ORIGINS OF POTTERY TECHNOLOGY IN THE ANCIENT NEAR EAST: AN EXAMINATION OF THE TECHNOLOGICAL AND SOCIOECONOMIC FACTORS THAT CONTRIBUTED TO THE INNOVATION AND WIDESPREAD USE OF POTTERY

The Institute of Economics and Social Sciences
of
Bilkent University

By

Genevieve Holdridge

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF ARTS

in

THE DEPARTMENT OF
ARCHAEOLOGY AND HISTORY OF ART
BILKENT UNIVERSITY
ANKARA

October 2004

I certify that I have read this thesis and in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in the Department of Archaeology and History of Art

(Assoc. Prof. Dr. Marie-Henriette Gates)

Supervisor

I certify that I have read this thesis and in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in the Department of Archaeology and History of Art

(Prof. Dr. Jacques Morin)
Examining Committee member

I certify that I have read this thesis and in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in the Department of Archaeology and History of Art

(Prof. Dr. Stuart Swiny)
Examining Committee member

Approved by the Institute of Economics and Social Sciences

(Prof. Erdal Erel)
Director

ABSTRACT

ORIGINS OF POTTERY TECHNOLOGY
IN THE NEAR EAST
An examination of the technological and socioeconomic
factors that contributed to the innovation and widespread use of pottery

Holdridge, Genevieve

MA, Department of Archaeology and History of Art

Supervisor: Assoc. Prof. Dr. Marie-Henriette Gates

October 2004

The objective of this thesis is to research the invention and innovation of pottery technology in the Pre-Pottery Neolithic B, in particular the Late and Final Pre-Pottery Neolithic B and Early Pottery Neolithic in the Near East. My approach will involve examining the various factors that are involved with the origins of clay vessel manufacture including: 1) the context of this event like the Pre-Pottery Neolithic B and Early Pottery Neolithic Societies; 2) the history of clay vessel manufacture such as the sporadic invention of pottery before its widespread adoption; 3) preceding technology; 4) circulation of goods and cultural and technological change; 5) settlement pattern change and movements of people; 6) domestication of animals and emergence of pastoralism; 7) ethno-archaeological comparisons; 8) ecological conditions; 9) social choice. The origins of pottery technology on a large scale are interrelated to all of these factors, and would not have emerged without all of these circumstances in place.

Keywords: pottery, technology, invention, innovation, PPNB, EPN, Near East, pastoralism, domestication, exchange, settlement change, clay familiarity, plaster making, pyro-technology, clay vessels, social complexity, environment, choice

ÖZET

YAKINDOĞU'DA SERAMİK TEKNOLOJİSİNİN KÖKENLERİ
Seramiğin yaygın kullanımına ve yol açtığı yeniliklere
katkısı olan teknolojik ve sosyo-ekonomik faktörlerin incelenmesi

Holdridge, Genevieve

MA, Arkeoloji ve Sanat Tarihi Bölümü

Tez Danışmanı: Doç. Dr. Marie Henriette Gates

Haziran, 2004

Bu tez çalışmasının amacı seramik teknolojisinin keşfi ve yol açtığı değişimin; Seramik öncesi Neolitik B döneminde, özelliklede Geç ve Son Seramik öncesi Neolitik B ve Yakındoğu'da Erken Seramikli Neolitik dönemde, araştırılmasıdır. Bu çalışmada kullanacağım yaklaşım pişmiş toprak eşyaların üretiminin kökenleri ile ilgili çeşitli faktörlerin incelenmesine yöneliktir. Bunlar: 1.Bu üretimin Seramik öncesi Neolitik B ve Erken Seramikli Neolitik toplumlarındaki konteksti; 2.Seramik teknolojisi kullanımının yaygın hale gelmesinden önce münferit olarak keşfi ve üretiminin tarihsel gelişimi; 3.Erken dönem teknolojisi4.Üretilen malların sirkülasyonu, kültürel ve teknolojik değişim; 5.Yerleşim planlarının değişmesi ve göç hareketleri; 6.Hayvanların evcilleştirilmesi ve pastoralizmin doğuşu; 7.Etno-arkeolojik karşılaştırmalar; 8.Ekolojik şartlar; 9.Sosyal seçim. Geniş ölçekte, seramik teknolojisinin kökenleri yukarıda sayılan bütün faktörlerle etkileşim içindedir ve bu faktörler biraraya gelmeksizin seramik teknolojisinin doğuşu mümkün olamazdı.

Anahtar kelimeler : Seramik, teknoloji, keşif, yenilik, PPNB, EPN, Yakın Doğu, pastoralism, evcilleşme, değiş-tokuş, yerleşim değişimi, kil benzerliği, hamur yapımı, ısı teknolojisi, kil eşyalar(pişmiş toprak eşyalar), sosyal güçlükler, çevre, seçim

ACKNOWLEDGEMENTS

To commence, I would like to show my gratitude to all the teachers and students in this and other departments as well as my friends outside the university, as I have learned much, both inside and outside the classroom. Next I would like to thank the committee members Drs. Marie-Henriette Gates, Jacques Morin and Stuart Swiny for accepting this task and taking the time to read my thesis. I would like to show my appreciation to Stuart Swiny, who gave me the idea to try for a Master's in Turkey. More importantly, I thank him for the encouragement he has given me to my archaeological work, without his help I wouldn't be as far as I am now. I would also like to express my gratitude to Jacques Morin for all his time and effort in editing my thesis. I am very grateful to Dr. Marie-Henriette Gates, for agreeing to have two independent study classes, both in the Neolithic from which this thesis topic came about. Above all, I thank her for listening to my ideas, pushing me to work hard and stick with this research. Lastly, but most importantly I want to thank my friends and family, for their support especially my Aunt, Parents and Grandmothers without whose enormous help I would have never been able to undertake a Masters degree.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

FOREWORD

GEOGRAPHY AND CHRONOLOGY

I. Introduction

The objectives of this foreword are, firstly, to clarify the geographical location of cultures that I propose to use as a basis for comparing regions and, secondly, to present the chronology for the Neolithic to which I will adhere in my text.

II. Geography

The Near East covers a vast territory encompassing many diverse ecological zones including steppe, desert, mountains, foothills, valleys and plains. Technically, the Near East is bordered by the Mediterranean in the west, the Red Sea in the southwest, the Persian Gulf in the southeast and finally the Taurus and Zagros Mountains in the north and east (Aurenche and Kozlowski, 1999: 9). For our sake, Cyprus and Central Anatolia have been included as part of this geographical area. The modern countries concerned here are: Turkey, Cyprus, Iraq, Iran, Jordan, Syria, Israel, Lebanon, Palestine and Saudi Arabia (Fig. 1).

In my research paper, I designated eleven geographical units according to cultural trends in the Near East (Fig. 2). I found that comparing and contrasting the data was much easier after it was categorized under regional headings. They are as follows:

1) The Central Anatolian Plateau, a large steppe surrounded by mountains will be referred to as *Central Anatolia*. Cappadocia, the Tuz Gölü Basin and the Konya Plain are situated in this plateau.

2) The area encompassing the foothills and valleys of the Taurus Mountains as well as along the banks of the Upper Euphrates will be referred to as *Southeastern Anatolia.*

3) Located in Northern Iraq and Syria is an area referred to as the Jezireh, which is a vast, fairly flat steppe that extends from the Middle Euphrates to the Mid- Tigris. As this covers a large geographical space, I separated it under two different headings. The area located in the western half of the Jezireh will be designated as the *Middle Euphrates*. This region encompasses the Middle Euphrates, Balikh and Khabur Rivers as well as the Balikh Valley and Upper Khabur Basin.

4) In northwestern Iran, the Taurus Mountains give way to the Zagros Mountains, which curve slightly to the southwest where they are situated east of, but parallel to the Tigris River down to its mouth. The Zagros Mountain zone will be divided into Upper and Lower Zagros regions. The *Upper Zagros* region incorporates the Upper and Middle Tigris River, the eastern edge of the Jezireh and the Tartar Valley. The landscape is made up of intermontane valleys with good access to the Tigris River and to the northern part of the Mesopotamian Plain.

5) The *Lower Zagros*, located further south, is an area isolated from the Tigris and other regions because the Zagros range pose a barrier. This

zone contains two important rivers: the Karkheh and the Karun (Aurenche and Kozlowski, 1999: 12).

6) The *North Levant* will indicate the Amuq Plain area, along the Mediterranean coast from Syria in the North to Lebanon in the south where the Litani River empties into the Sea. This region extends inland to the Queiq Valley and is bordered in the interior by the Amanus, Lebanon and Anti-Lebanon Mountains.

7) The *Central Levant* will specify the coast and mountains of Lebanon and inland to eastern Jordan. The Amanus and Lebanon ranges serve as a barrier isolating this region both physically and culturally from the North and South Levant.

8) The region that stretches from Palestine to the Sinai and Negev will be designated as the *South Levant.* This region includes Palestine, modern Israel, southern Lebanon and southwestern Jordan and is composed of a coastal zone, steppe and hilly areas and overlaps with the Desert zone.

9) The *Desert Zone* will represent the oases in northern Saudi Arabia, the Syrian Desert, Southwestern Iraq and two dry plateaus, the Judean and the Trans Jordan, located in East Jordan. The Jordan is the major river flowing through this region, which also contains many wadis (Aurenche and Kozlowski, 1999:10-11; Zarin, 1989:39).

10) *Cyprus* will refer to the entire island in the Mediterranean Sea, about 71km south of the Anatolian Coast and 112km to the west of the Syrian coast.

11) Finally, the *Mesopotamian Plain* indicates the area in southeastern Iraq and southwestern Iran where the Lower Euphrates and Tigris meet.

III. Chronology

This research will focus primarily on the PPN (Pre-Pottery Neolithic) and the PN (Pottery Neolithic) periods. Several relative and absolute dating systems have been proposed for the Prehistory of the Near East. Only two absolute chronologies are prominently found in publications: the old and new chronologies. Dates may differ by 500-1000 years between these two chronologies. To illustrate this disaccordance in dates, the old chronology (Fig. 3) states that the EPN (Early Pottery Neolithic) spans 6000-5600 BC whereas the newer chronology (Fig. 4) offered for the EPN spans 6900-6400 BC (Aurenche and Kozlowski, 1999; Aurenche and Hours, 1987, Evin 1995; Hours et al, 1994). The dating system for the Neolithic has generally followed the old chronology until recently (see Mellaart, 1981; Aurenche et al., 1987; Ehrich, 1992).

Currently, with research done in radiocarbon date analysis, more coherent conclusions have been obtained. The main reason for the change concerns new methods of C14 dating and dendrochronology. The results are mainly based on research and publications by the Maison de L'Orient méditerranéen, CANeW (Central Anatolian Neolithic e-Workshop) and the publication *Radiocarbon* (among others) (Hours et al, 1994; Aurenche and Kozlowski, 1999; Binder, 2002; Cessford 2002).

According to these studies, the problem arose from the calibration system of the BP dates. The new research proposes a new calibration method of the BP dates, which result in different BC dates from the previous system. For instance, the year 10050 BP

used to calibrate to 8100 BC, but with new procedures, 8100 BC corresponds to 9500 BP instead (Evin, 1995: 5, 8 13-15).

The newer dates for the Near East (see Stuiver and Reimer 1993 in *Radiocarbon*) provide a greater time span for each division of the Neolithic period (Hours et al, 1994: 378). This dating system also claims to sustain the chronology accepted for the Chalcolithic and Bronze Age periods (Evin, 1995:13-15).

It should be noted here that studies on Anatolian and Cypriot absolute and relative chronologies show that they correspond well to the dating and cultural trends in the rest of the Near East. For example, the L/FPPNB (Late and Final Pre-Pottery Neolithic B) of the Levant starts at 7500 and lasts until 6900 BC, when towards the end of this phase sporadic pottery appeared (Peltenburg et al, 2001b: 53).

During the same time span similar events were occurring in Central Anatolia (Binder 2002: 82-85; Cessford, 2002: 724). The initial stage of the PN culture in Anatolia also starts at about 6900 BC and lasts until around 6400 BC (Cessford, 2002; Hours et al, 1994, Aurenche and Kowloski, 1999; Binder, 2002).

The PPN of Cyprus starts around 8000 and continues to about 7600 BP, which is concurrent with the late Early and early Middle PPNB of the Levant (Binder, 2002: 82; Şevketoğlu, 2000: 98). The next occupation for the PPN sequence corresponding to the LPPNB and Final PPNB on the coast of the Levant, commences at 7600 and lasts until 7000 BC. The PPNB of Cyprus shows similarities to the PPNB of the Levant, such as the existence of domesticated animals and early glimpses of pottery (Le Brun 1989a: 167).

