demands commitment and cooperation, thus reinforcing the assumption that in prehistoric construction practices the combined effort of all community members was essential for the accomplishment of such laboured activity.

Plaster production was also labour intensive and involved diverse steps and profound knowledge of raw materials and procedures in order to obtain a resistant and long-lasting product. While the practice of 'plastering', which consists of the final application of the plaster product on a surface, can be conducted by one person, at the same time it is important to stress that the production of the applied plaster requires a lengthy series of operations. Some of these operations needed skills – e.g. wood preparation and control of fire temperatures in order to guarantee a complete calcination process of the carbonate material **[box 2.2]**, the selection of appropriate aggregates types and the mixing of binders and aggregates in the right proportion –, therefore they could have been conducted by those with technological know-how and experience, both men and women. Other tasks, instead, required little or no skills – e.g. fuel and water collection, burnishing of the surfaces –, hence they could have been carried out by most individuals within a community, including children and adolescents. Therefore, if we consider the entire cycle of plaster production, from raw material selection to the final application of the product, it appears evident that the organisation of labour activities necessarily involved many members of the community. No skilled woman or skilled man could have been responsible for the entire cycle of operations alone without the support and involvement of communal work. This assumption is even more appropriate for pre-industrial communities – such as the village-based communities of prehistoric Cyprus –, where non-specialised or semi-specialised labour was conducted in combination with other subsistence activities (Knapp 2013, 344-7).

It is often assumed by many ethnographic examples that the person who applies the plaster, generally a woman, is also in charge of surface decoration (cf. Boivin 2000; Dalton 2017, with references; Kramer 1983, 14-50). In prehistoric Cyprus there is evidence for the diffused use of red ochre for surface decoration (on this topic see Bombardieri et al., forthcoming). Residues of ochre nodules and ground stone tools with ochre staining were identified at many Neolithic, Chalcolithic and Bronze Age sites, e.g. Ayia Varvara-*Asprokremnos* (McCartney et al. 2008; Manning et al. 2010, 695-97; McCartney 2017; McCartney; Sorrentino 2019), Kissonerga-*Mosphilia* (Peltenburg et al. 1998a; 1998b), Soskiou *Laona* (Peltenburg et al. 2019, 261), Lemba *Lakkous* (Elliott 1985, 192) Kalavasos *Ayious* (Todd 1991, 7), Erimi *Pamboula* (Dikaios 1936, 54; Bolger 1988, 66), Marki-*Alonia* (Frankel, Webb 2006a, 241), Sotira-*Kaminoudhia* (Swiny 2003, 228; Rupp 2003, 464). Plastered wall surfaces with preserved red-ochre decoration are also attested at Neolithic Kalavassos-*Tenta* (Todd 1987, fig. 39; 1998, figs 41-42) and Khirokitia (Hadjisavvas 2007, 49), at Early Bronze Age Marki-*Alonia* (Frankel, Webb 2006a, 63-4) and Middle Bronze Age Erimi-*LtP* (Bombardieri et al. forthcoming). While ochre is part of the natural resources of Cyprus, overlying the sulphide ores of the Troodos range, not all of the sites mentioned are in close proximity to the ochre natural source. The procurement of this material at a distant source implies that a considerable amount of time was needed for its collection. If women were responsible for this task – as they possibly were – it means that they spent part of their day away from home and from other domestic tasks, which presumably were conducted by other women and/or men of the household or community. It is possible that members of a particular gender group more frequently performed certain aspects of building construction. However, it is important to underline that the assigned tasks complemented each other, and activities performed by men, women and by other members of the community were finalised at realising a common project, suggesting that every task was considered as having a similar relevance in the operational sequence of building construction, no matter who the actors were.

The increasing social complexity during the Prehistoric Bronze Age Cyprus fostered a re-organisation of social and economic roles within the communities on the island (Knapp 2013, 344-7). These social transformations involved also a progressive technological specialisation and a different arrangement of labour organisation (cf. Bombardieri 2013), possibly including a more distinct division of working tasks (Bolger 2003, 61). The construction of larger settlements with little or no evidence of building differentiation suggests that forms of cooperation prevailed during this period. This "communal spirit" (Bolger 2003, 193) did not exclude women from primary productive labour. However, progressive isolation of house compounds and increasing control of access and resources appeared in the earlier phases of Middle Bronze Age Cyprus, as identified at Marki-*Alonia* (Webb 2009). In this process of household enclosure, greater time commitments by females within the domestic environment likely emerged. As suggested by Webb (2002, 93-4; 2009), this increasing division of gender roles over the course of Prehistoric Bronze Age Cyprus is attested in the repeated portrayal of women in secondary food processing activities on Red Polished ware vessels, but also on the diffusion of figurine types with representations of women as parental figures (on this point, see Bolger 2003, 193). At a speculative level, it is possible to imply that in this progressive relegation of women and of women's activities to the household space, female members of Prehistoric Bronze Age Cypriot communities also acquired an increasing role in the operations of house construction and maintenance, thus possibly playing an important part in the process of implementation of building materials production, and in the increasing specialisation of constructional techniques.

3 Experiencing the Built Environment
Transformations in Architectural Forms and Installations

3.1 The Built Environment at the Meso-Scale

This chapter explores the performance of buildings and the significance of architectural forms through the examination of building shape and size and the analysis of building's installations and occupation surfaces as indicators of social practices and choices. The micro-scale examinations of building practices and operations, which have been presented in the previous chapter, are integrated, into this section, with the meso-scale analyses of the building's spatial characteristics and of buildings constitutive elements. This evidence provides important clues to analyse the way buildings were used, perceived and experienced in the prehistoric communities of Cyprus.

But, how can architectural forms be representative and indicative of past social practices? The built environment is very much part of the transformative society of prehistoric communities. This is because architectural space is a three-dimensional built object that results from a process of physical construction and a process of

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social appropriation and constant recreation by society (Amerlinck 2001, 2; Bille, Flohr Sorensen 2016). Within this constructed environment, built forms undergo changes and adaptations as different people maintain, use and dwell within them, and these architectonic changes are part of socially embedded technological processes influenced by the relationships between people, material culture and the practice that reproduce spatial conventions (Gosden 2004, 24). Archaeological studies of the *chaîne opératoire* in ancient technologies have shown that every step of a construction sequence involves a complicated exchange of input and output from individual actors, larger social structures, materials and local settings (Kearns 2011). In this perspective, architectural forms can be understood as active creations that afford humans certain possibilities for interaction, and that change over time and enact different responses as they are constructed, maintained, abandoned or destroyed (Ryan 2011). Therefore, the placement, layout and orientation of buildings and built forms in the larger context of community and culture can be used as important indicators to analyse ideological, political, and religious messages about individuals that constructed, used and experienced that built space. In the words of Amos Rapoport, "house form is not simply the result of physical forces or any single causal factor, but is the consequence of a whole range of socio-cultural factors seen in their broadest terms" (1969, 47).

3.2 The Performance of Buildings and Architectural Forms

The concept of 'built environment' as a space where social systems are produced, reproduced and transformed is examined through the analysis of architectural elements that were used to configure the building space and make them a place of interaction and social reproduction. Since buildings structure daily life and the life course as well as exceptional events, and communicate experiences and memories through their materials, shape, size, ornamentation and placement, the analysis of these constituent elements may be used to define spatial and socio-cultural conventions, values and boundaries.[1]

The role of buildings and architectural forms in structuring social identities and status is discussed through the analysis of building shape and the use of specific fixed elements as significant indicators of social conventions and transformations. Performances within buildings are then analysed giving special attention to floors, surfaces and occupation deposits as means of social organisation and representation.

1 Cf. Fisher 2014a; Love 2013b; Matthews et al. 2013; Rapoport 1990; Rasmussen 1962; Souvatzi 2012.

3.2.1 The Social Significance of Building Shape

The way a building came into being over time suggests the way collaborations formed and transformed at different spatial and temporal scales. Within buildings, walls serve as tangible and concrete boundaries, which are used by individuals and communities to organise their and others' social lives; therefore, the analysis of building shape can provide insights into the socio-cultural dynamics of the past society and, in the specific case, of prehistoric communities in Cyprus (Kent 1990a; Rapoport 1990; Hodder 1990; Bolger 2003, 21-50).

Three main arguments are addressed and discussed in this section pertaining to the main episodes of architectural and social transformation over the course of Cypriot prehistory:

- The persistence of a circular architectural module in the built environment of Neolithic Cyprus compared to the architectural trajectories observed on the mainland;
- The appearance of semi-subterranean structures at the beginning of Early Chalcolithic Cyprus, and their social significance;
- The introduction of a rectangular building module during the Philia phase and the materialisation of the so-called 'courtyard house' during Early Bronze Age Cyprus.

The change from curvilinear to rectilinear architecture in the prehistory of Anatolia and the Levant is a well-known phenomenon, and it has been largely used as a proxy for socio-economic transformations (cf. Saidel 1993; Steadman 2006; Byrd 1994; Watkins 2004), despite recognition that there is no unilinear evolutionary trajectory in the configuration of the built and social environments (see Wilk 1990). Flannery, who attempted to use mainly architectural evidence to understand social changes in the prehistoric Levant, suggested that the transition from circular to rectangular buildings reflected a significant transformation in household and kin relationships (1972) and that the introduction of a rectangular building module was the material manifestation of different types of households living in expanded agricultural communities (2002). However, recent analyses have shown little correlation between architectural form and social structure (cf. Banning 1996; 2010; Steadman 2004; 2006) and have emphasised that a more nuanced understanding of this significant social, economic, and architectural shift can be provided by looking at buildings as dynamic contexts of social reproduction.[2]

In Southwest Asia, this architectural transition occurred at the end of the Pre-Pottery Neolithic A (PPNA) and the beginning of the Pre-Pottery Neolithic B (PPNB) periods, between the 11th and the 7th

2 See Cutting 2006; Banning, Chazan 2006; Kay 2020; Duru et al. 2021.

millennia cal BCE (see Duru et al. 2021, tab. 1). In Cyprus, however, despite the close contact with the mainland from at least the 9th millennium cal BCE, the curvilinear tradition persisted until the introduction of rectangular structures during the 2nd millennium BCE.

The Late Aceramic Neolithic architecture in Cyprus was characterised by circular buildings of two different types, both of which have their origin in North Syria, Southeast Anatolia (Peltenburg 2004): the circular pillar buildings, consisting of small circular structures with internal large rectangular pillars, as exemplified by few structures at Kalavassos-*Tenta* and Khirokitia **[fig. 3.1: 1-3]**; and the circular radial building, consisting of relatively spacious, installation-free, central circular or sub-circular space and radial cells, as indicated by most of the structures at Cape Andreas-*Kastros*, Khirokitia and Tenta (Peltenburg 2004) **[fig. 3.1: 4-6]**. The introduction of sub-rectilinear architecture during the 5th millennium BCE, as primarily attested at Ceramic Neolithic Sotira-*Teppes* **[fig. 3.2]** and Ayios Epiktitos-*Vrysi*, did not consist in a proper transformation of the built space. At these sites, rectilinear architecture co-existed with the circular module, and no functional differentiation was noted between the two types of structures (see Clarke 2007c), suggesting that the rectilinear form was a variant of the circular module and possibly a sort of architectural experimentation to enlarge the interior living surface of buildings, with no abrupt changes in the way the built space was lived and perceived. As argued by Clarke (2007b, 114), although internal fixtures and fitting may have physically shifted in the sub-rectilinear buildings of Ceramic Neolithic settlements in Cyprus (for example, the off-centred position of hearths within rectilinear structures), the internal layout of these dwellings remained virtually unchanged. Also, from a constructional point of view, Clarke noted that the walls of these rectilinear structures were constructed as one continuous feature – likewise in the circular structures –, as opposed to the later rectangular buildings of Prehistoric Bronze Age Cyprus, which were constructed with right angles. According to Peltenburg (2004) and Clarke (2007b), the persistence of a circular module during Neolithic Cyprus, with structures characterised by an unchanged use of internal space, reflects the stable economic and social strategies that existed on the island. Peltenburg (2004, 83) affirms that the limited influx of migrants, the low population growth and the lack of intergroup competition promoted continuity of the communal system. Similarly, Clarke claims that when little or no pressure is exerted on a population to change, there will be a trend toward cultural stability, including construction practices and living space organisation.

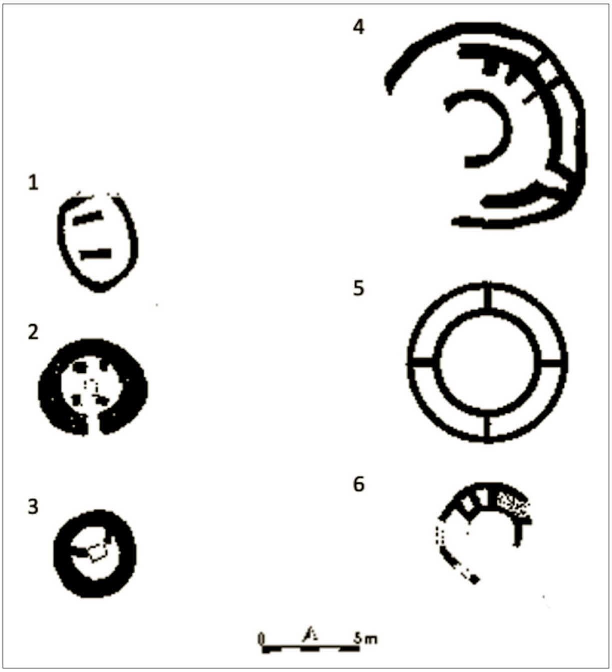

Figure 3.1
Circular Pillar Buildings (1-3) and Circular Radial Buildings (4-6): 1) Kalvassos-Tenta (Todd 1987, fig. 20); 2-3) Khirokitia (Le Brun 1984, figs 15.2, 24.2); 4) Kalvassos-Tenta (Todd 1987, fig. 20); 5) Khirokitia (Le Brun 1984, fig. 32.1a); 6) Cape Andreas-Kastros (Le Brun 1981, fig. 2). © Peltenburg 2004, fig. 7.2

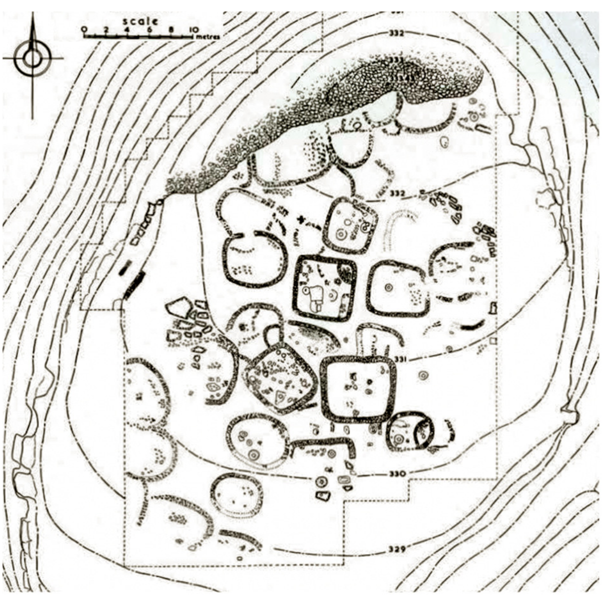

Figure 3.2
Plan of Sotira-Teppes. © Dikaios 1961

The circular module persisted during Chalcolithic Cyprus and became materialised in the architecture of the Middle and Late Chalcolithic settlements. In-depth analyses on Chalcolithic architecture conducted by Thomas (2005a) indicated that circular buildings became progressively larger, better realised in terms of construction technology and well-organised internally. While earlier circular building variants (Early to Middle Chalcolithic) were constituted by foundation hollows packed with clay or clay and rubble, sometimes with a ring of postholes around the exterior structure perimeter, and a rounded mud platform hearth in the internal building spaces, as at Erimi-*Pamboula* Phase 1 (Dikaios 1962), Lemba-*Lakkous* Period 1 (Peltenburg et al. 1985), and at Kissonerga-*Mylouthkia* (Peltenburg 2003), later building variants (Middle to Late Chalcolithic) were characterised by larger diameters, a more efficient use of plaster materials and stones and a more developed compartmentalisation of the internal building space, through the addition of partitioning elements like kerbs, as attested in the round buildings at Kissonerga-*Mosphilia*, Lemba-*Lakkous*, Souskiou-*Laona*, and Chlorakas-*Palloures*. Efforts to enlarge the living space inside the buildings, thanks also to skilful use of building materials and techniques, seem to have been one of the driving forces of the progressive transformation of Chalcolithic dwellings in Cyprus.

Detailed studies have been conducted on socio-economic transformations and dynamics of increasing social complexity, which are related to these progressive transformations of the built environment over the course of Neolithic and Chalcolithic Cyprus (see Thomas 2005a; Peltenburg 2004; Steel 2004). I would like to focus the attention on the increasing consistent orientation of entrances in circular buildings constructed or renewed at the end of Middle/beginning of Late Chalcolithic, as primarily identified at Kissonerga-*Mosphilia* (Thomas 2005a, 183) but also attested at Souskiou-*Laona* (Peltenburg 2019, 76-8), and partially at Lemba-*Lakkous* Period 4 (Thomas 1996, 52; 2005a). This constitutes an interesting aspect in the discussion of social and cultural implications associated with transformations of the prehistoric built environment on the island. In fact, the lack of building orientation characterises Neolithic and Early/Middle Chalcolithic circular structures and suggests that construction responded to individual household groups' exigencies. By contrast, the occurrence of buildings possibly oriented according to a wider settlement design during the Middle/Late Chalcolithic may be interpreted as an indication of an important transition towards an increased communal decision-making and a higher level of social organisation; this can be considered an important marker of increasing complexity in the wider economic and social life of Chalcolithic communities of the island (on this point, see also § 3.1.2.1) **[fig. 3.8]**.

This process of architectural transformation started in the Early Chalcolithic period, with the appearance of semi-subterranean post-frame structures during the 4th millennium BC. The possible correlation between the construction of semi-subterranean dwellings and climatic and environmental changes has been already addressed in § 2.1. Here, the aim is to focus on the possible social significance of the short-term shift to this building type.

Around 3900/3800 BC, Late Neolithic sites were abandoned, and sites characterised by small semi-subterranean dwellings and numerous pits of varying shape and size were constructed (Knapp 2013, 192-6). The two sites that best represent the period are Kalavassos-*Ayious* and Kissonerga-*Mylouthkia*, but structures of this type have been also identified in the early Chalcolithic phases at Erimi and in the Chalcolithic deposits of Maa, and appear to have their antecedents in the Ceramic Neolithic subterranean hollows at Kalavassos-*Kokkinoyia* **[fig. 3.3a]** and Philia-*Drakos* (Clarke 2007c, 124-6; Knapp 2013, 171). *Ayious* is a very distinctive site, characterised by wide shallow depressions, a pit and tunnel complex and more than 100 pits, varying in form from large and deep (with diameters up to 2.75 m) to small and shallow (with diameters of < 1.0 m) **[fig. 3.3b]**. There are no standing architectural remains, but these pits were possibly covered by light superstructures, according to archaeological reconstructions based on the occurrence of post holes which, in some cases, are associated with these hollows (Todd, Croft 2004). At *Mylouthkia*, pits have different shapes than those at *Ayious*. They are squarish in outline or shallow concave, and there are no tunnels or tunnel complexes (Peltenburg 2003). The most important aspect identified at *Mylouthkia* is that some contexts (e.g. Building 200) show a continuity of use from pit to semi-subterranean post-frame structures to round buildings with mud walls and stone foundations (see Clarke 2007c, 124; Croft, Thomas 2003). As pointed out by analyses conducted on the architecture of the Neolithic Near East, these different stages of construction could have responded to the need to enlarge the living surface inside the buildings, possibly to respond to new social exigencies deriving from a more defined organisation of activities inside and outside the building's perimeter (Bialowarczuk 2016) **[fig. 3.4]**. In fact, while the Neolithic and Early Chalcolithic buildings in Cyprus display a more fluid arrangement of rooms, with no formal boundaries and a tendency for buildings to exhibit divergent functions and diverse internal feature arrangements, the Middle and Late Chalcolithic phases witness a more formal organisation of interior spaces with specific floor types and distinct division of activities area (Thomas 2005a, 183-4).

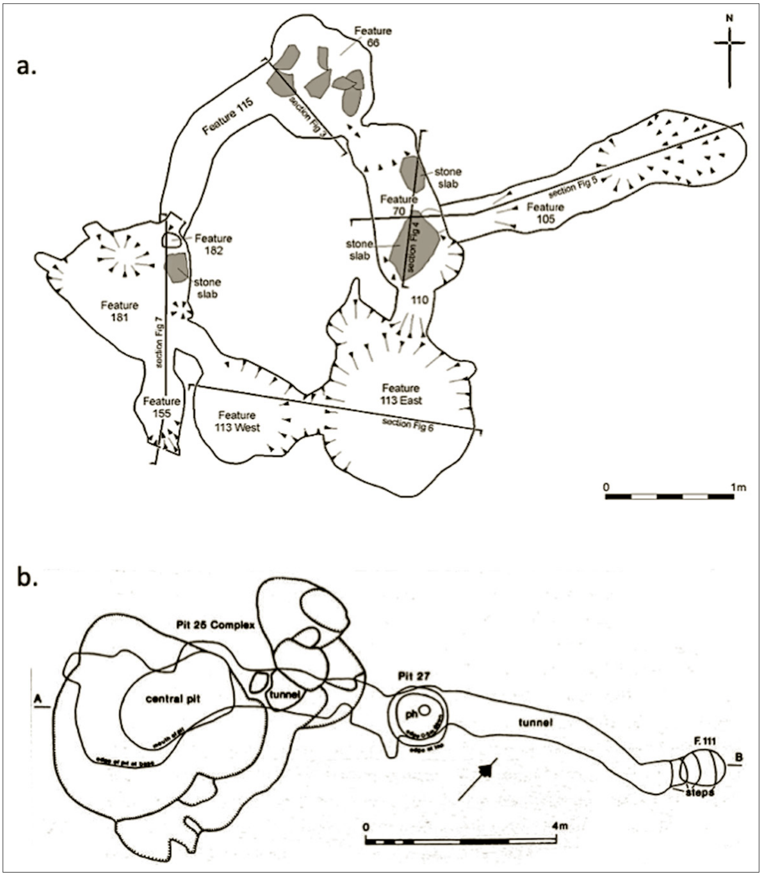

Figure 3.3 Plan of channel and tunnel complex at a) Neolithic Kalavasos-Kokkinoya – Area U (Clark 2009, fig. 2) and at b) Kalavasos-Ayious (Todd, Croft 2004, fig. 9)

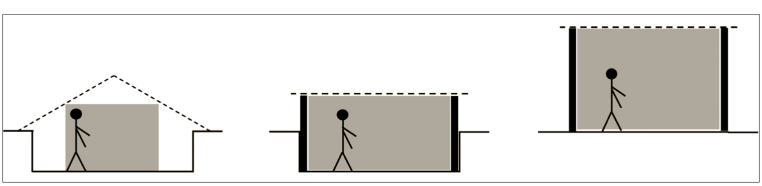

Figure 3.4 Reconstruction of the possible stages of construction from semi-subterranean shelters, to semi-subterranean post-frame structures, to free-standing structures. The grey square is indicative of the living area within the structures. As represented in the figure, the living area progressively becomes larger. © Bialowarczuk 2016

It has been argued that these pits and semi-subterranean post-framed structures were used as sources for building materials, as seasonal or regular shelters, or as storage facilities (cf. Clarke 2007c; Thomas 2005a, 118-24; Peltenburg 2003, 261-3; Knapp 2013, 204-6). As important as these functions were, the proposal here is to view these structures not in terms of function or economy but in terms of the social processes involved in their digging. Whittle writes that "to build a house, you must first dig. Digging makes that house-to be" (2007, 361-4). The act of digging can be seen as a physically collaborative effort, as well as an opportunity for collaboration and shared experience. According to Bailey (2018, 1-40), pit houses can be seen as projects which have effects on relations and communications between the people: working outside of the building in shared and more open spaces; collaborating on small-scale or more widely spread activities. In this perspective, it is possible to consider the semi-subterranean post-framed structures that appeared at the beginning of Chalcolithic Cyprus as transformative built and social environments (see also Clarke 2007c). The reduced space for activities within these structures – as testified by their limited size (the largest hollows rarely exceeded 2-3 m in diameter; Todd, Croft 2004, 214-15) and their restricted domestic inventory if compared to tools and installations of earlier Neolithic buildings – possibly promoted the use of open areas as *loci* of social activities and relationships. Mechanisms of cooperation and space sharing, which possibly emerged in these small-size communities living in and using these semi-subterranean dwellings, may constitute the first step towards a more communal way of living. This sense of community and engagement presumably increased over the course of Chalcolithic – as testified by buildings with consistent entrance orientation, which suggests the emergence of a supra-household settlement layout and organisation –, and represented an essential requirement in the establishment of larger social groups during Middle and Late Chalcolithic Cyprus.

