DISTINGUISHING PITS FROM PIT HOUSES THROUGH DAUB ANALYSIS: THE NATURE AND LOCATION OF EARLY NEOLITHIC STARČEVO-CRIŞ HOUSES AT FOENI-SALAŞ, ROMANIA

BY

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A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

Master of Arts

Department of Anthropology
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Winnipeg, Manitoba

0-612-23357-X

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

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ABSTRACT

A contentious issue in Central Balkan prehistory has been the nature and location of Early Neolithic domestic structures. Some researchers have argued for the existence of surface structures, while others have proposed pit houses. The problem to be addressed in this thesis is to determine the nature and location of Early Neolithic houses from archaeological sites in the Central Balkans through daub analysis. I will present a model for determining the nature and location of these houses based on the classification of construction daub from the Early Neolithic Starčevo-Criş site of Foeni-Salaş in southwestern Romania. This analysis will be used to demonstrate that Early Neolithic houses at Foeni-Salaş were semi-subterranean in nature and distributed in a semi-circle around a larger pit house and a central open space. These types of analyses are the first steps towards a more systematic investigation of Early Neolithic community patterning in the Central Balkans.

PREFACE AND ACKNOWLEDGEMENTS

The idea of this thesis grew out of a series of long-term discusssions with Dr. Haskel Greenfield, the Canadian director of the Foeni-Salaş project and my husband, and Sandra Jezik, one of the Canadian crew members. We were posed with the problem of determining the type of houses that existed during the Early Neolithic at Foeni-Salaş. The nature and location of houses in Early Neolithic Starčevo-Criş sites, such as Foeni-Salaş, were not immediately apparent during excavation. This has been a long-term problem associated with settlements from this period. We came to the conclusion that the nature and distribution of daub remains would provide the best initial indicator for the location and types of houses. This thesis is an attempt to solve this problem. It is the first step in the spatial analysis of the Early Neolithic remains from Foeni-Salaş. The results discussed in this thesis will need to be further tested through the analysis of the various other artifact categories (ceramics, bone, lithics, etc.). Hopefully, the results of this study will have a wider applicability to archaeological sites where structures are not apparent.

I would like to gratefully thank the two directors of the Foeni-Salaş project, Drs. Haskel Greenfield and Florin Draşovean, for permission to analyze the daub and utilize the results in this thesis. I would like to thank my thesis committee, Drs. Michael Cosmopoulos, Louis Allaire, and Larry Stene, for support and encouragement during the writing of the thesis. I would also like to thank the Department of Anthropology and the Faculty of Arts at the University of Manitoba for providing travel funds during my field work.

I cannot forget the sacrifices that my family has made to ensure that I completed this thesis. I must thank my daughter, Rachael, who on many occasions willingly sacrificed our play time so that I could stare at a computer screen for a few more hours. Most importantly, I would like to express my deepest gratitude to my husband, Haskel. Without his constant encouragement, unstinting pressure, and extensive knowledge of the relevant subject fields, this thesis could not have been completed. With the birth of my new daughter, Channah Sharone, in the midst of data analysis and chapter writing, my life has been enriched and my understanding of the human condition deepened. She also has sacrificed in order to allow this thesis to be completed. She has been a true inspiration to me.

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LIST OF ABBREVIATIONS

DA - Dacian

EIA - Early Iron Age

EN - Early Neolithic

ENEO - Eneolithic

ME - Medieval

SE - Southeastern

CHAPTER 1: THE PROBLEM

Introduction

There has been a long-term controversy among prehistorians of the Central Balkans of southeastern Europe (fig. 1) and in particular in eastern ex-Yugoslavia and southwestern Romania (fig. 2) concerning the nature of Early Neolithic (Starčevo-Criş culture, 6100-5100 B.C. - fig. 3) dwellings (Ehrich 1977; Garašanin 1983; McPherron and Christopher 1988; Tringham 1971). In the contemporaneous cultures in the surrounding regions of Greece, Bulgaria and Central Europe, there exists a wealth of information pointing towards the existence of rectilinear surface dwellings. In the intermediate region, otherwise known as the Central Balkans, little or no evidence exists for this type of structure. Instead, an abundance of pits are found on Early Neolithic sites. As a result of the absence of evidence for surface houses and abundance of pits on Central Balkan Early Neolithic sites, most prehistorians have continued to assume that occupation was in the form of semisubterranean dwellings (pit houses - eg. Bogdanović 1988; Garašanin 1983; Srejović 1972). A small but vocal minority of prehistorians continue to advocate for occupation in surface houses, and argues that the many pits on sites were used for a variety of non-habitation functions (refuse, storage, borrow - eg. Ehrich 1977; Gimbutas 1991; Gimbutas et al. 1989; Tringham 1971). Until the nature of dwellings has been established, however, it is difficult to progress to more behavioural levels of analysis, such as household and community pattern studies.

The study of community patterns in early agricultural societies has recently been one way of interpreting how past cultures worked, lived and interacted (Flannery 1976).

Unfortunately, little is known about the intra-settlement community structure of the earliest agricultural communities within the Central Balkans. This is partly a function of the traditional emphasis in this region upon cultural chronology, and its consequences for the nature of excavation of sites and data recovery systems. The problem is not that we require a new method to help define what and where these houses are, but rather an awareness that more systematic excavations and conceptual tools are required to answer some of these questions. In order to study community patterning, archaeologists must define the most basic unit of analysis - the house - and spend less time on the chronology and ceramic sequence. It is difficult to begin community studies without defining the nature of the houses and distinguishing them from refuse pit or other archaeological features. However, until these questions are answered it is impossible to accurately reconstruct the community organization on a socio-political or economic level.

The basic unit of production and reproduction within early European farming communities is the household (Bogucki 1988). The household is archaeologically visible as the *household cluster*. The household cluster is represented by all the archaeological features associated with the domestic activities of the occupants. It will generally "consist of the house and all the surrounding storage pits, burials, midden, and features that can be reliably associated with that same household" (Flannery 1976: 5; Kent 1984). These features are units of a household cluster because they are found directly adjacent to houses and reflect the nature of activities performed by its occupants. Each feature is associated with a particular house, and its occupants. The distinction between "household cluster" and "household" should be stressed. A household cluster consists of archaeological remains, while a household consists of a group of people who interact and perform certain activities. Through analysis of the archaeological household cluster data, it may be possible to reconstruct the composition of prehistoric households, compare the activities carried out by household members, and study the relations between different households (Flannery 1976: 25). Flannery's (1976) approach to community studies has been to focus on the household and its surrounding features, which form the household cluster. In the Early Neolithic Starčevo-Criş culture of the Central Balkans there does not appear to be any evidence for "Mesoamerican type" household clusters. This is not to say they do not exist. The problem is that the houses are not apparent. Until houses are defined it is premature to look for evidence for household clusters.

The house

The house is the centre of a household activity area. It is a representation of the actions, beliefs and socio-economic organization of the people living in the house. In order to understand people, it is necessary to study how they lived. This is possible by analysing the form, size, and distribution of houses. In addition to having served as a shelter for its occupants, a house can serve the azrchaeologist as a unit for analysis, it can be isolated from its surrounding debris and intrusive features. The variation between houses within a village can be one of our best sources of information about the variation between families - variation in subsistence, division of labour, craft activity, and social status (Flannery 1976: 16).

It is impossible and inaccurate to study Early Neolithic community patterns until it is understood what comprises an early Neolithic house. In the past, houses have been difficult to define archaeologically. There is an ongoing controversy in the archaeological literature as to what constitutes an Early Neolithic house (Ehrich 1977; Garašanin 1983; McPherron and Christopher 1988; Tringham 1971). Are houses surface structures made of wattle and daub[1] walls or semi-subterranean pit dwellings? Are these pits simply refuse dumps? This unfortunately has not been clearly defined in SE Neolithic archaeology. The result of this confusion is the inability to state what is an early Neolithic house, its associated characteristics and activities.

The interpretation of Early Neolithic household architecture

It is not possible to investigate household clusters, activity areas or community patterns until the essential unit of analysis (the house) is defined. This lack of definition affects the interpretation of the various "features" on sites. For example, pits are often labelled without justification of function (i.e. pit houses). This is the result of a more fundamental problem of not being able to decipher the function of the various pit features on sites. Many archaeologists working in the Balkans simply assume that these pits are houses without any systematic analysis of their data to back up their statements. Most of the features that have been identified as houses are of a semi-subterranean nature. However, most of these pit features do not show the architectural evidence associated with dwellings (e.g. presence and distribution of post holes). Unfortunately, many times the lack of evidence for such structures is due to poor excavation techniques that were used in the first half of the century and that continue even today. Conversely, other

[1]Daub is the baked remains of clay walls, floors, ovens and hearths.

archaeologists assume that the presence of pits on sites are simply for the deposit of refuse material (Ehrich 1977). Once again there has been little systematic evidence presented for this theory.

Starčevo sites are difficult to excavate. The sites are generally poorly preserved, they **do not have architecturally obvious houses**, and there is very little vertical stratification. Hence, the controversy over what constitutes a house during the Early Neolithic. When a feature (pit or surface structure) is defined, there must be a method of analysis that will allow the proper definition of its function, otherwise, misconceptions and confusion occur.

Site reports from eastern Yugoslavia and southern Romania show little evidence for preserved remains of surface houses. The major evidence used for the presence of a structure has been the distribution of post holes. However, few sites have been excavated sufficiently well to determine the presence of post holes. There is also difficulty in identifying other characteristics associated with houses, such as hearths and floors. This presents a major problem when trying to reconstruct not only houses but also spatial patterns within a village.

Until now, these issues have not been discussed in great detail because of the uncertainty of the function of these features. As a result, there is little literature that defines the distinguishing characteristics for refuse pits, pit houses, and surface houses for Central Balkan Early Neolithic sites.

In the absence of adequate excavation techniques to recover detailed data on posthole, hearth, artifact, and other distributions to determine the function of Early

Neolithic pit features, I propose a new, more systematic method of analysis for determining houses and their locations. This will be done through the examination of the nature and distribution of construction daub from sites.

Previous attempts to study EN community organization/household clusters in SE European archaeology

Little research has focussed upon the intra-settlement community structure of the earliest agricultural communities within SE Europe. This is partly a function of the traditional emphasis in this region upon cultural chronology, and its consequences for the nature of the excavation of sites and data recovery systems. It is also a function of the fact that these sites are difficult to excavate.

Very few attempts have been made in SE European archaeology to determine Early Neolithic community organization. However, even less effort has been expended in trying to determine Early Neolithic household clusters. Quite often only the material remains of a structure or feature are explained without any reference to the organization or interpretation of the feature itself. However, there have been some serious attempts to correct this. For example, Ammerman (1988) was determined to find the spatial layout of an Early Neolithic village in Italy based on the non-random scatter of remains of daub across the site. While there was no real discussion of the social organization of the community, there was the attempt to look at the site horizontally and not vertically as is the norm. Bankoff and Winter (1979) burnt a house that was structurally similar to those from the Early Neolithic in order to determine how daub house remains burn, and how they can be properly interpreted. This was the first attempt to look at the insides of a house and interpret the remains. Tringham and Stevanović (1990) were the first to systematically examine the daub remains of Neolithic houses. However, these were from Late Neolithic houses from the site of Selevac which were above ground quadrilateral structures. Tringham (pers. comm. 1995) is currently conducting experiments regarding the relationship between daub type and temperature to determine the types of daub that were used in different parts or for different functions of surface Neolithic houses.

Other prehistorians have attempted to distinguish between the different types of pits on Early Neolithic sites. Bogdanović (1988), in the analysis of the material from Divostin, was the first to systematically attempt to decipher between storage, borrow, and occupational pits from the Early Neolithic. He was able to distinguish four different building patterns or phases over time. Makkay (1992), as well, excavated an Early Neolithic site in Hungary and attempted to decipher between pits used for storage and refuse as opposed to dwelling pits.

Few scholars have attempted to look at the spatial organization of Early Neolithic communities. The most important scholar is Srejović (1972; and Srejović and Letica 1978) who attempted to look at the social organization of the Mesolithic-Early Neolithic of Lepenski Vir and Vlasac. They looked at the layout of the houses across the site. Unfortunately, the excavation techniques were not systematic enough to yield an accurate picture of the site. More recently, Chapman (1989) examined the spatial arrangement of structures in Early Balkan villages (Serbia, Bulgaria, and Romania) to determine the social organization of sites.

But by and large, most research on the spatial organization of Early Neolithic communities has been hampered by the lack of systematic and extensive excavations of single sites. Greenfield has attempted to rectify this problem in the overall data base through extensive excavations at two Early Neolithic sites: one in central Serbia (Blagotin) and one in the Banat section of southwestern Romania (Foeni-Salaş) (Greenfield and Draşovean 1994; Greenfield n.d. a and b; Greenfield and Stanković n.d.; Stanković and Greenfield 1992). At both sites the excavations have been systematic and over a large enough area that it is possible for the first time to determine community organization and household clusters. It was finally possible to determine house location and the surrounding features that can be associated with these Early Neolithic houses.

A model for interpreting the spatial distribution of daub architectural elements

The model I propose is based on the preliminary results of the typological analysis of the daub assemblage from the Early Neolithic site of Foeni-Salaş. Wattle and daub wall structures are difficult to identify in sites unless they have been burnt down and the clay was fired. Wattle and daub completely disintegrates over time if left unfired and will become archaeologically invisible (McIntosh 1974: 167).

In a typical wattle and daub construction, a framework of poles and twigs is lashed together using twigs, vines or thin pliable bark strips. Wet earth is pounded on one or both sides by hand. Any easily available soil may be used. An instrument is often run over the surface of the completed but still wet wall to make the surface smooth. The structure is then roofed in thatch. The wattle and daub wall is quite thin and displays a noticeable inward slant, a tactic possibly employed to counteract horizontal thrust. Wattle and daub is as impervious to rain as is *terra pisé* (tauf), but tends to decay sooner (McIntosh 1974: 162). Life-spans for wattle and daub structures are estimated at between seven years and fifteen years. Agents of decay may include a number of variables: climatic (rain, capillary condensation and translocation, mechanical erosion), structural (horizontal and vertical stress), animal (termite activity, rubbing by animals), and human (domestic activities, premature toppling of walls) (McIntosh 1976: 96). Undercutting, cracking and flaking take place in wattle and daub, given the same conditions of rain splash and capillary moisture movement and condensation. Cracking and the eventual loss of material occurs first at those points close to the poles. As cohesion is lessened, the daub covering the poles readily falls away. The poles are very often eaten from the bottom by termites. When the wall has eroded enough to be considered unsafe, the entire wall either falls or is pulled down. Ethnographically, the poles are often collected for reuse or as firewood. The remaining wall material is left to disintegrate by rain and wind, and very quickly becomes a low featureless mound. New homes may be built on top after only minor levelling (McIntosh 1974: 162-163).

Concentrations of daub are assumed to represent the collapsed remains of burnt structures. Baked daub remains are commonly recovered in Early Neolithic sites implying that structures frequently burnt down. They can be useful for determining the location of structures. For example, Ammerman et al. (1988) examined the distribution of daub remains across an Early Neolithic site in Italy to demonstrate that the concentrations of daub remains in the site were nonrandom, and hence represented daub houses. Unfortunately, daub analysis has never been done in a systematic way in southern

Romania. This is necessary in order to determine what constitutes an Early Neolithic house and where it is located on the site in this region.

Based on the distribution of the daub remains across the site it should be possible to locate the houses. It is necessary to look at several attributes (i.e. size, quality, and amount of daub fragments in one deposit) to determine daub function and context (i.e. was the daub found in a primary or secondary deposit). For example, the reason we would find burnt daub within a pit is because the pit was covered by an overlying superstructure, which had burnt down. After collapse, it fills in the pit. There should be high concentrations of daub inside pits that were dwellings, with a rapid decrease in density of daub outside of the pit. If the structure does not burn down, there will be little evidence of the superstructure, making the interpretation of the pit's function more difficult. If there is no evidence of construction daub in a pit (except for tiny fragments), it is possible that the pit was used solely for refuse (or the structure was not burnt, in which case there should be no evidence of daub at all). Daub is commonly found in refuse pits, but it is often composed of small eroded fragments in a secondary position. Theoretically then, there should be a difference in quantity and size of daub remains between refuse and dwelling pits. By analysing the construction daub, it will be possible to determine if floors, walls and other dwelling features (e.g., ovens) were found in all pits, some pits or elsewhere on the site. In contrast, pits that do not have construction daub, and no evidence of systematic associations of artifacts (except for the odd broken weight or whorl), may be interpreted as refuse depositories.

There are many other reasons for which the analysis of daub is important. It can be associated with other artifacts, such as loom weights and spindle whorls, which can indicate specialized activity areas within pit houses or household clusters.

In this thesis, I will present the results of my analysis of the daub remains from the Early Neolithic site of Foeni-Salaş. This is the first extensive and systematic analysis of daub from an Early Neolithic site from the Balkans. The method is based on the typological classification of individual pieces of daub from Foeni. Each piece was analysed and determined to be either construction daub, artifactual daub (i.e. figurines, fish weights, etc.), or unidentifiable daub fragments. Each fragment was analysed for a variety of attributes (temper, firing, shape, measurements, etc.). After the initial data analysis and typological classification, a model for spatial distribution of the daub across the site was implemented. The daub data were analysed using a GIS program called SURFER to determine the association between pits and the architectural daub. The proposed daub classification system and spatial model helped to determine not only what is a typical Early Neolithic houses but also where the houses had been located on the site.

Introduction to the data

The data came from the Early Neolithic Starčevo-Criş culture site at Foeni-Salaş situated in southwestern Romania (fig. 2). The site has been dated to ca. 5500 B.C. (calibrated) (Greenfield n.d. b). The Starčevo-Criş culture is one of the earliest food producing societies found in SE Europe. The significance of the site is that it had a very short occupation history and was a single component Early Neolithic occupation. What makes this site appropriate for this study is that the remains of houses were not apparent at the end of the excavations. The houses must be determined through the analysis of the architectural daub.

Many Central Balkan early agricultural sites are found at the base of tell sites. Tells make it difficult to excavate a site horizontally in order to get a clear picture of the spatial distribution of an entire site, because of the later overburden. However, in southern Romania, there is an early agricultural site (i.e. Foeni-Salaş) that is not buried under a tell. This site was occupied for a single phase during this period. Later (post-Neolithic) occupation at the site has been largely eroded away leaving the Early Neolithic remains and deposits relatively close to the surface. The site was systematically excavated to obtain a spatial perspective. Early Neolithic surface houses are not visible on the prehistoric surface, but there are many large Early Neolithic pits. As a result, Foeni-Salaş can be used as a case study for determining house type and location, regardless if the houses are on the surface or semi-subterranean. If the nature and location of structures can be determined, it may become possible for the first time to investigate the community pattern of an Early Neolithic site in the Central Balkans. As a result of this potential, a new method for determining house type and location has been developed.

All of the wattle and daub from this site was systematically excavated and analysed using a polythetic classification system. It took three summers in Romania to complete the daub analysis. It should be possible to reconstruct where the houses are on the site on the basis of this classification system. At Foeni-Salaş, a large enough surface was excavated to possibly obtain a picture of the spatial organization of the community during the Early Neolithic. This type of systematic analysis has never been done on this level before in this region. This thesis will attempt to correct this problem by systematically analysing the architectural daub from Foeni-Salaş.

Chapter 2: THE HOUSEHOLD AS BEHAVIOUR

Introduction

People participate in a vertical (hierarchal) and horizontal (spatial) series of integrated behavioural systems, ranging from the smallest (the local unit of production, usually the family) to the largest (regional and/or interregional polity or economy). The intensity of activity and participation of individuals on the local level declines as the spatial scale of the cultural unit increases, with respect to the system as a whole (Johnson 1978).

There are several hierarchically nested levels of analysis in non-urban community studies. The largest (spatial) unit of analysis is the relationship between the local community and the larger external society. While individual communities participate in regional and interregional systems of interaction, the basic "building block" of society is the local community (cf. Flannery 1976: 5-6). Anthropologically, community studies are a method for studying non-urban complex societies (cf. Redfield 1956). Small communities within complex societies are often studied by ethnographers as local representations of the larger non-urban regional culture (Redfield 1956: 6; Kottak 1974: 58; Blanton 1994: v).

The next level of analysis is the community, itself, often represented by the village settlement also known as the local community. Most day-to-day activities of people occur within their immediate living environs or the community. Interaction also occurs more with individuals within a community than with those outside their community (equals society) (Redfield 1956: 4). Community has been sociologically defined as

> "...a social group of any size whose members reside in a specific locality, share government, have a cultural and historical heritage" (Kottak 1974).

The social group represents the community lives "...in somewhat close association, and usually under common rules". A community can be a hamlet, village, town, or city, depending upon the size of the co-resident population (cf. American College Dictionary 1961). Communities of co-resident individuals are archaeologically definable units of analysis which would be represented by individual settlements.

The third level of analysis is the household. Most communities are organized into individual households (Bartram et al. 1991: 98). Wilk and Rathje (1982: 621) isolate four functions of households: production, distribution, transmission, and reproduction. These functions are combined in various ways in different societies. It has generally been difficult for archaeologists to define exactly what comprises a household in archaeological terms. The reason it is impossible to construct a narrow definition of the household that is valid cross-culturally is the diversity in residential patterns, kinship structure, and domestic functions (Bender 1967; Wilk and Rathje 1982; Stanish 1989: 8). The available ethnographic models are unfortunately quite inadequate. Ethnographers make normative statements that may be detailed and of value to the archaeologist, but, while they may quantify types of household within the settlement they rarely describe the expression of this variation in terms of structures. Societies do not have a norm for structures, but a graded series appropriate for corresponding social and functional configurations (David 1971: 111). The fundamental unit of analysis in community studies is the household.

The fourth level of analysis is the house. Houses, when viewed behaviourally, are the centre of the household. The house can be viewed as the physical manifestation of the household. It is where residence and a variety of activities occurs (Blanton 1994). The house as a fundamental unit of analysis will be discussed at length in the next chapter.

The fifth and smallest unit of analysis is the activity area. An activity area is "a single locus of activity of one or more members of the community" (Flannery 1976: 5). Activity areas can be of a specialized or generalized nature. Activities within communities may be spatially segregated and take place over different-sized areas.

The house and its associated activity areas are the constituent parts of the household. Households and communities cannot be reconstructed archaeologically without first defining their fundamental units, the house and its associated activity areas. In order to interpret architectural remains, they must be set in a behavioural context. The rest of this chapter will explore the household and its functions as indicators of behavioural patterns. Increased understanding of household behaviour is a necessary stepping stone to the interpretation of archaeological remains.

The household as behaviour

Until recently, scientists have tended to ignore the household as a social unit. In recent years, however, this universal social phenomenon has become a vital focus of interest. Social scientists now view the household as the basic unit of human social organization. It is considered a complex and flexible aspect of human interaction that must be understood before certain other aspects of social organization can be approached

(Blanton 1994).

Wilk and Rathje (1982: 618) argue, "Households are the level at which social groups articulate directly with economic and ecological processes. Therefore, households are a level at which adaptation can be directly studied. In fact. we define the household as the most common social component of subsistence, the smallest and most abundant activity group". Households are basic social units because so much happens within this smallest of social units. They are a "primary arena for the expression of age and sex roles, kinship, socialization, and economic cooperation where the very stuff of culture is mediated and transformed into action" (Netting et al. 1984: xxii).

In addition to being primary and adaptive, households are ubiquitous (Netting et al. 1984: xxi). This is not to say that households are easy to identify, define, or classify. On the contrary, the more one looks at households, the more complicated are the definitions and classifications. Nevertheless, because household units are found in every society, they are reasonable units of analysis to use in cross-cultural comparisons of human social organization (Blanton 1994).

Bender (1967) isolates three components essential to the concept of household function: co-residence, domestic functions, and familial relationships - each of which does not necessarily co-occur and may vary cross-culturally. Family members may or may not live together, and may or may not share resources. Two of these components (domestic functions and co-residence) can be recovered archaeologically. Familial or sociological relationships, on the other hand, are very difficult to define. Each of these issues are discussed below.

Familial relationships

Issues of familial (kinship and residence) relationships are extremely difficult to investigate archaeologically. There have been many attempts to reconstruct residence and kinship patterns from archaeological data (e.g. Hill 1968; Whallon 1968; Longacre 1966). However, Allen and Richardson (1971) has made a very strong case that archaeologists trying to reconstruct residence and kinship from material remains have by and large misinterpreted kinship and rules of residence. They maintain that "the analysis of kinship is best left to the ethnographer" and that, even for ethnographers, this task is difficult. They further state that it is important to remember that residence rules are not rigid, and adapt to different conditions. They recognize that prehistoric descent and residence rules are hard to discover, given the nature of archaeological data. It is static in the short run and not sensitive to the type of short term changes characteristic of residence and kinship rule changes can deal with long term. However, archaeologists have not totally given up on the subject. However, before such interpretations can be made with any confidence, we need far more cross-cultural ethnographic data on the architectural reflections of these various types of households than has presently been gathered (cf. Blanton 1994: 6, 24; Cribb 1991: 374-377; 1991b).

Co-residence and population size

The second major issue is coresidence. Coresident family members generally pool resources and coresident families generally form households (Bender 1967). Recognizing the limitation of defining co-residence both ethnographically and archaeologically, Stanish (1989: 8-11) argued for a definition of households based on the *minimal* *coresident domestic group.* The nuclear family-based household is only one of many types of domestic social organization. More than one nuclear family may be integrated into complex households (Stanish 1989: 11). Each of these family types has different implications for population size within households. The key to being able to distinguish between nuclear, extended, and more complex types of household social organization is by examining of the similarities and differences between households in terms of architecture (including size and nature) and associated material culture.

In order to determine family type one must first determine the population size of households. Community size is normally established through the cumulative population size estimates for individual households. But, beginning in the 1950's, several attempts were made to systematically reconstruct the populations of sites (e.g. Cook and Treganza 1950; Adams 1966; Adams and Nissen 1972; Naroll and Bertalanffy 1956) from the size of sites. In the Near East, archaeologists have often used the magic number of 200 people/ha in order to reconstruct community populations. However, many archaeologists have objected to this gross measure.

However, Naroll (1962) demonstrated a much more sensitive indicator - that population size was better predicted through an examination of the relationship between total under-roof dwelling floor area and the number of occupants. He estimated the ratio of floor area to population at approximately 10 sq m/person of floor area for sedentary agricultural peasant societies (one-tenth of the floor area in square metres).

Many studies have critically investigated Narroll's results and demonstrated that the situation is much more complex. For example, Wiessner (1974) demonstrated that there is a more complicated relationship among hunter-gatherers. In camps with a population of 10 people, there is a ratio of 5.9 sq m/person. This increases to 10.2 sq m/person in camps of 25 individuals. Anticipated mobility also affects population size within sites. Kent (1991) found that anticipated mobility was a much stronger predictor of site size than number of occupants, but also that anticipated mobility accounted for more variance than did site population. Actual mobility, ethnic affiliation, subsistence strategies, and season of occupation were not significantly associated with site size (Kent 1991: 39).

Among sedentary village agriculturalists, LeBlanc (1971) suggests caution be used when applying Narolls' ratio because of the large standard deviations in the floor area among family units. Any given household is unlikely to be a good indicator of the village average. It is necessary to collect data not only on total floor area, but on the amount of roofed area and/or walled space put to various uses. Any part of a dwelling used for other functions could cause an apparent increase in the amount of floor space available per person and deviations above ten square metres may be common. Deviations below 10 sq m are unlikely in sedentary villages. Kramer (1979) emphasizes that the roofed-over and not the total compound space must be measured. She suggests that if one is interested in determining the number of coresiding married couples, the number of dwelling rooms is a useful if not flawless source of information. If, on the other hand, one wishes to estimate the number of people, the metric area of dwelling space (i.e., living rooms and kitchens) proves a more reliable indicator. The average dwelling space allotment is approximately 9.75 square metres per person (Kramer 1979: 158). The presence or absence of second-story areas bears no clear relationship to the number of resident nuclear families, or to numbers of people Kramer (1979: 159). Sumner (1979: 172-3) proposed that the combination of household size, floor area, and density, will provide a more useful measure of population. In contrast, David (1971: 120) argues that household size cannot be estimated without painstakingly identifying the presence of individual men and women. This requires deduction of the function of huts and quarters. However, he does not provide a means of doing this type of analysis.

Domestic function - production, consumption, and storage activities and activity areas

The third essential role of the household is its domestic function. This is reflected by the range of domestic activities carried out within and around the household. The scheduling of activities is typically in the hands of individual households in hunter-gatherer and farming communities. This role lends households their dominant position in the mode of production (Kaiser and Voytek 1983: 329; Stanish 1989: 11; Bender 1967; Blanton 1994: 6-8).

The identification of activity areas and their associated activities can be a key source of information concerning aspects of economic variation. The more specialised nature of production, consumption, and disposal behaviour in sedentary societies allows for easier identification of specialised activity areas (Kramer 1979: 159). However, in hunter-gathering societies (i.e. base camps), household, communal and special activity areas are often present and overlapping. Household areas witness a wide range of domestic activities and are the most common activity areas in the camp. Communal areas are settings for essentially the same range of activities. Special activity areas see a much narrower range of activities, usually only one per area. They are generally peripheral to household areas and often peripheral to the site as a whole (O'Connell et al. 1991: 72).The function of an area (whether an enclosed room or open-air) can be reconstructed and its place within the household understood, if the activities performed within it leave behind evidence.

An *activity area* is the location where particular human events occur (Kent 1984). Activity areas are spatially restricted areas where a specific task or set of related tasks are carried out within the household's physical area. These include cooking areas (hearths, ovens), food processing and storage areas (open-air spaces for threshing, butchering, and other initial processing; rooms for cooking; and pits for storage), generalized living and sleeping (house floors), burial (cemeteries, individual graves), refuse disposal (pits, middens), material culture production (weaving, ceramic, lithic and bone tools, etc.), and other loci of individual or group activities.

Recent ethnoarchaeological research suggest that the greater the number of activities conducted within a given area, the greater the need to schedule those activities and their associated maintenance regimes. For example, where the area is relatively large in comparison to the intensity of the activity, activities and object placements should be relatively randomly located and free to change location or vary over time. In contrast, where area is very limited in comparison to activity intensity, activities should repeatedly take place in specific locations, and objects (including refuse dumps) should have specific locations where they are consistently found, often resulting in the construction of tasks-specific facilities or workshops. These fixed locations, in turn, might encourage more centralized disposal and presumably an intensified use of specific dumps would produce comparatively larger deposits than one would expect specific refuse locations within smaller compounds. (Arnold 1990: 916).

Domestic activity areas have also been divided into four main types of activities - production, consumption, storage, and disposal. The reason these four activities have been chosen is because they leave behind archaeological remains (as opposed to the overall functions of households (cf. Wilk and Rathje 1982; Bender 1967). Each is discussed below, in detail.

Production

Production refers to any activities that result in the creation of something - e.g. food; ceramics; bone, stone, metal tools; ritual objects and ceremonies; cloth and basketry weaving; etc. Each of these activities leaves a distinct archaeological record, which when identified allows the type of production to be determined.

Production generally takes place in more specialized activity areas. For example, a significant proportion of food production takes place in specialized activity areas, such as butchering sites, smoke houses, threshing floors, kitchens, ovens, hearths. All produce some sort of food within a specific and defined area (Kramer 1979; Flannery 1976; Therkorn 1987; Bartram et. al 1991; Binford 1978). Craft production also generally takes place in specialized areas. For example, Arnold noticed that the choice of firing techniques appears to be significantly associated with the availability of space within the domestic compound among Tuxtlas potters. Ceramic producers in Los Tuxtlas fire their wares either in kilns or in the open. No producer, however, employs both strategies. This variability cannot be attributed to differences in energy investment in production, market orientation or knowledge of production techniques. Instead, spatially restrictive activities (such as kiln firing) are performed at designated locations, often because of a reliance on some facility or procedure. Spatially restrictive tasks will often produce a large amount of primary refuse (because of the repetitive nature of localized activity). Furthermore, the fixed location of these activities may necessitate increased task scheduling. Spatially restrictive activities need not be exclusive since other tasks may also be conducted at the same location at other times but require an increased investment in temporal and spatial planning (Arnold 1990: 927).

There are a variety of activities related to production that take place within one community (cf. Flannery's 1976). There are the more general household activities in which each household participates in, as well as the specialized activities of production where only one or two households within a community participate in. In every case however, there are certain areas of the household in which these activities take place. It is possible to understand the behavioural aspects of different types of production better when these areas are carefully studied and interpreted. Below is a brief outline of four different types of production that are found within a community.

1. Universal household activities. Every reasonably complete house, carries out certain general household activities. Examples of some general activities carried out are, food procurement, food preparation and storage of food. During these activities materials such as grinding stones, storage jars, and utensils would be

used. There would also be remains found in and around the household as a result of these activities (i.e., bones of animals consumed, carbonised seed remains, storage pits).

2. Possible household specialization. Specialized activities take place generally in only a few households within a community. For example, activity areas where tools are manufactured are usually found at only one or two houses in a community. Not all of the households would manufacture their own tools. It can be assumed that these as activities are carried out at every village, but perhaps by only one or two households in each village. An example of this category is tool manufacture (e.g. flint or bone).

3. Possible regional specialization. Some activities are represented at only a few villages within a region; however, in the few villages they are represented at virtually every house. In these cases each household would participate in the activity. Such activities may be regional specialties which were carried out by certain villages. Examples for this category would be, certain kinds of shell ornament production, feather working, or salt making.

4. Possibly unique specialization. Certain activities are undertaken sometimes by only one village and are unique to that area. In this case the specialized activity would take place at many of the houses in the village. This activity would be highly specialized and remains of the activity could be found in many households. An example for this category could be magnetite mirror production.

Consumption

Consumption can be defined as an activity where goods are used, expended and/or consumed. Activity areas associated with consumption tend to be of a relatively generalized nature. There are many types of consumption activities (i.e. food, craft, tool manufacture, etc.) each of which may spatially overlap with one another. For example, Blanton (1994: 7-8) views houses as a consumer good. It is in the entire household area that objects are being consumed by its inhabitants and neighbours. According to Orlove and Rutz (1989: 17), "Consumption is often public in nature...goods can be used not only to reflect but also influence social relations ... and a system of categories of goods can be linked to a system of social classification". As a result, consumption areas as a whole are often quite distinct from specialized activity areas, such as production and storage.

Storage

Storage is when goods are set aside for future use. Formal facilities or areas are often set apart for storage. In hunting-gathering/horticultural communities, formal storage areas and storage huts were located only at sites with an anticipated medium or long occupation. Formal storage areas do not occur at sites with anticipated short occupations, regardless of the actual length of occupation. This is true even in farming societies, such as in a camp that was specifically inhabited for farming endeavours. This is in contradiction to the frequently assumed association between horticultural activities and storage facilities. Neither economic orientation nor season of occupation were significantly correlated with the presence of storage area, whereas anticipated mobility was (Kent 1991: 39).

Storage areas are more commonly associated with fully sedentary agricultural societies. Common types of storage facilities include pits, platforms, small structures, and large ceramic vessels.

Disposal

Disposal takes place when goods are discarded or lost. It can sometimes take place where they were used, or in specialized disposal areas (i.e middens). "Some [waste] material moves rapidly into a disposal context, while other items follow slower, more circuitous routes" (Arnold 1990: 915-916). This has important implications for the reconstruction of economic, social and behavioural changes at the household level. As our knowledge of site formation processes increases, it becomes more apparent that the distribution of cultural material within communities is not random. It is more often the result of patterned refuse disposal behaviour (Kuijt 1989).

In hunter-gatherer societies, the Efe (NE Zaire) practice various techniques of refuse disposal. The Efe sometimes toss lightweight refuse directly onto a nearby trash heap without allowing it to fall to the ground at the work area. Occasionally, however, a person places a broad leaf or banana leaf on the ground to catch debris, (such as vegetable peels), and subsequently disposes of both leaf and the accumulated debris directly onto a trash heap. Efe routinely clean up debris at a later time and discard it onto a nearby trash heap, although they sometimes overlook the smallest items (Fisher and Strickland 1991: 222). The ashes of cold fires inside and outside of huts are swept onto a broad leaf or a bark tray by the Efe and discarded onto a nearby trash heap before lighting a new fire. The trash heaps in a camp are not differentiated from each other in content - there are no specialized trash heaps that receive only a particular kind of refuse (Fisher and Strickland 1991: 223). Trash heaps occur at all Efe campsites. They accumulate at the perimeter of the camp, usually adjacent to the back and sides of the huts. In addition, people sometimes create a trash heap within the central open area - usually around the base of a tree. Trash heaps start as piles of vegetation cut when clearing the camp area, and continue to grow during the life of the camp as the residents discard food refuse, cold ashes from fireplaces, broken implements, and other debris. The quantity of discarded materials and the size of trash heaps are directly related to the length of camp occupation (Fisher 1987: Fisher and Strickland 1989). All of these actions can be seen as part of a patterned behaviour that appears to be unique to each society and/or community. It is important to understand and recognize these patterns in order to accurately reconstruct behaviour within a household and community as a whole.

Ethnoarchaeological research has indicated that several factors condition refuse accumulation in a sedentary, residential setting. One factor is the potential reuse of a given item although it no longer serves its original function. A consequence of such curation behaviour is the placement of used items along house lot fences, walls or in other out-of-the-way places (Arnold 1990: 915-916). Refuse is differentially treated within domestic compounds in agricultural societies. Another factor affecting refuse accumulation is the amount of area available for household activities (Arnold 1990). For example, the smaller the size of the household area, the larger the refuse accumulation will be. One example of such refuse build up is middens or refuse pits found near or around activity areas (areas for food procurement and tool manufacturing). If the site is large, there is a tendency to keep refuse away from the living area and along the outskirts of the area. Refuse size also affects maintenance activities. The smaller the item, the greater the chance of its deposition in a primary-use context (Arnold 1990: 916). For example, small amounts of refuse from a meal will be thrown into the fire to burn or place on a garbage pile that is close in proximity to the house. However, significant amounts of cultural material (such as broken pots, pieces of tools, or parts of the house) are from secondary contexts. Secondary refuse disposal is refuse that has been transported away from activity area (Kuijt 1989: 209, 215-216). Generally the larger the size of the refuse the more chance there is that it will be not found in a primary deposit and it will be further away from the house than non-cultural material.

Social and Economic Differentiation between Households

There usually is social and economic differentiation between households, the recognition of which is crucial to the understanding of social and economic patterns within a community. There are various ways to determine the social status of a community, village or individual household. One method is to distinguish differences between economic and social status. Economic differences are based on one's position within a community in relation to their job, housing situation and personal status. Social status is derived from the accumulation of material wealth. Social differentiation may be demonstrable through spatial separation, the differential accumulation of exotic "prestige" and "ritual" items, and the differential consumption of food and non-subsistence materials (Kent 1984). Below is a discussion of how to investigate social status from archaeological evidence.

Architecture can be used to hide as well as reveal differences between households. Horne argues that there is not always a direct relationship between architecture and social or economic status. Wealthier households tend to have more house space, However, this appears to have little to do with display of material wealth. In many cases extra rooms are not luxuries but places to store the tools of production for over which the wealthier have greater control and need to house animals, shelter food processing tasks, and store equipment, agricultural produce, fodder, and firewood. The rich tend to tend to have more of these (Horne 1991: 49).

The number of rooms could serve to signal economic differences to others in the village. But the rooms would need to be clearly identifiable with their owner - for example, by being placed directly within the owner's compound. This in turn can make economic determination difficult on an individual basis. For example, in the village of Taurus (Northeastern Iran) two "eras" of life with very different economic and social organizations are, apparent:

1. large fortified dwellings elaborately decorated, housing multiple households with high-walled courtyard enclosures and,

2. smaller village dwellings with undecorated living rooms housing single nuclear households with low walls around the compound (Horne 1991: 49).

Households can be economically differentiated on the basis of the distribution of materials (such as grain storage bins, pottery, bone tools and ornamental items) found in discrete rooms.

"By looking at the differences in artifact distributions between households it is possible to build up an accurate picture of the economic situation of the individual households as well as the community as a whole " (Hill 1968: 112, 128).

The house

The topic of this thesis is the definition and location of early Neolithic houses in the Central Balkans. In order to do this it is necessary to define the type of house that was utilized. As stated above, the house is a physical representation of a patterned set of behaviour. The house is an institution, not just a structure, created for complex purposes. Because building a house is a cultural phenomenon, its form and organization are greatly influenced by the cultural and functional milieu to which it belongs. Therefore, there are a variety of house forms that can be found around the globe (Rapoport 1969: 46). The challenge is to look at the many different variables that affect the nature of the built environment. For example, if the house is seen as a work-space, then changes in the kinds of work done in the household should be reflected in house form (Braudel 1973: 201). Or if the house is a reflection of how all household activities are organized and divided, then the shape of the house should change as the activities are modified or recombined (Kent 1983, 1984). A more environmentally deterministic perspective is that the form of the house is affected by human psychology, climate, technology and the kinds of building materials available (Canter et al. 1975; Duly 1979).

There is a basic division in house type - all other divisions derive from these categories: pit, surface and above surface (tree). The latter is not a factor in our study and is ignored. It would not be found archaeologically and is largely limited to the tropics and sub-tropics defensive positions (i.e. Ulundi, South Africa). Pit houses can be defined as below ground structures that usually have an overlying above ground superstructure made of organic material such as reeds, wood, and thatch. The walls are sometimes covered in clay or daub. Surface houses are above ground structures usually made of either stone, masonry, or wattle and daub walls. Both can be aggregated into a community or isolated (Gilman 1987: 548). The change from one house type to another correlates with changes in other factors such as population size, subsistence strategies, settlement systems and mobility, and food storage (Gilman 1987:538).

These two house forms were built for very specific reasons and have very distinct characteristics that define not only the structure but also the types of societies that choose to live in them. The use of cross cultural ethnographic examples shows the variation in social and environmental conditions associated with the use of each house type. The purpose of the following section is to increase our understanding and ability to predict the circumstances under which pit dwellings and surface houses will be used (Gilman 1987: 544). If it is possible to define a certain set of behavioural patterns that are predictive of pit houses or surface houses, it makes the task of locating and defining these structures on archaeological site easier.

Climate

Based on Gilman's research it is argued that climate and location are major factors in the decision to build pit dwellings. The vast majority of pit structures are used as winter-only habitation dwellings in non-tropical areas (i.e. Foeni-Salaş, Central Balkans). The reasoning behind this is to prevent the flooding of the pit and vermin infestation (characteristics of warm, wet climates). As well pit houses hold in the warmth for a longer period of time than a surface house, because the soil is not frozen the ground tends to hold in warmth than would stone or daub walls.

Surface houses are not as thermally efficient as pit dwellings and are often used under a different, less cold set of environmental conditions. Usually surface houses are used year round with less seasonal movements than pit houses. One reason for this could be the difference in subsistence strategies (discussed below). It appears that surface houses are found in a variety of climates and geographic regions of the world. For example, houses such as pueblos are confined to arid regions with hot, dry summers and cool winters. Houses made of wattle and daub can be found in environments with warm wet summers and moist cold winters i.e., Eastern Europe. The type of raw material available in the region is just as an important factor than the lack of rain that can be found in most regions. It is necessary to understand what type of behaviour causes what types of houses to be built. Climate also affects the above ground building shape that is most thermally efficient. The optimum shape is defined as the one with minimum heat gain in the summer and minimum heat loss in the winter. In order to have the minimum surface exposed to radiation, massed building shapes are advantageous in hot, arid climate; adjoining houses or contiguous rooms can create this volume effect (Gilman 1987: 550).

Population

Pit structures are present only within a specific range of population densities. Although, population per pit structure appears to vary in the ethnographic record. The average size of a settlement that uses pit dwellings is 100 people. Generally, pit dwelling settlements have lower population numbers than do other settlements with other types of houses. Pit house communities with the densest populations have access to large, rich, and fairly predicable food resources (Gilman 1987: 544).

Gilman suggests that absolute population numbers do not themselves determine the use of surface houses based on the large range of variation in population numbers from ethnographic examples. However, there is a range of population numbers that corresponds to surface house use as compared to pit houses. The population densities for surface houses is higher than the lowest population density per pit structure. The consensus appears to be that there is no surface house settlement with less than 100 people (Gilman 1987: 551).

Food consumption/subsistence

Although pit dwellings are used when a group is dependent on stored food, the actual subsistence patterns can vary in the same way that population densities vary. Subsistence systems of pit dwellers vary within a certain range, and they can help us predict what subsistence strategies might have been appropriate to prehistoric pit dwelling adaptations.

Murdock (1967) argued that a solely hunting and gathering economy accompanies the majority of pit dwelling use. However, there is evidence that agriculture was practiced on a casual level at many settlements with pit dwellings (i.e. American southwest, Central Balkans, North American Great Plains, Hungarian Basin, Southern Africa. etc). These settlements appear to cluster in these parts of the world where this type of subsistence is successful. In fact, Gilman argues that the presence or absence of agriculture is not directly related to the use of pit dwellings. The ethnographic record also suggests that people living in pit dwellings are tied to their food stores and are sedentary during the period of pit use. However, there has also been evidence in the Central Balkans for pit dwellings with little or no evidence for food storage facilities (i.e. sites such as Foeni-Salaş, Blagotin).

Gilman contends that pit dwellings will be used, regardless of the presence or absence of agriculture, if at least the three critical conditions of cold season use, a biseasonal settlement pattern, and stored food reliance during season of use are met. The presence of agriculture in a community using pit dwellings is not an exception to the rule that these houses are associated with hunting and gathering but rather shows that under certain circumstances they can be associated with other types of subsistence activities. The presence of pit structures, then, cannot be used to differentiate hunter-gatherer and agricultural economies (Gilman 1987: 546). This is an important issue when dealing with pit houses from the Central Balkans. While there is evidence of hunter-gatherer practices taking place, there is the presence of agriculture as well. When trying to locate and define pit houses on the basis of architecture and behavioural patterns it is necessary to understand that behaviourally, pit houses can occur on either type of site (Gilman 1987: 546).

As with settlement population densities, subsistence strategies for surface houses vary and are more intensive than pit house subsistence strategies. It is possible to see two very different behavioural patterns emerge in this situation. As stated above treating the built environment as a product of consumption decisions means that the focus of research must be on the pattern of behaviour they present. It is necessary to understand the processes by which people balance various options. So, while pit houses are designed for seasonal movement based on a hunting and gathering or casual agricultural event, surface houses are built for permanence in order to maximize their subsistence strategies (agriculture requires a time investment). The many forces acting on the built environment do not necessarily affect the structure itself. Culture does not shape houses in some abstract or direct fashion; people shape houses. They are informed by cultural knowledge and they act within cultural constraints, but there is always a vital dialectic between cultural rules and actual behaviour that allows both to change (Wilk 1990: 35).

Surface houses are usually accompanied by dependence on agriculture and in the Old World on domestic animals. Both of these food sources can produce relatively large and predictable amounts of food, probably corresponding with the needs of the larger populations that are indicative of surface house use. Very little hunting or gathering is undertaken by surface house settlements except for settlement without the reliance of domestic animals (i.e. New World groups) (Gilman 1987: 551).

Although information for all surface house groups is not available, the pattern appears to be a demonstrated less seasonal mobility strategy than groups using pit dwellings. It appears that surface houses have a more intensified and consistent use of agriculture and domestic animals. Groups using surface houses generally move less often each year (Gilman 1987: 550). Less mobility means that resources must be brought to the habitation site when they are available. Surface house storage also probably occurs for a longer duration than it does at pit dwelling settlements. This increasing sedentism corresponds with their adaptability for house use in more than one season or climatic region. Decreasing seasonal mobility is related to the kind of structure built. Wilk argues, by focussing on how household members themselves make decisions about their domestic architecture we can build up a body of empirical data on the cultural, economic, environmental, and psychological factors that affect that decision-making in different contexts (Wilk 1990 : 42).

What, then, are the archeological implications for the use of pit dwellings? Pit dwellings have defining characteristics. If they are found on a site they can indicate the site is only used seasonally, (usually in the winter months); there should be some evidence of stored food (either in storage pits, ceramic pots or granaries); that the size of the settlement will be relatively small (usually under 100 people), and that the occupants probably used subsistence strategies such as hunting and gathering with the possibility of agriculture (Gilman 1987: 547).

The archaeological implications for the use of surface houses are just as important when trying to define house type as those for pit houses. Usually surface houses will indicate some sort of permanence or long term occupation of a site. While these types of houses are generally found in arid climates there are cases where they are found in semi-tropical regions as well (i.e. southern Africa); however, this is not the norm. The surface house settlement should show evidence of larger storage facilities in order to accommodate the needs of feeding a large population (usually more than 100 people per settlement). The economy appears to be oriented towards an agriculture and the keeping of domestic animals.

Very early in recorded time the house became more than shelter for primitive man, and almost from the beginning "function" was much more than a physical or utilitarian concept. If provision of shelter is the passive function of the house, then its positive purpose is the creation of an environment best suited to the way of life of a people - in other words, a social unit of space (Rapoport 1969: 46). Kent (1984, 1987) states that architecture is a reflection of behaviour or the use of space which, in turn, is a reflection of culture. Factors other than relative construction and maintenance costs are important to the change in architectural forms. These can include changes in the population size, subsistence activities, social integration, household mobility, settlement longevity, and social inequality (Gilman 1987: 540). The way activities are performed, the house is built and materials are displayed are all indicators of domestic function. In order to understand why a house was built in a certain area it is necessary to look at the behaviour behind the house form and the building of the structure.

Conclusions

During the last 30 years, archaeologists have recognized that a behavioural perspective is the key to understanding the material remains recovered during excavation and survey. Surveys of settlements systems and excavations of individual sites are presently interpreted with reference to the larger cultural (social, economic, political, and religious) system of the inhabitants.

It is possible to reconstruct social organization of a community based on the similarities and differences between households, whether they be economic, social, or material indicators. While it is important to note that the household can be seen as a unit to understanding behaviour, it is the concept of the household cluster in archaeology that allows for the discovery of the house in the first place. As stated above, it is not possible to study a community or household until the house (or household cluster) has be identified. Through analysis of the archaeological data, it is possible to reconstruct the composition of prehistoric households, compare the activities carried out by household members, and study the relations between different households (Flannery 1976: 25).

The house is representative by the physical area or space (including the surroundings and associated features and occupants). It can be conceptualized as a specialized activity area (e.g. for sleeping, eating, storage, etc.).

CHAPTER 3: THE HOUSEHOLD CLUSTER CONCEPT IN ARCHAEOLOGY

Introduction - household vs. household cluster concepts

It has generally been difficult for archaeologists to define exactly what comprises a household in archaeological terms. The reason it is impossible to construct a narrow definition of the household that is valid cross-culturally is the diversity in residential patterns, kinship structure, and domestic functions (Bender 1967; Wilk and Rathje 1982; Stanish 1989: 8). The available ethnographic models are unfortunately quite inadequate. Ethnographers make normative statements that may be detailed and of value to the archaeologist, but, while they may quantify types of household within the settlement they rarely describe the expression of this variation in terms of structures. Societies do not have a norm for structures, but a graded series appropriate for corresponding social and functional configurations (David 1971: 111).

The distinction between *household* and *household cluster* should be stressed at the outset. While a household consists of a group of people who interact and perform certain activities within a residence, a household cluster consists of its archaeological remains. The household concept discussed in the previous chapter permits a definition of the household as those people who live together and who share in basic domestic economic behaviour. The household may be archaeologically visible (Deetz 1982: 724). The most obvious material indicator of the minimal domestic unit is the spatial segregation of individual structures that house each co-residential group. The individual co-residential units are by definition architecturally separated. Households also have a physical component. Each household should be composed of one to several physical structures with identifiable kitchen area, storage and food preparation and so on. These segregated architectural groups should have the material correlates of all recoverable domestic activities, such as hearths, storage, sleeping areas, food preparation, and so on. The pattern should repeat itself in each of these architecturally defined groupings (Stanish 1989: 11).

The key procedure in defining the minimal co-residential unit in any archaeological context is to isolate repetitive architectural and artifactual patterns among a structure or groups of structures. What we seek to define is the smallest architectural and artifactual assemblage repeated over a settlement that represents the minimal cooperative and co-residential economic unit. In the case of small, autonomous household units, a limited number of structures with similar domestic patterns is expected to be repeated numerous times throughout a settlement (Stanish 1989: 11). The presence of a general consistency in the organization and contents of individual architectural units in a community, irrespective of location and apparent class differences, denotes the presence of strict residential patterns (Stanish 1989: 11).

The household cluster concept

The basic unit of production and reproduction within early farming communities is the household. The archaeological representation of the household is is the *household cluster*. A household cluster is an archaeological unit of analysis that is represented by all the features associated with the domestic activities of the occupants. It will generally "...consist of the house and all the surrounding storage pits, burials, middens, and features than can be reliable associated with that same household" (Flannery 1976: 5; Kent 1984).

These features are units of a household cluster because they are found directly adjacent to houses and reflect the nature of activities performed by its occupants. Each feature can be associated with a particular house, and its occupants. Each of these features will be discussed separately below.

The individual household cluster conforms closely to the *nuclear activity area* of hunter-gatherer communities (Yellen 1977; Bartram 1991: 95). It is most frequently occupied by a nuclear family unit, although other household configurations have been observed to be present (e.g., unmarried adolescents of the same sex, widowed adults, etc.). Visitors are accommodated just outside the hut or just inside the windbreak near the primary hearth (Bartram et al. 1991: 93).

The concept of the household cluster has proved useful for organizing and comparing archaeological data on early farming villages. For example, a typical household cluster in an early Mesoamerican farming village might consist of one house, two to six large storage pits, one to three graves, and various additional features, separated from the nearest contemporary cluster by an open area of 20-40 m (Flannery 1976: 25). Each of these types of features are briefly discussed below.

The House

The house is an institution, not just a structure, created for a complex set of purposes. Because building a house is a cultural phenomenon, its form and organization are greatly influenced by the cultural milieu to which it belongs. Very early in recorded time the house became more than shelter for primitive man, and almost from the beginning "function" was much more than a physical or utilitarian concept. If provision of shelter is the passive function of the house, then its positive purpose is the creation of an environment best suited to the way of life of a people - in other words, a social unit of space (Rapoport 1969: 46).

The house is the centre of a household activity area, otherwise known as the *household cluster*. The house is a representation of the actions, beliefs and social organization of the people living in the house. In order to understand people, it is necessary to study how they lived. This is possible by analysing the form, size, and distribution of houses.

The house, in its most general sense, can be defined as some sort of dwelling and the space that surrounds it. The surrounding space is related to the activities in the dwelling. The house is the central part of the household cluster. The house or dwelling area must be identified before the rest of the cluster can be defined.

Houses within household clusters may have a different but overlapping range of functions. Most involve sleeping or resting. For example, Bushmen huts are used primarily for sleeping (Kent 1989). Other hunter-gatherer societies also utilize the space for storage. For example, the huts of the Kua (Africa) were used for both sleeping and storage during the both rainy season and the cool dry season. But almost no daytime activities were conducted within them (Bartram et al. 1991: 95-96). In agricultural societies, a more complete range of activities takes place within houses (Kramer 1979). This is true archaeologically, as well. For example, Flannery (1976: 27) hypothesized, based on the refuse and debris accumulation found in Early Formative houses in Mexico, that a wide range of activities occurred within the house structure (such as sewing/basketry, tool modification and cooking/food consumption, in addition to the sleeping and storage).

In the same vein, Hill (1968) found that a range of activities took place in the large rooms at the Broken K Pueblo site. The presence of fire pits in large rooms implied that activities performed in them required heat, light or both. Mealing bins were also found in the large rooms indicating that corn or other food materials were ground in such rooms. The large rooms also contained the expected evidence of manufacturing or craft activities. One of these activities was the manufacture of chert implements. Certain stages in the process of pottery-making may also have been carried out in these rooms. Out of a total of 42 worked sherds found on the floors of rooms, only four were found in the small rooms, and none in the special rooms. The rest came from the large rooms. Bone tools, and ornamental items were also found in these large rooms (Hill 1968: 112, 128).

In addition to having served as a shelter for its occupants, a house can serve the archaeologist as a unit for analysis if it can be isolated from its surrounding debris, intrusive features, and the like. Variation between houses within a village can be one of the best sources of information about the variation between households - such as variation in subsistence, division of labour, craft activity, social status and so on (Flannery 1976: 16).

It is dangerous to assume, without investigation of the architectural units and their associated finds, that a "house" can be equated with a "household". It is necessary to seek features associated with the household. These include provisions made for the long-term residence of the household (eg. the addition of parts of houses, the use of longer-lasting materials in house construction), and the maintenance of houses and their internal features by repairs (Tringham 1984: 13). There is often a close (but not perfect) fit between households (as behaviour) and houses (as an architectural unit visible archaeologically) in sedentary food-producing societies. For example, David used an ethnographic example of a Fulani village in North Cameroon to demonstrate the relatively close fit between households and their buildings (David 1971: 130-131). Kramer (1979) shows a similar relationship for Kurdish villages. In many societies, the house is coterminous with the household cluster. There is little beyond the physical boundaries of the house that can be clearly defined as part of the household cluster. In the absence of activity areas beyond houses, the house becomes the basic unit of analysis for investigating the household cluster.

Ovens and Hearths

Ovens can be distinguished from hearths by the range of associated activities - food preparation, material culture (e.g. ceramic) production, and heating. Hearths are generally used for cooking and heating. Ovens, which have basically the same function, are generally associated with sedentary societies because of their more permanent nature. Generally communities that are mobile will not take the time and effort required to construct an oven. Ovens and hearths can be located in both household and communal activity areas. They will be used at different times and with different intensities. For example, each tribal group of the Njemps and Tugen (Western Kenya) have a preference for a particular hearth position within the huts (Hodder 1977: 253). Conversely, in Kua camps, fires were simply kindled on the ground in front of dwellings with no special containment basins or structures.