IV. A Note on Terms

The application of standard terms such as numbers or named periods in accord with the BC dates is useful when making meaningful comparisons (Evin, 1995:5). Unfortunately though, variants in the terms used to relate changes in material culture are common. Different terms include *Proto-Hassuna* and *Samarra*, the *PPNB* and *PN* and *periods 1-5*. Each expression has inconsistencies with relation to time, space or chronology of events. For example, the first set of terms is based on cultural differences in various geographical locations, which in many cases do not correlate with a definite span of time. The terms PPN and PN are used to designate a period of time connecting to technological developments. However, the range of dates and the cultural change does not always correlate in different areas. For instance, the Anatolian plateau may not be seen as the equivalent of the PPNB of the Levant, rather another manifestation of it[1]. Finally, the periods numbered by 1-5 (the system usually presented by the French) are based on a fixed span of time, but there may be disagreements between the sequences of events in different areas (Cauvin, 1987a: 333-335).

V. Conclusion

Therefore, what passes for an absolute chronology is not so absolute...(!) but with new research on radiocarbon and with the standardization of dates and terms, some consensus may come about. Even though some discrepancies exist in terms, the PPNB phasing prevails throughout most publications, and to make it easier I have employed

[1] Another phrase, "PPNB of the Taurus" was applied to the PPNB of SE Anatolia in order to distinguish the internal developments of this region from those in the rest of the Near East (Cauvin, 1989b: 406-407; Özdoğan, 1999:14).

them in my text (Fig. 5). These phases correlate with the dates given by the more recent chronology.

PART I

The Transition from the PPNB: Movements of People

"The PPNB communities did not "collapse", rather they transformed into a society in which such relations and interactions were of a different order..." (Verhoevan, 2002: 12).

CHAPTER 1

INTRODUCTION

The invention of a technology usually occurs in more than one place and time, whereas its widespread use does not arise unless society finds that it offers a better alternative to the pre-existing technology. The ultimate adoption of an innovation may occur for various reasons and at a much later period. Pottery technology is a good illustration of the idea that innovation precedes distribution. During the PN, (Pottery Neolithic) spanning 6400 BC to 4500 BC, pottery appears in an advanced stage in the material record whereas in the PPNB, (Pre-Pottery Neolithic) lasting from 8800-6900 BC, there was no sign for widespread experimentation with clay in this manner. Instead, during the PPNB, early evidence for pottery is seen sporadically at sites throughout the Near East (Renfrew, 1984: 391, 415; Adams, 1996: 8-9; Kingery et al, 1988: 239; Rice, 1999: 47).

II. The Introduction and Development of a Technology

A. Early Theories on the Invention of Pottery

It is a commonly held belief that when the ancient peoples discovered that clay could be hardened by fire, the "history of pottery begins" (Cooper, 1988: 13). Childe was the first one to suggest that pottery was *adopted* in the "Neolithic Revolution", when sedentism, agriculture and animal domestication were already established.

Controversially, he does suggest that the first *invention* of pottery may have evolved in a non-agricultural society[1] when the accidental burning of clay lined baskets brought about the first pots. Thus, Childe (1951: 76) suggests that the earliest clay containers began as the imitations of vessels made from other materials such as gourds, bladders, skins and baskets.

The idea that pottery making is associated with an agricultural and settled way of life rather than to a mobile one also persists. Cooper (1988: 13) offers a good illustration of this idea when he writes, "Nomadic races would have little time or use for fragile pottery....". Furthermore, many hypotheses concerning the invention of pottery are not maintainable since they always imply that invention is immediately followed by its distribution. These hypotheses hinder finding a solution instead of advancing towards one.

B. Invention and Innovation

The difference between invention and innovation must be explained. Invention is the advent of a technology whereas innovation is the widespread application or adoption of this technology. Both of these terms must be examined separately because different factors must be present within a system for either one to come about (Renfrew, 1984: 391; Adams, 1996: 8-9, 11)

It has been observed that a certain invention may be made concurrently in diverse areas, or several different times in the same place. Any technology may be

[1] The finds of a Neolithic without pottery at Jericho followed by similar finds at other sites containing aceramic Neolithic layers such as at Jarmo, prompted a reconsideration of the theory of pottery invention (Moore 1995: 39).

purposefully created through incentive or simply due to chance (Renfrew, 1984: 391, 415; Adams, 1996: 18-19; Kingery et al, 1988: 239; Rice, 1999: 47).

An innovation must confer advantages over other technologies to become widespread, and it is only when certain conditions are in place that the characteristics of an invention are seen as benefits. The factor *timing* must be stressed: the development of a technology becomes evident only when several interconnected factors correspond in a particular way, *simultaneously*. This explains why in many cases, a technology may be invented at one stage but it will be incorporated into the system on a big scale at a later time when these specific features reciprocate each other (Renfrew, 1984: 394-396; Adams, 1996: 27-29).

C. Origins of Technology

The methodologies used to analyze the invention and innovation of present technologies are useful when applied to studying past ones (Dobres, 2000: 213).

The development of a technology exists in an intricate system of various, interrelated ecological, historical, political, economic and social factors of a past society. It is within this dynamic web that a technology is first invented (Dobres and Hoffman: 1999: 3; Ingold, 1999: ix; Rice, 1999: 2). If a certain combination of factors exists within this interlinking network, the technology will be allowed to expand on a large scale (Renfrew, 1984: 392, 396; Dobres, 2000: 213). On the contrary, if the variables of a system alter, it may cause a technology to fall out of use. Therefore, the adoption of an innovation is reversible (Renfrew, 1984: 413). Moreover, an innovation may be modified over time, that in many cases the altered version of the adopted

technology is even more widespread and effective than the initial invention itself (Renfrew, 1984: 394-396; Adams, 1996: 27-29).

Since a technology develops alongside certain features such as the domestication of plants and/or animals, but is essentially independent of them (Rice, 1999: 44, 47; Dobres, 2000: 213), pottery, which has long been assumed to evolve *only* with sedentary societies, may have developed in conjunction with mobile societies instead.

III. Objective

The purpose of this thesis is to examine the innovation of pottery technology in the Near East. Specifically, this research involves examining how and why clay, both fired and unfired and having many important functions, took on the container form and became a significant utilitarian item around the 7th millennium BC. The general outline of this thesis is summarized below:

A. PART I

This section will present the archaeological evidence for the L/FPPNB, the PN and a general overview of the animal domestication process. Firstly, the introduction of pottery technology will be examined within its prehistoric context, which entails presenting the conditions or 'historical circumstances' evident in the L/FPPNB, prior to the PN when the adoption of this invention occurred. Elements that will be considered for both the L/FPPNB and the PN are ritual, trade, architecture, subsistence strategy, lithic industries, settlement patterns, social complexity and technologies such as plaster.

Additionally, these chapters will cover issues like: the appearance of finely made pottery in the archaeological record without evidence for an "experimental stage", the so-called "gap" in the material record between the FPPNB and the PN, and the movements of people during this transitional period, which involves the rise of pastoralists and changes in settlement patterns.

B. PART II

In this section we will focus on examining certain technologies that preceded the pottery making process and are comparable to manufacturing pots. Clay, both fired and unfired had been used in the Near East for thousands of years. Before pottery came into use in the 7th millennium, knowledge of clay and its properties is illustrated by its use in architecture and for other, non-utilitarian purposes, such as figurines. Stone vessels, plaster, and metal production show similarities to pottery making and thus, can also be considered as prototypes to this process.

C. PART III

This section will focus on tying in all the evidence gathered for the L/FPPNB and the EPN to understand what combination of conditions brought about pottery technology.

The sporadic invention of clay vessels at random sites throughout the Near East starts in the PPNA, long before the widespread distribution of pots in the PN. These sites will be presented to demonstrate invention before innovation. Other important factors to be considered are the sophisticated manufacture of certain items such as plaster, stone bowls, obsidian, flint and metal and their existence in the highly

organized trade of this period. Furthermore, through contacts of settled and mobile peoples, cultural productions like technology may be exchanged along with raw materials and finished products.

More than once it has been remarked that the appearance of pottery on a large scale throughout Southwestern Asia was concurrent with the arrival of the four domesticated animals in each region. Using ethno-archaeological and cross-cultural comparisons, the relation of pastoralism[2] and pottery will be researched. The ecology plays a key role in determining what uncontrollable factors will affect the circumstances of a system. Thus, the environmental conditions in both the L/FPPNB and the PN will be researched. Finally, social choice has a major impact on the outcome of conditions and the result of any set of circumstances will rely inevitably on human decision, for better or worse. Thus, the last part of this work will examine the social factors involved in opting for pottery.

[2] I will use pastoralism as a general overall name for the four domesticates (sheep, goat, cattle and pig). This must be emphasized because there are various subclasses of pastoralism. Hence, only when it is specified will it take on a more specific meaning (See Chapter 11).

CHAPTER 2

THE LATE AND FINAL PPNB: THE TRANSITIONAL PHASE

I. Foreword

The origins of pottery technology may be better understood after examining the periods before its intense use, the Late and Final[1] Pre-Pottery Neolithic B (L/FPPNB) (Figs. 6 and 7). The LPPNB corresponds to a dynamic period when many cultural developments were taking place. The period from the FPPNB until the EPN was a transitional stage when clay vessels started to appear at sites in the Near East and the intense forms of pastoralism and agriculture materialized. It is also a time that involved the mass movement of people resulting in settlement reorganization.

II. Introduction to the PPNB: 9th to 7th millennium BC

The process of Neolithisation refers in one part to the domestication of plants, which developed during the PPNA of the Levant. This Neolithisation spread slowly to the east in the plains and lowland regions by those who were still more or less hunter-gatherers. Thus, the west was transforming at an accelerated pace towards sedentary agriculture, while the east developed at a slower rate (Kozlowski, 1999: 25). By the end of the 9th millennium, or about 8300-8000 BC, domestication of plants was fully

[1] The Final PPNB (7250-6900 BC) corresponds to the end of the Late PPNB.

achieved in most regions and animal domestication was in its initial stages. This period is known as the PPNB, when the Neolithisation process expanded to include domesticated animals as well as plants (Aurenche and Kozlowski, 1999: 55; Cauvin, 2000: 81).

III. Overview of LPPNB Society

The LPPNB was the time of "a virtual explosion of culture..." (Cauvin, 2000: 76).

A. Subsistence Methods

By the LPPNB, new forms of agriculture[2] and animal domestication have expanded into all regions of the Near East. Simultaneous to the development of animal husbandry, a new subsistence method, pastoralism was forming. It should be noted that following the emergence of herding in the E/MPPNB, hunting began to decrease. Nevertheless, this procurement strategy was still practiced and continued into the L/FPPNB and EPN (Aurenche and Kozlowski, 1999: 84-85).

B. Architecture

The use of all types of architecture was evident in the LPPNB. For instance, the full adoption of rectangular architecture (Fig. 8), an innovation that began in the early part of the PPNB, was observed during this period. This evolution in architecture was more observable in the west, whereas the earlier, small, irregular agglutinated

[2] At this stage full domestication and farming have been achieved in most regions, but some places only adopt agriculture when they start domesticating animals, for example, in the South Levant at Aswad and in SE Anatolia at Cafer Höyük and Nevali Çori (Aurenche and Kozlowski, 1999: 85).

houses persisted longer in the east. In the FPPNB the reuse (from the PPNA) of round architecture (Fig. 9) is apparent, for example, at Beidha. At some sites there were both round and rectangular architecture, such as at Halula. The rectangular architecture is associated with agriculturalists, whereas the round architecture is generally connected to pastoralists (Aurenche and Kozlowski, 1999:85-87; Kozlowski 1999). Cyprus is a different case, as the population continued using PPNA/EPPNB round architecture (Fig. 10a) adopted on the mainland (Fig. 10b)[3] when it arrived on the island in the Late Early and Middle PPNB. This form was used until the L/FPPNB and is seen at sites like Kalavassos-Tenta and Khirokitia. However, these circular dwellings had been altered a bit from their semi-subterranean predecessors in the PPNA because they were built directly on the surface instead (Le Brun, 1997: 19; Todd, 2001: 97; Peltenburg et al, 2001a: 84-85).

The majority of these houses displayed high quality, standardized mudbrick. Other habitations were made of pise, a mud-like mix, such as at Abu Hureyra and Mureybet (Cauvin, 2000: 79). Finally, some of these dwellings had stone foundations to support various types of superstructures like in SE Anatolia, while other houses were constructed all in stone such as those in the South Levant (Aurenche and Kozlowski, 1999: 75-76; Cauvin, 2000: 82).