It is important to stress that the possible tendency towards social cohesion and sharing contrasts with the narrative of an increasing development of domestic space (see Peltenburg 2003, 274-5) and of households 'owning' storage facilities, as proposed for Middle and Late Chalcolithic communities (see Bolger 2003, 29-31; Steel 2004, 89). However, these two distinct dynamics can be considered complementary rather than divergent (on this topic, see Carballo 2013): this seems best exemplified by the household communities of Prehistoric Bronze Age Cyprus.

The dichotomy between community cooperation and household competition, I argue, is materialised in the rectangular building module, which emerged on the island at the beginning of the Early Bronze Age, during the Philia phase (c. 2400/2350-2250 cal BCE). According to previous studies, the transition from circular to rectangular architecture indicates economic and social changes in the household structure, and reflects on the conceptual spaces and relationships between the household and supra-households (cf. Byrd 1994; Watkins 2004). Steadman (2006) affirms that rectangular buildings have practical advantages because rectangularity allows rooms and buildings to be packed closely together. In this perspective, the demographic growth of Early Bronze Age Cyprus and the emergence of new extended settlements, for example Marki-*Alonia*, can sustain Steadman's argument (see also Swiny 1989, 21). However, this single explanation is not entirely satisfying. More recent researches in the Levant and Anatolia point to cross-cultural practices in which storing food and the increased privatisation of households led to a simultaneous increase in the number of buildings and to increasing compartmentalisation of the building's space (cf. Duru et al. 2021; Kuijt 2000; Banning, Chazan 2006).

In this transformed architectural module, courtyards played a central role in the trend towards community cohesion, on one hand, and household privatisation, on the other. Courtyards, in fact, enlarged the building space, allowing inhabitants to have an additional area to conduct domestic activities **[fig. 3.5]**. This is well exemplified by evidence from the earlier occupation phases at Marki-*Alonia* (Phases B-C), the only prehistoric Bronze Age settlement by date which provides an extended development sequence from the Philia phase until the beginning of the Middle Bronze Age, and testifies the evolving interactions within and between households (Webb 2009, 262). In the earlier Phases B and C, courtyards were equipped with installations like hearths and emplacements, suggesting that the majority of daily activities were conducted within these semi-open spaces. Frankel and Webb (2006a; 2006b; see also Webb 2009), show that, in some instances, the courtyard space was shared between two or more compounds, indicating a high level of social and economic cooperation. According to their view, this can be viewed as a "survival mechanism appropriate to a newly established pioneer community, perhaps numbering only 40 people, dispersed among a handful of households in relatively inhospitable terrain" (Frankel, Webb 2006b, 301).

At the same time, courtyards created a physical as well as an ideological 'filter' between those who were inside and those who were outside. The introduction of courtyards in rectangular buildings, I argue, contributed to a more definite distinction between the individual and the communal spheres, through the activation of mechanisms of inclusion/exclusion. If the 'inclusion' entailed the opening of the household space to the others, thus promoting dynamics of cohesion and collaboration, the 'exclusion' implied a limitation of social interaction. In this perspective, courtyards offered new means of compartmentalising the domestic space. At Marki-*Alonia*, this dual role of the courtyard can be recognised in the architectural and social transformations between the earlier and the later phases of settlement occupation. Frankel and Webb (2006a; 2006b) explain how the

Figure 3.5
Plan of the courtyard houses at Alambra-Mouttes. In grey are evidenced the courtyards.
© Webb 2009, fig. 5a

gradual reduction of activities within courtyards and their progressive dismissal – as indicated by the relocation of hearths and other installations from courtyard to building space – is proportional to the increasing privatisation of domestic space. According to their view, the emergence of self-contained semi-enclosed households, during later occupation phases at Marki, coincided with increases in the size of the community and of individual families and with improved economic security at the household level. Similar architectural trajectories are likely to have characterised other prehistoric Bronze Age settlements of the island, such as Alambra-*Mouttes* and Sotira-*Khaminodhia*, with multi-roomed buildings with a single entrance and a flow from outer to inner rooms (Webb 2009) [fig. 3.5]. However, in the Gjerstad house at Alambra, courtyards were less enclosed than those at Marki, indicating a less pronounced filter between the household members and the outsiders, thus presumably suggesting a higher level of sharing and cooperation among community members over the course of Early and Middle Bronze Age Cyprus.

The increasing compartmentalisation of interior spaces and the subsequent creation of more private rooms within rectangular buildings have been identified as evidence of increasing social complexity in ancient communities (Kent 1984; 1990; Bolger 2003; Rapoport 1990). According to ethnographic studies conducted by Kent (1984; 1990), house interiors are likely to become more ideologically and physically segmented as household members have an increasing number of tasks to perform (1990, 150). Evidence deriving from archaeological and geoarchaeological analyses conducted on floors and occupation surfaces of prehistoric settlements in Cyprus can support this discussion, and will be presented in detail in § 3.2.

3.2.2 The Social Significance of Fixed Architectural Elements

Social settings are not only defined by buildings shape, but also by architectural forms, which help determine social conventions by encouraging social interaction and reproduction within building spaces. Fixed elements, together with their functional character, can be used to express socio-cultural ideologies and status, circulation and movement patterns, sequences and interconnections of activities and interrelations. In this section, doorways and fire installations will be examined as key indicators of socio-cultural transformations of early Cypriot communities.

3.2.2.1 Doorways

Among the fixed architectural components, doorways represent one of the most significant elements of analysis. The importance of doorways as *loci* of access and transition between building spaces and domains has been advocated by numerous authors who indicate doorways as liminal zones in the syntax of the built space (cf. Lang 1985; Parker Pearson, Richards 1994; Hillier, Hanson 1984). In his analysis of the Late Bronze Cypriot built environment, Fisher acknowledged their crucial role by sustaining that doorways, beyond their topological function, are elements embedded with social and symbolic meanings (2009a, 445; 2009b, 194-9).

Four attributes are taken into consideration to explore the role of doorways in the construction and transformation of the socio-cultural environment of prehistoric Cypriot communities: doorways orientation, number, width and architectural characteristics.

Building orientation can respond to climatic and topographic exigencies. In Cyprus, vernacular buildings are commonly oriented according to the north-south axis in order to take advantage of solar energy and daylight (Lapithis 2005; Nafiz, Haltan 2013). While building orientation in archaeological contexts can be site-specific, depending on the geomorphological and topographic characteristics of the settlement area, in more general terms it appears that in Neolithic and Chalcolithic Cypriot settlements there was a preference for a south-facing orientation. Considering that doors and entranceways constituted the main opening of these early prehistoric structures, the occurrence of a south-facing entrance contributed to taking advantage and maximising the amount of sunlight reaching the interior of the building [fig. 3.6].

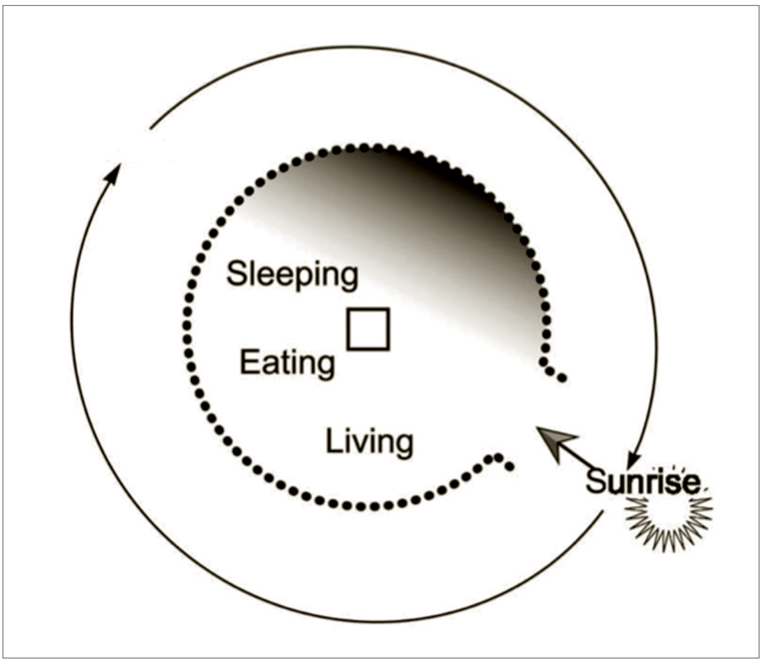

Figure 3.6 Schematic representation of circular building oriented according to the sun path. © Bradley 2013

In addition to functional explanations, doorway orientation retains also important social significance. In § 3.1.1, it was discussed how the recurrent orientation of buildings within a site may suggest communal decision-making in the organisation and planning of the settlement. According to Miles et al. (1998, 38) and Thomas (2005a, 45), a shift in building orientation can be recognised in Chalcolithic settlements between the Middle and Later Periods. During the Late Chalcolithic, there is a change in building orientation from the south to the south-east, with exceptions given by buildings which were oriented north, northwest and west possibly for practical reasons (Miles et al. 1998, 38; see also Schubert 2018, 82-6). Thomas (2005a, 45) suggested that the higher variability in building orientation observed during the Late Chalcolithic can be related to a more elaborate settlement organisation during this period, in which buildings reflect households organised around an open courtyard. However, this hypothesis has not been confirmed by preliminary analyses of the built environment at Kissonerga-*Mosphilia*, Lemba-*Lakkous* and Chlorakas-*Palloures*, which indicate that groups of buildings were preferentially oriented to the southeast rather than facing a central courtyard (Schubert 2018, 82-6). The idea that the consistency in buildings orientation over the course of Middle and Late Chalcolithic Cyprus can reflect communal planning and organisation (see § 3.1.1), could be endorsed for example by the re-organisation of the north section of the settlement at Kissonerga-*Mosphilia* and in particular of Building 1161 during the Middle Chalcolithic. Building 1161 is a rectilinear multi-phased structure, the doorway of which was oriented to the northeast during the first occupation phase. After the construction of a paved track next to it, this entrance was blocked and a new access was opened to the south (Peltenburg et al. 1998a, 30) **[fig. 3.7]** to respond to the same orientation of the other surrounding Buildings 2 and 1000 (see Schubert 2018, 83), and to enable easy and more direct access to the south part of the settlement, including the Ceremonial Area – an area of architecturally and functionally distinctive structures of symbolic significance (e.g. the so-called 'Red House'; see Peltenburg 1998a, 248). This re-organisation was most probably conducted at the supra-household level, according to a shared project and communal layout.

The consistent pattern observed in doorways orientation at Late Chalcolithic settlements **[fig. 3.8]** does not occur in Early Bronze Age rectangular structures. Both at Early Bronze Age Marki-*Alonia* and Sotira-*Kaminoudhia*, buildings orientation does not respond to an organised layout. Buildings' entrances were constructed and oriented according to individual households' spatial organisation. At Marki, doorways placement changed during the different phases of settlement occupation (e.g. Units 6 and 8), reflecting transformations in buildings organisation and layout; a trend that echoes the rapid demographic growth of the settlement and its progressive expansion in an interrupted process of buildings construction, maintenance, change of use and abandonment (Frankel, Webb 2006a, 305-15; Webb 2009). Doorways' placement in domestic buildings at Middle Bronze Age Alambra-*Mouttes* and Erimi-*LtP* show similar variation, with door orientation dictated by the relationship between buildings and the concomitant courtyards and access routes. A more regular pattern has been identified in buildings of the Workshop Complex at Erimi-*LtP*, where doorways appear to respond to a preconceived plan. Buildings show a northwest-southeast orientation and entranceways

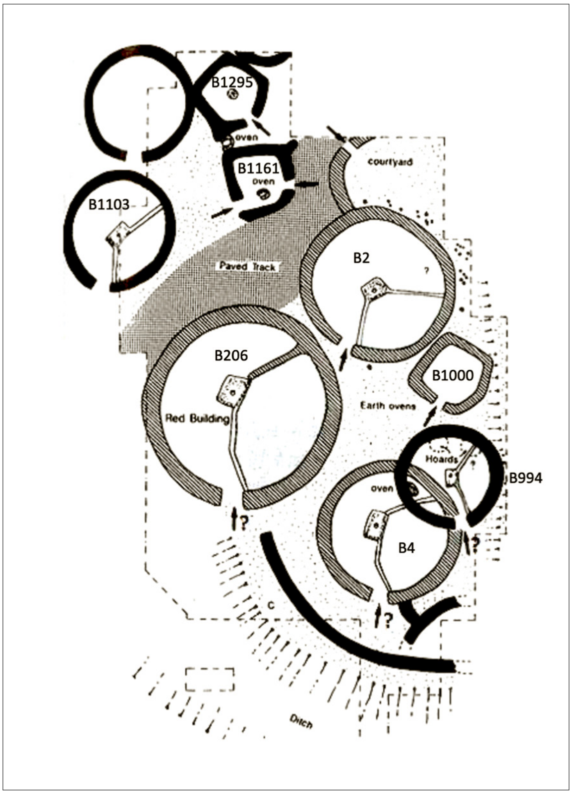

Figure 3.7
Plan of Kissonerga-Mosphilia indicating the doorways of buildings B1161, 1195, 1103, 1000, 206, 4, 2. © Peltenburg 1998, 245

were likely placed according to two main access routes and passageways: one in the southern portion of the complex, which connects building-units SA I, SA II, SA III, SA VIII with the domestic quarter of the settlement; one in the northern section of the complex, which connects building-units SA VI and SA V and open and semi-open spaces WA I, WA III, WA IV, WA VII, WA VIII to one of the possible access points to the settlement. Exceptions to this layout are due to the restructuring of buildings between the earlier and the later occupation phase, especially in the case of open areas turned into roofed structures (e.g. Building-Unit SA IIa-IIb). The divergent trend identified at the Workshop Complex in Erimi-*LtP* is indicative of different spatial organisation patterns between household spaces and communal working areas – such as those emerging over the course of Middle Bronze Age Cyprus and characterising most of the settlements constructed and/or transformed and occupied during this period, e.g. Erimi-*LtP*, Ambelikou-*Aletri*, Kissonerga-*Skalia*. The Workshop Complex at Erimi was conceived and constructed as a communal project responding to supra-household planning and organisation. Instead, domestic areas of Prehistoric Bronze Age settlements do not appear to have been regulated by a preconceived spatial layout, e.g. Marki-*Alonia* and Sotira-*Kaminodhia*; although some of these domestic structures were constructed taking into consideration internal routes, passageways and open courtyards, hence appearing spatially more organised, e.g. Alambra-Area A.

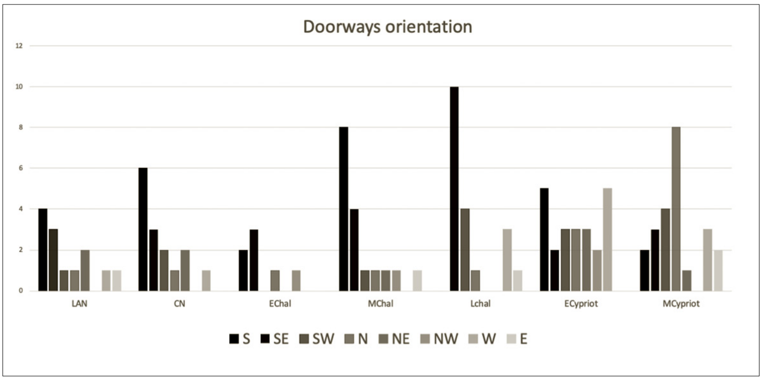

Figure 3.8 Bar chart showing doorways orientation in prehistoric Cypriot context. Numbers were calculated taking into consideration two main settlements for each recorded period: Khirokitia and Cape Andreas Kastros (LAN); Sotira-Teppes and Ayios Epitkitos – Vrysi (CN), Kissonerga-Myloutkia and Kalvassos-Ayous (EChal); Kissonerga-Mosphilia, Lemba-Lakkous (MChalc); Kissonerga-Mosphilia, Lemba-Lakkous (LChalc); Marki-Alonia-Phase E, Sotira-Kaminoudhia (EC); Alambra, Erimi-LtP (MC)

The number of doorways in a built structure also contributes to giving significant indications of socio-cultural practices and can inform on the filters applied to control or limit access to a building. Prehistoric Cypriot dwellings are generally equipped with one entranceway. The presence of two or more doorways is rare, and it occurs when there is a change in the use and orientation of the building. In this case, one of the accesses is blocked and a new one is opened in the structure. Limiting the number of entrances had practical advantages: it contributes to maintaining a good temperature and level of humidity within the building (Philokyprou et al. 2017) and to controlling the movement of people entering and exiting from the structure (Fisher 2009a). The need to enclose and control the space of the building is also suggested by doorways width. This represents an important factor to assess the level of interaction and social representation in any building. According to analyses conducted by Fisher, public-inclusive contexts are characterised by wider doorways than the private-exclusive ones (2007, tabs 8.2, 8.3; 2009a, tab. 2). As indicated in table 3.1, the average width of doorways in prehistoric buildings of Cyprus is c. 0.60-1.0 m **[tab. 3.1]**. Access width looks proportional to the elaboration of the doorway itself. Wider doorways are typically characterised by a higher architectonic elaboration, including the presence of constructed thresholds and pivot stones. On the contrary, narrower entranceways are represented by a simple gap in the wall. The occurrence of architectural elements – thresholds *in primis* – which embellish and mark the entranceway of a building, represents an important indicator of the need to increase privacy and control (Lang 1985). In buildings where entranceways were constituted of a simple gap in the wall, as in most Neolithic and Chalcolithic buildings, the transition from the outdoors to the indoors possibly was more fluid, allowing people to enter the structure with no particular restriction and limitation. In this regard, it is interesting to note that the most significant buildings within a settlement were generally equipped with more elaborated entrance systems. An emblematic case is represented by Building 3 – the so-called 'Pithos House' –, the most significant building of period 4 at Kissonerga-*Mosphilia* (Peltenburg et al. 1998a, 36-51, 249-58). This is one of the largest Late Chalcolithic buildings and it is characterised by a well-preserved entrance of 1.20 m in width, equipped with a stone-paved threshold and a socketed stone. The doorjambs (one not preserved) were built of roughly squared limestone blocks. A doorstep and a group of socketed stones were placed close to the east doorjamb. The occurrence of such architectural elements not only improved the aesthetic characteristic of the structure, but also constituted an important functional means to enclose the structure, secure the products within, and symbolically mark the building's importance and significance (Fisher 2009a).

Elevation changes and steps have also a key role in regulating passage and admittance within buildings, as they require people who traverse them to adjust their movement (Lang 1985). Stepped thresholds have been identified at Neolithic Sotira-*Teppes* (e.g. House 39) **[fig. 3.9]** and Chalcolithic Kissonerga-*Mosphilia* (B1), as well as in Prehistoric Bronze Age structures, notably at Sotira-*Khaminoudhia* and Erimi-*LtP*. At Khaminoudhia, in particular, the limestone monoliths used as thresholds in Units 6 (Area A) and 25 (Area C) were placed higher than the floor and the bedrock level (threshold 29 of Unit 25 rises c. 27 cm above the bedrock; Swiny, Rapp, Herscher 2003, 40) as "high sills" (Frankel, Webb 2006a, 11) **[fig. 3.10]**. While a possible explanation for this unusual threshold placement is that their raising position was intended to block and protect the building interior from flooding and rainwater, it is further possible that the elevation change of these thresholds was aimed at reinforcing the awareness in the transition, hence possibly amplifying the significance of the act of entering and the importance of the building itself (Lang 1985).

Figure 3.9 Stepped entrance of House 39 at Sotira-Teppes. Note the elevation change between the house floor level and the outdoor level. © Dikaios 1961

Figure 3.10 Monolithic threshold at Sotira-Kaminoudhia, Unit 25, Area C. Courtesy of S. Swiny; © Author

Thresholds may be identified as central elements of doorways (Unwin 2007, 33-5), as they tangibly mark the transition between spaces and the different ideological significance of these, such as indoor and outdoor, private and public, clean and dirt (Lang 1985, 206). Thresholds in prehistoric Cypriot contexts have important value in the archaeological reconstruction of the past built environment, because they validate the assumption that wooden doors were enclosing the doorway space of a building, especially when pivot holes are preserved. At Marki-*Alonia* many of the pivot stones identified and recovered show striations around the circular hollow left by swinging doors (Frankel, Webb 2006a, 11) **[fig. 3.11]**.

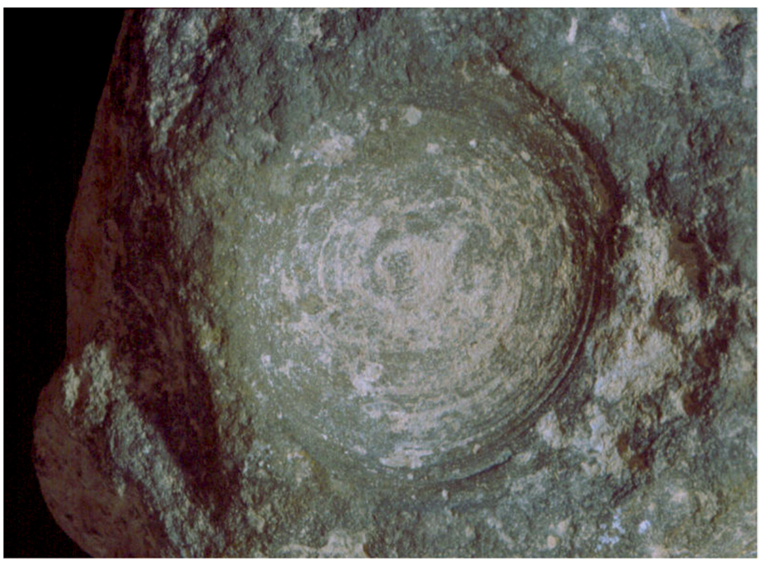

Figure 3.11 Detail of the concentric striation left by door pivot; pivot stone S890 from Marki-Alonia. © J. Webb

While stone thresholds have been used at many settlements since the Neolithic period **[tab. 3.1]**, the level of architectural elaboration of monolithic limestone thresholds attested at two Prehistoric Bronze Age settlements – Sotira-*Kaminoudhia* and Erimi-*LtP* – needs a particular mention. At Marki-*Alonia* (Frankel, Webb 1996, 58; 2006a, 11), Alambra-*Mouttes* (Coleman et al. 1996, 27-8, pl. 5c) and Alambra-*Asproyi* (Gjerstad 1926, 22) doorways were marked by more simple pivot stones and stone thresholds made of re-adapted limestone blocks and demolished walls. On the contrary, worked monolithic limestone blocks were in use at Sotira-*Kaminoudhia*. Here, blocks were selected from the surrounding calcareous environment and successively dressed in order to have a roughly rectangular face. In some cases, blocks were worked to be equipped with hollows for door pivots (Unit 6-Ft. 95; Unit 25-Ft. 29) **[fig. 3.10]**. At Erimi-*LtP*, monolithic limestone thresholds were diffusely used in the settlement. These monolithic blocks were carved from the calcareous bedrock floor according to specific sizes. The large dimension of these blocks indicates that they were procured from the local environment using an apt and specific carving process **[box 3.1]**. The more elaborate examples of these monolithic thresholds have been placed in the Workshop Complex; these blocks were carved in order to have a step toward the inner space of the building, holes to allocate c. 5 cm posts for doorjambs and a pivot hollow of c. 15-20 cm **[fig. 3.12b]**. The high-level dressing technique of Erimi-*LtP* thresholds, which, in some cases, are introduced by small entry areas (Building-Units SA IV, and SA XII) **[fig. 3.12c]** makes them more similar to Late Bronze Age ashlar prototypes. According to stratigraphic evidence, most of these monolithic thresholds were introduced at the settlement during the later occupation phase, at the end of the Middle Bronze Age period (Bombardieri 2017, 16, 34-8), and, considering the time and workforce necessary for conducting carving and dressing operations at a large scale, they can be identified as the product of specialised or semi-specialised work. Fisher (2009b, 194) argues that aesthetic elaboration is a means to attribute symbolic values to thresholds, reinforcing the ideological significance of these liminal architectural forms (Blanton 1994, 117; Sanders 1990, 61; Rapoport 1990); this appears to be the case at Erimi-*LtP*, where monolithic limestone blocks were selected and skilfully quarried and dressed in order to form a single homogenous block with the related abutting walls. If we consider the aesthetic characteristics of these monolithic blocks, including their large sizes, their worked and flattened faces, their level of architectural elaboration, as well as their social significance – notably the fact that they are the product of a supra-household effort made by experienced workers to mark the architectonic renovation of the built space of the Workshop Complex –, we can indicate them as 'pseudo-ashlar' and possibly argue that they represent one of the first stages in the process of experimentation which prelude the appearance of an ashlar architecture at the beginning of Late Bronze Age Cyprus. This idea is here further developed **[box 3.1]**.