Fisher and Strickland examined the potential for reconstructing the location of dwellings at campsites through the analysis of the distribution of fireplaces and camp refuse at the hunter-gatherer site of the Efe in Zaire. The location of dwellings at Efe camps greatly influences the placement of fires, trash heaps and other discarded materials, and indeed the locations where people perform campsite activities (Fisher and Strickland 1991: 216). There are two types of hearths in Kua camps. Each Kua household had a primary hearth positioned in front of the concave windbreak, roughly centred between the two ends of it. The communal hearths in the centre of the circle of windbreaks were typically the largest in the camp. These were the hearths used for cooking morning and evening meals, and they were usually the only ones used to provide night-time illumination and heat. For these reasons, the communal hearths grew in size at a much faster rate than did the hearths associated with individual dwellings, and were cleaned out more frequently (Bartram et al. 1991: 97). This distinction between large and small hearths was important in the identification of communal versus individual hearths and in the determination of dwelling location.

Ovens tend to be associated with permanent structures in sedentary societies. They can be used for a variety of purposes, such as cooking food, heating structures, firing ceramics, etc. More time and labour is invested in their construction because of their more permanent labour. They tend to be used over longer periods of time (Kramer 1979).

Burials

Burials associated with household clusters enable the reconstruction of socio-economic organization (Flannery 1976). It is possible to reconstruct social differences between individuals within the household and community based upon associated funerary objects. The spatial association of burials with dwellings suggests that the buried individuals were probably occupants of the nearest house. The location of a burial near a household (i.e. within the household cluster) allows the archaeologist to associate the burials with individual households (Flannery 1976: 29).

Storage Areas

Some type of storage area is generally found within the household cluster. It can be in the form of a pit, platform, or separate structure, or separate area within the dwelling. Storage areas are usually filled with some kind of perishable food, which would otherwise be at risk if left exposed (Kent 1989).

Storage pits are generally associated with sedentary villages that practice farming and need storage room for surplus food, such as grains. Storage pits tend to be of various shapes and sizes, although they tend to be somewhat standardized within cultures. For example, bell-shaped storage pits are ubiquitous in European Iron Age and Medieval sites (e.g. Reynolds 1979; Bewley 1994). The association between storage pits and houses is so tight that Flannery (1976: 28-9) predicts that where concentrations of storage pits occurred, a careful search would probably turn up a house within 10 m to one side or the other.

An alternative to the storage pit exists in more mobile African hunter-gatherer communities. Storage pits were not dug. Instead, storage platforms were frequently built at dry season camps. The platforms provided a surface on which food, cooking utensils, bedding, and sundry household items were stored. They also provided gratifying shade in the heat of the day. In the latter role, they were often the focus of midday activity. They were frequently located near the windbreaks or huts to facilitate easy retrieval of the personal belongings stored there (Bartram et al. 1991: 96). These storage platforms are archaeologically very visible in the record, and are identified as being part of the household cluster for hunter-gatherer communities of Africa.

Middens

The richest area (in terms of quantity and variety of artifact content) of a community or household cluster is the refuse/midden area. The artifactual contents of middens represent a mixture of most household activities. Investigating individual middens can increase our understanding of the household's subsistence diet, as well as other aspects of behaviour (e.g. Kuijt 1989).

Midden/refuse areas can be found within or near dwellings. Those associated within or in close proximity to individual dwellings enable them to be identified as part of the household cluster. For example, trash heaps occur at all Efe (NE Zaire) campsites. They accumulate at the perimeter of the camp, usually adjacent to the back and sides of the huts. In addition, people sometimes create a trash heap within the central open area - usually around the base of a tree. Trash heaps start as piles of vegetation cut when clearing the camp area, and continue to grow during the life of the camp as the residents discard food refuse, cold ashes from fireplaces, broken implements, and other debris. The quantity of discarded materials and the size of trash heaps are directly related to the length of camp occupation (Fisher 1987: Fisher and Strickland 1989).

There is an ongoing debate as to whether or not middens should be included within the household cluster. Flannery (1976: 30) states that middens should not be included in the household cluster unit of analysis because they are not a diagnostic feature of most individual households. Kuijt (1989) conversely believes that middens constitute a fundamental part of the household cluster and should be analysed as part of the household cluster unit. The basic disagreement between Flannery and Kuijt is their relative ability to associate middens with specific dwellings to form a household cluster in their respective sites.

Refuse deposits are frequently mistaken for activity areas. It is important that archaeologists (and ethnoarchaeologists) develop the means to identify refuse deposits, and understand their formation (cf. Kuijt 1989: 216; Deal 1985; Hayden and Cannon 1982; Murray 1980).

Conclusions

The household cluster concept is useful because it provides a context in which pits, burials, house remains, and other features can be understood not simply as isolated cultural features, but as manifestations of a specific segment of society. Much work needs to be done to clarify the nature of households and to test the validity of the household cluster concept at different sites and over several regions. It is a productive means of organizing data for studying a unit of society on an analytic level between that of the house or the activity area and that of the community (Flannery 1976: 25).

In order to accurately study the household cluster in archaeological terms, it is necessary to outline, as above, exactly what a household cluster entails. It is the study of the household cluster in its entirety that allows the archaeologist to understand the socio-economic behaviours of past cultures. For example, it is possible to understand the economic stature of the household by analysing a kitchen area (hearth, ovens, utensils, refuse). As well, it may be possible to accurately interpret methods of food procurement and disposal by analysing the storage and midden areas of household clusters. If it is possible to clearly separate out each household cluster within a village or settlement, it may become possible to determine how the village functioned both socially and economically.

It is important to be able to differentiate between the household cluster and the rest of the village. But in order to identify household clusters, we must first be able to identify the house. This is a particularly cogent question when examining Early Neolithic settlements in the Balkans. The household cluster has never been identified on such sites since it is not clear exactly what composes a house. The reason for this will be discussed in a later chapter. It is the goal of this thesis to develop a new method of identifying where the houses are located in Early Neolithic Balkan sites as a prelude to the reconstruction of the household cluster. Data from the Early Neolithic village of Foeni-Salaş in southern Romania will be used to test the proposed method.

The next two chapters outline the characteristics of the Early Neolithic period and cultures of the northern half of the Balkan peninsula. Once a broad understanding of these topics is achieved, a detailed description of the data set and method of analysis for locating dwellings at Foeni-Salaş will be outlined.

CHAPTER 4: EARLY NEOLITHIC OF THE BALKANS

Introduction to the Early Neolithic of the Balkans

The defining characteristics of the Early Neolithic throughout Europe is the concomitant appearance of food production (plant cultivation and stock breeding), pottery production, and ground stone tools (Childe 1957; Bogucki 1988: 1; Benac et al. 1979; Manson 1990: 71; McPherron and Srejović 1988). Food production began in the Near East and eventually spread northwards into Greece and southern Bulgaria. By 5900 B.C.[2], agriculture had spread into the northern half of the Balkans (Serbia, northern Bulgaria, southern Romania, and Bosnia - also known as the east, central, and west Balkans) (Childe 1958; Tringham 1971: 68). This area is north of the climatic divide between Mediterranean and temperate central Europe (fig. 4 - Greenfield 1988, 1991).

Southeastern Europe (also known as the Balkans) is not only important for the understanding of the spread of domestic economies, it is also significant for understanding the spread of the earliest agricultural communities and economies to temperate Europe. Agriculture which was introduced from the Near East to the Aegean and southern Balkan peninsula around 6500 B.C., because of the presence of similar environmental conditions. As a result, no noticeable changes occurred in types of species and nature of exploitation systems (Greenfield 1993). Archaeological cultures with ceramics, domestic plants and animals, and a Neolithic stone technology initially appeared in the temperate zone, north of the Mediterranean littoral, during the Early

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[2] All dates are calibrated in this paper.

Neolithic (5900-5100 B.C.) (McPherron and Srejović 1988). This spread northwards required a *readaptation* of already existing domesticated plants (wheat and barley) and animals (sheep and goat) to a temperate environmental zone, and the domestication of new species already indigenous to the area (cattle and pigs - Bökönyi 1974; Greenfield 1993). This is the first time that agriculture is adapted to a temperate zone. Once this occurs, it rapidly spread to the rest of central and northern Europe (Bogucki 1988; Greenfield 1993).

In Eastern-Central Europe, there are two different ways in which agriculture spread: A) through the introduction of new cultures (and by implication people) from the more Mediterranean zone into the more temperate areas of the Balkans (e.g. Morava river valley, hills of Serbia, plains of Pannonia), and B) through the adoption of food production lifestyles by indigenous hunter-gatherer groups in the temperate climatic zone (e.g. Iron Gates and Transylvania).

Several Southeastern European culture groups co-existed during the Early Neolithic (fig. 3). It is necessary to discuss each of them individually as well as their relationship to one another in order to fully understand the cultural and evolutionary dynamics of the Early Neolithic of this region. By the end of the 1940's, Milojčić and other prehistorians recognized that the "painted pottery cultures" found throughout much of the Balkan peninsula were more or less contemporary, based upon ceramic cross-dating (Milojčić 1949). They were subsequently grouped together as Early Neolithic, and eventually incorporated into Childe's (1957) grand syntheses of European prehistory.

This large grouping was eventually divided up into three regionally distinct groups of related archaeological cultures. Those in Central Europe (from Hungary northwards and westwards) are commonly referred to as the Linear Pottery cultures or culture group (formerly known as Danubian I - following V. G. Childe). Those of the Mediterranean Balkans are known as the Proto-Sesklo/Sesklo group. The cultures of the northern Balkans have no single name, but are referred to collectively as the Karanovo I-Kremikovci-Starčevo-Körös-Anza-Criş culture group (Tringham 1971: 73; cf. Gimbutas 1976). Some researchers prefer to utilize a more ecologically-oriented term "first temperate neolithic" for this latter group (Nandris 1970, 1976; Chapman 1989; Manson 1990: 77). The Early Neolithic cultures of SE Europe can be distinguished between those of the northern half of the Balkans (with its temperate central European climate) and those of the southern half of the Balkans (with its Mediterranean climate).

The Starčevo-Criş culture (which will be the focus of this chapter - fig. 3) is one component of this large and more or less contemporary grouping of northern Balkan culture groups (Gaul 1948; Ehrich and Bankoff 1990; Tringham 1971; Manson 1990: 77). Each of the northern Balkan culture groups will be discussed next.

Northern Balkan culture groups

Karanovo I designates the Early Neolithic sites of southern Bulgaria. The Kremkovci culture is found in SW Bulgaria and extends into SE Yugoslavia.[3] The Starčevo culture covers most of eastern Yugoslavia. The Körös culture is found in southern Hungary and northeastern Yugoslavia (see figure 3). The Criş culture is applied

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[3] All descriptions of Yugoslavia pertain to pre-1991 borders.

to similar sites in southern Romania (Gaul 1948; Tringham 1971; Manson 1990: 77; Gatsov 1995: 74). Each will be discussed below in greater detail.

Broadly speaking, each of the cultures is spatially separated. Some differences represents regional variations of material culture. The various culture names may reflect adaptations to the many micro-environments of the Balkan peninsula (Kaiser 1984: 46). The names in other cases are a result of the development of chauvinistic schools of archaeology within modern political boundaries. It is obvious that modern political boundaries and archaeological nationalism in the study of what is essentially a cultural continuum throughout the region (Tringham 1971) have affected our perception of the distribution of cultures. For example, sites in northern Yugoslavia (Starčevo) and south-eastern Hungary (Körös) and southwestern Romania (Criş) have nearly identical assemblages (Greenfield and Draşovean 1994; Tringham 1971: 70). However, the cultures are called by different names. The division between Starčevo and Criş cultures in SW Romania simply coincides with the modern national border. The cultures of the northern Balkans (i.e. Criş, Körös, Starčevo, and Karanovo I) are differentiated mostly because each national school of archaeology prefers its own local name (reflecting the original type site in that country for the culture) for essentially the same archaeological culture.

Each of the schools has also vied for the enhanced political status that would accompany finding the earliest Early Neolithic on its territories and having it spread to the surrounding countries. For example, Romanians, Hungarians, and Serbs often argue that theirs, respectively, is the oldest Early Neolithic culture. Hence the origins of agriculture in Central Europe began in their own country (Makkay 1989: 178-179; Srejović 1988: 15; Dumitrescu 1983: 16-22,27).

Prior to World War II, many "cultures" and "groups" were identified in Central and Eastern Europe on the basis of materials from one or a few sites. These sites were widely separated from other similar sites by areas where few or no data relating to the same period had been recovered. The fragmentary nature of the data base made materials from particular regions appear more distinct than they really were. Bogucki (1988: 12) argues that "given the perceived discreteness of these cultures, it was easy to make the leap to considering them as "ethnic" entities which had a concept of themselves as a distinct people whose identity was manifested in their material culture", leading to the European concept of an archaeological culture.

Part of the confusion also appears to be the manner in which Balkan prehistorians define archaeological cultures. They generally use a "normative" perspective, which looks for the stereotypical characteristics of a culture (usually based upon the assemblage from the type site or at the centre of its distributions in that country) rather than its range of variation (cf. Trigger 1990; Bogucki 1988: 10). It was a general belief among archaeologists (including non-eastern European) that the prehistorian must select for cultural classification only those assemblages that come from the central part of a people's distribution, avoiding those from along its boundaries, whether in space or in time (e.g. Rouse 1972: 81). Unfortunately, such a method makes it difficult to map the spatial distributions of culture. Fortunately, in recent years the earlier definitions of the archaeological "culture" in prehistory (e.g. Childe 1957: vi) have been expanded to include subsistence and settlement patterns which are associated with consistently recurring archaeological assemblages found in contiguous geographical areas (Bogucki 1988: 10). It is now possible in some areas of west and central Europe to map the entire spatial distribution of an archaeological culture using a more inclusive definition. Unfortunately, this method has not been employed to its full potential in the Balkans.

Inter-regional chronology - Starčevo chronology in relation to other northern Balkan Early Neolithic culture groups

In this section, each of the Early Neolithic culture groups of northern Balkans will be briefly discussed. The synchronisms are based initially upon ceramic cross-dating, and eventually upon radiocarbon dating (fig. 5).

North Macedonian Anzabegovo-Vršnik group (South) (fig. 3)

Sites from this culture group are found in Yugoslavian Macedonia. The Anza-Vršnik group has well been synchronised with the Starčevo group that lies to its immediate north. The first horizon (Anza I: 6100-5900 BC) at the type site appears to be slightly earlier than the Starčevo culture to the north (Gimbutas 1976: 70-71; 1991: 441; Manson 1990: 138). According to radiocarbon dates from this site, Anza II-III (5900 - 5200 BC) phases are basically contemporary with the entire Starčevo culture - phases I-III (5950-5200 BC) (Manson 1990: 138).

Kremkovci (Southeast)

The Kremkovci group is found in the Sofia basin of southwestern Bulgaria. This culture has been poorly dated in absolute terms (Pernicheva 1995: 106; Boyadziev 1995: 161). Based on similar ceramic styles, there is a close affinity between the Starčevo group and the Kremikovci group (found to the southeast of the Starčevo culture). This conclusion is based on relative dates from ceramic cross-dating between the two culture groups assemblages (Garašanin 1983: 105-6). Unfortunately, the Kremkovci culture is a poorly known culture in western language literature.

Karanovo (East)

The Karanovo I culture group is located in the Marica valley of central Bulgaria. It is represented in the lowest levels of the mounds at Azmak near Stara Zagora and Karanovo (Gimbutas 1976: 71). The time span for this culture is radiocarbon dated, ca. 6250-5450 B.C. These are the dates of the the Early Pottery and Early Neolithic cultures (Boyadziev 1995: 179). The Karanovo culture is more or less contemporary with although it may slightly predate the Starčevo culture. On the basis of radiocarbon dates, the site of Azmak is slightly earlier (ca. 6118 B.C.) than Starčevo I. At the type site of Karanovo, level II has been radiocarbon dated (ca. 5647 B.C.) and is contemporary with the Starčevo II phase (Gimbutas 1991: 443).

Criş (Northeast)

Criş sites are found in the southern and southwestern parts of Romania. The Criş culture group is assumed to exist between ca. 5950-5200 B.C. The Criş culture is assumed to have existed approximately at the same time as the Starčevo culture because they share a similar material culture and relative dating techniques of the cultural complex. As of yet, there are no reliable dates for establishing a chronological contemporaneity between Starčevo and Criş sites (Dumitrescu 1983: 20), with the exception of Foeni-Salaş on the border between Romania and Serbia (Greenfield and

Draşovean 1994). At Foeni-Salaş, the middle phases of the Starčevo-Criş culture have been dated to ca. 5500-5200 B.C. The earliest Starčevo-Criş sites in Romania are Gura Baciului (Vlassa 1976), Ocna-Sibiu (Paul 1981), and Circea (Nica 1977) and are all thought to be contemporary to the Starčevo I phase.

Körös (North)

The Körös culture group is located in southeastern Hungary (north of Starčevo) and the western perimeter of Romania and northern perimeter of Serbia. The culture is limited to the lowlands of the Pannonian (Hungarian) Plain (Sherratt 1982). These assemblages have been dated by radiocarbon analyses to ca. 5800-5300/5200 B.C. (Bankoff and Ehrich 1991: 343, 351, 379; Gimbutas 1976: 71; 1991: 29). Körös (I-III) sites appear to be contemporary with Starčevo II and III according to absolute dates.

Starčevo (Central)

The Starčevo culture group is located primarily within the borders of Serbia (an area also known as the Central Balkans). The culture is found in a variety of environments, including the lowlands of Pannonia in the north and the deep river valleys of the more mountainous areas to the south. The Starčevo culture is approximately dated from 6100-5100 B.C. (Manson 1990), although the earliest dates are associated with Anza-Vršnik culture sites. The culture is divided into three or four phases (depending upon the interpretation chosen by various scholars). This culture will be discussed at greater length in the next chapter.

General chronology of the Early-Late Neolithic of the Central Balkans

The Neolithic of the Central Balkans has been intensively studied for over a century. Several hundred Neolithic sites have been identified and many have been tested (Srejović 1988: 5; Garašanin 1983; Dumitresecu 1983; Tringham 1971; Whittle 1985). Based on the material from the excavation of several sites, Balkan prehistorians have established three stages in the Neolithic of the Central Balkans which span a total of ca. 3100 years (ca. 6100 to 3000 B.C.) (Tringham 1971: 75; Manson 1990: 2). Generally, the earliest phase was represented by the material from the site of Starčevo. The Starčevo culture became synonymous with the Early Neolithic for the Central Balkans (Milojčić 1950; Arandjelović-Garašanin 1954; Vasić 1906). The Vinča culture is the major culture of the Central Balkans during the Middle and Late Neolithic. It is divided into two phases, the Vinča-Tordoš (also known as Vinča I-II) and Vinča-Pločnik (Vinča III-IV) cultures. The Vinča-Tordoš phase is the middle phase of the Neolithic and was defined by excavations at the site of Vinča. The Vinča-Pločnik cultures is the latest phase of the Neolithic and was defined from material at sites such as Gradac, Vinča, and Pločnik (Garašanin 1983; Grbić 1930, 1939; Milojčić 1949). The Middle-Late Neolithic internal chronology is based upon the excavation of stratified tell sites, while that of the Early Neolithic is not.

Chronology and culture history are difficult aspects of European Neolithic cultures to discuss, for the simple reason that so many different chronological schemes have been developed over the years. Although there is a broad consensus concerning the overall sequence of cultures, each researcher has divided them into slightly different phases, groups, and periods. This is true for Central and Eastern Europe (Bogucki 1988: 12). The use of these terms (Early, Middle and Late Neolithic) is not consistent from author to author. There is a great deal of controversy as to which cultures belong to which periods. Different authors assign different culture groups to Early, Middle, or Late, depending upon their philosophy of cultural development. For example, Garašanin (1983) places Starčevo into the Early Neolithic, while Srejović (1988) places it in the Middle Neolithic. This is because Srejović argues for a proto-Starčevo culture transition from the Mesolithic to the Early Neolithic that would represent the Early Neolithic of the Central Balkans. However, most scholars reject Srejović's conclusions (e.g. Ehrich and Bankoff 1990; Manson 1990).

During the 1960's and 1970's, several of the regional cultures were radiocarbon dated. The radiocarbon revolution (with the advent of bristlecone pine calibration) had a tremendous effect upon the extant local and regional chronologies of Europe, which had been entirely based on cross-dating. The cross-dated chronologies were shown to be inaccurate. For example, the old relative dates assigned a beginning date for the Early Neolithic at ca. 3000 B.C. The Early Neolithic of the Central Balkans was pushed back to ca. 5500-4500 B.C. - uncalibrated (Garašanin 1983) once radiocarbon dates were available. Calibration has since pushed it back to ca. 6100 B.C. (Manson 1990). The acceptance of a radiocarbon-based chronology caused the traditionally cross-dated chronologies to be eventually abandoned or subsequently modified (Ehrich and Bankoff 1990; Renfrew 1971). However, many local archaeologists continued to ignore for a long time the mountain of evidence that the old cross-dating chronologies were woefully inadequate (e.g. Garašanin 1972; 1973, 1983; Srejović 1988).

During the 1960's, prehistorians began to realize that the temporal synchronisms between northern and southern Balkan cultures were inaccurate. There was a general time trend from southern to northern Balkans with the Early Neolithic cultures. The earliest levels in the southern Balkans (Aegean) were dated to ca. 6500 B.C., while those in the northern Balkans began ca. 6100 B.C. As a result, the earliest levels in the south lost their temporal synchronism with those in the north (e.g. Gimbutas 1976).

Even within the Starčevo culture there is temporal variation in its initial appearance and subsequent spread, which affects the Early Neolithic periodization. All Starčevo sites are not completely contemporary since the culture spans a thousand years. The earliest Starčevo sites in the southern end of the distribution belong to an "earlier" Neolithic period than the earliest in the north. Early Neolithic sites in the central and northern Balkans are synchronized to the "Middle" Neolithic sites of the southern Balkans (Garašanin 1979).

Conclusions

The spread of agriculture lifestyles from the Near East into the European Mediterranean littoral and then northwards into the Balkans resulted in the appearance of a number of archaeologically similar cultures during the Early Neolithic (Proto-Sesklo, Karanovo I, Kremkovci, Starčevo, Körös, Anza, Criş). These cultures were the first to adopt plant and animal domestication and production in Europe. The most common element that links these culture groups is the similarities in ceramic styles. Until recently, it was only on the basis of ceramic similarities (and derived cross-dates) that these groups were chronologically placed within the Early Neolithic sequence. More recently, radiocarbon dating has allowed a reevaluation of the chronological relationships of these groups to one another. There is still a great deal of confusion due to the absence of a systematic means of describing the local and regional chronologies of the region. Comparing data from one region to another is hampered by a lack of standardized description and terminology, and available radiocarbon dates.

In the next chapter, I will describe in depth one of these Early Neolithic cultures - the Starčevo-Criş culture group. This specific group was chosen because it is the one that corresponds to the data set analysed from southern Romania. While this group has been referred to as both the Starčevo and Criş culture groups, the similarities as described in the next chapter are so great that it is frequently referred to as the Starčevo-Criş culture group.

CHAPTER 5: EARLY NEOLITHIC STARČEVO-Criş CULTURE

Introduction to the Starčevo-Criş culture

In this chapter, the Starčevo and Criş cultures will be examined. The Starčevo and Criş cultures have been grouped together for the purpose of this discussion for two reasons: A) there are extreme similarities between the groups in their material culture, settlement patterns, architecture, subsistence, mortuary practices, etc. Scholars of these cultures have frequently treated the two cultures as part of a single culture area (e.g. Gimbutas 1991; Greenfield and Draşovean 1994; Tringham 1971); and B) the site used in this thesis, Foeni-Salaş, is located on the traditional border between the two culture areas.

The majority of data reviewed here derives from the Starčevo culture area because of the relatively greater abundance of data when compared with the Criş data. In particular,

1. there is a dearth of radiocarbon dates for Criş sites;
2. there is an absence of detailed Criş site descriptions published in English;
3. the Romanian school of archaeology (e.g. Lazarovici 1979; Draşovean 1989) relies heavily upon the Starčevo chronologies derived from the Yugoslavian-based research (e.g Milojčić 1949; Garašanin 1973, 1983; Srejović 1988; Dimitrijević 1974);
4. there is a dearth of research on Criş data concerned with issues such as regional settlement patterns.

Foeni-Salaş, while it is called a Starčevo-Criş site, is clearly in the Starčevo tradition. It is called Criş because of the political correctness of multinational research projects (Greenfield 1996 pers. comm.). The site is in the Romanian Banat, which is separated from the Serbian part of the Banat only by the modern border. Geographically, there are no any boundaries separating them. The Criş sites of the Romanian Banat are simply the end of the distribution of sites beginning to the south in Serbia. The real division in material culture occurs between the Criş sites in the Banat from those sites found east of the Carpathians (in Wallachia and Oltenia) and to the north in Transylvania and Crişana (see fig.3).

The two cultures are named after their type sites (fig. 3). The Starčevo culture derives its name from the archaeological site of Starčevo (also known as "Starčevo-Grad"), located just west of the small village of Starčevo, approximately 20 km east-northeast of Belgrade. The site is on the northern bank of the Danube (Fewkes et al. 1933; Ehrich 1977; Benac et al. 1979; Manson 1990: 73). Excavations were performed at Starčevo-Grad in 1928, 1931-1932, and 1969 (Ehrich 1977; Fewkes et al. 1933). The type site for Criş is found in the Transylvanian region of western Romania. It is on the eastern edge of the Pannonian plain in an area known as Crişanovo (Dumitrescu 1983).

The Starčevo-Criş culture represents the remains of one of the earliest food producing communities (domesticated plants and animals) in a temperate climatic zone. The Bulgarian Karanovo culture is also found in a temperate climatic zone, but it appears to be culturally more closely associated with the earlier cultures from the Mediterranean/Anatolian region (cf. Garašanin 1983). Geographically, the Karanovo culture is cut off from Starčevo and Criş cultures by the Rhodope and Balkan mountain ranges, and more accessible to the south and east towards Anatolia (in modern day Turkey).

The rest of this chapter will summarize the information relating to chronology, environment, and regional and local settlement patterns of Starčevo-Criş sites. Material culture (ceramics, figurines, and stone tools) is not discussed in this thesis because the emphasis is on architectural patterns. Architecture will be discussed at length in the next chapter.

Starčevo-Criş Chronology

Introduction

The Starčevo-Criş culture is now universally recognized as belonging to the Early Neolithic, although this was debated by Balkan prehistorians until the introduction of radiocarbon dating (e.g. Vasić 1906). With the passing of the older generation of Balkan prehistorians (i.e. death of Vasić) and the advent of radiocarbon dating, the Starčevo-Criş culture was clearly placed within the Early Neolithic (Garašanin 1973; Ehrich 1965). The decades-old "Danubian" sequence of Childe is so broad and out of date that it no longer fills the role of a periodization for the Neolithic (Bogucki 1988: 12).

The internal chronology of the cultures is still very problematic (cf. Ehrich and Bankoff 1990; Manson 1990, 1995; Tasić1992). The most frequently utilized method for chronologically sequencing most material and sites is through traditional cross-dating and the comparative analysis of associated material culture (i.e. figurines and ceramics). Most chronological analyses rely on seriation and stratigraphic superposition of deposits and assemblages within a site to organize the Starčevo-Criş ceramic inventory. However, most such studies are without any reference to absolute dates, and often their sequences contradict radiocarbon dates for the levels of individual sites (e.g. Milojčić 1949;

Arandjelović-Garašanin 1954; Srejović 1988: 7; Dimitrijević 1974).

The chronology of the Starčevo-Criş culture is less well established than in the neighbouring Karanovo and Anza cultures because of the lack of Starčevo-Criş stratified sites (Chapman 1989). It is extremely difficult to establish an accurate chronology if there is no continuity at a site. The stratification of cultural horizons is the key to understanding the different time periods associated with a particular culture. The Starčevo-Criş sites unfortunately are either disturbed (a result of being close to the surface and damaged easily) or improper excavation techniques in the past have destroyed the original contexts. The biggest difference between the Starčevo-Criş group and those of Karanovo or Anza is the lack of tell sites. The tell sites of the cultures that exist to the south and east of the Starčevo-Criş distribution are extremely well preserved. The stratigraphic sequence of occupation allows the establishment of an accurate chronological sequence. Unfortunately, the lack of tells and stratified sites make it difficult to create a chronological sequence for Starčevo-Criş.

Site-based chronologies abound in the literature (e.g. Arandjelović-Garašanin 1954; Srejović 1972, 1988). In the absence of large numbers of radiocarbon dates from many sites, it is often difficult to link together these seriated site-based chronologies. There is no single stratified Starčevo site to form the "yardstick" chronology to which local sequences can be tied - contra Karanovo, Anza, and Obre (Boyadziev 1995; Gimbutas 1974, 1976), which are well stratified.

Relative Chronological Systems for the Starčevo-Criş Culture

Several competing chronological frameworks have been proposed for the

Starčevo-Criş culture. Each will be discussed in turn (fig. 6).

One of the first attempts to devise a chronological sequence of pottery types for the Starčevo culture was by Vladimir Milojčić (1950: 108-118). By comparing (cross-dating) pottery and other ceramic artifacts from various Starčevo sites, he established a four-part ceramic chronology. The phases were termed Starčevo I through IV. This system is still widely used, particularly in Romania (cf. Lazarovici 1979; Paul 1981: 232).

The next major attempt to work out a Starčevo chronology was by Draga Arandjelović-Garašanin (1954). Arandjelović-Garašanin also based her sequence on the cross-dating of ceramics of the approximately 50,000 sherds recovered from the early excavations at Starčevo-Grad by Fewkes (Fewkes et al. 1933). Her sequence closely follows that of Milojčić, but recognizes closer similarities between his middle periods (II and III). As a result, her stages are labelled Starčevo I, IIa, IIb, and III. They correspond relatively closely to Milojčić's Starčevo I, II, III, and IV, respectively (Ehrich 1977: 66; Manson 1990: 129-130). The Arandjelović-Garašanin typology is generally considered to be the most accurate and widely accepted phasing of materials chronology in ex-Yugoslavia (Manson 1990: 130).

Local variations on these Starčevo sequences have also been proposed by Benac for Bosnia (1979), Vlassa for Transylvania (1976), Lazarovici for the Banat (1979), Dimitrijević (1974) for the Vojvodina, and others. In general, they follow the basic 4 phase system, with slight differences in the subphasing based upon differing artifact frequencies from sites in their respective areas.

Despite the common acceptance of a four phase system for Starčevo, Ehrich (1977: 66; Ehrich and Bankoff 1990: 380) proposed an alternative phasing for the culture. He suggested, based upon the excavation at Starčevo-Grad, that the Starčevo culture be considered as having only two major phases, an early and a late one. Unfortunately, he never defines the characteristics of each phase and the stratigraphic or material culture basis for his proposal. He places the type site, Starčevo-Grad, entirely into the late phase. Ehrich argued that Draga Garašanin(-Arandjelović) made mistakes during her original stratigraphic analysis of the original excavations at Starčevo-Grad conducted by Fewkes et al. (1933). Ehrich had been a graduate student on that excavation and had unpublished information which led him to this conclusion. This was also based upon his experience codirecting the renewed excavation at Starčevo-Grad with Garašanin-Arandjelović in the 1960's. Unfortunately, the results of this excavation have never been published due to stratigraphic and other disagreements between the two directors (Ehrich 1977).

The last of the major traditional chronologies was proposed by Stojan Dimitrijević (1974, 1979). His classification system is also based on the stylistic differences between Starčevo pottery decoration. He uses names for his phases, rather than subjective numbers. His first two stages represent a "preclassic" Starčevo period, characterised by the absence of barbotine ceramics. The first part of the preclassic is defined as the Monochrome phase; the second as the White Linear (or Linear A) phase (Manson 1990: 132). The next phase is referred to as "classic" Starčevo. It also encompasses two phases -- the Dark Linear (or Linear B) phase and the Garlandoid phase. Two phases also make up Dimitrijevic's "late classic" Starčevo period -- Spiraloid A and Spiraloid B (Manson

1990: 132-133). A "final" Starčevo period was also proposed by Dimitrejevic. This period is restricted to peripheral sites and the majority of the pottery appears more similar to many Körös forms than to Starčevo ones. Dimitrejević (1979: 253) suggests that his "final" period was "a substratum for the roots of the linear banded pottery culture" of central Europe (Manson 1990: 133).

Absolute Chronological Systems

By the late 1950's and early 1960's, the validity of the traditionally-seriated relative chronologies was beginning to be questioned with the advent of the initial results of radiocarbon dating of deposits (e.g. Ehrich 1965). The global position of Starčevo was reevaluated relative to the other regional cultures (i.e. Starčevo was dated later than the earliest Greek sites). The various systems of internal phasing were also scrutinized. Milutin Garašanin (1973, 1983) assigned radiocarbon dates to Arandjelović-Garašanin's broadly periodized Starčevo sequence in order to obtain a more accurate picture of the internal phases of Starčevo. His results generally supported Arandjelović-Garašanin's relative dating sequence for Starčevo. However, M. Garašanin does not provide the dates upon which he based his conclusions.

Srejović (1972; 1988) initially based his chronology on the stratigraphic sequence at Lepenski Vir. He argued that the material from the Iron Gates site of Lepenski Vir (level IIIa), originally thought to be Early Neolithic, had several Mesolithic characteristics. He believed that the earliest Early Neolithic levels were transitional from a Mesolithic substratum because the material remains had traits from the preceding and succeeding periods. This has yet to be conclusively demonstrated based on the lack of published Starčevo culture data from this site. Srejović (1972) proceeded to argue that the origins of the Starčevo culture are found in the Central Balkans (i.e. Serbia). He assumed that the culture spread through trading and migration to the south Balkans (i.e. Thessaly, Macedonia) occurred, but that the Starčevo culture did not originate from there (Srejović 1988: 15). Based on this assumption, Srejović interpreted Starčevo material found on southern Balkan sites as either a result of trade or migration from the north. The names of his Starčevo phase sequence were directly influenced by his theory. With the aid of radiocarbon dates from his Iron Gates site, Lepenski Vir, Srejović divided the Starčevo material from his sites into proto-Starčevo and Starčevo phases (Srejović 1963, 1988). He then further divided the proto-Starčevo culture sequence into 3 phases: Proto-Starčevo I, II, III. The Starčevo phase followed. He considered the Proto-Starčevo phases to be Early Neolithic, while the Starčevo phase was considered to be Middle Neolithic. Others, however, argue that his proto-Starčevo sequence is little more than what Arandjelović-Garašanin and Milojčić called Starčevo I, and that Srejović's Starčevo was nothing more than a lumping of Arandjelović-Garašanin and Milojčić's Starčevo II and III (Manson 1990: 129).

Gimbutas (1974; 1976) in her excavations at Obre and Anza, also tried to reconcile the traditional Starčevo chronology with radiocarbon dating. By and large, she found that the internal phasing as propounded by Arandjelović-Garašanin and others did not hold up. However, M. Garašanin (1983) and others (cf. Manson 1990) have largely rejected her assertions by maintaining that her sites lie on the periphery (or even beyond) of the Starčevo culture and hence are not applicable to their phasing. They argue, instead, that the Garašanin's system of dating are more valid because they come from the culture's geographic core.

Manson (1990) correlates several regional seriated sequences of ceramics with radiocarbon and archaeomagnetic dates to simplify the internal chronology of the Starčevo culture. She concludes that the Arandjelović-Garašanin phasing holds up best under the scrutiny of absolute dating, and hence is the most accurate. Manson's chronological study of the Starčevo phases is the most up to date and accurate. It demonstrates the essential validity of the 3-4 phase sequence (cf. Arandjelović-Garašanin), regardless of the names attributed to phases and sub-phases. Arandjelović-Garašanin's system is the most widely accepted relative chronological sequence among prehistoric archaeologists working in the region. The dates for each of the phases are as follows:

Starčevo I: at least 5300 to ca. 5100 b.c. (6100-5950 BC., calibrated);

Starčevo IIa: ca. 5100 to 4850 b.c. (ca. 5950-5650 B.C., calibrated)

Starčevo IIb: ca. 4850 to 4500 b.c. (ca. 5650-5400 B.C., calibrated)

Starčevo III: ca. 4500-4200 b.c. (5400-5100 B.C., calibrated) (Manson 1990).

On the basis of radiocarbon dating, Ehrich and Bankoff argued that the Starčevo culture is divided into two phases: early and late. They use the Anza sequence as their anchor to the cultures of the south. The Anza I phase is associated with the southern Balkan or Proto-Sesklo culture, not Starčevo I as is generally thought. Starčevo levels occur at stratified sites appearing as Anzabegovo II and III, Vršnik II and III, Obre I (levels II-III), Gornja Tuzla and also synchronous with Karanovo II and III (Ehrich and

Bankoff 1990: 380). They argue that Starčevo I is contemporary with the Anzabegovo II phase. This division is disputed by the absolute dating conducted by Manson (1990: 132).

Greenfield (n.d. b) has recently found that the radiocarbon dates from Foeni-Salaş, a stylistically Starčevo IIa site, do not correspond with the dates proposed by Manson (1990). As a result, it is apparent that the entire Starčevo chronological system must one day be revised from top to bottom.

Environmental Context

The Starčevo-Criş complex is spread over several different geographical regions - Pannonia, Serbia, Transylvania, and the Iron Gates. I will briefly describe the regional geography and the environments of each. What is called the Criş variant of the culture extends eastwards beyond Transylvania into the Dacian Plain of Oltenia and Wallachia, and is called the Circea-Gura Baciului culture group. This region is not discussed in this thesis since the Circea-Gura Baciului group are considered to be a separate culture group (- Dumitrescu 1983: 20, 27).

Pannonia

Pannonia (also known as the Carpathian Basin or Great Hungarian Plain) is the term used to describe the flat lowland plains within the arc of the Carpathian, Alpine and Dinaric mountains. It is a complex of interconnected lowlands in and around Hungary, approximately 400 km in diameter. It is surrounded on all sides by mountains (Bohemian Mountains, Moravian Heights, Carpathians, Serbian uplands, Dinaric Alps, and Alps). It is preferable to use the politically neutral ancient Roman term for this region since it avoids the more ethnically-possessive terms, such as the Great Hungarian Plain. This term is widely accepted among prehistorians in the region.

Pannonia is bordered to the east by the Transylvanian plateau, to the north by the Bükk mountains in northern Hungary, to the west by the Austrian/Slovenian Alps, and to the south by the Danube (at Belgrade) and Sava rivers in Serbia and Croatia.

This region is also known as the Middle Danube Drainage Basin which is a reflection of the importance of the Danube (Greenfield 1986: 42). The river systems are the most dynamic features of the landscape. Several rivers run through the plain , all of which drain into the Danube, such as the Sava, Drava, Tisza, Körös, Mures, and Timiş.

Pannonia was of the basin formed by the former Pannonian Sea. This sea, deposited sediments of sand, clay and mud over the lowlands forming the present-day Carpathian and Pannonian Basins throughout the Miocene. Today loess platforms, often marshy, abound, and are interspersed with tracts of alluvium. The entire region is a vast sedimentary basin (Grubić cited in Greenfield 1986: 41). During the Pleistocene, the region developed its current characteristic basal soil cover - loess. Above the loess deposits are often found a wide variety of lacustrine and riverine deposits. Some of the largest inland sand dunes in Europe occur in Pannonia. They are the result of the high loess and sand component, and strong winds in the elevated non-marsh areas.

The southeastern part of Pannonia is divided into several subunits that cross-cut the modern borders of Romania, Hungary and Yugoslavia. The Yugoslavian part of Pannonia (known collectively as the Vojvodina) is divided into three sections - Srem (west of the Danube, south of the Fruška Gora), Bačka (west of the Danube, north of the Fruška Gora), and Banat (east of the Danube). The Banat also extends into southwestern

Romania. The other regions of Pannonia in Hungary and Croatia fall outside the geographical limits of this thesis because the Starčevo-Criş culture did not spread into these areas, and will not be discussed.

The area is characterized by extensive permanent and seasonal marshes because of the low relief and meandering river channels. Large areas on the plain were seasonally or permanently unpassable due to flooding and unusable for agricultural activities until the large scale drainage activities of the Austro-Hungarian government in 19th century. The Pannonian basin had other considerable limiting factors for Neolithic agriculture. Most of the area is classified as moisture deficient for agriculture relative to the better-watered and deciduous forest zone in the highlands around the basin (Barker 1985: 100).

The Banat is a subregion of Pannonia. It comprises that portion of the middle Danube drainage bordered on the north by the Maroş, on the south by the Danube, on the west by the Tisa and on the east by the first spurs of the Western Carpathians. A unique characteristic of the Banat, in the southeastern Banat between the Danube and Vršac, is the formation of dunes from the loess and sandy sediments. They have created a rather rolling landscape (Bankoff 1974).

Serbia (south of the Danube and north of Macedonia)

The distinctive feature of Serbia is the extensive system of mountains and valleys. Serbia is a topographically complex geographical unit. Topographically, Serbia is characterized by an area with low rolling hills and broad plateaus in the north and northwest, and high mountains in the south, east, northeast, and west that cut it off from the surrounding regions. Two major mountain systems exist: a) The Dinarics which rise from the Adriatic coastline and decrease in altitude until the foothills merge with the low terraces of the Pannonian Plain; and b) the mountains of east Serbia. The latter are a section of the Carpatho-Balkano system which arcs down into Yugoslavia and is known locally as the Balkan Mountains (Stara Planina in the south or Homolske Planina in the north) (Greenfield 1986: 38-43). The center of Serbia is known as Sumadija, which is a large eroded plateau and mountain-valley system.

The mountain systems are dissected by a plethora of large and small rivers and their tributaries. Several major river systems cut through the region - the Morava, Kolubara, Ljig, etc. The Morava river is the last southern tributary of the Danube before it enters the Iron Gates. Often the rivers form narrow valleys and gorges (e.g. upper Kolubara and Ljig), but also wide alluvial flood-plains (Western and Lower Morava).

Iron Gates

To the east of Pannonia, the Danube flows through the Carpathians to form a series of gorges, defiles and small basins that connect the Pannonian and Dacian basins. The Danube river gorge (Iron Gates or *Djerdap*) splits the Carpatho-Balkano mountains into two parts - the Carpathians to the north and the Balkan or East Serbian mountains to the south. Within the gorge, there are small basins, where the river widens and the banks slope less severely, alternating with gorges and rapids (Greenfield 1986: 44). The gorge is surrounded on both banks by high mountains, limiting vertical movement out of the Iron Gates. Movement traditionally has been limited to along the river bank or on the river.

Transylvania

Transylvania is Romania's largest and most varied region. This region is near the

Hungarian border in the north-west and extends throughout central and northwestern Romania. This region includes most of the country's mountains, the Transylvanian Plateau, and the northwestern plains. It covers about 39,000 square miles (101,000 square kilometres). The surrounding mountains are covered with beech and oak trees, similar to the Iron Gates. Transylvania's high plains make good grazing grounds for cattle and sheep and the plateaus and plains have good soil for farming (World Book Encyclopedia: vol. R, p. 401).

Settlement Patterns

In this section, I will summarize the evidence for the intra-settlement and regional (or inter-) settlement patterns for the Starčevo-Körös-Criş culture complex. I am adding the data from the related Körös culture to the discussion because there is more extensive information on the Körös material than for either the Starčevo or Criş cultures. The better known settlement patterns of the Körös culture will be used to highlight those from Starčevo and Criş cultures. The Hungarian sections of the plain with Early Neolithic Körös remains are limited to SE Hungary (bordering on Romania and Yugoslavia) in the Tisza and Körös river regions.

Location

Environmental factors (such as climate, soils, and forest cover) determined where people initially settled and began farming in Europe (Barker 1975, 1985: 95; McPherron and Srejović 1988). However, conditions vary quite widely throughout the region under consideration (see environment description above). Early Neolithic settlement is limited, however, to a relatively narrow range of locations. It can be generally found in clusters dispersed along the edges of rivers and streams (Whittle 1986: 13-151).

The location of Starčevo sites in Serbia fall into two basic groups: those in the main river valleys (Lower, Western and Southern Morava) and those in the adjacent hill country. All the Starčevo settlements in the first group occupy positions on the edge of the Morava flood basin, at the junction between the forest soils and what are known as alluvial smonitsas (Barker 1985: 96). The second group of Starčevo settlements are found dispersed above streams in the low hill region (e.g. Tečić, Blagotin and Divostin) (Barker 1985: 96; Chapman 1990). Almost all of these sites appear to be situated near less cohesive soils which are easily tillable (with a digging stick). None are surrounded by heavier alluvium (Sherratt 1980a,b). There is no occupation in the more mountainous zone.

In Pannonia (Vojvodina, Romanian Banat and Hungarian Tisza-Körös region), Early Neolithic sites also appear to follow the distribution of river and stream channels. Most of the sites cluster near functioning water-sources or near former channels. The sites usually appear on natural rises alongside the rivers, such as levees. These are areas that would either drain quickly or remain dry, even when the rivers annually flooded the surrounding lowlands (e.g. Foeni-Salaş) (Sherratt 1983; Barker 1985: 99; H. Greenfield pers. comm.; Kosse 1979). The soils on the levees are also light and more easily tillable than those in the surrounding lower elevations. In most areas, these dry islands are often only a few hundred meters across; the 5 km territories and even the land within 1 km of the settlements usually encompass areas which would have been liable to seasonal inundation (Barker 1985: 100). This pattern extends from the Danube near Belgrade northwards through the Tisza, Körös, and Maros (Mures) river regions into Transylvania. Seventy percent of the settlements are located on the flood-plain of rivers, and on islands in the flood-plains (Ehrich 1965: 413; Horvath 1989: 85). Where the flood plain is narrow, the sites show a linear arrangement on bluffs overlooking the valley; where the flood-plain is broader they occur on the small islands of higher ground within it (Sherratt 1982: 303).

Spacing

Settlements in the northern Balkans are spaced further apart than the tell settlements of the southern Balkans (Barker 1985; 1975; McPherron and Srejović 1988; Barker 1985: 95). For example, Starčevo sites in the Morava and Sava river valleys are commonly spaced 7 to 10 km apart (Whittle 1986: 49). This pattern appears to extend to sites in the hill country of Serbia (cf. Bankoff and Winters 1982; Chapman 1990). Unfortunately, there is a dearth of information of this type for the Pannonia area.

Size

There is a wide range of site sizes between and within regions. Some sites are quite small, while others are very large. There is little systematic data on site sizes from the Criş culture.

In the Körös culture, near Szeged, the site of Endrőd-Oregszolok was 70-75 metres long and 40-50 metres wide, while Rehelyi Dulo (based on surface scatters) stretched in a narrow strip for over a kilometre along the river bank. In the Upper Tisza region, the size of the settlements varies from 150-400 x 20-30 m to 300-400 x 30-40 m. In two cases (Devavanya-Katonafoldek and Szolnot-Szanda) the size of the settlement is much larger, 80-50-100 meters and 600 x 100 metres respectively (Horvath 1989: 85). In the south-western region, the great Hungarian section of Pannonia some sites are known to be 2 km in length (Sherratt 1982, 1983), but are multiple overlapping occupations.

Size data from 11 different early Neolithic Starčevo sites in the region around Smederevska Palanka (Serbia) show a range from 0.2 hectares (Golobok-Rimskibunar) to 12 hectares (Krusevo-Celopek). Starčevo stream-side sites vary in size from 0.2 to 8.8 ha and hillslope sites from 1.5 to 10 ha (Chapman 1990: 28). A comparison of site sizes of Starčevo sites in Sumadija and single-period Hungarian Körös sites suggests that the strong linear constraints of stream-side Körös sites did not apply with such force to the Sumadija sites with their more varied topographical conditions. Starčevo inhabitants were able to spread out more than Körös sites.

Stratigraphy - Thickness of deposit

The thickness of deposit has an important effect upon site size. A characteristic of the Starčevo culture is the paucity of stratified sites. The majority show occupation of a single period only. The levels tend to be thin and often disturbed. On average the horizon is 1 metre or less in depth, except for pit houses or structures which can range from 1-3 metres in depth. However, as a rule Starčevo-Criş sites have a single thin cultural layer (Srejović 1988: 5).

Many Starčevo-Criş and Körös sites have laterally displaced stratigraphy. They have thin scatters of occupational debris that may extend for distances up to 1- 2 km. The great length of some of these sites is probably the result of periodic occupation of small areas by small groups whose successive settlements only partly overlapped (McPherron and Srejović 1988: 465). Virgin soil was often found at a depth of 60-100 cm where there is no later occupation (e.g. Endröd-Oregszolok, Foeni-Salaş) (Makkay 1992: 121; Greenfield and Draşovean 1994). However, excavations at some sites have yielded evidence for superimposed Starčevo stratigraphy. These are usually tell sites, which have some constraints upon settlement spread. For example, Drenovac on a low rise in the alluvial flood-plain of the Lower Morava river revealed a 3-4 m Starčevo deposit (Chapman 1981; Barker 1985: 96). To move off the mound, meant living in seasonally flooded areas.

House spacing

There is little information on the spatial distribution of features within Starčevo-Körös-Criş sites due to the lack of large-scale horizontal excavations (Horvath 1989: 85). A few sites, however, have been spatially excavated. These enable us to better understand the internal structure of these sites and to interpret areas of activities. At each of these sites, almost all of the structures excavated were semisubterranean. At Rehelyi Dulo in Hungary, an area of hut clusters was spatially excavated. Between the clusters, a concentration of flaked and ground stone was found, probably indicating a working area between the houses. Storage pits with carbonised seeds of cereal grains were also found (some of the earliest in Hungary). At Divostin, the architectural remains are widely separated. Six semi-subterranean huts or earth cabins were found spread over a large area. However, the areas in between were not excavated, so the overall distribution is unknown. However, at other Starčevo sites, the general intra-site patterning is that of a larger central building surrounded by several smaller houses. The structures are arranged as clusters, in a semi- or full circle surrounding the central building. This type of patterning is found at Blagotin and Foeni-Salaş, where wide areas of the site were excavated (Greenfield, pers. comm). Linear arrangements of structures do not appear until the end of the Early Neolithic in Starčevo-Criş sites.

Presently there are only two sites from which the number of contemporaneous houses is known. Both of these sites have been almost completely excavated (i.e. Foeni-Salaş, Lepenski Vir). At the former, only 5 small structures were found. They were distributed in a semicircle around a larger structure. The distance between each of the small structures was more or less the same. The pattern at Lepenski Vir was very different. A large number of houses were crowded in rows along the river's terraces, and have been hypothesized to be contemporary (N=>35; Srejović 1972). Smaller Körös settlements are thought to have consisted of 5 to 10 houses and larger ones may have 50 or more houses (Horvath 1989: 85). However, there is little excavated data to support the contention that all of these Körös structures were contemporaneous. Hence the population estimates for Körös may be exaggerated.

Conclusions

In this thesis, the Arandjelović-Garašanin's system of phasing will be used since it has been recently found to have the greatest radiocarbon validity. This is the most widely used chronological system for the Central Balkans (cf. Manson 1990). However, there are enough problems with this system to warrant caution. The regional chronology needs to be reevaluated from the bottom up.

CHAPTER 6: EARLY NEOLITHIC ARCHITECTURE

Introduction

This chapter will discuss some of the characteristic elements of Early Neolithic architecture from temperate southeast Europe. There does not appear to be any single type of architecture for the entire Starčevo-Criş-Körös-Karanovo-Kremkovici complex. Each of the cultures has its own local architectural traditions (Whittle 1986: 131-51). There are some architectural elements that they all share (i.e. the use of wattle and daub). Two types of houses are present across the region - surface houses and semi-subterranean pit houses. Unfortunately, there is little agreement on which one typically represents the southeast temperate European Early Neolithic dwelling. Below is a brief review of this problem.

Evolution of Early Neolithic house types

A great deal of ink has been consumed in the literature concerning the nature of houses during the Early Neolithic of the northern Balkans. The literature has divided houses into two basic categories: surface and semisubterranean (Bogdanović 1988; Garašanin 1983; McPherron and Christopher 1988; Tringham 1971). Part of the problem is that there are few sites from the larger region with well preserved *in situ* and published architectural remains (i.e. Endröd, Tisajeno, Szolnok-Szanda, and Hódmezövásáhely-Kotacpart in Hungary; Blagotin, Divostin, and Lepenski Vir in Serbia; and Foeni-Salaş, Gura-Baciului, and Circea in Romania). The houses appear to be made of wattle and daub. Unfortunately, this region is a temperate zone, where the wood quickly rots away to leave thin strata and little archaeological evidence (Ehrich 1965: 409).

Several scholars have suggested that there was an evolution from semisubterranean to surface dwellings, on the basis of architectural sequences from stratified sites (eg. Bogdanović 1988: 36; Garašanin 1983; Gimbutas 1991). In these sites, only pits (interpreted as pit-houses) were found in the lowest occupation horizon. The upper horizons, in contrast, contained only surface dwellings. Other scholars (eg. Ehrich 1977; Manson 1990; Tringham 1971) disagree. When pit and surface houses occur at sites with intact stratigraphy, pit houses are generally found underneath surface houses and are earlier than surface houses. This is the traditional model of the evolution of architecture (and house types) used by local southeastern European prehistorians, and is substantiated by the data from Divostin (i.e., Bogdanović 1988; Garašanin 1983). Finding pit houses in both ends of the phase would invalidate this model. An alternative explanation for the presence of pit houses in both earlier and later sites and the apparent evolution of surface houses in some later sites may be as follows: where surface houses appear, this is a reflection of settlement stability and intensification of occupation (cf. Kent 1991). The earlier sites would be less stable and, as a result, less intensively occupied. As time passes, the sites are either abandoned or continually occupied, which might require a more permanent structure (i.e. a surface house). Any late Starčevo sites that have only pit houses might imply that the site is a seasonal site without any, or little intensification of the area. Starčevo-Criş sites are not marked by elaborate and labour-costly features such as palisades, well-constructed storage facilities, multiple chambers, etc. These features appear in the later Neolithic and reflect a more long term strategy of settlement (Kaiser 1979: 15; Kaiser and Voytek 1983).

Sites with architectural stratigraphy (i.e. Divostin) might reflect an initial short term occupation with pits and then a switch to long term occupation. Surface houses would be expected to appear only in the later periods. In these cases, mobile or less permanent settlements, whether early or late, can and do have evidence of pit houses (cf. Rocek 1995: 218). This does not invalidate a pit house to surface house evolution. But, the governing variable for when surface houses appear is settlement stability and mobility. Evolution in house type is not unidirectional. One cannot assume that surface houses are the end result of the evolution of Early Neolithic society as proposed by the traditional model. However, some prehistorians would disagree with the basic premise of pit house evolution. Ehrich (1977) and Tringham (1971: 19) argue that there is no evidence of pit houses in the Early Neolithic of the Central Balkans, and that only surface houses existed during this time. Since there is such evident controversy in the literature concerning the basic nature of houses during the Neolithic, below is a brief description of the evidence for each house type.

Pit houses (semisubterranean dwellings)

Sites with semisubterranean structures are characterized by a near absence of durable daub architecture (e.g. Foeni-Salaş in the Romanian Banat and Blagotin in central Serbia). The occupants of these sites invested very little energy in modifying and improving their living area. Simple semi-subterranean huts were constructed and occupied for a short period of time. Floors were not specially constructed or plastered. Instead, they were simply the bottom of the pit, which was dug into the well-drained Pleistocene loess deposits. Pits often designated as dwellings are generally large and irregular in shape (the size of pit houses vary from 10 x 4.5 m in the Iron Gates (Lepenski Vir) to ca. 8 x 5 or 6 m in area in the Vojvodina (Vinkovic-Trzhnica) (Srejović 1988). Shape can also vary from oval (Lepinski Vir) to trapezoidal (Padina). They are usually without internal structural features or postholes (Starčevo-Grad, Perlezh-Batka, Aradac-Leje, Bashtina-Obrežh, Golukut, lowest levels of Vincha, Crnolachka Bara, Lepenski Vir IIIa, Padina, Vinkovci-Trzhnica, Divostin I, Peshterica). Many pit houses have an entrance ramp on one side of the pit (i.e. Foeni-Salaş). It is also common for the backs of pit houses to be cut into the loess plateau, mound or hill to make for a more stable structure with better insulation. The roofs were probably simply wooden affairs (Bogdanović1988). Various pit houses as well as storage pits had surrounding postholes, burnt soils horizons, similarly shaped walls and floors, etc.

The Starčevo-Körös-Criş complex is most characteristically defined by the presence of semisubterranean structures. These semisubterranean structures are found from one end of the complex's distribution to the other - from southern Serbia to the Körös-Tisza region. In the northeastern regions (Transylvania, Crişanovo), sites with semi-subterranean structures are found at Gura Bacului (Vlassa 1976); in the north and northwestern regions (Vojvodina, Banat, Pannonia), Donja Branjevina, Golukut, Foeni and Margareci Mlin-Apatin have pit houses (Greenfield and Draşovean 1994; Srejović 1988); in the eastern part of this complex (the Iron Gates) Lepinski Vir IIIa and Padina have pit house structures present (Srejović 1972; Bogdanović1988); in central Serbia, several sites have pit houses, such as Blagotin, Divostin I, Starčevo-Grad, Perlezh-Batka, Aradac-Leje, Bashtina-Obrežh, lowest levels of Vincha, Crnolachka Bara, Padina, Vinkovci-Trzhnica, Peshterica (Bogdanović1988; Stanković and Greenfield 1992). Pit houses are found as far northwest as Transdanubia (Hungary), which is the maximum northwestern limit of the Starčevo-Körös-Criş complex (Makkay 1978). The only region where there is almost no evidence of pit houses during the Early Neolithic is in southern Serbia (Glisić 1967). It appears that the majority of sites with pit houses is in the heart of the Starčevo complex (central Serbia), with a lesser density sites with pit houses in the surrounding regions.