The shape of the houses generally reflects the basic framework of community organization. Rectangular dwellings, thanks to their shape, allow a close, planned out and collective organization of space. In contrast, the use of round houses creates a

[3] Cyprus is well incorporated within the "interactive sphere" of the rest of the Neolithic Near East. The newcomers followed similar economic strategies (ie, agriculture, hunting and a degree of pastoralism) and had a lifestyle comparable to the rest of the Near East (Le Brun, 1989: 161-167; Guliane et al, 1995; Davis, 1994: 305; Vigne et al, 1999b: 51; Peltenburg et al, 2001b: 53).

more separated and disorganized community. At some sites, a place was set out for public affairs, such as the courtyard at Çayönü, or open spaces at Beidha or Nemrik.

C. Distribution of Plaster

The distribution of lime and gypsum plaster throughout the Near East by the PPNB, indicates that similar technology and cultural use existed for this material as well. According to the chart (Fig. 11) a clear regional division existed for these two plaster types. Throughout the Levant, Central Anatolia and Southeast Anatolia lime plaster seems to be the preferred type, whereas on the Middle Euphrates, the Desert Region and both the Upper and Lower Zagros gypsum plaster is employed. The use of various raw materials is mostly related to geological differences, but may have cultural implications as well (Kingery et al, 1988: 237)[4].

D. Ritual

Sophisticated forms of ritual began at the end of the 9th millennium, which are recognized by extra-ordinary forms of architecture, sculptures, and the production of other smaller, but no less significant, objects.

1. Sacred Spaces

Special areas were designated within a site or region to perform ceremonial activities. For example, in both the South Levant and SE Anatolia certain sites contain sanctuary buildings. Such temple buildings are found at Nevalı Çori (Fig. 12), Çayönü, Çatal Höyük and Göbekli Tepe. Other possible examples of sanctuaries are suggested

[4] Does the distibution of this plaster have any relation to pyro-technology, natural resources or just choice?

at Ain Ghazal, Jericho, Beidha, Qermez Dere and Bouqras, although these are not as exceptional as those in SE Anatolia (Aurenche and Kozlowski, 1999: 73-74; Cauvin, 2000: 117-118; Özdoğan, 1999: 47).

At Göbekli Tepe (Fig. 13) existed a unique example of ritual architecture, where virtually all the site was composed of buildings with non-domestic functions. These structures were round or oval shaped, many containing large stone pillars with animal depictions on them (Schmidt, 2001: 48-49).

Evidence for ritual communal buildings was also found at Hallan Çemi: two fairly big, circular semi-subterranean constructions each with a plastered floor and a bench or platforms running along their perimeter. Artifacts consist of copper ore, obsidian and in one case, an aurochs skull that fell from the wall (Rosenberg, 1994: 127).

During the LPPNB at Çayönü, outdoor plazas such as the Pebbled Plaza and the Earth Plaza were constructed. These incorporated rows of standing stones and limestone slabs. In addition to these plazas, a new Skull Building was built in the ruins of an oval domestic structure filled with limestone slabs, steles, an "altar" and benches. Slightly later than the Skull Building, a Terrazzo building was erected, inside of which fragments of a basin with a human face relief were discovered (Özdoğan, 1999: 50-51).

At Çatal Höyük, there was no ritual center but rather each house had a room dedicated to sacred functions, which contained paintings and pictures of cut animal heads molded in clay. In addition to these features, some dwellings also contained a cattle skull with large modeled horns hanging on the wall (Cauvin, 2000: 117-118).

2. Ceremonial Relics

Other evidence for ritual consists of special artifacts made for non-utilitarian purposes. Some relics include life-sized and smaller anthropomorphic stone and plastered statues. The anthropomorphic statues were found in SE Anatolia, while the plastered ones were discovered in the South Levant at Jericho and Ain Ghazal. The latter were made with reeds or grasses and covered in lime plaster. The limestone base relief such as those located at Nevalı Çori, Çayönü and Göbekli Tepe (Fig. 14) also had a ritual function (Cauvin, 2000: 108-109).

The skull was another item venerated throughout the Near East. Skull treatment involved separating the head from the skeleton and presenting it in different ways (Fig. 15). In the Middle Euphrates region at Mureybet for example, skulls were lined up on the floor of a house and placed over clay lump pedestals (Cauvin, 2000: 81; Cauvin, 1977: 31). The skull deposits buried in the houses at Tell Halula represent a more traditional treatment of human heads (Molist, 1998: 75).

On Cyprus, wells at Mylouthkia were highly valued and after they ceased to function, they were intentionally filled up or "buried". One contained a skull and other human remains, caprine crania and a high quality macehead (Peltenburg et al, 2001b: 54). Remains of humans and animals inhumed together are also known from the South Levant, in particular at Kfar Hahoresh (Peltenburg et al, 2001a: 85).

In the South Levant a similarly related practice thrives, which involved plastered skulls with modeled faces, buried inside houses or under floors (Cauvin, 2000: 81). Plastered skulls are observed at Jericho, Beisamoun, Tell Ramad, Kfar Hahoresh, and Ain Ghazal. At Nehal Hemar, a skull was discovered with an asphalt design on the back of its head (Fig. 16a) (Cauvin, 2000: 113).

Secondary burials were placed below platforms inside the houses at Çatal Höyük, where the head was placed at the center of the body and sometimes painted with ochre (Balkan-Atlı, 1994: 139).

Additional ceremonial items are stone masks. Five masks were found in Nahal Hemar Cave (Fig. 16b), decorated with paint and containing fitting holes and bitumen for hair attachment (Cauvin, 2000: 113).

E. Evidence of circulation and contact

The circulation of raw materials and finished items in the LPPNB attained a more complex level of organization than the previous periods. For example, the exchange engaged the whole Near East where items traversed distances of up to 400 km. The extensive network included the circulation of culture and technology as well (Aurenche and Kozlowski, 1999: 85-87). The most significant trading region at this time lay along the banks of the Middle Euphrates River because its central location made it an important meeting point of exchange and influence (Copeland and Hours, 1983: 77-78).

1. Lithic Industries

The lithic industry of the LPPNB involved the circulation of raw materials such as flint and obsidian, finished items like blades as well as the exchange of techniques for producing certain types of tools. The degree of standardization exhibited by this industry indicates that a sophisticated circulation network existed at this time. During the PPNA to the PPNB periods, the lithic industries in the west went through much modification (about five to six sequences) until about 6000 B.C, while in the east the

industries remained almost unchanged over the same time span.[5] The later sequences in the PPNB, (from about the 8th to the 6th millenniums), involved certain technological innovations, such as the broad blade technology, which was introduced in the east by the 7th millennium. They were made on double platform or bipolar cores and were specially selected from mined raw materials, including the tabular flint from Syria and the obsidian in Anatolia. Both of these materials were imported throughout the Near East in the PPNB. Towards the very end of this stage and especially into the PN, these materials began to be replaced by local ones (Kozlowski 1999; Aurenche and Kozlowski 1999).

The location of PPNB and PN lithic industries was not limited to geography or cultural factors. Instead, one industry could cover a vast area but contain variations in different parts. Kozlowski divides the location of these lithic industries into three major zones, the Iraqi-Iranian, the Levantine[6], and the Caucasian-Caspian (Kozlowski 1999). In the LPPNB, the BAI, (Big Arrowhead Industry)[7] which originated in the Levant reached as far as the Tigris, Euphrates basin, Zagros/Taurus zone and Cyprus by the FPPNB (Figs. 17 and 18) (Kozlowski, 1999: 149; Peltenberg et al, 2001a: 80-82; Peltenburg et al, 2001b: 51-52). The lithics from the PPNB on Cyprus, especially the late EPPNB and early MPPNB, show similarities with the BAI industry on the mainland. The use of high quality materials also provides evidence for continuing

[5] Examples of western industries are the Khamian, Mureybetian, and Sultanian while the Nemrikian and Mlefatian continue over this period in the east.
[6] The Levantine Province is the most researched area of the Neolithic period.
[7] This BAI industry is characterized in the beginning by the appearance of Byblos points in the north and Jericho points in the south, where the southern version of the BAI includes backed sickle blades with gloss. This includes Amuq points, when the PN begins.

contacts with the continent during this period[8] (Peltenberg et al, 2001a: 80-82; Peltenburg et al, 2001b: 51-52).

Due to the vast region that the BAI covers during the PPNB/PPNC and PN periods, many territorial variants of the E, M and L BAI industries are found dispersed throughout Southwestern Asia[9]. For instance, two major divisions within the Near East, are the North: Syria, Iraq, and eastern Anatolia, and the South: Israel, Jordan, and Syria (Kozlowski 1999: 124, 131,133).

2. Ceramics

Important and relevant to this study, is the evidence for the fabrication of sun-dried, fired and unfired *clay* figurines, both anthropomorphic and zoomorphic that became more abundant during the LPPNB. Other ceramic artifacts include tokens, plaques and spindle whorls. Most importantly though, was that by the FPPNB the use of fired and unfired clay storage facilities and cookware was underway (Aurenche and Kozlowski 1999: 66-68; Le Mière, 1989: 53-54; Cauvin, 2000: 89, 106-109).

IV. Conclusion

The cultural evolution of the PPNB resulted in great developments in many different aspects. They are illustrated by the complexity in procurement strategies, settlement patterns, architecture, ritual, various industries and trade. Altogether, these

[8] The lithics from Shillourokambos, Mylouthkia and Tenta are comparable to the Early and Middle PPNB on the mainland: for example, bi-directional cores and blade based industry, many arrowheads. In the later PPNB or MPPNB and early LPPNB the Naviform is also present on the island, demonstrating high technical skills. By the Late PPNB the lithic industry points to early regionalization as compared to other region in Southwestern Asia (Peltenberg et al, 2001a: 80-82; Peltenburg et al, 2001b: 51-52).

[9] The early PPNB industries of the region are Mureibetian and Aswadian. They are derived from two sites, Tell Aswad and Mureybet. These industries are successors of the Khamian, which appear around the early 8th millennium. Versions of these industries reach the Negev and slightly east of the Jordan Valley in the south and Anatolia to the north by the later 8th millennium.

factors point to a sophisticated society existing in the Late and FPPNB. Most significantly, the developments that occurred during this time paved the way for the PN.

CHAPTER 3

MOVEMENTS OF PEOPLE

> "Lors des tentatives de mise en évidence des changements culturels, la faune est souvent sous-employée. Elle semble pourtant un assez bon marqueur au même tître que l'outillage lithique ou osseux et l'architecture. En effet les habitudes alimentaires reflètent l'économie, bien entendu, mais aussi les structures sociales et le niveau culturel, c'est-à-dire la complexité des exploitations du monde animal. Cela veut dire qu'un changement d'habitudes alimentaires peut, lui aussi, avoir une signification socio-culturelle" (Helmer, 1991: 131).

I. Introduction

The changes that occurred during the transition between the PPN and the PN resulted in part from the migrations of people[1]. The resettling of people during the PPNB is strongly supported by the transport of animals by herders outside their natural environment. The rise of pastoralism in the transitional phase allowed for seasonal and nomadic migrations, therefore this subsistence method was partially responsible for the relocation of people at the end of the 7th millennium. These movements of people during the FPPNB and EPN are reflected in the archaeological record by alterations in the settlement pattern and a change in diet from primarily hunted species to domesticated animals at sites. Further evidence that illustrates this shift in population is the emergence of cultural regional designations in the PN, characterized by pottery types (Perrot, 2000: 25; Zarins, 1989: 35; Tchernov, 1993: 15-16).

[1] Zarins believes that the traditional assumptions about the sedentarisation process and its impact on populations during the PPNB phase need to be revised.

II. Transformation of Settlement Pattern

During the MPPNB (8200-7500 BP) villages become bigger and more organized, which reflects that new procurement strategies, agriculture and animal-husbandry are being implemented (Molist and Stordeur, 1999: 399, 403; Akkermans, 1999: 523). At the start of the LPPNB, the changes from the previous period intensified, such as the increase in settlements and site enlargement (Rollefson, 1989: 168-169).

During the transitional period or the FPPNB, further modifications are observed in the settlement pattern. For example, the size of sites was greatly reduced, while many others were abandoned including Jericho, Beidha and Munhatta. The end of the PPNB on Cyprus shows an abandonment of large sites like Khirokitia and Kalavassos-Tenta (Molist and Stordeur, 1999: 402-403; Verhoevan, 2002: 10; Zarins 1989: 37; Cauvin 1976: 54; Mellaart 1981: 227; Perrot 1993; Le Brun, 1997: 41; Todd, 1998: 19).