Box 3.1
What Is 'Ashlar'? A Brief Consideration Concerning the Initial Appearance of Ashlar Stone in Cyprus

Ashlar blocks are stones that unequivocally went through a process of human intervention; thus, the efforts, skills and tools necessarily associated with ashlar are its distinctive markers (Kreimerman, Devolder 2020). The term 'ashlar' can designate both the single stone element worked and dressed in order to have flat surfaces, and the masonry made of such components.

According to Hult (1983), Bronze Age ashlar stone refers to wrought blocks which approach the ideal of a rectangular visible face when the blocks are in place. The faces that are not visible are mostly unwrought and the size of the carved blocks varies considerably from 0.50 × 0.30 × 0.30 m to 1.0-5.0 × 0.50-1.50 × 0.50 × 0.90 m (Philokyprou 2011). Among scholars, the term 'true ashlar' is used to refer to stone components of which all faces, with the exception of the back one, are worked; while the term 'pseudo-ashlar' is used to designate blocks of which only one or two faces are worked, generally the front face and the top and the bottom ones (Gineouvès, Martin 1985, 56; Kreimerman, Devolder 2020, 3).

The regular shape of ashlar components is often generated by the procurement of quadrangular rough blocks through channel extraction. This technique is attested in the entire Eastern Mediterranean, including Egypt, Crete and Cyprus, and consists in digging narrow channels around elements of the desired shape and dimensions (cf. Shaw 2009; Wright 1992; 1985). The extraction activity is governed mostly by the presence of a good cleavage plane (Philokyprou 2011; see also Fisher 2020), and the removal of the block is finalised through the use of wooden or metal wedges, which facilitate the extraction of the block from the surface (Wright 1992, 362-3). The blocks are quarried with a specific size or module in mind; this practice is necessary to regularise the carving process and to exploit the carved stone as much as possible in the construction activity (Amadio, Chelazzi 2014; Wright 1992, 362-3).

The production of ashlar did not take place simultaneously in the ancient Mediterranean region. Social and economic factors, including the organisation of labour and workforce, played a fundamental role in enabling technological innovations, including those related to carving and dressing stones. In Egypt and Syria, the production of ashlar is dated back to the third millennium BC (Hult 1983); in Anatolia and mainland Greece, the technique spread during the Middle and Late Bronze Age (Philokyprou 2011); in Crete, it emerged over the course of the Early Minoan period (Shaw 1983; 2009). Analyses conducted by Philokyprou (1998; 2011) indicate that the first use of ashlar in Cyprus is dated back to the Late Bronze Age (c. 1700-1050 BC), with the appearance of the first public and administrative building complexes.

It is important to stress that the ashlar architecture – like other socio-cultural and technological innovations – did not abruptly appear on the island, nor can it be considered a process favoured exclusively by foreign involvement, as argued by earlier studies (cf. Catling 1973, 170; Hult 1983, 89; 1992, 75). Instead, it should be considered as the result of a process of experimentation, which gradually emerged in the transformative social environment of Prehistoric Bronze Age Cyprus (Webb, Knapp 2021; Peltenburg 2008; Manning, de Mita 1997). The socio-economic dynamics which characterise this period, and the progressive transformations in the organisation of labour that are progressively evident over the course of Middle Bronze Age Cyprus – including the emergence of supra-household forms of production (as indicated by the appearance of productive areas separated from the domestic ones; see Webb, Knapp 2021; Bombardieri 2013) – enabled the necessary workforce for demanding and time-consuming operations, such as quarrying and dressing activities.

The more evident outcome of this transformative socio-economic and architectonic environment is represented by the Middle Bronze Age III/Late Bronze Age I fortresses. One of the most representative examples of the earlier use of ashlar in Cyprus is constituted by the fort of Korovia-*Nitovikla*; here ashlar blocks and masonry are attested in the construction of the structures' foundation, mostly for the plinths with drafted margins that supported the monolithic doorjambs of the main gate (Hult 1983, 15, 81; Astrom 1972; Wright 1992, 410-11). I argue that this process of increasing experimentation in carving and dressing stones gradually developed during the Early and Middle Bronze Age Cyprus, as represented by the monolithic threshold prototypes identified at Sotira-*Kaminoudhia* and Erimi-*LtP*. For the production of these stone features, a compact calcareous material was skilfully sourced among the local resources available; the blocks were then carved according to a specific size, dressed and further worked in order to have additional elements, such as hollows for setting jambs, door pivots and steps. In particular, the monolithic thresholds produced at Middle Bronze Age Erimi-*LtP* represent examples of high-level skills in carving and dressing limestone blocks (see § 3.1.2.1). The monoliths recovered and analysed at the settlement have variable sizes, ranging from 1 to 1.50 m in length, and show three out of six faces worked **[fig. 3.1.2]**.

The thresholds of Sotira and Erimi demonstrate how technological know-how was progressively established in local communities of the island through the sharing of technical knowledge and ongoing experimentation. This progressive specialisation was supported by the emergence of supra-household forms of labour, mostly attested during Middle Bronze Age Cyprus.

Returning to the initial definition of ashlar as "a stone that went through human intervention, the appearance of which is imbued with symbolic meaning and is a corollary to wholesale changes in socio-cultural and economic settings" (Kreimerman, Devolder 2020), we can conclude that the construction of these monolithic thresholds at Sotira and Erimi symbolises control over human, material and technological resources. Their occurrence certainly contributed to enhancing the aesthetical appearance of the structures, providing a sense of permanence not only for the buildings where these thresholds were placed but possibly also for the social structure that endorsed their construction (see Fisher 2020).

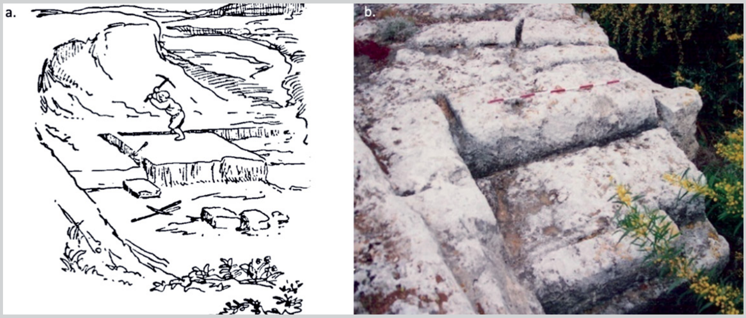

Figure 3.1.1 Carving technique in Cyprus: a) Sketch representing the channel extraction technique, adopted to carve the ashlar blocks (Wright 1992, 214); b) Ancient quarry site in Cyprus (Philokyprou 2011, fig. 8)

Figure 3.1.2 Examples of monolithic limestone thresholds at Erimi-*LtP* (Building-Units SA I, IV, XII, X respectively; © L. Bombardieri)

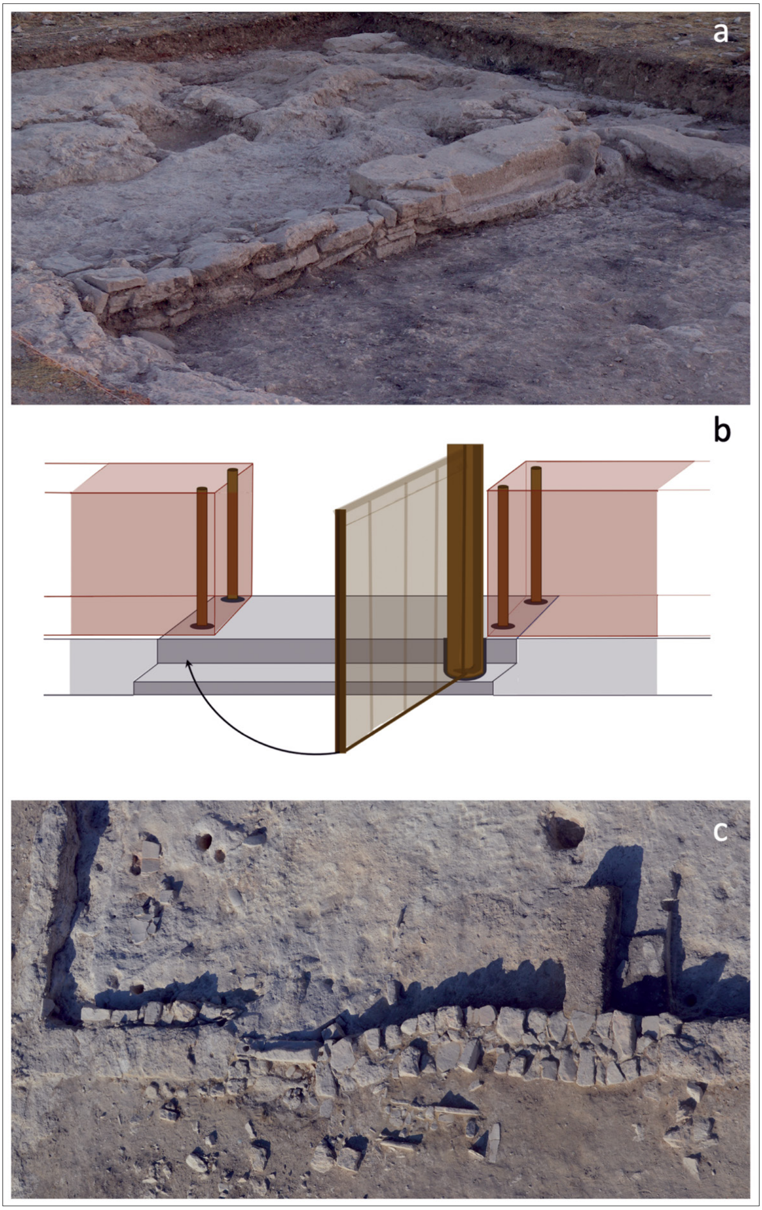

Figure 3.12 Thresholds at Erimi-LtP: a) monolithic threshold of building-unit SA I, Workshop Complex; b) hypothesized reconstruction of the monolithic threshold with the door system. © Author; c) threshold of building-unit SA IV with a small entry, Workshop Area. © L. Bombardieri

Table 3.1 Doorways types and width at the main prehistoric Cypriot settlements considered in the analysis

Period	Sites	Doorway types	Doorway width (m)
LAN	Khirokitia-*Vouni*	Stone threshold	0.50-0.80
		Threshold made of mudbricks	1.0 c.
CN	Sotira-*Teppes*	Simple gap	0.70
		Threshold covered with stones	1.0-1.30
		Threshold with steps	1.0-1.30
EChal	Kissonerga-*Mylouthkia*	Simple gap and earth threshold	0.60 c.
MChal/ LChal	Kissonerga-*Mosphilia*	Basal course stones as doorjambs + steps/ramp + pivot stone	0.50-0.70 c.
		Carefully constructed stone doorjambs + stone-paved threshold + pivot stone	1.0 or more
		Large stones as doorjambs (thicker walls) + earth/stone threshold + pivot stone	0.60-1.0
		Simple gap into the wall	0.50 c.
	Lemba-*Lakkous*	Carefully constructed stone doorjambs + stone-paved threshold + pivot stone	1.0 or more
		Large stones as doorjambs (thicker walls) + earth/stone threshold + pivot stone	0.60-1.0
		Simple gap into the wall	0.50 c.
	Souskiou-*Laona*	Large stones as doorjambs (thicker walls) + earth threshold + pivot stone + fragmented querns as door stopper	0.60-1.0 c.
	Chlorakas-*Palloures*	N.A. (only one door identified by date)	-
EC	Marki-*Alonia*	Flat slabs as threshold	0.60-1.10
		Pivot stone	0.60-1.10
	Sotira-*Kaminoudhia*	Monolithic thresholds equipped with pivot holes	1.0-1.32
		Simple gap into the wall	0.80-1.0
MC	Alambra-*Mouttes*	Simple gap into the wall	0.60-1.30
		Stone threshold with step	0.60-1.30
	Erimi-*LtP*	Simple monolith threshold	0.60-0.80
		Monolith threshold with carved pivot hole, and post-hole for jambs	0.80-1.0
		Monolith threshold with carved pivot hole and step and post-holes for jambs	1.0-1.50
	Ambelikou-*Aletri*	Simple gap into the wall + pivot stone (?)	1.0 c.

3.2.2.2 Fire Installations

Fireplaces, hearths and ovens have an important role in structuring social life, as they contribute to creating places of belongings, transforming landscape and materials, and marking continuity or discontinuity in social roles and relations (Matthews 2016, 107-8; Bloch 2010). The socio-cultural power of hearths is that they embrace a series of events, from daily activities to ritualised ceremonies; by doing so they aggregate people and play a key part in shaping social identities and memories (Dunbar, Gowlett 2014). The social importance of hearths is well indicated by the fact that, in many cultures, they materialise the 'home' itself (e.g. in the Italian lexicon the word *focolare*, 'hearth', is also a synonym for home; see Balossi Restelli 2015). Another important aspect is the potential of hearths and fire as a source of energy in technological choices, as they provide enhancement in processing and production and therefore play a fundamental part in economic improvement (Sillar, Tite 2000; Clark, Yusoff 2014). In order to consider the functional and social aspects of these structures, fire installations are analysed by examination of their availability, construction, shape, size and location within prehistoric Cypriot buildings. This will provide data to preliminarily establish variation over time that may reflect the varying requirements of households and communities.

Installations identified in prehistoric Cypriot contexts comprise fire features without built structures; for example, areas of reddened and burnt materials (fire spots), and built structures, such as fire pits **[fig. 3.13b]**, circular/rectangular hearths and ovens **[tab. 3.2]**. Among these, hearths are the most attested fire installation type in prehistoric Cypriot settlements. Hearths were generally made of a clay or mud-plaster kerb, circular in shape, less frequently rectangular. Other prototypes include the so-called 'campfire' hearth (Miles et al. 1998, 42), consisting of a ring of fieldstones containing an area of burnt and ashy material; however, only a limited number of this hearth type has been identified in prehistoric Cypriot settlements, e.g. at Neolithic Sotira-*Teppes* (House 20) and Chalcolithic Kissonerga-*Mosphilia* (B 200 ?), Lemba-*Lakkous* (F1 and F2 in B3 1A) and Souskiou-*Laona* (Units 541, 733, 1086, 1132, 1179, 1181, 1184) **[figs 3.13, 3.14a]**. A more elaborated hearth is represented by the Middle/Late Chalcolithic circular platform hearth with a central fire bowl. This type occurs so frequently in Chalcolithic dwellings that could almost be regarded as the hallmark of the architecture of this period (Peltenburg et al. 1998b). These platform hearths were made of a stone bed set in mud and inserted into a shallow circular pit; the mud was shaped according to the hearth profile (Thomas 2005a, 51-2) **[fig. 3.14c]**.

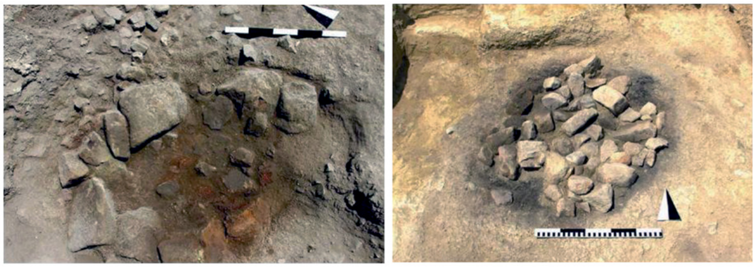

Figure 3.13 Firepits 1030 and 1032 from Souskiou-Laona. © D. Bolger. 1030 has been also interpreted as an oven because of the coarse ceramics inside, which could be interpreted as the remnants of a domed cover, cf. a tanour, as also identified at Kissonerga-Mosphilia (Miles et al. 1998)

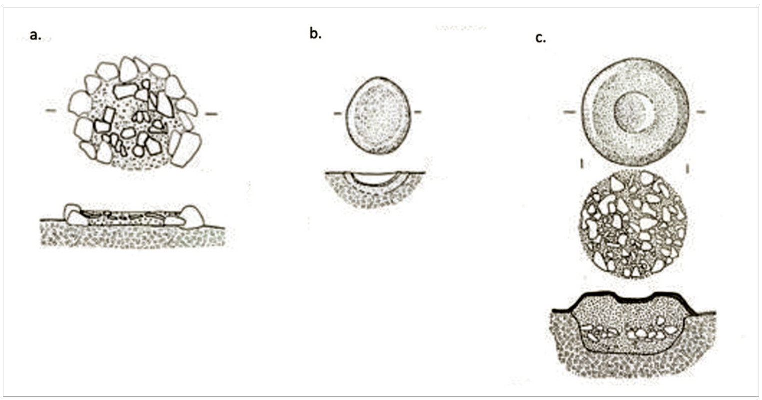

Figure 3.14 Hearth types as identified at Kissonerga-Mosphilia (Peltenburg et al. 1998) and Lemba-Lakkous (Peltenburg et al. 1995): a) campfire hearth; b) pit-hearth; c) circular platform hearth (Peltenburg et al. 1998)

Other hearth prototypes include those identified in Early Bronze Age Marki-*Alonia* and Alambra-*Mouttes*, consisting of rectangular or semi-circular structures set into wall benches (Frankel, Webb 2006a, 14-17; Coleman et al. 1996, 86) **[fig. 3.15: a-d]**, and the rectangular double hearths identified at Sotira-*Kaminoudhia* (Swiny, Rapp, Herscher 2003, 62-3) and Erimi-*LtP* (Bombardieri 2017, 18) **[fig. 3.16]**. Ovens appear instead in the architectural record of prehistoric Cypriot villages relatively later if compared to the other fire installation types, and generally remained little attested in the prehistoric buildings of the island compared to hearths. According to Fuchs-Khakhar (2021), this 'preference' is due to individual choices and collective tradition, as well as ways of cooking and processing food. I also advocate that this preference could be possibly explained by the fact that hearths have multifunctional properties, as they allowed people to simultaneously cook, heat and light up the building space. The first recognised oven structures are at Middle Chalcolithic Kissonerga-*Mosphilia*, the so-called 'tanour' (Miles et al. 1998, 43). The structure consists of an above-ground horseshoe-shaped bank of stone and cobbles set in mud, surrounding an oval-shaped pit, sometimes ceramic-lined (Miles et al. 1998, 43). Similar structures have been also identified at the coeval settlement of Souskiou-*Laona* (Peltenburg 2019, 77-8). Ovens of various shapes are attested at Early Bronze Age Marki-*Alonia*. They are characterised by a narrow, rectangular or elliptical chamber enclosed by vertical slabs of fire-hardened mudbricks on one side, and the building wall on the other (Frankel, Webb 2006a, 21-2) **[fig. 3.15: e-f]**. Modified jug necks were used as chimney flue or as support for cooking pots within these oven structures at Marki-*Alonia* (e.g. Oven 1389 in IX-5; cf. Frankel, Webb 2006a, 21-2); comparative evidence has been identified within hearth Ft. 4 at Middle Bronze Age Erimi-*LtP* (Bombardieri 2017, 18) **[fig. 3.16]**.

Hearths and ovens in prehistoric Cypriot contexts preferentially have a circular shape; this may be possibly explained as a functional choice, considering that most of these structures were moulded with clay or mud-plaster **[fig. 3.15]**. Rectangular prototypes, which are attested both in Chalcolithic (the rectangular platform hearth at Kissonerga-*Mosphilia*) and Prehistoric Bronze Age contexts, were more frequently made of mudbricks, as attested at Marki-*Alonia*, or in limestone slabs bound with mortar, like at Sotira-*Kaminoudhia* and Erimi-*LtP* **[fig. 3.16]**. The possibility that different shapes may correspond to different functions of the fire installations is supported by ethnographic analyses, which demonstrate that there is a correlation between shape and function of fire installation, and that different installations may utilise different fuel types to conserve resources and exploit particular fuel properties (cf. Meyer 2003, 292-3). At Marki-*Alonia*, the identification of hobs associated with semi-circular and circular hearths – especially when hobs are fixed and embedded in the hearth structure (e.g. XII-2 P2450, LXVII-6 P16880, XCIII-7 P14200) – can sustain the idea that these circular structures were primarily used for cooking and processing activities; however, considering the multi-functional character of buildings and features during prehistoric Cyprus, it is possible that these circular hearths also served other functions, primarily heating. It is not possible to confirm the association between the shapes and functions of fire installation on the basis of the archaeological data available for prehistoric Cypriot contexts, as most of these structures were re-used and cleared before the final dismissal, and fuel residues and organic substances that could support their functional identification are on most occasions no longer preserved.

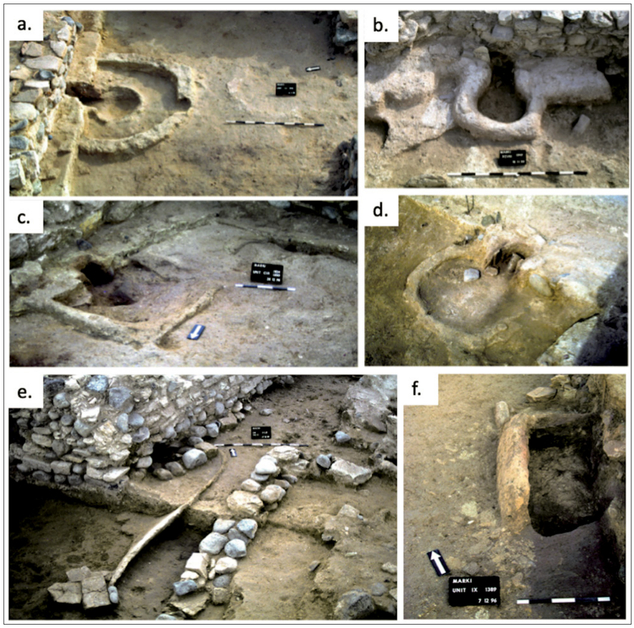

Figure 3.15 Semicircular and rectangular hearths (a-d) and ovens (e-f) at Early Bronze Age Marki-Alonia. © J. Webb

Figure 3.16 Rectangular double chamber hearth made of limestone slabs at Middle Bronze Age Erimi-LtP (Ft. 4). In the firing chamber, a modified jug neck has been recovered. In the bottom right picture, the modified jug after cleaning and restoration. © L. Bombardieri

Even if it is rarely attested, there are cases when two different fire installation types coexist within the same building: e.g. at Chalcolithic Kissonerga-*Mosphilia* (B1547, B3), Chlorakas-*Palloures* (B1), and Early Bronze Age Alambra-*Mouttes* (Buildings II-III) and Middle Bronze Age Erimi-*LtP* (SA I-Area A). While in most of these instances the assumption is that the two structures pertain to two different phases of occupation and use of the building, the presence at Early Bronze Age Marki-*Alonia* of two coeval hearths within different units of one compound (e.g. Compounds 7, 8, 9 Phase E; Frankel, Webb 2006b) may support the hypothesis that two different structures may have served different functions. This is certainly the case when a hearth and an oven coexist in the same compound, as in Compound 6. No temporal variations can be identified in the use of specific hearths and oven shapes, since both circular and rectangular structures were simultaneously used in many contexts **[tab. 3.2]**. Shapes are likely to depend on spatial arrangements and organisation within buildings, but also on individual/communal preferences. This assumption has been also stressed by Swiny (Swiny, Rapp, Herscher 2003, 62-3) when comparing the different hearth shapes at Early Bronze Age Sotira-*Kaminoudhia*, where a prevalence of rectangular structures occurs, and Marki-Alonia, where oval and circular/semi-circular hearths/ovens are the most attested.

In his examination of hearth structures at the Anatolian Neolithic site of Catalhoyuk, Hodder (2014) identifies a trend towards rectangular hearths during the course of the Neolithic. He argues that rectangular structures may indicate more autonomous households because angular structures would compartmentalise the room more than circular ones, thus providing the space for different activities and enabling more household independence (Fuchs-Khakhar 2021). This trend cannot be identified in prehistoric contexts in Cyprus. The analysis conducted indicates that rectangular structures did not become more progressively attested over time. It is possible to assume that the layout of the rooms in each building determined the shape of the installation, also according to the individual/communal needs of their users.