Pit houses are present in both early and late Starčevo settlements, and often in sites with some surface architecture. They disappear at the end of the Early Neolithic, but reappear during the Eneolithic (ca. 3300 B.C.). The later Starčevo pit houses appear to be more structurally developed and are quickly followed by the appearance of surface houses. For example, at Divostin, (central Serbia), there is evidence for both pit houses and surface structures. The pit houses are earlier (Bogdanović1988). The earliest semisubterranean structures generally have a circular or elliptical plan. They probably had simple wooden superstructures based upon surrounding postholes (2.2-6.8 m length; 1.50-4.80 m; depth 0.15-0.80 cm) and a concave floor (fig. 7). Semisubterranean structures from the middle Starčevo phase were trapezoidal or rectangular and larger in size. Evidence of wall and roof construction is poor, and traces of postholes are rare. The floors were a mixture of concave and flat. Walls in both pit house phases were slanted inwards. The latest Starčevo phase at Divostin were all surface houses (Bogdanović1988: 35-38).

Surface structures

The architecture of the Starčevo surface dwellings is characterized by timber frame dwellings with wattle-and-daub walls and clay plastered floors (Horvath 1989: 85-86; Gimbutas 1991). Surface houses are generally small in size, but they are still larger than semisubterranean houses (Makkay 1992: 121-125). Most surface houses are single story. However, some structures (usually those found in the Körös regions) appear to have two floors (Whittle 1986: 131-151). The second floor may not have been a full storey, but may have been used as a loft or granary.

Single storey houses are characteristically small, one-room structures without any evidence for internal divisions, and can range in size from a maximum length of 6-7 m (i.e. in the Yugoslav part of the Bačka (Vovojdina) at Biserna Obala) to 10-12 m long. The average size appears to be 7-10 m long and 4-6 m wide (i.e. Anza, Zelenikovo, Gračanica, Vršnik - Bogdanović 1988: 36; Gimbutas 1976; Renfrew 1969: 9; Tringham 1971: 86; Makkay 1992: 121-125).

In general, the shape of surface houses is rectangular or square in shape (fig. 8). However there does appear to be characteristic shapes for different regions. All surface houses have post holes in and around the floors to support the wattle and daub walls (McPherron and Srejović 1988: 36-41). The roofs were either thatch (usually found in the Starčevo regions) or gabled. The latter was more characteristic of the Körös Culture than Starčevo or Criş (e.g. at Hódmezövásáhely near Subotica - Makkay 1992: 121-125; Horvath 1989: 85-86). The characteristic shape of the Körös culture house (Tisza and Tisza regions) was a single-room rectangular or oblong structure (i.e., Endröd-Oregszolok

- Horvath 1989: 85-86). In the Starčevo regions, the characteristic shape of buildings is quadrangular (i.e. Starčevo type site). Traces of surface houses with rectangular bases and footings of stone were found in the southern and eastern most regions of the Starčevo culture (i.e. Obrež, Tečić, Crnokalačka Bara, and Ludoš-Budžak - Bogdanović 1988: 88). In the later phases of the Early Neolithic Starčevo-Criş culture, surface houses are definitely present. These can be found at many sites in the southern and eastern part of Serbia, such as Obre I, Divostin I, Anza II-III, Lepenski Vir IIIb, etc. (Benac 1974; Gimbutas 1991; Bogdanović 1988; Srejović 1972). Six surface houses were also found in late Starčevo deposits at Divostin (central Serbia). In the Yugoslav part of the Bačka (Vojvodina), surface level buildings were found at Biserna Obala near Nosa.

An interesting temporal pattern is recognizable in the distribution of surface structures. In Serbia, they are limited to late Starčevo contexts. The Körös surface houses also appears to be slightly later than the early Starčevo to the south. The differing house type pattern of the Körös-Tisza region is a reflection of the fact that this is the transition to the more central European Linear Bandkeramik long house pattern. The origin of the Linear Bandkeramik pattern has been traced to this region and culture (Bogucki 1988: 119). Surface houses might then be considered a later phenomenon. The exception appears to come from sites within the Iron Gates, such as at Lepenski Vir and Hajdučka Vodenica in Yugoslavia and Schela Cladovei in Romania. They consist of villages with small (5.5 to 9.5 sq. m) trapezoidal surface houses on stone-built and clay foundations (Srejović 1972: 64; Bogdanović 1988; Milisauskas 1978: 96). These are about the size of most of the semisubterranean dwellings in other sites. However, the origins of this architectural form found in each of the Iron Gates sites lies in the Mesolithic. This is not surprising given the evidence for population continuity from the Mesolithic into the Neolithic in the Iron Gates (Prinz 1987).

Population reconstruction

Usually the size of the site can be indicative of the number of inhabitants. However, the entire site has to be excavated (or systematically sampled) in order to obtain an estimate of the potential number of dwellings. Unfortunately, there are only two more or less completely excavated Early Neolithic sites from our region, Foeni-Salaş and Lepenski Vir. They yield very different types of estimates based upon the number and size of dwellings. If we assume that a nuclear family (ca. 5 people) inhabited each of the dwellings, since each are relatively small, then Foeni may have been occupied by less than 50 people and Lepenski Vir by almost 150 (H. Greenfield, pers. comm.).

Distinguishing pit houses from other pits

During the earliest phases of the Early Neolithic, there is confusion over the form and nature of house types and pits types. There is no literature that defines the distinguishing characteristics for surface houses, pit houses and refuse pits. There are a larger number of unstratified sites that show only evidence for pits, unassociated with any surface dwellings. As a result of the lack of surface evidence, the larger of the pits have been interpreted to represent semi-subterranean dwellings (eg. Bogdanović 1988; Garašanin 1983; Gimbutas 1991; Srejović 1972). Consequently, the fundamental problem is to be able to decipher the function of the various pit features on sites. There are several reasons for this lack of definition: a) there is poor evidence for surface structures during these phases; b) there is an abundance of pits in almost all sites; c) the majority of pits are filled with cultural debris. This fill makes it difficult to interpret the initial function of the pit. For example, the function of pits is commonly assumed to be: 1) for habitation (eg. Bogdanović 1988; Srejović 1972); 2) as borrow pits for daub extraction to manufacture surface dwellings (eg. Ehrich 1977; Gimbutas, Winn and Shimbaku 1989); or 3) refuse disposal (eg. Gimbutas 1991: 15). However, there are no systematic studies of the function of pits in the Starčevo-Criş-Körös culture area. As a result, there is confusion as to whether the pits were for habitation, refuse, or daub manufacture. This confusion has interfered in the reconstruction of Early Neolithic houses, settlement structure and the interpretation of Early Neolithic community organization.

Manson concludes that "in spite of the lack of good vertical stratigraphy at most sites, pit houses are often classified as earlier than the surface structures" based upon their presumed relative chronological position (Manson 1990: 86). Tringham (1971: 86) argued that the pits were not dwellings. There was "an absence of any traces of a superstructure over the pits or habitation floor within them". As a result, it would seem that it is "unlikely that any of the pits were lived in. The absence of any traces of surface habitations on a site may be explained either by poor local conditions of preservation, the fact that in most cases, if the houses were not accidentally fired, the clay comprising the walls would not be preserved, or lack of recognition of the traces" (Tringham 1971: 86). Ehrich (1977: 62), in his criticism of the interpretation of pits at the type site of Starčevo, disagreed with his co-director's (D. Arandjelović-Garašanin) interpretation of the function of the larger pits as pit-houses. While Arandjelović-Garašanin continued to maintain that they were the remains of semisubterranean dwellings (eg. M. Garašanin 1983), Ehrich argued that all the pits at the type-site were in fact refuse or daub pits.

> "The function of the pits as house foundations, although a usual interpretation, now seems to me to be very doubtful. They are of no consistent shape. Some of them are roughly circular, while other are long, shallow, wandering and irregular. Since no postholes can be attributed to them and, since in none of them was a true hearth found, I am now inclined to view them as probably borrow pits for earth or loess, to construct daub houses elsewhere, or to supply material for pottery making.... The shapes of the pits, are quite different from the quadrilateral and trapezoidal house forms found at some other Starčevo and Körös sites. It seems more than likely that any possible traces of actual houses, either as postholes or as mud or brick construction, had completely disappeared" (Ehrich 1977: 65).

Tringham (1971) and Ehrich (1977) epitomize the attitude that the pits in Early Neolithic sites, whether in the basal or subsequent horizons, were not occupational dwellings. Ehrich's confession is simply one example of how difficult it has been to properly interpret these pit features.

It was assumed that the smaller pits on the order of 2-3 m in diameter and 1-1.5 m deep were considered to be rubbish or storage pits, or possibly seasonal habitations. Conversely, the larger, shallow somewhat irregular pits were designated communal living activity areas (cf. Manson 1990: 86-87). Bogdanović (1988: 42) distinguishes between pit houses and storage pits in Divostin I. However, he does not provide any distinguishing criteria by which he separated them. The problem of distinguishing between pits and pit houses has been an issue of contention for at least the past 30 years.

Site reports from this region (i.e. eastern Yugoslavia and southern Romania) show little evidence for preserved remains of surface houses. The Starčevo-Körös-Criş complex is most characteristically defined by the presence of semisubterranean structures. It remains controversial as to whether these were dwellings or simply pits for wall daub for surface structures, which were later filled with domestic refuse. Most of the features that have been identified as houses are often assumed to be of a semi-subterranean nature. However, most of these pit features do not show architectural evidence that they were dwellings. The major evidence used for the presence of a structure has been the distribution of post holes for both pits and surface houses. Unfortunately it is difficult to determine what many of these were since there is poor preservation of architectural remains in most of the sites. This makes it difficult to reconstruct structures. Furthermore, few sites have been excavated sufficiently well to determine the presence of postholes. There is also difficulty in identifying specific characteristics associated with pit houses (i.e. hearths, floors, etc.). As a result, most archaeologists from the region prefer to interpret any pit feature as the remains of pit-dwellings (e.g. Bogdanović 1988; Garašanin 1983). This presents a major problem when trying to reconstruct, not only houses, but also spatial patterns within a village.

In Körös sites, both pits and surface houses are present. It is hypothesized that the surface houses were two storey houses with the second storey likely to have been used as a loft or granary. Such structures are common throughout the region today. It is hypothesized that the clay for the walls and roofs of such structures was derived from pits alongside or nearby the houses, which were afterwards used as middens or burials (eg. Gimbutas 1991: 15; Tringham 1971: 86). In these sites, it is easy to distinguish midden/borrow pits from surface structures because of their close proximity. In sites without evidence of surface structures, the situation is more difficult to resolve.

Many of the features identified as pit houses appear in the basal horizons of stratified Early Neolithic sites. If the pits are not excavated stratigraphically, the features are at risk of being destroyed or mixed. However, most of these pit features do not show architectural evidence that they were, in fact, dwellings. The major evidence used for the presence of a pit-dwelling (instead of refuse pit) structure has been the presence of exterior and/or interior post holes, a burnt area or hearth, and/or burnt daub remains of floors or walls (Srejović 1972; Bogdanović 1988). Many excavators use the presence of various postholes, hearths, daub floor fragments to distinguish between pit houses and refuse pits.

Another major reason that this problem still remains today is because of the method in which pits have been excavated. The common method of "pit feature" excavation has been to excavate them using unnatural horizontal cuts (10-30 cm in depth). Because of the uncertainty of the pits function, many archaeologists tend to believe there is no internal stratigraphy to a pit. This creates a problem because internal stratigraphy is usually present within these pits and it tends to get mixed with this type of excavating. Furthermore, much of the confusion comes about if there has been secondary use of the pit (i.e. occupied, abandoned, and then used as a refuse pit). In such cases, many archaeologists in the past have simply dug straight through the "garbage/refuse" deposits to sterile soil. This results in the mixing of the basal and fill horizons. If there is an occupation horizon on the basal level of the pit, it is usually missed and/or mixed.

All of these have consequences for the problem of not being able to decipher the function of the various pit features on sites. The division between the two schools of thought is presently wide and seemingly unbridgeable. Neither side has systematically examined this question using alternative methods of analysis or independent data. Unfortunately, most continue to make assumptions on pit function without proper data to back up their statements. As a result, I will propose a new method of analysis in chapter 8 to more adequately solve the problem of where the pit houses were located on a site and what their original function was (i.e. borrow pit or dwelling).

A final problem affecting the controversy is that the preservation of architectural remains varies widely from region to region. Surface remains are very well preserved at Körös culture sites. They are less frequently preserved at Starčevo-Criş sites. Sites in Romania and Serbia tend to be shallow and the Starčevo-Criş cultural horizon is close to the surface. As a result, Starčevo-Criş horizons are frequently destroyed by agricultural activities.

Intra-structural architectural features

The density of features within structures in Starčevo-Criş sites appears to have been low. Several types of features have been identified in structures: ovens, storage pits, and postholes. The evidence for each will be discussed in turn.

Ovens and hearths

There is evidence of immoveable ovens and hearths found both inside and outside surface and pit house structures. Most frequently, there is evidence for a single hearth or oven. In Körös culture sites (Tiszajenő, Szolnok-Szanda and Hódmezővásáhely-Kotacpart), hearths or fireplaces were found inside houses, but outdoor fire-places were more common (Horvath 1989: 85-86). At Tiszajenő, an open hearth measuring 120 x 145 cm was excavated. It was slightly lowered into the floor and coated with daub (Bogdanović 1988: 88). At Endrőd, only exterior ovens (n=8) were found (Makkay 1992: 134). In the most northwestern of Körös-related culture, in the area where they are evolving into Linear Bandkeramik, sites such as sites Bicske have clear evidence of probably domed ovens were found in pit houses (Makkay 1978). At Starčevo sites in Pannonia (i.e. Foeni-Salaş), small central hearths were occasionally found inside houses. There is little evidence for exterior hearths. Domed ovens are also occasionally found inside of the houses, at. Foeni-Salaş (Greenfield n.d. b) and several Criş sites (Luca 1993). At Divostin, there is evidence for hearths found directly beside Starčevo structures. Hearths are characteristically identified by their round base, the slightly raised centre, a densely packed broken stone and shard horizon (ca. 6 cm. thick), and a thin clay-sand-limestone horizon covering the entire hearth (Bogdanović 1988: 48). Stone-lined hearths are found in the centre of the Lepenski Vir-type trapezoidal surface structures in the Iron Gates (Srejović 1972; Bogdanović 1988; Milisauskas 1978: 96). The presence of ovens and hearths inside of pits would indicate that these were habitation structures where activities took place (i.e. sleeping, cooking). At Endrőd, the ovens were poorly preserved. They resembled round surfaces dug into the sterile soil or the actual floor level. Burnt and well-fired lumps of clay were scattered over them (Makkay 1992: 134).

Most frequently, however, neither ovens nor fireplaces were found within structures during the excavation of Starčevo-Criş-Körös culture sites.

Storage pits

Plastered storage pits and storage vessels were occasionally found dug into the ground both inside and outside houses in Körös-Starčevo cultures (i.e. Endröd, Divostin) (Bogdanović 1988: 42-44; Makkay 1992). There is evidence of at least 30 storage pits at Divostin, without any apparent spatial patterning to the distribution across the site. There is a little evidence for storage pits from Foeni-Salaş (H. Greenfield, pers. comm.). Refuse pits may be shallow (<1 m) or as deep as 220-300 cm (Foeni-Salaş - Greenfield n.d. b; Endröd - Makkay 1992). Their fill may be as much as 2 metres deep. The majority of pits were filled with a loose and ashy soil, with a high organic content (Makkay 1992: 121-125), and occasionally have a large pithos type ceramic at their base (Foeni-Salaş, locus 25 - Greenfield n.d. b).

Post holes

Postholes are found with increasing frequency in and around Early Neolithic pit and surface house structures. Since the floor of the buildings were only beaten earth, only the post-holes indicated the structure's ground plans. It makes it very difficult to accurately reconstruct the shape of the house. Unfortunately, this is an all too common problem in defining Early Neolithic architecture.

In the Körös culture, a rectangular house (8 x 4.2 m), found at Tiszajenö, preserved a complete system of postholes (Bogdanović 1988: 88). Excavations at Endröd-Oregszolok (southeastern Hungary) revealed that only one of the houses showed evidence of postholes. These postholes did not follow a definite outline. Plaster and/or burned floors were not apparent either. Thus, the floor level of these buildings could only be defined on the basis of the artifacts' position (Makkay 1992: 122). In the most northwestern of Körös-related culture, in the area where they are evolving into Linear Bandkeramik, sites such as sites Bicske have clear evidence of post holes in pit houses (Makkay 1978).

In the Yugoslav part of the Bačka (Vovojdina), surface level buildings were found at Biserna Obala near Nosa. They were small rectangular structures. They had levelled and mud-coated floors, daub walls with supporting posts (as evidenced by postholes), and ovens of fired-earth (Bogdanović 1988: 88).

Internal divisions

Internal division are visible at a few sites. For example, at Crnokalačka Bara, a pit-house with three differentiated rooms was found (Bogdanović 1988). At Blagotin, pit house number 10 had two rooms (Greenfield and Stanković n.d.). However, the norm appears to be a lack of any discernible internal divisions within pit house structures.

Conclusions

Since no remains of surface houses were found at most Starčevo-Criş sites, large pits are usually classified as pit houses. However, the identification of these features as pit houses has been treated with scepticism (Milisauskas 1978: 94; McPherron and Christopher 1988: 469). In contrast, Srejović and other local prehistorians feel that most Starčevo settlements had lean-to huts sunk into the ground (Srejović 1972, 1988: 5).

There are many reasons why it has been difficult to distinguish pits from pit houses in sites from the Central Balkan Early Neolithic, despite the importance of the time and region to European prehistory. First, most excavations carried out in the region were not systematic. Second, the focus was not on excavation strategies which would yield detailed information on the function of structures. Third, excavation has typically been of a limited spatial nature, so that there is a poor perception of the distribution of features across a site (which requires excavation over a large horizontal area). Fourth, there has been a focus upon chronology (with limited excavations to recover vertically superimposed sequences), instead of wide spatial exposures (outside of the Iron Gates). Fifth, few sites have been excavated sufficiently well to determine the presence of postholes. There is also difficulty in identifying specific characteristics associated with such houses (i.e. hearths, floors, etc.). This presents a major problem when trying to reconstruct, not only houses, but also spatial patterns within a village. Sixth, there is no literature that defines the distinguishing characteristics for refuse pits and pit houses. Seventh, none of the excavations have recovered in sufficient detail the spatial distribution of artifactual remains associated with pits. These would be crucial to unravelling the functions of various pits on a site.

CHAPTER 7: FOENI-SALAŞ

Introduction

Foeni-Salaş is an Early Neolithic site in the southwestern part of the Romanian Banat (fig. 2). It is approximately 7500 years old (ca. 5500 B.C. calibrated). The site appears to have been occupied for a short period of time (ca. 100 years) during the Starčevo-Criş culture, and then abandoned for about 4,000 years until the Early Iron Age, after which it was abandoned once again until the early Medieval period (4-5th century A.D.). The later periods at the site are heavily disturbed, but the Early Neolithic is more or less intact. It was not subjected to erosion. The site is situated on top of a low mound surrounded by agricultural fields.

The site has a single and very thin occupation level which allowed the excavators to open a large area of the site in only three summers of field work. Excavations at the site were undertaken in order to acquire a better understanding of the socio-economic and spatial organization of an Early Neolithic community. Foeni-Salaş is an excellent and rare example of a single phase Early Neolithic agricultural site in the Balkans. The importance of this site lies also in its ephemeral nature. The site was occupied for a very short time. Such sites are particularly useful for increasing our understanding of the nature of spatial aspects of the Early Neolithic social-economic organization in this area.

The excavations at Foeni Salaş have demonstrated the presence of a new Starčevo-Criş II settlement in the Romanian Banat. The site appears to be one of the earliest Starčevo-Criş settlements in the area. The only other known Starčevo-Criş settlements in the immediate vicinity are found in or near the modern villages of Guilvaz, Parţa and Unip. All of these sites appear to be from later phases of the Starčevo-Criş culture (IIB or III). Therefore, Foeni-Salaş is the earliest Starčevo-Criş site known from the Romanian side of the Banat.

History of research

A collaborative research program of survey and excavation of the settlement at Foeni-Salaş was carried out by the University of Manitoba (Winnipeg, Canada) and Museum of the Banat (Timişoara, Romania) during three field seasons (July 22-August 25, 1992; July 1-Aug. 25, 1993; May 1-Aug. 6, 1994). The two directors of the project were Drs. Haskel Greenfield (University of Manitoba) and Dr. Florin Draşovean (Museum of the Banat). Students from the University of Manitoba, Belgrade, Harvard, Illinois and other institutions participated in the excavation and analysis of most of the material from Foeni-Salaş during each of the three field seasons. While assistance was provided by the Romanians in the way of permits, logistics and occasional student volunteers, the majority of the excavation and analysis was carried out by the Canadian-directed team. All of the botanical, faunal, stone, spatial, and daub analyses were undertaken by either students or other specialists of the Canadian-directed team. The ceramics inventory will be analysed by the Romanians (Dr. Draşovean and his students), but their contribution is still in preparation.

The site: physical geography and surroundings

Site location

The prehistoric settlement at Foeni Salaş is 3 km north of the modern village of Foeni, in the county of Timiş, province of the Banat, Romania. The village of Foeni is approximately 45 km SW of the city of Timişoara (capital of the Banat). The site is situated alongside the asphalt road between the villages of Foeni and Ionel, and is approximately 3 km from the Yugoslavian border. The coordinates of the site are approximately 20 degrees, 52 minutes and 30 seconds longitude and 45 degrees and 31 minutes latitude (Greenfield and Draşovean 1994).

Physical description of the site

The site at Foeni-Salaş is on a natural hill, rising approximately 5 m above the surrounding flood plain (fig. 9). It is located in the southwest half of the low rise (extending SW-NE) and is part of a remnant of a large-scale loess terrace that forms the edge of the Timişat flood-plain. The Timişat is a tributary stream of the Timiş river which flows past the site (Greenfield and Draşovean 1994).

The hill and surrounding area has been under cultivation by the local cooperative and landowner at least since the area was drained in the 19th century. The soil is normally plowed with a relatively shallow plow, which turns soil to depths of about 30 cm. Approximately 25 years ago, the local cooperative embarked upon an ambitious plan to increase productivity by deep ploughing (down to 50 cm). The results of the deep plowing were apparent during the excavations (there were several plow disturbances found in the Early Neolithic features) (Greenfield n.d. b: 3).

The site in its entirety is relatively small (ca. half a hectare). The Early Neolithic part of the site is even smaller (ca. 2000 sq m). The Early Neolithic settlement was oriented toward the south, facing the old palaeochannel or oxbow on the Timişat. In the past, this channel wrapped around the southern and eastern sides of the site. Today, the

Timişat has been straightened and channelled and lies about 100 m east of the site. The site slopes steeply on the east and south, and gently towards the west and north down to the modern day cultivated fields.

Soil and vegetation

The only vegetation on the site today is the modern crops the villagers grow. The most common type of vegetation grown is corn. There are also small patches of alfalfa that grow alongside the corn fields.

The soil is a mixture of clay and silt with a sandy substrate. The soil on the site drains rapidly because of the presence of the underlying sand. However, when exposed to the sun for a short period of time, the Holocene soils become extremely hard baked, due to the high clay content.

Surrounding environment

The site is found in the midst of the flat alluvial plain between the Timiş and Bega rivers in the Banat. The Banat, is the SE-most area of the region known as Pannonia - a politically-neutral name for the great plain within the arc of the Carpathian, Alpine, and Dinaric mountain ranges.

The Foeni region belongs to the Banat plain. The plain is organized into several areas depending upon altitude and relief. Foeni is located in the Timiş plain, which includes the flood plain of the Timiş, Bega, Moravisa and Brzava rivers (Zavoinanu 1979: 23-28). The average altitude of the Timiş plain is ca. 80 m asl (Greenfield and Draşovean 1994).

In the 19th century, the Timişat stream, and the Bega and Timiş rivers were channelled and large areas of the plain were drained. What was formerly swamp and marsh, is today rich agricultural land.

Modern climate

The site is in the midst of an area with a central European type climate. The summers are wet and hot and the winters are moist and cold. The winds come from the Russian steppes and travel over the mountains to the plains. Although moisture levels for this region are relatively high, the Banat receives less moisture than the western and northern areas of the plain. It is affected by the rain shadow effect of the Carpathians, which block moisture coming from the east. Precipitation occurs year-round, but is highest in July, declines in August and September, and rises again in October and November (Zavoianu 1979: 38). There are between 120-130 rainy days and 15-20 snowy days (Zavoianu 1979: 41).

Chronology

Relative chronology

The Early Neolithic occupation of Foeni-Salaş is tentatively dated to the second phase of the Starčevo-Criş culture (IIA and IIB), on the basis of the relative frequency and presence and absence of stylistic elements found during the preliminary analysis of the ceramics (Greenfield and Draşovean 1994; Greenfield n.d. b: 20-21). The site is stylistically connected with several other Starčevo-Criş sites from the area (i.e. Timişoara-Fratelia, Cuina Turcului I, Gura Baciului II, Ocna-Sibiu II, and Lepenski Vir IIIA - cf. Lazarovici 1984: 62; Paunescu 1979; Vlassa 1980; Srejović 1972). It is one of the earliest settlements in the Banat (Romanian and Yugoslavian) (Greenfield n.d. b: 21).

Absolute chronology

Five of the animal bones from Early Neolithic features were radiocarbon dated, but only three were considered accurate. On the basis of these three dates, the site appears to have been occupied for a relatively short period of time during the second half of the 5th millennium BC (5600-5300 BC). The other two dates were rejected because they fell outside the range of the Starčevo-Crişculture in the Banat (Greenfield n.d. b: 21).

Excavation strategy and methodology

Excavation strategy

The objective of the excavation was to reconstruct the internal social and economic organization of a single settlement of an Early Neolithic site. It was therefore necessary to map the spatial distribution of *in situ* features and artifacts in a systematic way in order to understand the relationship between different types of features and associated artifacts. Previous excavations of Starčevo-Criş settlements have not recorded and/or published the exact distribution of excavated materials in a manner which would allow systematic intra-settlement spatial analysis and reconstruction of Early Neolithic social and economic organization (Greenfield n.d. b: 1).

Excavation and recovery methodology

Initially the site was gridded into a system that covered the entire mound (fig. 10). The reason for the gridding system was to facilitate the rapid and easy location of any feature or deposit for eventual incorporation into a GIS-based analytical system. Each macro-block was 20 x 20 m, each of which were divided into 5 x 5 m trench areas, which were further subdivided into 1 x 1 m quads. It was within each of these quads that material was separately described, bagged and labelled for further analysis.

Excavation was by a combination of natural and artificial stratigraphic units, depending upon the nature, context and visibility of each stratum. The plow zone for each excavation area was removed as a 30 cm unit (occasionally subdivided) with picks and shovels. Once this top soil was removed, each subsequent horizon was removed with trowels and small handpicks. Spades and shovels were used if the horizon was culturally sterile. Underneath the plow zone, the levels were excavated in arbitrary horizontal 10 cm thick layers, unless there were noticeable changes in soil colour or texture. Small tools were used for more delicate work such as cleaning concentrations (e.g. trowels, spatulas, brushes, brooms, dustpans, dental picks, and spoons). Excavations continued until culturally sterile soil was reached - either the Pleistocene loess (locus 12) or the immediate post-Pleistocene humus above the loess (locus 5). Shovels were used to shave undifferentiated cultural horizons flat for drawing and photography. When artifact concentrations were noticed, all large remains were drawn to scale on trench plans and elevations were taken of the bottom of that level or cut (Greenfield n.d b: 8).

Each major stratigraphic unit is called a locus. Every stratigraphic unit was assigned its own locus number, and specific descriptions of the horizon were noted. When differences in soil types, both inside and outside of features, and inside and outside of artifact concentrations were noted, each unit was separately excavated and designated as a locus. Some loci may extend across the entire site, while others may be more discrete (Greenfield n.d. b: 7). With the locus system, it was possible to connect similar stratigraphic units across the site while still in the field.

All of the soil from the cultural horizons were sieved with 1 cm mesh. Soil from culturally important deposits (i.e. pits, fireplaces) was collected, sieved, and a sample was taken for flotation. Areas that had traces of charcoal or burnt soil were also collected for flotation and radiocarbon analysis.

Taphonomic problems

The most important taphonomic agents at the site are rodents. Rodent activity was and is intense at Foeni-Salaş. Modern rodents destroyed new and old areas of the trenches each night. Rodent tunnels riddle the entire site and all strata, often blurring stratigraphic distinctions and moving artifacts down as much as 50 cm. Efforts were made to separate rodent-shifted material as much as possible. Rodents seem to prefer deposits with high organic content. They intensely riddled the edges of the Starčevo-Criş pit complexes, destroying the walls and floors so as to make them indistinguishable from the surrounding strata. Many post holes appear to have been incorporated into or eradicated by rodent burrows (Greenfield and Draşovean 1994).

Plowing is another important taphonomic agent. There appears to be two periods of plowing stratigraphically preserved at the site - modern and ancient. Ancient plowing is possibly reflected in locus 4. This locus is relatively constant across the site (Greenfield and Draşovean 1994). Modern plowing has created a distinct two level modern plow zone to a depth of 30 cm beneath the surface. The site has been subject to disturbance by two types of modern plowing. At least twice each year, the site is ploughed with a relatively shallow plow (20-30 cm deep), which brings artifacts annually to the surface. Modern plows are of two types in the area. One is a shallow plow that turns over the soil to a depth of 30-40 cm. The second is a deep shovel-like plow that extends to 50-60 cm. The effects of each can be clearly seen where cultural horizons come close to the modern plow zone (Greenfield and Draşovean 1994).

Characteristics of major deposits

In this section, the characteristics of each of the major loci will be discussed according to their temporal position.

Pan-site horizons

There are five natural and cultural horizons that extend across the entire site. Each of these is easily distinguishable from other strata. These five horizons express the history of the site from Pleistocene times to modern day. Each is explained below, beginning with the earliest and ending with the most recent (fig. 11).

Locus 12 - This horizon represents a thick deposit of Pleistocene loess deposited over the area.

Locus 5 - At the end of the Pleistocene, the upper loess horizon is colonized by vegetation. The resulting soil modification caused by the vegetative growth and the accumulation of detritus caused the formation of locus 5. This horizon probably represents the first post-Pleistocene humus at the site.

Locus 2 - When the first occupants (Starčevo-Criş) arrived on the site, the surface of the site was sterile of any cultural material. They settled on top of the post-Pleistocene locus 5 horizon to form the locus 2 (Starčevo-Criş) cultural horizon. Locus 2 is the pan-site Starčevo-Criş exterior living horizon culture. It stratigraphically seals all of the earlier loci and connects to all of the semi-subterranean structures. The occupants dug through locus 5 and locus 12 to build their structures. After the Starčevo-Criş occupation, the site is abandoned for more than 2000 years.

Locus 4 - The next major phase of occupation appears during the Early Iron Age. This phase is characterized by ceramics from the Halstatt B/C "culture" - ca. 1000-800 BC. The ceramics from this culture are mostly found in locus 4. Most structures associated with this locus were destroyed by prehistoric plowing or erosion.

Locus 1 - This is the modern plow zone. After the Early Iron Age, the site is abandoned for almost 1000 years. It is reoccupied in the late Roman period (3-5th century AD). In the plow zone, a number of late Roman locally-produced ceramics were found, representing the final phase of occupation at the site.

Periods of occupation

Below is a complete list of all the loci at Foeni-Salaş organized by time period. Specific characteristics of each locus are described including soil colour, texture, material found, and possible function of the deposit. All of the loci have been divided up into their respective periods of occupation (earliest to latest). For a full loci list arranged by number see appendix 1.

Pleistocene

Locus 12 - Pleistocene loess underlying locus.

Post-Pleistocene

Locus 5 - Post-Pleistocene humus. It has a low frequency of Starčevo-Criş ceramics that filtered down into the deposit by rodent activity and other natural processes. It is found stratigraphically beneath locus 2.

Starčevo (fig. 12a)

Locus 2 - This is the Starčevo-Criş cultural horizon outside of structures and pits. It is the first cultural horizon on the site. The Starčevo-Criş occupants of the site changed the colour and texture of locus 5 to form locus 2.

Locus 7 - This is the designation for the entire Starčevo-Criş pit feature complex in trench 131/F. This locus seems to be a combination of three stratigraphically differentiable sub-loci - 14, 16 and 17, each of which is discussed below. Stratigraphically, it is possible to reconstruct the following sequence within locus 7. Locus 17 represents the initial basal occupation. Then the pit is abandoned and filled with locus 16 refuse. Locus 14 probably represents the final silting in of the pit, with washed in cultural residue, after site abandonment.

Locus 10 - This locus represents the second Starčevo-Criş pit complex. It is a trapezoidal shaped pit found in trenches 149L and 150I. There is no perceptible micro-stratigraphy in locus 10. The locus is stratigraphically below locus 4 and cut into locus 5.

Locus 14 - This locus is the upper fill of Starčevo-Criş locus 7 pit complex in trench 131F. Stratigraphically it connects to locus 2 and is beneath locus 4. Sub-locus 14 represents the upper fill of the locus 7 pit complex. It begins at an average depth of 79.88 m asl and is found largely within the centre of the depression. The density of remains in this level may represent the natural erosion of the edges of locus 16 and 17 material toward open depression after final abandonment and the disposal of new material into the still-open depression.

Locus 16 - This locus is the middle fill of Starčevo-Criş pit house locus 7 in trench 131F. It is a garbage fill level dominated by snail shells. It is the sub-locus that represents the middle level of the locus 7 pit complex. It is found stratigraphically below locus 14 and above locus 17. It is a kidney bean-shaped midden deposit distinguishable by its unique fill - a high quantity of snail shells (almost 10,000), mixed with a smaller percentages of mussel shells, Starčevo-Criş ceramics and mammal bones. In this locus, the locus underlying pit-house depression is abandoned as a living structure and begins to rapidly fill with garbage.

Locus 17 - This locus is the basal fill of Starčevo-Criş pit house locus 7 in trench 131F. It represents the basal level and living horizon of the locus 7 pit-house complex. It is a semi-subterranean Starčevo-Criş structure. The structure appears to enclose a trapezoidal area about 5x4 m (n-s: e-w).

Locus 23 - This is the third and largest Starčevo-Criş pithouse complex on the site. It is found in trenches 129C (Q5,10,15,20,25), 129D (Q1-25), 129H (Q1-5), 130A (Q1,2,6,7,11,12,16,17,21,22), 149P (Q16-25), 150M (Q16,17,21,22). It is a large circular structure, with several superimposed internal strata. The basal horizon had a large dome-shaped oven and a large central fire pit. The locus was disturbed by a later prehistoric pit (called the hearth) and a Medieval fortification ditch (locus 8).

Locus 24 - This is the fourth Starčevo-Criş pit house complex on the site. It was also trapezoidal in shape, with a fire pit at the southern end. The pit house was found in trenches 130D (Q1-3,6-8), 150P (Q1-25), 150O (Q10,15,20,25), 150L (Q21-24). During the 1993 excavations in trench 130D, it was partially mixed and disturbed by locus 30 (Halstatt) and a possible Eneolithic pit (Q1-2).

Locus 25 - This locus is a small Starčevo-Criş storage pit. A concentration of Starčevo ceramic storage ceramics were found in a small depression on the border of trenches 130A (Q5) and 130B (Q1). The pit is stratigraphically connected to locus 2, but extends slightly beneath it.

Locus 41 - This is the fifth Starčevo-Criş pit house complex at the site. It was badly disturbed by the EIA pits in this area. A few postholes were noticed and the presence of a central fire pit was noted. It is located in trenches 129E (Q14,15,18-20,23-25), 129F (Q11,16,21), 129I (Q3-5), and 129J (Q1,2). This is the only one of the Starčevo-Criş pit houses not to be filled completely with debris.

Locus 50 - This is the remains of a sixth Starčevo-Criş pit house. It was not excavated because it was found on the last day of the final field season during auguring of the area between loci 10 and 41. Its shape (trapezoidal), depth (2 m), date (Starčevo-Criş), and contents (snail shells, animal bones, and Starčevo-Criş ceramics) were determined through remains and sediments recovered in the auger.

Locus 51 - This is the remains of a large circular-shaped Starčevo-Criş concentration of ceramics and bones in the eastern half of trench 130B. It is a surface deposit. A number of possible post holes were also identified with it. It was not given a separate locus at the time, but is recognized as the remains of possibly a later Starčevo-Criş structure on the site.

Locus 52 - The remains of a possible corral in 130E. It was identified on the basis of the perimeter of post holes, and uneven surface, extreme compaction and light color of the soil.

Locus 53 - This is a surface concentration of daub without any associated architectural features or other artifact concentrations. It is centered in 130F, extending east and west into 130E and 130G. It is thought that it may represent the remains of a surface or above-ground small daub structure, such as a storage structure.

Eneolithic

While scattered remains of the Eneolithic were found in the deposits (mostly locus 1 and 4), no features were found or excavated.

Middle Bronze Age (fig. 12b)

Locus 15 - Locus 15 represents the remains of a small Middle Bronze Age Vatin culture pit in trench 131F (Q7,8). The locus cuts into and disturbs the northern edge of locus 7. This pit was dug through loci 2,7,5, and 12 (in order). The top level of the ceramic concentration in the lower levels of the pit is at 80.81 m asl and is associated with a layer of white, ashy clay at the edge of the pit. The soil around the ash at this level was full of carbonised remains. The pit was used for heating something to a high temperature (hence the white ashy clay and other carbonised remains in one part of the pit). There is no other evidence of other Bronze Age occupation at the site, although there is a large contemporary settlement only 500 m to the north.

Early Iron Age (fig. 12b)

Locus 4 - This is the remains of the Early Iron Age occupational stratum, destroyed by medieval plowing.

Locus 11 - This is a small Halstatt storage pit that was cut down from locus 4 through locus 2 and into locus 5 in trench 150I, quad 18. The remains of a large storage ceramic vessel was found in the bottom. 5. It disturbed the east edge of the Starčevo pit house in locus 10.

Locus 18 - This locus is a Halstatt pit (possible pit house) in trench 130D, (Q4,5,9,10,14,15). The floor appears to have been divided into two rooms.

Locus 22 - This is the remains of a Halstatt pit in trench 150E, Q16. Little is known about its function.

Locus 28 - The bottom of a small circular storage Halstatt (probable) pit in trench 130H (Q1,2,6,7), with postholes surrounding it probably for a small superstructure. It cut into locus 2, down from locus 4, and has a very low density of ceramic remains.

Locus 30 - This is a large Halstatt refuse pit that cut into and disturbed the centre of the Starčevo-Criş pit house in locus 24 in trench 150P. It has a high density of remains.

Locus 31 - This is a small circular and bell-shaped Halstatt storage pit in trench 130G (Q4,5). It was filled with carbonised remains (filled with a black soil darker than locus 8 soil) and had a low density of other remains. It was probably for grain storage. The top edge of the northern border appears to be cut by locus 8, which implies that locus 8 postdates locus 31.

Locus 32 - This is a small elliptical Halstatt storage pit in trench 149P (Q12). It has a low density of remains. It was filled with a series of micro-strata of blackened soil, probably indicating the presence of burnt grain.

Locus 33 - This is a Halstatt storage pit for a large pithos on the border of trenches 130H (Q24-25) and 130L (Q4-5). Only the base of the storage pit was preserved since the plow zone disturbed this area to a great depth.

Locus 36 - This is a small and shallow Halstatt pit in trench 150G (Q22,23) A low density of remains was found in the pit. It is possibly the edge of a pit structure, but more likely a garbage pit.

Locus 37 - This is another small Halstatt pit in trench 150H (Q21,22) with a low density of remains. It is also probably a garbage pit.

Locus 39 - This locus is the remains of another small circular Halstatt pit in trench 150H, Q1. It also is probably the remains of a garbage pit.

Locus 40 - This locus is the remains of a large Halstatt pit (pit-house?) complex in trenches 129B (Q5,10,15,20,25), 129C (Q3-5,8-10,13-15,18-20,23-25), and 129F (Q5). There are associated postholes and a fallen daub wall/floor stratum. It is filled with a dark grey soil with a high clay content. The locus is cut by the Medieval trench (locus 8). It contains mostly Halstatt remains, but with a substantial quantity of Starčevo since it disturbed the western edge of locus 23.

> Locus 40.1 - This sub-loci is the upper stratum in locus 40. This stratum is light in colour (light grey).
>
> Locus 40.2 - This sub-loci is the lower stratum and basal fill of feature locus 40. The two loci are separated by a daub floor stratum at the base of cut 7. It is darker in colour than in the preceding stratum - light yellowish brown, with orange flecks (probably daub).

Locus 44 - This is another large Halstatt pit house complex. It is found in trenches 129E (Q3-5,8-10) and 129F (Q5,10). Both sets of internal strata are composed of a loose silty loam and contain mostly Halstatt material. Some Starčevo remains are also present, but probably as a result of disturbing the Starčevo deposit in locus 41.

44.1 - The upper stratum of locus 44. It cuts loci 6 and 7.

44.2 - The lower stratum and basal fill of pit 44. The two loci are separated by a fallen daub wall stratum (cut 07). This stratum is darker than 44.1. This is the basal fill of the pit.

Locus 45 - This is a small Halstatt pit in trench 129C (Q3 and 8), cutting into locus 40. It has a low density of remains. It is probably a storage pit.

Locus 47 - This is a small Halstatt garbage pit in trench 130L (Q15,20), sealed by Medieval floor. It has a high density of ceramics and mussel shells.

Locus 48 - This is a small Halstatt pit in trench 129C, Q18. It was found beneath the fill of the Halstatt pit house material in locus 40, and possibly dates to the same period of use of the overlying pit house.

Feature 3 - This is a small Halstatt pit containing the base of a large pithos. It is found in 130D, quad 3. It is associated with the Halstatt pit house feature to its immediate east (locus 18).

Dacian and Medieval (fig. 12c)

Locus 4 - Locus 4 was probably created through Medieval plowing. It contains a mixture of all the post-Neolithic deposits on the site. It contains mostly Halstatt material, but also some Eneolithic, Bronze Age, and Medieval materials. All of the features in it were destroyed and the artifacts appear to not be in primary context. Medieval plowing of the area destroyed the Eneolithic, Bronze Age, Halstatt and Medieval horizons above the Early Neolithic. Only the later deposits cutting into the Early Neolithic horizons were preserved. The colour of the soil is a Grey (10YR, 5/1), and is widespread through site. The colour seems to be caused by the mixture of whitish ash and black soot, probably the result of field burning. Locus 4 contains a mixture of Starčevo-Criş (disturbed by Iron Age and Medieval activities), Eneolithic, Halstatt, and Medieval ceramics. Halstatt ceramics dominate the assemblage implying that this was mostly a former Halstatt cultural horizon destroyed by later plowing activities.

Locus 4.1 - This locus stratigraphically connects with locus 8.1 in 131F. It is the upper locus 4 in 129C.

Locus 4.2 - This locus stratigraphically connects with locus 8.2 in 131F. It is the lower locus 4 in 129C

Locus 8 - This is a Medieval fortification ditch. It appears to stratigraphically connected to locus 4 (131F) and sealed by locus 4 (129D, 130H). It cuts through locus 2 and 5 and sometimes extends into locus 12 (131F). Locus 8 represent a deep ditch that extends in an east-west orientation across the site and eventually turns southward at trench. It cuts all underlying deposits in trenches 131E,F, 130C,D,E,F,G,H, and 129C,D,E,I,M. A relatively low frequency of ceramics are included in the soil, which are a mixture of all periods on the site implying that the ditch was dug during the final occupation of the site. The ditch was created as part of a large wooden palisade, the posts of which were placed upright in the ditch, which was then filled. Many of the post burnt down, leaving carbonised remains of their form.

Locus 8.1 - This sub-locus is the upper fill of locus 8. It is very thick, and greyish brown (10YR, 5.2) in colour.

Locus 8.2 - This sub-locus is the lower or basal fill of locus 8. It is very thin, and brown (10YR, 5.3) in colour.

Locus 13 - This is a sedimentary lens above locus 8 and below locus 1. No ceramics have yet been analysed that are associated with this locus.

Locus 21 - This is the remains of a Medieval pit house structure in trenches 149L (Q4,5,9,14), 149I (Q4,5,9,14,19), 150E (Q21) and 150I(Q6). A row of associated postholes were found along its side with a low density of Medieval remains.

Locus 27 - This is a Medieval pit structure with postholes and fired clay floor in trenches 130G (Q22-24,17-19). It is cut from locus 4 into locus 2. A low density of remains were associated with this locus.

29 - This locus is a Medieval storage pit in trench 130F (Q17). It cut into locus 2 and 5 from locus 4. It can be seen in the middle of locus 4. No associated ceramics. Possibly upper fill of locus 35.

Locus 35 - A deep circular bell-shaped Medieval storage pit in trench 130F (Q12,13).

38 - A small square Medieval pit house, with a fire clay floor, surrounding postholes, and a dome-shaped oven in the south end. It is located in trenches 170K (Q19,20,24,25), 170L (Q15,17,21,22), 170O (Q4,5,10), and 170P (Q1,2,6). There was a low density of remains (including ceramics, bone, carbonised wood, and metal).

Locus 42 - This locus belongs to another Medieval pit house complex in trenches 130L (Q15,20,25) and 130P (Q5,10). Its shape was not determinable since it was only transected. Postholes and a fired clay floor were found.

43 - A Small Medieval pit cut down from the centre of the Medieval pit house (locus 42) in trenches 130L (Q25) and 130P (Q5). It was possibly used for storage initially, but was filled with rubbish after abandonment.

Locus 46 - A deep Medieval bell-shaped storage pit in trench 129E (Q8,13,18), cutting through loci 41 and 44. It contained a low density of remains, and carbonised soil at the bottom.

Feature 4 - This is a bell-shaped storage pit in 130A, quad 7. It is cut by feature 5.

Feature 5 - This is a bell-shaped storage pit in 130A, quad 3 and 7 that cuts into feature 4.

Feature 6 - This is a bell-shaped storage pit in 130A, quad 15. It had an infant burial in the middle of the fill. It was cut by locus 8 (the fortification ditch).

Modern

Locus 0 - This locus was reserved for the surface collection above the trenches. It has mixed temporal affiliation.

Locus 1 - This locus is the modern plow zone. It is 30 cm thick, with dark brown soil (10YR, 3/3).

Temporal distribution of activities

While the site is relatively small, there is spatial differentiation in activity areas (as defined by the above loci). Structures were found in only three periods.

Medieval - This occupation is spread over the largest area of the site. It includes both surface houses (locus 38), semi-subterranean structures (loci 21, 27, 42), storage pits (29, 35, 43, and 46), and fortification trench (locus 8), and two graves (graves 2 and 3). In addition, there is the large pit (locus 30, whose function is uncertain). The majority of these features appear to be concentrated in the most southern part of the site, probably as a result of erosion, which was greatest in the northern half of the mound. Structures do not appear to be preferentially inside or outside the fortification ditch. Medieval features appear both inside and outside of the ditch. No apparent organization in the distribution of Medieval features is apparent, except that all of the graves are outside the fortification.

Iron Age - Iron Age features appear to be concentrated in the southern half of the site. They include three large pits whose function is uncertain (loci 30, 40, and 44). It is possible that they are pit houses since no remains of Early Iron Age surface houses were found. There is one definite pit house (locus 18). There are several recognizable bell-shaped storage pits (loci 11, 31, 32, 33, 36, and 37, and the large pithos feature - feature 3). There are several pits which may have begun as storage pits, but whose final function was for rubbish disposal (loci 22, 28, 39, 45, 47, and 48). There does not appear to be any spatial patterning of the features across the site.

Starčevo - All of the Starčevo features appear to face the southern part of the site and are concentrated to the southern half of the entire site. There does not appear to be any Starčevo features that are on the northern side of the site. The features were constructed to face the old river channel which ran along the south and eastern sides of the site. Six pit houses were identified. Five of the pit houses are small and are arranged in a semicircle around the perimeter of the site (loci 7, 10, 24, 41, and 50). In the centre of the arc of pit houses, there is a large open space, a large central pit house (locus 23), a possible corral (locus 52), and a large surface concentration of bone and ceramics (locus

51). The largest structure found so far on the site was locus 23. All of the other features appear to be arranged in a semi-circle around this feature, and are nearly equidistant from the centre of the open space. A small storage pit (locus 25) was also found in the centre of the arc.

Conclusions

The earliest cultural features on the site are the Starčevo-Criş pit complexes. The importance of this site is the short-lived nature of the Starčevo-Criş occupation. The ceramics appear to be largely from the Starčevo-Criş IIA phase. The site has a single and very thin occupation level. There is no evidence of later Starčevo-Criş structures cutting into earlier ones. There is a near absence of intact Early Neolithic daub architecture or the construction of other durable structural forms. It has been hypothesized by the excavators (Greenfield n.d. b; Greenfield and Draşovean 1994) that the occupants of the site invested very little energy in modifying and improving their living area. They argue on the basis of the lack of evidence for surface houses, that simple semi-subterranean huts were constructed and occupied for a short period of time. Floors were not specially constructed or plastered. Instead, they were simply the bottom of the pit, which was dug into the well-drained Pleistocene loess deposits. The dwellings seem to have been abandoned relatively soon after construction because: 1) there is no evidence of stratigraphic accumulation of occupation debris and habitation levels above the basal level; 2) there is a lack of well-constructed hearths for warming the interior during the colder seasons, and a lack of immovable storage facilities (such as clay ovens and large storage pots); etc. All of these are characteristic of more sedentary societies. After the pit dwellings were abandoned, they may have been filled with midden materials from neighbouring structures. But they were not subsequently reoccupied or dug into indicating that the pits were probably still open during the rest of the occupation (hence garbage fill - Greenfield n.d. b). However, the identification of these features as pit houses remains tentative. It will not be until the typological and distribution analysis of the daub architectural remains is complete that the original function of these large pit complexes can be ascertained.

CHAPTER 8: DISTINGUISHING PITS FROM PIT HOUSES THROUGH DAUB ANALYSIS

Introduction - using daub analysis to locate and identify houses

Daub is the remains of baked clay used during the construction of walls, floors, ovens and hearths. Such clay is often mixed with an organic temper and placed over a wooden lattice framework. The latter is known as wattle-and-daub, and can be used for walls, roofs, fences, etc. (fig. 13). Wattle and daub structures completely disintegrate over time, if left unfired, and will eventually become archaeologically invisible (McIntosh 1974: 167). Daub structures in prehistory are not normally fired, except when burnt in a fire. Houses can burnt down purposely to destroy the structure (eg. to rid the area of vermin or spirits - cf. Tringham 1988) or accidentally (as a result of cooking or heating activities within or nearby the structure). When the structure burns, the daub in the wall is fired, becomes hard, and preserves (Bankoff and Winter 1979). Baked daub remains are commonly recovered in Early Neolithic sites implying that structures frequently burnt down.

Theoretically, many different types of architectural daub - eg. house, floor, wall, roof/ceiling, oven, granary, etc. can exist as a by-product of the construction of an Early Neolithic structure. It is possible to reconstruct the different types of architectural daub by analysing the attributes of the recovered daub. For example, it is possible to distinguish between the daub remains of fallen walls and floors by looking at special attributes unique to each of these types. This method of analysis can also be used to determine pit function. Through daub analysis, it is possible to distinguish between habitation pits (those associated with superstructures such as daub walls and floors), and those pits with other functions. When trying to locate houses on a site, it is necessary to isolate pit houses from other pit types. Therefore, it is essential that daub analysis should become the first step in trying to locate houses on sites, especially where there is very little obvious architectural evidence.

The spatial distribution of daub remains can be used to interpret the spatial organization of a site. Distribution studies of daub have been previously used to identify houses. Ammerman et al. (1988) examined the distribution of daub remains across an Early Neolithic site in Italy to demonstrate that concentrations of daub remains on the site were nonrandom, and hence represented daub houses. Greenfield (n.d. a) has used the distribution of daub remains from the surface of the Starčevo site at Blagotin (Serbia) to target the location of structures for excavation. However, neither of these studies have directly addressed the issue of identifying pits as houses through the analysis of daub remains.

In the absence of adequate excavation techniques to recover detailed data on posthole, hearth, artifact, and other distributions, it is necessary to determine the function of Early Neolithic pit features by means of an alternative method of analysis. In this chapter, I will outline the theoretical framework for the identification of habitation pits from non-habitation pits in Early Neolithic sites. This will be done through the examination of the nature and distribution of construction daub from sites, in particular, the Early Neolithic Starčevo site at Foeni-Salaş in Romania.

Architectural daub size, fragmentation, and spatial distribution model

There are many possible interpretations that can be made about a pit's function. When daub fragments are associated with a pit or archaeological feature, there are certain assumptions that can be made on the function of the feature. The feature can be assumed to be a house, storage pit, or a refuse pit, as opposed to rubbish (which would not require a daub wall or floor). It is therefore necessary to be able to outline specific characteristics for each pit type that are specific only to that particular feature pit type. For example, it is necessary to determine the size, quantity and diagnostic qualities it possesses for each daub deposit found. This type of information can help us to make an informed decision on the pit's function. Below are some assumptions that can be made when daub is found in specific locations across a site, and how these assumptions can help in the location and identification of houses.

Assumptions underlying architectural daub distributions

In this section, I outline several of the general assumptions that can be made about daub, its distributions across a site, and the implications of each type of daub found in a particular location on a site. On the basis of these assumptions, it becomes possible to construct hypotheses for determining pit function through daub analysis.

1. It is possible to recognize different types of architectural daub on an archaeological site.

2. The spatial distribution of architectural daub concentrations can be used to isolate structural remains and to help distinguish between the presence of pit-houses and/or surface houses on a site.

3. The location of daub within a pit and identification of what the daub was used for can be indicative of a pit's function.

4. Differences in size, quality, and quantity of daub can determine the function of the pit and its fill (eg. as a garbage deposit, secondary deposition, or as a dwelling floor deposit).

5. The location of pits in a site is indicative of its function and the nature of its fill.

Some hypotheses about daub distribution and interpretation of deposit function or origin

It is possible to predict the location or function of a pit based on the distributions and characteristics of daub found across a site. For example, if construction daub is found in only certain areas across the site, it is likely that these will be either remains of surface or pit houses in this area. Once patterns of daub distribution can be seen, it is possible to predict the origin of the distribution. In this section, I will present some predictions concerning daub distributions and explanations of deposit origin and function (fig. 14).

Once a daub concentration is discovered, it is necessary to analyse the concentration to determine its characteristics. Size of daub fragments, quantity of daub fragments, and diagnostic quality of daub were chosen to help predict specific types of daub deposits according to its distribution pattern (i.e. is the daub characteristically distributed like a surface house, pit house or refuse pit). Each of these categories can be helpful in revealing information on deposit function and origin.

Daub size

The first question to be asked when analysing daub and forming predictions of its function is: are the fragments large or small? Larger pieces of daub tend to be diagnostic, while smaller pieces of daub tend to be non-diagnostic and eroded. Below are some predictions of pit function based on the size of daub.

A. Large-sized fragments: If the size of the daub fragments is large, and if there is a large quantity of fragments, and if the daub is found *in situ*, the deposit probably represents a house.

B. Small-sized fragments:

a. If the size of the daub fragments is small and eroded, and there is a large quantity of fragments, then the deposit possibly represents the remains of a disturbed house that was not rapidly buried and preserved.

b. If the daub pieces are small, not eroded, and there is a small quantity of daub, then either the house is smaller than the house mentioned above or, it is some other type of structure (i.e. refuse pit) that was poorly preserved.

Quantity of daub

Two quantity categories have been initially utilised - large and small quantities.

A. Large quantity of fragments: If there is a large number of daub fragments and they are large in size, then it is probably the remains of an *in situ* house.

B. Small quantity of fragments:

a. If there is a small quantity of daub, but they are large in size, then perhaps this was a secondary deposit. Possibly, the feature was used as a refuse pit after abandonment.

b. If there is a small amount of eroded daub and the pieces are small in size, this possibly represents a secondary deposit (possibly a refuse dumping area).

Based upon the above assumptions (size and quantity of daub), it is possible to formulate the following three hypotheses:

1. A daub deposit that has large-sized pieces and a high quantity of material is probably a house.

2. A daub deposit that has small-sized pieces and a small quantity of material is probably a refuse pit.

3. If wall, floor, or oven/hearth daub are found in large quantities within a pit, it is a dwelling. These are however complicated by the presence/absence of diagnostic daub.

Architecturally diagnostic daub

The third category is concerned with the presence/absence of daub that is architecturally diagnostic. It is important to the daub analyses to determine whether the daub has any diagnostic features. Three major types of diagnostic daub were recognized in the analysis of the material from Foeni-Salaş. Construction daub is used for those fragments that derive from a wall, floor, ceiling, or roof. It usually indicates the presence of a structure. Formed daub is used to describe daub fragments that were parts of figurines, weights, furniture, etc. The term non-diagnostic daub is used for fragments that could not be assigned to any of the previous categories. It is difficult, if not impossible to assign a function to non-diagnostic daub (except as part of a refuse pit or secondary deposit if found in large quantities). Since this thesis is concerned with Early Neolithic architecture, I will only be investigating the construction daub.

The following modifications of the above hypotheses can be offered on the basis of the presence/absence of construction daub. If construction daub is present in a deposit, the size and quantity of the fragments must be considered.