Conversely, other sites such as Abu Hureyra, uninhabited for about 1000 years (since the Natufian) were resettled (Cauvin, 1976: 54; Kozlowski, 1999). Finally, certain sites such as Mureybet continued on into the PN but with alterations (Cauvin, 1976: 55; Molist and Stordeur, 1999: 402-403).

Other alterations that occurred during the FPPNB are illustrated by the great number of newly settled sites such as Çatal Höyük, Can Hasan, Suberde, Aşıklı Höyük and Musular[2] (Bottema and Woldring, 1984: 28, 148).

New sites founded in SE Anatolia and the Zagros area included Cafer Höyük, Maghzalia, Umm Dabaghiyah, Tell Sotto and Kültepe. Additionally, new

[2] These sites show a combination of both local and outside traits (Bottema and Woldring, 1984: 28, 148).

sites like Beisamoun, Kirbet Sheik, 'Ali, Basta and Wad Shu'eib were settled in the South Levant.

There was also an expansion to new regions, for example on the North and Central Levantine Coast and in the Desert zone during the FPPNB. These regions were uninhabited before this time. Sites in the North and Central Levantine coastal region include Byblos, Ras Shamra, Labwe and Atlit-Yam. El Kowm was a major site established at an oasis in the Desert zone (Cauvin, 2000: 161-162, 175-182; Smith and Young, 1983: 151; Mortenson, 1983: 216; Perrot, 2000, 24-25; Zarins, 1989: 37; Aurenche and Kozlowski, 1999: 64; Verhoevan, 2002: 10).

Along with the expansion into the desert/steppe regions during the Late and FPPNB, pastoralism made its way into these areas (Tchernov, 1993:15; Helmer and Segui, 1999: 257). Actually, the resort to arid, marginal areas was essentially made possible *by* pastoralism, and the findings of campsites in areas with sparse resources are associated with FPPNB and EPN herders (Henry et al., 2001:16; Cauvin and Cauvin 1993: 23-28; Zarins 1989: 39, 41-43). A good illustration of pastoralist camps was discovered in Wadi Araba,[3] an area located in the southern Rift Valley on the Western Band in Southern Jordan. The sparse use of this area by pastoralists was based on transhumance between this marginal region and the mountainous area nearby (Henry et al., 2001:16).

The arrival of these four species into this zone, already domesticated, was seen along with the incorporation of other LPPNB traits from outside regions (Cauvin and Cauvin, 1993: 25, 37; Contenson, 1994: 167; Davis, 1982: 13-14; Garrard et al, 1994: 82). The influx of people and their herds into the Azraq Basin

[3] This was a survey conducted to compare upland areas nearby in the Hisma Basin with the foothills of the Ma'an Plateau. Overall these investigations were conducted to see how the lower regions of Wadi Araba fit into the whole scheme of transhumance in this area of Southern Jordan (Henry et al, 2001: 1-2).

illustrates the continuity of LPPNB architecture and lithic traditions of the steppe (Garrard et al, 1994: 88). Thus, the migrations into marginal areas during the transitional phase were made by pastoralists.

Conversely, the agricultural and agro-pastoral villages relocated to more fertile areas with concentrated water sources. A good example of the shift in site location is the settlement dispersal noticed at Wadi Ziqlab in the South Levant. Sites, usually in the form of small hamlets, spread along this drainage, which were better suited to the peoples' needs where they had access to water, pasture and farmlands and competition was reduced (Banning et al, 1994: 154). Thus, the settlement pattern changed from a conglomerated to a more dispersed one.

To summarize: the seasonal camps were situated in flat, semi-arid zones or on the slopes of mountains where natural resources were more limited, whereas the major sedentary sites were situated in areas ideal for agriculture such as alveoli, rivers and oases (Fig. 19). The agricultural sites are dispersed throughout the landscape at specific localized areas with good resources while the temporary pastoral sites are situated in sparsely vegetated and watered regions, which may be visited seasonally. The campsites usually had strong connections with permanent farming villages (Le Mière, 1989: 12; Akkermans, 1996: 76-77; Mortensen, 1983: 216; Smith and Young, 1983: 148-151). To illustrate these changes, nomadic and semi-nomadic inhabitants of the Desert Zone had access to the wadi and lake systems of Western Iraq and Southeast Syria while oases supported larger villages (Cauvin and Cauvin 1993: 23-28; Zarins 1989: 39, 41-43; Henry et al., 2001:16).

The dispersed settlement pattern observed for the EPN supports the movement of people in the FPPNB, parallel to the rise of pastoralism (Fig. 20a, b and c) (Henry et al., 2001:16; Zarins, 1989: 43). It may seem that the population

drastically changed, but in fact, the same people were organizing themselves differently in the landscape from the previous period (Verhoevan, 2002:10; Banning et al, 1994: 151, 152, 154).

III. Domestication of Animals

A. Introduction

The domestication of animals is subject to another major complex debate and will not be discussed further than mentioning general trends as it relates to the phenomenon of pastoralism and more importantly, to pottery technology. It is essential to include this process because it provides a strong argument to support the idea that people were migrating. Animal bones uncovered in the material record are evidence for diet, thus, a change in the faunal assemblage indicates an alteration in diet, pointing towards a cultural adjustment. A variation in culture perceived from the faunal assemblage is linked to a modification in both animal consumption strategies and social organization. This change may occur from the arrival of external groups into a new area, the acceptance of a new technology by indigenous group or new strategies developed locally (Helmer, 1991: 131). Thus, fauna are a significant marker of a site's function (Russo, 1998: 143, 160).

B. Explaining Domestication

The first phase of animal domestication is selective hunting[4]. The first animal to be selectively hunted was the gazelle when the culling of the males resulted in certain alterations of the species over time (Tchernov, 1993: 12). It is

[4] Some sites in the desert have stone circle complexes used by contemporary hunter-gatherers representing sophisticated forms of selective hunting when this transition occurred in the 7th to the 6th millennium. These are found in the Negev/Sinai, East of Levant into Jordan and Saudi Arabia (Zarins, 1989: 13).

important to point out that the hunting techniques exhibited by a human group are directly related to the animal that is being hunted and how it is killed. For example, a huge herd of gazelle slaughtered at a kill site is a task not feasible by a single hunter but requires the cooperation of a group of hunters. Thus, to a certain degree the type and level of subsistence strategy (in this case particular hunting techniques) reflect what level of socio-political organization a group maintains (Helmer, 1991: 131). The early stages of the domestication process have usually been observed in the material record by an increasing amount of faunal remains of potentially domesticable animals such as goat, sheep, cow and pig, coinciding with a decrease in the remains of hunted animals such as the gazelle (Tchernov, 1993:10).

The later stages of domestication, which are referred to as proto-domestication have not been observed with gazelle but with domesticable animals. Proto-domestication can be explained as an intensified form of selective hunting when humans manage the sex, age and movements of the herd. People progressively gained more control over them, which eventually led to full domestication (Tchernov, 1993:12; Ducos, 1994: 165). Proto-domestication is marked by large changes of a certain species' sex and age profile in faunal assemblages[5]. The different demographic make-up results from a much stricter type of selective hunting than hunters would normally practice; that is usually killing of young male adults but keeping the females alive to breed (Vigne et al, 1999a: 6-7). When the demographic make up is totally altered it suggests much

[5] It should be explained that in the past, the recognition of the early phases of domestication focused on changes in bone morphology. Recent studies of the data prompted many scholars to conclude that modifications in bone morphology are rarely evident in the archaeological data of the PPNB. Instead, they support that the overall bone size of a herd reduces only because the female proportion of the herd increases and female animal bones are generally smaller than male (Ducos, 1994:161, 168). Thus, it has been suggested that the first stages of domestication involve various forms of selective hunting not morphological change. A long period of time is needed in this domestication process before the morphological changes in a species are apparent (Vigne et al, 1999a: 7; Ervynch et al, 2001: 70).

control is maintained over the animals and their behaviors (Vigne et al, 1999a: 7; Ervynch et al, 2001: 70).

Thus, the domestication process is related to a number of factors and according to many it evolved gradually from the Natufian to the PPNB, when the three economic strategies (pastorialism, hunting-gathering and agriculture) coexisted (Tchernov, 1993:12; Zarins, 1989: 43).

IV. The PPNB Evidence

An overview of the PPNB evidence for the Near East will be presented to understand where the process of domestication for each animal came about, and how it spread (Tchernov, 1993:10) (Fig. 21a, b, c and d).

A. Domestication and Migration

Certain conditions were in place that triggered the onset of domestication. This process was initiated when the selective hunting of certain animals like goat, sheep, cow and pig, replaced the killing of other animals. The earliest evidence for the selective hunting of these four species only occurred within a region where they naturally lived (Ducos, 1994: 40; Helmer and Segui, 1999: 257). Each of the four domesticates showed signs for selective hunting by the EPPNB (Helmer and Segui, 1999: 258, 266; Peters et al, 1999: 43). The case of Cyprus verifies that the process of domestication must have started early enough to allow sufficient amount of control to be administered over these four animals[6] during their diffusion to the island by the MPPNB, before the full domestication of all four animals was apparent on the mainland and long before the morphological changes were

[6] An analysis of the fauna assemblage from Shillourokambos points to selective hunting of cattle and pig and the proto-domestication of goats and sheep on Cyprus, but the hunting of other species, like deer continued (Vigne et al, 1999b: 54).

identified in the archaeological record[7] (Ervynch et al, 2001: 70; Vigne et al, 1999b: 54, 55). The arrival of people from the Levant[8] to Cyprus is corroborated by the fact that they introduced the fauna that they usually consumed on the mainland, including sheep, goat, pig, deer and cattle. It should be stressed the animals were not indigenous to the island but brought there from the continent by boat (Vigne et al, 1999b: 52, 54; le Brun 1989a: 163).

Slightly later, during the MPPNB, these animals were subjected to the initial stage of the domestication process *outside their natural habitat.* Proto-domestication succeeded the selective hunting of a species in its original homeland or outside of it and by this time alterations were discerned in the demographic make-up. In many cases, an animal was introduced into a region already proto-domesticated or fully domesticated (Ducos, 1994: 40; Helmer and Segui, 1999: 257, 258, 266; Peters et al, 1999: 43).

B. Summary: The Dispersal of Domesticated Animals

The dispersal of animals is summarized as follows: Research suggests that the goat was first selectively hunted in the Upper and Lower Zagros in the EPPNB and by the E/MPPNB, proto-domesticated herds were dispersed into other areas of the Near East. It has been proposed that sheep were in an advanced stage of the domestication process in SE Anatolia, earlier than in other regions. Sheep spread slightly later, seemingly from this area to the Zagros and then to other areas (Helmer and Segui, 1999: 258, 266; Peters et al, 1999: 43). These observations explain why many sites contained ovicaprine remains by the MPPNB. During the

---

[7] See Vigne et al, 1999, 49-62. "Les premiers pas de la domestication animale à l'ouest de l'Euphrate: Chypre et l'Anatolie centrale." *Paléorient* 25/2.

[8] A particular species of deer, the Mesopotamian deer, endemic to the Levant confirms that these people and their animals came from the Levant area and not from Western Anatolia (Vigne et al, 1999: 51).

EPPNB, initial cattle domestication took place in the Middle Euphrates. In SE Anatolia, pig-husbandry possibly started in the PPNA but was certainly subjected to the first stages of domestication by the EPPNB. Both of these animals did not reach full domestication until the LPPNB, later than the domestication of goat and sheep (Helmer and Segui, 1999: 258, 266; Peters et al, 1999: 43).

By the LPPNB, ovicaprids were domesticated in all regions in the Near East except the South Levant[9] where only goat-husbandry existed. Thus, goats and sheep were being herded in the Zagros regions (Zeder, 1992: 15; Peters et al, 1999: 33), in SE Anatolia[10] (Peters et al, 1999: 34, 39; Ervynch et al, 2001: 47, 70; Martin et al, 2002: 194-195; Aurenche and Kozlowski, 1999: 83-85; Balkan-Atlı, 1994: 108-109; Özdoğan, 1999: 52, 54), on the Middle Euphrates (Peters et al, 1999: 30; Cauvin and Cauvin, 1993: 24; Helmer and Segui, 1999: 258, 259; Ervynch et al, 2001: 47, 70), in Central Anatolia[11] (Martin et al, 2002: 203-204), and on Cyprus (Le Brun 2001: 113; Vigne et al, 1999b: 55-56).