The varied size of fire installations can also give significant indications of social organisation and reflect the adaptation to the requirement of larger or smaller groups within communities. As reported in table 3.2, more elaborated hearth types are generally the larger (e.g. the Chalcolithic platform hearths, the Early Bronze Age double chamber hearths) **[tab. 3.2]**. Larger hearths necessarily require a wider space so as not to impede movements within the building/room; therefore, their presence can possibly suggest a supra-household use as it has been proposed for Oven 1275 in Building 1161 at Kissonerga-*Mosphilia* (Peltenburg et al. 1998b, 29) and possibly for the hearth within Building 1 at Chlorakas-*Palloures*. The central platform of this hearth (Unit 11) is one of the largest encountered in prehistoric contexts of the island and measures 2.50 meters in diameter and is equipped with two non-coeval fire bowls (Düring et al. 2019, 467-90); their occurrence may suggest that the hearth was in use for a longer period (Düring et al. 2019; Schubert 2018, 90). In Prehistoric Bronze Age Marki-*Alonia* and Alambra-*Mouttes*, it has been noted that the largest oven/hearths structures are those installed outside. At Marki-*Alonia* Oven 2468, XCIX-11, Phase B, is formed by a curving hard clay wall, about 350 cm long, with a wide opening to the north side **[fig. 3.15e]**. The oven was placed in an open yard and it was associated with a freestanding dedicated storeroom (XCIII; Frankel, Webb 2006a, 313). At Alambra-*Mouttes*, a 1.50 m wide hearth was constructed in the open space 22, made of flat stones set vertically against the face of the building wall (Coleman et al. 1996, 100-1). Another exterior structure was identified at Alambra, in the Gjerstad's house. The structure is described as a 'bake oven' measuring 3.40 × 2.70 m. However, because the proposed fire installation is preserved only as a burnt clay and ashy area in the plan (Gjerstad 1926, 25), its reconstruction is open to doubt (see Coleman et al. 1996, 28 fn. 3; see also Crewe, Hill 2012, 214). The placement of larger fire structures in courtyard spaces may possibly suggest that the use of these features was not limited to the household members, but also to adjoining and concomitant households. This hypothesis may be in line with the reconstruction proposed by Frankel and Webb (2006a, 311-13), according to which the restricted number of inhabitants within the settlements during earlier occupation phases at Marki favoured mechanisms of sharing and cooperation. The idea that larger fire installations may have served supra-household needs is further reinforced by the fact that ovens and hearths in the productive, communal areas at Middle Bronze Age Kissonerga-*Skalia* (Ft. 33 measuring 2.50 × 1.90 m; Crewe, Hill 2012) and Erimi-*LtP* (Ft. 42 measuring 1.26 m in diameter; Ft. 4 measuring 1.60 × 0.60 m) show larger size than structures observed and identified within domestic buildings in other coeval centres.

As far as the location of fire installations is concerned, the general trend is that fireplaces were situated in the dirty area of a building, and possible changes to this pattern could suggest diverse uses and functions of that installation/area/building, as suggested by Peltenburg for hearths dislocated in off-centred areas at Kissonerga-*Mosphilia* (Peltenburg et al. 1998a, 238: e.g. hearths located in Segment 1 or 2 instead of more standard Segment 4). During the earlier prehistoric period until the Late Chalcolithic, fire installations were preferentially located in the centre of the building (for a detailed examination of Middle and Late Chalcolithic contexts, see Schubert 2018). Instead, a different setting emerged during the Prehistoric Bronze Age Cyprus, where hearths and ovens were constructed on one side of the building room, abutting one of the structure walls. Considering this, it is possible to suggest that the location of fire installation was dictated not only by individual/household choice but also by building shape and spatial organisation. In the circular buildings of Neolithic and Chalcolithic Cyprus, the central location of fire installations permitted warming and light of the building's inner space without constituting an obstacle to the circulation and movement within the structure (Fuchs-Khakhar 2019; 2021). In the passage to rectangular architecture, while the location of fire installations changed, one factor of continuity is represented by the fact that hearths and ovens were always located according to entranceways placement – never too far from the building openings –, in order to allow good ventilation, thus reducing smoke and improving life-quality (Kedar, Barkai 2019; Ozbasaran 1998).

A further interesting data is represented by the limited occurrence of hearths and ovens outdoors. This evidence appears particularly relevant considering the mild climatic condition of Cyprus. Fire pits and fire spots were more frequently constructed and placed in open areas both in the Neolithic and Chalcolithic contexts analysed, e.g. Khirokitia (Dikaios 1953, 158-60; Le Brun 1989, 51-3), Cape Andreas-*Kastro*s (Le Brun 1981, 24-6), Lemba-*Lakkous* (Peltenburg et al. 1985, 226-8); Souskiou-*Laona* (Peltenburg, Bolger, Crewe 2019, 85-6) **[tab. 3.2]**. On the contrary, hearts and ovens seldom occur in courtyards. Rare exceptions are constituted by Cape Andreas-*Kastro*s (Le Brun 1981, 24-6), Kissonerga-*Mosphilia* (Peltenburg et al. 1998, 42-3) and Prehistoric Bronze Age Marki-*Alonia* (Frankel, Webb 2006a, 14-22), Alambra-*Mouttes* (Coleman et al. 1996, 28-9). On the basis of the current evidence available, it is difficult to confirm if the limited occurrence of outdoor hearths and ovens – especially in Prehistoric Bronze Age contexts – can reflect dynamics of increasing privatisation of household furniture and space, or if it can be related to practical reasons, including the fact that indoor areas were possibly cooler than outdoor spaces during the hot season (Kedar, Barkai 2019).

Equally interesting is the complete absence of hearths in some of the domestic structures of prehistoric settlements analysed. While this appears to be much less frequent in the earlier Neolithic and Chalcolithic settlements, the absence of hearths within domestic buildings in Prehistoric Bronze Age – as primarily attested at Marki-*Alonia* (e.g. Compound 7, Phases E-F; Compounds 14, 20), Sotira-*Kaminoudhia* (e.g. Units 1 and 3 Area A; Units 9, 10, 17 Area C) and Erimi-*LtP* (only one hearth structure has been identified within domestic buildings investigated to date) – can be possibly associated to mechanisms of cooperation and facilities sharing among households or to diverse use and functions of buildings within settlements (Kuijt 2018; Kay 2020; on this topic, see also § 4.2.1). This evidence tells us something more important: buildings and households were not necessarily autonomous and stable across time. Instead, arrangements that linked people, practices and places were in a continuous process of transformation.

While a detailed description of spatial and temporal variations of individual buildings within prehistoric contexts investigated is beyond the scope of this section, two brief examples are presented here to describe the process of fire installation construction and decommissioning, and their socio-cultural significance. Hearths and oven construction and placement generally follow the many phases of construction, transformation and re-use of building structures. This is because, as mentioned before, fire installations have to respond to the practical needs of the house and the household. The best example of the process of constant change is represented by the case of Early Bronze Age Marki-*Alonia*, where the numerous transformations in the configuration of building compounds produced also a reconfiguration of hearths placements. This is well exemplified by Compound 6, one of the structures with a long occupation history, and characterised by major structural changes over the course of its use **[fig. 3.17]**. Here, hearths were dismissed and re-built adopting different shapes and sizes according to functional and architectonical reasons. Changes in the building structure and in the position of the hearth were possibly indicative of changing requirements, for example, an increasing need for space to accommodate larger household groups. However, there are also cases where the position of the fireplaces was preserved and – where possible – maintained in the process of building transformation, e.g. in Compound 7. Constructing fire installations in the same location as the previous phase ensured less commitment in the new construction, but also guaranteed a successful layout deriving from previously-gained experience (Fuchs-Khakhar 2019). Düring (2014), taking up Bourdieu's observations (1971; 1977) argues that functional explanations are not adequate to account for building – and hearth – continuity through time, and that building arrangement are never completely due to technical and practical imperatives. Also, according to Hodder and Cessford (2004), the continuity in hearth placement can also reflect household/community memories embedded in daily practices. It is important to stress that these memories stem from daily practices and functional reasons; also, household requirements were most presumably of primary concern and taken into equal account with ideological motivations and symbolic significance in the process of heart building and re-building. At Middle Bronze Age Erimi-*LtP*, for instance, in one of the more prominent buildings of the productive Workshop Complex – SA I –, continuity in the location of fire installation was maintained for practical reasons (vicinity to the main entrance and possibly good ventilation, easy access to the fire structure, easy movement within the building), but an enhancement in its symbolic and social value was expressed with a transformation of the heart shape and materials. The circular hearth made of mud plaster, pertaining to the earlier phase of occupation of the building (Ft. 42) was dismissed and substituted by a new rectangular hearth made of limestone slabs and lime mortar (Ft. 4) **[fig. 3.18]**. The renovation of this hearth accompanied a general renovation of the building itself, whose internal space was completely re-organised and enclosed with a monolithic threshold. The case of Erimi-*LtP* well demonstrates that continuity in hearth location could be explained both by the functional need of maintaining an efficient arrangement within the building as well as by ideological motivations, driven by the role and significance of the hearth and the building for the community production.

Finally, it is important to underline the role of hearths in the emerging supra-household production areas at Middle Bronze Age Kissonerga-*Skalia*, Erimi-*LtP* and Ambelikou-*Aletri*. From a technological point of view, the fire installations retrieved within communal productive areas at these three settlements show no differentiation from the fire structures within coeval domestic contexts. Area B at Kissonera-*Skalia* is characterised by the construction of an oval-shaped fire installation (Ft. 33) measuring 2.50 × 1.90 m with an opening of 0.80 m on its southern side (Crewe, Hill 2012, 214-20). Stratigraphic analysis suggested that Ft. 33 originally had a domed roof, while its floor was characterised by ten irregular and oval-shaped pits of 10-50 cm in diameter containing rich ashy materials, but no charcoal. Archaeological interpretation, based also on comparative examples, indicated Ft. 33 as a communal rather than household structure, associated with beer production processes (Crewe, Hill 2012, 218-20). Hearth structures Ft. 4 and Ft. 42 in the communal Workshop Complex at Erimi-*LtP*, already described in the present section, were associated with processing activities connected to the production of natural dyes (Muti 2021, 197-202; Bombardieri, Muti 2018). Fire installations at Ambelikou-*Aletri* constitute significant examples of structures constructed and used for metallurgy and pottery production at the supra-household level. The circular hearth 't' in Area 1 Unit II, of 1.25 m in diameter, was presumably used for melting and casting activities (Webb, Frankel 2013b, 34-40). Instead, the rectangular structure in Area 2 has been identified as a pottery kiln. The installation, which was located in one corner of a partially covered yard, has a maximum internal base measurement of 2.50 × 2.80 m (c. 7 m^2) and appears to have had the capacity to fire the 39 cutaway-mouthed jugs scattered and retrieved on the floor of the structure (Webb, Frankel 2013b, 213-17). These fire installations certainly had a central role in the production of commodities for communal activities. They contributed to sustaining social relations by providing opportunities for socio-economic development within communities, but we can further suggest that they also played a key part in the dynamics of social division, by promoting activities which potentially encouraged the differential accumulation of wealth among household groups (see Falconer, Fall 2014; Spielmann 2002).

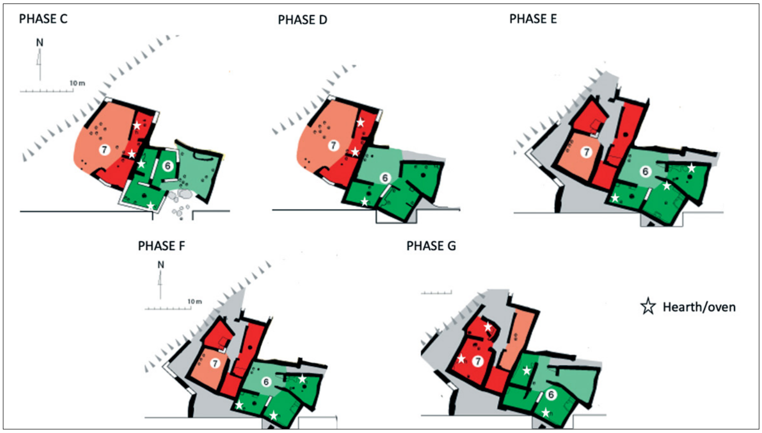

Figure 3.17 Compounds 6 and 7 at Early Bronze Age Marki-Alonia with the changing placement of hearths and ovens. © Frankel, Webb 2006a

Figure 3.18 Building-unit SA I-Workshop Area at Middle Bronze Age Erimi-LtP, with the placement of the two hearth structures, Ft 42 pertaining to the earlier Phase B and Ft 4 pertaining to the later Phase A

Table 3.2 Fire installation types, shape, size, location in the main prehistoric Cypriot settlements considered in this analysis

Period	Sites	Total no.	Type	Shape	Size (m)	Location
LAN	Khirokitia-*Vouni*	4	Fire spot	Rectangular/ irregular	0.80 × 0.50	Within buildings, in a central position; or in an external area
		7	Fire pit (?)	Oval, circular	0.45 dia.	Building exterior
		38	Platform hearth	Rectangular	0.55-1.0 × 0.35-0.70	Within buildings in a central position; or on one side of the structure
	Cape Andreas-*Kastros*	1	Fire pit	Circular	0.50 dia.	Building exterior
		2	Fire spot/ Campfire hearth	Circular	0.50 dia.	Building exterior
		3	Hearth	Circular	0.60-0.80 dia.	Building exterior
CN	Sotira-*Teppes* (Phase 3)	8	Fire spot	Circular	0.40-0.90	Within buildings, close to the wall
		5	Fire pit	Circular	0.14-10.70	Within buildings, close to the wall
		13	Mud platform hearth	Circular	0.50-1.0	Within buildings; generally in a central position, but also on one side of the structure
		2	Stone hearth	Circular	-	-
EChal	Kissonerga-*Mylouthkia*	4	Fire pit	Circular	1.0 c. dia.	Within pits and buildings
		1	Hearths	Circular	0.70	Within buildings

Period	Sites	Total no.	Type	Shape	Size (m)	Location
MChal/ LChal	Kissonerga-*Mosphilia*	1	Fire spot bordered with stones (so-called 'campfire' hearth)	Circular	1.0 c. dia.	Within buildings, on one side of the structure
		1	Fire pit	Circular	1.0 c. dia.	Within buildings, on one side of the structure
		25	Platform hearth	Circular/ Rectangular	0.70-1.30 c. dia. 1.50-2.20 long × 1.10-12 wide	Within buildings, usually in the centre
		4	Oven (so-called 'tanour')	Oval	1.0 × 0.30 c.	Either outside or inside buildings (usually in the centre)
	Lemba-*Lakkous*	5	Fire spot bordered with stones (so-called 'campfire' hearth)	Circular	1.0 c. dia.	Either outside or inside buildings
		15	Platform hearth		0.70-1.30 c. dia. 1.50-2.20 long × 1.10-12 wide	Within buildings, usually in the centre
	Souskiou-*Laona*	73	Fire spot (so-called 'campfire' hearth) and fireplaces	Circular	-	In unenclosed areas
		1	Fire pit	Circular	-	Within buildings
		10	Platform hearth	Circular	0.75-1.0 dia.	Within buildings, usually in the centre
		2	Oven (so-called 'tanour')	Oval/circular	-	Within buildings, on one side of the structure

Period	Sites	Total no.	Type	Shape	Size (m)	Location
EC	Marki-*Alonia*	37	Hearth (hobs can be embedded in the structure)	Circular/ Rectangular	0.70-1.0 c. dia. 0.50-0.90 × 0.70-0.50 c.	Within buildings, set against interior walls
		6	Oven	Rectangular or oval	0.80 × 0.50 c.	Generally within buildings, set against interior walls (especially from Phase D onwards), but also in the courtyard space
		78 (40 are frag.)	Hob	Different shapes	Different size	Associated to hearth structures
	Sotira-*Kaminoudhia*	2	Fire spot	Circular	0.25 dia.	On one side of the building
		4	Mud-plaster double hearths	Rectangular	0.40-0.60 wide	Against the building wall
		3	Single chamber hearth	Rectangular	0.32-0.70 wide	Against the building wall
MC	Alambra-*Mouttes*	6	Fire spot	Circular	-	Within buildings
		3	Hearth	Circular/ Rectangular	1.0 c. dia.	Within buildings and in courtyard (only in one case: Space 22)
	Erimi-*LtP*	1	Fire spot (associated with a mailing bin)	Circular	-	On one side of the building
		1	Hearth	Circular	1.0 c. dia.	On one side of the building
		2	Oven	Rectangular	1.0 × 0.50 c.	Against the building wall
	Kissonerga-*Skalia*	1	Oven (?)	Oval/irregular	2.5 × 1.90	
	Ambelikou-*Aletri*	1	Hearth	Circular	1.25	Against the building wall
		1	Kiln	Rectangular	2.50 × 2.80 (72 c.)	On the corner of a partially covered yard

3.3 Spatial Convention Within Buildings: Floor, Surfaces and Occupation Deposits

Ethnoarchaeological and geoarchaeological approaches to household studies[3] have demonstrated that living surfaces, including walls, floors and occupation deposits are powerful media through which social relationships are expressed and materialised (De Marrais, Castillo, Earle 1996; Hendon 2004, 276) and embody socio-cultural and political settings, boundary and events within buildings and the life histories of the individuals, household and communities associated with them (La Motta, Schiffer 1999; Matthews 2005a).

Both floor and wall surfaces were used in the past as symbolic means to express socio-cultural identities and roles. As Clarke argued, wall plasters represented "white canvas" that communities/individuals used to express themselves through the use of colours (2012, 177-8). The contrast of the white colour of plaster and red/brown of ochre, umber or terra rossa used as pigments for painting – as attested for example at Khirokitia (Hadjisavvas 2007, 49) and in Building 206 in the Ceremonial Area at Kissonerga-*Mosphilia* (Peltenburg 1998a, 244) – possibly acted as a mnemonic device for evoking remembrances, creating memories and reproducing identities (Jones 2004, 174). Despite the great importance of walls in the study of social practices and relationships, the evidence pertaining to wall plastering and painting in prehistoric Cypriot contexts is limited due to their scant preservation as *in situ* preservation. For this reason, arguments and discussions in this section are focused on floor surfaces.

Examinations of floors and occupation deposits have been largely conducted by research in household archaeology.[4] In these analyses, floors have been used as evidence for detecting and interpreting the spatial conventions through which economic and social relationships were represented and negotiated during the life history of communities and settlements (Matthews, French 2005, 325; Parker Pearson, Richards 1994). However, the study of floors and living surfaces has been always challenging, due to the difficulty of recognising floor surfaces in archaeological contexts, and mostly in prehistoric sites, where earthen and clay floors are the more attested and are of more difficult identification. As pointed out by Thomas (2005a, 48), earthen floors, especially when degraded and eroded, are difficult to differentiate from the underlying constructional or natural deposits upon which a floor is founded. Before the recognition of the crucial importance of formation processes in the creation and transforma-

3 Cf. Boivin 2000; Karkanas, Efstratiou 2009; Kramer 1979; Matthews 2005b; Matthews et al. 1997; Milek 2012; Schiffer 1987.

4 Cf. Boivin 2000; La Motta, Schiffer 1999; Milek 2012; Shahack-Gross 2011.

tion of the archaeological record (Schiffer 1987), one of the limitations of the studies conducted on living surfaces within buildings was given by the fact that the attention was mostly on the analysis of materials and installations, with little consideration to the depositional history of the structure analysed and to post-depositional processes, which acted and impacted on the archaeological context as transforming agents. A big contribution in support of the study of floors and living surfaces has been given by geoarchaeological examination, through the application of microstratigraphic and micromorphological analyses, as high-resolution techniques to enhance stratigraphic observations conducted in the field. Micromorphology, in fact, enables the analysis of site formation processes and traces of activities by permitting simultaneous analysis of a diverse range of mineral, bioarchaeological and artefactual remains, and their predepositional and depositional pathways. Furthermore, micromorphology contributes to the analysis of taphonomy and post-depositional alterations, enabling a more robust reconstruction of site formation processes and settlement micro-history, improving archaeological examinations and interpretations.[5]

5 E.g. Ge et al. 1993; Karkanas, Goldberg 2007; Karkanas, Efstratiou 2009; Macphail et al. 1997; Matthews 2005a; 2005b; Milek, French 2007.

Box 3.2
Micromorphology: A High-Resolution Application in Support of Archaeological Analysis and Reconstruction

Archaeological contexts are the product of actions by anthropogenic and natural agents. For this reason, examinations should include not only the architectural (buildings, walls, floors etc.) and artefactual (pottery, flints, stone tools etc.) features that constitute them, but also the deposits which accumulated within it by a combination of processes. Archaeological deposits, in fact, are fundamental units of a site (Schiffer 1987) and as such should be treated as having equal importance with the 'traditional items' of the archaeological record (architecture, pottery, lithics etc.). As Karkanas and Goldberg stated, "the deposit is the encoded relationship between sediments and the contained artefacts that provide the meaning of the archaeological record" (2018, 4-6). The deposit is a three-dimensional segment of a site (Schiffer 1987), which comprises physical components of both natural and anthropic origin. Each of these components can contribute to informing on cultural behaviour and settlement history (Matthews et al. 1997, 282); hence the importance of deposits in the study of archaeological contexts. The integration of artefact analysis and deposits examination enables archaeologists to reconstruct more thoroughly the processes which contributed to the formation and transformation of the archaeological record. However, it is important to consider that the archaeological record is formed by the combination of macroscopic and microscopic evidence; both of them are equally important in the examination of the archaeological contexts.

The recognition of the fundamental role of macro- and micro-evidence implies the exigence of developing a multi-proxy dataset with which to interpret and reconstruct the study context through the application of a methodological approach based on the dialogue between field practices and laboratory-based analyses. Among the micro-analytical techniques, micromorphology represents a valid and effective method of studying depositional sequences and micro-materials (Stoops 2003, 5).

Micromorphology is a branch of soil science concerned with the description, interpretation and measurement of components, features and fabrics in soils at a microscopic level (Bullock et al. 1985, 9). Micromorphology's principal contribution is that it enables simultaneous high-resolution analysis of the microscopic properties of sediments, artefactual and bioarchaeological remains, within their precise depositional and post-depositional contexts in occupation sequences, which are critical sources of socio-cultural and environmental information (Matthews 2005b, 356). Micromorphology enables the analysis of site formation processes and traces of activities by permitting simultaneous analysis of a diverse range of mineral, bioarchaeological and artefactual remains, and their pre-depositional, depositional and post-depositional pathways.

This technique involves the analysis of undisturbed soil samples by means of thin-sections under an optical polarising microscope. Thin-sections are microscope slides of resin-impregnated sediments, cut, mounted, ground and polished to 30 µm (microns = 1/1000 mm) (Bullock et al. 1985; Murphy 1986; Courty et al. 1989; Stoops 2003). Thin-sections allow us to observe material components (including aggregates, voids, mineral grains, anthropic inclusion, post-depositional features etc.) as they occur in their original setting (Bullock et al. 1985; Courty et al. 1989). This enables contextual interpretations of assemblages of diverse archaeological micro-remains, which would otherwise be disaggregated and studied as individual categories (Matthews 2005b; Matthews et al. 1997).
Despite these great potentials, micromorphology has also inherent limitations, mainly related to the fact that the sampling process is more frequently selective, and the sample size is relatively small, which can lead to misinterpretation of the study context (Matthews et al. 1997, 285; Koromila 2016, 47). Furthermore, the emphasis in the analysis is largely on extant visual attributes (Matthews et al. 1997, 285; McAnany, Hodder 2009). To overcome these limitations, the application of micromorphology should be incorporated into a well-integrated research programme, in order to compare micromorphological data with archaeological and stratigraphic analysis conducted in the field. The integration of higher resolution micromorphological analysis with macro-stratigraphic analysis in the field provides an efficient analytic tool to address some of the sampling limitations of micro-analyses, by linking the results with larger-scale field observations.