A. Large-sized fragments:

a. If the daub is architecturally diagnostic, with large-sized fragments and a high quantity, and found *in situ*, it is probably the remains of a house that was rapidly buried.

b. If the architecturally diagnostic daub is large-sized but there is only a small quantity of remains, this is possibly the remains of a secondary deposit.

B. Small-sized fragments:

a. If the daub fragments are architecturally diagnostic, small-sized, and occur in a large quantity, the deposit was possibly a disturbed house that was left open to the elements for a long time.

b. If the daub is architecturally diagnostic, and if only a small amount is present, it is likely that the deposit was used as a refuse pit.

Non-diagnostic daub

Non-diagnostic pieces of daub occur where the remains have fragmented to such an extent that they cannot be identified as more than daub. Daub easily breaks down and erodes into small unidentifiable (in terms of function) fragments. Daub exposed to the elements, including that lying in an occupational zone, is subject to erosion, fragmentation, and spatial displacement on a daily basis due to a variety of forces, such as rain, stepping, sweeping, and cleaning. These forces tend to displace daub from their primary context and destroy any diagnostic features on its surface.

In this analysis, such non-diagnostic daub will be further divided into two size categories: small and large. These categories are further subdivided by the quantity of daub.

A. Large-sized fragments: large-sized daub fragments would be buried rapidly and found only a short distance away from the structure from which they derive:

a. If the architectural daub fragments are large in size, but found in small quantities, with no signs of erosion, it is probable that the deposit was buried rapidly, but was not immediately next to the daub structure. If the pit was very far from the house, the daub would have had to move a greater distance and been subject to increasing fragmentation. A pit is probably a refuse or borrow pit if it lies close to a surface or pit house.

b. If the daub fragments are large in size and the quantity of remains is also large, then the deposit was probably buried rapidly and very close to a house. It probably was the result of a mass clearance or reconstruction of the area.

Small-sized fragments: characteristically, small-sized daub fragments would be buried slowly and found spread out over a substantial distance away from the structure from which they derive. Small pieces as opposed to large pieces of daub can be swept or moved a greater distance by natural or human processes (such as keeping the house area clean, trampling, kicking, erosion, etc.).

a. If the deposit has small-sized pieces of daub, and a small quantity of daub fragments, it is probably a refuse pit found farther away from the structure.

b. If the deposit has small-sized pieces of daub, but a large quantity of fragments, it is probably a refuse pit found nearer to where the structure destruction took place. The key difference between this hypothesis and the preceding is that larger quantities of daub are found. The other possible explanation is that the pit was open to elements for a long time.

Daub distribution hypotheses for habitation pits and dwellings

Once the basic model of daub distribution, function, and origin has been established, it is possible to make further predictions of the relationship between daub distribution and structures. The hypotheses in this section assume that daub is architectural.

1. If house wall daub concentrations are found only above pits in a site, with other evidence of dwellings in the pits, then this was the location of the structure and there was a superstructure above the pit.

2. If daub concentrations are found only in areas between pits, then it can be assumed that the houses were surface houses and the pits were used as borrow pits or for refuse.

3. If daub concentrations are found randomly between pits and in pits, the situation becomes more complicated. It is more difficult to determine whether or not the pits were used as houses.

4. If daub is found in certain locations within a pit (i.e. upper, as well as basal levels), it is necessary to separately analyse the different daub levels to establish the pit's changing function (eg. basal level is for dwelling; middle level for refuse after abandonment).

5. If daub is found only on the basal level of a pit, the pit was probably used initially as a dwelling.

6. Pits with non-diagnostic daub in large quantities are refuse pits.

7. Pits with large quantities of diagnostic daub are assumed to be houses.

8. If there are smaller pits beside larger pits that contain architectural daub, the smaller pits can be assumed to be garbage pits or pits of functions other than occupation.

Relationship between pit function and daub types

Theoretically, there should be a difference in type, quality, quantity, and size of daub remains between habitation pits and pits used for other functions. However, even after the analyses are completed, it is necessary to understand the assumptions and expectations of daub found in habitation pits in order to properly identify them as such. Below is a brief discussion of the function of habitation pits, and the expectations of daub remains found inside of this specific pit type.

It is expected that substantial quantities of relatively *in situ* burnt daub remains would be found within pits if the pit was used as a dwelling (or for storage). Part of the architecture would be composed of an overlying superstructure, probably of thatch and mud. The superstructure, when burnt, will fire, harden, and finally collapse into and fill the pit. It is expected to largely fall into the pit, rather than to the side as in surface houses, if the surrounding terrain is flat. Pits that were not used as dwellings are not expected to have high quantities of diagnostic daub remains (see above). Therefore, there should be higher concentrations of daub inside pits that were used as dwellings, with a rapid decrease in density of daub outside of the pit.

If the structure does not burn down, there would be little evidence of the superstructure, making the interpretation of the pit's function more difficult. When there is no evidence of construction daub in a pit, it is possible that the pit was used solely for refuse or the superstructure did not burn down. The advantage of this perspective is that it focuses upon those pit houses that burnt down and therefore are archaeologically most visible. Once this pit type is separated from the rest, other criteria that allow them to be further identified as residences can be isolated (eg. postholes, hearths, artifactual distributions, etc.). In association with excavation techniques that allow separation of the various internal horizons within pits, it is possible to discriminate between pit houses that were later used as refuse pits. However, the first step must be to establish what constitutes a habitation pit. Once the characteristics and function of a habitation pit are established, it is possible to then determine whether the pit had a secondary function (eg. as a post-occupation refuse pit). Next, there will be a brief discussion of the various architectural elements that are usually found ethnographically associated with habitation pits. These can sometimes help in the determination of pit function when daub remains are scarce.

Relationship of daub to other architectural elements

If the structure does not burn down, it is still possible, though difficult, to find remnants of other architectural elements. Such elements could suggest the presence of structures now invisible, because there is no burnt daub associated with them. Below are some indicators of other architecture elements, and the hypotheses and expectation that can be developed from these indicators.

Post holes

Post holes are the remains of the overlying superstructure (made of wattle and daub) of a pit house. The actual posts do not normally survive in the archaeological record. The mounds marking deteriorated wattle and daub structures will show few distinct features. It is usually rare to find the remains of the wood used for wattle and daub as a result of not only behavioural factors (eg. the practice of retrieving wood used as wattle) but also environmental factors (disintegration of wood over time) (McIntosh 1974: 166). However, the evidence they leave behind is very important and can sometimes be useful in determining pit function. Remains of the post extensions into underlying strata may also be observable by changes in the soil strata (colour and/or texture), or possibly by the presence of a hard baked ring - the result of the post burning down - found around the hole where the post used to stand. It is necessary to find either evidence of the posts themselves or changes in the soil where these posts once stood in order to be sure of pit function. Evidence of post holes is one of the best indicators that the pit was used for habitation. For example, a refuse pit would not normally have evidence of postholes unless the pit was used after abandonment as a garbage deposit.

Distinguishing post holes from rodent holes can be extremely difficult. For example, at Foeni-Salaş the best criteria for defining post holes was that they had to be discrete - meaning that they had to have a definite bottom to them and could not be traced into rodent tunnels. Some post holes at Foeni-Salaş are readily recognizable by either their stratigraphic association or by a compact or baked clayey soil surrounding them. There were two different post hole sizes - larger (10-20 cm wide) and smaller (5-10 cm wide). Only the larger holes were associated with compact or baked soil. This baked soil is probably the remains of a dense clayey soil that is pressed around the base of the pole to make sure it remains in place. If the pole eventually burns, the soil bakes (Greenfield and Draşovean 1994). All of the holes that met these criteria were relatively perpendicular to the ground.

If certain characteristics can be associated with the presence of post holes, the task of locating structures becomes easier for the archaeologist especially if there is no other indication of a structure. Some hypotheses that can be offered are:

1. pits with evidence of post holes are habitation pits first and then possibly used for a secondary function (i.e. refuse).

2. If post holes have a discrete bottom, they are probably remains of the superstructure of a pit and not a rodent hole.

Ovens/hearths

Evidence of ovens and hearths is usually the best indicator that food production and consumption are occurring on that spot. The remains of ovens and hearths inside of a pit are excellent indicators that the pit was used for habitation. If the oven or hearth is not found directly inside the pit it, but just outside it, this is still a good indicator that the pit - if large enough - was used for habitation. Ovens and hearths are usually made of daub mixed with either sand, silt or another fine soil matrix. The walls and floors of hearths or ovens are in constant contact with fire. Once fired, they become extremely hard and durable and therefore survive fairly well in the archaeological record.

Evidence of ovens and hearths is commonly found in the centre of a dwelling, but can be to one side or outside. The remains of oven daub are usually bright red in colour. They can be rounded on one side if it is part of the dome, or if it is part of the oven base, one side will be very hard baked (the baking surface) while the other side will not be formed, but rather mottled. The daub from hearths are much less formed. The hearth is usually a simple unenclosed ring of daub that would contain a fire used for cooking. The daub would be less fired because the intensity and exposure to fire is less intense than that of an oven. As a result the remains of hearths are harder to find in the archaeological record. However, stains in the shapes of circles from the hearth can usually be found in the soil strata and can help to identify the presence of a hearth even if no daub has survived. Many archaeologists assume that once the hearth or oven has been identified the house is nearby. For example, stains from fires (in hearths, ovens) identify former walls and occupation layers very nicely because the daub has usually been baked to a reddish colour and easily identifiable in the soil (McIntosh 1974: 166-167). Below are some hypotheses that can be formed from relationship between ovens/hearths and habitation pits.

1. remains of either an oven or hearth inside a pit indicate that the pit was used for habitation.

2. remains of ovens are an indicator that food processing occurred at this site.

3. remains of a deep red stain in the shape of a circle found in the basal soil of the pit is a good indicator that fire and ovens/hearths were used inside a pit (eg. the pit was used for habitation).

4. if ovens or hearths are found nearby pits and if the pits were large enough, they were

probably used for habitation.

Walls

Baked daub are the remains of walls that were part of the wattle and daub superstructure over a pit or surface house. When a house burns down, the clay bakes and becomes daub. As the house walls collapses, they will form a low mound usually in the same rough shape as the former structure outline. When remains of walls are found inside or around a pit, it is usually a good indication that the pit was used for habitation. If there is no evidence of wall daub, then the pit is usually assumed to be used for a different function. Surface houses will also have wall daub. Surface houses should be easily distinguishable from pit houses by the lack of an associated pit. Finding baked remains of wall daub, whether sun baked or fired, is the optimal situation to determining pit function.

Baked daub remains often have good diagnostic indicators of their architectural nature, such as stick impressions where the wattling was present before it burnt. The impressions on the daub from the sticks will vary in thickness depending on the size of the structure and their location within the wall. For example, a large house would require substantial upright pieces of wood to hold up the walls and roof and therefore such stick impressions would be larger than those for a small house. The size of impressions will also vary depending upon their location within a structure. The horizontal wattling intermediate between upright posts will be smaller than the uprights.

If the structure did not burn down, the identification of walls will be extremely difficult. It may be possible to see the outline of walls during a horizontal excavation of the lower soil horizons or exposure in the vertical soil profile (McIntosh 1974: 165). Skill and patience are required during the excavation of mounds to identify such walls, since the unbaked wall remains may be of the colour and texture of the surrounding soil. The use of local soils collected in shallow pits nearby means that the material in the walls and in the surrounding soil will be virtually indistinguishable. One indication of walls is that the mud that fell from the upper parts of the wall will characteristically form an almost solid mass which is generally flush with the wall stump. If undercutting has not obliterated this feature it should be possible to identify this anomaly (McIntosh 1974: 165). If walls have fallen around the outside of a pit and have not burnt down, or the daub has disintegrated, there should be evidence of low mounds of unbaked daub around the perimeter of the pit. A difference in the soil colour and intrusions of daub flakes would be evident around the pit's perimeter in the case of the disintegrated daub.

Wattle and daub walls decay readily and this process continues until the wall remains are covered by subsequent deposits. The persistent humidity and acidity of some local soil tends to break down buried wall material further. If the area is full of burrowing animals, and intense root action, the problem of identifying former mud walls becomes even more difficult due to the high level of disturbance (McIntosh 1974: 165). A structure may be partially rebuilt, several times over or alternatively the structure may be allowed to decay completely at which time the collapsed material from the walls may be used by later builders. This, however, generally occurs after several "generations" of construction and repair to parts, while the compound as a whole remains a viable entity. At collapse, a substantial low wall-stump can be preserved by the surrounding mud (McIntosh 1976: 97).

McIntosh (1976) also has proposed a "repair state typology" for wattle-and-daub structures:

A. Pole framework construction - wet clay is pounded on to the framework.

B. New wall - beginning of the etching of a rain gully; wall shows decidedly inwards slant; tiny web-like cracks form as the earth dries.

C. Undercutting and advanced cracking - deep rain gullies; light material was spread widely from the wall base; heavy material lies immediately at the base of the wall; exposure of a good deal of interior framework; wall soon to be pulled down and most of the wood recovered. (good for daub distribution)

Based on the association between wall daub and habitation dwellings, it is possible to form the following hypotheses:

1. baked daub with stick impressions is an indication of a wall.

2. finding large amounts of wall daub within or around a pit usually indicates that the pit was used for habitation. If the pit is very small, but still had evidence of wall remains, the pit was possibly used for storage, such as a granary.

3. low mounds of soil/daub, either baked or not, in the shape of a structure is usually a good indication of a house structure

4. low mounds of soil found around the perimeter of a pit might indicate the presence of collapsed walls that did not burn down or have disintegrated.

5. a cluster of baked wall daub not in association with a pit could be an indication of a surface house.

Storage pits (below ground)/granaries (above ground)

Other types of pits are not used for habitation (i.e. borrow pits, storage pits, and refuse pits). All of these can be associated with archaeological sites and are usually found in and around the area of habitation pits and houses. Storage pits are generally smaller than habitation pits and usually do not have any diagnostic daub associated with their construction. However, it is possible to distinguish between them depending on their size and contents. Storage pits are similar to refuse pits in that there usually will not be remains of architectural daub within these pits. These pits are used usually for food storage, so the presence of charred grain remains is most common. The depth of storage pits will vary, but they tend to be relatively deep (i.e. 1-3 m) in order to keep the food from spoiling from heat and exposure. Quite often the pits will be lined with rocks, manure or clay to prevent any intrusion from rodents. Usually storage pits are found in close proximity to a habitation pit or surface house. These pits are sometimes have a secondary function as refuse pits. According to McIntosh (1974: 166), shallow pits tend to be borrow pits, subsequently used for rubbish disposal. The walls constructed of this earth should be quite near.

Above-ground granaries, similar to houses, are often made of wattle and daub. The presence of above-ground granaries is usually difficult to determine unless the structure has burnt down or the daub has been sun-baked for a long period of time. Such granaries tend to be made of a wooden or clay base with an over-lying superstructure made of either thatch or wattle and daub. If the structure is made of thatch, the only indication of a granary would be from the bases of the poles in the soil (see post holes for further discussion). However, if the granary had clay that baked into daub, the same stick impressions would be found on the daub as in most wall daub. There would not be any evidence of a pit associated with an above ground granary. The only indication that the structure was a granary as opposed to a house would be in the quantity, size and thickness of the daub and stick impressions. Daub remains from a disintegrated or collapsed above ground granary would be concentrated in a small area on the surface and not in a pit. If the daub did not bake, there might be evidence of a small mound of soil that is different in colour and texture from its surrounding matrix, possibly with evidence of some disintegrated daub in it. The post holes associated with this structure might help to determine its function as well.

Below, I present some hypotheses concerned with the relationship between distinguishing storage from habitation features through daub analysis.

1. deep pits (regardless of their size) with or without architectural daub are usually assumed to be storage pits.

2. shallow pits, even if filled with refuse, are usually borrow pits.

3. If baked wall daub is found in association with a small deep pit, the pit is probably a below ground storage area (granary).

4. If baked wall daub is not found in association with any type of pit, the daub is clustered within a small area, and any associated stick impressions are small in size, the daub is probably from an above ground granary. This is especially true if there is evidence of post holes around the base of the granary.

Borders

House structures are often delineated by borders made of various materials, such as rock or earth. When one of these borders or rings are found, it is a good indication that some type of architecture existed within the border.

Earthen humps are frequently found around the edges of pit houses. These are the result of the piling of the earth from the pit around the edge of the pit to prevent water from flowing in and to weigh down the edge of the superstructure (McIntosh 1974). Earthen humps survive less well and are more difficult to recognize during excavation. Yet through careful excavation, they can be recognized.

Ethnographically, stone borders are also quite common. Rock borders survive relatively well in the archaeological record. For example, the Northern Paiute and Shoshone traditional dwellings were conical thatched or mat-covered structures. Rings of rocks around the perimeter weighed down the super-structure (Hackenberger et al. 1989: 135). The rings of rock would be left in place after the structure had been abandoned or destroyed. Usually the rocks would be of a substantial size and be found directly beside one another. If there is evidence of this sort of architecture, it is usually a good indication that some sort of habitation took place. The ring of stones must be large enough to circumvent a structure, and large enough weigh down or delineate the edge of a dwelling. They should not be confused with the stone that are normally used as a ring around a hearth. If the ring of stones is relatively small, it is possible that the stones demarcated a hearth. In either case, a stone border is an indicator of architecture.

Earthen or rock borders may be used to reconstruct the internal division within a structure. For example, if a house was made of stone and daub, there might be internal walls within the structure. After abandonment, the structure would eventually collapse. The evidence of these walls would be found in low piles of stone and dirt, all concentrated in rows within the larger rock structure (McIntosh 1974: 167). In pit houses, subdivisions are often created through the use of curtains or a light wattle framework. Earth usually accumulates along this border or a hump of soil will be left to divide the two rooms (Lipe and Hegmon 1989; Fladmark 1986).

Some hypotheses concerning the relationship between borders and structures are:

1. rock or earthen borders will usually indicate that some sort of structure existed on that spot - whether surface or pit house. The major exception may be with areas that are used for some outdoor ceremony (religious, social or political). These may have no structural association.

2. a small ring of rocks or earth may be used to surround a hearth.

3. lines humps of soil and rocks are good indicators of internal house walls especially if they are found in the general shape of the assumed structure.

Finished floors

Evidence of finished floors, made of rock, smeared and baked manure, burnt soil, clay, etc., are excellent indicators of not only the house itself but also the size and shape of the structure. Finished floors can be found in storage areas as well. Only the size and shape of the floor can help distinguish between the two. Pit houses, because of their more ephemeral nature, tend not to have finished floors. As a result, finished flooring cannot be used as an indicator of pit dwellings, nor to distinguish pit dwellings from other types of pits.

Size and shape of pit

The size of a pit is one of the biggest indicators as to the pit's function. For example, if the pit is very deep, circular in shape and small in diameter, it is probably a storage pit. If the pit's shape is irregular or trapezoidal in shape, the diameter is larger than a storage pit, and it is not very deep (circa 2 m in depth), it is probable that the pit was initially for habitation.

secondary pit functions

Refuse pits are expected to not have substantial quantities of construction daub within them. The size of the daub fragments will also differ. There is little reason to expect that refuse pits should have any kind of construction daub associated with them, except for small fragments that may be swept into them with the general refuse. The dominance of small fragments in the pits would indicate that the daub is not in situ, and has been moved around quite a bit causing extreme fragmentation. Daub is expected to be found in refuse pits. However, it would be composed of small and often eroded fragments, in a secondary position.

Refuse pits and daub distributions

Refuse deposits represent only select aspects of the social and economic systems of households. As a result, the processes which led to their formation must be understood before undertaking wider behavioural reconstructions. As a first step in the process, it is necessary to develop criteria for the identification of deposits that resulted from cleaning and dumping (Kuijt 1989: 211). O'Connell (1987) argues that small objects (i.e. small pieces of undiagnostic daub) have a greater chance of being disposed of near their place of use as primary refuse. Whereas larger, heavier, and more obstructive objects (i.e. larger pieces of wall/floor daub, ovens, and hearths) are usually removed from an activity area and disposed of as secondary refuse. Other studies note that larger and heavier items are often removed during the cleaning and maintenance of high-use area, such as hearths (Binford 1978; Hayden and Cannon 1983; Schiffer 1983).

These studies can be used to generate a number of tentative propositions concerning the disposal of refuse - including daub (cf. Kuijt 1989):

1. The quantity of refuse deposits tends to be greater in low-use areas, such as sub-floor features or next to walls, than in high-use areas;

2. The size and weight of individual items along floor zones is likely to be greater in low-use and discard areas, and less in anticipated high use areas such as major traffic corridors;

3. High use areas of food preparation, recreation and foot traffic tend to occur around hearths, in shady locations and near storage and habitation buildings.

The degree to which these statements are applicable to the identification of refuse deposits and activity areas around specific dwellings is uncertain. It may be argued, however, that the human goals of refuse behaviour and site maintenance are universal, even though the specific characteristics of sweeping and dumping activities may vary (Kuijt 1989; 212).

Two exceptions to these observations are *de facto* refuse disposal and provisional discard. Defacto reuse disposal, in which large objects are left at the location of use, is conditioned by factors such as length of occupation, rituals, household composition and the nature of activities occurring on the site (Hayden and Cannon 1983; Schiffer 1983). The intentional storage of items for future use, or provisional discard, can result in the clustering of larger, heavier objects near walls or in pits and abandoned structures (Deal 1985; Hayden and Cannon 1983).

When the entire site or compound is abandoned in haste and is the terminal occupation of the area, it is likely that the pits will not be filled with refuse. At Foeni-Salaş, there are numerous examples of Medieval storage pits that were virtually empty of their contents. This situation differs radically from the Early Neolithic pits, which were filled with artifacts and food debris. Pits are abandoned and used for secondary purposes, such as refuse disposal, when they are no longer suitable for their original function (storage or dwelling). A storage pit will be abandoned also if there is nothing left to store in it. New pits are often dug for storage or occupation when it is felt that the effort for the upkeep of old pits is greater than that required for new construction (cf. McIntosh 1974: 165). Sometimes, storage pits will be filled with artifactual (not midden) debris following the death of the owner (Greenfield, van Schalkwyk and Jongsma 1996).

Conclusions

There are many characteristics that allow the different types of pits to be identified as to their function, and to distinguish pit houses from surface houses. It is important to understand the defining characteristics of different types of pits before excavation so that they may be recognized in the field. It is almost impossible to reconstruct such data after the field work has been completed and only from field notes.

Some sites have no more than two or three indicators of architecture that are based on some sort of evidence that could be seen in profile or section. In spite of these difficulties, McIntosh (1974: 167) argues that it is clearly useful for the archaeologist to be familiar with the nature of deteriorated architectural elements. This knowledge may be obtained through complementary ethnographic and taphonomic observation. It is necessary to understand and observe patterns in the deterioration of these walls in order to identify them in the soil.

Chapter 9: METHODOLOGY - DAUB CLASSIFICATION AND TYPOLOGY

> "Classification comes most properly before analysis and interpretation. The reason should be obvious - we cannot analyse or interpret until we know what bits of information we have to work with! Since the items we recover are direct representations of knowledge (i.e. they 'contain' the inferences we will discover), it stands to reason that they should first be grouped or ordered in such a way as to make the information they contain more obvious". (Hill and Evans 1972: 234)

Introduction: Classification and typology theory

In this chapter, I will discuss the theories and methods of classification and typology considered in the analysis of the daub data from Foeni-Salaş. Most systems of classification and typology were eventually rejected as unsuitable for this analysis (see below). Nonetheless, it is important to discuss each of them in order to understand the logic behind the choice of classification system determined to be best suited for the Foeni-Salaş data.

It is much easier to organize data after a typological classification system is developed. Once the data are organized, it becomes possible to recognize patterns within a data set. It was immediately apparent at the outset of the analysis that a new classification system had to be developed since this kind of analysis had never been performed before for this area and period. A polythetic classification system using multiple variables to describe the many features relating to daub was ultimately chosen. The reasons for this choice will become clear within the chapter.

Inductive versus deductive classification schemes

There are two basic starting points for the creation of classification schemes - induction and deduction. Each will be discussed below.

Inductive classification schemes are relatively uncommon. They follow from the school of thought that any classification scheme must be objectively created with respect to a particular set of questions, without bias on the part of the observer, and then applied to data sets. The classification is not governed or limited by the range of variation within a particular data set. In other words, the classification scheme is not based upon what one sees in the data, but rather it is based upon preconceived ideas as to the range of all possible patterns. The scheme is created prior to analysis and should be flexible enough to grow as the analyst encounters new classes of data. Many of the common faunal classification schemes (e.g. Meadow 1978; Greenfield 1986) are based upon this idea since they were designed to collect all of the data necessary to do any analysis. However, as time progresses and questions to be answered change, these classification systems have to be changed or even abandoned if they cannot be adapted to the new types of data. Induction is a theoretically attractive way in which to do classification, but is not necessarily useful when trying to classify a particular category of data for the first time. The range of variation is unknown and even the parameters are still uncertain. These problems are taken into account in deductive classification.

Most traditional classification schemes are based upon deductive thought processes. Information or inferences, such as classification, are derived from the data (Rouse 1972: 86-87). Data are gathered first and inferences derived afterwards from perceived patterns in the data (Rouse 1972; Willey and Phillips 1958: 1-7).

For the classification of the Foeni daub material, I began to create the classification system based upon some deductive inferences since there was no existing classification system. Deduction observation helped to recognize that different types of daub existed, and that the patterning in the data may be related to different architectural uses. For example, I recognized that there existed wall, floor, and other types of architectural daub in the data. However, in order for the analysis to progress, a comprehensive classification system had to be created that would not be limited to any preconceived notion as to the range of architectural variation that may be encountered. This was especially important considering that daub architectural elements from many periods (Early Neolithic-Medieval) may be encountered during the analysis. As a result, induction was used in the creation of a comprehensive classification system. The classification system was based upon a study of ethnographic situations involving architectural daub. The Foeni-Salaş data could then be analysed with this system, and compared to data from other sites.

Classification versus typology

Before proceeding with a discussion of the classification scheme used in this thesis, it is necessary to define the terms classification (class) and typology (type). "Classification is the process of putting objects, events, and so forth, into classes by virtue of properties which they possess in common" (Benjamin, 1965: 62). The term "class" is a generic term referring to any division of materials or events into groupings based on similarities and differences. Any such group is called a "class". Classification is simply an extension of the recognition of differences and similarities among phenomena. Those materials, events or processes that are more similar than different, according to the classifier, are placed together into classes. Classification is a tool of analysis. It is carried out for the purpose of bringing order to a set of observations (Clarke 1972: 232).

Typology is the process involved in the creation of types. A "type" is a group that has been formed on the basis of a consistent patterning of attributes and is distinguished from other types, which possess different patterns of attributes (Krieger 1944, 1960: 143; Spaulding 1953; Sackett 1966). Typology differs from classification in that it is more specific and looks for differences between groups. A "type" is a specific "class" of phenomena, which is characterized by a non-random cluster of attributes. They are distinct groupings. Groupings based on a sorting of a single attribute dimension, however, are not types. For example, a sorting of pottery vessels would not produce different types of pots. If, however, the pottery vessels were simultaneously sorted for the attribute dimension of surface colour and some other attribute dimension (such as technique of decoration), the resulting groups could be considered as types if the groupings are distinct (Hill and Evans 1972: 233; Sackett 1966; Spaulding 1953). Types are defined on the basis of shared attributes in technique of production, form, and decoration. Theoretically they are created as a result of the interaction of individuals and small groups within a society. Sharing of accepted social values defines appropriate style. Types therefore are material representations of regularities in human behaviour (Gifford 1960: 126-136). A class may group several types together into a larger category of analysis. Hence, typology and classification are complementary, and should exist within any typological classificatory scheme. The Foeni-Salaş daub analysis is essentially based upon a classification of (daub) types.

Gifford (1960) used artifact types as indicators of social behaviour. He created artifact types and organized archaeological material (through classification) using the 'type-variety' method. Patterns and regularities are noticeable within assemblages, and this according to Gifford, lead to the creation of types. 'Types' include 'variety' as a finer level of the variation category (Gifford 1960: 126-136). A type may include several varieties. A variety is a slight shift in the constellation of diagnostic attributes that compose the type. A variety is an expression of the individual who made the object, above and beyond the general pattern derived from idea of their society. Variation within types can be thought of as a product of the individual or small social groups. Based on this behavioural foundation, the type-variety method is an important tool for cultural interpretation, and is one reason that I have chosen to use it for my analysis. It is concerned with the organization and analysis of non-biological cultural products. Gifford argues that types and varieties are inherent in all data (Gifford 1960: 126-136).

Normative versus non-normative classification schemes

Normative classification systems are also known as the 'true' typological method - types are taken to represent specific groupings of materials. It focuses upon the norm, not the normal range of variation. The determining criteria are not constant, but are continually discovered as the material is analysed. Each recognized 'type' is defined by a specific and cohesive combination of features (i.e. temper, decoration, etc.), including individual variation within an observed pattern. The distribution of each type is limited in time and space, and in its association with other cultural material. According to Krieger, the production technique, form and decoration of each type should approximate a definite pattern. This pattern represents the shared ideas of the makers of the objects. The number of distinguishing criteria can vary with different types. Even small differences between specimens are important to recognize and classify into distinct categories, if they have the same cultural associations. Each type must hold its form consistently over time and space. The framework is flexible enough to allow for subtractions or additions in groups, when or if needed without disturbing the type category. A type must be named and described, and cannot have ethnic or cultural labels (Krieger 1944: 271-287).

Non-normative classification systems should be designed to solve particular problems and, therefore, the attributes selected for measurement must be sensitive to meaningful variations in the assemblage (Redman 1973: 10). Classification systems that are sensitive to variation are non-normative. They are essentially statistical in their foundation, using the measurement of range of variation of form to define types. It focuses upon the range of variation, including the exceptions. Non-normative are essentially polythetic in form (cf. Williams et al. 1973). They involve the explicit definition and recording of each variable's (i.e. artifact's) morphological attributes. The selection of these dimensions, such as weight, size, edge angles, etc. is a complex process in which the archaeologist determines the attributes relevant to the particular hypotheses being tested from the numerous possibilities. Once attributes are selected and recorded, their covariance with other attribute values is calculated. After determining which attributes do, in fact, vary together in a nonrandom manner, the observed attribute values are statistically clustered into types that are empirically testable (Spaulding 1953; Sackett 1966; Redman 1973: 9; Whallon 1971, 1972). This method is necessary if any quantifiable or statistical manipulations of the data are required. It is also possible to visually show the range of variation between types clearly with the use of graphs and charts when using this method because the method deals with numbers and not words. Redman (1973: 10) argues that although he recommends this procedure for artifact analysis, there is not a 'best' analytical scheme.

The non-normative method is different than the normative classification method in that the former is flexible and can be adjusted to the material and questions at hand. The normative method is valuable when descriptions of types are necessary in a non quantifiable way. While it is not possible to use any charts or statistical manipulations with this method, this method will show patterns in the material quite clearly. But absolute consistency is not possible nor necessary for classificatory analysis. This is the strength of non-normative methods. Both of these methods appear to be the most flexible and allow for a wide range of variety between types and individual specimens. Both of these methods allow for the analyst to add extra variables to the system and not affect the overall analysis. There is no limit to the amount of variables added. As well, these methods are not designed to pertain to a specific data set (i.e. stone tools, ceramics), they are general enough that the daub assemblage can be fit easily to the requirements of each classification system.

I chose not to use many other classification schemes (i.e. Redmans' 1973 functional classification system; Spaulding 1953) because they were not flexible enough for the type of analysis I was doing. I needed a system that not only let me look at the morphological patterns within the daub assemblage, but also the system had to be flexible to continuously add new types to the system when they were discovered. Using the combination of both methods I was able to constantly add in new variables and types of daub that emerged from the data set. I was able to see patterns both statistically and descriptively in my daub categories and interpret these patterns quite easily due to the wise choice of classifications systems used. An in-depth discussion of how my classification typology was developed and the method that I used to analyse the individual pieces of daub will be discussed shortly. However, the differences between classification and typology are discussed briefly below in order to properly understand how these two concepts are linked within a larger classification system. It is necessary to understand the differences before commencing with a new classification system.

The Foeni-Salaş daub classification system

The system of classification used in this thesis is a combination of both normative and non-normative systems. Some variables are examined in a normative sense, while others in a more non-normative way, depending upon their qualities. The formation of daub types, however, is based upon the polythetic method. This type of analysis was necessary because daub architectural daub types have so many different and often overlapping characteristics that it is difficult to create mutually exclusive categories (types) based upon the presence/absence of one or a few characteristics. The basis for each of the daub types and the overall classification scheme will be described in this section of the thesis.

Major daub categories analysed at Foeni-Salaş

Before each variable and attribute is discussed, it is necessary to explain the major categories of daub found and analysed from the Foeni-Salaş assemblage. All of the daub excavated from the three seasons at Foeni-Salaş were analysed. Each piece was separately analysed, representing a single line on an Excel spreadsheet. The provenience data (locus, level, three-dimensional coordinate, and any special information about where the piece came from) were recorded with the other data.

There were three grossly different categories of daub remains. This was based upon an initial examination of the shape of the piece. On the basis, the daub fragments were categorized into three major daub types. The first two daub types are not as relevant for this thesis, but are mentioned only because they share some of the physical properties of architectural daub. The third category was architectural data which are discussed in detail in this thesis. Below is a brief description of each of the main categories of daub found at Foeni-Salaş.

1. *Formed (artifactual) daub* - this was anything that was formed into a specific artifact (i.e. bollas, fish weights, loom weights). Morphology, firing quality, temper type, colour, and degree of oxidation and reduction attributes were recorded. However, there were no measurements of any of this type of daub. Each more or less preserved piece was photographed and drawn.

2. *Miscellaneous (unidentifiable) daub* - this category received the most basic type of analysis. It refers to any type of daub that could not be identified as either formed or construction daub. In general these pieces were very small (ca. 2-5 cm in diameter), not morphologically distinguishable to a particular type, or severely misshapen by erosional processes. Relatively little data could be derived from this class of daub. Form was one major variable examined for each piece of miscellaneous daub (i.e. shape, dimensions).

There were 5 separate sub-categories for the different forms of miscellaneous daub; one-side formed, two-sides formed, three-sides formed, no-sides formed, and a miscellaneous perforated daub category - any daub that is formed but it is not clear what the piece represents. Frequency, size, and weight were also recorded.[4]

3. *Construction daub* - Four different types of construction daub were chosen before the classification began; wall daub, floor daub, kiln daub and oven daub. This category is the focus for this thesis and was analysed in the greatest detail. Below is a detailed explanation of the classification and analysis of construction daub.

Classification of daub architectural remains at Foeni-Salaş

Using the principle of recording of morphological attributes (Redman 1973), all of the variables and attributes describing the daub's morphological characteristics were inputted into an Excel spreadsheet. Information on each individual piece of daub was recorded on a separate line. Each piece of daub was examined for the presence/absence or quality of various attributes that would allow it to be associated with a particular type of construction daub. Each typological category was composed of several discrete attributes (see below). For an individual piece of daub to be attributed to a type, it had to possess several of the attributes characteristic of the type (cf. Krieger 1944). This model allowed for many variables to be expressed on the spread sheet without presupposing the overall patterning of the types. As well, when a new variable was discovered, it was easy to add

[4]Preliminary analysis of the daub at the end of the 1992 field season only distinguished between obvious artifacts (i.e. whole loom weight or fish weight) and nonartifactual daub. As a result of this, a significant amount of the 1992 daub was not properly analysed (for more information and its effects on this analysis see chapter 10).

it to the classification system without disruption.

The following variables were analysed during classification of the material: size, frequency, weight, manufacturing attributes such as the quality of firing (oxidation/reduction), temper inclusions, colour, and the size and number of wattling impressions (for wall daub). While the curvature of fragments and hardness of each piece of daub were not recorded, they were taken into account during analysis and are also discussed. Each of these variables are discussed in detail below as well as why this specific attribute was chosen for this analysis.

Variables and attributes

For each individual piece of daub the following variables were separately recorded for each fragment.

1. Frequency - Each piece of daub was counted as one individual piece unless it was possible to piece two or more fragments within the same excavation unit as part of the same fragment. The reason for this was to minimize double counting of fragments for each level, locus etc. In most cases, it was rare to find several pieces of daub that fit together. If several pieces of daub did fit together, they were counted as one. This variable will allow for analysis of the distribution of daub fragment frequencies across the site. It will also allow for the testing of the hypothesis that pits will have a higher frequency of daub fragments in them than across the surface of the site.

2. Weight - Each piece or group of daub was analysed by initially weighing it. Each piece of daub within an excavation unit was weighed separately. This will enable analysis of the density and frequency distribution of daub weight across the site, independent of

number of fragments. It can be used in conjunction with frequencies to correct for extreme fragmentation caused by differential preservation. Another potential significance of this attribute is to test the hypotheses that architectural elements higher up in a structure (walls and roofs, depending on the level of oxidation/reduction) tend to be lighter in weight than those below (floors);

3. Firing - Each piece of daub was analysed for the type of firing atmosphere (oxidation and reduction). Each piece of construction daub was analysed to determine the colour of the inside and outside of the fragment. Two basic colour attributes were used when determining type of firing. Red colour generally means the daub was fired in an oxidized environment (exposed to oxygen when fired) and black means the daub was fired in an reduced environment (lack of oxygen during firing) (cf. Shepard 1957). Any combinations of these two attributes is possible. Below is a description of the four major variations of firing recorded from the Foeni-Salaş daub and some of their implications.

a. Fully oxidized - Red colour is found inside and outside, often with small areas of black colour (coded as 1). This is considered evidence of an oxygen rich firing environment, and can be indicative of the firing in the open-air (burning walls and roofs of houses and ovens).

b. Poorly reduced/mostly oxidized - The colour of the majority of the exterior and interior would be red with a thin black line in the very interior (coded as 4). This could be an indication that the daub was fired in an oxygen rich environment but was either not exposed to heat for very long, or the intensity of the heat was low. This type of daub is a reflection of wall daub that burnt down and was only exposed to the fire for a short period of time.

c. Poorly oxidized/mostly reduced - This type of daub would have a black colour, with a thin red exterior (coded as 2). This is considered evidence of an oxygen-poor firing environment, where the firing area had a poor air flow (eg. bottom of floors, interior of ovens).

d. Fully reduced - This type is found where the colour is both black inside and outside (coded as 3).

e. Kiln - Another category of firing was noted towards the end of the analysis when we began finding fragments that did not fit into the above categories. Kiln daub has a very characteristic pattern. The fragments have a whitish colour on both the interior and exterior, and are extremely hard. It is an indication that the fragments were exposed to a very intense heat, while still in an oxidized environment. This type of firing is considered to be the highest quality of firing found at Foeni-Salaş, and is considered to be a reflection of the use of kilns at this site.

4. Temper - Seven separate temper categories were observed, occurring either independently or in conjunction with one another, depending on the individual piece of daub. Each category was mixed with a base of clay. If more than one type of temper was present, the relative dominance of each was noted. The attributes were are as follows:

a. Small-sized sand granules (size <1 mm);

b. Large-sized sand granules (size >1 mm);

c. Mud (was eventually omitted in favour of silt and the two categories were combined);

d. Silt;

e. Shell;

f. Chaff;

g. Small-sized sand granules mixed with silt.

5. Colour - The colour of the exterior surface of each piece of daub was recorded with the help of a Munsell Colour chart. Often more than one colour was noted, and their relative dominance noted.

6. Wattling impressions - Each piece of daub was examined for impressions created by construction techniques, such as stick impressions. For every stick impression, the width, length, and height of each impression was also recorded.

7. Shape - Shape was not recorded separately for each piece of daub. It was used as the basis for initially assigning fragments to a particular class of daub types (i.e. formed, miscellaneous or construction). Once this basic categorization took place, the daub was then analysed according to its appropriate type.

There were also a few variables that were not recorded separately for each fragment at the time of data entry. However, these variables were recognized and taken into account at the time of analysis. They were implicit in the assignment of daub fragments to the various classes within the construction daub category. One example is curvature. If a piece of daub was found with a curvature, and it possessed all of the variables characteristic of an oven, it was considered to be the domed part of an oven. Another example is the hardness of the daub. It can be used as an indicator of the type of daub (i.e. hearth daub is much less fired and compact than kiln daub). Below are the variables not recorded separately. Interpretations of each variable are outlined following the discussion of the characteristics of each of the non recorded variables.

1. Degree of curvature of fragments:

a. curved (inwards and out), with a smooth or rough interior or exterior. This type of daub is characteristic for walls or domes of ovens and hearth walls;

b. one side with a prepared flat surface with a second side that was unfinished and mottled. The reason for the mottling is because it was placed directly in a dirt or sand substrate. If found, this could reflect floors of structures or kilns, when there is no evidence of stick impressions;

c. two flat surfaces. This is expected to be part of the floor of a kiln where there is a firing chamber beneath the floor;

d. one flat surface and one surface with wattling impressions for walls of structures;

e. two pieces of daub that meet at a corner joint. Both sides of the daub should be smooth. One side could be smoother than the other (reflecting the interior wall side). This could reflect the corner of a wall, especially if there is evidence of stick impressions. Or it could represent the joint between the bottom of a wall and the floor (in which case one side would have evidence of mottling), or the top of the wall and the roof. This particular attribute was not found for joints between floors and walls and roofs. Each fragment appeared to represent a discrete part of a floor, wall, or roof.

f. a smooth surface of daub that has a lip on one or two sides, and a rough or mottled underside. This would reflect a floor that has been curved and raised on the sides to meet the walls.

2. Degree of compactness of fragments:

a. low - flaky or crumbly texture. This attribute was usually reserved for hearth because characteristically hearths are not fired as well as kiln. They are usually made of chaff and other types of intrusions (i.e. small rocks, shell, etc.) and are not compacted or formed very well. The time investment in making a hearth is minimal and the daub is not as compact and formed as an oven. Hearth daub is also less fired than an oven or kiln and therefore can break easily;

b. medium - tends to break into large pieces, not flaky or crumbly. This type of compactness is usually reserved to wall daub. Wall daub is usually made up of clay and some kind of chaff. One reason that chaff is used in wall daub is because it makes the clay stick together well and is lighter than using sand or silt as the dominant temper inclusion. It is meant to be light weight in order to stick to the wood. As a result, the wall daub can fragment easier than floor made of daub;

c. high - compact on one side with decreasing compactness towards the other. This attribute usually reflects floor daub. The upper surface is very compact as a result of the constant pressure and walking on the surface. It does not fall apart very easily. The daub is usually made of sand, silt and clay and does not have any chaff in it to make it susceptible to breakage. The underside of the floor would be less compact and formed since it is usually placed onto the soil strata and is not very well formed or compact - due to a lessening of the pressure from above;

d. very high - compact or cement-like throughout, almost vitrified. This attribute is indicative of the kiln daub found at Foeni-Salaş. Kiln daub is made on pure clay and does not have any sort of chaff. Kilns are subjected to extreme heat for long periods of time. It is very difficult to break apart a piece of kiln daub.

3. Evidence for joints between walls, floors and roofs:

a. the presence of wall and floor joints would be indicative of the structure possessing definite walls and floors.

b. to find a joint between the wall and the roof would be rare especially at an Early Neolithic pit house site. The presence of this joint would show that the houses had some sort of roof superstructure present.

c. absence of wall, floor or roof joints - this would imply only that the fragment was not part of the joint. The absence of any joints would imply that there was a relatively smooth transition between wall and roof, and absence of rectilinear type structure with well-defined joins.

Construction daub typology

In order to construct the daub architectural typology, the attributes characteristic of each type must be defined. Once all the characteristics for each type were defined, it was possible to assign each fragment of construction daub into its appropriate type.

Most analysts recognize that there are two major (and several subtypes) of construction daub: structure daub (walls, floors, and roofs of dwellings, storage, and other large-scale activity areas) and feature daub (walls, floors, and roofs of kiln, oven, and hearth daub) based upon expectation drawn from the literature (Bogdanović1988; Shaffer 1983; Tringham and Stefanović 1990) and personal ethnographic observation. It is possible to assign daub into a construction daub category if the piece of daub possess the majority of the characteristics that type possesses. Each type and subtype has its own defining characteristics which make it possible to distinguish between the types (fig. 15).

Structure wall daub - The diagnostic characteristics of wall daub from structures (eg. dwelling, storage, etc. structures) are the following:

- one or two sides formed (smoothed, but not necessarily flat).
- overall shape of surface is slightly irregular (not perfectly flat since it is not a walking surface);
- wattle stick impressions;
- chaff as the dominant temper inclusion. Small amounts of sand, silt, and other inclusions can be present;
- a mostly reduced quality of firing;
- a medium level of compactness;
- should be light in weight relative to size; and
- do not have a characteristic or standard thickness.

The reason that wall daub is characteristically light in weight is because it must adhere easily to the wood or stick internal structure. If the daub was too heavy, it would fall away from the wattling. Walls are a variety of thicknesses because many houses will have several different types (and thicknesses) of walls, depending upon the type of wall (interior or exterior walls) and part of the wall (lower tends to be thicker than upper).

Some walls are required to be very thick while others do not. As a general rule, walls that are very thick will use larger sticks. The wider the sticks, the thicker will be the daub. Wide impressions tend to imply that the daub was from areas with large pieces of wood, which are generally used in support walls. Support walls tend to leave wider stick impressions than thinner walls using smaller, more narrow sticks.

Structure floor daub - The diagnostic characteristics of floor daub from structures should have the following features:

- There must be one hard/compact baked flat surface. The underside side should be highly irregular and less compact and baked.
- The upper surface may be burnt, while the lower surface is not;
- stick impressions should not be present;
- The degree of oxidation should be more complete than in walls because of the higher temperatures that floors will be subjected to. Floors may also be periodically fired to clean them;
- There is a much more limited range of fragment thickness. The optimal thickness of floors appears to be ca. 3-4 cm because floors do not have to be very thick (in order to provide support for walls and roofs) or too thin. Otherwise, they will crumble under the impact of walking;
- There should be differential degree of oxidation/reduction present on each piece of floor daub. More oxidation is expected to occur on the upper flat surface (because it is more exposed to oxygen) than on the lower surface (because of less exposure to oxygen).

- Each piece should be heavier in weight than wall daub; and
- Tempers are expected to be dominated by sand and/or silt, rather than chaff. This will provide greater durability.

Greater differential degrees of oxidation/reduction are expected on floor than wall daub because the underside of the floor will have less oxygen circulation. When there is no oxygen, the daub will be reduced and become black in colour. Floors are different than wall daub because the latter are generally fired in a more oxidized environment. Wall daub has a more even exposure to oxygen over its entire surface. Floor daub is meant to be walked on and therefore must be more compact and heavier than wall daub. The inclusions of sand and silt allow for the floor to stay intact under pressure than if chaff inclusions were used. There is a general floor thickness that is expected among structures of similar function. Some variability in floor thickness should occur depending on the function of the structure. Floor daub should be heavier in weight (relative to size) than wall daub because of the presence of more silt and sand inclusions.

Kiln daub - There are two separate types of kiln daub: kiln wall and kiln floor daub. They share several characteristics:

- Both types are highly fired. There is very little or no reduction present;
- The temper is very compact and the weight is higher than any other type of daub;
- Silt and sand are the dominant temper inclusions;
- The intensity of firing is extremely high. They are exposed to extreme degrees of heat for long and constant periods of time; and

- The colour of kiln daub is an extreme pale yellow or white, which is unique to only this type of daub. These colours are a reflection of exposure to extreme heat.

There are some important differences, between kiln wall and floor daub, which help to distinguish between them.

Kiln floor daub:

- Only one side is formed (smooth and flat). The other side is irregular unless a lower chamber is present;
- it is generally very thick but not as thick as standard structured daub floors;
- it is completely oxidized;
- it is more compact than wall kiln daub with only silt, sand and clay inclusions (there is no evidence of chaff); and
- there is a standard thickness that is expected.

Kiln wall daub:

- Generally it has two formed (slightly curved) surfaces;
- Silt and sand are the dominant inclusions, but chaff temper occasionally occurs (which does not occur in kiln floor daub);
- It has a more variable thickness than kiln floor daub;
- It is extremely compact, but less so than kiln floor daub;
- generally the inside of the wall will be less oxidized than the outer-side of the wall.

These two kiln daub types are the heaviest and most compact types of daub. This is because the dominant inclusion is sand or silt which is initially very heavy and becomes cement-like when continually exposed to intense and high heat. The high amount of sand helps the clay withstand high and intense temperatures. Because of the constant firing, the colour of the daub changes to an almost white. The walls of the kiln may have a lighter weight inclusion (i.e. chaff) than the floor in order to maintain its dome-like superstructure and not collapse inwards. The walls are curved in order to form a dome over the fire and ceramics. Kiln daub is the most easily recognizable type of daub.

In the Foeni-Salaş analysis, all fragments meeting the above criteria for kiln daub were labeled as such. However, the function of this type of daub remains ambiguous. It was clearly designed for heating materials at higher temperatures than oven-type daub, no features of kiln were found intact even though they were *in situ*.

Oven/hearth daub - This was the least common and most difficult category of construction daub to recognize. The criteria are very similar, largely with the difference that ovens would be more enclosed than a hearth. An oven will be roofed or domed, while a hearth is open. The hearth may have a ring of clay around its edges to prevent the fire from spreading. The most common characteristics would be:

- Floor and wall pieces may be slightly curved in shape;
- Hearths will not have any evidence of formed (completely smoothed) walls, whereas ovens will have variable degrees of smoothing on both sides of walls and dome and one side on the floor (if there is no separate heating chamber);
- There is an extreme variability in thickness, depending upon where in the domed wall or often sloping wall the daub came from;
- Most of the daub is incompletely oxidized or reduced because temperatures do

not reach the intensity and degree of kilns. When daub is fired with constant oxygen present, such as in an open hearth, the colour of the ring of daub around its edge will be very red;

- Oven floors will be relatively flat (since cooking takes place on them), while hearth floors will be uneven (since wood is laid on them for heating an open area);
- Hearth daub will have a low level of compactness, and will crumble very easily since little effort is often placed on its finish. Oven daub will probably have a medium level of compactness; and
- Hearth and oven daub are often burnt (and baked), as opposed to kiln daub that is always baked. They often will show evidence of carbonised remains on their surface. This is because hearths and ovens experience direct contact with the flame, while kilns are usually heated indirectly via a separate fire chamber.

An oven or hearth would have been less time-consuming to construct than a kiln because there is less finishing and the materials used for construction are lighter weight and require less preparation. Lighter weight materials can be used because it is not be subjected to the extremes of temperatures that kilns are expected to endure. Therefore ovens and hearths would not endure as long as kilns. The inclusions in hearth daub, such as chaff, do not allow for a hard compact construction. Curved walls (horizontal and vertical) are found in ovens when they are part of the dome. A hearth is not domed or enclosed. As a result, temperatures will be lower than in an oven or kiln. Therefore, the daub from the hearth would not be as highly fired or oxidized as in ovens and kilns.

Conclusions

I began this analysis with the with the following general question - what is the nature and location of the houses at Foeni-Salaş? I decided that the best way to answer this question was by looking at the nature and distribution of daub found on the site. But in order to understand the nature of daub distributions, I was forced to classify the daub data into a variety of specific types based upon a list of the potential attributes that would be helpful in my quest. I then constructed an initial classification scheme designed to help answer my question of house location based on daub distribution. The final step was to complete the daub in terms of typological attributes.

There are several basic methods of attribute recognition and artifact classification that are currently being used to improve the reliability of artifact analysis. Since there was no preexisting daub classification system that could be referenced beforehand, it was necessary to look at the data, see some patterns (i.e. shape, size, morphology etc.), and begin the initial typology based on these types and varieties of daub. Therefore, the first step was to look at similar attributes in daub pieces in order to understand characteristics of daub from this site. Since we knew that there were several different types of daub coming from the site, it was necessary to design a suitable classification scheme. It would be necessary to add several daub types and varieties to our system as the classification progressed.

I did not only use one standard classification method but rather a combination of different methods that would yield the most accurate results for the questions to be answered. It was necessary to have two different methods of analysis. For example, I used one method for the quantifiable data - such as statistics, in order to see patterns of variation within out daub types. It was necessary to use a non-quantifiable method, using normative variables, in order to explain patterns and differences in the daub. This method did not involve analysis of the range of variation.

In the next chapter, the spatial distribution of construction daub remains is examined in relation to pit features on the site of Foeni-Salaş. It is my hypothesis that the pits with high concentrations of construction daub found within the Early Neolithic level, especially in the basal levels, are associated with pits whose function was a dwelling. The differences should become apparent between pits utilised for habitation as opposed to refuse, on the basis of the daub associations. This will highlight whether or not Early Neolithic occupants at Foeni-Salaş lived in pit houses. If we find no evidence for pit houses, it can be presumed that only surface structures existed at this location during this period.

Chapter 10: QUANTITATIVE AND SPATIAL ANALYSIS

Introduction

In this chapter I will describe the results of the spatial analysis of the daub remains from Foeni-Salaş. Several different types of analysis were used to analyse the remains. Each will be described separately.

The first part of the chapter will be a statistical analysis of daub types to show that the daub types chosen for the classification system have statistical validity. The second part of the chapter will be an examination of the spatial distribution of daub type in order to determine the location of Early Neolithic architectural features.

This analysis will not include the mixed, sterile, Eneolithic, Medieval, and Early Neolithic/Early Iron Age and Early Iron Age/Medieval deposits from the site, unless specifically discussed. The daub found in these deposits cannot be assigned to a individual temporal phase and will not be representative of the daub from a single period. Each of these deposits intruded into features with daub architectural remains and mixed the daub from two or more temporal phases within it.

The 1992 daub was not analysed completely and most was simply categorised as miscellaneous. This has a huge effect on the spatial analysis of the site. There is a large amount of miscellaneous daub in trench 131F and almost no remains of construction daub.

In this analysis, only the percentages of daub weights will be used as the measure of frequency rather than number of fragments. The reason is that the number of daub fragments is highly affected by the degree of preservation of daub remains. In some deposits the daub has been highly fragmented into many tiny pieces, while in others only a few pieces may be present. However, the weight of the two deposits may be equal. In other deposits, the percentage of fragments is higher than the weight. These deposits are generally those that have been subjected to greater fragmentation. As a result, they over-emphasize the fragment frequency. I feel that daub weights, therefore, will be a more consistent measure of the quantity of daub remains from any single deposit. This is a common problem in ceramic analysis, and also occurs with daub. Daub weights, however, are sometimes difficult to compare between periods since it appears that the same volume of daub weighs different amounts in different periods. The reason appears to be the use of different tempers over time.

The raw material used in the temper affects fragmentation. Temper 4 (silt), when used alone appears to fragment into many very small fragments. On the other hand, daub weight as a measure of frequency seriously under-represents temper 6 (chaff). It is very light in weight. Its frequencies tend to decrease when weight is used (instead of quantity).

Temporal patterns in architectural types (table 1)

Each daub type is present in the Early Neolithic deposits. As will be shown below, it has different characteristics from the daub from the other periods. Each period was assigned its own acronym in this discussion (i.e., Early Neolithic (EN), Medieval (ME), Early Iron Age (EIA), Dacian (DA). It is useful to view the data when divided by period to demonstrate the presence of architectural daub in the Early Neolithic. Some authors (e.g. Tringham 1971) have argued that some types of daub (eg. oven) do not exist in the Early Neolithic. The data from Foeni-Salaş demonstrates otherwise (see below).

Floor daub

The highest quantity of floor daub derives from the EN deposits (47%). This is followed by EIA/ME (43%), and DA/ME (7%). The other deposits had only insignificant frequencies. Further analysis must be done on the EIA/ME deposits to separate out the secure EIA pits from the temporally mixed larger pan-site horizon, such as locus 4.

Wall daub

The highest quantity of wall daub derives from the EIA/ME deposits (56%). EN deposits are much lower (28%). This is followed by ME (8%) and DA/ME (4%).

Kiln daub

The highest quantity of kiln daub derives from the EN deposits (52%). This is followed by EIA/ME (43%) and DA/ME (2%). It is interesting to note the presence of kiln daub in Early Neolithic contexts. By and large, the literature does not present any evidence of Early Neolithic kilns. Most authors suggest that Early Neolithic ceramics would have been fired in hearths, pits, or bread ovens. But fragments of kiln daub were definitely found in *in situ* depositional contexts at Foeni-Salaş.

Oven daub

There is no oven daub in any of the periods, except for the EN (100%). This could be a function of sample size, since this is the category with the smallest sample (n=7).

Temporal patterns of attributes

The major question that arises during this analysis is what is the validity of the daub types that have been selected for analysis. First, the ethnographic basis for identifying major daub types was presented in an earlier chapter 8. Second, the various daub types will be shown to have analytical validity by showing they are associated with a different constellation of attributes. For example, kiln daub easily distinguished from the others because it has recognizable differences in firing quality, temper and colour. These attributes were used to help define the various daub types. In the first section of this chapter, the attribute patterning associated with the various daub types will be discussed.

The discussion of the attribute analysis will be largely limited to the Early Neolithic and Dacian/Medieval deposits. The reason is that these are the only two sets of temporally homogeneous deposits on the site. Most of the Early Iron Age deposits are disturbed by later Dacian and Medieval digging and ploughing activities, or erosion. The Early Iron Age deposits are also mixed with substantial amounts of Early Neolithic material since they often dug into the underlying deposits and incorporated ceramics and daub into them. This is illustrated by Locus 4, the pan-site horizon that underlies the plow zone. Locus 4 is temporally assignable to the EIA/ME period. This horizon represents a mixture of the whole temporal span between these two periods due to erosion, ploughing, bioturbation and other mixing factors. As a result, daub found within this horizon could not be assigned to any single period. Hence any distribution analysis of this horizon would be invalid. The Dacian/Medieval deposits chosen for analysis represent discrete features and by and large did not disturb the Early Neolithic deposits.