In most regions, such as in both the Zagros and in Central Anatolia, pig and cattle appear in the proto-domestication stage during the Late and FPPNB (Zeder, 1992: 15; Peters et al, 1999: 33; Martin et al, 2002: 203-204). In SE Anatolia, pig husbandry was being practiced by the LPPNB although cattle husbandry was not achieved until the FPPNB (Peters et al, 1999: 34, 39; Ervynch et al, 2001: 47, 70; Martin et al, 2002: 194-195; Aurenche and Kozlowski, 1999: 83-85; Balkan-Atlı,

---

[9] Also see Kolska-Horvitz, C. 1993, The Development of Ovicaprine Domestication during the PPNB of the Southern Levant. In H. Buitenhuis and A. Clason eds., *Archaeozoology of the Near East.* Universal Book Series. Leiden. 37-45.

[10] See Helmer, D.1991, Les changements de stratégies de chasse dans le néolithique préceramique de Cafer Höyük est. In J. Cauvin ed., *Cahiers de l'Euphrate 5-6.* Editions Recherches sur les civilizations. Paris. 131-135; Buitenhuis, H, 1990. Archaeozoological Aspects of the Late Holocene Economy and Environment in the Near East. In S.Bottema, G.Entjes-Nieborg and W.Van Zeist eds., *Man's Role in the Shaping of the Eastern Mediterranean.* A.A.Balkema. Rotterdam.195-219.

[11] Also for this region see: Vigne, J., Buitenhuis, H. and Davis, S., 1999. Les premiers pas de la domestication animale à l'ouest de l'Euphrate: Chypre et l'Anatolie centrale. *Paléorient* 25/2: 49-62.

1994: 108-109; Özdoğan, 1999: 52, 54). Conversely, in the Middle Euphrates region, cattle are domesticated by the LPPNB, but pigs do not appear until later in the EPN (Peters et al, 1999: 30; Cauvin and Cauvin, 1993: 24; Helmer and Segui, 1999: 258, 259; Ervynch et al, 2001: 47, 70).

The exploitation of the Desert zone during the FPPNB, involved herded goat, both proto-domesticated and herded sheep and domesticated pig and cattle (Ducos, 1994: 166; Peters et al, 1999: 33, 42).

Compared to other regions the South Levant changes *more gradually* from hunting to herding animals. This observation is illustrated by the fact that only goats[12] began the domestication[13] process in this area, and even these animals remained in the proto-domestication stage until the FPPNB at some sites and even through to the PPNC at others (Tchernov, 1993: 17; Hershovitz et al., 1986: 73; Garrard et al., 1994: 96-97).

C. The Reliance on Domestication: The FPPNB- EPN

By the FPPNB, all four animals are being herded in the following regions: Upper and Lower Zagros, (Zeder, 1992: 22;) Southeastern Anatolia (Peters et al, 1999: 37), Middle Euphrates (Ervynch et al, 2001: 47, 70; Peters et al, 1999: 31-32), Cyprus, (Le Brun, 2001: 113; Vigne et al, 2001: 55-56), Central Anatolia (Martin et al, 2002: 198, 203-204) and in most parts of the Desert Region (Ducos,

[12] The timing for sheep domestication in the South Levant has been the focus of certain debates. It has been claimed that very little evidence existed for sheep in the South Levant and the Damascus region until the PN, where the only existing proto-domesticated species was the goat during the PPNB (Ducos 1994: 165; Contenson, 1994: 167; Peters et al, 1999: 39; Perrot, 1993; Tchernov, 1993: 15-16).

[13] By the FPPNB, around 7600 BC, some argue that goat was definitely herded in the South Levant (Tchernov, 1993: 15; Helmer and Segui, 1999: 257). However, it has been argued by others, that even goats were not yet fully domesticated during this period or in the subsequent PPNC. Instead, their exploitation involved more intense forms of selective hunting. In their opinion the only domesticated animals evident in this area occurred in the PN (Ducos 1994: 165; Contenson, 1994: 167).

1994: 166). It is only the South Levant that lags behind, but the four domesticates reach this region as well by the end of the EPN (Davis, 1982: 13-14; Garrard et al, 1994: 182; Ducos, 1994: 166). Therefore, during the *Pottery Neolithic*, domesticated animals appear along with pottery in all parts of Southwestern Asia.

V. Conclusion

Towards the later half of the 9th millennium, most of the Orient was touched by the two ways of life, sedentarism and agriculture and the beginnings of animal domestication and pastoralism, but it took some time before the latter fully replaced hunting (Aurenche and Kozlowski 1999: 83-85). Domestication evolved at various rates for different animals in separate regions; this technology spread to other areas by the movements of people with their animals (Vigne et al, 1999a: 7).

The settlement changes observed for the Late and FPPNB and EPN confirm that people were moving. The fact that both campsites and agricultural villages throughout the Near East contained a majority of domesticated animal remains corroborates that pastoralists were moving and occupying these sites. It has been concluded that pastoral migrations involved different types of movements, which in some cases were associated with nomadic movements evident in the findings of campsites in marginal regions. In other cases, however, it meant resorting to pastoralism to resettle another village, where pastoralism continued in conjunction with agriculture. The intensified movements during the FPPNB encouraged the rise of pastoralism as an independent subsistence strategy. In sum: the migrations of pastoralists with their herds increased in the LPPNB and reached its climax in the FPPNB, resulting in the emergence of the agro-pastoral subsistence strategy and the existence of the four domesticates in all regions of the Near East by the PN.

CHAPTER 4

THE PN, 7TH MILLENNIUM: THE FIRST STAGE

I. Introduction

It has been often questioned why ceramic in vessel form[1] was not in use for about 1,600 years before the PN even though many other characteristics of this period originated in the PPNB. Certain traits that emerged in the PPNB and can be traced back in the PN include domesticated plants and animals, lithic technology, small villages, knowledge of both round and rectangular architecture, and the use of clay for other purposes. Hence, the introduction of ceramic vessels is what essentially signals the arrival of the Pottery Neolithic (Copeland and Hours, 1983: 75-76; Molist and Stordeur, 1999: 402-403; Aurenche and Kozlowski 1999: 91; Braidwood et Braidwood, 1960: 43). At this stage pottery appears in the archaeological record at many Near Eastern sites already displaying a high level of standardization and complexity, as well as showing stylistic and territorial differences. The inhabitants of the following zones: the North and Central Levant (especially adjacent to the coast), the Upper and Lower Zagros, the Middle

[1] As we will see in later chapters, pottery appeared sporadically at sites since the PPNA but did not become part of the culture until the PN (Faura and Le Miere, 2001: 281; Copeland and Hours, 1983: 76). An example of this sporadic appearance of pottery can be seen at sites like Tepe Guran in the Zagros and the lower levels at Çatal Höyük in Anatolia. According to Le Mière and Faura this is pottery in the first phase of development, which they acknowledge as an experimental stage (Faura and Le Mière, 2001: 281; Copeland and Hours, 1983:76). According to these authors, the second stage of pottery development was when pots appeared in a developed stage in most regions throughout the Near East. The latter stage will be the focus of this chapter (Faura and Le Mière, 2001: 283).

Euphrates, particularly along its tributaries the Balikh and Khabur, definitely produce pottery. However, in other regions like the South Levant, and further south in the Negev/Sinai, another culture develops without pottery, the PPNC. By the end of the PN, or by the 6th millennium, all regions have adopted earthenware (Aurenche and Kozlowski 1999: 91 and Braidwood and Braidwood, 1960: 43).

Finally, another very significant factor that marks the PN is the intense practice of semi-pastoralism as a subsistence method (Verhoevan, 2002: 10-12). Therefore, the growth of pastoralism coincided with the widespread adoption of pottery technology (Mellaart, 1981:85).

II. The PN: A Changed Society (Figs.22 and 23)

In the EPN many traces of the PPNB culture, although modified, can still be identified by factors like pottery technology, socio-political organization, pastoralism and architecture. However, some of the traits that arise in the PN show a certain amount of diversity from the PPNB such as the development of distinct regional cultures and a greater emphasis on local resources and materials. The comparison between the PPNB and the PN will be examined below.

A. Cultural Regions

The rise of more clearly defined cultural regions is marked by slight differences in pottery between regions. Although clay vessels throughout the Near East have common characteristics, each region's pottery exhibits certain traits that distinguish it from others (Copeland and Hours, 1983: 78-80; Mortensen, 1983: 218). Some of these regional cultural 'communities' include Central Anatolia, Southeastern Anatolia, Syro-Cilicia, the Khabur Basin and the Balikh Valley in the

Middle Euphrates region, the area surrounding the Middle Tigris River, the Syrian Desert and the Upper and Lower Zagros zones (Copeland and Hours, 1983: 77-78).

B. Localization

Additional evidence for a more localized society in the PN is the partial abandonment of certain raw materials. The partial abandonment[2] of resources like obsidian, which was exchanged over long distances, was compensated by a focus on local materials (Aurenche and Kozlowski, 1999: 91-92). Furthermore, the whole BAI industry of the PPNB develops into local variants from 7500 to 5000 BC, when it also seems that the quality of the knapped stone manufacturing process became increasingly poorer[3] (Kozlowski, 1999: 151; Aurenche and Kozlowski, 1999: 67).

Finally, the emphasis on a more localized culture is reflected in the changes in ritual. Certain aspects of the PPNB, such as central monumental structures and other features like plastered skulls or carved stone statues point to collective communal practices, a trait that did not persist into the PN. Instead, during this latter time, emphasis on burials and figurines increased, suggesting that the individual house and domesticity played a more important role than communal religious rites (Verhoevan, 2002: 6-9).

[2] The importation of raw materials did continue, (such as that of obsidian), however this occurred on a smaller scale (Kozlowski 1999; Aurenche and Kozlowski 1999).

[3] Localization is noticed a little earlier on Cyprus by the same trends: use of local raw materials of less quality, rare obsidian, decrease in arrowheads etc. This phenomenon may have occurred before the rest of the Near East since the island's environment imposed different restrictions and called for a different adaptation (Peltenburg et al, 2001a: 83; Peltenburg et al, 2001b: 52; Le Brun, 2001: 113).

C. Pottery Technology

In contrast to the examples above, pottery technology offers strong evidence for continuity from the PPNB to the PN. For instance, the production of pottery throughout the Near East did not exhibit total diversity but rather a certain level of homogeneity. The fact that vessels throughout the Near East contained similar components and surface applications illustrates the conformity of ceramic making. To elaborate this point: ceramic pots throughout the Near East were handmade of either a dark or a buff clay fabric (whatever was locally available), and were not well fired. Usually either mineral or vegetal tempering was used and most vessels were burnished. Decoration was not frequent, but it did occur and involved incisions, impressions and in some cases painting. Finally, shapes were simple, primarily consisting of bowls and jars (Fig. 24a and b).

The importance for recognizing the existence of corresponding pottery traits throughout the Near East rests on the fact that they offer further support for the transfer of people during the Late and FPPNB and the EPN. While these movements permitted interactions (and thus prompted sharing of similar technologies) they allowed for the preservation of the PPNB practices in a more passive form. When the PN finally did arrive, PPNB traits became more perceptible in an altered manner, affected in many ways by these contacts. For example, the preceding PPN related technologies of pyro-technology, plaster, bitumen and clay/mud brick production appeared modified in the PN *as pottery* (Le Mière and Faura, 1999: 283; Copeland and Hours 1983, 75-79; Mortensen, 1983:218; Mellaart, 1981).

D. Pastoralists and Agriculturalists: Transfer from the PN

By the PN, a complex society had evolved, one that had foundations in the PPNB. The PN socio-political structure was largely linked to the relation evolving between pastoralists and agriculturalists during the Late and FPPNB. It should be emphasized that the relation between nomads and farmers is interdependent. They cannot exist in isolation since herders rely on the agriculturalists for grain, while the opposite is also true; pastoralists offer animals and their products to the agriculturalists. Even though various levels of this relation can be recognized, it is always balanced and so not disproportionate to either group. How extensive this relationship was during the PPNB remains unclear at this point, as there were variants of gathering, hunting, pastoralism and agriculture, though pastoralism and agriculture were more closely knit and seemed to be the dominating subsistence methods by the PN.

The evidence for agriculturalists is more obvious in the material record, as they constructed permanent villages, whereas the remains of pastoralists, who are partially or fully mobile, are harder to discern archaeologically. However, looking at the settlement patterns and material from sites, we can obtain some indication of the presence of both nomads and farmers (Zarins, 1989: 43; Kohler-Rollefson, 1992: 11).