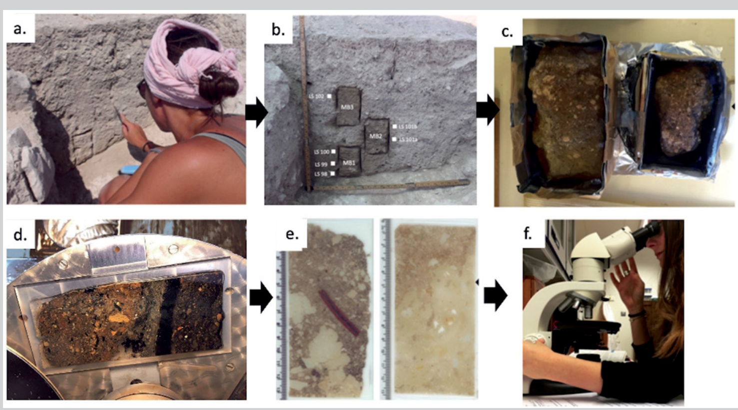

Figure 3.2.1 Procedure for thin-section making: a-b) Block extraction and documentation; c) Block impregnation; d-e) Slide cutting and lapping until reaching a thickness of 30 µm; f) Thin-section examination under a polarised microscope

In Cyprus, floors have been examined and recorded as one of the main features in the analysis of the architectural environment of prehistoric contexts.[6] However, only in more recent years attention has been given to floors as key evidence in the analysis of the household society of early communities on the island (Frankel, Webb 2012, 473-500; Webb 1995; Thomas 2005a). Geoarchaeological projects and examinations have been particularly important in this regard, as they have provided micro-data and multi-scalar reconstruction in support of the analysis of buildings as *loci* of social action and reproduction.[7]

A review of data resulting from macroscopic and microscopic analyses conducted on different prehistoric settlements of the island has provided evidence to examine the role of floors as indicators of spatial and social transformations **[tab. 3.3]**.

Period	**Sites**	**Floor material and technique**	**Spatial variation of floor types**	**Spatial segmentation**	**Temporal variation of floor types**
LAN	Khirokitia-*Vouni*	Earth floor, clay floor, lime plaster floor (?)	Consistency in floor types applied within buildings of the settlements	Interior buildings space was divided by walls and kerbs, not by distinct floor types	N.A.
	Cape Andreas-*Kastros*	Earth floor, clay floor	Consistency in floor types applied within buildings of the settlements	No evidence of spatial segmentation within buildings	N.A.
CN	Ayios Epiktitos-*Vrysi*	Earth floor, clay floor	Consistency in floor types applied within buildings of the settlements	Interior buildings space was divided by walls and kerbs, not by distinct floor types	N.A.
	Sotira-*Teppes*	Earth floor, clay floor	Consistency in floor types applied within buildings of the settlements	Interior buildings space was divided by walls and kerbs, not by distinct floor types	N.A.
EChal	Kissonerga-*Mylouthkia*	Earth floor, clay floor	N.A.	N.A.	N.A.

6 Cf. Peltenburg et al. 2000, 39-41; Peltenburg, Bolger, Crewe 2019, 76-90; Frankel, Webb 1996, 53-71; 2006a, 10-11; Swiny, Rapp, Herscher 2003, 54-5; Bombardieri et al. 2017, 14-16.

7 Dalton 2019; Mylona et al. 2017; Hourani 2003; Klinkenberg 2021; Amadio 2018.

Period	Sites	Floor material and technique	Spatial variation of floor types	Spatial segmentation	Temporal variation of floor types
MChal/ LChal	Kissonerga-*Mosphilia*	Earth floors, clay floors, lime plaster floors, cobbles	Spatial variation in floor types applied within buildings	The application of diverse plaster floor types contributed to the segmentation of buildings interior space	Temporal variation in the use and function of buildings, but no micromorphological data available for floor sequences
	Lemba-*Lakkous*	Earth floors, clay floors, lime plaster floors, cobbles	Little spatial variation of floor types within buildings	N.A.	N.A.
	Souskiou-*Laona*	Earth floors, clay floors, lime plaster floors	Spatial variation in floor types applied within buildings	N.A.	Floors marked different episodes/ phases of construction and use within buildings (B920)
	Chlorakas-*Palloures*	Earth floors, clay floors, lime plaster floors	Spatial variation in floor types applied within buildings. Use of diverse plaster types depending on individual choice and building function	N.A.	Floors marked different episodes/ phases of construction and use within buildings (B12.13)
EC	Marki-*Alonia*	Clay and lime plaster (?)	Spatial variation in floor types can possibly be recognised in areas where floors are better preserved (e.g. the application of pebblecrete surface in open work areas)	N.A.	N.A.

Period	Sites	Floor material and technique	Spatial variation of floor types	Spatial segmentation	Temporal variation of floor types
EC	Sotira-*Kaminoudhia*	Lime plaster floor	General consistency in floor types applied within buildings despite limited preservation	N.A.	N.A.
MC	Alambra-*Mouttes*	N.A.	N.A.	N.A.	N.A.
	Erimi-*LtP*	Unfired plaster floor, fired lime plaster floor	Use of different floor plaster types depending on the function of the space on which the floor was laid	The application of diverse plaster floor types contributed to the segmentation of buildings interior space	Marked temporal variation in floor sequences within buildings
	Kissonerga-*Skalia*	Clay floor, lime plaster floor	Use of different floor plaster types depending on the function of the space on which the floor was laid (?)	N.A.	N.A.
	Politiko-*Troullia*	Clay floor, lime plaster floor	N.A.	N.A.	N.A.
	Ambelikou-*Aletri*	No evidence of prepared floors	N.A.	N.A.	N.A.

Plaster floors, other than revealing sensible indications of uses of materials and technological advancement, are highly representative of socio-cultural conventions within settlements and communities. In Neolithic buildings there is a general consistency in the production and use of floor types. Petrographic analysis conducted by Philokyprou at Khirokitia indicates that floors were made of a mixture of calcite and clay, with little variation among samples analysed, possibly indicating interaction among household groups and circulation of technological knowledge among members of these early prehistoric communities (Philokyprou 2012a). A different trend appears to characterise the Chalcolithic Cypriot communities. Thomas (1996; 2005) divides the floors identified at Chalcolithic Kissonerga-*Mylouthkia* and *Mosphilia*, Lemba-*Lakkous* and Erimi-*Pamboula* into five distinct types, according to the material and techniques applied (Type 1: earth floor; Type 2: clay floor; Type 3: lime plaster; Type 4: cement-like floor on a cobbled foundation; Type 5: cobbled surface), suggesting an increasing use of lime plaster floors and a general improvement in techniques applied in the construction of building surfaces over the course of Middle Chalcolithic; this is also confirmed by petrographic and chemical analyses conducted on few samples from Kissonerga-*Mosphilia* (Philokyprou 2012b, 186-7). Micromorphological analysis conducted at Middle/Late Chalcolithic Chlorakas-*Palloures* confirms that there is considerable variation in the manner of application of floors layers within buildings of the settlement, and also indicates that diverse materials were selected and mixed to produce different floor surfaces according to cultural conventions, availability of materials and labour and desired characteristics, such as aesthetic and physical strength (Klinkenberg 2021, 45-6; see also Schubert 2018, tabs 9, 11). Variations in floor materials and construction practices can be noted among Chalcolithic settlements and communities. While at Kissonerga-*Mospihilia* a large variety of floors was in use during the Middle Chalcolithic, at Lemba-*Lakkous* clay floors remained the most common type; lime plaster floors were limited to the larger buildings of the settlement, notably Buildings 1, 10, 21 (Schubert 2018, 76).

The partial preservation of floor surfaces – due to episodes of progressive reconstruction and erosion – in Early Bronze Age contexts, such as Marki-*Alonia* and Sotira-*Kaminoudhia*, does not enable a discussion on the social roles of floors and their functional distinction. However, evidence collected at Middle Bronze Age Erimi-*LtP* may contribute to shedding light on social practices within Prehistoric Bronze Age communities on the island. The general consistency in type, thickness and frequency of floors and deposits identified across many buildings of the Workshop Complex through micromorphological analysis (Amadio 2018), suggests consistency in uses and concept of space **[fig. 3.19]**. Furthermore, the consistency of floor frequency and thickness may also be related to episodes of construction, which may reflect annual seasonal activities as well as lifecycle changes (Boivin 2000). Micromorphological observations also revealed that the majority of floors within building-units of the Workshop Complex were maintained extremely clean; evidence which suggests the presence of common standard in daily activities, possibly associated with the role and representation of these buildings, but also to sense of hygiene and purity, which was used to create community cohesion and social well-being (Clarke 2012). Similar maintenance practices appear to have been applied on floors at other Early/Middle Bronze Age Cypriot settlements. At Sotira-*Kaminoudhia* and Alambra-*Mouttes*, occupation debris was not allowed to accumulate on domestic floors when they were in use (Coleman 1985, 134; Coleman et al. 1996, 331; Swiny, Rapp, Herscher

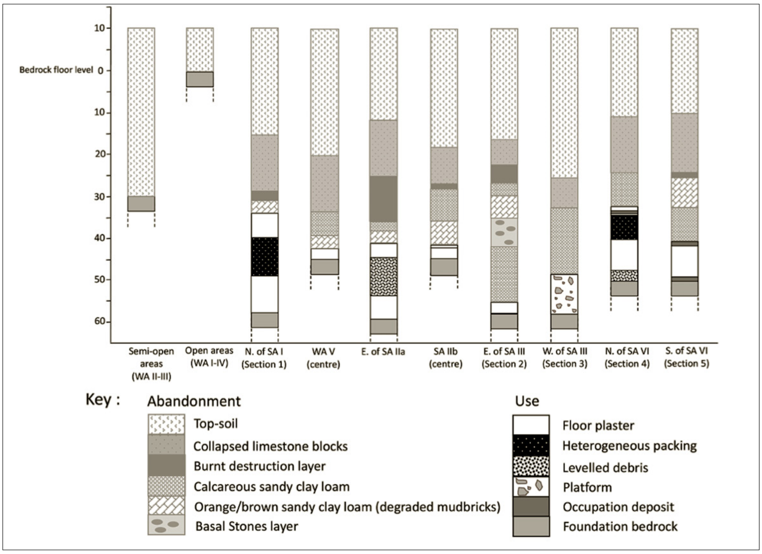

Figure 3.19 Microstratigraphic columns illustrating the type, thickness and frequency of floors and occupation deposits within building-units and open areas at Middle Bronze Age Erimi

2003, 30-1). At Marki-*Alonia*, occupation residues were either removed and deposited in communal middens or recycled and re-used as building fill in later occupation levels (Webb 1995, 65).

It is further important to underline that floor plastering episodes represented important markers of buildings renovation during the life history of many Cypriot prehistoric buildings analysed. In his detailed analysis of Chalcolithic structures, Thomas (1996; 2005a) indicates a progressive enhancement of building interiors over the course of Middle Chalcolithic with the introduction of lime plaster floors. The best examples are documented in Buildings 2, 4 and 206 at Kissonerga-*Mosphilia*, where the laying of a white, finer lime plaster surface over a foundation of cobbles marks the architectonical and possibly functional renovation of these structures. Similar instances are documented at Middle/Late Chalcolithic Souskiou-*Laona* and Chlorakas-*Palloures*. Micromorphological analysis conducted in Building 920 at Souskiou-*Laona* revealed a floor sequence characterised by the occurrence of a white, lime plaster layer constructed on top of an earlier phase of occupation marked by the application and use of a brownish-grey clay plaster floor. The observed change in floor materials and techniques within this sequence suggested a shift in the function of Building 920 over the course of its life history (Dalton 2019, 91-5). Similarly, at Chlorakas-*Palloures*, the introduction of lime plaster floors within Buildings 12 and 13 during the structure's occupation phases, indicated a possible change of use of these two dwellings (Klinkenberg 2021). Considering that lime plaster floors are mostly associated with 'clean' activities within domestic structures (e.g. sleeping, eating and receiving guests), it is possible, according to Klinkenberg (2021, 46), that Buildings 12 and 13 were turned into domestic spaces just in a later phase, while they were possibly associated with craft activities during the earlier occupation. At Middle Bronze Age Erimi-*LtP*, instances of the introduction of layers of new types of plaster have been documented in correspondence with changes in activities within buildings, from dirtier to cleaner, from productive to representative, and with enhancement in the spatial and architectural elaboration of built spaces. These examples include the introduction of prepared floors plaster in open work areas during the latest occupation of the settlement (Middle Cypriot II-III); this marked the functional and ideological renovation of these open areas in the Workshop Complex, with the creation of small annexes as new reception spaces (e.g. Units WA V, SA IIb). Similarly, the introduction of thin layers of pure lime, built on a constructional packing, within the large Building-Unit SA VI during its latest phase of use and occupation corresponded with and signed the architectonic renovation of this structure and its shift from productive to representative functions **[fig. 3.20]**. This spatial transformation during the latest phase of Middle Bronze Age Cyprus is suggested to be a possible consequence of the increasing need for the Erimi community to create spaces of interaction and exchange at the supra-community level (Amadio 2018).

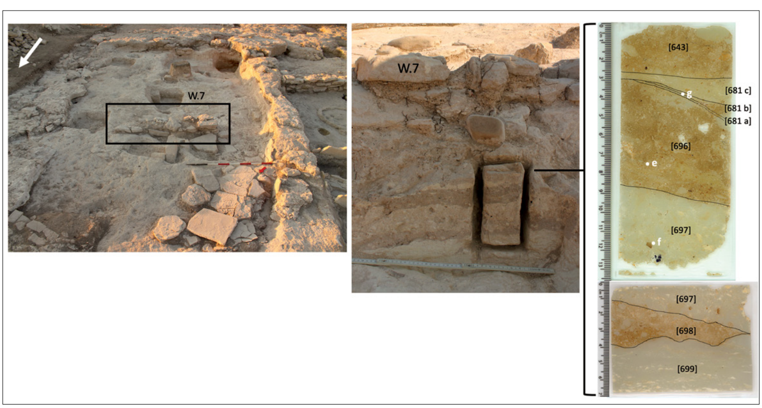

Figure 3.20 Floor sequences identified at Middle Bronze Age Erimi, within building-unit SA VI in the Workshop Complex. © Amadio 2018

Finally, it is important to stress that the use of different floor types contributed to the compartmentalisation of the building's interior space. In contrast to Neolithic circular structures, where the segmentation of space was realised through the introduction of walls and pillars – as indicated in § 3.1 and exemplified by the case of Khirokitia –, during the Middle Chalcolithic the space of buildings was also divided internally through the application of different floor types. At Kissonerga-*Mosphilia*, evidence is attested of the use of diverse floor types according to the function and role of the space where the surface was applied. In one of the most significant buildings of the Ceremonial Area, B206, a lime plaster floor was applied to the left, opposite to the entrance, where clean activities were conducted, and the central lime plaster platform, where the hearth was located, was painted red, presumably to mark the socio-cultural importance of this structure **[fig. 3.21]**.

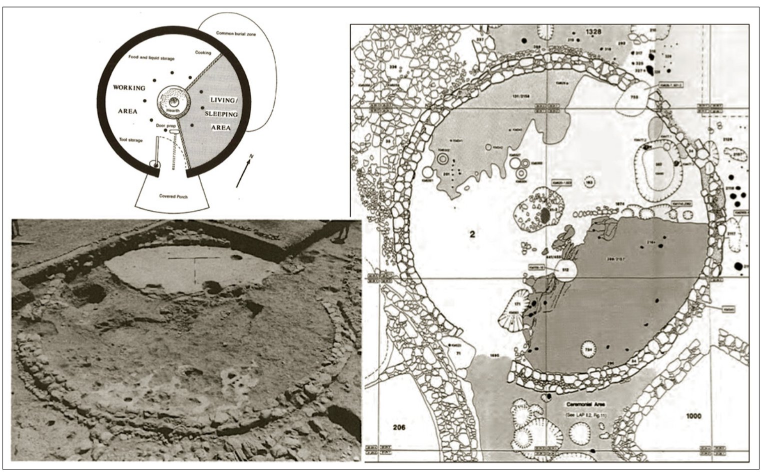

Figure 3.21 Middle-Late Chalcolithic building model with internal spatial division, as exemplified by Building 2 (excavation picture and plan) at Kissonerga-Mosphilia (Peltenburg 1991, fig. 5; 1998c, 239; Peltenburg and Thomas 1996, figs. 19-20). In the black and white picture, it is evident the different applications of floor surfaces within the building space. The white lime-plaster floor at the right of the entrance is much better preserved than other surfaces within the building

A more complex division of space progressively emerged also within rectangular buildings of Prehistoric Bronze Age Cyprus (see Bolger 2003, 31-7). This is evident at the Early Cypriot Marki-*Alonia*, where the compartmentalisation of buildings' interior space is argued to have improved the opportunity for privacy for household members, and possibly marked the division of gender-related tasks within buildings (Webb 2009; Frankel, Webb 2009; 2012; Bolger 2003, 37-41). Investigated floor sequences at Middle Bronze Age Erimi-*LtP* suggested that buildings of the Workshop Complex were organised as large single spaces in the earlier occupation phase (Phase B; Middle Cypriot I). However, an enhancement towards the segmentation of the built space may be identified in the passage to the latest occupation phase of the settlement. The introduction of distinct plaster types together with the construction of small partition walls enhanced the definition of distinct buildings rooms, as well exemplified by the Building-Unit SA I, which over the course of Middle Cypriot II-III was re-arranged in three distinct rooms by the application of diverse plaster floors **[fig. 3.22]**. This trend towards the segmentation of buildings space may be interpreted as a manifestation of the functional specialisation of spaces within buildings, which firstly appeared in some peculiar structures of Middle Chalcolithic settlements (e.g. B206 at *Mosphilia*), and became progressively more evident in Prehistoric Bronze Age buildings, in particular within structures of the new-established formal workshops engaged in the supra-household production of goods during Middle Bronze Age Cyprus.

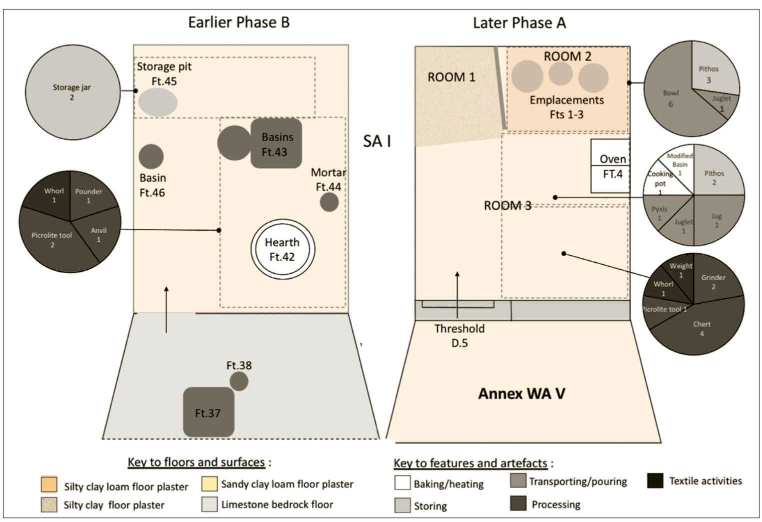

Figure 3.22 Variation in the spatial organisation within building-unit SA I and annex WA V, Middle Bronze Age Erimi, between the earlier Phase B and the later Phase A. The pie chart shows the distribution and occurrence of artefacts according to the functions they are related to (after Amadio 2018)

4 Interacting with the Built Environment
Transformation in Settlement Organisation and Concept of Space

Summary 4.1 The Built Environment at the Macro-Scale. – 4.2 Settlement Organisation and Spatial Conventions. – 4.2.1 Transformations in Settlement Layout. – 4.2.1.1 Neolithic Cyprus. – 4.2.1.2 Chalcolithic Cyprus. – 4.2.1.3 Prehistoric Bronze Age Cyprus. – 4.3 Settlement Organisation and Social Convention. – 4.3.1 Transformations in the Settlement Constitutive Elements. – 4.3.1.1 Neolithic Cyprus. – 4.3.1.2 Chalcolithic Cyprus. – 4.3.1.3 Prehistoric Bronze Age Cyprus.

4.1 The Built Environment at the Macro-Scale

"We live and interact in a world that has been modified by the existence of built structures" (Beckwith 2017, 1). In order to come to an understanding of how architectural forms, buildings and settlements contribute to shaping social interaction, it is fundamental to stress that the built environment promotes or inhibits encounters among inhabitants through the placement of walls, streets, buildings, and open spaces (Beckwith 2017; Hillier 1996; Rapoport 1980; 1990). The design and placement of buildings and built forms within a settlement have the ability to influence how social agents interact with each other. In this sense, the built environment constitutes a material arena within which social roles and relationships are shaped and negotiated. Most studies on the analysis of settlement layout are based on the premise that built space is in some way related to the shape of social relations of the inhabitants (cf. Hillier, Hanson 1984;

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Souvatzi 2008). Instead, settlements are not only set up according to existing social structures, but also take part in the shaping of identity and social relations (cf. Banning 2010; Fisher 2007; 2009a; 2009b; Furholt 2016). Therefore, it is erroneous to suggest that societies living in settlements organised in a similar manner share common organisation forms by default (on this point, see Düring 2006, 28-30).

In this section, I attempt to understand the complex interrelationships between the built environment and social interaction in the communities of prehistoric Cyprus. The analysis of the prehistoric Cypriot built environment is conducted at a macro-scale by taking into consideration aspects of transformation at the larger settlement level. Spatial and socio-cultural conventions are examined through analysis of settlement design, with attention to buildings, streets, and open spaces in order to evaluate how defined spatial settings may contribute to the formation and reproduction of social identities and economic roles. By examining these constitutive elements of the built environment as possible markers of socio-cultural and economic changes during prehistoric Cyprus, the analysis does not underestimate the potential complexity and diversity of evolutionary patterns, architectural biographies and socio-cultural histories. The outlined framework constitutes a preliminary analytical attempt and aims to contribute to a critical assessment of the role of the built environment in the dynamic transformations of the social, cultural and economic settings of the early communities in Cyprus.

4.2 Settlement Organisation and Spatial Conventions

Reconstructing the developments of settlement formation and transformation is not an easy task. In a simplistic view concerning settlement structure and organisation, large, planned settlements are considered the result of more complex social systems, while smaller, unplanned ones are considered the product of simpler forms of social aggregation (Smith 2007). However, settlements as a concept include a broad spectrum of human agglomerations, ranging from few buildings to larger urban contexts (Düring 2006, 29-30; Banning 2010); furthermore, these are not static, but dynamic forms. Also, it is important to consider that settlement layout not only reflects and reproduces social order, but also shapes identities and social relations (Bourdieu 1977; Giddens 1984; see also Furholt 2016, 1196-7). Therefore, it is always preferable to approach the analysis of settlement organisation in the context of the local settlement system in order to interpret the transformations of settlement organisation and layout from the perspective of the socio-economic trajectories of specific communities (van Dommelen 1997, 270-2). Analysing the way early communities in Cyprus structured themselves and their built environment, by configuring and constructing well-defined settlement spaces, can provide important insights into the socio-cultural conventions existing and emerging within these communities over the course of prehistoric Cyprus.

4.2.1 Transformations in Settlement Layout

Factors of diverse nature may intervene in shaping and affecting the organisation of settlements and living spaces. These factors can be of physical nature, e.g. the topography of the settled area and of socio-cultural and economic nature, notably social organisation, demographic rate, and cultural conventions, including burial practices and the need to provide space for the dead (Smith 2007; Bose, Malhotra 1963).

Topographic attributes certainly had an important role in defining the organisation of settlement areas among prehistoric communities in Cyprus. Building on a flat plateau or a plain was most presumably easier than building on a steep slope, where the configuration and construction needed to take into account factors such as the right inclination of the structure to avoid instability and collapse, the right orientation so as not to obstruct sun and wind access into the building, the right position on the available space in order to guarantee visibility and easy access to the structure (Steadman 2010; Roberts 2013, 1-14). Building on large plains also provided more possibilities for settlement expansion if compared to environments limited by natural barriers, such as headlands and steep hillsides (see Sneddon 2015). Topographic characteristics may influence the possibility of a settlement organisation, considering not only the built-up areas but also those spaces designed for subsistence activities, including herding and farming.