Temper

The four different architectural daub types are separately analysed. Each is subdivided by period, and discussed separately. Seven different temper types were recognized in the analysis (see Chapter 9). Not all were equally present in all periods.

Floor Daub (table 2)

In the Early Neolithic, six temper types are present within floor daub. Some times they are found alone, and other times in association with each other. Types 1 (sand with small granules), 4 (silt), 5 (shell), and 7 (small sand and silt) are found alone. Types 1, 2 (sand with large granules), 4, 5, 6 (chaff), and 7 are found in association with each other. The two most common tempers are found alone - types 7 (38%) and 4 (33%). The frequency of type seven temper is actually greater since it is also found in association with other tempers (types 2, 5, and 6 - 11%). As a result, type seven makes up approximately 50% of the assemblage. Type 4 is also found in association with other types (1 and 6 - 7%). Types 4 and 7 never occur together. Type 4 is only associated with type 1, while type seven is associated with only types 2 and 5. Only type 6 is shared by both types 4 and 7. The constellation of types 4 and 7 and their associated types constitute 90% of the Early Neolithic temper distribution.

In the Early Iron Age/Medieval floor daub assemblage, all six temper types are present. Some times they are found alone, and other times in association with each other. Only types 4 and 7 are found alone. However, there is a drastic difference between the percentages of the two types - temper 7 (73%, and in association with other types is 87%) and 4 (2%, and in association with other types is 4%). All of the other types are present in relatively insignificant frequencies (<10%), with the exception of the combination of types 6 and 7 (11%). The characteristic temper of this largely mixed set of deposits is temper 7. The other tempers have little impact on the assemblage. These deposits include substantial frequencies of Early Neolithic remains which account for the high frequencies of temper 7. This temper type is not present in the Dacian/Medieval deposits.

Only four temper types are found in the Dacian/Medieval floor daub material. Tempers 4 (6%) and 7 (7%) are found alone, while tempers 1 and 6 (62%), and 6 and 7 (24%) are found in association with each. The diagnostic temper for this period appears to be temper 6 (chaff). Temper 6, when found in association with the other tempers, represents 87% of the total sample from the period.

The Dacian/Medieval pattern is the opposite of the Early Neolithic, where temper 6 was a much more minor constituent. But the biggest difference is in the frequency of tempers 4 and 7, which were the dominant types for the Early Neolithic (and for all other deposits in the site).

Wall Daub (table 3)

All six temper types are present within Early Neolithic deposits. Tempers 1, 4, 5, 6 and 7 are found alone, and in combination with each other. The highest frequency is the combination of tempers 6 and 7 (44%). The second highest is temper 7 (22%), followed by temper 4 (17%). All the rest are less than 5%.

Only five temper types are present in the Dacian/Medieval wall daub material. Temper type 2 is not present at all. The highest frequency is a combination of tempers 6 and 7 (61%), followed by a combination of 5 and 7 (15%), and temper 4 (12%). All the rest are less than 7%. A similar pattern is observable in the Medieval deposits. The combination of tempers 6 and 7 dominate (62%), followed by the combination of tempers

4, 5, and 6 (34%).

The major observable pattern for wall daub is the prevalence of tempers 6 and 7. It is the dominant temper type for both periods (and for all the other deposits in the site). It makes sense that chaff is so prevalent for wall daub because the nature of wall daub is to be light weight. To do this, it is necessary to use a light weight temper such as chaff (in contrast to the other daub types).

Kiln Daub (table 4)

Only four temper types are present within the Early Neolithic deposits. Tempers 1, 4 and 7 are found alone. Temper 6 is found in combination with temper 7 and tempers 1 and 4 are found in association with each other. The highest frequency is from temper 7 (61%). The second highest frequency is for temper 4 (32%). The rest of the temper types have a frequency of under 6%. Temper 7, both alone and in association with other tempers dominate with a frequency of 66% for the entire assemblage.

The Dacian/Medieval deposit has five different temper types. Only tempers 4 and 7 are found alone, and tempers 2 and 5 plus 6 and 7 are found in association with one another. The highest frequency is from temper 7 (44%). The second highest frequency comes from temper 4 (42%) which has a percentage very close to temper 7. Once again the dominant temper for this period is 7 which has a total of 54% or just over half of the entire data set. It appears that the pattern for this data set is that the most widely used temper for kilns is temper 7 (small sand granules and silt), followed by the use of temper 4 (silt). Nowhere in either period does the combination of 4 and 7 appear. The combination of 6 and 7 does appear to be the third highest frequency for both periods.

Oven Daub (table 5)

Oven daub is present only during the Early Neolithic period. Three different temper types are found in the deposit (4,5 and 7). None of the temper types are found alone. The highest frequency comes from a combination of tempers 5 and 7 (53%). The second highest frequency comes from the combination of tempers 4 and 7 (46%). Temper 7 is present in both of these combinations which when combined has a frequency of 99% of the assemblage. The oven daub pattern is unreliable to the small sample size (n=7).

In sum, Temper 7 appears to be the dominant temper type for all of the architectural daub categories. The second highest frequency of temper type is 4. This patterns appears to extend to all of the architectural daub types found in the Early Neolithic. This pattern does not appear for the Dacian/Medieval period where the dominant temper types are generally a combination of tempers 6 and 7.

Firing

There are four different types of firing categories ranging from 1 (poor or low quality) to 4 (very high quality - kiln-like). The first three types of firing (1-3) are used in each analysis of architectural daub type with the exception of oven daub. The types are only found individually and not in combination with each other. The fourth type of firing is found only in a few situations, of which will be discussed below.

Floor Daub (table 6)

All four of the firing types are represented in this period. The highest frequency of firing quality is from type 2 (55%). It represents just over half of the entire assemblage. The second highest percentage is from type 3 (27%). Type one had 17% and types 4 had a percentage of less than 1% (0% shows on the table because the number is so statistically insignificant).

There are only three firing types represented in the Dacian/Medieval period (1,2, and 3). The pattern is very different than the Early Neolithic floor daub. The highest frequency of firing type is from type 3 (61%), the second is type 2 (32%), and then type 1 (7%).

There is no similarity at all between the types of firing practiced in the Early Neolithic and Dacian/Medieval periods. However, types 2 and 3 together dominate in both periods. This makes sense if the floor is to be relatively impermeable.

Wall Daub (table 7)

For the Early Neolithic deposit only the first three types of firing are represented. The dominant type of firing is type 1 (53%). The second highest frequency is from type 2 (27%), and finally from type 3 (20%). Note the difference in the quantity and its percentages versus the weight percentages and totals. Type 1 (the dominant type) is the poor quality firing which makes sense for the Early Neolithic since firing techniques may not have been as well developed as later periods (i.e. Dacian/Medieval).

There are three different firing types represented in the Dacian/Medieval period (types 1,2, and 3). The most dominant type of firing is type 3 (54%) or just over half of the entire assemblage. The second most represented type during this period is type 2 (24%) and, then type 1 (21%). There is very little similarity with Early Neolithic firing patterns. The only firing type that is similar is type 2 which has the second highest frequency for both time periods. Type 3, is the highest quality of firing type (other than kiln) and it appears to be characteristic of this period for both floor and wall daub.

Kiln Daub (table 8)

There are three firing types present for the Early Neolithic (types 1,2 and 3). The highest frequency is type 3 (71%), the second highest is type 2 (24%) and the third is type 1 (5%).

The Dacian/Medieval period has types 1, 2 and 3 present. The frequency pattern is similar to the Early Neolithic, with type 3 dominating (80%), followed by type 2 (11%), and finally type 1 (9%).

This pattern makes sense since kiln daub would be expected to have high qualities of firing most of the time. Kilns are subjected to the very high firing temperatures.

Oven daub (table 9)

Only two types of firing were present in the Early Neolithic sample - 1 and 3. The highest frequency was type 1 (53%), followed by type 3 (46%). This firing pattern is different than in the Early Neolithic kiln sample, where type 3 dominates (71%). This pattern is probably not very representative due to the extremely small sample size (n=7). Oven daub was not identified in the remains from other temporal contexts.

In sum, firing levels 2 and 3 are characteristic of floor daub, type 3 dominates kiln, and type 1 for oven. There is no obvious patterning in the firing of wall daub.

Daub colour

The common names for colours are used in the table. Each letter represents a specific colour (B=brown; O=orange; R=red; Y=yellow; W=white; W*=extremely white, almost vitrified), and the number represents a gradation of tone from light (1) to 3 (dark).

For example, R3 is a very dark red. Colours were also found in combination with one another, such as BO which is brownish orange. The first colour always represented the dominant colour. The identified colour always came from the external surface. Each are discussed below.

Floor Daub (table 10)

There is a wide variety of colour and tones in the Early Neolithic remains. No single type dominates and no type exceeds 15% of the frequency. The highest frequency is found with BO2 (13%), followed by RO3 (12%), Y2 (9%), and RO2 (8%). All the rest are less than 6%. It would appear that the reddish colour range dominates (31.28%).

The Dacian/Medieval sample also has a wide range of colours. The highest percentage is YO2 (57%), followed by BO2 (21%). All the rest are under 5%.

The Dacian/Medieval pattern stands in strong contrast to the Early Neolithic, where YO2 is insignificant (3%). BO2 is in second place in both periods, however.

Wall Daub (table 11)

There are numerous colour types in the Early Neolithic (n=39). The highest frequency, by far, is O2 (21%), followed by RO2 (10%), and B1 (9%). All the rest are less than 7.5%.

In the Dacian/Medieval sample, there is much less variety of colour types (n=21). Four colour types dominate - B1 (23%), RB2 (19%), RO2 (15%), and OB1 (10.7%). All the rest have less than 7%.

The dominant colour types appear to be similar in both periods - B1 and RO2. Colour is affected by a combination of clay, temper, and heat. Since the former two vary between the two periods, it is likely that the similarities in colour are due to heat. In effect, the conditions for burning down a wattle-and-daub structure would be the same - low heat, exposure to an oxidized firing environment - creating the characteristic red and brownish colours for wall daub.

Kiln Daub (table 12)

The Early Neolithic sample has an extremely large variety of colour types (n=40), similar to the floor daub. The highest frequencies are white* (*almost bleached of any colour - 26%), followed by B2W* (10.8%), and O2 (9.6%). All the rest are below 7.8%.

The Dacian/Medieval sample has a much smaller range (n=10) of colour types. The highest frequency is W (32%), followed by B2 (25%), and BY2 (18%). All the rest are less than 4%.

White is clearly the dominant colour in both phases, and is characteristic of kiln. This is a result of the high constant heats that cause a near-vitrification of the clay and tempers, and bleaching of colours.

Oven Daub (table 13)

Only two colour types were found in the Early Neolithic sample. The most common was RB2 (53%) and RO3+W (46%). This may be due to the small sample size, since only 7 fragments were found. No oven daub was found in other temporal contexts. The characteristic colours of oven daub are reds and browns, with a mixture of white. This is a reflection of the higher temperatures found in ovens, than in walls or floor daub.

In sum, the characteristic colours of wall daub are reds and browns, of kiln daub is white, and oven daub is red and brown mixed with white. There is no characteristic colour for floor daub. This patterning appears to validate the classes of daub (types and associated characteristics) within the classification system presented in this thesis.

Firing atmosphere (oxidation/reduction)

Four categories of firing atmosphere (oxidation and reduction) were used in the analysis (see chapter 9). The distribution of each type is discussed below.

Floor Daub (table 14)

In the Early Neolithic sample, all four firing atmospheres were found. Type 3 is the highest frequency (32%), followed by type 1 (30%), type 4 (24%), and type 2 (14%).

In the Dacian/Medieval sample, only three of the firing atmospheres were found. Type 1 dominates (78%), followed by type 2 (14%), and type 4 (8%).

All the types were found commonly throughout the sample, except for type 3 which was found only in the Early Neolithic. This makes sense in terms of evolution of control over firing atmospheres. The Dacian is dominated by fully oxidized material, implying that there is tremendous control over the flow of oxygen. In the Early Neolithic, the lack of a dominant type implies poor control over the flow of oxygen. This is similar to the range in variability existing in Early Neolithic ceramics, in comparison to the high quality of Dacian wares.

Wall Daub (table 15)

In the Early Neolithic, all four firing atmospheres were found. Type 2 is the highest (54%), followed by type 1 (33%), type 4 (8%), and type 3 (5%).

In the Dacian/Medieval sample, all four firing atmospheres were also found. Type 2 dominates with the highest frequency (47%), followed by type 1 (24%), type 4 (23%), and type 3 (5%).

The pattern of wall daub firing atmosphere appears to be similar in both periods. This makes sense since wall daub would not be purposefully fired for use afterwards as a habitation or storage structure. It is the result of accidental firing or purposeful destruction of a structure. Therefore, the firing conditions are expected to be constant across time.

Kiln Daub (table 16)

In the Early Neolithic, all four firing atmospheres were found. Type 1 clearly dominates (72%), followed by type 2 (23%), type 3 (3%), and type 4 (2%).

In the Dacian/Medieval sample, the pattern is very similar. All four firing atmospheres were found. Type 1 is the highest (73%), followed by type 2 (20%), type 3 (4%), and type 4 (4%).

The similarity in kiln daub between the two periods, where type 1 is the highest in both and dominates the sample with over 72%, is probably indicative of the nature of the firing process.

Oven Daub (table 17)

In the Early Neolithic, only type 2 was found (100%). This is probably a reflection of the small oven daub sample size (n=7)

In sum, the dominant type in the wall and oven daub is type 2, implying that oven and house walls were similarly constructed (light weight) and similarly exposed to the air. This stands in strong contrast to kiln daub, where type 1 dominates. There is no obvious patterning in the floor daub.

Spatial analysis

Archaeologists concede that quantitative, intra-site spatial studies often have produced thin results (Ammerman et al. 1987: 211; Whallon 1984: 242). A fundamental problem concerns the dichotomy between identifying spatial patterns and interpreting them. Quantitative techniques can do the former, but quantitative techniques alone cannot, no matter how sophisticated, deliver interpretations. Deriving interpretations and inferences from patterns requires a guiding set of theory, principles, and assumptions. The merit of a quantitative study rest to no small degree on the calibre of these underpinnings. In recent years, archaeologists have recognised that the abyss separating pattern recognition from interpretation or inference can be bridged using middle-range theory (Binford 1981; 1983; Fisher and Strickland 1991: 215).

In the past 10 years, major advances have been made in the analysis and behavioral interpretation of spatial patterning within archaeological sites. A number of quantitative methods that allow the discovery of spatial patterning among entities have been introduced into archaeology, permitting more sophisticated analysis of the arrangement of artifacts within sites and more precise definition of tool kits and activity areas (Carr 1984: 103). We can now move beyond the simple observations of McIntosh:

> "Outside each house compound in the African site of Hani, lies a large concentric zone of borrow pits from which earth for construction was collected. These contain may artifacts, for the pits served as convenient rubbish dumps" (McIntosh 1976: 98).

Spatial distribution of Early Neolithic daub: quantitative assessment

The distribution of Early Neolithic daub types is analysed here by locus to assess any evidence for differential association with particular loci (table 18). The basic goal is to determine if the quantity of daub (for each type) differs between loci. This is necessary for determining whether particular loci are filled with types of architectural daub versus unidentifiable daub. For example, if a pit is filled with substantial quantities of unidentifiable daub (and little else), the reason for the presence of the daub (according to the model presented in chapter 8) may be either as a very disturbed dwelling pit or as a secondary deposit. If a pit contains substantial quantities of architectural daub, then it may be interpreted as a dwelling. Weight will be the unit of measure since it is less subject to the forces of fragmentation.

Locus 2 - This locus is the pan-site Early Neolithic locus. The vast majority of remains are unidentifiable (85%), followed by wall (6.3%), floor (5%), and kiln daub (2.96%). Oven was not present at all. This locus represents the open area between Early Neolithic features. It is extremely interesting to observe that most of the remains were unidentifiable and that it had the highest percentage of unidentifiable remains (excluding loci 7 and 10). This makes sense if this area was an open walking/gathering space where fragments would have been severely exposed to the forces of erosion.

Overall, 42% of the total daub remains come from this locus. However, locus 2 incorporates material from three other loci (50-52). The daub from these loci were not separately analysed from the rest of locus 2 because these loci were defined only after the excavations were completed. The data were lumped with the locus 2 data during the laboratory analysis for this thesis. As a result, their data must still be separated from the rest of locus 2. It was not possible to do this for this thesis since the analysis of their spatial extent still remains poorly defined.

Locus 7 - Almost all of the daub in this locus is identified as miscellaneous (99.54%). Only a small percentage of wall (0.38%) and kiln (0.08%) were identified. These percentages are a function of the nature of the analysis conducted during the 1992 field season (where most of the architectural daub was not classified to an architectural type). Only counts and weights were recorded. As a result, it is not a comparable distribution with the rest of the sample (with the exception of locus 10, which has similar problems). This problem plagues all of the 1992 excavated features. The few identified architectural remains came from peripheral deposits excavated in 1993. As a result of the manner in which the daub was analysed, it is not possible to reconstruct the function of this pit locus based upon daub distributions. Other architectural indications (such as post holes, oven, possible hearth area), however, are present to indicate that this was a dwelling feature.

Locus 10 - Most of the remains in locus 10 are unidentifiable (98.7%). There is very little of anything else (wall - 1.3%). The others are absent. It presents extremely high numbers of unidentifiable daub. At the same time, the overall quantity of daub in this locus is extremely low when compared to other Early Neolithic loci. It is only 1.98% of the total Early Neolithic sample (n=1864). This locus is also plagued by similar analytical problems as locus 7. Most of it was excavated in 1992. As will be shown below, the spatial distribution of daub in this locus is very restricted and largely limited to the 1992 excavation area. The 1993-4 excavations largely excavated the area around the locus. As a result of the manner in which the daub was analysed, it is not possible to reconstruct the function of this pit locus based upon daub distributions. Other architectural indications (such as post holes), however, are present to indicate that this was a dwelling feature.

It is for the analytical reasons discussed above that both loci 7 and 10 will not appear in the analysis of the spatial distribution of architectural daub types.

Locus 23 - This locus has the second highest frequency of all daub remains (34.49%) and highest found in any of the pit features. It also has the highest frequency of identified architectural types (66.13%).

The vast majority of Early Neolithic architectural daub types derive from locus 23 - floor (73.98%), wall (46%), oven (100%), and kiln (71.57%). This is partially a byproduct of its larger than usual size. It is at least twice to three times the size of any of the other pit features. This difference in spatial size is parallelled by the weight of daub.

Within the locus, most of the remains were unidentifiable (50%). The other types are found in smaller, but still significant quantities - floor (20.29%), wall (10%), oven (2.79%), kiln (16.8%). The presence of all four architectural daub types in significant percentages (ca. half the daub remains) would lead one to believe that the function of this large pit was as a dwelling. This is substantiated by the presence of other architectural features, such as post holes and central hearth.

Locus 24 - This locus contains a relatively small quantity of daub remains when compared to the other Early Neolithic loci (6.42%). Part of this may be a function of the disturbance of most of this feature by a Early Iron Age pit (locus 30).

Most of the daub remains in this locus were unidentifiable (71.39%). The distribution of types is as follows - floor (.99%), wall (13.45%), oven (0.0%), kiln (14.16%). This distribution is very different than that found in locus 23, and probably is a reflection that a substantial area of the feature was disturbed. Only the deeper area of the pit feature was preserved intact. On the basis of the presence of floor, wall and kiln daub, and other architectural features (post holes and hearth), the original function of this pit would appear to be as a residence. The high frequencies of unidentifiable are probably an indication of the destruction of the upper deposits of the pit and reuse of the entire area of the pit as a midden.

Very small quantities of architectural daub types are found in locus 24 - floor (0.67%), wall (11.52%), oven (0.0%), and kiln (11.23%). These frequencies are very similar to those in locus 41, but very different than in locus 23. This may be partially a byproduct of the smaller size of loci 24 and 41.

Locus 25 - This locus has a very small quantity of daub (0.04%) when compared to all other loci. This is a function of the small-size of the feature (1 m diameter) and function (storage pit).

Most of the remains within the locus are unidentifiable (72.22%; n=9, 11 gm), followed by floor (27.78%; n=1). No wall, kiln or oven remains were identified. The small quantities of unidentifiable and floor daub are interpreted as the result of downward filtering of remains or part of the post-abandonment fill of the feature, and not contemporaneous with the use of the feature as a storage pit. This conclusion is in accordance with the expectation of daub distribution in the model.

Locus 41 - Very few daub remains were found in this locus (1.5% of Early Neolithic total; n=1419 gm). This small quantity is somewhat affected by the fact that only half of this feature was fully excavated. As a result, we may be able to assume that the frequencies would probably be much higher (maybe double!).

Over half of the daub material from this locus is unidentifiable (63.78%; n=306). This frequency half-way between those loci with high unidentifiable frequencies (locus 24 - 71%; locus 25 - 72%); and those with low frequencies (locus 23 - 50%). The other daub types are wall (27.84%; n=9) and kiln (8.39%; n=4). No floor or oven daub were found.

This pit is different than the other Early Neolithic pits. By and large, it contained relatively few artifacts. It also was distinguished by an almost complete absence of snail shells, which are endemic to the other large Early Neolithic pit features. Cases such as this where there are very low frequencies of daub, in general, would indicate that the superstructure may not have burnt down creating daub. However, the dearth of overall artifacts and organic remains would indicate that this pit was dug and not used or abandoned quickly afterwards. As a result, there would be little accumulation of artifactual (including daub) or organic remains in the pit. The relatively low quantity of unidentifiable fragments support this hypothesis. If it had remained open for a long time and reused as a midden (eg. Locus 24), its is expected that there would be larger quantities of unidentifiable daub. Little evidence for other architectural features were found during the excavation of this pit possibly because part had been damaged by later features (locus 44) and that it was not completely excavated (only the southeast part). A large hearth-like pit filled with dark soil was found in the center.

Surfer: a contouring and 3-D surface mapping program

Surfer is a grid-based contouring and 3 dimensional surface plotting program. Surfer interpolates irregularly spaced x,y,z data onto a regularly spaced grid to produce isoline maps and surface plots. The control Surfer provides allows the production of the type of contour map or surface plot that best represents the data. Since most x,y,z data file sets are not collected in a regular grid, Surfer takes the irregularly spaced existing data and interpolates it to fill in the holes. "The term irregularly spaced means that the data follow no particular pattern over the extent of the map so there are many holes where data are missing. Gridding fills in these holes by extrapolating or interpolating z values at those locations where no data exists. ... A grid is a rectangular region comprised of evenly spaced rows and columns. The intersection of row and column is called a grid node" (Keckler 1995: 1-1).

This program is very suited for the analysis of the Foeni-Salaş data. All the data from this site were collected with reference to a 3-dimensional grid coordinate system. The provenience of each fragment of daub is known within a 1 m quadrat. The 1 m gridded collection unit is easily transformable to a Surfer grid format. Surfer will fill in the blanks between excavation units allowing broad spatial patterns to be recognised.

Three types of maps are used in this analysis that are produced with Surfer: contour, orthographic and, posting. Each of these map types are be useful for examining frequency distribution across space.

A. A contour map is a two dimensional representation of 3 dimensional data (x,y,z). Contours define lines of equal z values across the extent of the map. The shape of the z distribution (be it elevation, artifact frequencies, etc) is shown by the contour lines (Surfer 1-4).

B. An orthographic map is a 3 dimensional representation of 3 dimensional data..The third dimension is the z values. Z values are represented by relative height above the base map. At each x,y intersection the height of the surface is proportional to the z value assigned to that node. In an orthographic projection lines plotted in the same direction remain parallel this is different than a prospective projection where lines appear to converge as they become more distant from the viewer (Surfer 1-5, 7-1).

C. Post maps show data point locations and values on a 2 dimensional surface (map) (Surfer 1-5). Posting data points on a map can be useful for determining the distribution and density of data points (Surfer 8-1).. Often, during Surfers's interpolation process, data micro-variations are masked. As a result a less sensitive data picture is produced of the data variations. This is particularly important when single data points with high z values are surrounded by nodes with 0 z values. The high data point is often masked in the contour. It usually takes two neighbouring data points with non-zero z values to be recognised by Surfer and a contour line generated. As a result posting is done to check on the validity of any contour.

A mesh or gird of Foeni Salaş and the excavated areas is superimposed over each map to provide a constant visual orientation. The cardinal orientations do not reflect true or magnetic orientation but rather those used on the site. The numbers along the maps axes represent metres measured from the off-site base datum in the south-east corner.

Spatial analysis of individual architectural types

In this section, the spatial distributions of each architectural daub type will be separately analysed. Daub weight will be the analytical measure employed for the determination daub concentrations. Generally, the maps were generated with a 50 gm contour minimal interval. Less than 50 gm weight was considered to be background noise and was considered not to be useful for display. Only the data from the Early Neolithic deposits are described in this section.

It is these concentrations of architectural daub that will help in the analysis of pit function. The distribution of daub concentrations will be compared with known feature distribution (based on excavation) from the site. The concentrations of daub will help determine the function of the features (i.e. pit house, storage pit, surface house, etc.). The analysis is designed to test the following two hypotheses:

1. Starčevo houses were surface wattle and daub houses.

Test implication of this hypothesis would be the lack of association between architectural daub concentrations and large Starčevo pits.

2. Starčevo houses were semi-subterranean dwellings (pit house).

Test implications of this hypothesis would be the association between large quantities of architectural daub and large Starčevo pits.

Wall daub

Four concentrations of wall daub are evident in the contour map of this daub type (fig. 16). In the posting map (fig. 17), it is evident that three of the concentrations have less than 225 grams in a single quadrat, while the fourth is much larger (n=383). The concentrations found in trenches 129E/F (locus 40) and 130F (locus 2) are extremely small in size and spatially discrete (<3 m). The other two concentrations (in loci 23 and 24) are much larger in size (8-9 m). Wall daub was found in insignificant quantities (< 59 gm) in the following Starčevo-Criş pit house loci (7, 10 and 41), storage pit (locus 25) and surface feature/concentrations (loci 51 and 52). Wherever an Early Neolithic feature was found, some wall daub was also found. The difference is one of the scale of daub quantity.

Floor daub

Floor daub was found in much more restricted contexts during the Early Neolithic than wall daub (fig. 18). The highest concentration of floor daub was found in locus 2 in trench 130E/F (1880 gm in a single quad - fig. 19). This was a long and narrow concentration (5x1 m), and was not associated with any recognizable Early Neolithic feature. The largest spatial concentration of floor daub was found in locus 23 (7x6 m). The maximum in a single quad was 1156 gm. No other substantial spatial concentration of floor daub was found. A number of isolated individual quads had medium amounts of daub weight (325-134 gm). For the most part, those features with low or no quantities of floor daub also lacked or had minimal quantities of wall daub. The major exceptions are the pit houses in loci 24 and 41.

Kiln daub

Kiln daub was scattered over a large area of the site (fig. 20). Only two large spatial concentrations, however, were found (loci 23 and 24). These were not only the largest spatially, but several quads contained high quantities of kiln daub (>400 gm - fig.

21). At least five other very small clusters with low frequencies per quad (<100 gm) are also observable. Two of these correspond to Early Neolithic pit house loci (7 and 41). However, they are in such small quantities as to be considered statistically insignificant. The other small clusters are in the large open space in the centre of the site. It is interesting that the same pit house loci that did not have high quantities of wall and floor daub, also have low or no quantities of kiln daub (loci 7, 10, 41). This is true for the Early Neolithic storage pit (locus 25) and surface features (loci 51 and 52), as well.

Oven daub

Early Neolithic oven daub was found in the most restricted spatial distribution (fig. 22). Most of the oven daub was found in locus 23. Inside of this locus, the oven daub was found in quads at opposite ends of the pit house. A second oven-like daub concentration was found in locus 7 (quad 11). However, it was found at the outset of the first season and was not collected for later analysis. It is well-documented in the notes and its presence is clearly visible in the plan drawings of the pit house. In the southwest corner of locus 23, the highest quantity in a single quad of oven daub was 704 grams, while in the northeast corner it was 100 gm (fig. 23). The quantity of oven daub in the southwest corner of locus 23 is somewhat under-represented in this analysis because the oven feature was largely (and accidentally) left *in situ*. It is estimated that only 10% of the oven was collected. A similar occurrence happened with the Medieval oven in locus 38.

Combined identified architectural daub

In this section, all types of identified architectural daub have been combined in order to see if there is a larger spatial pattern of daub distribution. This analysis confirms much of the above observations. Based upon the distribution of remains with weight values greater than 50 grams, a number of concentrations can be defined (fig. 24). For example, the two largest spatial concentrations of daub are the pit feature in loci 23 and 24. A smaller daub distribution is found in a third pit feature, locus 41. The other two large pit features found on the site, loci 7 and 10, are poorly identified on the basis of daub distributions. They both contain extremely low quantities of daub - <50 gm (fig. 25). Consistent with the earlier observations, a linear concentration of daub remains is found in the open central area of the arc of Early Neolithic pit features in 130E,F,G (locus 53).

Unidentified Daub

The absence of concentrations of identified architectural daub in loci 7 and 10 are a function of the way in which the 1992 daub material was analysed (see above). In order to determine if these loci contain concentrations of daub that were misidentified as unidentified, it is necessary to spatially plot the distribution of unidentified daub. In figure 26 (100 gm interval), both loci 7 and 10 appear, as well as loci 23, 24, 41, and 53. Locus 7 appears as a dramatically intense concentration of material. It has the highest frequencies (fig. 27). It is followed by loci 23, 24, 10, 41 in descending order (table 19). It is apparent from figure 27 that loci 10 and 41 have very similar levels of daub remains, which was seen in the similarities in the percentages of total daub weight for the Early Neolithic. The other three Early Neolithic pit house loci have dramatically greater frequencies of unidentified daub.

Conclusions

Why are there no concentrations of material in pit house loci 7, 10 and 41? The reason may be that they did not burn down, or were not used for occupation (locus 41 - it lacked most of the other accoutrements of dwellings - ceramics, bone and shell concentrations).

The presence of spatially discrete concentrations of oven daub is our best indication for the existence of a dwelling. It is frustrating not to find concentrations of such daub in each of the pit houses. This could imply that all of the pits were not occupied as dwellings, but were used for other functions. However, there is an abundance of other indications that these other pit houses were also used for habitation (e.g. hearths, post holes, wall, floor, and kiln daub).

There are two possible explanations for the limited spatial distribution of oven daub. First, the differential distribution of oven daub may be an indication of differential distribution of activity areas. Certain types of food preparations (baking) may have been located in only one or two of the pit houses. Second, kiln daub is found within each of the identified pit houses (7, 23, 24 and 41). The identification of kiln daub at Foeni-Salaş is in contradiction to the results from other Early Neolithic sites in the region. Kilns have not been located on any other site in the region during this period. This could be the result of the identification of kiln features as ovens. Ovens are commonly identified. However, there has never been such a systematic analysis of Early Neolithic daub remains that would have distinguished the two types of daub on the basis of temper, firing quality, colour, and firing atmosphere. It is because of the systematic analysis of architectural daub at Foeni-Salaş that is certain that these two types of daub exist. However, none of the structures with kiln daub were preserved intact. As a result, it is difficult to reconstruct their form. Is it possible to definitively identify these as ceramic kilns, as a result? At this time, it is only possible to say that they are characteristically different in every way from the traditional dome-shaped ovens found at the site. Their function must have been different from that of the traditional ovens because they were used at higher temperatures.

Another reason why locus 10 and 41 may have little or no daub is that they were not used in winter time, not burnt down, or that they were garbage pits. Locus 41 does not make sense as a garbage pit because of lack of material found within it. Locus 10 does not make sense because of the presence of central post holes, whole pot.

Chapter 11: CONCLUSIONS

Introduction

The problem investigated in this thesis has been to determine the nature and location of houses on Early Neolithic sites in the Central Balkans. This is essential before the study of community patterning can begin. This is the reason that few community pattern studies exist for southeastern European Early Neolithic cultures. Most research is still essentially of a cultural historical nature, with a focus on time-space systematics (e.g. Garašanin 1983).

There are two major types of studies of Early Neolithic community patterning: regional and local. Sherratt (1983) and Kosse (1979) examine communities at the regional level. Both conclude that the Early Neolithic settlement in the flat plains of Hungary is distributed in a linear fashion along rivers and streams. At a more local level is the study by Chapman (1989), who explores various attributes of sites (e.g. form, size, building size, distance between buildings) to reconstruct behavioural implications of different community settlement forms. He concludes that there is great variability in settlement form. However, he does not link his conclusions concerning settlement form with behaviour. Also, he largely ignores the data from the Starčevo-Criş settlements (because of the dearth of spatial information), instead focussing upon that of the surrounding cultures with surface houses.

There are three major reasons why community studies have not been more widely undertaken for the Early Neolithic of the Central Balkans, despite the importance of the region to European prehistory. First, most excavations carried out in the region were not systematic. Second, the focus was not on community patterning (which requires excavation over a large horizontal area), but rather upon chronology (with limited excavations to recover vertically superimposed sequences). As a result, it is very difficult to understand the spatial organization of a settlement or community. Third, there has been a controversy over what constitutes a house during this period. It is not possible to investigate household clusters, activity areas or community patterns until the essential unit of analysis (the house) is defined. This lack of definition can be seen in the interpretation of the various "pit features" on sites. It is from the understanding of the house feature, that makes it possible to investigate the household cluster and associated activity areas. Unfortunately, in eastern Europe, the initial step of defining the house has not been accomplished.

It is impossible and inaccurate to begin community patterns (including activity areas and household clusters) until it is understood what an Early Neolithic house is comprised of. There has been a long-standing discussion among southeast European prehistorians as to the nature of Early Neolithic houses. Are houses surface structures made of wattle and daub walls or semi-subterranean pit dwellings? Or are the pits commonly found on Early Neolithic sites simply borrow pits and/or refuse dumps? The general opinion until now has been not to discuss these issues in too much detail because of the uncertainty of the function of these pits. However, until these questions are answered it is impossible to accurately reconstruct the community organization on a socio-political or economic level.

Architectural daub spatial distribution model

The spatial distribution model is based upon daub. Daub is the baked remains of clay walls, floors, ovens and hearths. Wattle and daub wall structures are difficult to identify in sites unless they have been burnt down and the clay was fired. Wattle and daub completely disintegrates over time if left unfired and will become archaeologically invisible (McIntosh 1974: 167). Baked daub remains are commonly recovered in Early Neolithic sites implying that structures frequently burnt down. For example, Ammerman et al. (1988) examined the distribution of daub remains across an Early Neolithic site in Italy to demonstrate that the concentrations of daub remains in the site were nonrandom, and hence represented daub houses. However, no one has looked at the relationship between daub concentrations and pits. The reason we may find burnt daub within a pit is either because the pit was part of a structure with an overlying superstructure or it eroded into the pit. High concentrations of daub inside of pits with a rapid decrease in density of daub outside of the pits is an indication that they were dwellings. If the structure does not burn down, there is little evidence of the superstructure, making the interpretation of the pit's function more difficult.

If there is no evidence of construction daub in a pit (except for tiny fragments), it is possible, that the pit was used solely for refuse. Daub is commonly found in refuse pits, however, it is composed of small and often eroded fragments in a secondary position.

By analysing the construction daub from pit features, it is possible to determine if floors, walls and other dwelling features (eg. ovens) were found in all or some pits on the site. Theoretically, there should be a difference in quantity and size of daub remains between refuse and dwelling pits.

In order to determine the nature and location of Early Neolithic houses (and differentiate surface from pit houses, and pit house from borrow/refuse pit), I developed a model based upon the classification and the spatial analysis of construction daub. This model has been applied to a data set from the Early Neolithic site of Foeni-Salaş in southwestern Romania. The classification system allowed for a more systematic determination of architectural daub types and the nature of construction technique. The spatial analysis enabled the determination of house location.

Foeni-Salaş: Results

The Early Neolithic features at Foeni-Salaş are arranged so that they do not cut into each other, and seem to have been abandoned relatively soon after construction (after the pits were filled with occupational debris). There is no evidence of the rebuilding of dwellings in the same location. The artifact typological analysis also imply that it was occupied for a short period during the Starčevo-Criş culture (Greenfield and Draşovean 1994). This distribution of features and the thin depositional horizon imply that the site had a short-term occupation. This short occupation makes the site suitable for this analysis. As a result of the short time span, the Starčevo-Criş horizon of the site is less disturbed (than most others) by later cultures. Many of the Starčevo-Criş features are intact and undisturbed across the entire site. As a result, time is less of a concern. As a result of the intact Starčevo-Criş horizon it was possible to systematically excavate and collect all of the artifacts across the horizon, with low probability of intrusions by later periods. The combination of good temporal placement and an intact Starčevo horizon makes Foeni-Salaş an appropriate site for investigating spatial patterning in a single sub-phase of this Early Neolithic culture.

Earlier in this thesis, a model for the spatial distribution of daub remains was introduced. The function of the model was to aid in the discrimination of surface houses, pit houses, and pits used for functions other than dwelling. The model was very successful in reaching this goal. By plotting the spatial distribution of daub remains, it was possible to determine daub concentrations. These concentrations could then be compared with predictions from the daub distribution model to propose function for these deposits. The distribution of daub concentrations was compared to excavated features to determine the location of Early Neolithic dwellings. It is the combination of daub distributions and associated excavated features that enables the identification of dwelling areas.

Pit houses

Based on excavation, five pit features were considered to be dwellings (loci 7, 10, 23, 24, and 41) in the Early Neolithic horizon (a sixth was found during coring at the end of the last season - locus 50). The major artifact concentrations from the Early Neolithic were found within these pits. Few artifacts were found spread in the intervening space across the site. Only one pit feature was reconstructed to be a storage pit (locus 25).

According to the daub distribution model, the size of fragment, quantity of deposit (weight), and diagnostic features are the main variables that were found to be useful in determining pit/feature function. Based on the daub analysis and comparison of its results with the daub distribution model, loci 23, 24, and 41 are interpreted to be pit houses. This conclusion was based on the numbers of unidentified daub weights versus identified daub weights within each of their deposits. This is discussed next.

In **locus 23**, only 50.11% of the entire deposit was unidentified, 49.88% was diagnostic construction daub (table 19). Identified and unidentified daub were nearly equal within the deposit. According to the distribution of daub model, the high percentage of construction daub is a good indicator that the pit was used as a dwelling. If there is a high percentage (quantity) of diagnostic daub found within a pit, and there is a low quantity of unidentified daub, the function of the pit is for a dwelling. The low percentage of miscellaneous daub reflects that the pit house would not have been used after abandonment as a midden or garbage pit. Possibly the house was covered quickly. Hence, the construction daub was not exposed to the environment for a long period of time and a large proportion remained identifiable.

In **locus 24**, 71.38% of the daub was unidentifiable. Identified or diagnostic construction daub was much smaller - 28.60% of the deposit. While these numbers are not as large as locus 23, they are still a good indicator that this deposit represented a pit house. According to the model, a high percentage of construction daub is indicative of a pit used for a dwelling. Nevertheless, the percentage of identified daub is twice as high in locus 24 than in the surrounding open-air deposits (locus 2 - 14.91:85.08% identified:unidentified). The high percentage of unidentified daub in locus 24 could indicate that the pit either was used secondarily as a refuse midden or was left open to exposure for a long period of time eroding a substantial proportion of the identifiable construction daub.

Locus 41 had over one third of the daub analysed as identifiable construction daub (36.21%). The sample size (in weight) is not as large as either loci 23 or 24, but it has a relatively large percentage of diagnostic daub in relation to sample size (n=1419 gm). According to the model, such a high percentage of construction daub is indicative of a pit used for a dwelling that was rapidly filled-in. The high percentages of unidentified daub, however, could indicate that the pit either was used secondarily as a refuse midden or that the pit was left open to exposure for a relatively lengthy period of time eroding most of the identifiable construction daub. The former appears to be unlikely considering the dearth of refuse found within the Early Neolithic levels of the pit. A likely reason why locus 41 may have had relatively low quantities of daub is that it did not burnt down.

The presence of spatially discrete concentrations of oven daub is our best indication for the existence of a dwelling. It is only found in locus 23. It is frustrating not to find concentrations of such daub in each of the pit houses. This normally would imply that all of the pits were not occupied as dwellings, but were used for other functions. However, there are an abundance of other indications that these other pit houses were also used for habitation (e.g. hearths, post holes, wall, floor, and kiln daub).

It was not possible to do this type of analysis with loci 7 and 10. They both contained extremely high frequencies of unidentified daub (98-99% - table 19) as a result of the nature of the 1992 field analysis of daub (which did not distinguish identified from unidentified architectural daub types). They were identifiable as pit houses also on the basis of associated features (post holes, ovens, hearths, etc. - figs. 28 and 29).

Storage pits

In **locus 25**, the results of the analysis are very different. It had a similar percentage of identifiable daub (71.83%), but the overall sample size was very small (n=36 gm). It is necessary to look at the overall size of the feature when determining function. It was documented in the field notes that this pit was extremely small and very deep. The small-size and fact that there is only one piece of identifiable construction daub found within this deposit leads to the obvious conclusion that this pit was not used for habitation. It is also possible to state that it was not used as a midden deposit due to the relatively low percentage of unidentifiable daub present. According to the distribution model our conclusions on the function of the pit appear to be correct. If there is a pit feature with a small quantity of diagnostic daub, and a small quantity of miscellaneous daub the pit will not be a dwelling or refuse midden, but rather a storage pit that was abandoned after use.

Surface houses

It is important to note that there is no evidence of Early Neolithic surface houses at Foeni-Salaş, based upon excavation or daub spatial analysis. A few surface deposits, loci 51-52, were recognized during excavation as loci of activity on the surface, but not as features or distinct deposits from the surrounding open area. As a result, their material was not separated during excavation from the rest of locus 2. Only locus 53 was not recognized during excavation, but appeared during the post-season analysis of the daub remains. This is particularly surprising since the concentration of ceramic and bone in locus 52 was originally thought to possibly represent a surface structure. The complete absence of daub in this area undermines the validity of this hypothesis.

Why pit houses and not surface houses?

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. Form is in turn modified by climatic conditions (the physical environment which makes some things impossible and encourages others) and by methods of construction, materials available, and the technology (the tools for achieving the desired environment). Rapoport considers the socio-cultural forces primary, and the others secondary or modifying (1969: 47).

All of the Early Neolithic cultures of Hungary, Bulgaria, Bosnia, northern Macedonia, and Greece have surface houses. As of yet, no complete villages have been excavated. In Macedonia and Hungary, Renfrew (1969: 9) imagined villages to be composed of 10 to 20 houses, with each house square or rectangular and about 7 to 10 metres long. The postholes and foundations at Anza, Zelenikovo, Gračanica, Vršnik and other sites show that these were timber-frame houses, with walls simply of plastered mud (Gimbutas 1976; Renfrew 1969: 9). The characteristic Early Neolithic surface house type of the Hungarian Tisza region was a single-room rectangular structure with gable roof and wattle and daub or reed walls. There is archaeological evidence that suggests that some buildings were constructed without plastered floors. Only postholes indicated the structures ground plans (Horvath 1989: 85-86).

The appearance of pit houses in the Starčevo-Criş culture area obviously is not related to the particulars of the environment of this culture, because the environment is essentially similar to that of the neighbouring cultures. The essential reason that pit houses would have been the common architectural form for the Starčevo-Criş culture is the nature of occupation. Short occupation spans seem to generally be the rule based on the thickness of deposits (characteristically thin horizons), the lack of overlapping deposits, and lower frequencies of features (i.e. ovens, hearths, etc.) (cf. Greenfield and Draşovean 1994; Kaiser 1979: 14). This is in contrast to Körös settlements which generally have thick deposits with more evidence of storage pits, ovens, hearths and surface houses (cf. Horvath 1989). Pit houses are also found in the Körös (and surrounding) culture region (eg. Makkay 1978, 1992). Unfortunately, there has not been a systematic analysis of the relative chronology of surface and pit houses in this culture. As a result, it is unclear whether pit houses evolve into or coexist with surface houses in this region.

Early Neolithic households

Now that the nature of Early Neolithic houses has been defined, it is possible to move on to the larger behavioural issue of what constitute an Early Neolithic household and community. Based upon our analysis, it appears that Foeni-Salaş is characterized by a cluster of small pit houses (n=5 - loci 7, 10, 24, 41, and 50), arranged in a semi-circle around a larger pit house (locus 23). Oven and kilns are found in association with several of the smaller and with the larger pit house. This could be interpreted to mean that each of the pit houses was economically independent and therefore represented a single household (or household cluster). The presence of a possible corral in the centre of the arc of smaller pit houses (locus 52) may be an indication that certain activities may have been of a more communal nature, such as stock keeping. The presence of a large centrally-placed pit houses (larger than the rest) may also be indicative of some integrating social function in the community (communal). Its nature at this point is indeterminate until further analysis of the other artifacts from the site can be completed. Households, of course, do not usually stand in total social isolation, and they are usually grouped into larger communities. The community can be presumed to be generally congruent with individual settlement sites, although outlying sites may also have been attached. This spatial pattern is very different than that seen in villages in the surrounding cultures (eg. central Europe - Bogucki 1988; Chapman 1989).

Conclusions

The definition of the household cluster, as defined by Flannery (1976), has not been applied to the investigation of community studies for the Early Neolithic of the Central Balkans. Flannery's approach to community studies has been to focus on the household and its concomitant archaeological features which form the household cluster. The problem for the Early Neolithic of the Central Balkans is that it has been difficult to clearly identify the nature and location of houses, without which the household clusters cannot be investigated. The house is the fundamental unit of analysis, but must first be defined. As of yet, very little has been done in the way of reconstructing community patterns for Early Neolithic sites of this region.

The problem then becomes to determine the nature and location of houses on archaeological sites in the Central Balkans during the Early Neolithic. In this thesis, I have developed a model for determining the nature and location of Early Neolithic houses based on the classification of construction daub from an Early Neolithic site in southwestern Romania. Based upon the results presented in this thesis, the daub classification and distribution model appears to be valid. It has proven to be a useful analytic tool for investigating the spatial distribution and nature of construction of Early Neolithic structures.

What is found in Early Neolithic Starčevo-Criş sites is usually a series of pits containing very high densities of artifacts and organic debris. Dramatically lower densities of material remains are found beyond the pit edges indicating nothing more than open space. There is very little evidence for associated features in the neighbourhood (such as storage pits or graves). The distribution analysis of architectural daub to differentiate between habitational structure areas and open areas of a site, even when the structures are severely eroded. The daub analysis conducted in this thesis demonstrated that the concentrations of daub occurred in the large Early Neolithic pits. This, in combination with the dearth of daub in the intervening spaces, indicates these pits were in fact residential features. Activity areas are visible often within pits (ovens, hearths, etc.).

Even though the model has been very useful in determining the location and nature of Early Neolithic houses (e.g. distinguishing surface from pit houses), it is not without its problems. One major problem is that it should not be used in isolation in determining feature function or house location. It is necessary to look at all of the archaeological indicators (eg. post holes, hearths, borders, etc.). It is extremely useful in disturbed sites where such indicators may not be preserved. By plotting out the spatial distribution of daub remains, clusters of daub can be used to identify the location of structures. Any future analyses of daub should include accurate size measurements of each fragment, and develop a sensitive single measure that includes both quantity of fragments and weight of fragments.[5]

[5] This analysis could not directly employ the part of the model relating to the size of daub fragments because such data were not collected. A proxy measure (the weight of identified architectural versus unidentified daub) was used instead. Based upon a comparison of this ratio from pit features thought to be pit houses versus the open air surface between pits, those deposits with very high percentages of unidentified daub were open-air surfaces. Each of the supposed dwelling pit features had far lower percentages.

BIBLIOGRAPHY

Adams, Robert McC. and Hans J. Nissen 1972 *The Uruk Countryside.* Chicago: University Chicago Press.

Adams, Robert McC. 1966 *The Evolution of Urban Society.* Chicago: Aldine.

Alexander, John 1972 *Jugoslavia Before the Roman Conquest.* London: Thames and Hudson.

Alder, Michael A. 1989 Ritual facilities and social integration in nonranked societies. In William D. Lipe and Michelle Hegmon, eds., *The Architecture of Social Integration in Prehistoric Pueblos.* Crow Canyon Archaeological Center, Colorado, pp. 35-52.

Allen, W. L. and J. B. Richardson 1971 The Reconstruction of Kinship from Archaeological Data: The Concepts, the Methods, and the Feasibility. *American Antiquity* 36 (1): 41-53.

Ammerman, Albert J., Gary D. Shaffer, and N. Hartmann 1988 A Neolithic Household at Piana di Curinga, Italy. *Journal of Field Archaeology* 15: 121-140.

Arandjelović-Garašanin, Draga 1954 *Starčevačka Kultura.* Lubljana.

Arnold, Philip J., III 1990 The organization of refuse disposal and ceramic production within contemporary Mexican houselots. *American Anthropologist* 92: 915-932.

Bankoff, H. Arthur 1974 *The End of the Middle Bronze Age in the Banat.* Ph. D Thesis; Harvard University.

Bankoff, H. Arthur and Frederick A. Winter 1979 A House-Burning in Serbia.

Archaeology 32 (5): 8-14.

Bankoff, H. Arthur and Frederick A. Winter 1982 The Morava Valley project in Yugoslavia: Preliminary report 1977-1980. *Journal of Field Archaeology* 9 (2): 149-164

Barker, Graeme 1975 Early Neolithic land Use in Yugoslavia. *Proceedings of the Prehistoric Society* 41: 85-104.

Barker, Graeme 1985 *Prehistoric Farming in Europe.* Cambridge: Cambridge University Press.

Barnhart, C. L. 1961 *American College Dictionary.* New York: Random House.

Bartram, Lawrence E., Ellen M. Kroll, and Henry T. Bunn 1991 Variability in Camp Structure and Bone Food Refuse Patterning at Kua San Hunter-Gatherer Camps. In Ellen Kroll and T. Douglas Price, eds., *The Interpretation of Archaeological Spatial Patterning.* London: Plenum Press, pp. 77-148.

Benac, Alojz 1974 *Obre II: A Neolithic Settlement of the Butmir Group at Gornje Polje.* Sarajevo: Wissenschaftliche Mitteilungen des Bosnisch-Herzegowinischen Landesmuseums 3, heft A, pp. 5-91.

Benac, Alojz 1979 Prelazna zona. In Basler, Djuro, Alojz Benac, Stane Gabrovec, Milutin Garašanin, Nikola Tasić, and Ksenija Vinski-Gasparini, eds., *Praistorija Jugoslavenskih Zemalja. Neolit.* Sarajevo: Akademija Nauka i Umjetnosti Bosne i Hercegovine, Centar za balkanološka ispitivanja, vol. 3, pp. 363-472.

Benac, Alojz, Milutin Garašanin, and Dragoslav Srejović 1979 Uvod. In Basler, Djuro, Alojz Benac, Stane Gabrovec, Milutin Garašanin, Nikola Tasić, and Ksenija Vinski-Gasparini, eds., *Praistorija Jugoslavenskih Zemalja. Neolit.* Sarajevo: Akademija

Nauka i Umjetnosti Bosne i Hercegovine, Centar za balkanološka ispitivanja, vol. 3, pp. 11-32.

Bender, D. R. 1967 Refinement of the concept of household: families, coresidence, and domestic functions. *American Anthropologist* 69: 493-504.

Benjamin, A. C. 1965 *Science, Technology, and Human Values*. Columbia, Missouri: University of Missouri Press.

Bewley, Robert 1994 *Prehistoric Settlements*. Great Britain: B.T. Batsford Ltd.

Binford, Lewis 1978 *Nunamiut Ethnoarchaeology*. New York: Academic.

Binford, L. 1990 Mobility, Housing, and Environment: A Comparative Study. *Journal of Anthropological Research* 46 (2): 119-152.

Blanton, Richard 1994 *Houses and Households: A Comparative Study*. New York: Plenum.

Bogdanović, Milenko 1988 Architecture and structural features at Divostin. In Alan McPherron and Dragoslav Srejović, eds., *Divostin and the Neolithic of Central Serbia*. University of Pittsburgh, Department of Anthropology, Ethnology Monographs no. 10, pp. 35-142.

Bogucki, Peter 1988 *Forest Farmers and Stockherders*. Cambridge; Cambridge University Press.

Bökönyi, Sandor 1974 *History of Domestic Mammals in Central and Eastern Europe*. Budapest: Akademiai Kiado.

Boyadziev, Yavor D. 1995 Chronology of Prehistoric Cultures in Bulgaria. In Douglass W. Bailey and Ivan Panayotov, eds., *Prehistoric Bulgaria*. Monographs in

World Archaeology vol. 22, Wisconsin: Prehistory Press, pp. 149-191.

Braudel, F. 1973 *Capitalism and Material Life: 1400-1800*. New York: Harper and Row.

Canter, David, Peter Stringer, Ian Griffiths, Peter Boyce, David Walters, and Cheryl Kenny 1975 *Environmental Interaction: Psychological Approaches to our Physical Surroundings*. London: Surrey University Press.

Carr, Christopher 1984 The Nature of Organization of Intrasite Archaeological Records and Spatial Analytic Approaches to their Investigation. In Michael Schiffer, ed., in *Advances in Archaeological Method and Theory* vol. 7, Orlando: Academic Press, pp. 103-131.

Chang, K. C. 1958 Study of the Neolithic Social Grouping: Examples from the New World. *American Anthropologist* 60: 298-333.

Chapman, John. C. 1981 *The Vinča Culture of South-East Europe: Studies in Chronology, Economy and Society*. British Archeological Reports (Oxford), I.S.S. 117.

Chapman, John 1988 From "Space" to "Place": A Model of Dispersed Settlement and Neolithic Society. In Colin Burgess, Peter Topping, Claude Mordant and Margaret Maddison, eds., *Enclosures and Defences in the Neolithic of Western Europe*. British Archaeological Reports (Oxford), I.S.S. 403, pp. 21-46.

Chapman, John C. 1989 The Early Balkan Village. *Neolithic of Southeastern Europe and its Near Eastern Connections*. Varia Archaeologica Hungarica 2, pp. 33-53. Budapest: Institute of Archaeology, Academy of Sciences.

Chapman, John 1990 The Neolithic in the Morava-Danube confluence area: a regional assessment of settlement pattern. In Ruth Tringham and Dušan Krstić, eds., *Selevac: A Neolithic Village in Yugoslavia.* Los Angeles: UCLA Institute of Archaeology, pp. 13-44.

Chapman, John C., R. S. Sheil, and Sime Batović Settlement Patterns and Land Use in Neothermal Dalmatia, Yugoslavia: 1983-1984 Seasons. *Journal of Field Archaeology* 14 (2): 123-146.

Childe, V. Gordon 1957 (First published in 1925) *The Dawn of European Civilization.* London: Routledge and Kegan Paul.

Childe, V. Gordon 1958 *The Prehistory of European Society.* England: Harmondsworth.

Cook, S. and A. E. Treganza 1950 *The Quantitative Investigation of Indian Mounds.* University of California Publications in American Archaeology and Ethnology vol. 40, no. 5. Berkeley and Los Angeles.

Cribb, Roger L. D. 1991 Mobile vIllagers: the structure and organisation of nomadic pastoral campsites in the Near East. In Clive S. Gamble and W. A. Boismier, eds., *Ethnoarchaeological Approaches to Mobile Campsites: Hunter-Gatherer and Pastorialist Case Studies.* International Monographs in Prehistory: Ethnoarchaeological Series 1, pp. 371-393.

David, Nicolas 1971 The Fulani compound and the archaeologist. *World Archaeology* 3 (2): 111-131.

Deal, Michael 1985 Household pottery disposal in the Maya highlands: an ethnoarchaeological interpretation. *Journal of Anthropological Archaeology* 4: 243-291.

Deetz, James 1982 Household: a structural key to archaeological explanation. *American Behavioral Scientist*, special edition, 25 (6): 717-724.

Dimitrijević, Stojan 1974. Problem stupnjeva starčevačke kulture s posebnim obzirom na doprinos južnopanonskih nalazišta rjesavanju ovog problema. *Materijali* 10: 59-122 (Beograd).

Dimitrijević, Stojan 1979 Sjeverna zona. In Djuro Basler, Alojz Benac, Stane Gabrovec, Milutin Garašanin, Nikola Tasić, and Ksenija Vinski-Gasparini, eds., *Praistorija Jugoslavenskih Zemalja. Neolit*. Sarajevo: Akademija Nauka i Umjetnosti Bosne i Hercegovine, Centar za balkanološka ispitivanja, vol. 3, pp 229-362.

Duly, Colin 1979 *The Houses of Mankind*. London: Thames and Hudson.

Dumitrescu, V. 1983 The Prehistory of Romania from the earliest times to 1000 B.C. In *The Cambridge Ancient History*, vol. 3, part 1 (2nd edition), pp. 1-74.

Edwards, P. C. 1989 Problems of recognizing earliest sedentism: the Natufian example. *Journal of Mediterranean Archaeology* 2 (1): 5-48.

Draşovean, Florin 1989 Observaţii pe marginea unor materiale inedite privind raporturile dintre culturile Starčevo-Criş, Vinča A şi lumea liniară în nordul Banatului. *Apulum* (Alba Iulia, Romania) 24: 9-48.

Ehrich, Robert W. 1965 Geographical and chronological patterns in east-central Europe. In Robert Ehrich, ed., *Chronologies in Old World Archaeology*. Chicago: University of Chicago Press, pp. 403-458.

Ehrich, Robert W. 1976 Anthropological Theory and Method: Some Applications to Southeastern and Central European Prehistoric Archaeology. *Archaeologia Austriaca*

13: 177-187.

Ehrich, Robert W. 1977 Starčevo revisited. In Vladmir, Markotić, ed., *Ancient Europe and the Mediterranean.* Warminster: Aris and Phillips, pp. 59-67.