1) Regional Settlement Pattern

The FPPNB is characterized by the establishment of sites in new, previously unoccupied areas, a hiatus in the record, or abandonment. Few sites continued from the PPN to the PN. The reorganization of sites during the FPPNB resulted in a clear division of settlements in the EPN: villages in the fertile areas and campsites in marginal ones (Le Mière, 1989). Major sedentary sites were situated in areas

ideal for agriculture such as near lakes, rivers, streams and oases. Seasonal camps were located on the slopes of mountains or flat arid zones, where natural resources are more limited (Aurenche and Kozlowski, 1999: 76-77; Mortensen, 1983: 216; Smith and Young, 1983:148-151; Le Mière, 1989: 12). Thus, both campsites and villages were located next to water sources, but in different extremes (Cauvin 1976: 54 and Mellaart 1981: 227).

2) Evidence for Pastoralism at sites

a) Changes in Architecture

The choice to adopt pastoralism as a subsistence form, which became pronounced during the FPPNB and EPN[4] is reflected by the changes in the settlement pattern (Gopher et al, 1992: 4, 6, 14). Evidence to support the movements of pastoralists during the transitional period is indicated by architectural and domesticated faunal remains found at sites. In some cases, people who resorted to pastoralism in the FPPNB maintained this lifestyle in the PN, which involved seasonal migrations or nomadism. However, the persistence of sedentary, agricultural sites, a development from the PPN, is demonstrated when sites are inhabited first by pastoralists and then soon after followed by an agricultural type settlement. Many times this initial settlement includes pot sherds.

According to the cross-cultural comparisons (Fig. 25) such as the Beidha ethno-archaeological survey, seasonally visited pastoral sites contained permanent bed or stone platforms over which a tent was pitched. This base may entail reusing an abandoned floor, an old foundation for a house, and/or modifying either one of these, which were useful for storing bedding and mattresses. The function of

[4] See Chapter 3.

adjacent, outdoor areas and hearths also proved important (Banning and Kohler-Rollefson, 1992: 195; Cribb, 1991: 377; Garrard et al, 1994: 185).

This type of architecture has been recognized in the archaeological record in newly established or resettled sites during the transitional phase. For example, the findings from this time span include round subterranean structures with light building materials, or no architecture, pits, hearths and pottery. In many cases, these remains were followed by modified architecture, usually rectangular mud brick buildings associated with agricultural village type settlements. In other instances, newly settled or reoccupied sites only correspond to pastoralists' campsites. These observations can be seen throughout the Near East from the 7th to the 6th millennium (Fig. 26) (Mellaart, 1981: 68-69).

b) Zagros Regions

In the Upper Zagros region at Yarim Tepe the earliest layers show a temporary camp with hollows, pits, ovens and hearths underneath more permanent structures. Other sites in the Upper and Lower Zagros, such as Ganj Dareh, Umm Dabaghiya and Tell Hassuna[5] show a similar pattern of permanent structures preceded by camp-like settlements (Merpert and Munchaev, 1987: 3-4). In addition, the initial settlement of Tell Hassuna, Umm Dabaghiyah and Yarim Tepe included ceramics (Aurenche and Kozlowski, 1999: 171, 185). At Ginnig, pits associated with pastoralists were dug into the ruins of a collapsed building in order to reuse the older houses in lower levels at the site. In addition, the pits contained coarse pottery (Aurenche and Kozlowski, 1999: 166; Campbell and Baird, 1990: 69-70). The early levels at Sarab include semi-subterranean architecture and ceramics (Mellaart, 1981:84, 89; Mortensen, 1983: 217; Aurenche and Kozlowski, 1999: 184). Finally,

the evidence from Tepe Tula'i, such as stone platforms for tents in conjunction with pottery making, indicates that it was a pastoralist camp (Aurenche and Kozlowski, 1999: 185; Bernbeck, 1992: 86-87).

c) North Levant

The earliest two layers at the Kerkh 2, 6 but in particular 5 produced coarse ware and local Kerkh ware[6] (Fig. 27) (Tsuneki and Miyake, 1996: 114, 118). At Ras Shamra, level VC corresponds to the initial settlement of this site where "il y a des traces d'occupation humaine qui êvoquent des campents plutôt q'une installation permanente." In this early level corresponding to the LPPB no pottery was produced. However, in the latter part of the VC layers, just before the VB level, sun-dried vessels[7] were locally made[8] (Tsuneki and Miyake 1996: 125; de Contenson, 1982: 95; de Contenson, 1992: 12-13). Finally the Amuq A and B levels at Judaidah contain no architecture remains but only hearths, charcoal, the findings of only domesticated animals and were essentially based on pottery types.

d) Middle Euphrates

In the Balikh Valley in the Middle Euphrates region, the lowest levels at Sabi Abyad contained no architecture, but clay vessels were present. Later on, this site exhibited rectangular architecture (Aurenche and Kozlowski, 1999: 183-184). The inhabitants of Kashkashok II lived in semi-subterranean houses, made pots and used silos and hearths. In later levels at the site, rectangular houses were built. Dja'de was reoccupied in the EPN by pottery makers and shows no remains of

---

[5] The houses of the Hassuna phase show quite an intricate knowledge of building style carried from the PPNB like multi-room structures (Merpert and Munchaev, 1987:5).

[6] DFBW is introduced in the latter 4 levels and thus local Kerkh ware is a predecessor of the Amuq A ware (Tsuneki and Miyake, 1996: 122).

[7] The only evidence for this is found in Kuschke's report, where he mentions sun dried clay vessels underneath the DFBW layers (Tsuneki and Miyake 1996).

[8] This level does not show any connections to the Antioch Plain sequence until later in the EPN when the Amuq A Ware is introduced (de Contenson, 1982: 95; de Contenson, 1992; Tsuneki and Miyake 1996: 125).

architecture (Aurenche and Kozlowski, 1999: 164, 164). The site of Abu Hureyra was initially resettled in the LPPNB with no ceramic. Even though Abu Hureyra was not abandoned during the FPPNB, its population declined much by the EPN. This decline was concurrent with the adoption of pit-dwellings and the introduction of pottery. The first pot sherds[9] found in the succeeding levels were very fragile and were composed of straw temper and showed burnishing (Aurenche and Kozlowski, 1999: 152; Moore, 1975: 120).

e) SE Anatolia

After a hiatus in occupation at Çayönü, it was resettled with a new type of architecture and the appearance of ceramic containers (Aurenche and Kozlowski, 1999: 162).

f) Cilicia

Clay vessel manufacturing and the use of semi-subterranean architecture are evident in the initial settlements at Mersin and Tarsus (Caneva, 1999: 106, 109; Garstang, 1957: 257).

g) South Levant

Additional evidence for such a pattern comes from the South Levant only a bit later than in other regions. For example, at Nahal Beset I, located in the South Levant, a gap appears in the material record after the PPNB. When the PN settlers came, they left oval pits filled with stones, bones and potsherds. Further examples in the region are Tell Ramad and Beidha, which are reoccupied with pits, hearths, dug-out dwellings and clay vessels. Later levels at both sites exhibit more substantial architecture (Gopher et al, 1992: 4, 6, 14; Aurenche and Kozlowski, 1999: 182, 158). When Jericho was resettled, pottery manufacturing was also

[9] In the later PN levels Amuq A Ware appears (Moore, 1975: 120).

introduced. Although semi-subterranean dwellings were built, they tended to have more sophisticated superstructures than other sites with this type of architecture (Aurenche and Kozlowski, 1999: 173). Munhata was reoccupied with people living in pit dwellings and making clay vessels (Aurenche and Kozlowski, 1999: 177). At Dhra', (Fig. 28) a similar pattern is seen, although a bit later. The PN newcomers dug into the underlying levels when they constructed their semi-subterranean dwellings in order to reuse older storage bins, hearths and living surfaces (Bennett, 1980: 33,36; Finlayson et al, 2002: 7). In these domestic structures there was much pottery, consisting of PNA and PNB pottery types contemporary to Jericho IX (Bennett, 1980: 33,36 and Kuijt, 2001: 111). An additional example in the South Levant of initial pastoral settlement is the desert site near Tel Qatif (Fig. 29), dating to the latter part of the PN. There, no preserved architecture was discovered, but hearths, living surfaces and pottery were found (Epstein, 1984: 214, 218). Finally, at Ain Ghazal, circular stone bases for tents were introduced in the PPNC, along with the use of some coarse ceramic (Aurenche and Kozlowski, 1999: 154).

h) Cyprus

The overall transition to the PN on Cyprus is very similar to the developments on the mainland, as shown by the evidence for the initial settlement or reoccupation of sites containing architectural and other remains associated with pastoralists (Todd, 1998: 19; Todd, 2001: 95; Guilaine et al, 1995: 25). Furthermore, these remains were replaced by mud brick rectangular architecture in

later levels during the PN, a trend also seen on the continent[10] (Le Brun, 1987:526,528; Le Brun, 1997: 41).

For example, at Tenta no traces of architecture were found, just pits and pottery in the first levels of the PN. The PN levels of Shillourokambos indicated that the newcomers dug down into earlier PPNB layers creating pits, which contained pottery and lithics (Todd, 1998: 19; Todd, 2001: 95; Guilaine et al, 1995: 25).

3) Implications for Socio-Political Organization

The archaeological evidence shows that the appearance of new intra-site and interregional settlement patterns coincided with a transformation in the social structure of the population (Copeland and Hours, 1983:80-81). This reformation involves the close relation between semi-sedentary peoples, such as pastoralists, (but does not exclude other mobile groups like hunters), and settled agriculturalists. Hence, the interactions of herders and farmers formed the basic structure of the PN society, which strongly influenced the emergence of regional cultural groups in the EPN (Kirkbride, 1968: 207, 212).

Mortensen[11], who deals with the development of villages and semi-permanents sites, suggests that in the third stage when villages were introduced, they are the central places to peripheral sites organized around them at different intervals. These peripheral sites consist of semi-permanent hunting stations, caves

[10] This observation is significant because it shows that the beginning of the PN resulted from external influence, as the beginnings of this cultural phase has not been intensely studied for the island (Todd, 1998: 19; Le Brun, 1997: 41).

[11] Mortensen has offered three stages of development relating to the following groups: hunter-gatherers, agriculturalists and pastoralists. This is based on evidence from the Zagros and North Mesopotamia. He suggests that in the first stage there are permanent agricultural settlements and hunting-gathering seasonal sites, which become in the second stage, semi-permanent sites. At the latter type sites hunting-gathering continues and pastoralism starts and they are visited by circular annual movements around the sedentary sites. This pattern continues through the initial stages of the domestication of animals and the rise of pastoralism (1983: 215-216).

shelters and pastoral camps, which would be visited on a seasonal basis[12] when certain groups within the village moved out to these sites for specific activities such as hunting and pastoral activities (Mortensen, 1983: 216; Özbaşaran and Buitenhuis, 2002:70-71). Many of these campsites exchange with the village, but if they are involved in long migrations, the mobile groups trade with other villages as well (Bernbeck, 1992: 83; Mortensen, 1983: 215-216).

Humans settled in different types of landscapes depending on their subsistence behavior. An investigation of seasonal camps and permanent settlements might give a clue to interactions between the pastoralist and agriculturalist groups. An example of this type of relation can be observed between Tepe Sarab and Umm Dabighiyah. For instance, the bone analysis of Tepe Sarab established that it was a year round settlement, while the lithic analysis of Umm Dabighiyah proved Kirkbride's hypothesis that this was primarily a seasonal hunting camp on the Middle Euphrates (Kirkbride, 1968: 214, 215). A similar conclusion was gathered from a survey done in Wadi el Hasa based on architectural data. This survey revealed five PN sites, all within the same vicinity and containing similar pottery[13]. The two larger sites can be characterized as small villages with architecture, whereas the three small sites can be recognized as campsites with no structures (MacDonald, 1988: 128, 131).

III. The PN Cultures and Pottery

The culture groups (Fig. 30) identified by specific differentiations in pottery (Table 1) will be examined more closely in order to further clarify the widespread

[12] Although only seasonal groups are mentioned here, fully mobile groups during both the PPN and the PN also existed.

[13] These sherds were heavy, handmade, with straw inclusions. They had a red-brown color on the inside and were black on the outside. They were overall very friable (MacDonald, 1988:128, 131).

use of pottery technology as a specialization and the intensification of local interactions and culture spheres (versus inter-regional contacts).

A. Central Anatolian wares (Fig. 31)

The EPN sites in this region include Çatal Höyük levels VIII-VII, Erbaba III, Can Hasan III and IV and Musular (Özbaşaran and Buitenhuis, 2002:70-71; Özbaşaran, 1999: 152).