The irregularity of the terrain does not appear to have discouraged Late Aceramic Neolithic and Ceramic Neolithic communities to build their settlements in topographically prominent positions and headlands, in areas of optimal water and soil resources (Knapp 2013, 122-9; Clarke 2001). The disposition of buildings within these settlements generally does not respond to any organisational plan, with round and/or sub-rectangular structures characterised by diverse orientation, size and design. Far from being in favour of environmental determinism, and setting aside socio-cultural explanations – which will be considered later in this chapter –, we can see that topography played a part in the distribution of buildings within these early settlements. The two Ceramic Neolithic sites of Sotira-*Teppes* (Dikaios 1961) and Ayios Epiktitos-*Vrysi* (Peltenburg 1982) share general attributes in common, including house shape and size (Knapp 2013, 166-7; Peltenburg 1985, 49-50). However, the physical configuration of the two settlements is quite dissimilar. The settlement structure at Sotira-*Teppes* appears more regular than what has been observed at coeval Ayios Epiktitos-*Vrysi*. The compressed nature of the *Vrysi* building clusters perhaps also derives from the limitations imposed by the irregularity of the area and the constriction imposed by artificial or natural hollows (on the natural origin of the hollows, see Mantzourani 2003) used as foundation trenches for building construction (Peltenburg 1978, 56-7). In contrast, the flat plateau where Sotira-*Teppes* was built constituted a large and more homogenous constructional surface compared to the more irregular top of the headland where *Vrysi* was erected. We can speculate that the natural characteristics of the *Teppes* plateau may have facilitated building construction activities and might have contributed to a more regular organisation of the structures within the settlement.

Areas with different topographic characteristics were privileged by Late Chalcolithic and Early Bronze Age communities. The majority of settlements constructed during Early Chalcolithic Cyprus were built on alluvial and coastal plains as well as on gentle slopes; areas that provided good natural resources and space for extended settlements development (Sewell 2012, 27-37). Instead, new relationships with the landscape emerged during Middle Chalcolithic Cyprus (Peltenburg, Bolger, Crewe 2019), as testified by locations in strategic areas, e.g. the site of Soskiou-*Laona*, constructed on a hilly and remote area, optimal for picrolite procurement. The size of these settlements is, in fact, larger than earlier ones **[tab. 4.2]**. However, small centres, like hamlets and farmsteads located along river valleys and on spurs, co-existed with these larger villages, especially during the Middle Chalcolithic. The availability of space provided more possibilities for horizontal expansion of settlement spaces, as a consequence of the demographic growth during Middle/Late Chalcolithic Cyprus – as exemplified by the site of Kissonerga-*Mosphilia*, periods 3A-3B – and during Early Bronze Age Cyprus – as indicated by the case of Marki-*Alonia*, Phases D-F.

Middle Bronze Age Cypriot sites are characterised by major variation in the placement of settlements, in areas with diverse topographic and natural characteristics. Alambra-*Mouttes* was built on the flank of a ridge, on one of the low hills rising above the Mesaoria plain (Coleman et al. 1996, 17-18; Sneddon 2015). Not so far from Alambra, Politiko-*Troullia* was constructed on an alluvial terrace (Falconer, Fall 2013; 2014). The site of Ambelikou-*Alteri* was placed on a substantial hill on the northwest foothills of the Troodos (Webb, Frankel 2013b, 1). Erimi-*LtP* was located on a hill, characterised by gentle terraces, along the east bank of the Kouris River (Bombardieri 2017, 1-2). Kissonerga-*Skalia* was constructed on a gentle rise framed on the north and the south by two streams, c. 300 m from the coast in the Paphos area (Crewe, Hill 2012; Crewe 2017, 140-52). In all these sites, topographic attributes do not seem to have influenced the distribution and organisation of settlements much, if compared to earlier Neolithic sites. However, evidence of variability in the configuration and organisation of buildings in settlement areas characterised by different topographic attributes can be identified at Erimi-*LtP*. Here building units of the Workshop Complex, on the flat plateau on top of the hill, show more consistency in orientation, shape and design than domestic buildings, placed on the slopes of the hill terraces. Certainly, the more regular layout observed in the organisation of the Workshop Complex derives from the fact that the entire structure was built according to a preconceived layout and possibly did not undergo many structural transformations as in domestic buildings. Nevertheless, it should be stressed that building on a large, flat plateau facilitated the configuration and subsequent construction of the Workshop Complex units according to a homogenous plan. As stressed by Sneddon (2015), topography provides only a partial explanation for the settlement's configuration. Geophysical investigations conducted at Alambra have indicated that some areas suitable for domestic construction do not appear to have been built upon, while other locations which do not seem well-suited for residential buildings and domestic activities were used for these purposes, including buildings of Area A. Sneddon concludes that the configuration of inhabited space reflects a spread of social and cultural mechanisms, including land availability, defence, desire for light and ventilation, religious practices, gender relationships, and the keeping of certain animals (2015, 159).

Robb sustains that "practical action originates in cultural logic and reproduces it" (2007, 94). In this study, other lines of examination, which could help to disclose social and cultural aspects connected to settlement organisation strategies, include the analysis of settlement layout through the application of space syntax analysis. This approach is used to infer patterns of social organisation and identify overall trends affecting diverse prehistoric contexts, without underestimating the effect of multiple local agencies, and of individual histories. 'Space syntax' is the collective name given to a conceptual framework which can be used to identify, compare and interpret patterns of social configuration within settlements, as exhaustively explained here **[box 4.1]**. Space syntax techniques include axial line analysis, convex isovist analysis and convex spatial analysis, also known as 'access analysis' (cf. Fisher 2007; 2009a; 2014a; 2014b; 2023). Access analysis is of particular interest in archaeological examination, as it provides a framework for studying the social use of spaces, through the analysis of interaction potential (Hillier, Hanson 1984; Hanson 1998). Given the limitation of access analysis to the study of prehistoric contexts (on this point, see Cutting 2003), this approach is used not as a quantitative method but only as a model or a "tool to think with" (Cutting 2003), in order to provide insights into the spatial and social organisation of prehistoric communities in Cyprus.

Box 4.1
Spatial Analysis and the 'Integrative Approach' by Fisher

Spatial analysis, or 'convex spatial analysis' (Hillier, Hanson 1984, 143-55; Hanson 1998, 22-38) is a component of space syntax used to examine the relationship between spatial configuration and social interaction within a constructed space. Spatial analysis is described in archaeological research as 'access analysis'. Access analysis, specifically, is used to record patterns of potential movement in the spatial system analysed and to identify the level of interaction within a certain space (Cutting 2003); therefore, it provides a way to determine which spaces are more apt to host social interactions (Fisher 2007; 2023). This analytical technique involves the representation of built space as a graph and can be applied to the analysis of buildings in order to investigate how each space is integrated with the rest of other spaces in the spatial system, and to study social accessibility and control over materials, people and place (Fisher 2007; 2009a). Access analysis is based on the analysis of two spatial units: convex space, which is the enclosed space bounded on all its sides and often represented by rooms or buildings (Fisher 2009a, 440); and the links between convex spaces, which are represented by entrances and doorways.
Access analysis is not only applied as a visual analytical tool, but also as a quantitative analytical technique. Quantitative analysis is conducted by calculating syntactic and topological aspects of the numerical relationship between spaces within the spatial system (Cutting 2003, 5).
Despite the great potential of access analysis for the examination of syntactic and topological properties of the built space, concerns have been raised pertaining to the application of quantitative analysis to prehistoric contexts (Cutting 2003). Typical prehistoric archaeological contexts are unlikely to provide sufficient material to justify the use of access analysis as a quantitative methodology, as exposure may be limited and the definition of spatial units may be problematic. In fact, it is essential to have reasonably complete plans, with clear entry locations to attempt such an application (see also Fisher 2009a, 442). Other scholars have further criticised access analysis, as it fails to consider the symbolic meanings of the built space, and therefore, while the application of this technique may be effective for the analysis of 'spaces', it has been argued that it is not suited for studying 'places' (Hodder 1991, 39-41; Parker Pearson, Richards 1994, 30).

To address these issues, Fisher (2007; 2009a; 2009b; 2014a; 2014b; 2014c; 2023) developed an integrative approach that combines access analysis with a detailed study of how buildings influence human behaviour and interaction through the non-verbal communication of meanings, which are encoded in fixed and semi-fixed architectural elements as doorways, floors, furnishing and other artefacts, as well as in non-fixed features including the physical and verbal expression of buildings users. By combining theory and analytical methods from a variety of disciplines including sociology, human geography, architecture, planning and environmental psychology, Fisher aims at demonstrating the recursive relationships between human action and interaction and social structure (2009a). A primary goal of the integrative approach is to determine the places in which particular types of social occasions likely occurred and provide insight into the specific nature of those interactions. Access analysis provides a useful starting point and is conducted through the realisation of an access graph [fig. 4.1.1], which provides a visual representation of the relational properties of each space in terms of their access to one another. The second step includes the recording of the properties of fixed and semi-fixed architectural elements to determine the potential of a given space as a venue for social interaction. Isovist and viewshed are then integrated as analytical tools suitable for analysing the visual experience of a place from a particular position.

The aim of this integrated approach is to augment the informative potentials of spatial analysis by providing an effective analytical framework with which to examine the meaning encoded in buildings and their constitutive elements, investigating the materiality of the built space and analysing how the built environment configures daily practice, actively facilitating the social interactions through which identities, role and status are reproduced and negotiated (Fisher 2014a, 400).

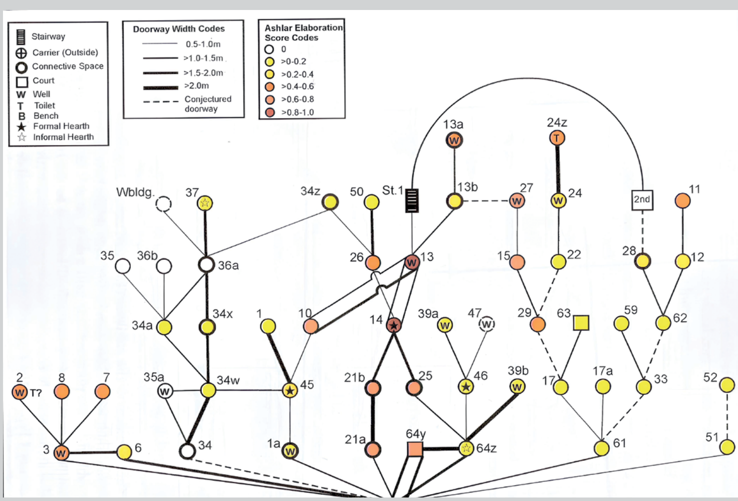


Figure 4.1.1 Example of enhanced access graph (Fisher 2023, fig. 15)

The framework used to analyse the settlement configuration of buildings within prehistoric Cypriot settlements draws on the method firstly developed by Hillier and Hanson (1984), successively applied to the examination of prehistoric and protohistoric contexts by many scholars (cf. Foster 1989; Banning 2010; Furholt 2016; Fisher 2023). In this examination, buildings will be the focal point of analysis as single structures are easier to study than entire settlements, since open spaces cannot be separated so easily into analytical elements and the richness in differentiation of internal buildings means that they can provide more social information (Hillier, Hanson 1984; Foster 1989).

Table 4.1 Schematic diagram of spatial syntaxes identified in prehistoric settlements in Cyprus (Hillier, Hanson 1984, 78; Banning 2010, fig. 1). In the column 'Syntax type', the black dot represents the building's space, while the white dot represents the outdoor space. Lines are indicative of the connection between spaces

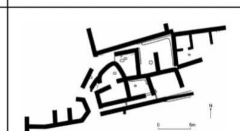
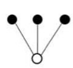
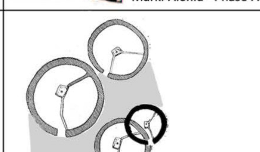
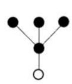
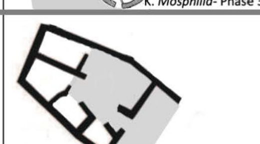
	DISTRIBUTED		NON DISTRIBUTED	
	Syntax Type	Example	Syntax Type	Example
SYMMETRIC	Z_1  Cluster	 Marki-*Alonia* –Phase A	Z_2  Closed cell	 Sotira-*Kaminoudhia*
SYMMETRIC	Z_3  Clump	 *K. Mosphilia*- Phase 3		
ASYMMETRIC	Z_5  Central space	 Alambra-*Mouttes*	Z_4  Concentric	 Marki-*Alonia* –Phase D-E

Table 4.2 Spatial attributes recorded in prehistoric Cypriot contexts. Two representative settlements for each study period are included in the analysis

Period	Sites	Size (ha)	Settlement layout	Spatial arrangement	Types of structures	Functional/social differentiation of buildings	Open areas Communal spaces
LAN	Khirokitia-*Vouni*	2.50	Z1-Z3	Free-standing Adjacent	Circular Monocellular	Functional distinction*	Communal open areas Walls
	Cape Andreas-*Kastros*	0.17	Z3	Free-standing	Circular Monocellular	No differentiation	Wide passageways
CN	Sotira-*Teppes*	0.25	Z1 (Phase 1) Z3-Z4 (Phases 2-3)	Free-standing Adjacent	Circular, rectilinear, irregular Monocellular Annexes/ subsidiary structures	No differentiation	Semi-enclosed courtyards Wide passageways
	Ayios Epiktitos-*Vrysi*	0.50	Z3 (mostly)	Free-standing Adjacent	Circular, rectilinear, irregular Monocellular Annexes	Not present**	Narrow passageways, sometimes blocked Retaining wall Small open-areas
MChal/ LChal	Kissonerga-*Mosphilia* (Phase 3b)	12.0 c.	Z3	Free-standing	Circular Single-roomed with internal division	Functional and social differentiation	Pathways, paved tracks Settlement organised in sectors
	Lemba-*Lakkous*	3.0	Z3	Free-standing	Circular Single-roomed with internal division	Functional differentiation	Pathways
EC	Marki-*Alonia* (Phases D-F)	6.0	Z4-Z5	Compounds	Rectilinear Multi-roomed	No differentiation	Pathways/lanes
	Sotira-*Kaminoudhia*	1.0 c.	Z2	Agglutinative	Rectilinear, irregular	Possible functional differentiation (Unit 12, Area B)	Pathways
MC	Alambra-*Mouttes*	6.0 c.	Z4-Z5	Compounds	Rectilinear	Possible functional differentiation? (Building IV)	Street
	Erimi-*LtP*	1.10 c.	Z3-Z4	Compounds (?)	Rectilinear	Functional differentiation Communal work space segregated from domestic work areas	Communal workshop Communal open areas Passageways Walls

* Cf. Le Brun 1993
** Even if Peltenburg (1982) suggests a social division between buildings of the two sectors of the settlement

Tables 4.1 and 4.2 summarise the results of this analysis **[tabs 4.1-2]**. In particular, table 4.1 illustrates the five elementary syntaxes identified in the prehistoric settlements analysed, following the idea of Hillier and Hanson (1984) **[tab. 4.1]**. The five types are classified as 'distributed' when structures are located in space as independent spatial units; 'non distributed' when one unit imposes or controls access to other units; 'symmetric' when the relationship between one space and another is identical with respect to the third space; 'asymmetric' when one space controls access from the other space to some third space (see Hillier, Hanson 1984, 66-81; Banning 2010, 51). The five types of syntax identified include:

1. The 'cluster' syntax: when one monocellular building is loosely clustered in the settlement. No specific settlement layout can be recognised;
2. The 'closed cell' syntax: characteristic of agglutinate settlement layouts;
3. The 'clump' syntax: it comprises buildings connected to an open space or courtyard by a doorway. This pattern type generally creates a non-organised system of passageways among clumps of buildings;
4. The 'concentric' syntax: when, within a building, the access to a room is controlled by the need to pass through another room;
5. The 'central space' syntax: typical of the courtyard house type.

Data deriving from spatial analysis applied to the prehistoric settlements on the island are collected in table 4.2. It is important to stress that resulting data are affected by a number of biases due to the inhomogeneity of the available documentation, as a result of different recording methods, and variability in the size of excavated areas. Nevertheless, this approach can still be helpful for characterising the architecture of buildings and settlements, despite the fragmentary nature of the evidence **[tab. 4.2]**.

4.2.1.1 Neolithic Cyprus

Settlement plans of Neolithic communities in Cyprus appear to be characterised by an agglutinative syntax type, with structures densely packed within the settlement area. Looking at one of the most representative cases – the Late Aceramic Neolithic site of Khirokitia-*Vouni* –, it is possible to note the agglomerative pattern of the densely built-up area is the result of transformation and super-imposition of structures deriving from an interrupted activity of construction, maintenance and modification of buildings within the settlement. The distribution of building units according to the different sectors (East and West) and the different phases – Phases B and C (in the East sector); Phases I, II, III (in the West sector) – suggests an intensification of construction during the last period of occupation of the settlement. The analysis of the single structures indicates that most of the buildings are organised according to the clump syntax type (Z_3) **[tab. 4.1]**, with clusters of structures organised around an unroofed courtyard where grinding grain and other daily activities were conducted (Le Brun 2001, 115; 2002, 25). If the lack of large, open areas within the domestic space indicates that this part of the settlement was not accommodated to host public gatherings, and that interaction possibly occurred only among restricted groups within the community, the occurrence of an area segregated from the residential units – which was equipped with oval platforms and designed for processing activities – indicates that exchange and interaction at a supra-household level were performed in this portion of the settlement **[fig. 4.1]**. Additionally, the presence of distinctive structures, characterised by larger size and possibly designed for communal functions, for example Tholos 1A (Dikaios 1953; on this point, see Knapp 2013, 126-7), and the presence of massive wall structures delimiting the site in a southeast to the northwest direction (Le Brun 2001; Le Brun, Daun-Le Brun 2009), indicate a level of interaction among community groups which was possibly fostered and reinforced by cooperation and collaboration in the accomplishment of communal tasks. Despite this communal effort, analysis indicates that at Khirokitia the living space was fragmented, with daily activities mostly conducted within buildings and outdoor areas used only for specific tasks, including the disposal of rubbish (Le Brun, Daun-Le Brun 2003, 56; Clarke, McCartney, Wasse 2007, 120).

More limited evidence from the coeval site of Cape Andreas-*Kastros* (Le Brun 1981) suggests a less dense settlement layout, with domestic structures scattered in the limited space of the rocky spur. A looser organisation in the arrangement of buildings and open areas characterise the settlement. Structures were free-standing and arranged into groups around external spaces (syntax type Z_1-Z_3). The occurrence of wide pathways between the buildings indicates a fluid passage and the possibility for interaction in these spaces.

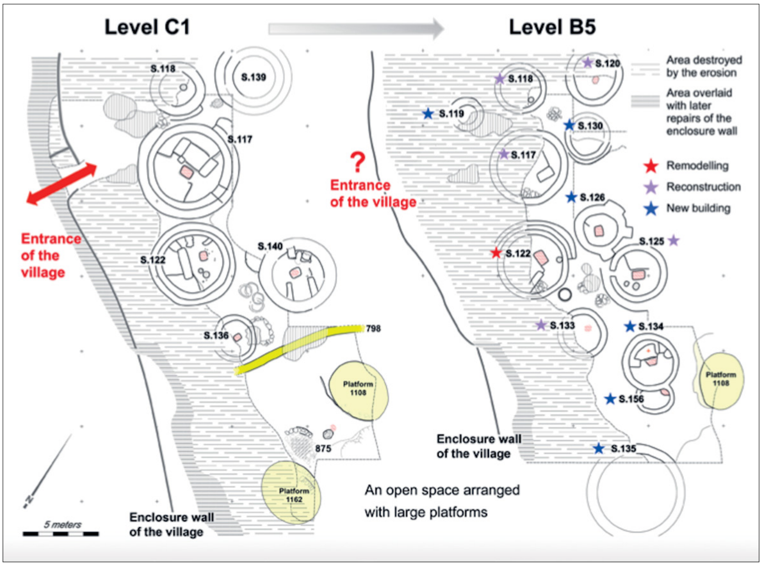


Figure 4.1 Distribution of buildings and open areas at Khirokitia-Vouni. Courtesy of Le Brun

Encounters between inhabitants also occurred in open areas, which were used for domestic activities. These external spaces appear to have been used differently than at Khirokitia. Analysis of architectural structures and residual artefacts indicate that exterior space at Cape Andreas-*Kastros* complemented interior living areas, therefore daily activities were conducted in both spaces, with little demarcation between them (Clarke 2007c, 120).

The Ceramic Neolithic settlements of Sotira-*Teppes* and Ayios Epiktitos-*Vrysi* show a compact distribution of buildings, similar to the layout observed at Khirokitia. A closer look at the structures indicates that the clustered spatial pattern which characterises these two sites is the consequence of a progressive expansion of the inhabited areas, with a super-imposition of constructions during the main phases of occupation of the two settlements. The first phase of occupation at Sotira-*Teppes* (Phase 1) is characterised by monocellular free-standing structures (mostly Z_1 and Z_3 syntax types) **[fig. 4.2a]**, which were thinly spread over the plateau where the settlement was built (Knapp 2013, 165). The habitational pattern in the subsequent Phases 2 and 3 (according to the relative chronology proposed by Stanley Price 1979) changed significantly with the construction of new buildings and the addition of annexes and subsidiary structures to the previously existing constructions **[fig. 4.2: b-c]**. The incorporation of these subsidiary structures, e.g. in Houses 1 and 7, transformed the syntax of buildings from clumped (Z_3) to concentric (Z_4), contributing to the increasing compartmentalisation of the domestic building space (Bolger 2003, 28-9) and the creation of more private areas not directly accessible from the outside. Certain groups of structures were arranged around open spaces or courtyards (e.g. House 31.A, 34.A; see Dikaios 1961, pls 35, 37) where domestic activities were conducted. The layout of these courtyard areas, which were constructed with narrow entrance-ways, may suggest that the access to these spaces was controlled and possibly regulated by household members. More possibilities for encounters and interaction were provided by the wide passageways occurring between the cluster of buildings (Knapp 2013, 165).

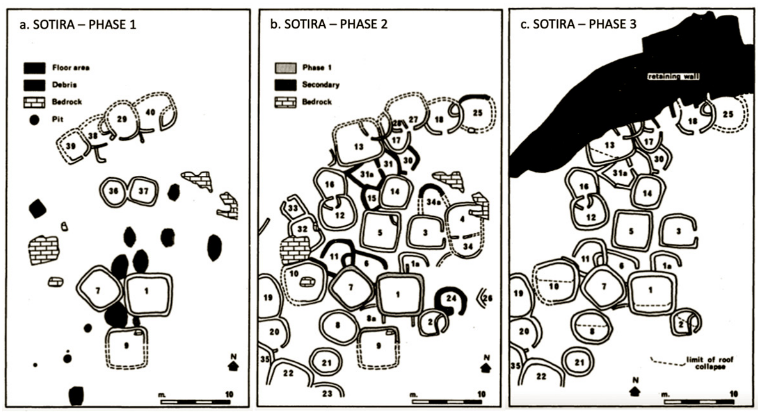


Figure 4.2 Distribution of buildings at Sotira-Teppes during the three different occupation phases. © Stanley-Price 1979

At Ayios Epiktitos-*Vrysi*, buildings were constructed within deep hollows carved into the calcareous bedrock floor (Peltenburg 1982; 2003). Given the limitation imposed by these semi-subterranean foundations, buildings were transformed by super-imposition of structures one on top of another in a column-like arrangement (Knapp 2013, 167-8; Peltenburg 1982, 25; 2003, 102-3). The space syntax which characterises the buildings within the settlement is only apparently similar to the type of organisation observed at Sotira-*Teppes* Phases 2-3. At Ayios Epiktitos-*Vrysi*, the settlement appears to be divided into two distinct sectors, the northern and the southern, which were separated by a central ridge given by the natural top of the headland where the site was built **[fig. 4.3]**. Buildings within each of these sectors were clustered around two narrow passageways (Passage A and B), which possibly constituted *loci* of interaction between individuals living in the concomitant structures. The occurrence of pavings denotes communal attention for these passages (Peltenburg 1985); however, their narrow width may suggest that forms of exchanges and interaction were possible only among restricted groups. In some cases, these passageways were blocked by installations like fireplaces and querns (see Peltenburg 1982, 37). Peltenburg (1985) proposed to interpret these installations as preventive against erosion. However, at a more speculative level, the blocking of these passageways could be potentially seen also as a form of control and appropriation of the available space, in the process of progressive expansion of some households (e.g. Building 2A-2B) at the expense of others (see Frankel, Webb 2006b). The placement of installations on these passageways could have possibly curtailed and limited the communication routes between sectors of the settlement, hence activating processes of spatial negotiation between household groups. If we admit this hypothesis, we can postulate that this process of re-articulation and transformation of space and community through time was part of the social structure of *Vrysi* (Papaconstantinou 2002). We might argue that this social structure subsisted in the acts of dynamic collaboration, consensus and negotiation among members of the communities across generations (De Marrais 2016; Hodder 2012; Kay 2020).