Ehrich, Robert W. and H. Arthur Bankoff 1990 Absolute chronology of the Neolithic in southeastern Europe, in Robert Ehrich, ed., *Chronologies in Old World Archaeology.* Chicago: University of Chicago Press, third edition, pp. 375-394.

Ferguson, C. W., M. Gimbutas, and H. E. Suess 1976 Historical Dates for Neolithic Sites of Southeast Europe. *Science* 191: 1170-1172.

Fewkes, Vladimir J., H. Goldman and Robert W. Ehrich 1933 Excavations at Starčevo, Yugoslavia, seasons 1931 and 1932. *Bulletin of the American School of Prehistoric Research* 9: 33-54.

Fisher, John W. Jr. 1987 *Shadows in the forest: Ethnoarchaeology among the Efe Pygmies.* Unpublished Ph.D. Dissertation, University of California, Berkeley.

Fisher, John W. and Helen C. Strickland 1989 Ethnoarchaeology among the Efe Pygmies, Zaire: spatial organization of campsites. *American Journal of Physical Anthropology* 78: 473-484.

Fisher Jr., John W. and Helen C. Strickland 1991 Dwellings and fireplaces: keys to Efe Pygmy campsite structure. In Clive S. Gamble and W. A. Boismier, eds., *Ethnoarchaeological Approaches to Mobile Campsites: Hunter-Gatherer and Pastorialist Case Studies.* International Monographs in Prehistory: Ethnoarchaeological Series 1, pp. 215-236.

Fladmark, Knut R. 1986 *British Columbia Prehistory.* Ottawa: National Museums of Canada.

Flannery, Kent V. 1972 The origins of the village as a settlement type in Mesoamerica and the Near East: A comparative study. In Peter Ucko, Ruth Tringham and G.W. Dimbleby eds., *Man, Settlement and Urbanism.* London: Duckworth, pp.23-49.

Flannery, Kent V. 1976 *The Early Mesoamerican Village.* New York: Academic.

Forenbaher, S. 1994 The Late Copper Age Architecture at Vucedol, Croatia. *Journal of Field Archaeology* 21 (3): 307-323.

Gaul, J. H. 1948 The Neolithic period in Bulgaria. *Bulletin of the American School of Prehistoric Research* 16. Cambridge, MA.

Gatsov, Ivan 1995 Flint Production from the Ninth to the Sixth Millennium BC. In Douglass W. Bailey and Ivan Panayotov, eds., *Prehistoric Bulgaria.* Monographs in World Archaeology 22, pp. 73-78. Wisconsin: Prehistory Press.

Garašanin, Milutin 1972 *The Bronze Age of Serbia.* Belgrade: National Museum.

Garašanin, Milutin 1973 *Praistorija na Tlu SR Srbije.* Belgrade: Srbska Knjuževna Zadruga; 2nd edition.

Garašanin, Milutin 1983 The Stone Age in the Central Balkans. *Cambridge Ancient History*, vol. 3, part 1. Cambridge: Cambridge University Press, pp. 75-135.

Gifford, J. C. 1960 The Type-Variety Method of Ceramic Classification as an Indicator of Cultural Phenomena. Reprinted in James Deetz, ed., *Man's Imprint from the Past*, pp. 126-136. Boston: Little, Brown Co.

Gilman, Patricia 1987 Architecture as artifact: Pit structures and pueblos in the American Southwest. *American Antiquity* 52 (3): 538-565.

Gimbutas, Marija 1974 *The Gods and Goddesses of Old Europe, 7000-3500 B.C.: Myths, Legends and Cult Images.* Los Angeles: University of California Press.

Gimbutas, Marjia 1976 *Neolithic Macedonia: as reflected by excavation at Anza, Southeast Yugoslavia.* Los Angeles: Institute of Archaeology, The University of California, Los Angeles, pp. 70-71.

Gimbutas, Marija 1991 *The Civilization of the Goddess: The World of Old Europe.* New York: Harper Collins.

Gimbutas, Marija, Shan Winn and Daniel Shimabuku 1989 *Achilleion: A Neolithic Settlement in Thessaly, Greece, 6400-5600 BC.* Monumenta Archaeologica 14. Los Angeles: University of California.

Glisić, Jovan 1968 Ekonomika i socialno-ekonomski odnosi u neolitu Podunavsko-Pomoravskog basena. In L. Trifunovicć, ed., *Neolit Centralnog Balkana.* Beograd: Narodni Muzej, pp. 21-61.

Grbić, M. 1930 Bemalte keramik aus Starčevo Belgrader Donaugelände Jugoslavien. *Ksiega Pamiatkova en prof. W. Demetrykiewicza*, pp. 111-112.

Grbić, M. 1939 Praistorijsko doba Vojvodine. *Vojvodina* I. Novi Sad.

Grubić, A., ed., 1980 *Yugoslavia. An Outline of Geology of Yugoslavia. Excursions 201a-202c.* Paris: 26th International Geological Congress and Belgrade; National Committee for Mineral Resources of Yugoslavia.

Greenfield, Haskel J. 1986 *The Paleoeconomy of the Central Balkans (Serbia): A Zooarchaeological Perspective on the Late Neolithic and Bronze Age (4500-1000 BC).* British Archaeological Reports, Int. Ser. 304 (Oxford).

Greenfield, Haskel J. 1991 Fauna from the Late Neolithic of the Central Balkans: Issues in Subsistence and Land Use. *Journal of Field Archaeology* 18: 161-186.

Greenfield, Haskel J. 1993 Zooarchaeology, Taphonomy, and the Origins of Food Production in the Central Balkans. In Ross W. Jamieson, Sylvia Abonyi and Neil A. Mirau, eds., *Culture and Environment: A Fragile Co-Existence. Proceedings of the 24th Chacmool Conference*. Archaeological Association, University of Calgary, Alberta, pp. 111-117.

Greenfield, Haskel J. n.d. a The application of integrated surface and subsurface reconnaissance techniques to later prehistoric SE European sites: Blagotin Serbia. *Praeistorische Zeitschrift*, in press.

Greenfield, Haskel J. n.d. b Recent research at Foeni. Unpublished manuscript.

Greenfield, Haskel J. and Florin Draşovean 1994 An Early Neolithic Starcevo-Criş Settlement in the Romanian Banat: Preliminary Report on the 1992 Excavations at Foeni-Salas. *Annale Banatului: Journal of the Museum of the Banat* (Timisoara, Romania) 3: 45-85.

Greenfield, Haskel J. and Svetozar Stanković n.d. Preliminary report on the excavations at Blagotin: 1989-1992. Unpublished manuscript.

Greenfield, Haskel J., Len van Schalkwyk and Tina Jongsma 1996 Ndonandwane: Preliminary report on the 1995 survey and excavations. *Nyame Akuma*, in press.

Hackenberger, Steven, David Sisson and Bruce Womack 1989 Middle and Late Preshistoric Residential Strategies, Central Idaho: House Frequency and Size on the Middle Snake, Salmon and Middle Fork Rivers. In Scott Macheachern, David J. W.

Archer and Richard D. Garvin, eds., *Households and Communities*. Chacmool; University of Calgary Archaeological Association, pp. 133-142.

Hayden, Brian and Aubrey Cannon 1982 The corporate group as an archaeological unit. *Anthropological Archaeology* 1: 132-158.

Hayden, Brian and Aubrey Cannon 1983 Where the garbage goes: refuse disposal in the Mayan highlands. *Journal of Anthropological Archaeology* 2: 117-163.

Hill, James N. 1968 Broken K Pueblo: patterns of form and function. In Sally and Lewis Binford, eds., *New perspectives in Archaeology*. Chicago: Aldine, pp. 103-142.

Hill, James N., and Robert K. Evans 1972 A model for classification and typology. In, David L. Clarke, ed., *Models in Archaeology*. Great Britain: Methuen & Co Ltd., pp. 232-233.

Hodder, Ian 1977 The Distribution of Material Culture Items in the Baringo District, Western Kenya. *Man* 12: 239-269.

Hodder, Ian 1987 The contextual analysis of symbolic meanings. In Ian Hodder, ed., *The Archaeology of Contextual Meanings.*Cambridge: Cambridge University Press, pp. 1-10.

Horne, L. 1991 Reading Village Plans: Architecture and Social Change in Northeastern Iran. *Expedition* 33 (1): 44-52.

Horvath, Ferenc 1989 A survey on the development of Neolithic settlement pattern and house types in the Tisza region. *Neolithic of Southeastern Europe and its Near Eastern Connections.* Varia Archaeologica Hungarica 2. Budapest: Institute of Archaeology, Academy of Sciences, pp. 85-103.

Johnson, Gregory A. 1978 Information Sources and the Development of Decision-Making Organization. In Charles L. Redman, et al., ed., *Social Archaeology: Beyond Subsistence and Dating*. New York: Academic, pp. 87-112.

Kaiser, Timothy 1979 Moving Frontiers and The Starčevo Settlement of Yugoslavia. Unpublished paper presented at the Archaeological Conference on Eastern Europe, University of Pennsylvania, Philadelphia, Pa.

Kaiser, Timothy 1984 *Vinča Ceramics: Economic and Technological Aspects of Late Neolithic Pottery Production in southeast Europe*. Unpublished Ph.D. Thesis, University of California, Berkeley.

Kaiser, Timothy and Barbara Voytek 1983 Sedentism and Economic Change in the Balkan Neolithic. *Journal of Anthropological Archaeology* 2: 323-353.

Keckler, Doug 1995 *Surfer for Windows, version 6 User's Guide: Contouring and 3D Surface Mapping*. Golden, Colorado: Golden Software, Inc.

Kent, Susan 1983 The differential acceptance of culture change: an archaeological test case. *Historical Archaeology* 17 (2): 56-63.

Kent, Susan 1984 *Analyzing acitivty areas: an ethnoarchaeological study of the use of space*. Albuquerque: University of New Mexico Press.

Kent, Susan 1987 Parts as wholes - a critique of theory in archaeology. In Susan Kent, ed., *Method and Theory for Activity Area Research - An Ethnoarchaeological Approach*. New York: Columbia University Press, pp. 513-546.

Kent, Susan 1989 Cross-cultural perceptions of farmers as hunters and the value of meat. In Susan Kent, ed., *Farmers as Hunters: The Implications of Sedentism*.

Cambridge: Cambridge University Press, pp. 1-17.

Kent, Susan 1990a Activity areas and architecture: an interdisciplinary view of the relationship between use of space and domestic built environments. In Susan Kent, ed., *Domestic architecture and the use of space: an interdisciplinary cross-cultural study.* Cambridge: Press syndicate of the University of Cambridge, pp. 1-8.

Kent, Susan 1990b A cross-cultural study of segementation, architecture, and the use of space. In Susan Kent, ed., *Domestic architecture and the use of space: an interdisciplinary cross-cultural study.* Cambridge: Press syndicate of the University of Cambridge, pp. 127-152.

Kent, Susan 1991 The Relationship between Mobility Strategies and Site Structure. In T. Douglas Price and Ellen Kroll, eds., *The Interpretation of Archaeological Spatial Patterning.* London: Plenum Press, pp.33-59.

Kent, Susan 1995 Unstable households in a stable Kalahari community in Botswana. *American Anthropologist* 97 (2): 297-312.

Kosse, Krisztina 1979 *Setttlement ecology of the early and middle Neolithic Körös and Linear Pottery cultures in Hungary.* British Archaeological Reports, International Series, no. 64.

Kottak, Conrad 1974 *Anthropology: The Exploration of Human Diversity.* New York: Random House.

Kramer, Carol 1979 An archaeological view of a contemporary Kurdish village: Domestic architecture, household size and wealth. In Carol Kramer, ed., *Ethnoarchaeology: Implications of Ethnography for Archaeology.* New York: Columbia

University Press, pp. 139-163.

Kreiger, A. D. 1944 The Typological Concept *American Antiquity* 3: 271-287.

Kreiger, A. D. 1960 Archaeological typology in theory and practice. In *Selected Papers of the 5th International Congress of Anthropological and Ethnological Sciences*, Philadelphia, pp. 141-151.

Kuijt, Ian 1989 Refuse Patterning or Activity Areas: an examination of cultural material from the Jack Harkey site 1, New Mexico. In Scott Macheachern, David J. W. Archer and Richard D. Garvin, eds., *Households and Communities*. Calgary: University of Calgary Archaeological Association, pp. 209-217.

Lazarovici, Gheorghe 1979 *Neoliticul Banatului*. Cluj-Napoca: Bibliotheca Musei Napocensis.

Lazarovici, Gheorghe 1984 Neoliticul timporiul din Romaniea. *Acta Musei Porolissensis* (Zalau, Romania) 8: 49-104.

LeBlanc, Steven 1971 An Addition to Naroll's Suggested Floor Area and Settlement Population Relationship. *American Antiquity* 36 (2): 210-211.

Longacre, William. A. 1966 Changing Patterns of Social Integration: A Prehistoric Example from the American Southwest. *American Anthropologist* 68 (1): 94-102.

Luca, Sabin A. 1993 Contribuţii la problema modelelor du cuptoare în cultura Starčevo-Criş. *Annale Banatului (Arheologie-Istorie)* 2: 19-24.

Makkay, János 1989 V. G. Childe on chronological correlations between the orient and Europe. *Neolithic of Southeastern Europe and its Near Eastern Connections.*

Varia Archaeologica Hungarica 2. Budapest: Institute of Archaeology, Academy of Sciences, pp. 177-182.

Makkay, János 1978 Excavations at Bicske I. The Early Neolithic - The Earliest Linear Band Ceramic. *Alba Regia* (Szekesfehervar, Hungary) 16: 9-60.

Makkay, János 1992 Excavations at the Körös culture settlement of Endröd-Öregszölök 119 in 1986-1989. In Sándor Bökönyi, ed., *Cultural and Landscape Changes in South-East Hungary: Report on the Gyomaendröd Project*. Budapest: Archaeolingua, pp. 121-194.

Manson, Joni L. 1990 *A Renanalysis of Starčevo Culture Ceramics: Implications for the Neolithic Development in the Balkans*. Unpublished Ph. D. Thesis, Southern Illinois University at Carbondale.

Manson, Joni L. 1995 Starčevo pottery and Neolithic development in the central Balkans. In William K. Barnett and John W. Hoops, eds., *The Emergence of Pottery*. Washington D.C.: Smithsonian Institution Press, pp. 65-77.

McPherron, Alan and Dragoslav Srejović, eds. 1988 *Divostin and the Neolithic of Central Serbia*. University of Pittsburgh, Department of Anthropology, Ethnology Monographs no. 10.

McPherron, Alan and K. Chris Christopher 1988 The Balkan Neolithic and the Divostin Project in Perspective. In Alan McPherron and Dragoslav Srejović, eds., *Divostin and the Neolithic of Central Serbia*. University of Pittsburgh, Department of Anthropology, Ethnology Monographs no. 10, pp. 463-489.

McIntosh, Rod 1976 Square Huts in Round Concepts: Prediction of Settlement

Features in West Africa. *Archaeology* 29 (2): 92-101.

McIntosh, Rod 1974 Archaeology and mud wall decay in a West African village. *World Archaeology* 6 (2): 155-167.

Meadow, Richard 1978 'Bonecode' - A system of numerical coding for faunal data from Middle Eastern sites. In Richard H. Meadow and Melinda A. Zeder, eds., *Approaches to Faunal Analysis in the Middle East*, Peabody Museum Bulletin, no. 2 (Cambridge, Massachusetts; Harvard University), pp. 169-186.

Milisauskas, Sarunas 1978 *European Prehistory*. New York: Academic.

Milojčić, Vladimir 1949 South-eastern elements in the prehistoric civilisation of Serbia. *Annual of the British School in Athens* 44: 266-285.

Milojčić, Vladimir 1950 Körös-Starčevo-Vinča. *Reinecke Festschrift*, Mainz, pp. 108-118.

Murdock, George P. 1967 *Ethnographic Atlas*. Pittsburgh, Pennsylvania: University of Pittsburgh Press.

Nandris, John 1970 Groundwater as a factor in the first temperate neolithic settlement of the Körös region. *Zbornik Radova Narodnog Muzeja* (Beograd) 6: 59-71.

Nandris, John 1976 Some factors in the Early Neothermal settlement of South-East Europe. In G. de G. Sieveking, I. H. Longworth and K. E. Wilson, eds., *Problems in Economic and Social Archaeology*. London: Duckworth, pp. 549-556.

Naroll, Raoul 1962 Floor Area and Settlement Population. *American Antiquity* 27 (4): 587-589.

Naroll, Raoul and Ludwig von Bertalanffy 1956 The principle of allometry in biology and the social sciences. *General Systems: Yearbook of the Society for the Advancement of General Systems Theory* 1: 76-89.

Netting, Robert McC., Richard R. Wilk, and Eric J. Arnould 1984 Introduction. In Netting, Robert McC., Richard R. Wilk, and Eric J. Arnould, eds., *Households: Comparative and Historical Studies of the Domestic Group*. Berkeley: University of California Press, pp. xiii-xxxviii.

Nica, Marin 1977 Nouvelles donnees sur le neolithique ancien d'Oltenie. *Dacia* 21: 13-53.

Nissen, Hans J. 1968 Survey of an abandoned modern village in southern Iraq. *Sumer* 24: 107-117.

O'Connell, James F. 1987 Alyawara site structure and its archaeological implications. *American Antiquity* 52: 74-108.

O'Connell, James F., Kristen Hawkes, and Nicholas Blurton Jones 1991 Distribution of Refuse-Producing Activities at Hadza Residential Base Camps: Implications for Analyses of Archaeological Site Structure. In T. Douglas Price and Ellen Kroll, eds., *The Interpretation of Archaeological Spatial Patterning*. London: Plenum Press, pp. 61-76.

Orlove, Benjamin S. and Henry J. Rutz 1989 Thinking about consumption: a social economy approach. In Henry J. Rutz and Benjamin S. Orlove, eds., *The Social Economy of Consumption*. Lanham, Maryland: University Press of America, pp. 1-57.

Parsons, Jeffrey R. 1972 Archaeological Settlement Patterns. *Annual Review of Anthropology* 2: 127-150.

Paul, Iuliu 1981 Cultura Starčevo-Criş in sudul Transilvaniei. *SCIVA (Studii si cercetari istorie veche si archeologie)* 32: 3-27.

Păunescu, Alexandru 1979 Cercetările arheologice de la Cuina Turcului-Dubova (Jud. Mehedinţi). *Tibiscus* 5: 11-56.

Pernicheva, Lilyana 1995 Prehistoric cultures in the Middle Struma Valley: Neolithic and Eneolithic. In Douglass W. Bailey and Ivan Panayotov, eds., *Prehistoric Bulgaria*. Monographs in World Archaeology vol. 22, Wisconsin: Prehistory Press, pp. 99-140.

Piggott, Stuart 1965 *Ancient Europe*. Chicago: Aldine.

Pounds, Norman 1969 *Eastern Europe*. Chicago: University of Chicago Press.

Prinz, Beth 1987 *Mesolithic Adaptation on the Lower Danube: Vlasac and the Iron Gates Gorge*. British Archaeological Reports, International Series 330 (Oxford).

Rapoport, Amos 1969 *House Form and Culture*. New Jersey: Prentice-Hall Inc.

Redfield, Robert 1956 *The Little Community and Peasant Society and Culture*. Chicago: University of Chicago Press.

Redman, Charles. L. 1973 Research and Theory in Current Archaeology: Introduction. In Charles Redman, ed., *Research and Theory in Current Archeology*. New York: John Wiley & Sons Inc., pp. 5-20.

Renfrew, Colin 1969 The autonomy of the southeast European Copper Age. *Proceedings of the Preshistoric Society* 35: 12-47.

Renfrew, Colin 1971 Sitagroi, radiocarbon and the prehistory of south east Europe. *Antiquity* 45: 275-282.

Reynolds, Peter J. 1979 *Iron Age Farm: The Butser Experiment.* London: British Museum Publications Ltd.

Rocek, Thomas R. 1995 Sedentarization and Agricultural Dependence: Perspectives from the Pithouse-to-Pueblo Transition in the American Southwest. *American Antiquity* 60 (2): 218-239.

Rouse, Irving 1972 *An Introduction to Prehistory: A Systematic Approach.* New York: McGraw-Hill Inc.

Sackett, J. R. 1966 Quantitative analysis of Upper Paleolithic stone tools. *American Anthropologist* 68 2 (2): 356-394.

Schiffer, Michael B. 1983 Toward the identification of formation processes. *American Antiquity* 48: 675-706.

Shaffer, Gary D. 1983 *Neolithic building Technology in Calabria, Italy.* Ph.D. Dissertation, State University of New York at Binghamton. Ann Arbor: University Microfilms.

Shepard, Anna O. 1957 *Ceramics for the Archaeologist.* Carnegie Institution of Washington, Publication 609. Washington, DC.

Sherratt, Andrew G. 1980a Water, soil and seasonality in early cereal cultivation. *World Archaeology* 11 (3): 311-330.

Sherratt, Andrew G. 1980b Plough and pastoralism: Aspects of the Secondary Products Revolution. In Ian Hodder, Glynn Isaac, and Norman Hammond, eds., *Pattern of the Past.* Cambridge: Cambridge University Press, pp. 261-306.

Sherratt, Andrew G. 1982 The development of Neolithic and Copper Age settlement in the Great Hungarian Plain, part I: the regional setting. *Oxford Journal of Archaeology* 1 (3): 287-316.

Sherratt, Andrew 1983 The Development of Neolithic and Copper Age Settlement in the Great Hungarian Plain: Part II: Site survey and settlement dynamics. *Oxford Journal of Archaeology* 2 (1): 13-42.

Smith, D. N. 1996 Thatch, Turves and Floor Deposits: A survey of Coleoptera in Materials from abandoned Hebridean Blackhouses and the implications for their visibility in the archaeological record. *Journal of Archaeological Science* 23: 161-174.

Spaulding, Albert 1953 Statistical Techniques for the Discovery of Artifact Types. *American Antiquity* 18: 305-313.

Srejović, Dragoslav 1972 *Europe's First Monumental Sculpture: New Discoveries at Lepenski Vir*. New York: Stein and Day.

Srejović, Dragoslav, ed., 1988 *The Neolithic of Serbia: Archaeological Research 1948-1988*. University of Belgrade, Centre for Archaeological Research: Belgrade.

Srejović, Dragoslav and Zagorka Letica 1978 *Vlasac*. Belgrade: Sprski Akademija Nauka i Umetnosti.

Stanković, Svetozar and Haskel J. Greenfield 1992 Arheološka istraživanja višeslojnog praistorijskog lokaliteta Blagotin u selu Poljna (iskopovanja 1991 godine). *Glasnik Srpsko Arheološko Društvo* (Belgrade) 8: 46-50.

Stanish, Charles 1989 Household archaeology: testing models of zonal complementarity in the south central Andes. *American Anthropologist* 91 (1): 7-24.

Sumner, W. M. 1979 Estimating Population by Analogy: An Example. In Carol

Kramer, ed., *Ethnoarchaeology: Implications of Ethnography for Archaeology*. New York: Columbia University Press, pp. 164-174.

Tasić, Nenad 1992 Mogućnosti poredjenja raziličiti metoda absolutnog datovanja. In Dragoslav Srejović, ed., *Arheologija I Prirodne Nauke*. Belgrade: Serbian Academy of Sciences and Arts, pp. 107-110.

Therkorn, L. 1987 The inter-relationships of materials and meanings: some suggestions on housing concerns within Iron Age Noord-Holland. In Ian Hodder, ed., *The Archaeology of Contextual Meanings*. Cambridge: Cambridge University Press, pp. 102-110.

Tomka, Steve A. 1993 Site Abandonment behavior among transhumant agro-pastoralists: the effects of delayed curation on assemblage composition. In Catherine M. Cameron and Steve A. Tomka, eds., *Abandonment of Settlements and Regions: Ethnoarchaeological and Archaeological Approaches*. Cambridge: Cambridge University Press, pp. 11-25.

Trigger, Bruce G. 1990 *A History of Archaeological Thought*. Cambridge: Cambridge University Press.

Tringham, Ruth 1971 *Hunters, Fishers, and Farmers of Eastern Europe, 6000-3000 BC*. London: Hutchinson University Library.

Tringham, Ruth 1984 Architectural Investigation into Household Organization in Neolithic Yugoslavia. Paper presented at the 83rd Annual Meeting of American Anthropological Association, Denver, 1984.

Tringham, Ruth 1988 Households with faces: the challenge of gender inprehistoric architectural remains. In Joan Gero and Margaret Conkey, *Engendering Archaeology: Women and Prehistory*. Oxford, U.K.; Basil Blackwell Ltd., pp. 93-131.

Tringham, Ruth and Mirjana Stefanović 1990 The nonceramic uses of clay. In Ruth Tringham and Dušan Krstić, eds., *Selevac: A Neolithic Village in Yugoslavia*. Los Angeles: UCLA Institute of Archaeology, pp. 323-396.

Waterbolk, H. T. 1968 Food Production in Prehistoric Europe. *Science* 162: 1093-1102.

Whallon, Robert Jr. 1968 Investigation of late prehistoric social organization in New York State. In Sally and Lewis Binford, eds., *New perspectives in Archaeology*. Chicago: Aldine, pp. 223-244.

Whallon, Robert Jr. 1971 *A Computer Program for Monothetic Subdivisive Classification in Archaeology*. Museum of Anthropology, University of Michigan, Technical reports 1.

Whallon, Robert Jr. 1972 A new approach to pottery typology. *American Antiquity* 37: 13-33.

Whallon, Robert Jr. 1984 Unconstrained clustering for the analysis of spatial distributions in archaeology. In Harold J. Hietala, ed., *Intrasite Spatial Analysis in Archaeology*. Cambridge: Cambridge University Press, pp. 242-277.

Whittle, Alasdair 1986 *Neolithic Europe: A Survey*. Cambridge: Cambridge University Press.

Wiessner, Polly. 1974 A Functional Estimator of Population From Floor Area. *American Antiquity* 39 (2): 343-349.

Wilk, Richard R. 1990 The built environment and consumer decisions. In Susan Kent, ed., *Domestic architecture and the use of space: an interdisciplinary cross-cultural study*. Cambridge: Press syndicate of the University of Cambridge, pp. 34-42

Wilk, Richard R. and William L Rathje 1982 Archaeology of the households: building a prehistory of domestic life. *American Behavioral Scientist* 25: 617-639.

Williams, L., Thomas, D. H., and Bettinger, R. 1973 Notions to numbers: Great Basin settlement patterns as polythetic sets. In Charles Redman, ed., *Research and Theory in Current Archaeology*. New York: Wiley, pp. 215-238.

Willey, Gordon and P. Phillips 1958 *Method and Theory in American Archaeology*. Chicago: University of Chicago Press.

Wilshusen, Richard H. 1989 Unstuffing the Estufa: Ritual Floor Features in Anasazi Pit Structures and Pueblo Kivas. In William. D. Lipe and Michelle Hegmon, eds., *The Architecture of Social Integration in Prehistoric Pueblos*. Colorado: Crow Canyon Archaeological Center, pp. 89-112.

The World Book Encyclopedia. Chicago: World Book, Inc., vol. R.

Yellen, John E. 1977 *Archaeological Approaches to the Present: Models for Reconstructing the Past*. New York: Academic Press.

Vasić, M. 1906 Nekoliko preistorijski nalasci iz Vin če. *Starinar* (n.r.) 1/2: 89-127.

Vlassa, Nicolae 1976 Cea mail veche fază a complexului cultural Starčevo-Criş in România. *Neoliticul Transilvaniei*. Bibliotheca Musei Napocensis III. Muzeul de Istorie Al Transilvâaniei: Cluj-Napoca, pp. 198-264.

Vlassa, Nicolae 1980 Din nou despre poziţia stratigrică orizontului Gura Baciului I. *Marisia* 10: 691-697.

Zăvoianu, I. 1979 *Judeţul Timiş - Sport-turism*. Timişoara: Editura Academiei.

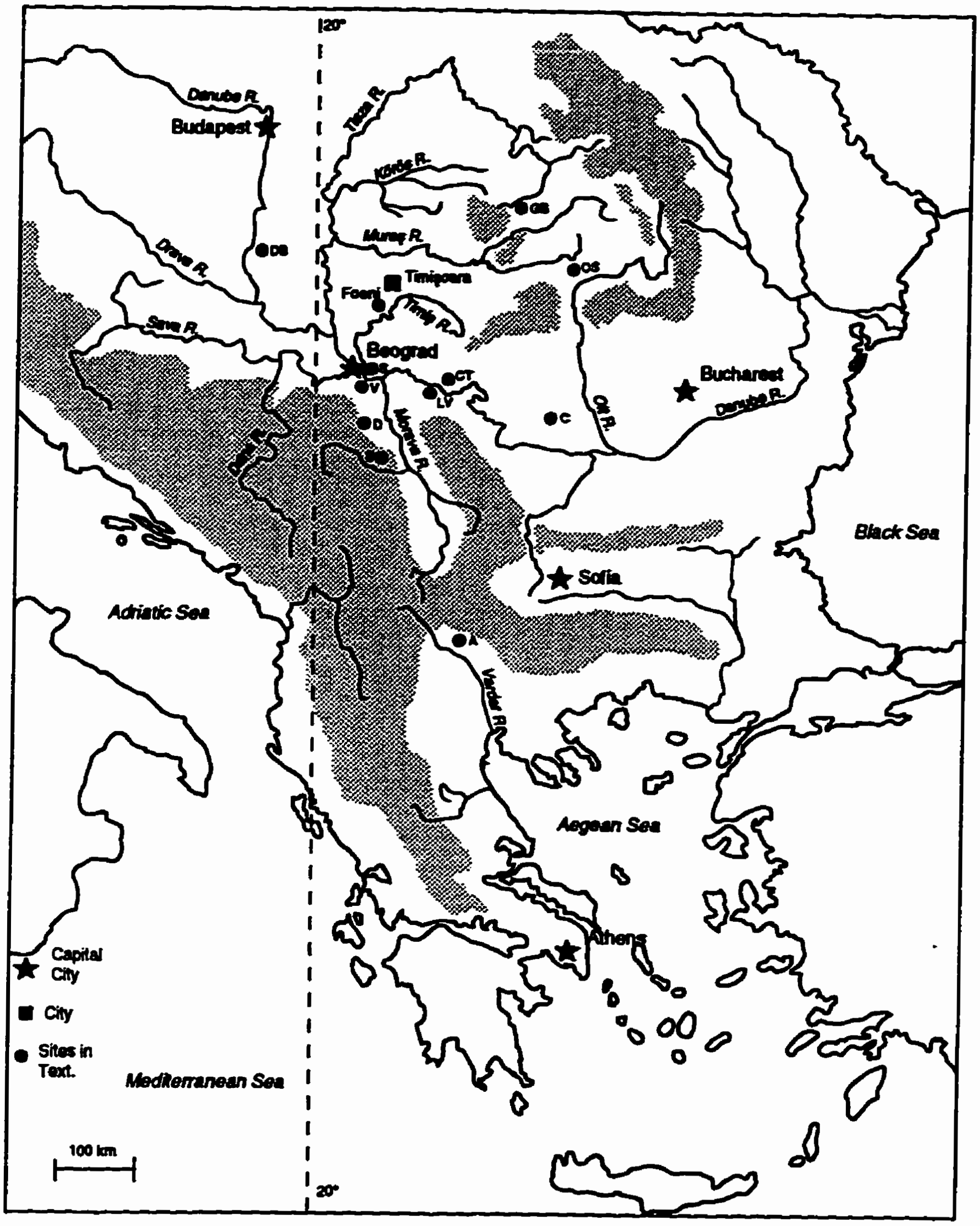

20°
Danube R.
Budapest
Tisza R.
Körös R.
GS
Mureş R.
DS
Drava R.
CS
Timişoara
Foeni
Timiş R.
Sava R.
Beograd
CT
V
LV
Bucharest
Danube R.
C
Olt R.
D
Morava R.
Black Sea
Sofia
Adriatic Sea
A
Vardar R.
Aegean Sea
Athens
Capital City
City
Sites in Text.
Mediterranean Sea
100 km
20°

Figure 1

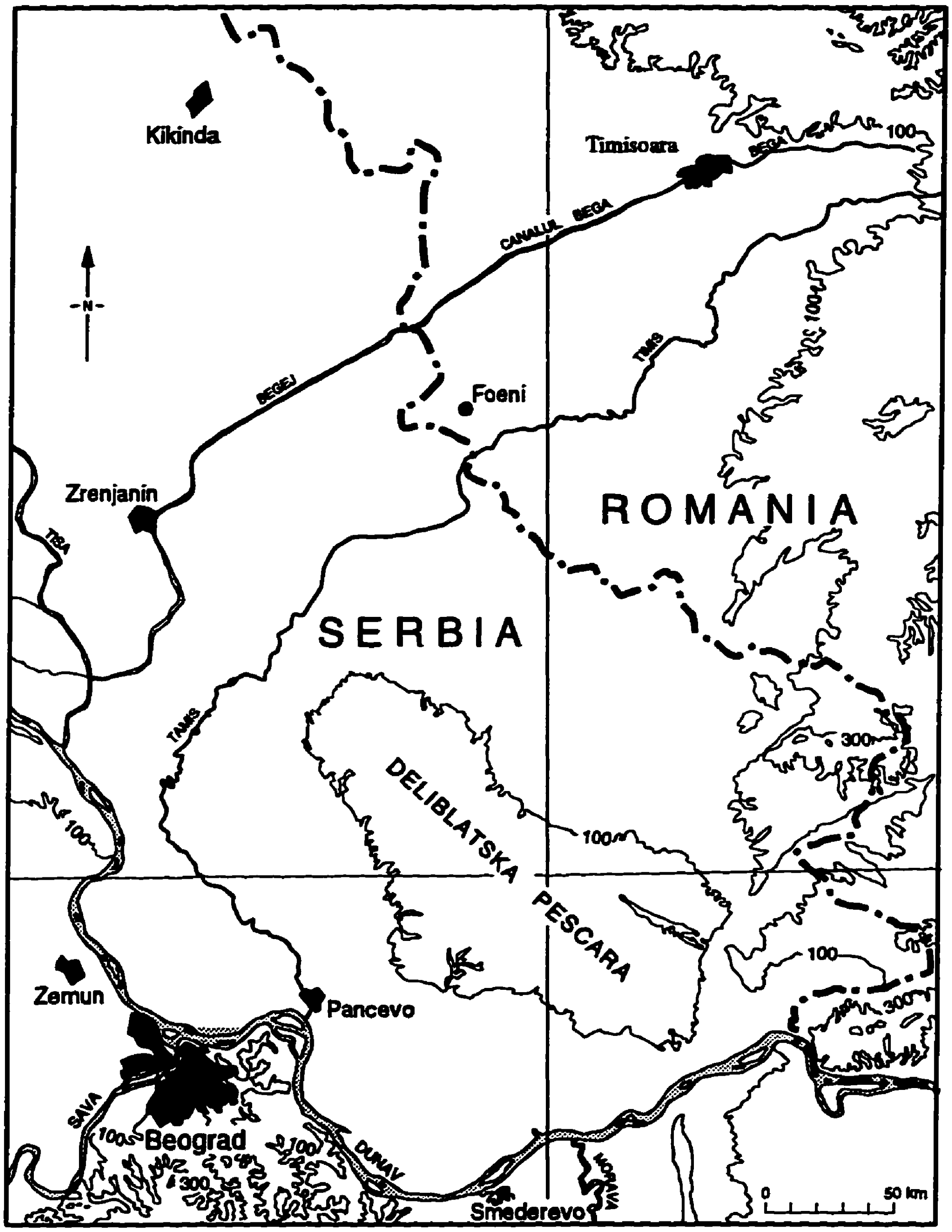


Figure 2: Map of the Banat

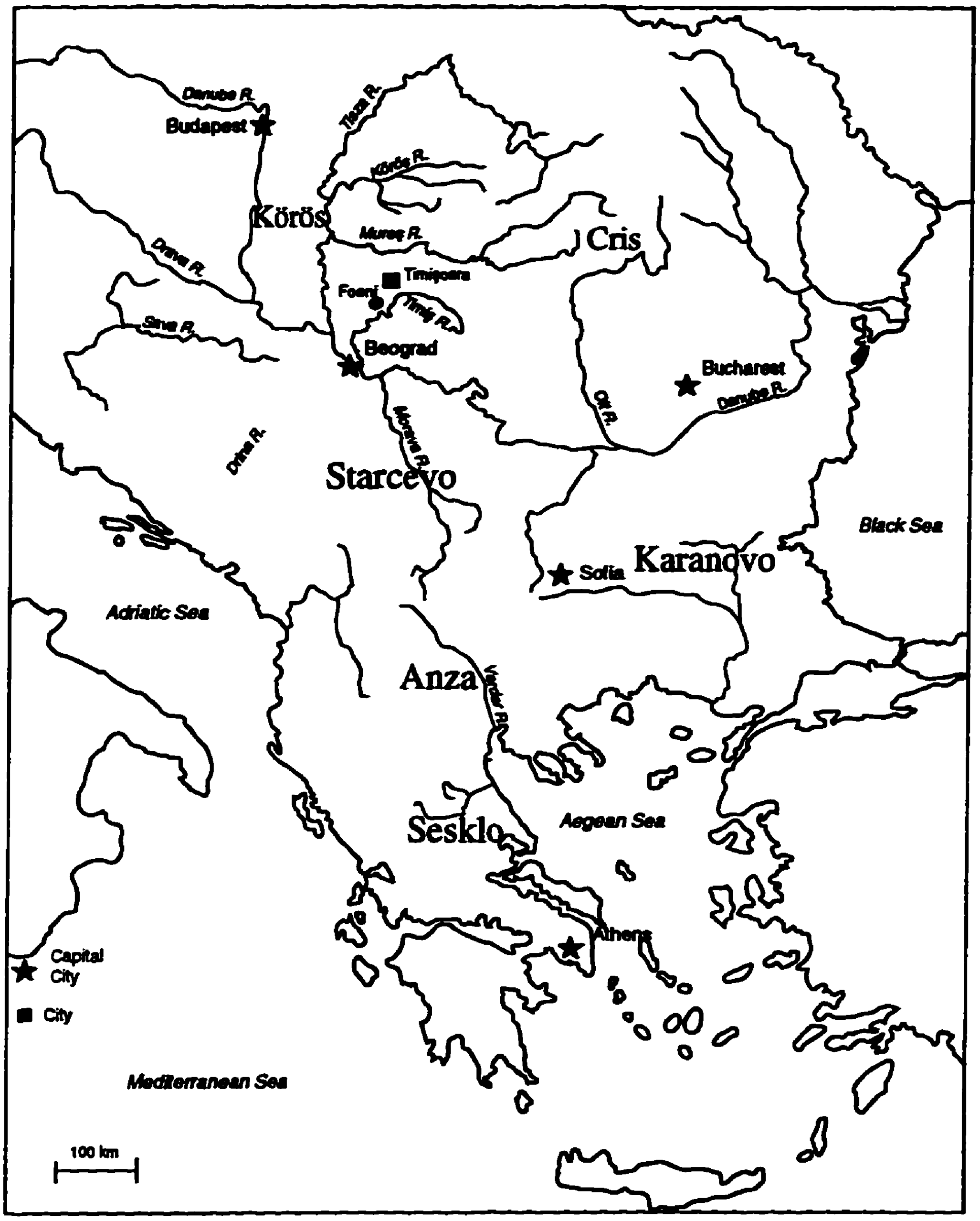


Figure 3: Early Neolithic Culture Groups of Southeastern Europe

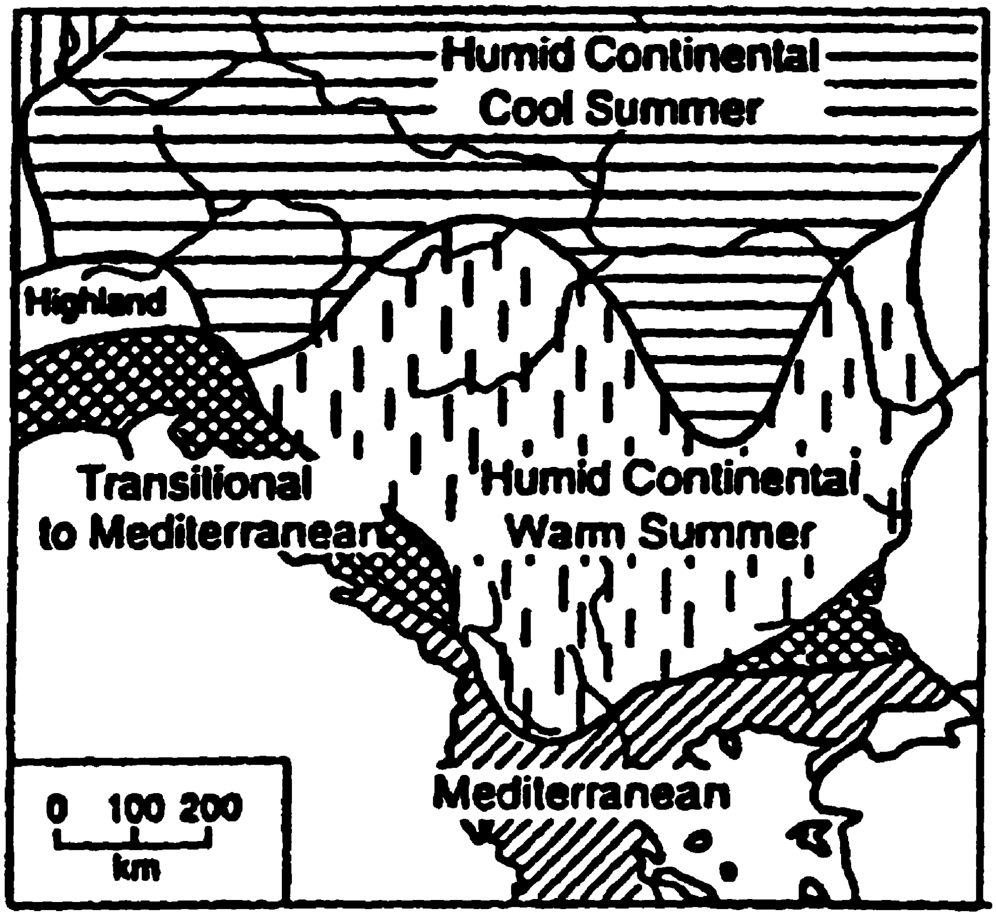


Figure 4. Map showing climatic divide between mediterranean and temperate central Europe (Pounds 1969).

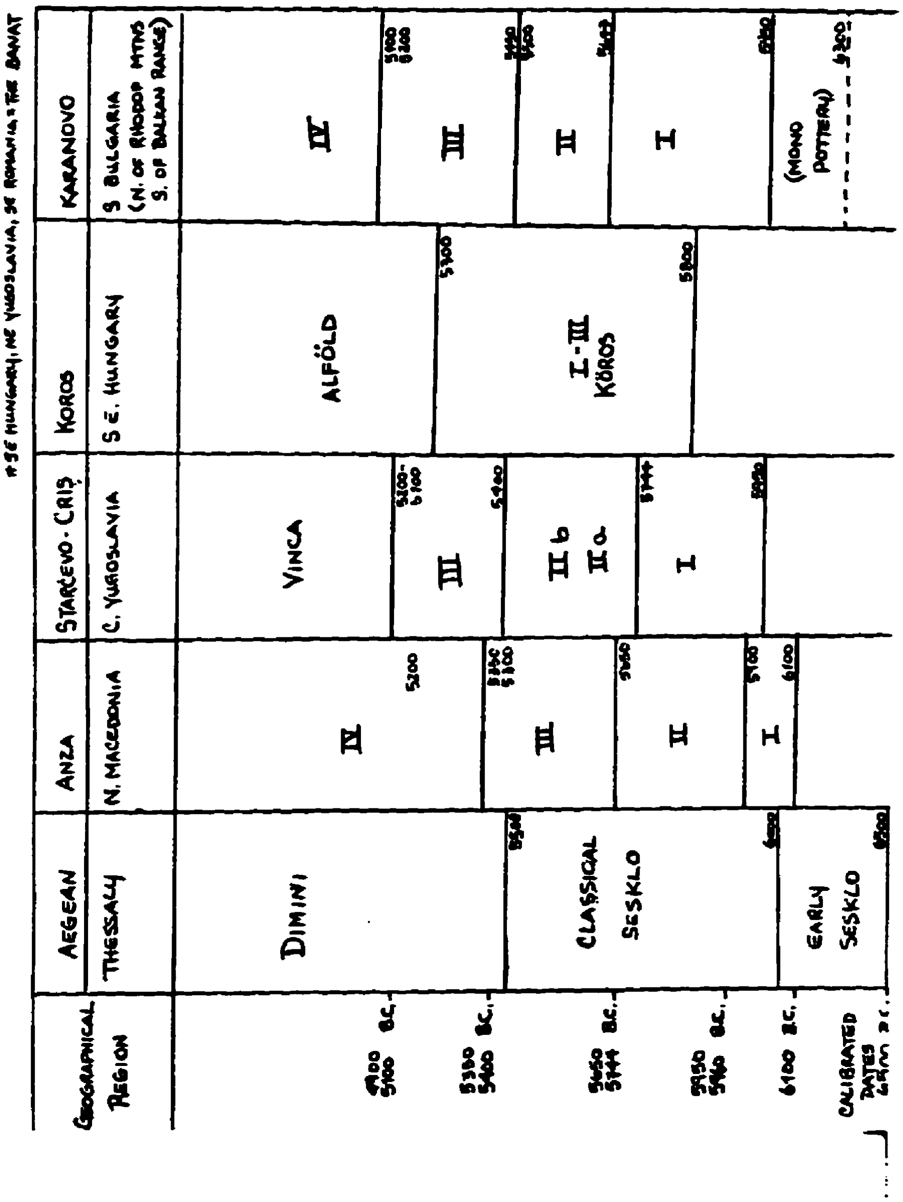


Figure 5: Chronological chart of the Early Neolithic culture complexes of Southeastern Europe.

Milojčić 1950	Arandjelović-Garašanin 1954	Garašanin 1979	Garašanin 1979	Gimbutas 1974	Srejović 1972		Dimitrijević 1974, 1979
							Final
Starčevo IV	Starčevo III	Starčevo III	Veluška Tumba IV	Anzabegovo III	Classic Starčevo	LATE CLASSIC	Spiraloid B
							Spiraloid A
Starčevo III	Starčevo IIb	Starčevo IIb				CLASSIC	Garlandoid
Starčevo II	Starčevo IIa	Starčevo IIa	Veluška Tumba III	Anzabegovo II			Dark Linear (Linear B)
Starčevo I	Starčevo I	Starčevo I (Gura Baciului)	Veluška Tumba II	Anzabegovo I	Proto-Starčevo	PRECLASSIC	White Linear (Linear A)
			Veluška Tumba I				Monochrome

Figure 6. Chart of the competing chronological models for the Early Neolithic Starčevo culture (Manson 1990: figure 4.1, p. 129).

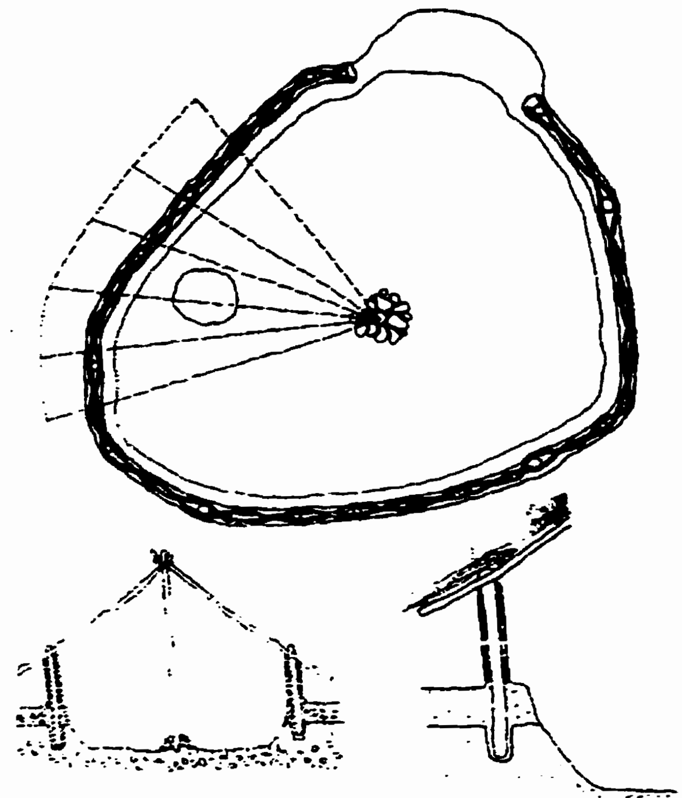


Figure 7. Hypothesized reconstruction of Divostin Early Neolithic pit house superstructure -cf. Bogdanović 1988: fig. 5.24.

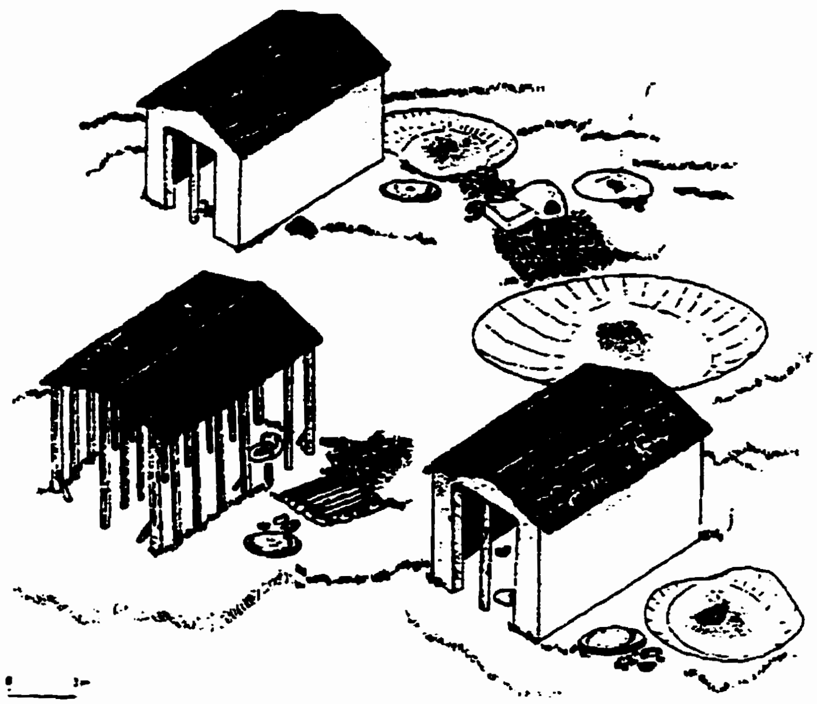


Figure 8: Hypothesized reconstruction of the relationship between surface daub houses and daub borrow pits at Achilleion 2 (Gimbutas 1991: fig. 2-3).

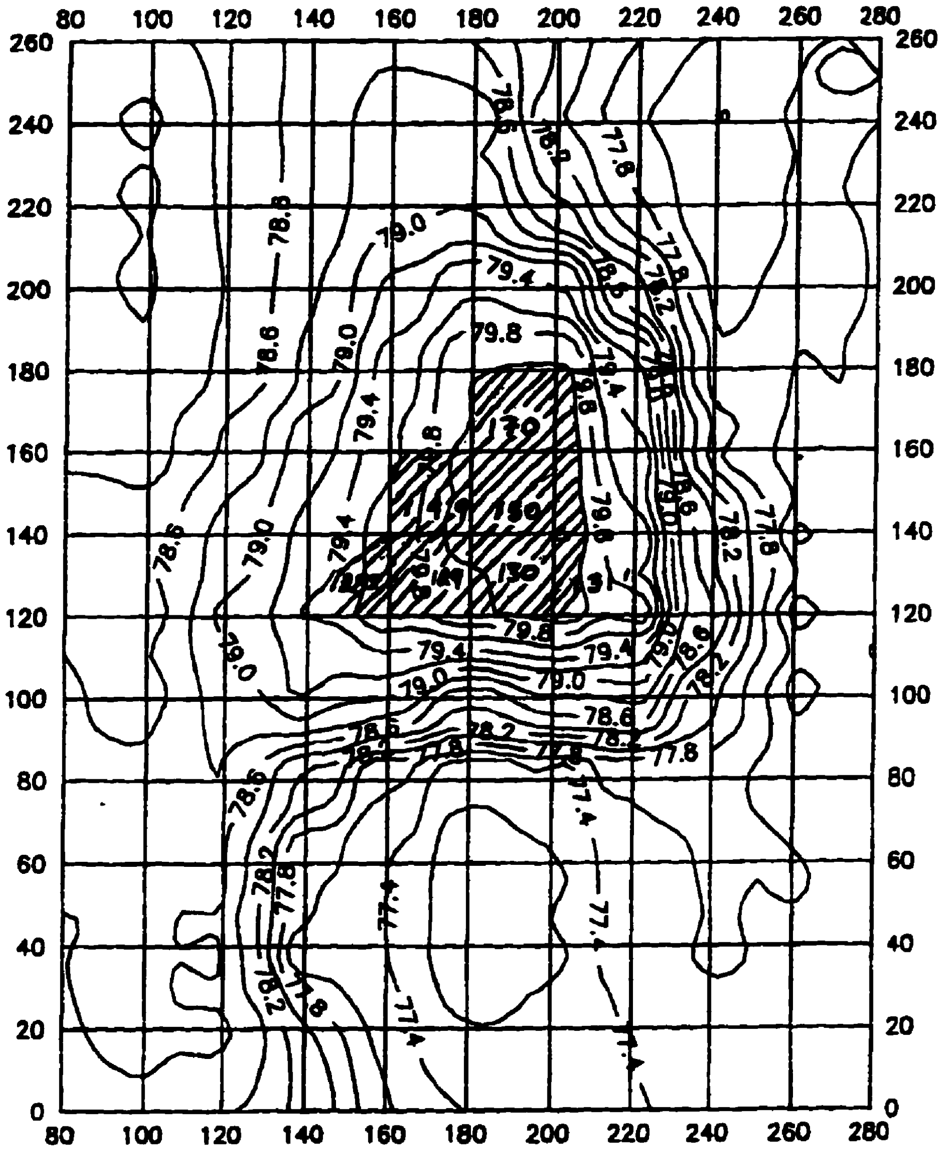
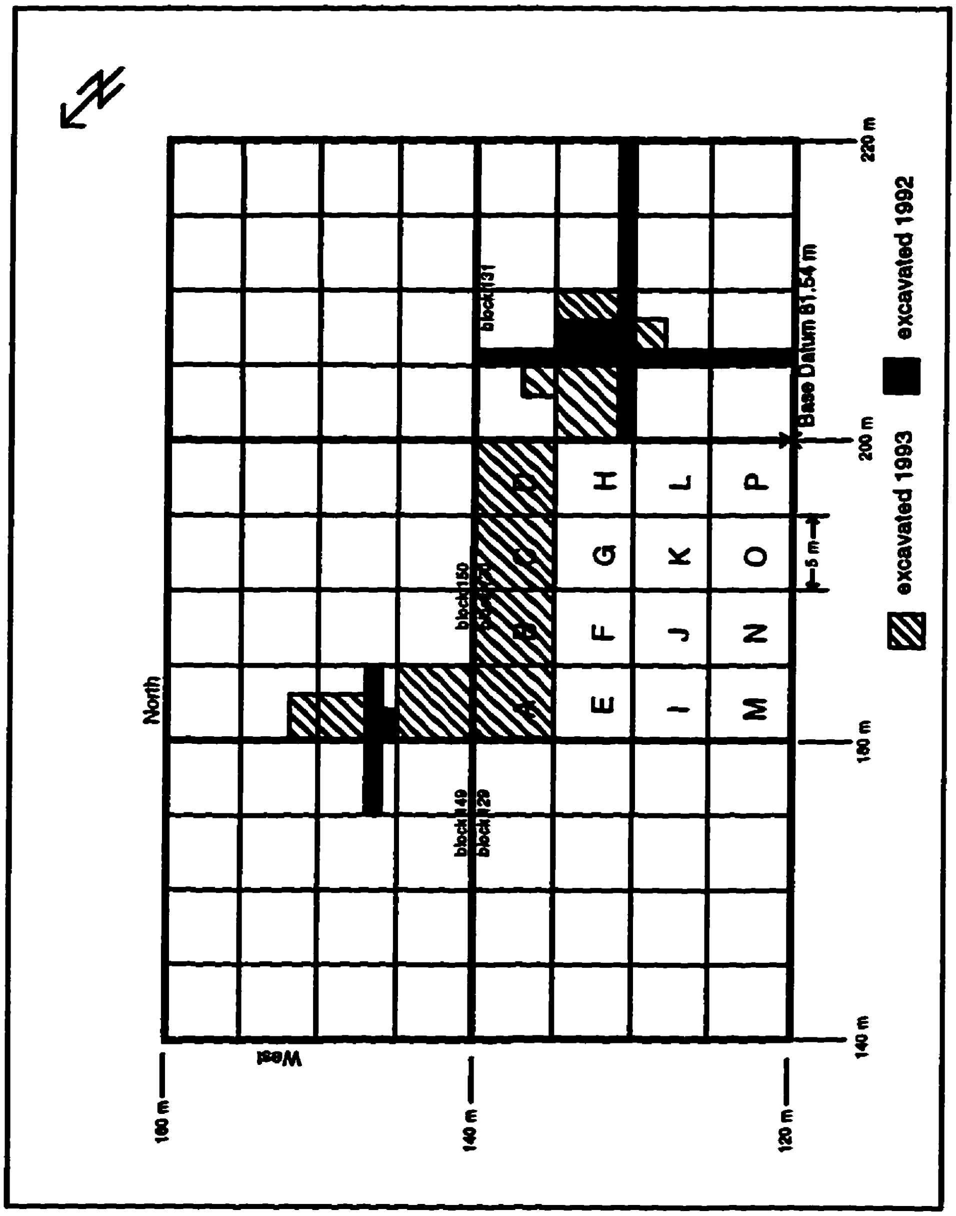


Figure 9. Map of topography and grid at Foeni-Salaş, showing maximum extent of occupation. Contours lines are meters above sea level; grid units are 20 m intervals.