The Anatolian pottery comprises a mix of different traits, but the slight majority consists of light fabric with mineral temper. Some diverse local characteristics include the black or brown surface colored pots evident at Can Hasan and Çatal Höyük (Fig. 32) and the vegetal tempered ceramic at Musular (Fig. 33). The majority of Anatolian wares were burnished, and occasionally slipped. Decoration is rare, but if it occurs it displays fingernail impressions and incised geometric patterns. Round bowls and short necked globular jars are the dominant shapes (Copeland and Hours, 1983:78, Cessford, 2001:723-724; Mellart 1981: 110; Bordaz and Bordaz, 1982: 87; Aurenche and Kozlowski, 1999: 160).

B. Pre-Halaf Culture

The Halaf culture emerged from a diverse set of Pre-Halaf ones (Table 2). The advancement to the Halaf[14] culture is largely based on change in pottery techniques (van As et al, 1997: 42-43).

The Pre-Halaf homeland is broadly situated within West Syria, encompassing the coast inwards to the Syrian Jezireh and the High and Middle Euphrates (Fig. 34). This culture is essentially focused on the two most important

tributaries of the Euphrates: the Khabur and the Balikh (Copeland and Hours, 1987: 402). The area along these two rivers is the middle way between the Syro-Cilician culture in the west and the Hassuna culture in the east (Hijara, 1997: 98). The Pre-Halaf culture emerged alongside the DFBW (Dark Faced Burnished Ware), which is located in the Syro-Cilician coastal region. Slightly later the Pre-Halaf culture expanded to incorporate this latter coastal zone and so the DFBW is assigned as a Pre-Halaf ware. However, it should be emphasized that they developed in two diverse geographical areas separated by mountain ranges (ie, the Amanus) (Molist and Stordeur, 1999: 402-403). This Syro-Cilician region includes the Syrian coast, Cilicia (southern coast of Turkey) and inwards to the Amuq Plain and the Ak Su valley (Copeland and Hours, 1987: 427-428).

1) Balikh Valley –Earliest Evidence

The Balikh River Valley is bounded by the Jezireh in the east, the Euphrates in the west and the south and the Taurus Mountains in the north (Akkermans, 1996: 144). The first pre-Halaf pottery occurred in this region about 1000 years before the true Halaf culture emerged (Copeland and Hours, 1987: 402). The overall, relative chronology for the Pre-Halaf wares is related to the framework provided by Akkermans based on the sequence at Sabi Abyad.[15] The levels corresponding to this chronology were designated as Balikh IIA, IIB[16] and IIC (Akkermans, 1996: ix-xi, Molist and Stordeur, 1999: 141; van As et al, 1997:27).

Around 7200-6900 BC the earliest Pre-Halaf clay pots were developed locally in the Balikh Valley at sites such as Tell Damishliyya, Telul Brielat and Assouad. The initial use of clay vessels corresponds to the beginning of the Balikh

[14] The transition from Pre-Halaf to Halaf is observed in the pottery sequence at Sabi Abyad, in particular between levels IIC to IIIA (van As, Jacobs and Nieuwenhuyse, 1997: 27).
[15] This site shows the first evidence for this ware in the Balikh Valley.

IIA phase (Copeland and Hours, 1987: 404; Evin 1995; Aurenche and Hours 1994; Hijara, 1997: 98; Le Mière, 1989: 58; Akkermans, 1991: 129). These sherds consisted of shortly fired coarse ware with mainly plant but occasionally mineral temper and were often slightly burnished. These early containers consisted of bowls and hole-mouth jars (Akkerman, 1991: 123, 125).

The characteristic type of pottery produced in the Balikh region, which tends to be coarsely made and un-standardised, is observed slightly later in the Balikh IIA phase, at sites like Sabi Abyad, Tell Mafraq Slouq and Mountabah. The wares include Mineral Coarse Ware, Dark Grey Black Ware (similar to the DFBW) and Standard Ware, which is the most abundant pottery type. The Grey and Standard Wares are first observed in Balikh IIB but continue into Balikh IIC (Van As and Le Mière, 1996: 127; Hijara, 1997: 98, 119, 12; Molist and Stordeur, 1999: 119, 122, 143; Akkermans, 1991: 131).

Generally, Dark Grey Black Ware is characterized as having a light fabric ranging from buff to brown, but gray and occasionally black surface color. As the fabric is naturally light, its dark surface is evidence for intentional coloring or reduction. This ware usually contains vegetal tempering, but fine mineral inclusions may exist as well. The surface demonstrates burnishing and polishing but no decoration. Mineral Coarse Ware is similar to this ware, only the majority contains mineral tempering. It is also coarser and other features indicate that it was primarily used for cooking. Contrary to its designation, Standard Ware comprises a mix of un-standardized wares. In general the Standard Ware consists of a gray core with a buff to pink surface. It contains plant inclusions and is burnished or polished in most cases. Sometimes a red or brown slip has been applied. Among all the

[16] Balikh IIB does not appear at Sabi Abyad as there is a hiatus at this level, but it does occur at

IIA phase (Copeland and Hours, 1987: 404; Evin 1995; Aurenche and Hours 1994; Hijara, 1997: 98; Le Mière, 1989: 58; Akkermans, 1991: 129). These sherds consisted of shortly fired coarse ware with mainly plant but occasionally mineral temper and were often slightly burnished. These early containers consisted of bowls and hole-mouth jars (Akkerman, 1991: 123, 125).

The characteristic type of pottery produced in the Balikh region, which tends to be coarsely made and un-standardised, is observed slightly later in the Balikh IIA phase, at sites like Sabi Abyad, Tell Mafraq Slouq and Mountabah. The wares include Mineral Coarse Ware, Dark Grey Black Ware (similar to the DFBW) and Standard Ware, which is the most abundant pottery type. The Grey and Standard Wares are first observed in Balikh IIB but continue into Balikh IIC (Van As and Le Mière, 1996: 127; Hijara, 1997: 98, 119, 12; Molist and Stordeur, 1999: 119, 122, 143; Akkermans, 1991: 131).

Generally, Dark Grey Black Ware is characterized as having a light fabric ranging from buff to brown, but gray and occasionally black surface color. As the fabric is naturally light, its dark surface is evidence for intentional coloring or reduction. This ware usually contains vegetal tempering, but fine mineral inclusions may exist as well. The surface demonstrates burnishing and polishing but no decoration. Mineral Coarse Ware is similar to this ware, only the majority contains mineral tempering. It is also coarser and other features indicate that it was primarily used for cooking. Contrary to its designation, Standard Ware comprises a mix of un-standardized wares. In general the Standard Ware consists of a gray core with a buff to pink surface. It contains plant inclusions and is burnished or polished in most cases. Sometimes a red or brown slip has been applied. Among all the

[16] Balikh IIB does not appear at Sabi Abyad as there is a hiatus at this level, but it does occur at

wares, only a few sherds contain decoration, which varied in type, such as painted geometric or simple motifs, incisions, impressions, or pattern burnishing. Shapes mainly include open or closed oval shaped bowls (Van As and Le Mière, 1996: 127, 129, 136; Akkermans, 1996: 119, 128-129, 133; Le Mière, 1989: 57-58).

At some sites, such as Sabi Abyad, a small amount of DFBW was imported from Cilicia. The origin of the DFBW is confirmed based on the differences between the Amuq and the Balikh wares. For instance, clay fabric in the east (Balikh) is light and usually includes vegetal temper whereas wares in the west (Amuq) are composed of dark clay and mineral inclusions. The Balikh IIA ware is roughly contemporary with the Amuq A ware while the Balikh IIC ware appear at approximately the same time as the Amuq B one (Akkermans, 1996: x; Van As and Le Mière, 1996: 143; Molist and Stordeur, 1999: 143).

2) Amuq A and B

Amuq A ware is found at sites along the Cilician coast or the Plain of Antioch and the Syrian coast to the Queiq (river) valley, as well as inland to the Amuq Plain in the North Levant around 6900-6400 BC (Fig. 35) (Copeland and Hours, 1983; Tsuneki and Miyake 1996: 109). In this region an earlier stage of local chaff ware emerged before the Amuq sequence started at sites like Kerkh 2 and at Ras Shamra. This initial phase of pottery is not observed in Cilicia (Tsuneki and Miyake, 1996: 122, 125; de Contenson, 1982: 95;). (Goldman, 1950: 65, 70, 395; Caneva, 1999: 112).

The Amuq sequence is based on the excavations in the Amuq Plain. The earliest levels at these excavations were assigned as Phase A, and accordingly the pottery in these levels was referred to Amuq A ware. The site Tell Judaidah offers

---

other sites (Molist and Stordeur, 1999: 141).

the best example of Amuq A ware, which corresponds to a variety of slightly different wares, including Coarse Simple Ware, Washed Impressed Ware and most importantly the DFBW (Braidwood and Braidwood, 1960: 46-52). These types continue into the next phase, Amuq B, along with the addition of other wares. Phase B is closely related to phase A and is thus considered to be a part of the Pre-Halaf wares in Syro-Cilicia (Braidwood and Braidwood, 1960: 68-69, 501-502).

DFBW originates in the northern Syria-Lebanon coastal region (Mellaart, 1981: 68). It should be stressed that DFBW is not just a title to describe all types of pottery with these traits (i.e., Dark surface or Faced and Burnishing). Conversely, it specifically corresponds to Syro-Cilician wares such as the Amuq A and B types and not to similar wares located outside of this region (Copeland and Hours, 1987). Some sites where DFBW was found are Tell Judaidah, Tabbat al Hammam, Ras Shamra, Tell Sukas, Byblos, Tell Kerkh 2, Tell esh-Sheikh and Chagar Bazar (Mellaart, 1981: 67; Copeland and Hours, 1983:79; Copeland and Hours, 1987:404-405; Schwartz and Weiss, 1992: 226; Tsuneki and Miyaki, 1996: 109).

DFBW can be described as containing fine or coarse mineral inclusions and as highly fired. It has a dark core and brown to black fabric and its surface is always burnished. The surface tends to be grey-brown but ranges from dirty yellow to black, including red, grey and brown, which demonstrates the existence of proficient fire control, employing oxidation and reduction techniques (Braidwood and Braidwood, 1960: 49; Tsuneki and Miyake 1996: 114-115; Goldman, 1950: 66). Shapes mostly consist of bowls, in particular the straight sided bowl, but there are jars as well (Braidwood and Braidwood 1960: 47-52). The decoration is rare but includes some impressions, incisions as well as other secondary features consisting

of handles or cordons in relief (Braidwood and Braidwood, 1960: 47-52; Caneva, 1999:112; Tsuneki and Miyake 1996: 114).

a) Cilicia

Mersin (also known as Yumuktepe) and Tarsus are sites in Cilicia[17] located on the southern coast of Anatolia. Both Mersin and Tarsus were settled in the EPN between 6900-6400 BC, only Tarsus was established slightly later than Mersin closer to 6400 BC (Goldman, 1950: 395, 65; Caneva, 1999: 106-108). Both of these sites reveal pottery in their lowest levels. The early levels at Mersin contain fragments of DFBW (Fig. 36) and a light gritty ware also evident at Tarsus. At the latter site this light gritty domestic ware consists of two subtypes: a fine ware and mottled cookware, as well as small quantities of a highly polished red ware[18]. The DFBW and the light gritty ware are similarly made at both sites and use the same fabric. Many hole-mouthed jars were uncovered from both sites, which are parallel to those observed at Tell Judaidah in North Syria. Furthermore, the painted decoration observed at Mersin seems to be a local development as it is not evident in other Amuq A wares.

The Cilician wares show a strong connection with the Amuq A Ware in North Syria, but due to their different locations and relation to other regions these wares show some different traits (Goldman, 1950: 65, 70, 395; Caneva, 1999: 112).

[17] In Cilicia no early aceramic sites have been found. This observation shows that communities in Cilicia originated from non- local ancestors. This area however, must have played an important role in the obsidian trade to the Near East so certain mobile hunters must have been living there, exchanging this item to the east. The settlement here was part of a simultaneous diffusion of farming villages to previously deserted areas as many farmers migrated at the end of the PPNB to the coastal or riverside sites (Copeland and Hours, 1983; Tsuneki and Miyake 1996).

[18] This red polished ware has no parallel on the continent outside of Cilicia. It can be described from its very fine, dark grey, buff to red or black surface. It has very small inclusions and was polished with a greasy substance and sometimes decorated with impressions. Shapes are mainly bowls (Garstang, 1957: 67).

4) Southeastern Turkey and the Middle[19] and Upper Euphrates River

This area corresponds to the Mid/Upper Euphrates in the Northern Levant and extends to the Taurus foothills in Eastern Anatolia. The ceramic type is related to the Pre-Halaf wares, although it must be distinguished from the Balikh, Upper Khabur and Syrio-Cilician or Amuq A types (Faura and Le Mière, 1999: 288, Molist, 1995: 77; Cauvin, 1988: 79-81; Aurenche and Kozlowski, 1999: 152).