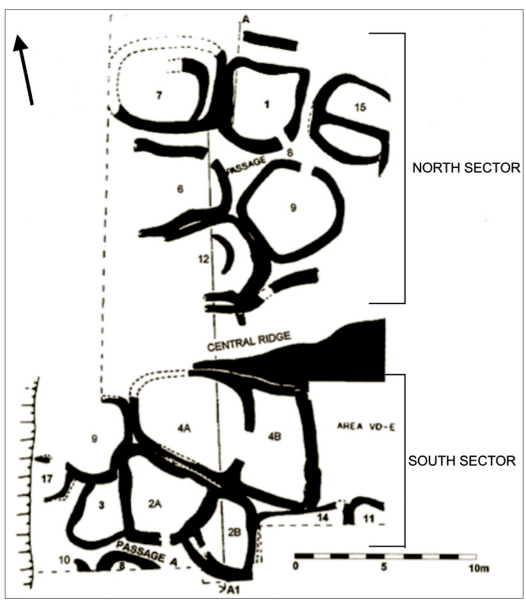


Figure 4.3 Distribution of buildings at Ayios Epiktitos-Vrysi. © Peltenbur 1982

In more general terms, during the entire Neolithic Cyprus, buildings lack consistency in shape, size and orientation. No marked distinction emerges in buildings construction, although functional differentiation among structures has been recorded at Late Aceramic Neolithic Khirokitia, where buildings with larger sizes and a diverse arrangement of internal space have been identified (e.g. S.148; Le Brun, Daune-Le Brun 2003). Inconsistency in building content and average floor areas at Ayios Epiktitos-*Vrysi* suggested asymmetric social relations between the northern and southern sectors of the settlement (Peltenburg 1985, 55-62; 1993, 10-11); however, Papaconstantinou (2002, 38-44) recently observed that despite in quantitative terms the North sector appears to be much richer in comparison to the South, in qualitative terms, the picture change and differences are eliminated, hence suggesting that no marked social differentiation occured at the settlement and that both sectors had the same access to all types of artefacts (see also Knapp 2013, 168-9). Open areas were almost exclusively used by single households, as evidenced at Cape Andreas-*Kastros*, and more rarely mechanisms of facilities sharing were in place. Even when communal open areas are attested, as at Khirokitia, it appears that their functions are limited to a restricted number of activities. As consequence, we can suggest that the interaction potential of open areas during this phase remains limited. More possibilities for the establishment of cooperative forms of labour derive from the construction of public works, *in primis* walls. This evidence led Le Brun (2002, 25) to suggest forms of cooperative planning at Khirokitia by a society sufficiently structured and capable of assembling the necessary labour to accomplish such a plan. However, as further discussed in § 4.2.1.1, it is important to be cautious of assuming that such public works were necessarily conducted at the level of the whole community (Banning 2010).

4.2.1.2 Chalcolithic Cyprus

During the Chalcolithic period, the overall settlement organisation is that of flat sites with dispersed free-standing buildings separated by paths, passageways and open areas (Papaconstantinou 2013, 130-1). Scanty evidence from Early Chalcolithic semi-subterranean settlement and their patchy floor plans (Bolger 2003, 29) make difficult the examination of their spatial arrangements. Better evidence and more extended site plans derive from Middle/Late Chalcolithic settlements, in particular Kissonerga-*Mosphilia* and Lemba-*Lakkous*, which will be analysed in this section.

Kissonerga-*Mosphilia*, the largest and long-lived settlement of Middle Chalcolithic Cyprus, was constructed with a more organised layout than earlier Neolithic settlements. Evidence pertaining to the first occupation phases is too limited to confirm if the site was planned and organised in different sectors from the very outset of its lifecycle. The following occupation Period 3A, which is dated to the middle/late 4th millennium BC, is characterised by a pattern of sequential construction of free-standing buildings separated occasionally by pathways. Structures were organised in two distinct areas: the Main Area, characterised by rectilinear buildings of small size, and the Upper Terrace, with circular buildings showing internal segmentation. Despite the differentiation in shape and construction among buildings of the two sectors, all the structures appear to have been displaced in the settlement space according to the clump syntax (Z_3), with clusters of buildings sharing an open courtyard. The organisation and construction of circular buildings in the Upper Terrace and the appearance of private storage areas (Peltenburg et al. 1998b, 242-3) suggested trends toward the development of property rights (Knapp 2013, 209) and an emerging social differentiation among groups living in the two sectors of the settlement (Peltenburg et al. 1998b, 242-3). In the subsequent Period 3B, the settlement space was renovated by a significant construction programme, which transformed completely the earlier layout. The construction of new buildings is conducted following a coordinated, pre-planned project (Papaconstantinou 2013, 131). Settlement expansion is attested by the construction of new buildings in the Main Area, displaced into two separate sectors: the upper and the lower. What is significant is that during this phase there is an increasing differentiation between buildings of the settlement. This is exemplified by the circular structures of the Ceremonial Area, which show larger sizes compared to other buildings of the settlement and were constructed with calcarenite blocks brought up from the coastal area (Peltenburg et al. 1998a, pl. 5.1). The new buildings edified in the Main Area also show consistency in the orientation, with the entranceway towards the south (see § 3.1.2.1). These data support the idea that Kissonerga-*Mosphila* was a centrally-organised settlement. The spatial arrangement of buildings become more standardised (Thomas 2005b) with indoor spaces segmented by partition ridges and by different floor types. However, no substantial changes appear in the general layout of the structures. No annexes or subsidiary constructions are added to the main buildings, so that the passage between the communal, outdoor space to the private, indoor space is fluid and regulated by the occurrence of enclosing doors. The organisation of settlement space during successive Period 4 is indicative of a system of social relations different from the previous occupation phase. Public works, including paved tracks or enclosure walls which characterise the settlement during earlier Period 3, no longer occurred (Papaconstantinou 2013, 133). Similarly, ovens were no longer placed outdoors, suggesting that processing activities were conducted preferentially indoors. This is indicative of a less sharing and interactive social environment **[fig. 4.4]**.

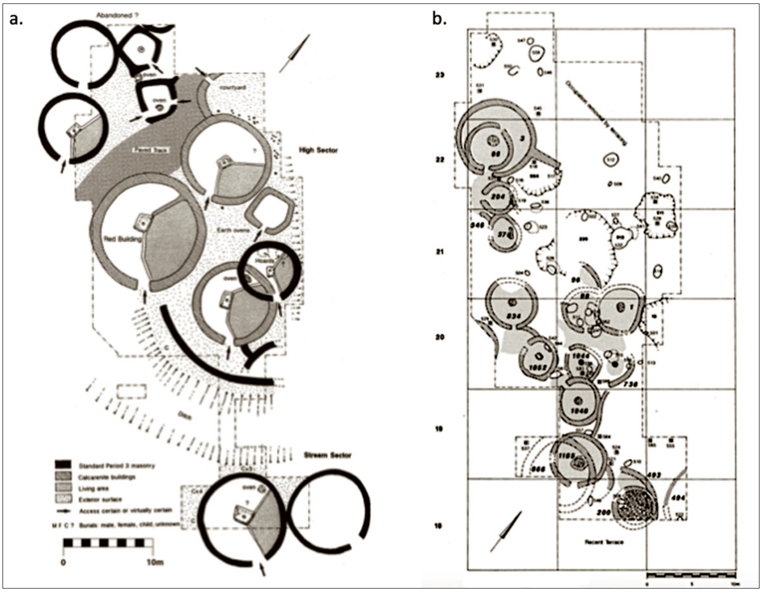


Figure 4.4 Distribution of buildings at Kissonerga-Mosphilia. a) period 3B; b) period 4. Peltenburg et al. 1998a, figs 31, 39

Similar evidence, attesting a transformed configuration of the settlement space compared to what was observed in the Neolithic period, has been identified at Lemba-*Lakkous*. Here the inhabited space was organised into two different areas (I and II) with a rather dense arrangement of buildings **[fig. 4.5]**. In both the two periods identified at the settlement (Peltenburg et al. 1985; see also Knapp 2013, Appendix), the spatial syntax of single structures resembles the organisation observed at Kissonerga-*Mospilia*, with monocellular buildings, internally segmented, associated to open courtyards (syntax Z_3), which suggests a fluid interaction among community members. Fixtures and depositional evidence within buildings indicate a functional differentiation of the structures, which appear to serve complementary rather than identical functions (Papaconstantinou 2013, 136-7). Buildings of Period 2 are generally larger than the previous Period 1, however, no substantial changes in the spatial distribution of structures and open areas can be traced between the two periods of occupation in the settlement. In contrast to what was observed at Kissonerga-*Mosphilia*, no evidence of marked differentiation in construction techniques and organisation of buildings within the settlement can be identified, with the exception of Building 1-Period 2, which is characterised by larger size and a richer material assemblage (e.g. the well-known 'Lemba Lady', a nearly 40 cm tall, fiddle-shaped, limestone female figurine; cf. Peltenburg et al. 1985, 35-6, fig. 55).

A closer look at the spatial configuration of individual structures within Chalcolithic settlements indicates a process of progressive segmentation of the internal building space, which was achieved through the addition of partition ridges, the application of different floor types and a more consistent arrangement of spaces and activities areas within buildings (Peltenburg 1998, 233-60). It is important to stress that this process of increasing segmentation, which may be indicative of a process of emerging social complexity (Bolger 2003, 29-31), does not necessarily correspond to a process of increasing privacy and control of the building internal space, as demonstrated by the lack of more private rooms/spaces within the monocellular circular buildings of these Chalcolithic settlements. Doors allowed direct entry into the building's interior space, thus reducing the possibility of household segregation. The fluid relationship and interaction which appear to occur in this built and social environment are also indicated by the fact that household groups did make no effort to detach their houses from their neighbours, for example with the addition of entry rooms or courtyards. Instead, courtyards and open spaces were *loci* of shared and communal activities. An exception is constituted by the identified separation of buildings into distinct areas at Middle Chalcolithic Souskiou-*Laona* during Period 2, which "denotes the establishment of new boundaries where integration was previously paramount, perhaps an attempt at 'distancing strategies' used by household-based communities to overcome the social risk and uncertainties of initial integration" (Bolger et al. 2019, 333).

The picture that emerges from a pivotal spatial analysis is of Chalcolithic Cypriot settlements as places of encounter and interaction rather than competition and contestation. It is generally assumed that manipulation of space to provide privacy allows individuals authority over belongings and self (Steadman 2000; 2011). In the specific case of Chalcolithic Cypriot settlements and communities, the lack of spatial segregation and the limited privacy within buildings and between households should not be considered as an indication of limited material possession by social groups, but might possibly suggest that mechanism of solidarity and sense of community were in place, and that this guaranteed a balanced relationship among inhabitants and helped to the maintenance of social control (Bolger et al. 2019, 328-30), at least until the Middle Chalcolithic period.

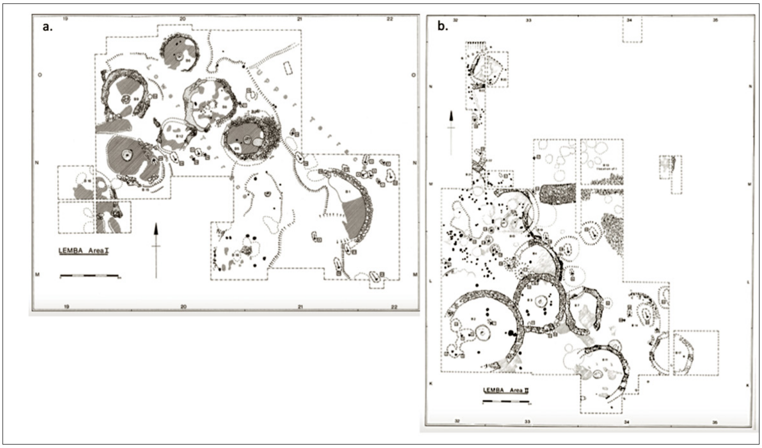


Figure 4.5 Distribution of buildings at Lemba-Lakkous. a) Area I; b) Area II. © Peltenbur 1985, figs 10, 22

4.2.1.3 Prehistoric Bronze Age Cyprus

Settlements of the Prehistoric Bronze Age Cyprus are characterised by a layout renewed by the introduction of rectangular architecture. Villages of Early Bronze Age Cyprus show a complete transformation, not only of the architectural form, but also of all the basic settings of the habitational units, including the spatial arrangement of rooms and installations. The anatomy of this development is well-represented by Marki-*Alonia*, which, with its 500 years of occupation, from the early stages of the Bronze Age to its final abandonment at the beginning of the Middle Cypriot period, provides one of the best examples of Prehistoric Bronze Age architecture. What can be observed in Marki-*Alonia* is the gradual change of building layout, from simpler structure plans during the first occupation phases (space syntax Z_1) to more elaborated compounds, characterised by rooms connected by a courtyard, according to a central space syntax (Z_5) **[fig. 4.6]**. This transformation in the spatial arrangement is viewed as the result of the gradual aggregation of household groups, following demographic growth during the Early Bronze Age period (Knapp 2008, 123). While the configuration of buildings within the settlement during the main phases of expansion (Phases D-G) appears to have responded to an agglutinative layout, without an organisational principle, the in-depth analysis of the spatial arrangement of single structures suggested how buildings were organised in compounds, with rooms arranged around an enclosed courtyard (Frankel, Webb 2006a; Webb 2009). All compounds were entered through the courtyard, either directly from open space or a public access route or, via a private passageway, as observed in Compounds 6 and 29 (Frankel, Webb 2006a, 311-15). In most cases, the interior rooms followed one another, achieving greater privacy with more depth of access (Frankel, Webb 2006b). The greater emphasis on private space is correlative with changes in socio-economic organisation, and possibly with an increasing possession by individual households which desired to better control their own personal space (Steadman 2010). Foster, in her study of Iron Age buildings in Orkney (1989) observed a correlation between the development of the concept of 'authority over personal belongings' and an increase in boundary control and limits on access, illustrated by the number of architectural segmentation among buildings within the settlement. Developments in the arrangement of the settlement architectural organisation at Marki-*Alonia* may be identified in the appearance of defined lanes and streets during Phase D (EC I-II), and in the different configuration of open areas and courtyards, which contributed to transforming interaction potential within settlement areas and promoted new forms of space negotiation (Frankel, Webb 2006a, 313-15; 2006b, 287-302). However, the complete lack of building orientation persisted in the settlement until the last phases of occupation, suggesting a lack of centralised decisions and large-scale planning (2006b) **[fig. 4.6]**.

An agglutinative layout (Z_2) characterises the settlement structure of Sotira-*Kaminoudhia* and in particular of Area A, the largest of the three plots investigated at the site (Swiny, Rapp, Herscher 2003) **[fig. 4.7]**. Here, structures do not respond to the courtyard model but are clustered one against the other with no consideration for access routes and open areas. In contrast to what observed at Marki-*Alonia*, where no marked differentiation between buildings has been evidenced, at Sotira-*Kaminoudhia*, Unit 12 of Area B and Units 2 and 21 of Area C have been indicated as a non-domestic space. Unit 12, in particular, is characterised by a more elaborated architectural plan, whose entrance is marked by a wide doorway, the presence of unique installations, including a large platform with two saddle querns, and the occurrence of striking materials on its floor, notably a carefully planned female burial. All of this evidence indicates that this complex may have served ceremonial rather than domestic purposes (Swiny 2008, 49-50). At Middle Bronze Age Alambra-*Mouttes*, structures investigated by Coleman et al. (1996) indicate a more standardised building layout, according to the model of the courtyard house (Z_5). The apparently more organised arrangement of compounds and the more formal layout of the settlement can derive from the less stratified architectural evidence compared to those analysed at Marki-*Alonia* (Webb 2009). No marked evidence of differentiation can be inferred from the record of the seven structures investigated at Alambra-*Mouttes*. The only exception is constituted by Building IV, which possibly served communal purposes given its spacious

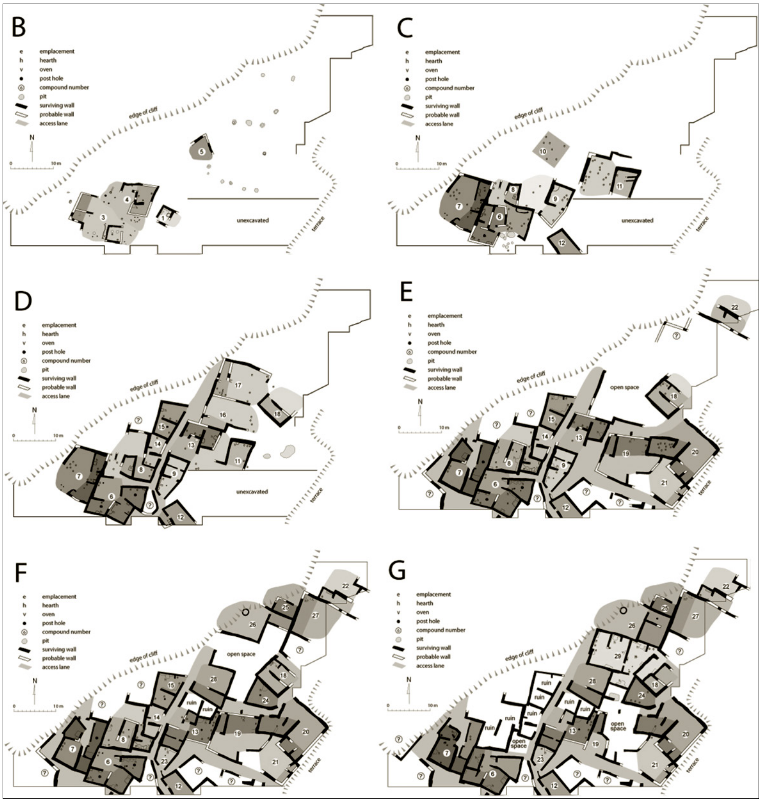


Figure 4.6 Distribution of buildings during the different occupation phases at Marki-*Alonia*

size and the large dimension of the hearth within one of its rooms. An organised pattern, with structures and open areas aligned according to east-west oriented passageways, appears to characterise also Middle Bronze Age Politiko-*Troullia*; however, further data are needed to better define the internal arrangement of buildings within the two areas investigated at the settlement, *Troullia*-East and *Troullia*-West (see Falconer, Fall 2013; 2014).

Figure 4.7 Distribution of building in the three plots investigated at Sotira-Kaminoudhia. © Swiny et al. 2003

The analysis of settlement structure at Middle Bronze Age Erimi-*LtP* provides new evidence to investigate the evolution of forms of organisation at the end of Prehistoric Bronze Age Cyprus, and to examine the manner in which spatial layout was used to define social settings. Archaeological data revealed that the settlement was organised in two distinct areas: the productive area of the settlement – the Workshop Complex – on top of the hill and the domestic area, on the lower terraces, separated from each other by open spaces and characterised by diverse forms of buildings organisation (Bombardieri 2017, 27-8). The Workshop Complex was constructed with a regular layout, with buildings aligned according to a street system, whereas in the proposed domestic area, the organisation of buildings and open areas is less regular and more similar to the clustered arrangement of Early Bronze Age contexts **[fig. 4.8]**. Buildings of the domestic area were arranged in groups around an open courtyard (Z_3) or constructed according to the central space syntax (Z_5). Despite the differences in the spatial layout between buildings of the Workshop Complex and buildings of the domestic area, the entire settlement appears to respond to a homogenous organisation principle. Structures, open areas and passageways respond to a coordinated orientation (northeast/southwest), which suggests a preconceived and coordinated settlement plan (Amadio 2017). This hypothesis is supported by the fact that the entire settlement was constructed with buildings' foundations carved into the bedrock floor, thus creating semi-sunken structures. We can speculate that this type of construction technique limited any extensive transformation to the original settlement layout. However, changes in the architectural forms and building arrangement have been identified in the structures of the domestic area (Bombardieri 2017, 58-73; Amadio 2017, 202-17), which indicates a dynamic process of structural and social transformation occurring throughout the settlement occupation phases. This evidence indicates that if on one side activities like house renovation and maintenance were presumably conducted at the individual household level, on the other side the construction of an organised settlement layout must have involved collective labour, planning and decision-making, all of which imply organisation at the community – rather than the household – level. The planning of a structured design and the construction of an organised settlement contributed to connecting different buildings into a communal place-making, and provided a mechanism for enhancing social interaction among community members (on this point, see Souvatzi 2012, 26).

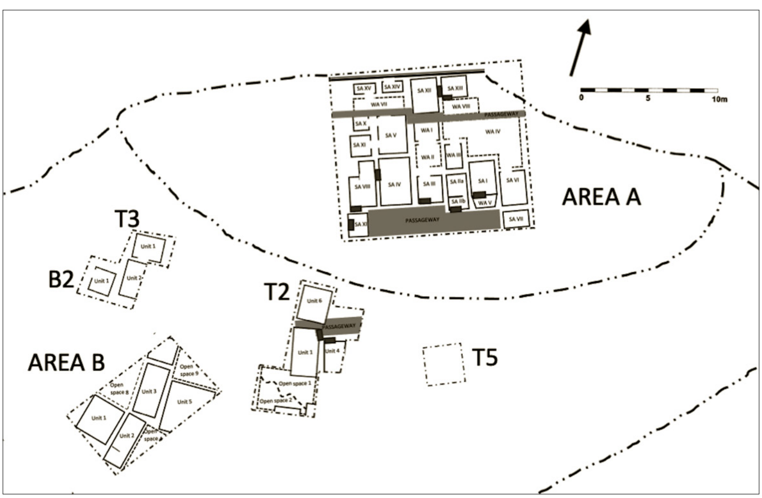


Figure 4.8 Distribution of buildings in the productive (area A) and residential areas (area B, B2, T2, T3, T5) of Erimi-LtP. © Bombardieri 2021

4.3 Settlement Organisation and Social Convention

4.3.1 Transformations in the Settlement Constitutive Elements

A closer analysis of the constitutive elements of settlements, including the examination of the internal arrangement of buildings within the broader picture of the community – rather than the individual household – structure, and the organisation of public works – such as streets, walls and open areas – may provide additional data to further examine social settings within prehistoric communities of the island.

4.3.1.1 Neolithic Cyprus

During Neolithic Cyprus, evidence of public works, despite limited, indicates a level of cooperation among groups of the settlement which possibly involved supra-household organisation strategies. The first supporting evidence for this assumption is represented by the massive wall structure at the Aceramic Neolithic Khirokitia. In the early reconstruction by Dikaios (1953), this feature was interpreted as the main road dividing the two sectors of the settlement, and only later Le Brun (1994, 15-26) proved it was a wall with possible defensive functions. It is more plausible that the wall served to mark out the settlement circuit, preserving the social cohesion among inhabitants (Knapp 2013, 126-7); however, it is further conceivable that the protection from potential external pressure – which we may suppose was guaranteed by this wall – helped to reinforce inhabitants' sense of security, hence possibly contributing to strengthening the community identity (Maisels 2010, 81-138). Le Brun interprets the occurrence of these wall structures as evidence of communal involvement in the settlement planning, construction and maintenance (2002, 25). The accomplishment of this work certainly involved a degree of communal decision-making and cooperative labour. However, it is possible that the scale of this cooperation was smaller than the whole community, and that households or groups of households living concomitant to the wall were responsible for construction and maintenance tasks (see Banning 2010). If this is true, we can speculate that this commitment was not conducted without practical advantages, comprising easier and more direct access to the settlement gateways. The existence of supra-household forms of organisation, possibly involving associations of nuclear families, is advocated by Le Brun (2002) and supported by the spatial organisation of houses around small courtyards as spaces for shared domestic activities (see § 4.1.1), but also by the possible articulation of gateways around the settlement wall (this is only hypothesised since only one access point has been identified to date), which possibly demarcated territorial subdivisions creating different segments or membership groups within the community. Data from Cape Andreas-*Kastro*s suggest different forms of organisation. Evidence for public works is limited to large streets and mud-plastered open areas; the latter were reserved for domestic activities and spread beyond the limit of a single household. These open areas seem to have been at the centre of everyday life, as they contained a large number of features and installations – while inner buildings were almost empty of furniture (Le Brun 1975) –, suggesting that a large number of activities were conducted in these outdoor spaces. The arrangement of these open areas can suggest more fluid mechanisms of sharing and cooperation among members of the small settlement of Cape Andreas-*Kastros*, and a less enclosed organisation of the built and social space compared to the more structured organisation observed in the larger community living at Khirokitia.