Survey and Excavation Grid System
North
West
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
block131
Base Datum 81.54 m
5 m
excavated 1993
excavated 1992
220 m
200 m
180 m
140 m
160 m
140 m
120 m

Figure 10

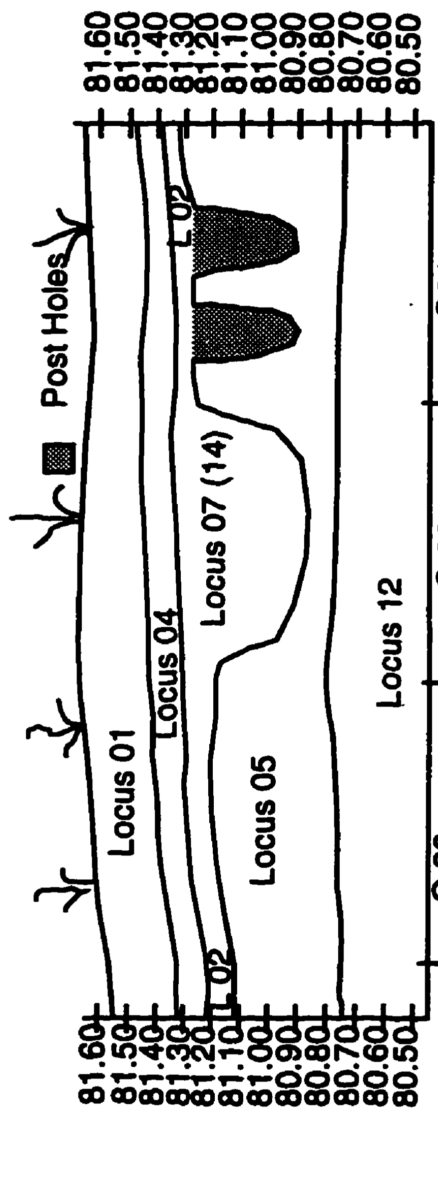


Figure 11: South Profile of 131F

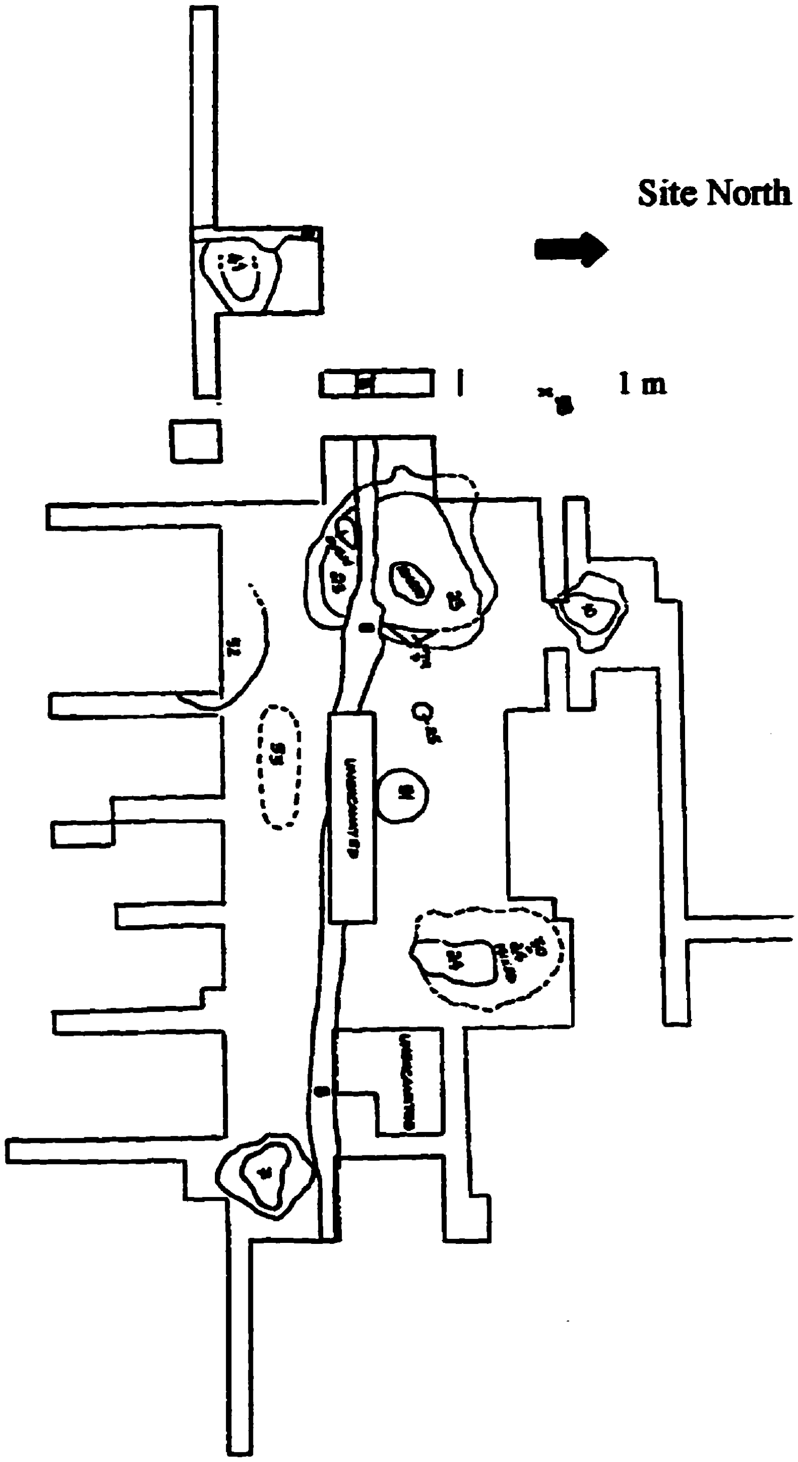


Figure 12a. Map of Starčevo-Criş loci at Foeni-Salaş.

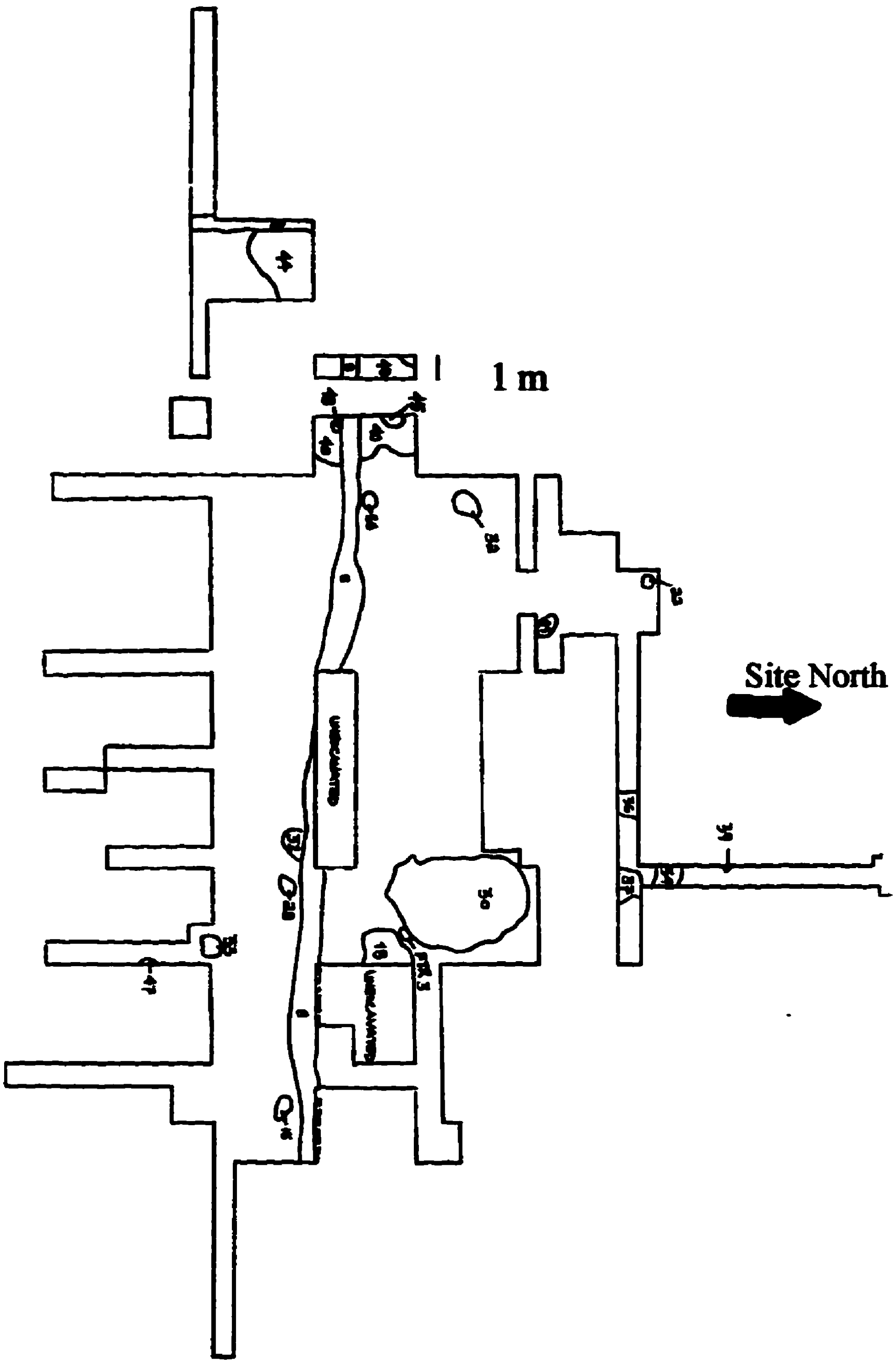


Figure 12b. Map of Bronze and Early Iron Age loci at Foeni-Salaş.

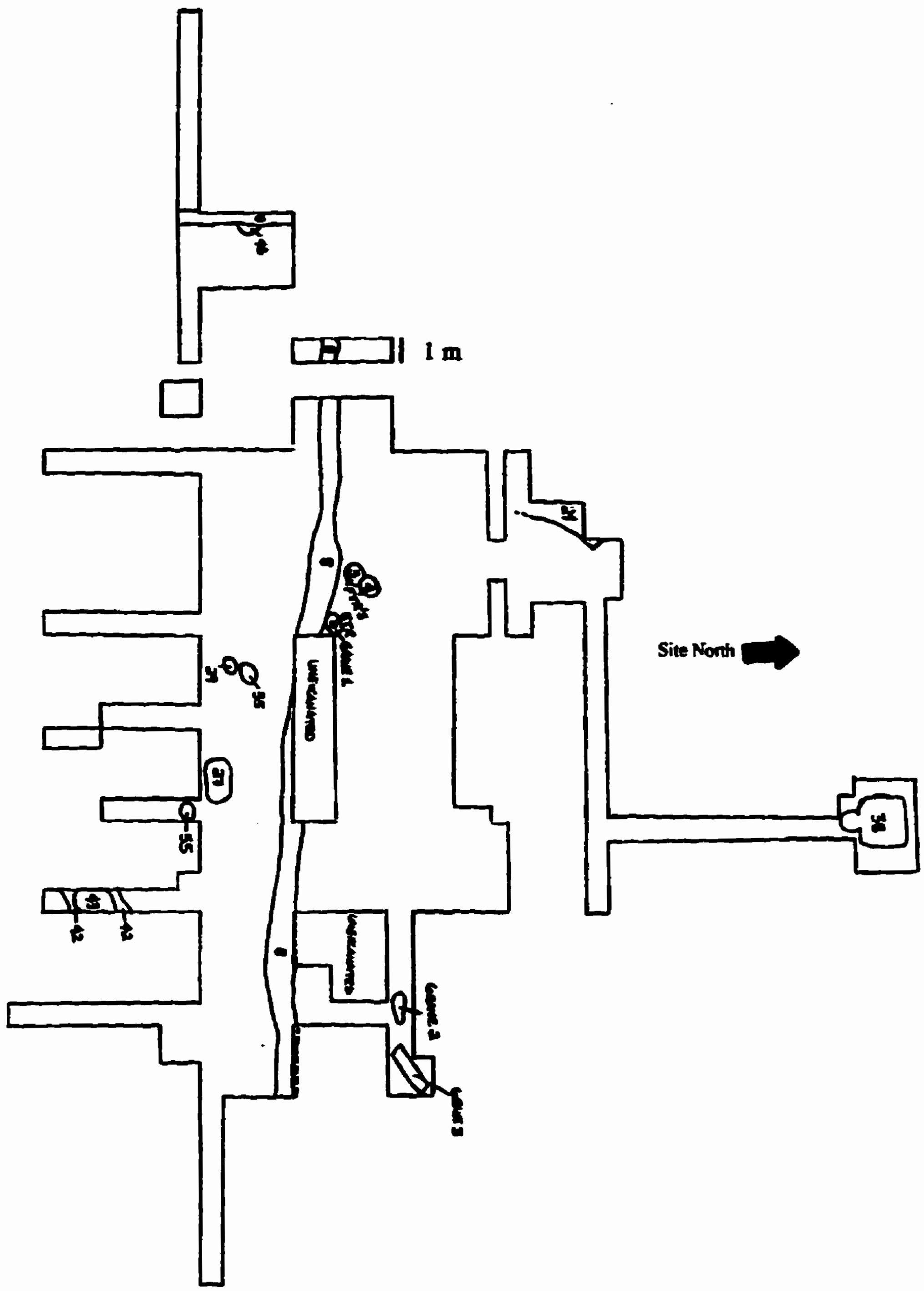


Figure 12c. Map of Dacian and Medieval loci at Foeni-Salaş.

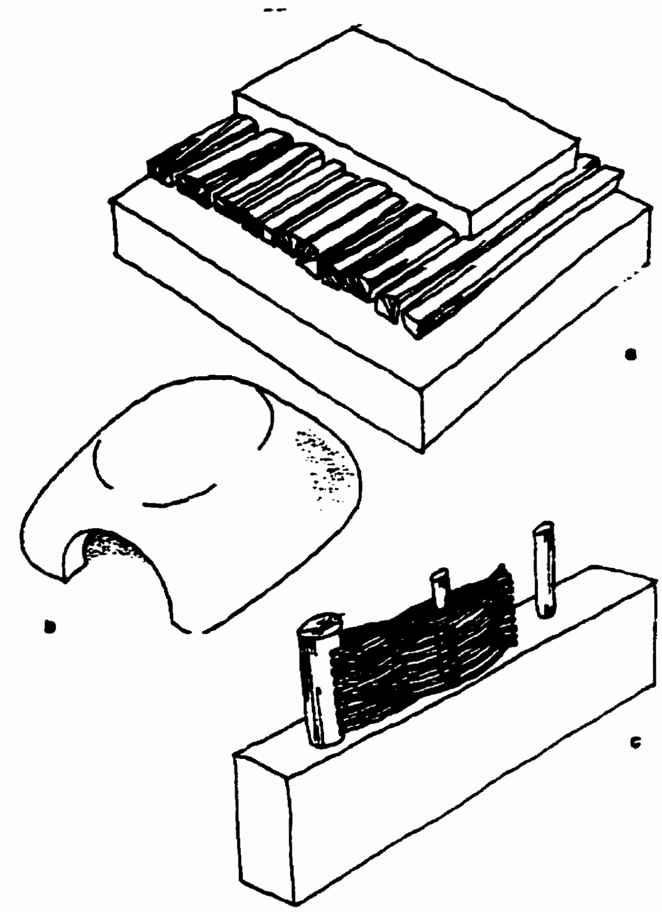


Figure 13. Hypothesized reconstruction of Divostin IIb (a) daub floor, (b) domed oven, and (c) wall (Bogdanović 1988: fig. 5.25).

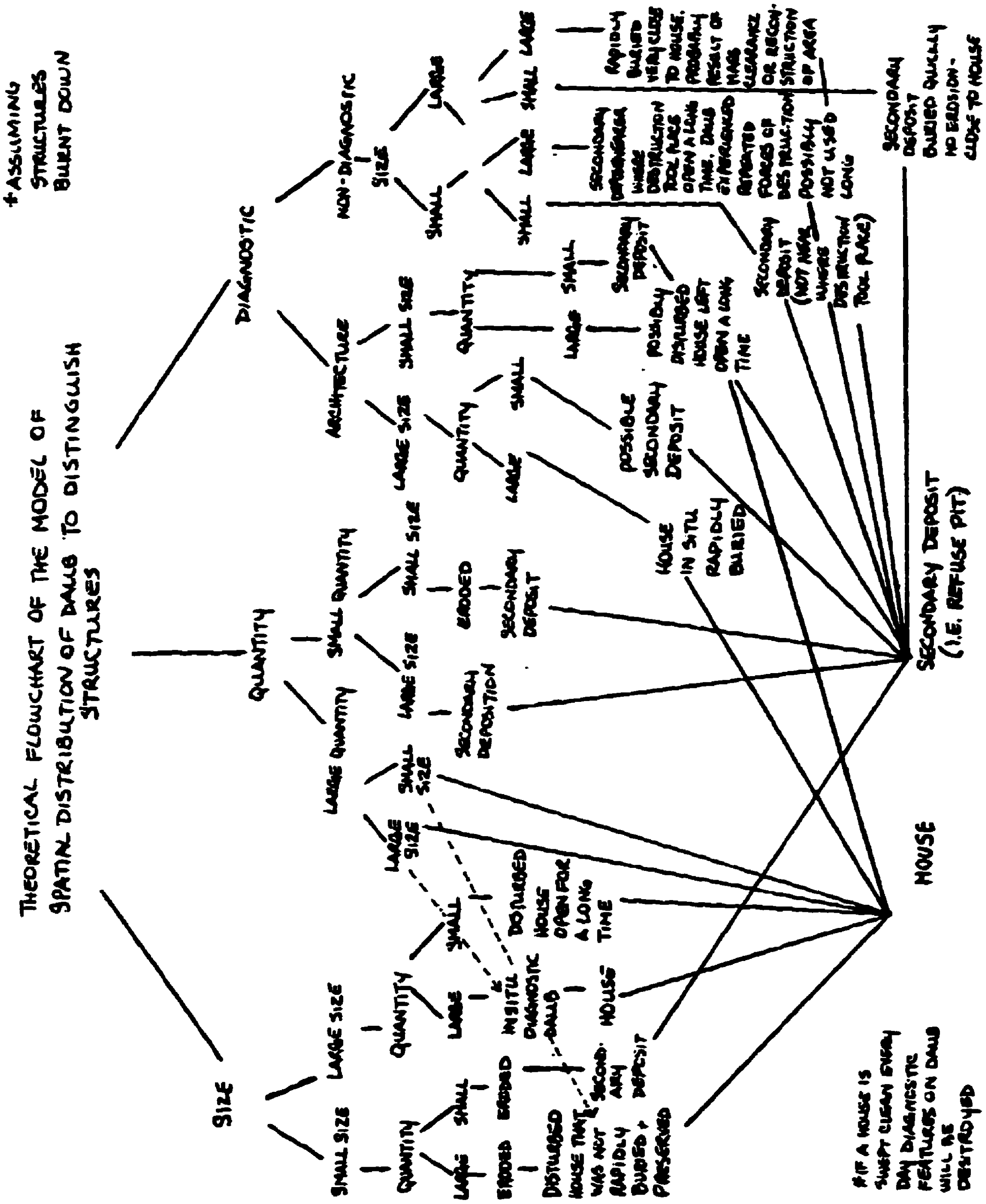


Figure 14. Theoretical flow chart of the daub spatial distribution model.

	Wall	Floor	Oven	Kiln
Shape	formed 1 or 2 sides	formed 1 side	floor-formed 1 side; wall-formed 2 sides (curved)	floor-formed 1 side; wall-formed 2 sides (curved)
Impressions	sticks	none	none	none
Temper	chaff sand and silt	packed soil - may or may not be burnt	wall - chaff, sand and silt	high quantities of fine grained sand and clay
Thickness	variable	variable	variable	variable
Compactness	not flaky - falls apart	very compact	very compact	extremely compact
Hardness	least hard	less hard	very hard; has sand	extreme hardness, vitrified clay
Firing	less	differential firing - highly fired on flat surface and less below	oxidized - finished surface; reduced - unfinished	completely fired inside and out. Exposed to high degrees of temperature
Weight	lighter - to be supported frequently, have chaff	heavier -	very heavy - thick compact clay to withstand firing	the heaviest - lots of clay to withstand extreme heat
Oxidation-red (more oxygen) reduce-black (less oxygen)	mostly oxidised	oxidised on the upper part of the floor and reduced on the underside	mostly oxidised except for the inside of the dome walls	white in colour

Figure 15: Characteristics of architectural daub types

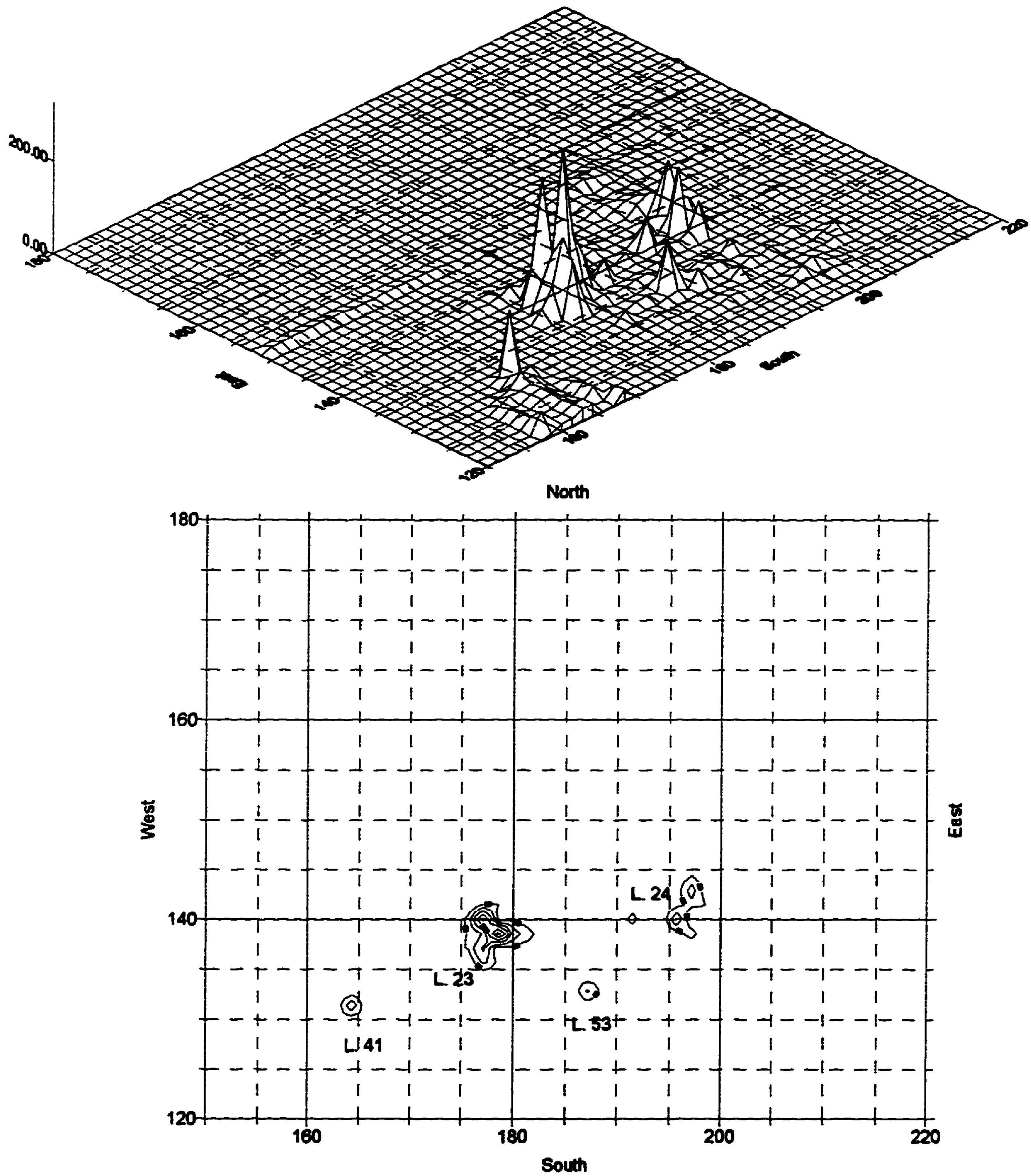


Figure 16
Foeni-Salas: Distribution of wall daub (gram weight)
50 grams per contour, 50 gram minimum interval
(File: Daub wall EN weight)

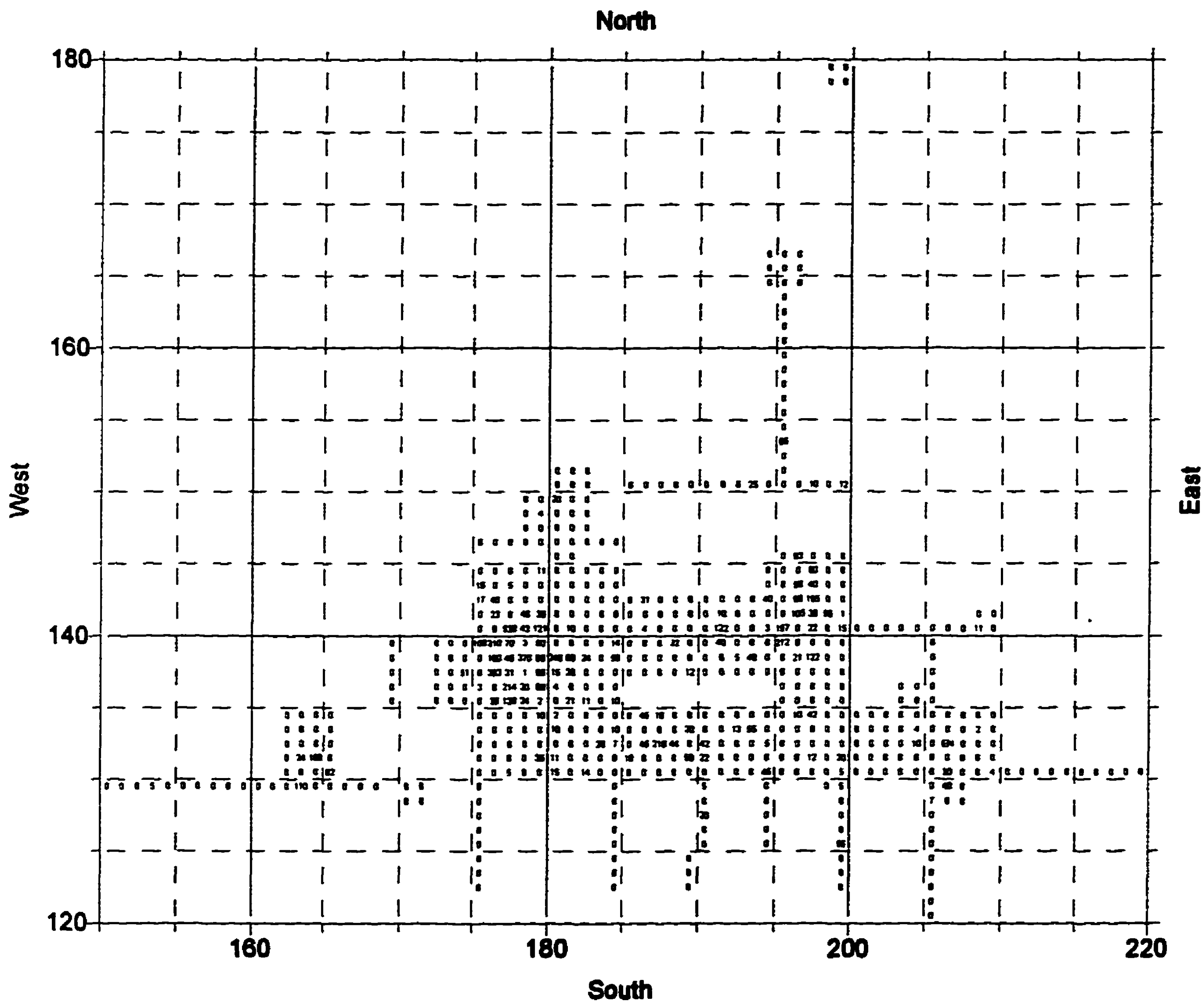


Figure 17
Foeni-Salas: Distribution of wall daub (gram weight)
(File: Daub wall EN weight.post)

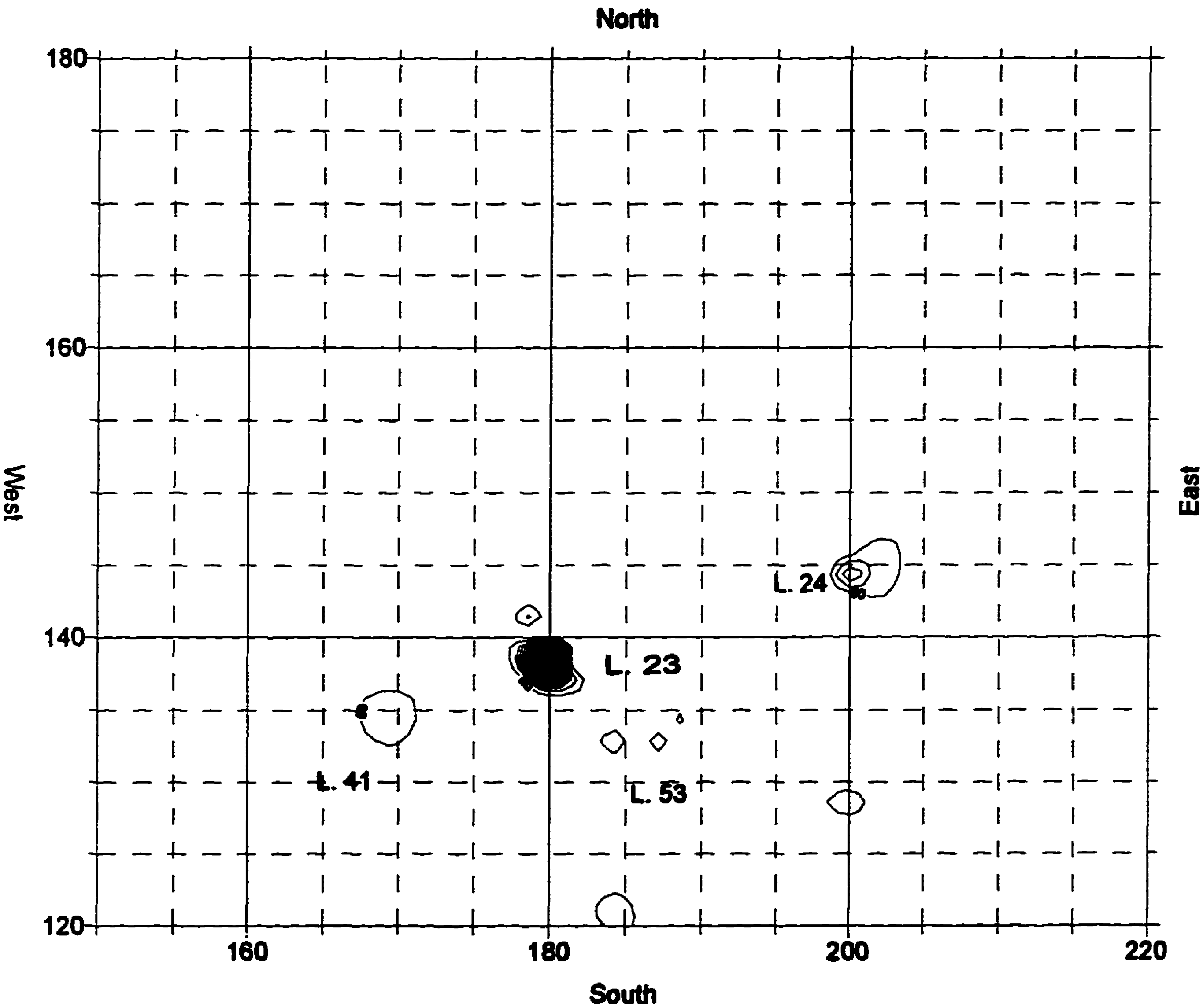


Figure 18
Foeni-Salas: Distribution of floor daub (gram weights)
50 fragments per interval, 50 fragment minimum interval
(File: Daub Floor EN Weight)

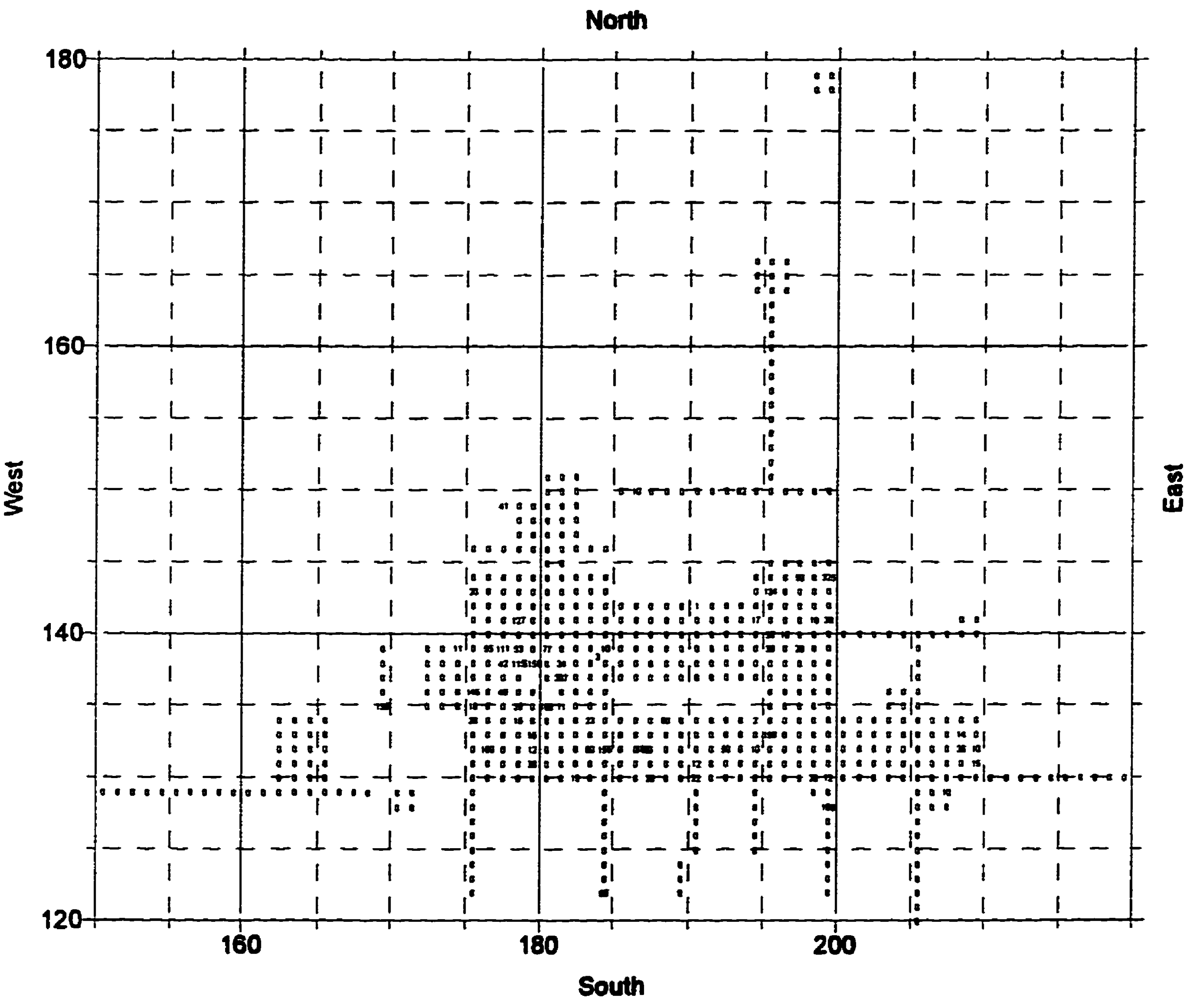


Figure 19
Foeni-Salas: Distribution of floor daub (gram weights)
50 fragments per interval, 50 fragment minimum interval
(File: Daub Floor EN Weight Post)

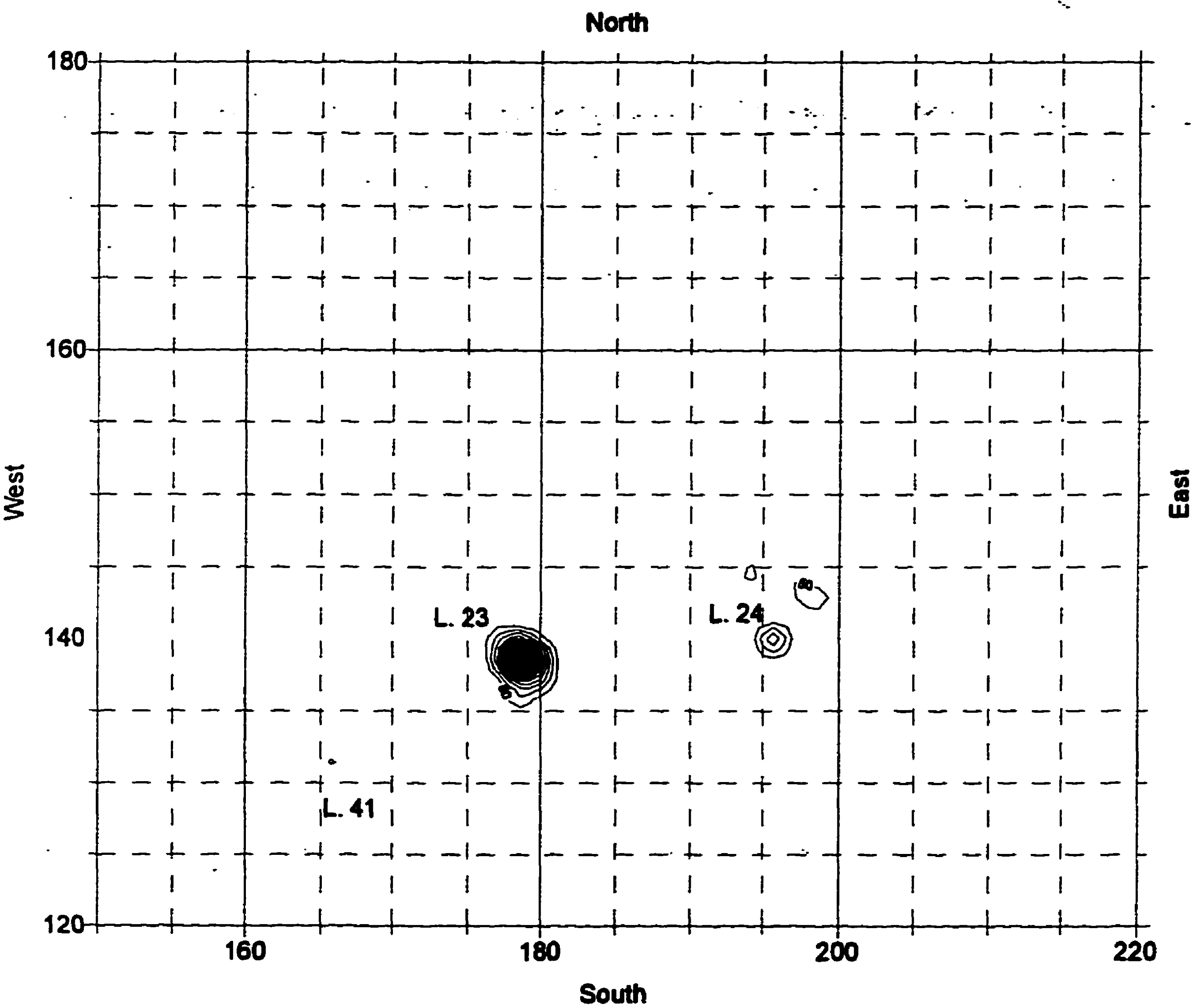


Figure 20
Foeni-Salas: Distribution of kiln daub (gram weight
50 grams per interval
50 grams minimum interval
(File: Daub Kiln EN Weight)

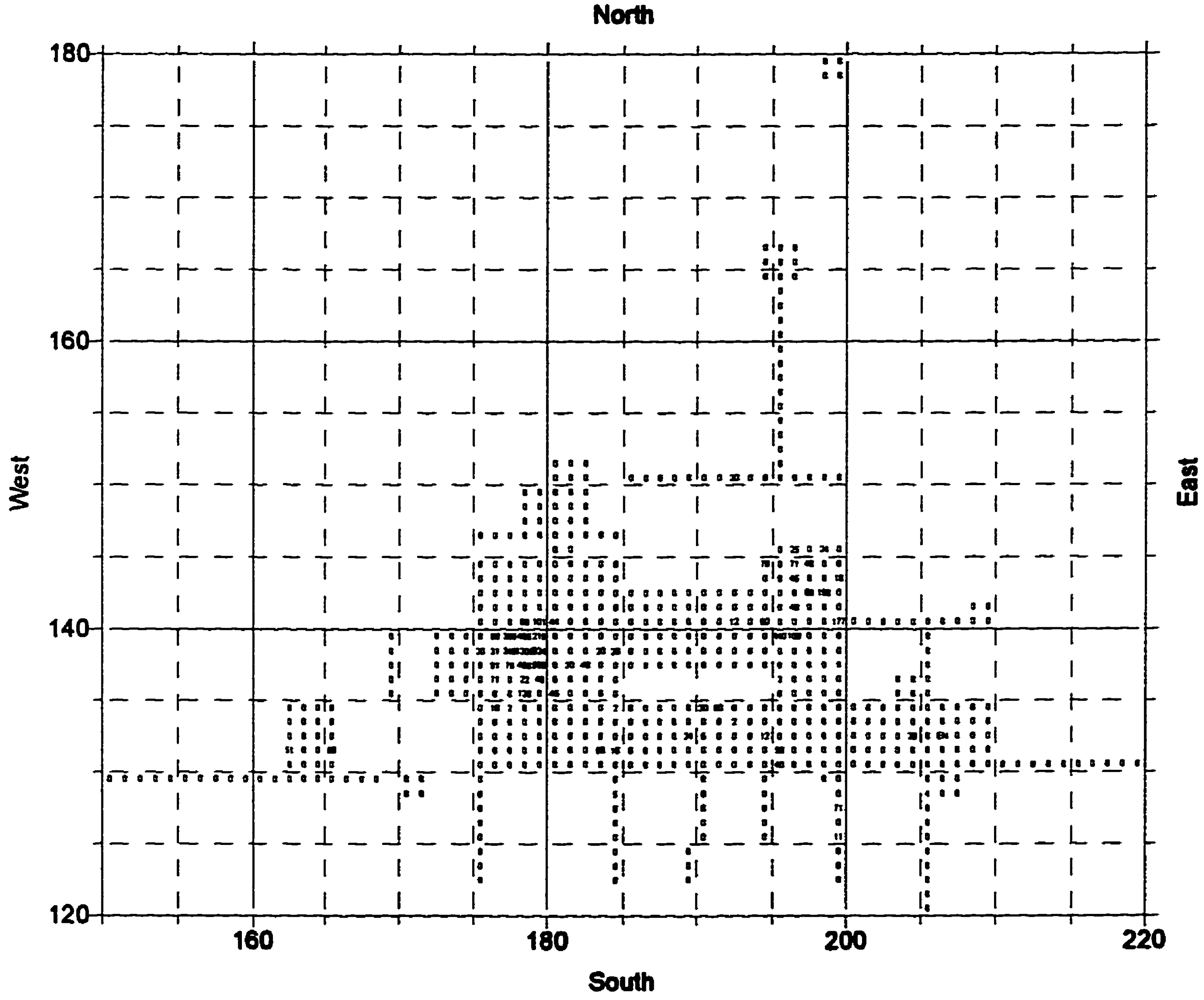


Figure 21
Foeni-Salas: Distribution of Early Neolithic kiln daub (gram weight)
(File: Daub kiln EN weight post)

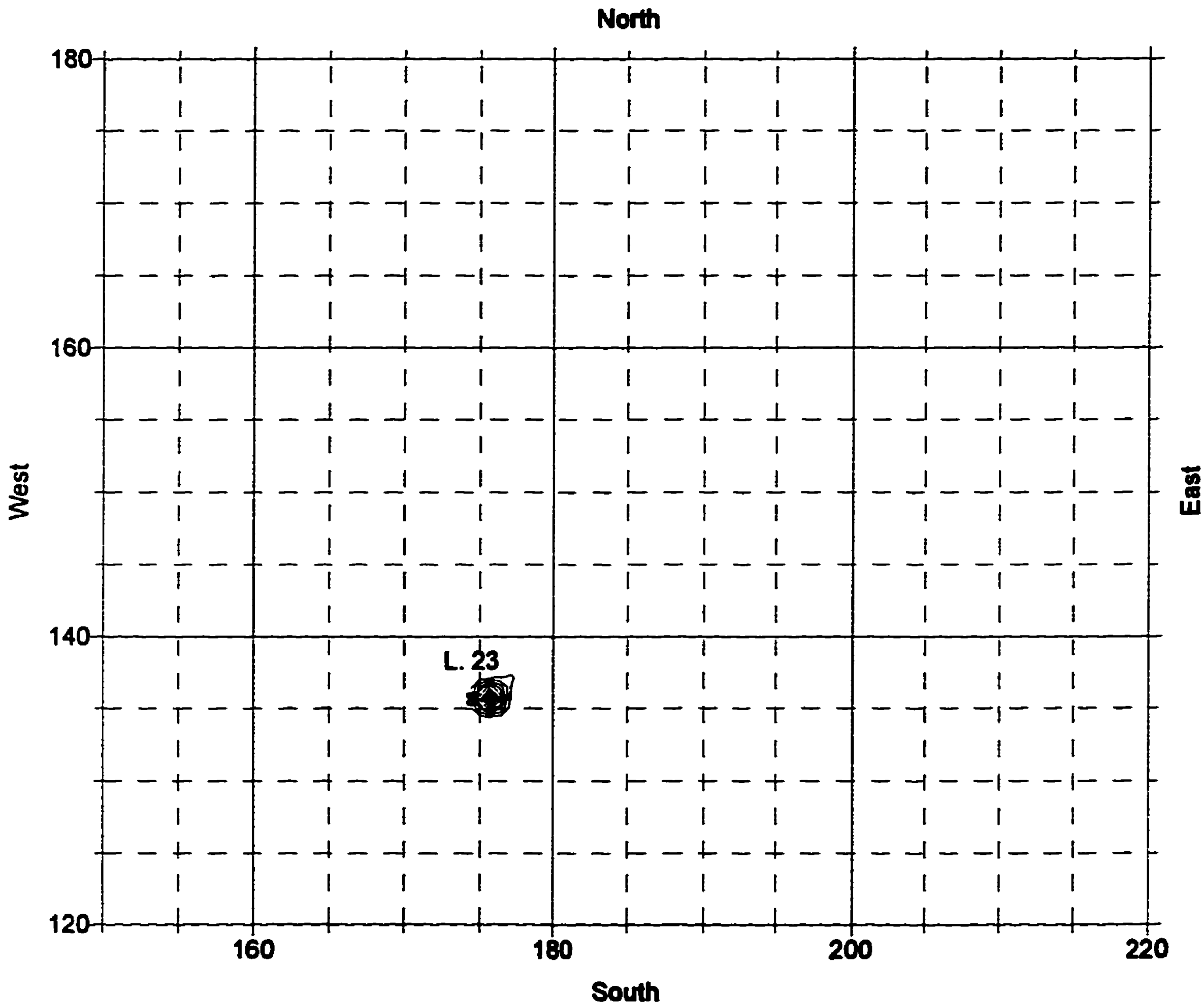


Figure 22
Foeni-Salas: Distribution of oven daub (gram weight)
50 grams per contour, 50 gram minimum contour
(File: Daub oven EN weight)

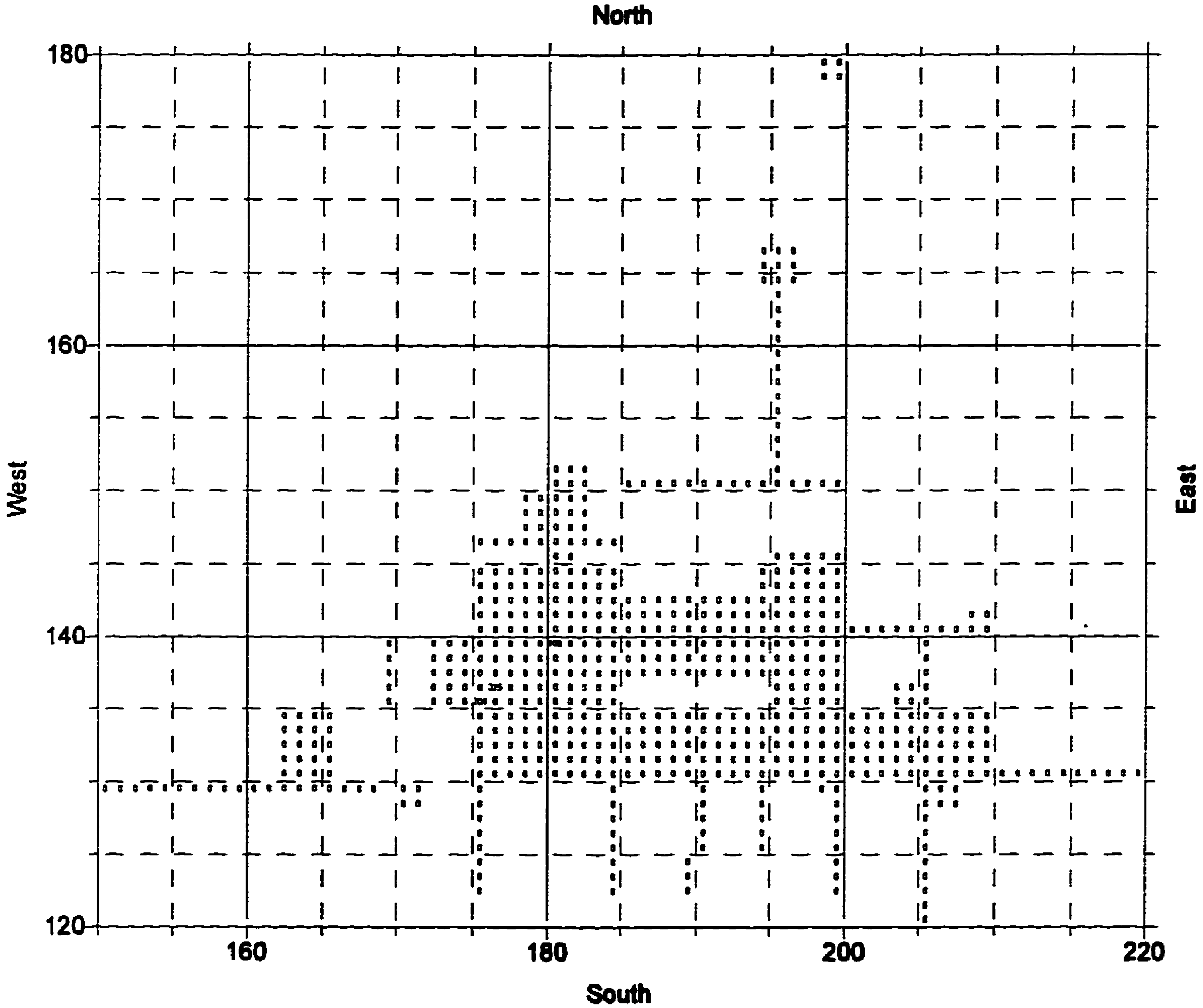


Figure 23
Foeni-Salas: Distribution of oven daub (gram weight)
(File: Daub oven EN weight.post)

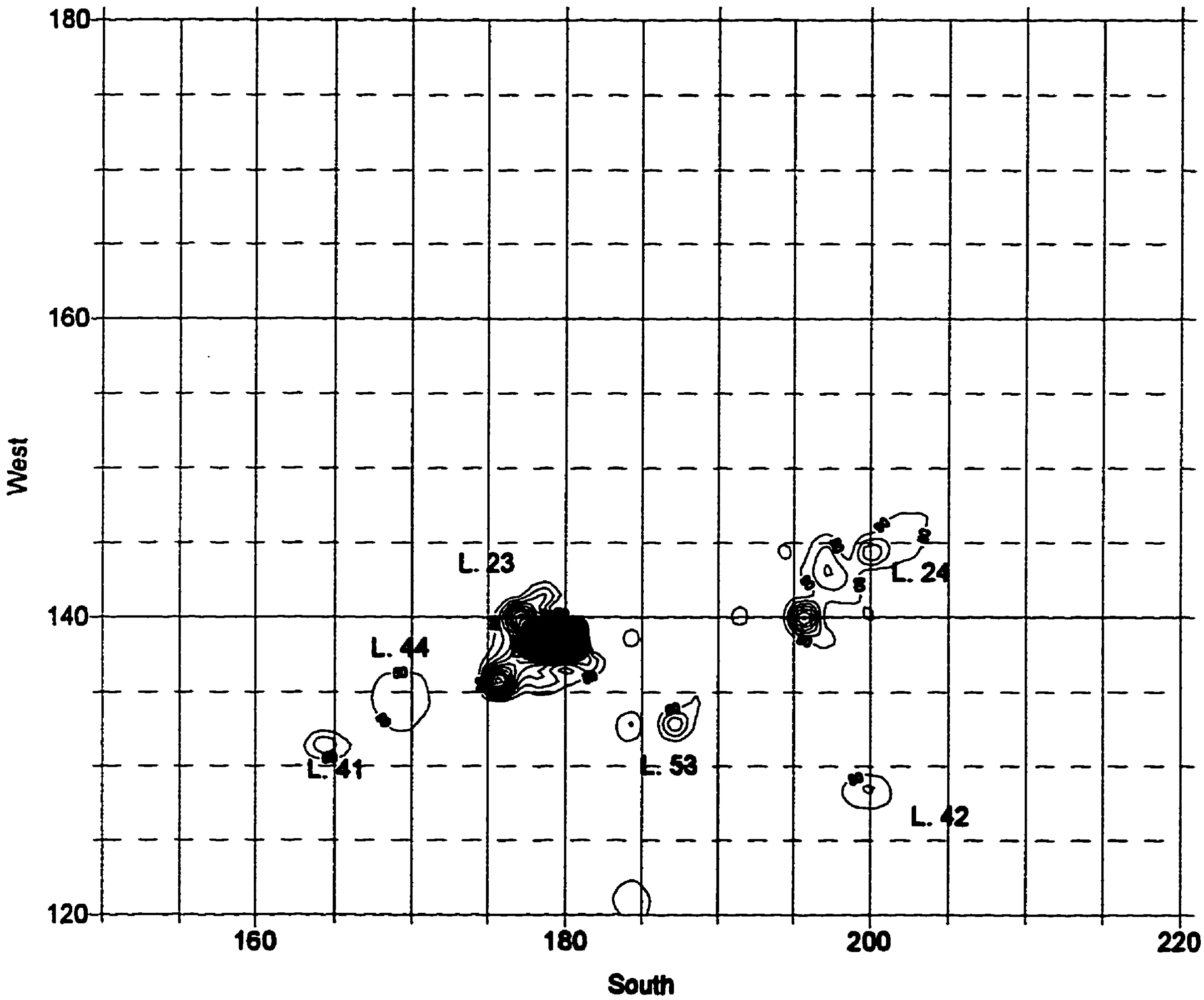


Figure 24
Foeni-Salas: Distribution of all Early Neolithic architectural daub (floor, kiln, oven, and wall)
50 gram weight contour interval, 50 gram weight minimum interval
(File: Daub floor kiln oven wall.srf)

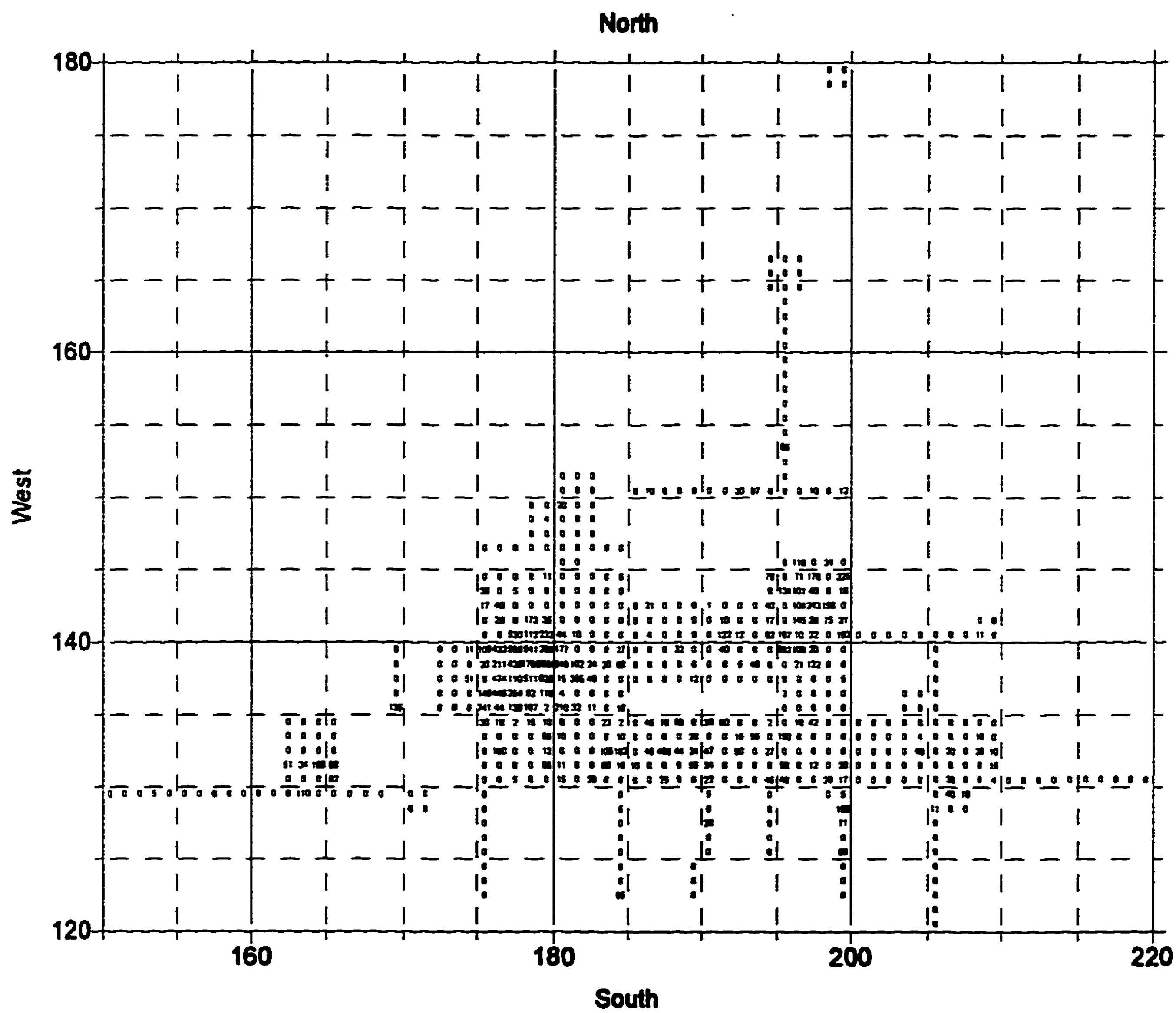


Figure 25
Foeni-Salas: Distribution of all Early Neolithic
architectural daub (floor, kiln, oven, and wall)
50 gram weight contour interval, 50 gram weight minimum interval
(File: Daub floor kiln oven wall post.srf)

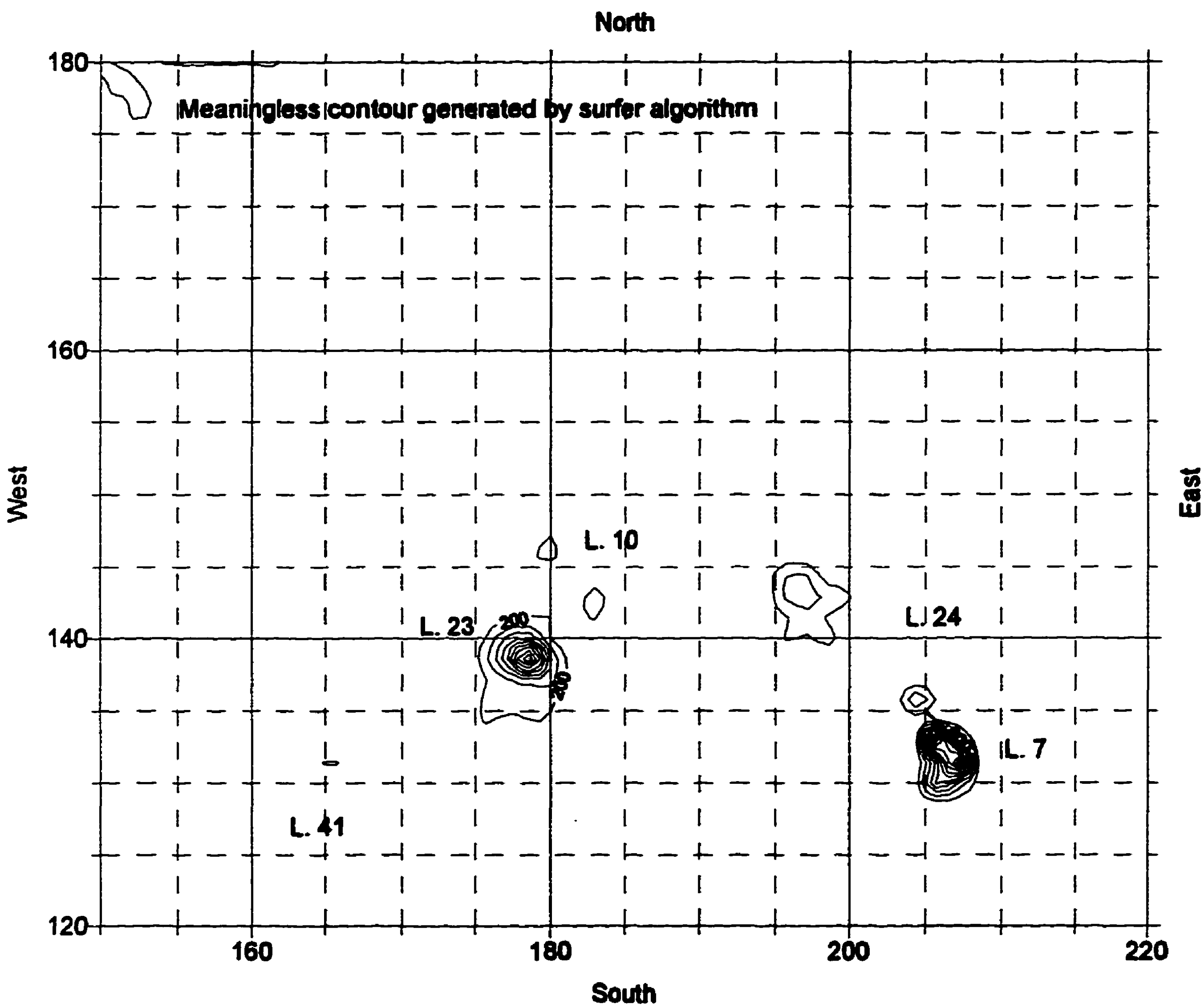


Figure 26
Foeni-Salas: Distribution of miscellaneous daub (gram weight)
200 gram interval, minimum interval of 200 grams
(File: Daub EN misc weight 200.srf)

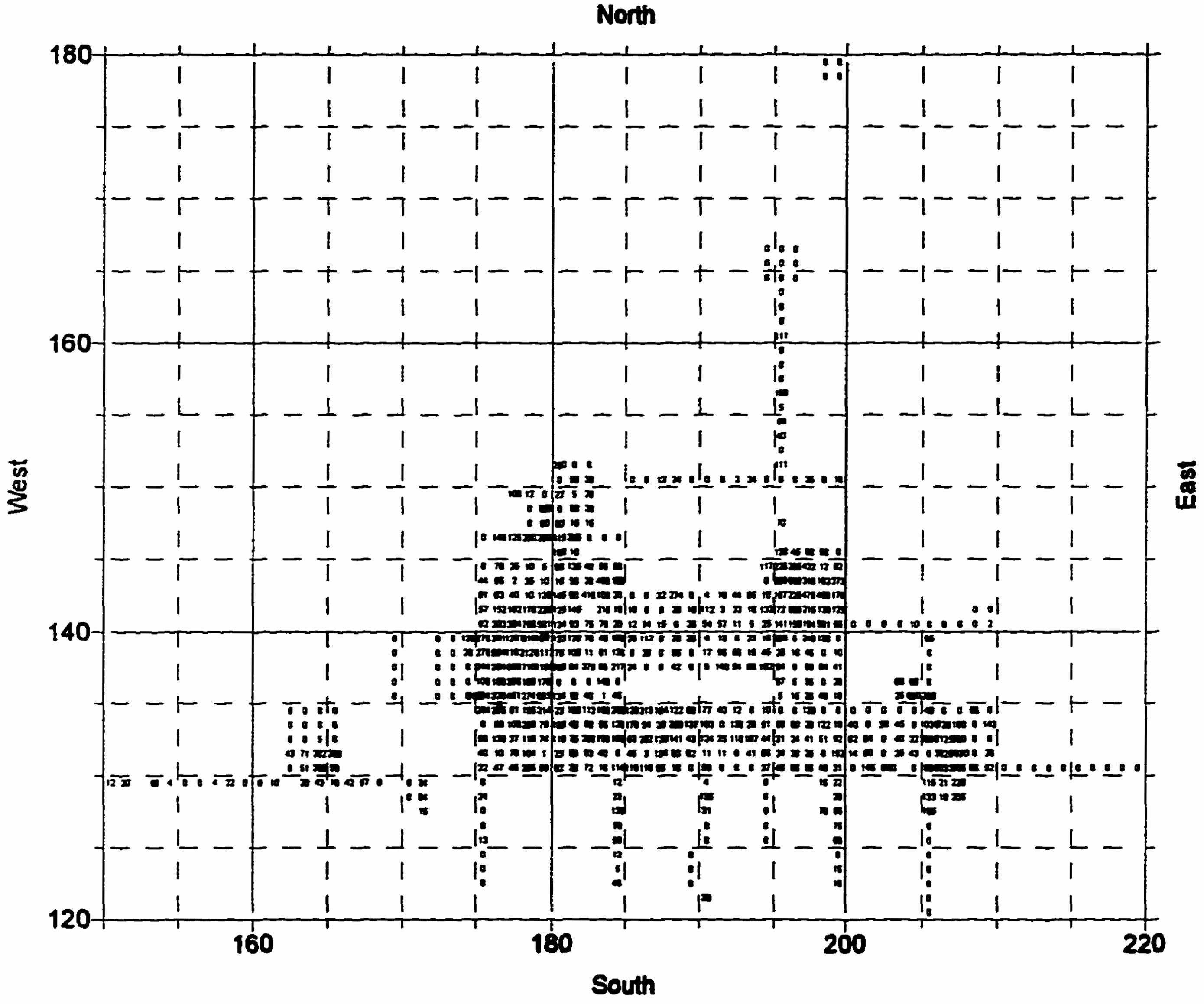


Figure 27
Foeni-Salas: Distribution of miscellaneous daub (gram weight)
(File: Daub EN misc weight post.srf)

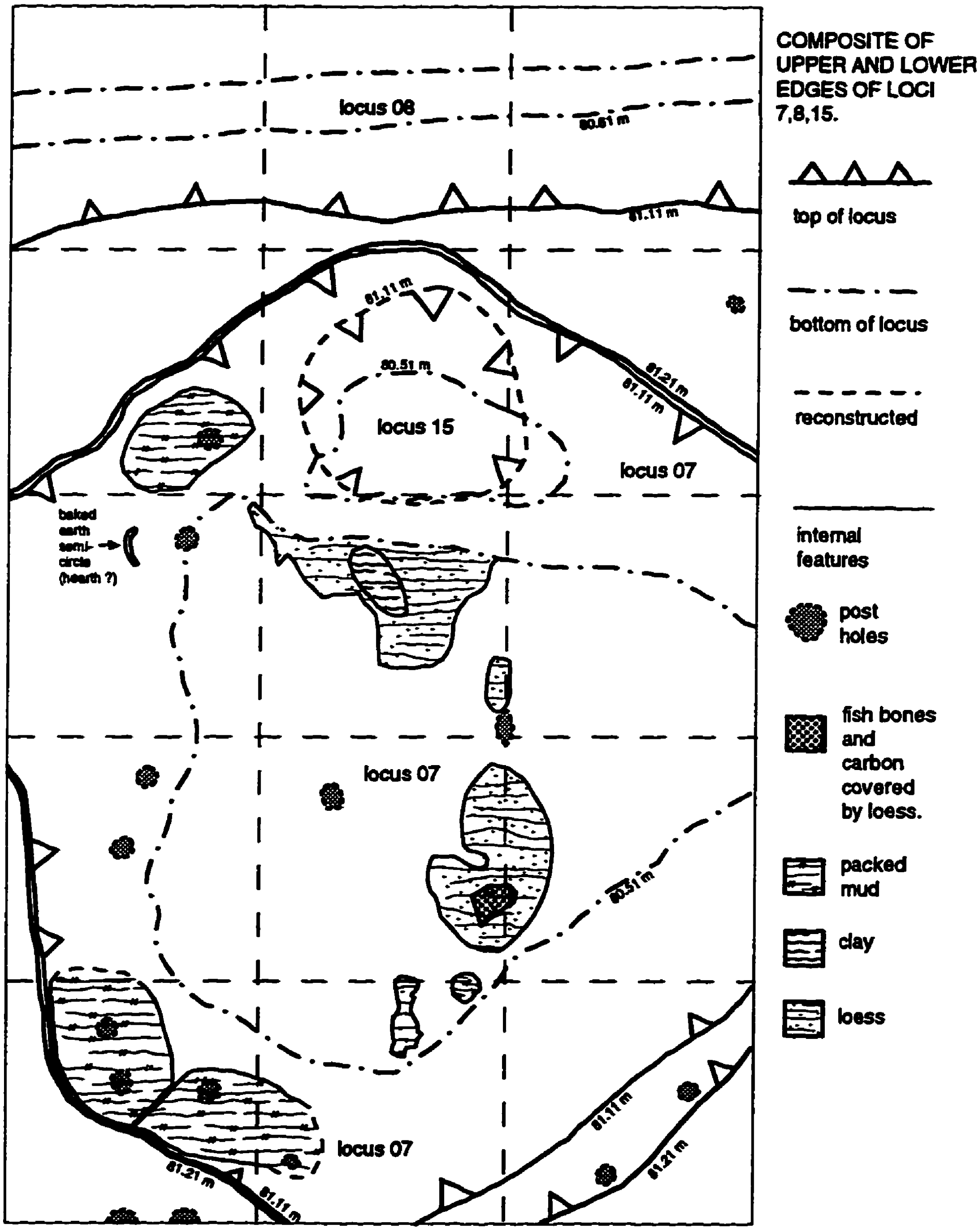

COMPOSITE OF UPPER AND LOWER EDGES OF LOCI 7,8,15.
top of locus
bottom of locus
reconstructed
internal features
post holes
fish bones and carbon covered by loess.
packed mud
clay
loess
locus 08
80.61 m
81.11 m
81.21 m
80.51 m
locus 15
locus 07
baked earth semi-circle (hearth ?)
80.51 m

Figure 28

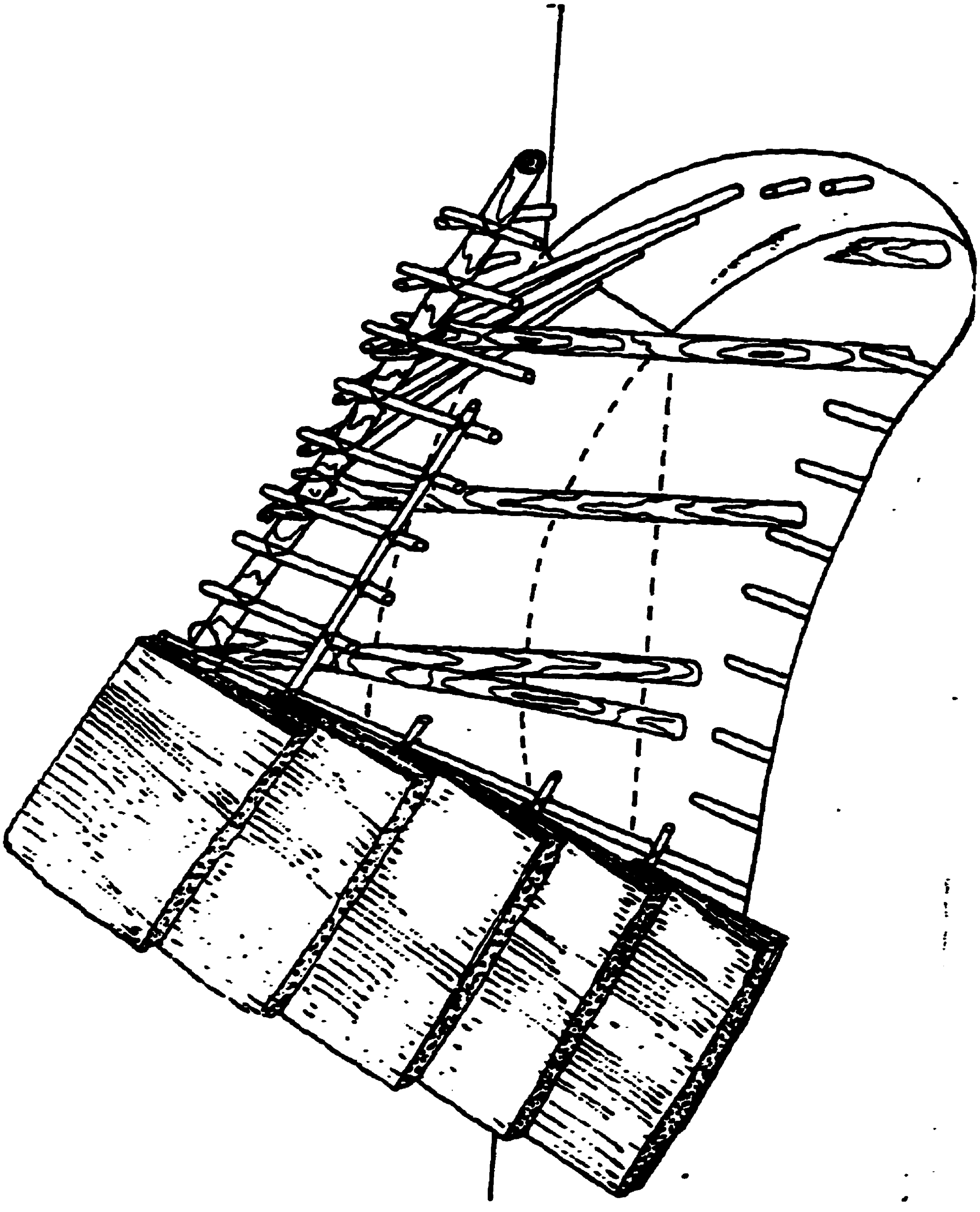


Figure 29. Reconstruction of pit house superstructure at Foeni-Salaş - cf. Draşovean 1989.

Table 1: Daub type by period from Foeni-Salas

		Period	DA:ME	EIA:ME	EN	EN:EIA	ENEO	ME	Mixed	Sterile	Total
Floor daub	fragment	No.	23	128	213				10	7	381
		%	6.04%	33.60%	55.91%				2.62%	1.84%	100.00%
	weight	No.	1392	8386	9059				320	149	19306
		%	7.21%	43.44%	46.92%				1.66%	0.77%	100.00%
Wall daub	fragment	No.	71	295	321	1	3	11	28	26	756
		%	9.39%	39.02%	42.46%	0.13%	0.40%	1.46%	3.70%	3.44%	100.00%
	weight	No.	979	14006.5	7074.5	23	22	1966	388	346	24805
		%	3.95%	56.47%	28.52%	0.09%	0.09%	7.93%	1.56%	1.39%	100.00%
Kiln	fragment	No.	14	48	231			3	7	6	309
		%	4.53%	15.53%	74.76%			0.97%	2.27%	1.94%	100.00%
	weight	No.	250	6395.5	7710			83	200	117	14755.5
		%	1.69%	43.34%	52.25%			0.56%	1.36%	0.79%	100.00%
Oven	fragment	No.			7						7
		%			100.00%						100.00%
	weight	No.			907						907
		%			1						100.00%

Table 2: Temper analysis of floor daub by period from Foeni-Salas.

Period	Temper quality	quantity	%	weight	%
DA:ME	4	5	21.74%	84	6.03%
DA:ME	7	5	21.74%	103	7.40%
DA:ME	1,6	7	30.43%	866	62.21%
DA:ME	6,7	6	26.09%	339	24.35%
	Total	23	100.00%	1392	100.00%
EIA:ME	4	9	7.09%	185	2.22%
EIA:ME	7	78	61.42%	6127	73.43%
EIA:ME	1,5,6	1	0.79%	240	2.88%
EIA:ME	1,6	1	0.79%	100	1.20%
EIA:ME	2,5,6	5	3.94%	320	3.84%
EIA:ME	2,7	2	1.57%	91	1.09%
EIA:ME	3,1	2	1.57%	9	0.11%
EIA:ME	4,6	1	0.79%	3	0.04%
EIA:ME	5,6,7	4	3.15%	112	1.34%
EIA:ME	5,7	1	0.79%	70	0.84%
EIA:ME	6,4	6	4.72%	169	2.03%
EIA:ME	6,7	17	13.39%	918	11.00%
EIA:ME	?	1		42	
	Total	128	100.00%	8386	100.00%
EN	1	1	0.57%	75	1.93%
EN	4	40	22.86%	1292	33.29%
EN	5	1	0.57%	10	0.26%
EN	7	100	57.14%	1486	38.29%
EN	1,4	4	2.29%	270	6.96%
EN	2,5,6	2	1.14%	145	3.74%
EN	2,6	1	0.57%	21	0.54%
EN	2,7	4	2.29%	149	3.84%
EN	5,6,7	1	0.57%	10	0.26%
EN	5,7	4	2.29%	55	1.42%
EN	6,4	1	0.57%	12	0.31%
EN	6,7	16	9.14%	356	9.17%
EN	?	38		5178	
	Total	213	100.00%	9059	100.00%
Mixed	4	4	40.00%	47	14.69%
Mixed	7	4	40.00%	153	47.81%
Mixed	2,6	2	20.00%	120	37.50%
	Total	10	100.00%	320	100.00%
STERILE	4	4	66.67%	14	10.07%
STERILE	7	2	33.33%	125	89.93%
STERILE	?	1		10	
	Total	7	100.00%	149	100.00%

Table 3: Temper analysis of wall daub by period from Foeni-Salas.					
Period	Temper quality	quantity	%	weight	%
DA:ME	1	1	1.41%	10	1.02%
DA:ME	4	8	11.27%	115	11.75%
DA:ME	6	1	1.41%	4	0.41%
DA:ME	7	11	15.49%	63	6.44%
DA:ME	4,6	1	1.41%	22	2.25%
DA:ME	5,7	12	16.90%	144	14.71%
DA:ME	6,4	3	4.23%	23	2.35%
DA:ME	6,7	34	47.89%	598	61.08%
	Total	71	100.00%	979	100.00%
EIA:ME	1	1	0.41%	15	0.12%
EIA:ME	2	1	0.41%	5	0.04%
EIA:ME	4	66	27.16%	584	4.54%
EIA:ME	7	63	25.93%	821.5	6.38%
EIA:ME	1,4	9	3.70%	220	1.71%
EIA:ME	5,6,	1	0.41%	38	0.30%
EIA:ME	5,6,7	9	3.70%	816	6.34%
EIA:ME	5,7	2	0.82%	405	3.15%
EIA:ME	6,4	33	13.58%	794	6.17%
EIA:ME	6,7	58	23.87%	9177	71.27%
EIA:ME	?	52		1131	
	Total	295	100.00%	14006.5	100.00%
EN	1	3	0.96%	58	0.85%
EN	4	94	30.13%	1180.5	17.28%
EN	5	1	0.32%	50	0.73%
EN	6	1	0.32%	98	1.43%
EN	7	101	32.37%	1500	21.95%
EN	1,4	4	1.28%	60	0.88%
EN	1,5	3	0.96%	110	1.61%
EN	2,4,5	1	0.32%	25	0.37%
EN	4,2	1	0.32%	9	0.13%
EN	5,6,4	1	0.32%	85	1.24%
EN	5,6,7	7	2.24%	232	3.40%
EN	5,7	3	0.96%	57	0.83%
EN	6,1	2	0.64%	11	0.16%
EN	6,4	16	5.13%	340	4.98%
EN	6,7	74	23.72%	3018	44.16%
EN	?	9		241	
	Total	321	100.00%	7074.5	100.00%
EN:EIA	7	1	100.00%	23	100.00%
	Total	1	100.00%	23	100.00%

Table 3: Temper analysis of wall daub by period from Foeni-Salas.					
Period	Temper quality	quantity	%	weight	%
ENEO	6,7	3	100.00%	22	100.00%
	Total	3	100.00%	22	100.00%
ME	4	6	50.00%	67	3.37%
ME	7	1	8.33%	9	0.45%
ME	5,6,4	1	8.33%	682	34.31%
ME	6,4	1	8.33%	5	0.25%
ME	6,7	3	25.00%	1225	61.62%
	Total	12	100.00%	1988	100.00%
Mixed	1	1	3.57%	2	0.52%
Mixed	4	4	14.29%	64	16.49%
Mixed	7	11	39.29%	92	23.71%
Mixed	5,6,7	1	3.57%	30	7.73%
Mixed	6,4	1	3.57%	15	3.87%
Mixed	6,7	10	35.71%	185	47.68%
	Total	28	100.00%	388	100.00%
STERILE	4	6	23.08%	75	21.68%
STERILE	7	14	53.85%	187	54.05%
STERILE	5,7	1	3.85%	3	0.87%
STERILE	6,4	2	7.69%	45	13.01%
STERILE	6,7	3	11.54%	36	10.40%
	Total	26	100.00%	346	100.00%

Table 4: Temper analysis of kiln daub by period from Foeni-Salas.					
Period	Temper quality	quantity	%	weight	%
DA:ME	4	3	21.43%	105	42.00%
DA:ME	7	8	57.14%	111	44.40%
DA:ME	2,5	1	7.14%	9	3.60%
DA:ME	6,7	2	14.29%	25	10.00%
	Total	14	100.00%	250	100.00%
EIA:ME	4	22	45.83%	863	13.49%
EIA:ME	6	1	2.08%	65	1.02%
EIA:ME	7	13	27.08%	4451.5	69.60%
EIA:ME	5,6,7	9	18.75%	966	15.10%
EIA:ME	5,7	1	2.08%	4	0.06%
EIA:ME	6,4	1	2.08%	20	0.31%
EIA:ME	6,7	1	2.08%	26	0.41%
	Total	48	100.00%	6395.5	100.00%
EN	1	1	0.44%	10	0.14%
EN	4	67	29.26%	2300	32.94%
EN	7	153	66.81%	4289	61.42%
EN	1,4	1	0.44%	10	0.14%
EN	6,7	7	3.06%	375	5.37%
EN	?	2		63	
	Total	231	100.00%	7047	99.87%
ME	7	1	33.33%	41	49.40%
ME	4	2	66.67%	42	50.60%
	Total	3	100.00%	83	100.00%
Mixed	4	4	57.14%	61	30.50%
Mixed	7	1	14.29%	23	11.50%
Mixed	2,6	1	14.29%	65	32.50%
Mixed	5,6	1	14.29%	51	25.50%
	Total	7	100.00%	200	100.00%
STERILE	4	4	66.67%	77	65.81%
STERILE	7	2	33.33%	40	34.19%
	Total	6	100.00%	117	100.00%

Table 5: Temper analysis of oven daub by period from Foeni-Salas.					
Period	Temper quality	quantity	%	weight	%
EN	4,7	1	25.00%	375	46.47%
EN	5,7	3	75.00%	432	53.53%
EN	?	3		100	
	Total	7	100.00%	907	100.00%
* there is no oven daub in the other periods.					

Table 6: Firing quality of floor daub by period from Foeni-Salas.

Period	Firing quality	quantity	%	weight	%
DA:ME	1	5	22.73%	96	7%
DA:ME	2	12	54.55%	435	32%
DA:ME	3	5	22.73%	816	61%
	Total	22	100.00%	1347	100.00%
EIA	1	41	32.03%	1849	22%
EIA:ME	2	79	61.72%	6321	75%
EIA:ME	3	8	6.25%	216	3%
	Total	128	100.00%	8386	100.00%
EN	1	80	44.69%	717	17%
EN	2	65	36.31%	2253	55%
EN	3	33	18.44%	1127	27%
EN	4	1	0.56%	2	0%
EN	?	35		5035	
	Total	214	100.00%	9134	100.00%
Mixed	2	9	90.00%	308	96.25%
Mixed	3	1	10.00%	12	3.75%
	Total	10	100.00%	320	100.00%
STERILE	2	3	50.00%	12	8.63%
STERILE	3	3	50.00%	127	91.37%
STERILE	?	1		10	
	Total	7	100.00%	149	100.00%

Table 7: Firing quality of wall daub by period from Foeni-Salas.

Period	Firing quality	quantity	%	weight	%
DA:ME	1	49	21.59%	650	21.54%
DA:ME	2	58	25.55%	738	24.46%
DA:ME	3	120	52.86%	1629	53.99%
	Total	227	100.00%	3017	100.00%
EIA:ME	1	173	59.25%	8144.5	63.22%
EIA:ME	2	81	27.74%	4259	33.06%
EIA:ME	3	38	13.01%	479	3.72%
EIA:ME	?	3		1124	
	Total	295	100.00%	14006.5	100.00%
EN	1	98	31.31%	3626	52.98%
EN	2	134	42.81%	1822.5	26.63%
EN	3	81	25.88%	1396	20.40%
EN	?	8		230	
	Total	321	100.00%	7074.5	100.00%
EN:EIA	1	1	100.00%	23	100.00%
	Total	1	100.00%	23	100.00%
ENEO	1	2	66.67%	20	90.91%
ENEO	2	1	33.33%	2	9.09%
	Total	3	100.00%	22	100.00%
ME	1	8	66.67%	1930	97.08%
ME	2	4	33.33%	58	2.92%
	Total	12	100.00%	1988	100.00%
Mixed	1	13	46.43%	124	31.96%
Mixed	2	11	39.29%	175	45.10%
Mixed	3	4	14.29%	89	22.94%
	Total	28	100.00%	388	100.00%
STERILE	1	6	23.08%	76	21.97%
STERILE	2	14	53.85%	199	57.51%
STERILE	3	6	23.08%	71	20.52%
	Total	26	100.00%	346	100.00%

Table 8: Firing quality analysis of kiln daub by period from Foeni-Sa					
Period	Firing quality	quantity	%	weight	%
DA:ME	1	2	11.76%	30	9%
	2	3	17.65%	38	11%
	3	12	70.59%	265	80%
	Total	17	100.00%	333	100%
EIA/EIA:M	1	4	8.33%	164	3%
	2	17	35.42%	2208	35%
	3	27	56.25%	4023.5	63%
	Total	48	100.00%	6395.5	100%
EN	1	8	3.46%	389	5%
	2	32	13.85%	1861	24%
	3	191	82.68%	5460	71%
	Total	231	100.00%	7710	100%
Mixed	1	1	14.29%	65	33%
	2	1	14.29%	10	5%
	3	5	71.43%	125	63%
	Total	7	100.00%	200	100%
Sterile	1	0	0.00%	0	0%
	2	0	0.00%	0	0%
	3	6	100.00%	117	100%
	Total	6	100.00%	117	100%

Table 9: Firing quality of oven daub by period from Foeni-Salas.

Period	Firing quality	quantity	%	weight	%
EN	1	3	75.00%	432	53.53%
EN	3	1	25.00%	375	46.47%
EN	?	3		100	
	Total	7	100.00%	907	100.00%

* there is no oven daub in the other periods.

Table 10: Colour analysis of floor daub by period from Foeni-Salas.					
Period	Coulor	quantity	%	weight	%
DA:ME	B3	1	4.35%	30	2.16%
DA:ME	BO2	3	13.04%	288	20.69%
DA:ME	G3	2	8.70%	60	4.31%
DA:ME	O2	2	8.70%	44	3.16%
DA:ME	O3	2	8.70%	45	3.23%
DA:ME	OB2	1	4.35%	32	2.30%
DA:ME	RB2	2	8.70%	31	2.23%
DA:ME	RO2	1	4.35%	25	1.80%
DA:ME	Y2	1	4.35%	1	0.07%
DA:ME	Y3	3	13.04%	45	3.23%
DA:ME	YO2	5	21.74%	791	56.82%
	Total	23	100.00%	1392	100.00%
EIA:ME	B2	5	3.94%	97	1.17%
EIA	B3	1	0.79%	38	0.46%
EIA	BO1	12	9.45%	598	7.21%
EIA	BO2	5	3.94%	263	3.17%
EIA:ME	BO3	1	0.79%	34	0.41%
EIA	BY2	1	0.79%	1780	21.46%
EIA:ME	G2	1	0.79%	40	0.48%
EIA:ME	O1	1	0.79%	25	0.30%
EIA	O2	3	2.36%	76	0.92%
EIA	O3	2	1.57%	68	0.82%
EIA	OB2	10	7.87%	408	4.92%
EIA	OR3	4	3.15%	180	2.17%
EIA	OY1	1	0.79%	25	0.30%
EIA	OY2	1	0.79%	4	0.05%
EIA:ME	RB1	5	3.94%	320	3.86%
EIA	RB2	3	2.36%	313	3.77%
EIA:ME	RB3	1	0.79%	35	0.42%
EIA:ME	RBO2	2	1.57%	92	1.11%
EIA:ME	RO1	2	1.57%	27	0.33%
EIA	RO2	6	4.72%	316	3.81%
EIA	RO3	50	39.37%	3365	40.56%
EIA:ME	Y2	3	2.36%	75	0.90%
EIA	Y3	3	2.36%	40	0.48%
EIA	YO1	2	1.57%	57	0.69%
EIA	YO2	2	1.57%	20	0.24%
EIA:ME	?	1		90	
	Total	128	100.00%	8296	100.00%
EN	2	1	0.57%	61	1.55%
EN	7	1	0.57%	55	1.40%
EN	B02	1	0.57%	5	0.13%
EN	B2	2	1.14%	23	0.58%
EN	B3	2	1.14%	145	3.68%
EN	BO1	3	1.70%	172	4.37%
EN	BO2	15	8.52%	524	13.31%
EN	BO3	2	1.14%	24	0.61%
EN	BY1	1	0.57%	30	0.76%

Table 10: Colour analysis of floor daub by period from Foeni-Salas					
Period	Coulor	quantity	%	weight	%
EN	BY2	1	0.57%	15	0.38%
EN	G1	1	0.57%	1	0.03%
EN	LB2	1	0.57%	75	1.91%
EN	O1	3	1.70%	52	1.32%
EN	O2	1	0.57%	55	1.40%
EN	O2	14	7.95%	188	4.78%
EN	O3	3	1.70%	43	1.09%
EN	OB1	2	1.14%	72	1.83%
EN	OY1	2	1.14%	80	2.03%
EN	OY2	1	0.57%	11	0.28%
EN	RB1	2	1.14%	24	0.61%
EN	RB2	5	2.84%	160	4.07%
EN	RB3	7	3.98%	132	3.35%
EN	RO1	1	0.57%	35	0.89%
EN	RO2	66	37.50%	345	8.77%
EN	RO3	11	6.25%	495	12.58%
EN	RY2	1	0.57%	40	1.02%
EN	W	9	5.11%	207	5.26%
EN	Y2	7	3.98%	366	9.30%
EN	Y3	2	1.14%	27	0.69%
EN	YB1	2	1.14%	310	7.88%
EN	YB2	1	0.57%	32	0.81%
EN	YO2	5	2.84%	132	3.35%
EN	?	37		5123	
	Total	213	100.00%	9059	100.00%
Mixed	B	1	10.00%	5	1.56%
Mixed	B2	1	10.00%	50	15.63%
Mixed	B3	1	10.00%	10	3.13%
Mixed	O1	1	10.00%	50	15.63%
Mixed	O2	2	20.00%	33	10.31%
Mixed	RO2	3	30.00%	152	47.50%
Mixed	Y1	1	10.00%	20	6.25%
	Total	10	100.00%	320	100.00%
STERILE	BO2	1	16.67%	25	17.99%
STERILE	G1	1	16.67%	1	0.72%
STERILE	O2	1	16.67%	100	71.94%
STERILE	RO2	1	16.67%	10	7.19%
STERILE	W	1	16.67%	1	0.72%
STERILE	Y3	1	16.67%	2	1.44%
STERILE	?	1		10	
	Total	7	100.00%	149	100.00%

Table 11: Colour analysis of wall daub by period from Foeni-Salas					
Period	Colour	quantity	%	weight	%
DA:ME	B1	18	25.35%	230	23.49%
DA:ME	B2	1	1.41%	45	4.60%
DA:ME	BO2	2	2.82%	30	3.06%
DA:ME	BR3	1	1.41%	10	1.02%
DA:ME	G2	1	1.41%	8	0.82%
DA:ME	G3	1	1.41%	10	1.02%
DA:ME	G3,O2	1	1.41%	5	0.51%
DA:ME	O2	2	2.82%	66	6.74%
DA:ME	O3	1	1.41%	20	2.04%
DA:ME	OB1	14	19.72%	105	10.73%
DA:ME	OB2	1	1.41%	4	0.41%
DA:ME	RB1	1	1.41%	10	1.02%
DA:ME	RB2	7	9.86%	190	19.41%
DA:ME	RO1	1	1.41%	8	0.82%
DA:ME	RO2	9	12.68%	150	15.32%
DA:ME	RO3	3	4.23%	26	2.66%
DA:ME	Y1	1	1.41%	5	0.51%
DA:ME	Y2	1	1.41%	13	1.33%
DA:ME	YBO2	1	1.41%	22	2.25%
DA:ME	YO2	3	4.23%	17	1.74%
DA:ME	YO3	1	1.41%	5	0.51%
	Total	71	100.00%	979	100.00%
EIA:ME	B1	9	3.11%	584	4.64%
EIA:ME	B1 + G1	1	0.35%	2093	16.64%
EIA:ME	B2	13	4.50%	1099	8.74%
EIA:ME	B3	3	1.04%	457	3.63%
EIA:ME	BG1	1	0.35%	135	1.07%
EIA:ME	BO1	3	1.04%	32	0.25%
EIA:ME	BO2	11	3.81%	652	5.18%
EIA:ME	BO3	2	0.69%	55	0.44%
EIA:ME	BR3	1	0.35%	75	0.60%
EIA:ME	BY1	4	1.38%	40	0.32%
EIA:ME	BY2,O2	1	0.35%	752	5.98%
EIA:ME	G1	31	10.73%	116	0.92%
EIA:ME	G2	3	1.04%	91	0.72%
EIA:ME	G3	3	1.04%	127	1.01%
EIA:ME	G3,B1	1	0.35%	122	0.97%
EIA:ME	O1	6	2.08%	1006	8.00%
EIA:ME	O2	43	14.88%	2104	16.72%
EIA:ME	O3	17	5.88%	718.5	5.71%
EIA:ME	OB1	11	3.81%	633	5.03%
EIA:ME	OB2	5	1.73%	131	1.04%
EIA:ME	OB3	6	2.08%	65	0.52%
EIA:ME	OY2	2	0.69%	22	0.17%
EIA:ME	OY3	1	0.35%	5	0.04%
EIA:ME	RB2	4	1.38%	19	0.15%
EIA:ME	RB3	1	0.35%	30	0.24%

Table 11: Colour analysis of wall daub by period from Foeni-Salas					
Period	Colour	quantity	%	weight	%
EIA:ME	RO1	3	1.04%	621	4.94%
EIA:ME	RO2	17	5.88%	145	1.15%
EIA:ME	RO3	76	26.30%	332	2.64%
EIA:ME	W	1	0.35%	20	0.16%
EIA:ME	Y2	4	1.38%	93	0.74%
EIA:ME	YBO2	3	1.04%	187	1.49%
EIA:ME	YO2	1	0.35%	5	0.04%
EIA:ME	?	7		1440	
	Total	295	100%	14006.5	100%
EN	B1	26	8.33%	636	9.31%
EN	B2	17	5.45%	242	3.54%
EN	B3	4	1.28%	106	1.55%
EN	BO1	2	0.64%	92	1.35%
EN	BO2	10	3.21%	140	2.05%
EN	BO3	6	1.92%	273	4.00%
EN	BR2	1	0.32%	15	0.22%
EN	BY1	9	2.88%	67	0.98%
EN	BY2	4	1.28%	40	0.59%
EN	BYO1	1	0.32%	25	0.37%
EN	G1	2	0.64%	27	0.40%
EN	G2	1	0.32%	12	0.18%
EN	G3	1	0.32%	5	0.07%
EN	LB1	3	0.96%	110	1.61%
EN	O1	18	5.77%	238	3.48%
EN	O2	38	12.18%	1459	21.35%
EN	O3	7	2.24%	94	1.38%
EN	OB1	4	1.28%	502	7.35%
EN	OB2	15	4.81%	438	6.41%
EN	OR2	7	2.24%	146	2.14%
EN	OY1	1	0.32%	21	0.31%
EN	OY2	3	0.96%	16	0.23%
EN	OY3	3	0.96%	25	0.37%
EN	R2	1	0.32%	15	0.22%
EN	R3	1	0.32%	10	0.15%
EN	RB2	1	0.32%	13	0.19%
EN	RB3	2	0.64%	10	0.15%
EN	RO#	3	0.96%	18	0.26%
EN	RO1	10	3.21%	436	6.38%
EN	RO2	34	10.90%	689	10.08%
EN	RO3	27	8.65%	383	5.61%
EN	W	2	0.64%	50	0.73%
EN	Y1	32	10.26%	13	0.19%
EN	Y2	2	0.64%	13	0.19%
EN	Y3	6	1.92%	51.5	0.75%
EN	YB1	1	0.32%	218	3.19%
EN	YBO1	1	0.32%	19	0.28%
EN	YO1	3	0.96%	48	0.70%

Table 11: Colour analysis of wall daub by period from Foeni-Salas					
Period	Colour	quantity	%	weight	%
EN	YO2	3	0.96%	117	1.71%
EN	?	9		240	
	Total	321	100.00%	7072.5	100.00%
EN:EIA	O2	1	100.00%	23	100.00%
	Total	1	100.00%	23	100.00%
ENEO	O3	2	66.67%	11	50.00%
ENEO	B2	1	33.33%	11	50.00%
	Total	3	100.00%	22	100.00%
ME	B2	3	27.27%	692	35.20%
ME	B3	1	9.09%	22	1.12%
ME	O2	1	9.09%	1215	61.80%
ME	O3	1	9.09%	9	0.46%
ME	Y1	2	18.18%	3	0.15%
ME	Y2	1	9.09%	5	0.25%
ME	Y3	2	18.18%	20	1.02%
	Total	11	100.00%	1966	100.00%
Mixed	O1	1	3.57%	10	2.58%
Mixed	O2	1	3.57%	1	0.26%
Mixed	O3	6	21.43%	81	20.88%
Mixed	OB2	3	10.71%	32	8.25%
Mixed	OY1	1	3.57%	10	2.58%
Mixed	RB2	1	3.57%	11	2.84%
Mixed	RO2	11	39.29%	138	35.57%
Mixed	RO3	2	7.14%	50	12.89%
Mixed	Y1	1	3.57%	2	0.52%
Mixed	YO2	1	3.57%	53	13.66%
	Total	28	100.00%	388	100.00%
STERILE	BO2	2	7.69%	88	25.43%
STERILE	G3	1	3.85%	4	1.16%
STERILE	O1	1	3.85%	20	5.78%
STERILE	O2	2	7.69%	20	5.78%
STERILE	OY1	1	3.85%	5	1.45%
STERILE	RB2	2	7.69%	35	10.12%
STERILE	RO2	11	42.31%	90	26.01%
STERILE	RO3	4	15.38%	67	19.36%
STERILE	Y2	1	3.85%	2	0.58%
STERILE	YB1	1	3.85%	15	4.34%
	Total	26	100.00%	346	100.00%

Table 12: Colour analysis of kiln daub by period from Foeni-Salas.

Period	Colour	Quantity	%	Weight	%
DA:ME	B2	5	35.71%	63	25.20%
DA:ME	B3	1	7.14%	7	2.80%
DA:ME	BO2	1	7.14%	6	2.40%
DA:ME	BY2	1	7.14%	45	18.00%
DA:ME	G2,W	1	7.14%	10	4.00%
DA:ME	OY3	1	7.14%	10	4.00%
DA:ME	RO3	1	7.14%	5	2.00%
DA:ME	W	1	7.14%	80	32.00%
DA:ME	Y2	1	7.14%	15	6.00%
DA:ME	YB2	1	7.14%	9	3.60%
	Total	14	100.00%	250	100.00%
EIA:ME	B1	3	6.25%	242	3.78%
EIA:ME	B1,W*	1	2.08%	110	1.72%
EIA:ME	B2	2	4.17%	292	4.57%
EIA:ME	B2 + O1	1	2.08%	2950	46.13%
EIA:ME	BO1	4	8.33%	222	3.47%
EIA:ME	BO2	2	4.17%	40	0.63%
EIA:ME	BO3	1	2.08%	35	0.55%
EIA:ME	BY2,O3	1	2.08%	80	1.25%
EIA:ME	G2	1	2.08%	68	1.06%
EIA:ME	G3	2	4.17%	55	0.86%
EIA:ME	GY1	1	2.08%	80	1.25%
EIA:ME	O1	4	8.33%	1214	18.98%
EIA:ME	O2	4	8.33%	128.5	2.01%
EIA:ME	O3	3	6.25%	62	0.97%
EIA:ME	OB2	1	2.08%	40	0.63%
EIA:ME	R2	1	2.08%	20	0.31%
EIA:ME	RB2	7	14.58%	565	8.83%
EIA:ME	RO2	1	2.08%	5	0.08%
EIA:ME	RO3	1	2.08%	4	0.06%
EIA:ME	RY2	1	2.08%	30	0.47%
EIA:ME	W	5	10.42%	121	1.89%
EIA:ME	Y1	1	2.08%	32	0.50%
	Total	48	100.00%	6395.5	100.00%
EN	B1	4	1.75%	99	1.31%
EN	B1,W*	1	0.44%	8	0.11%
EN	B2	8	3.49%	589	7.80%
EN	B2,W*	3	1.31%	814	10.79%
EN	B3	1	0.44%	41	0.54%
EN	BO1	4	1.75%	304	4.03%
EN	BO1,W*	1	0.44%	110	1.46%
EN	BO2	1	0.44%	8	0.11%
EN	BO3	5	2.18%	103	1.36%
EN	BR3	15	6.55%	15	0.20%
EN	G1	1	0.44%	10	0.13%
EN	G1,W*	1	0.44%	30	0.40%

Table 12: Colour analysis of kiln daub by period from Foeni-Salas.					
Period	Colour	Quantity	%	Weight	%
EN	G2	3	1.31%	54	0.72%
EN	G3	1	0.44%	50	0.66%
EN	G3,W*	1	0.44%	71	0.94%
EN	GB2	2	0.87%	18	0.24%
EN	O1	3	1.31%	176	2.33%
EN	O1,W*	1	0.44%	80	1.06%
EN	O2	12	5.24%	725	9.61%
EN	O3	9	3.93%	213	2.82%
EN	OR2	1	0.44%	76	1.01%
EN	OY1	2	0.87%	35	0.46%
EN	R1	1	0.44%	69	0.91%
EN	RB 2	1	0.44%	45	0.60%
EN	RB1	4	1.75%	221	2.93%
EN	RB2	1	0.44%	177	2.35%
EN	RO1	2	0.87%	141	1.87%
EN	RO2	10	4.37%	525	6.96%
EN	RO2,W*	1	0.44%	41	0.54%
EN	W*	107	46.72%	1961	25.98%
EN	Y1	6	2.62%	275	3.64%
EN	Y1,W*	1	0.44%	41	0.54%
EN	Y2	6	2.62%	179	2.37%
EN	YB1	1	0.44%	2	0.03%
EN	YB2	1	0.44%	10	0.13%
EN	YBO2	1	0.44%	20	0.27%
EN	YO1	1	0.44%	131	1.74%
EN	YO2	2	0.87%	42	0.56%
EN	YO3	2	0.87%	30	0.40%
EN	YW*	1	0.44%	8	0.11%
EN	?	2		173	
	Total	231	100.00%	7547	100.00%
ME	RO1	1	33.33%	41	49.40%
ME	RB2	1	33.33%	22	26.51%
ME	RO2	1	33.33%	20	24.10%
	Total	3	100.00%	83	100.00%
Mixed	OB3	1	14.29%	65	32.50%
Mixed	OR3	1	14.29%	51	25.50%
Mixed	RB3	1	14.29%	31	15.50%
Mixed	W	2	28.57%	33	16.50%
Mixed	Y3	2	28.57%	20	10.00%
	Total	7	100.00%	200	100.00%
STERILE	G3	1	16.67%	5	4.27%
STERILE	O3	3	50.00%	50	42.74%
STERILE	OY1	1	16.67%	42	35.90%
STERILE	YO2	1	16.67%	20	17.09%
	Total	6	100.00%	117	100.00%

Table 13: Colour analysis of oven daub by period from Foeni-Sala					
Period	Colour	Quantity	%	Weight	%
EN	RO3 + W	1	25.00%	375	46.47%
EN	RB2	3	75.00%	432	53.53%
EN	?	3		100	
	Total	7	100.00%	907	100.00%
* there is no oven daub in the other periods.					

Table 14: Firing atmosphere analysis of floor daub by period from Foeni-Salas.							
Period	Firing atmosphere type	Quantity	%	Weight	%	Weight/Quantity*	%
DA:ME	1	4	17.39%	774	55.60%	193.50	78.25%
DA:ME	2	16	69.57%	562	40.37%	35.13	14.20%
DA:ME	4	3	13.04%	56	4.02%	18.67	7.55%
	Total	23	100.00%	1392	100.00%	247.29	100.00%
EIA:ME	1	16	12.60%	682	8.16%	42.63	26.10%
EIA:ME	2	84	66.14%	6505	77.86%	77.44	47.42%
EIA:ME	4	27	21.26%	1168	13.98%	43.26	26.49%
EIA:ME	?	1		31			
	Total	128	100.00%	8386	100.00%	163.32	100.00%
EN	1	23	13.14%	845	21.81%	36.74	29.51%
EN	2	133	76.00%	2414	62.30%	18.15	14.58%
EN	3	5	2.86%	199	5.14%	39.80	31.97%
EN	4	14	8.00%	417	10.76%	29.79	23.93%
EN	?	38		5184			
	Total	213	100.00%	9059	100.00%	124.48	100.00%
Mixed	1	2	22.22%	44	16.30%	22.00	25.93%
Mixed	2	4	44.44%	150	55.56%	37.50	44.21%
Mixed	4	3	33.33%	76	28.15%	25.33	29.86%
Mixed	?	1		50			
	Total	10	100.00%	320	100.00%	84.83	100.00%
STERILE	1	2	40.00%	102	89.47%	51.00	92.73%
STERILE	2	3	60.00%	12	10.53%	4.00	7.27%
STERILE	?	2		35			
	Total	7	100.00%	149	100.00%	55.00	100.00%
	Grand total	381		19306			
*weight divided by quantity							

Table 15: Firing atmosphere analysis of wall daub by period from Foeni-Salas.					
Period	Firing atmosphere type	Quantity	%	Weight	%
DA:ME	1	13	18.31%	235	24.00%
DA:ME	2	32	45.07%	462	47.19%
DA:ME	3	2	2.82%	53	5.41%
DA:ME	4	24	33.80%	229	23.39%
	Total	71	100.00%	979	100.00%
EIA:ME	1	53	18.86%	3405	26.54%
EIA:ME	2	127	45.20%	6815.5	53.12%
EIA:ME	3	8	2.85%	226	1.76%
EIA:ME	4	93	33.10%	2384	18.58%
EIA:ME	?	14		1176	
	Total	295	100.00%	14006.5	100.00%
EN	1	95	30.94%	2268.5	33.35%
EN	2	175	57.00%	3654	53.72%
EN	3	14	4.56%	322	4.73%
EN	4	23	7.49%	557	8.19%
EN	?	14		273	
	Total	321	100.00%	7074.5	100.00%
EN:EIA	2	1	100.00%	23	100.00%
	Total	1	100.00%	23	100.00%
ENEO	1	1	33.33%	2	9.09%
ENEO	2	1	33.33%	9	40.91%
ENEO	4	1	33.33%	11	50.00%
	Total	3	100.00%	22	100.00%
ME	1	6	54.55%	1243	63.22%
ME	2	4	36.36%	701	35.66%
ME	3	1	9.09%	22	1.12%
	Total	11	100.00%	1966	100.00%
Mixed	1	7	25.00%	119	30.67%
Mixed	2	11	39.29%	144	37.11%
Mixed	4	10	35.71%	125	32.22%
	Total	28	100.00%	388	100.00%
STERILE	1	7	26.92%	75	21.68%
STERILE	2	17	65.38%	237	68.50%
STERILE	3	1	3.85%	4	1.16%
STERILE	4	1	3.85%	30	8.67%
	Total	26	100.00%	346	100.00%
	Grand Total	756		24805	

Table 16: Firing atmosphere analysis of kiln daub by period from Foeni-Sala

Period	Firing atmosphere type	Quantity	%	Weight	%
DA:ME	1	7	50.00%	182	72.80%
DA:ME	2	5	35.71%	49	19.60%
DA:ME	3	1	7.14%	9	3.60%
DA:ME	4	1	7.14%	10	4.00%
	Total	14	100.00%	250	100.00%
EIA:ME	1	21	43.75%	1607.5	25.13%
EIA:ME	2	17	35.42%	3942	61.64%
EIA:ME	3	3	6.25%	281	4.39%
EIA:ME	4	7	14.58%	565	8.83%
	Total	48	100.00%	6395.5	100.00%
EN	1	180	80.00%	5434	71.63%
EN	2	33	14.67%	1783	23.50%
EN	3	7	3.11%	216	2.85%
EN	4	5	2.22%	153	2.02%
EN	?	6		124	
	Total	231	100.00%	7710	100.00%
ME	2	2	66.67%	63	75.90%
ME	1	1	33.33%	20	24.10%
	Total	3	100.00%	83	100.00%
Mixed	1	4	57.14%	74	37.00%
Mixed	2	2	28.57%	61	30.50%
Mixed	3	1	14.29%	65	32.50%
	Total	7	100.00%	200	100.00%
STERILE	1	4	66.67%	92	78.63%
STERILE	2	1	16.67%	20	17.09%
STERILE	3	1	16.67%	5	4.27%
	Total	6	100.00%	117	100.00%

Table 17: Firing atmosphere analysis of oven daub by period from Foeni-Salas.					
Period	Firing atmosphere type	Quantity	%	Weight	%
EN	2	4	100.00%	807	100.00%
EN	?	3		100	
	Total	7	100.00%	907	100.00%
* there is no oven daub in the other periods.					

Table 18: Distribution of architectural types by Early Neolithic locus from Foeni-Salas.

	Locus	2	10	14	16	17	14,16,17 (mixed)	23	24	25	41	Total	7
Unidentified	Quantity	9353	258	1068	175	158	173	3207	914	9	308	15619	1574
	Weight (gm)	34097	1840	7232	1820	1317	1940	16307	4325	26	905	69809	12309
	% within type	48.84%	2.64%	10.36%	2.61%	1.89%	2.78%	23.36%	6.20%	0.04%	1.30%	100.00%	17.63%
	% within locus	85.09%	98.71%	99.90%	98.38%	98.50%	100.00%	50.12%	71.39%	72.22%	63.78%	73.98%	99.54%
Floor	Quantity	85	0	0	0	0	0	120	3	1	0	209	0
	Weight (gm)	2252	0	0	0	0	0	6602	60	10	0	8924	0
	%	25.24%	0.00%	0.00%	0.00%	0.00%	0.00%	73.98%	0.67%	0.11%	0.00%	100.00%	0.00%
	% within locus	5.62%	0.00%	0.00%	0.00%	0.00%	0.00%	20.29%	0.99%	27.78%	0.00%	9.46%	0.00%
Wall	Quantity	179	3	1	1	1	0	10	17	0	9	221	3
	Weight (gm)	2539.5	24	7	30	10	0	3255	815	0	395	7075.5	47
	%	35.89%	0.34%	0.10%	0.42%	0.14%	0.00%	46.00%	11.52%	0.00%	5.58%	100.00%	0.66%
	% within locus	6.34%	1.29%	0.10%	1.62%	0.75%	0.00%	10.00%	13.45%	0.00%	27.84%	7.50%	0.38%
Oven	Quantity	0	0	0	0	0	0	7	0	0	0	0	0
	Weight (gm)	0	0	0	0	0	0	907	0	0	0	0	0
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%
	% within locus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.79%	0.00%	0.00%	0.00%	0.96%	0.00%
Kiln	Quantity	69	0	0	0	1	0	146	11	0	4	231	1
	Weight (gm)	1165	0	0	0	10	0	5468	858	0	119	7640	10
	%	15.51%	0.00%	0.00%	0.00%	0.13%	0.00%	71.57%	11.23%	0.00%	1.56%	100.00%	0.13%
	% within locus	2.96%	0.00%	0.00%	0.00%	0.75%	0.00%	16.80%	14.16%	0.00%	8.39%	8.10%	0.08%
Total	Weight (gm)	40073.5	1864	7239	1850	1337	1940	32539	6058	36	1419	94355.5	12366
	%	42.47%	1.98%	7.67%	1.96%	1.42%	2.06%	34.49%	6.42%	0.04%	1.50%	100.00%	13.11%

Table 19: Comparison of identified and unidentified daub in Early Neolithic loci from

Locus	Unidentified Weight (gm)	%	Identified construction Weight (gm)	%	Total
1993-94 loci that separated identified and unidentified daub					
2	34097	85.08%	5976.5	14.91%	40073.5
23	16307	50.11%	16232	49.88%	32539.0
24	4325	71.38%	1733	28.60%	6058.0
25	26	70.83%	10	27.24%	36.0
41	905	63.75%	514	36.21%	1419.0
1992 loci that mixed identified and unidentifiable daub					
7	12309	99.53%	57	0.46%	12366.0
10	1840	98.66%	24	1.29%	1864.0
14	7232	99.89%	7	0.10%	7239.0
16	1820	98.33%	30	1.62%	1850.0
17	1317	98.43%	20	1.49%	1337.0
14,16,17 (mixed)	1940	99.95%			1940.0