Ceramic Neolithic Sotira-*Teppes* and Ayios Epiktitos-*Vrysi* represented two other examples, which attest to the variegated sketch of the social and spatial organisation of Neolithic Cyprus. While evidence of public areas in these two settlements is confined to streets and courtyards, which were mostly used by individual households, evidence of the internal arrangement of buildings can reveal aspects of the social organisation of household groups within the settlement. The analysis of hearths at Sotira-*Teppes* indicates that each structure was furnished with fire installation, an essential requirement for domestic activities. However, examination of stratigraphic evidence (Dikaios 1961; Stanley Price 1979; see also Peltenburg 1978, fig. 4) indicates that during occupation level III, a few buildings – e.g. Houses 16, 18, 24, 25, 28, 31 – lack fire installations. If we take for granted that these structures had domestic functions, we have to hypothesise that family groups living and using these spaces had necessarily to share hearth structures with other household groups owning this facility (Kay 2020). These data – although in need of further and more complete evaluation – could represent preliminary evidence of the appearance of association between community groups, supporting the idea that Neolithic communities were not only formed by relatively autonomous households, but that intermediate forms of organisation between households and the local community were possibly in place (Düring, Marciniak 2005). In this regard, Ayios Epktitos-*Vrysi* returned a different picture. Here all units are hearth-equipped, suggesting a socio-economic division of one family per house. In this case, we can suggest that mechanisms of cooperation between households were certainly occurring; however, no clear indicators can be traced in the spatial and architectural record (Peltenburg 2003).

4.3.1.2 Chalcolithic Cyprus

In a broader perspective, Middle and Late Chalcolithic Cyprus represent a moment of transformation in the concept and organisation of buildings and settlements. As it has already been discussed in § 4.1.1.2, the analysis of the settlement's layout suggests a more structured arrangement of the built and social environment. Evidence deriving from Kissonerga-*Mosphilia*, Lemba-*Lakkous*, Soskiou-*Laona*, Erimi-*Pamboula* and Chlorakas-*Palloures* indicates that, in contrast to what was observed at Sotira-*Teppes*, communities were structured as independent self-sufficient households – as suggested by the fact that each building was furnished with the essential equipment for the conduction of domestic activities –, and that interaction at the supra-household level was occurring in other extra-domestic spaces, including streets and shared courtyards (see § 4.2.2). The lack of less accessible and more isolated spaces within buildings suggests a high level of interaction and cooperation among household groups, not only in the construction and maintenance of the inhabited space, including its public structures (paved tracks, walls, communal buildings), but also in the conduction of socio-cultural and productive activities (Peltenburg et al. 1998b, 249).

Whitin this social environment, evidence of social differentiation is represented by functional and social distinctive buildings. The most representative example of this process is attested at Kissonerga-*Mosphilia* (Period 3b), in the Ceremonial Area, which constituted a separate sector within the layout of the settlement. This area, accessible through a wide paved track, characterised by large buildings constructed of non-local calcarenite blocks, may be indicative of an "ascendant social minority" (Peltenburg et al. 1998b, 248) of groups within the community that wished to distinguish themselves (Papaconstaninou 2013, 133).

An important aspect to characterise the spatial and social configuration of Middle/Late Chalcolithic Cyprus is represented by the consistent segmentation of internal building spaces, primarily identified at Kissonera-*Mosphilia* and Lemba-*Lakkous* but additionally observed at the coeval settlements of Souskiou-*Laona*, Erimi-*Pamboula*, Chlorakas-*Palloures* (Peltenburg 2014, 256-7). Although this specific aspect concerns the structuration and organisation of single buildings and not of the entire settlement spaces, it has been included in the present discussion because the identified consistency in building configuration has significant implications not only at the individual household scale, but mostly at the larger communal level.

Emphasising the importance of internal building partition and the recurrent yet not uniform construction pattern of these Chalcolithic contexts does not have the scope to flatten the individuality of buildings' histories and settlement-diversified trajectories. The purpose here is to stress the social importance of the existence of communal construction norms, which were certainly individually and contextually re-adapted and re-interpreted. These norms, I argue, become progressively more attested over the course of Middle Bronze Age Cyprus in the process of 'domestication of space' (Steadman 2010; Banning, Chazan 2006), when dwellings were considered not only shelters but also symbols, thus used to communicate social identity and statuses. As discussed by Klinkenberg (2022), the emergence and diffusion of a standard built form was the expression of communal cohesion, and even when differentiation in size and elaboration occurred – e.g. the Ceremonial Area at Kissonerga-*Mosphilia* –, this diversity was expressed within these socially acceptable norms; such mechanism was important to the maintenance of social balance within these Chalcolithic communities (Klinkenberg 2022; Bolger et al. 2019, 328-30; Peltenburg 1998a, 237-40), and possibly enabled the development of collective decision-making structure, by limiting competition and promoting forms of cooperation beyond the level of the individual household (Bolger et al. 2019, 330-2).

4.3.1.3 Prehistoric Bronze Age Cyprus

In the excavated rural villages of Early Bronze Age Cyprus, the lack of street plans and the clustered distribution of buildings suggest that individual households and groups provided the necessary labour for building construction, encouraging the idea of a household organisation, based on an even distribution of products and goods (Peltenburg 1996, 27; Knapp 2008). The lack of social distinction is also reflected in the lack of special-purpose buildings, with the only exception of Unit 12 in Area B at Sotira-*Kaminoudhia*, which attest to the occurrence of spaces designed for ritual or ceremonial functions (Swiny 2008).

A closer look at the stratigraphic evidence available from Marki-*Alonia* suggests a community in progressive transformation. During the earlier phases of occupation, courtyards were routinely used as outdoor working spaces by mutually dependent and closely related households (Frankel, Webb 2006a, 311-13) indicating a high level of social and economic cooperation between groups within the community. However, from Phase C onwards, a new social system emerged, based on a more complex negotiation of available territories and increased household privacy, as indicated by the decreasing size and importance of courtyards, the introduction of controlled access routes and of private entry passages, and the development of single-entry non-courtyard house (Frankel, Webb 2006b, 299-302). As anticipated in § 4.1.1.3, this increasing control over settlement spaces exerted by household groups within the whole community reflects transformations within the household-based system. If, on one side, a process of increasing privacy occurred over the course of settlement and community life history, on the other, contextual analysis of individual compounds reveals that in Phases E and F there is a progressive loss of fire installations within some of the compounds of the settlement, which may be indicative of mechanisms of affiliation between compounds and households [tab. 4.3]. For example, Compound 7 – one with a longer lifecycle – is autonomous during earlier occupation Phases C-D, but possibly loses this independence when the hearth is removed during successive Phases E-F. We may suggest that domestic activities, like food processing, were no longer conducted within this compound, and that people living here necessarily relied on concomitant compounds' facilities. This possibly encouraged dynamics of cooperation within and between households. We may propose that the use of shared facilities and space could have been an additional basis for the kind of face-to-face interactions; this possibly contributed to the creation of particular forms of aggregation at the supra-household level (Düring, Marciniak 2005; Fisher 2014b, 202-5; Keith 2003; see also Sneddon 2015). Similar trajectories have been also identified in Compound 14. It is further possible that during Phases E-F, Compound 7 acquired other functions, and was used as space for supra-household activities. Other compounds built in the later Phases E-F-G (e.g. 20, 21, 22) were never furnished with a fire installation, possibly suggesting that the dynamic of affiliation and cooperation between households, or of compounds' functional distinction were progressively more diffused in the settlement.

At Sotira-*Kaminoudhia*, evidence for communal/public works is constituted by the narrow alleyways (nos 30-3, 37-42) which provided the access to different units of the settlement. Considering that there is no organic settlement layout at Sotira, which may suggest supra-household spatial organisation, it is possible to infer that these alleys were constructed and maintained by those groups living nearby and using these open spaces more frequently. Apart from streets, there is a lack of large, open, publicly accessible spaces that could be used for spontaneous gatherings or planned social occasions. However, the diverse spatial setting observed in Area B implies that forms of communal-based organisation were possibly in place at the settlement. Here, a wide and straight street – Unit 13 (the width varies from a minimum of 1.70 m to a maximum of 2.50 m; cf. Swiny, Rapp, Herscher 2003, 37) – determined the alignment of one of the most prominent spaces investigated at the site, the Unit 12 complex, which consisted of an unclosed unroofed area which may have been used for ceremonial activities (see § 4.2.3; Swiny 2008, 48-50). The occurrence of such an area, characterised by a more structured plan and by a more elaborated architectural form and construction than the domestic buildings of Area A, may indicate that this space served as a context for social interaction and aggregation at the supra-household level.

Table 4.3 Occurrence of fire installations within the compounds at Marki-*Alonia* during Phases D-E-F-G

Compound no.	Phase D	Phase E	Phase F	Phase G
6	* *	* * *	* * *	* *
7	*	-	-	* *
8	*	* *	* *	R
9	*	*		R
11	*			R
12	-	-	-	-
13	*	*	*	-
14	*	-	-	R
15	*	*	*	R
16	-			R
17	*			R
18	-	*	*	-
19		*	*	-
20		-	-	-
21		-	-	-
22		-	-	-
23			*	*
24			*	-
25			-	-
26			-	-
27			*	*
28			-	-
29				* * * *

Key:
* fire installation (hearths/oven);
- absence of fire installations;
R ruin

The examination of settlements' constitutive elements of Middle Bronze Age contexts indicates a progressive transformation in the use and concept of built space, which reflects marked changes in the configuration of households and communities. Manning (2019, 99-130) affirms that changes towards the emergence of complex societies on the island did not occur in a vacuum, but appeared progressively during Early and Middle Bronze Age Cyprus. The more evident outcome of the increasing complexity in the organisation of communities and built spaces is constituted by the construction of forts – e.g. Nitovikla fortress – at the very outset of Late Bronze Age Cyprus, which materialise the desire to control movement and interaction throughout a larger and more monumental appropriation of space (Fisher 2014b, 201). However, indicators of progressive social and spatial transformation are already evident in the arrangement of Middle Bronze Age settlements (see Webb, Knapp 2021).

The first evidence of change is represented by the emergence of more organic settlement plans, which appear to be attested both in the domestic Area A at Alambra-*Mouttes*, at Politiko-*Troullia* and in the productive and domestic space at Erimi-*LtP*. With the exception of Alambra, in the other two contexts buildings are aligned and organised according to a system of passageways/lanes which constitutes evidence of the existence of a road system connecting buildings and areas within these two settlements. We may consider this coordinated arrangement as an indicator of preconceived planning and it is suggested to be one of the prominent aspects of spatial configuration at the suprahousehold level and a possible indicator of the occurrence of a coordinating authority (Fisher 2014b, 191-5; Garfinkel 2006, 103-11). In the case of Erimi, the organised layout, especially evident in the more extensively investigated Workshop Complex, can be the result of a corporate strategy, where the tasks and surveillances are distributed according to expertise, enabling the continuity to undertake large-scale projects (Amadio 2017, ch. 8; see also Paz 2012, 423; Chesson 2003). This is also demonstrated by the big effort in the construction of the entire settlement, with buildings carved into the bedrock floor and aligned according to the northwest/southeast axis (see Chapter 2).

The second indicator of transformation is constituted by the different use of open areas, which acquire an extra-household dimension thus becoming spaces of interaction and exchange, but also places of negotiation and possible contestation (Fisher 2014b; Stanley et al. 2013). While evidence from the latest phases of occupation at Marki-*Alonia* reveals a shift of domestic activities from the exterior areas to the interior, more private spaces, the record of Middle Bronze Age Cyprus attests instead to the renovated prominence of open areas as *loci* of aggregation and shared activity. The two more representative cases of this shift are Politiko-*Troullia* and Erimi-*LtP*, where open areas appear to be the core of economic production and social interaction, as well as “potential locales for socially significant behaviours” (Falconer, Fall 2014, 176; see also Bombardieri 2013; 2017, 353-62). In the Workshop Complex at Erimi-*LtP*, open spaces were planned and constructed in direct relation to the main passageways running east/west. The fact that these open areas were not limited and enclosed by fixed structures such as walls and doorways implies that these spaces were designed to be accessible by anyone. The occurrence of working installations and shared facilities both at *Troullia* and in the productive and domestic contexts at Erimi-*LtP* may suggest that communal working activities were conducted in these open spaces, indicating cooperation and coordination in the conduction of daily tasks. The face-to-face interaction, encouraged by communal activities, is likely to have

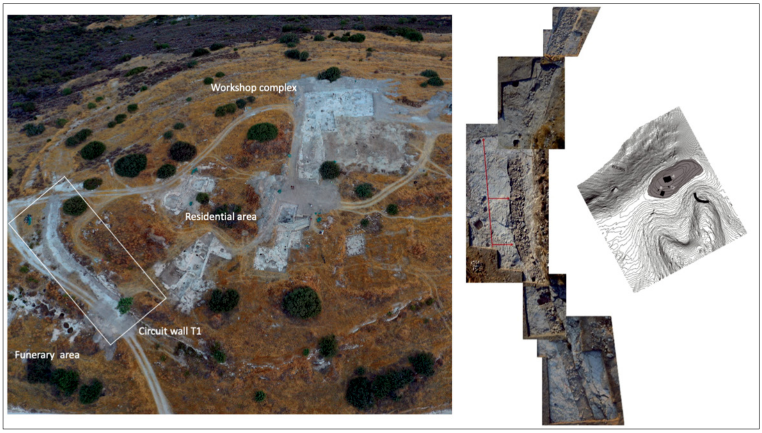


Figure 4.9 Circuit wall T1 at Erimi-*LtP*

reinforced mechanisms of solidarity and possibly contributed to shaping and strengthening social identity (Keith 2003; Fisher 2014b, 201). The large size and the particular assemblage in the southern courtyard of *Troullia*-West, including plank figurine fragments and large faunal evidence, have led to hypothesise the use of this area for corporate feasting, as aggregative events at supra-household, communal level (Falconer, Fall 2014, 176). We can imagine how similar trajectories could have occurred also in productive Area B at Kissonerga-*Skalia* (Crewe, Hill 2012, 233-4) and in the industrial workshops at Ambelikou-*Aletri* (Webb, Frankel 2013b, 201-25), possibly suggesting that open work areas could have constituted the most prominent places of aggregation, interaction and exchange during Middle Bronze Age Cyprus (Webb, Knapp 2021). Sharing facilities, collaborating in the accomplishment of work tasks and participating in communal events could not have failed to reinforce social cohesion and develop a sense of community and possibly attachment to the place (Keith 2003).

The analysis of transformations in use and concept of courtyards and open spaces in Middle Bronze Age settlements is strictly connected to another important architectural, social and economic change, represented by the appearance of workplaces segregated from spaces of production at a domestic scale. As sustained by Bombardieri (2013, 93-9; 2017, 356-7), this spatial transformation has important socio-economic implications and indicates a transition from a household-based subsistence economy to a more developed socio-economic system, where there is evidence of supra-household production and communal decision-making. The case of Erimi-*LtP*, characterised by the segregation between the productive and the residential area, well represents the transition from domestic courtyards used as informal work spaces – as exemplified by courtyards at Marki-*Alonia* and Alambra-*Mouttes* (Bombardieri 2013, 92-4; Webb, Knapp 2021) – to the establishment of a formal workshop, based on semi-specialised productions. The existence of these distinct spaces at Erimi-*LtP* is indicative of the emergence of areas with specific functions, the domestic and the productive. These two areas of the settlement are characterised by different spatial organisation and architectural elaboration, as evinced by the more regular alignment of buildings in the Workshop Complex and the use of more elaborated dressed thresholds. The introduction of monolithic thresholds indicates both the increasing need to secure products within the workshop units and to physically create a filter to control access within these enclosed spaces and through which to activate mechanisms of inclusion/exclusion. This segregation between productive and domestic areas also characterises the settlements of Ambelikou-*Aletri* (Webb, Frankel 2013b, 221-3) and Kissonerga-*Skalia* (Crewe, Hill 2012; Crewe 2013; 2014), suggesting that forms of cooperation, interaction, planning and production beyond the level of the household were in place during Middle Bronze Age Cyprus (Crewe 2017).

Preliminary analysis from the residential area at Erimi-*LtP* seems to indicate that domestic units were not always equipped with fire installations, suggesting that households were not necessarily autonomous but possibly organised in cooperative forms, as also hypothesised for the community living at Marki-*Alonia* during the latest Phases E-H. Data from coeval settlements are too limited to confirm if this dynamic is occurring at a broader scale in other contexts of the island.

The described picture demonstrates that forms of aggregation beyond the level of kin groups were emerging over the course of Prehistoric Bronze Age Cyprus, possibly facilitated by the creation of new spaces of social interaction such as communal open areas and workplaces. These larger aggregations may have functioned as "cooperative enterprises of communities of practices" (Webb, Knapp 2021), which, if on one side provided the necessary workforce for the accomplishment of supra-household and more specialised forms of production, on the other possibly determined dynamics of inclusion and exclusion, perhaps raising the potential for internal tension and conflict (Fisher 2014b, 205; Shin 2009, 434).

In this regard, further evidence of transformation is represented by the appearance of circuit walls, as observed at Erimi-*LtP* and Kissonerga-*Skalia*. The circuit wall at Erimi-*LtP* (T1) is a massive structure of c. 2.0 m in width, which delimits the settlement on its southwest side, where the hill slopes are less steep. The entire structure was built on a foundation trench cut into the bedrock floor **[fig. 4.9]**. Although the upper-standing structures are not preserved anymore, we can suggest that this massive structure was standing out against the surrounding environment (Bombardieri 2016; 2019). The circuit wall identified in Area G at Kissonerga-*Skalia* (Wall 68/407) is a sinuous structure which shows a construction technique similar to the one observed at Erimi. The wall was built by digging a wide foundation trench cutting pre-Bronze Age deposits, into which rubble was then dumped (Crewe 2014, 144; 2017). What is proposed here is to interpret these enclosing walls not just as military and defensive structures, but also as means to control movement and access within the settlement (Fisher 2014b, 201). They possibly materialised the boundary of the community, thus permitting those who lived within them to identify themselves in contrast to the surrounding natural, built and social environment. Walls possibly participated in the construction and reinforcement of roles, statuses and identities of these transformative pre-urban communities.

Although not all of these transformations took place at every site, nor did they occur simultaneously throughout the island, the making of these renovated built environments over the course of Middle Bronze Age Cyprus and their use in daily practices embodies the gradual emergence of new forms of social representation and of cultural, economic and political identities, which anticipate the emergence of the more complex spatial and social structure of the Late Bronze Age urban centres of the island (Webb, Knapp 2021).

5 Concluding Remarks

The discussions presented in this volume demonstrated the potential of the analysis focused on architectural evidence in the study of sociocultural and economic transformations of Prehistoric Cyprus. As a cultural artefact, architecture provided an effective data set for analysing sociocultural narratives[1] and preliminary exploring the formation and reproduction of cultural identities, social ideologies and economic developments of the early communities inhabiting the island from the Late Aceramic Neolithic until the end of Middle Bronze Age Cyprus.

In the past, the studies focused on the architectural remains of ancient Cyprus created a bias in favour of the monumental architecture of the Late Bronze Age period, which certainly produced a large number of well-preserved buildings and settlements (see § 1.2.4). Yet, the evidence we have on the Prehistoric built environment of the island represents an important resource, one that continues to grow thanks to new excavation and survey projects as well as ongoing studies, which are progressively dismantling the Classical perspective and understanding of architecture only as a collection of shapes,

1 See Love 2013a, 755; Watkins 2004; Banning, Chazan 2006; Hodder 1990, 30; Fisher 2014a; Robb 2010; Bloch 2010.

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forms and design.[2] This volume stressed the exigence of approaching the analysis of the prehistoric built environment of Cyprus with consideration of the complex interplay between society and space. From a methodological point of view, the multi-scalar approach adopted in this research has provided an apt framework for broadening the existing discussion about architectural data of prehistoric Cyprus and has enabled the examination of transformations in the use and concept of space and related socio-cultural implications at individual and community levels. The integration of evidence at the increasing scale of analysis offered a functional data set to investigate the dynamic relationship between the built and social environment of Prehistoric Cyprus and contributed to a less static understanding of buildings, agglomerations and settlement patterns (see Letesson, Knappet 2017). What emerged from the arguments presented, is that buildings and agglomerations were more than static products, they – instead – were implicated in a dynamic process and were an integral part of the spatiality of early communities of the island.

From a theoretical perspective, the analysis of architecture offered an effective data set to delineate aspects of transformations at the household and settlement scale. These transformations are attested in the development of building techniques, including mudbricks manufacture and plaster pyrotechnology (see § 2.2) as well as in the emerging specialisation in building activities and in the organisation of supra-household labour, as discussed in Chapter 2. A new perception of the domestic space developed over the course of Neolithic and Chalcolithic Cyprus; dwellings progressively become the core of social activities and identity, not just shelters (see § 3.1). This change is materialised in the increasing distinction between the individual/interior house space and the communal/exterior space, as exemplified by the introduction of courtyard houses during Early Bronze Age Cyprus (see § 3.1.1). New building types were constructed to respond to the transforming exigencies of these early societies, with the definitive passage to the rectangular architecture in the Prehistoric Bronze Age Cyprus. Changes in the organisation of settlements included the progressive appearance of spaces for communal activities (see § 4.1) and more pronounced segregation between working and domestic spaces in Middle Bronze Age settlements (see § 4.2). The making of these transformative built environments, with their contextual peculiarities, materialised the gradual emergence of new forms of social organisation. Social structures, which were not exclusively based on individual households, but also on extended groups, emerged and cooperated in the conduction of communal activities. It

2 E.g. Webb 2009; Fisher 2023; Papaconstantinou 2010; Kearns 2011; Manning et al. 2014.

is possible that in some cases cooperation and coordination acted as unifying forces, which enabled the balance of social tension, in other cases, mechanisms of increasing privatisation likely prevailed, contributing to emerging social inequalities, especially at the end of the Prehistoric Bronze Age Cyprus (see Webb, Knapp 2021).

As stated in the preface, this book does not pretend to have exhausted the subject, instead, in the writing up of the three core chapters of the volume, the arguments were selected to focus on specific research themes and to approach them from a diachronic perspective. Although the arguments exposed did not go through an in-depth examination of single contexts but remained at a more general scale, the work presented tried to not underestimate the importance of single settlement histories and contributed to the delineation of a range of potential avenues for examining socio-cultural trajectories, by using architecture as a key data-set of cultural evidence.

There is, of course, great potential for further diachronic and comparative approaches based on the integration of macro and micro analyses on materials, technologies, architectural forms and social spaces. This will enable the examination of patterns of transformations in the insular communities at a larger scale. What is important, is the reliance on systematic and detailed – possibly standardised – data description. Luckily, in recent years, numerous sites have been published in great detail, and the results of earlier excavations are re-assessed and progressively made available.[3] The production of this implemented architectural record offers countless potentials and may have a number of important implications for future studies concerning the socio-cultural and economic trajectories of early communities in Cyprus.

3 E.g. Bombardieri 2017; Frankel, Webb 1996; 2006a; Peltenburg et al. 1991; 1998; 2003; 2019; Swiny et al. 2003; Sneddon et al. 2002; Webb 2020.

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Studi ciprioti

1. Calvelli, Lorenzo (2020). *Il tesoro di Cipro. Clodio, Catone e la conquista romana dell'isola*.

Architecture plays an active role in structuring socio-cultural identities and provides a range of potential avenues for exploring social rationales in particular contexts and environments, both at the individual and community levels. This book examines ‘architecture’ as key media for analysing socio-cultural narratives in prehistoric Cyprus and exploring the formation, reproduction and development of early communities on the island. In particular, the volume aims at moving beyond the classification of architectural forms and examining the social transformations that characterised the Cypriot prehistory from the late Aceramic Neolithic until the Middle Bronze Age period (7000/6800-1750/1700 Cal BC).

Marialucia Amadio is specialised in integrated micromorphological approaches to the study of occupation sequences and building materials in Mediterranean prehistoric contexts. Her research interests lie at the intersection between archaeological science and social theory, specifically geoarchaeology, materiality and social science. She was awarded a PhD by the University of Reading for a thesis on *Architecture and Urbanisation in Bronze Age Cyprus: Local and Regional Innovation in Material, Technology and Social Representation*. As a postdoctoral fellow at the University of Torino (2018-20) and the University of Pisa (2020-22), Amadio focused her research on the study of Middle Bronze Age contexts in Cyprus, by applying high-resolution analyses to the examination of building materials and abandonment sequences. She is the scientific coordinator of the Erimi-Archaeological project in Cyprus, directed by Prof. Luca Bombardieri (University of Siena). She is currently working as a post-doc researcher at the Department of Archaeology, University of Ghent, where she is collaborating as an expert in Bronze Age Cypriot architecture with the ERC Daedalos project, directed by Prof. Maud Devolder.

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