Firstly, this local ware does not exhibit any homogeneity but a combination of diverse traits (Le Mière, 1989: 61). For example, the pots consist of various fabrics, ranging from light to dark, but light dominates. They are tempered with various materials, the majority contain vegetal temper, others a mix of mineral and vegetal temper, while some have no temper at all. Some display polished surfaces, others burnished, and some show decoration, such as with paint, slip or incisions. Shapes comprise either opened or closed bowls. The great diversity in pottery manufacture is illustrated by the comparison of ceramic found at Teilelat, which primarily comprises chaff temper, very coarse, unburnished and light colored pots, while at Kumartepe much mineral tempered, fine, burnished and buff to grey colored vessels sometimes displaying a red slip were discovered (Le Mière, 1989: 55-56; Faura and Le Mière, 2001:283-284; TAY-site).

The reason this ware has so many diverse traits is because it is located at the border between the Balikh wares and the Amuq wares. For example, many of the ceramics to the East of the Euphrates show similarities to Balikh wares like at Dja'de and Kosak Shamali, while those to the west of the Euphrates resemble the Amuq wares such as Halula (Van As and Le Mière, 1996: 143). Conversely, this ware also contains traits common to the Grey Black Ware in the Balikh, the DFBW

[19] The pottery associated with this cultural region is found in the Middle Euphrates zone but it must

belonging to the Amuq A types and the Altmonochrom ware such as: dark fabric, both mineral and vegetal tempering and various decorative devices (Faura and Le Mière, 1999: 284-285, 288; Aurenche and Kozlowski, 1999:164,152; Moore et al, 1975: 63; Cauvin and Cauvin 1993:79).

Other sites in this region associated to Pre-Halaf wares include Gritille (in later levels), Turlu, Tell Halula, Kumartepe, Sumuk Tepe, Kosak Shamali, Teleilat Höyük, Hammam Seghir, Dja'de, Abu Hureyra and Molla Assad (Faura and Le Mière, 1999: 283-284; Le Mière, 1989: 55-56).

C. Proto-Hassuna Culture (Fig. 37)

This culture is situated between the Tigris and Euphrates, along the Tartar Valley in N. Iraq and Syria (Copeland and Hours, 1983: 79-80). The Proto-Hassuna culture emerges at about the same time as the Pre-Halaf one, around 6900 BC (Hole, 2001: 70).

The site representing the earliest example of the Proto-Hassuna ware is Ginnig[20]. Around 313 sherds were found, which can be described as poorly fired and very fragile. The surface treatment consists of rough smoothing and a few examples have red slip, but there is no evidence for decoration (Campbell and Baird, 1990: 69-70). In N. Iraq, sites that contain early forms of this ware are Tell Sotto, Umm Dabaghiyah, Kulli Tepe, Bouqras and Tell eth-Thalathat (Copeland and Hours, 1987: 405 and Merpert and Munchaev, 1993: 1,2). The lower levels at Tepe Hassuna and Yarim Tepe I are dated a bit later than those at Tell Sotto, but

---

be emphasized that these PN sites are only located near the Middle Euphrates River and not along its tributaries nor in the Tartar Valley.

[20] The finds at Ginnig are stated to be the earliest example of pottery in this region, and are considered as a sort of transition between the PPN culture, seen at Maghzalia, and the PN culture of this region. Due to little findings and discrepancies between sites, Ginnig is considered as the type-site for the PPN to PN transition (Campbell and Baird, 1990:76).

they still contain Proto-Hassuna wares (Bader, 1993b: 45-49; Copeland and Hours, 1983:80-81, 84; Copeland and Hours, 1987:405; Schwartz and Weiss, 1992: 224).

Proto-Hassuna ware generally has a pink or light fabric with a red or gray surface and is poorly fired. It is normally tempered with organic materials such as shell, sand or other vegetal matter like chaff but occasionally it remains un-tempered. This ware consists of two types: crude, coarse cookware while other vessels are finer, with thin walls and slighter temper. Both of these types tend to be burnished, display ochre paint and other decoration like incisions, impressions or relief. For example, in the earliest levels at Kültepe and especially at Tell Sotto, the decoration on fairly crude vessels exhibit remarkable detail such as ribbing on cookware and zoomorphic designs molded on rims. Shapes mainly comprise bowls or platters and jars. Other vessels include chalices, oval tubs and rectangular shaped containers (Bader, 1993c: 58; Le Mière, 1989: 59).

Finally, other sites that belong to the Proto-Hassuna group are Gerdaliaga, Jarmo, Tell Shimshara and Çayönü (Bader, 1993d: 70-71; Schwartz and Weiss, 1992: 224).

D. Zagros Group Cultures (Fig. 39)

The evidence for the PN in the Upper and Lower Zagros comes from sites like Tepe Asiab, Ganj Duran, Tepe Abdul Hussein, Jarmo and Tepe Guran. The PN here is in full force around 6500 BC.

1) The Hulailan Sequence

The Hulailan Sequence is based on the pottery sequence at Tepe Guran. The earliest levels at Guran coincide with the later levels at Ganj Dareh where the earliest pottery was uncovered. Two types of pottery are represented at this site.

The first one has grey-brown fabric with coarse thick walls, contains little temper and shows either smoothing or burnishing on the surface but no decoration. The second, finer, type is composed of buff fabric with straw temper and remains undecorated. It usually takes the form of open bowls. (Mellaart, 1981: 85-86).

The Hulailan phase 2 is comparable to the Mohammed Jaffar at Ali Kosh and the Upper Jarmo and Late Sarab levels in Kurdistan. This type is described as having a buff to orange color surface with chaff temper. Its surface is slipped, burnished and decorated with red ochre paint. Bowls and beakers comprise most shapes (Mortensen, 1974: 5-6, 21, 25; Voigt and Dyson, 1992: 154; Adams, 1983: 515-518; Braidwood, 1983: 538).

2) Mohammed Jaffar Phase[21]

The Deh Luran Plain is located east of the Mesopotamian Plain where the first stages of the PN are designated as the Mohammed Jaffar Phase. This phase was identified at Ali Kosh but is also represented at Choga Sefid. This type of pottery has a buff fabric, sometimes a grey brown surface and contains chaff temper. Generally it exhibits decoration painted in red ochre, but occasionally includes geometric motifs painted in black and brown on a grey-brown surface. The shapes consist of small open vases with either flat or round bottom (Aurenche and Kozlowski, 1999: 130; Voigt and Dyson, 1992:124).

Overall, sites like Guran, Jarmo[22] (Fig. 40), Sarab, Asiab and Abdul Hussein emerged only slightly later than the later levels at Ganj Dareh, but are more representative of the Zagros culture. The Zagros wares can be generally

[21] A related ware developed at sites like Choga Mish, Choga Bonut, and Boneh Fazili, the only differences being that all vessels have a rounder shape and more simplified decoration, (but still geometric) (Aurenche and Kozlowski, 1999: 130; Voigt and Dyson, 1992:124).

[22] Jarmo is slightly later than Guran and the later levels at Ganj Dareh, but is still more or less contemporary. The similarities that decorative schemes, displayed on these ceramic vessels as well

characterized by their buff to orange fabric and a gray brown surface color with a darkened core. These wares contain vegetal temper and are burnished in most cases. The greater part of these wares shows a red slip, while the remaining portion displays geometric decoration in red paint on light fabric or incisions with paint. Early shapes consist of bowls and jars (McAdams, 1983: 215-218; Levine and Young, 1987: 17; Aurenche and Kozlowski, 1991: 149, 160).

E. Samarra Culture[23] (Fig 37)

The Samarra culture was located in the Mesopotamian Plain, or the Middle Tigris and Euphrates. Baghouz, Sawwan, Choga Mami I and Songor A are examples of sites included in this culture. The Samarra ware consists of open round bowls with a flat base and at times legs. Decoration comprises painting and incisions.

The Samarra culture evolves later in the PN, after the Proto-Hassuna and the Pre-Halaf wares emerged. It shows the first evidence for a fully developed Pottery Neolithic society slightly after 6400 BC. Its origins lay in the Middle Euphrates, the central axis of the whole Near East. It is across this region that the movements of people from east to west occurred, resulting in repeated contacts over an extended period of time. It is important to mention the Samarra because it was this culture that revived the previous PPNB characteristics in the west, rather than allow them to totally disappear. In addition, the Samarra culture maintained the modified, local version of the PPNB BAI of the Levant (Aurenche and Kozlowski 1999: 94-95,

---

as their shape, have with the stone bowls found in previous levels at this site are remarkable (Braidwood and Braidwood., 1960:43 and Mellaart, 1981:80).

[23] The Samarra culture develops almost in parallel with the Hassuna one, while the Halaf culture evolves slightly later on. The Halaf culture is influenced by the Samarra and Hassuna cultures, but later replaces them both. Thus, these wares are interrelated and in some cases hard to distinguish

142; Hijjara, 1997: 99). In the advanced stage of the PN the new important cultural center is no longer in the 'golden triangle' (the area situated between the Jezireh, Middle Euphrates and the Eastern Anatolian foothills), but instead in the central Mesopotamian Plain, better known as the Fertile Crescent (Aurenche and Kozlowski 1999: 94-95, 142).

F. The PPNC and PN of the South Levant and the Desert Zone

1) PPNC

Although the events from the L/FPPNB to the EPN occur in the South Levant at a slower pace than the rest of the Near East, there is continuity in the South Levant during this time span. For example, while the other regions[24] were experiencing pottery and full blown pastoralism with four domesticated animals in the EPN, the South Levant shows neither of these traits until later in the PN (Ducos, 1994: 166; Rollefson, 1998: 43). The culture that emerged here after the FPPNB was designated as the PPNC culture by Rollefson and Simmons based on the excavations at Ain Ghazal. This culture has been identified also at Abu Gosh, Girat, Wadi Shu'eib and Basta (Rollefson, 1998: 43; Simmons 1997: 310; Rollefson and Rollefson, 1990: 9). In comparison to the EPN, the PPNC is also a modified version of the PPNB, one that contains influences from a pastoral life-style (Mellaart, 1981:67, 69). This observation is mainly based on the presence of architectural remains such as semi-subterranean dwellings, associated with pastoralism (Rollefson, 1998: 51).

---

from one another but they can be differentiated on a technical basis (van As, Jacobs and

2) The PN in the South Levant and the Desert

The PN culture of this region arrived 250-300 years later than the initial stages of the PN in other regions through contacts with the north (Mellart, 1981:67, 69). Thus, the PN in this region starts from the latter part of the 7th millennium BC, which corresponds to the Late PN in the rest of the Near East (Kuijt and Chesson, 2002:110). There are three other major cultures in the initial stages of the PN in the South Levant: the Yarmukian/Jericho IX PNA, Wadi Raba/Jericho VIII PNB[25] and Qatifian cultures (Banning et al, 1994: 5-7; Kuijt and Chesson, 2002: 110). The sites well researched for the PN in this region are mainly located in the Mediterranean vegetative zone and include Munhata, Sha'ar Hagolan, Esh-Shallaf, Tabaqat al-Buma, Wadi Raba, Abu Hamid, Nahal Zehora I and II, and Lod.

a) Jericho IX PNA/Yarmukian Phase

The Yarmukian phase and Jericho IX PNA succeeds the PPNC in the South Levant. Jericho IX pottery was initially assigned its name from the level IX at Jericho, where it was found and divided into two types PNA and PNB. The PNA is characterized by burnishing and painted chevron motifs (Koplan, 1958: 159; Banning et al, 1994: 157-158).

Sites that correspond to the Yarmukian phase include Ain Ghazal, Ayn Kahub, Jabal Abu Thauwab, Tabagat al Burna and Wadi Ziqlab[26]. Two interesting observations were made concerning the Yarmukian ware (Fig. 41) reminiscent of the trend already noted for the PN in other regions. Firstly, it demonstrates similar pottery traits to the rest of the Near East. For example, it contains either mineral

---

Nieuwenhuyse, 1997: 28, 43).

[24] Excluding Cyprus until later.

[25] The Wadi Raba culture corresponding to Jericho VIII is characterized by bowl rimmed jars (Banning et al, 1994: 157).

(limestone), or vegetal (straw) temper, and has burnishing, slip and painted decoration. It also displays incised decoration, in particular the herring-bone lines with paint. Shapes include straight-sided vases as well as jars like those observed for the EPN in other regions.

The second significant factor about the Yarmukian culture is that like the other EPN cultures, there is evidence in the South Levant for strong pastoral influences. Thus, it was pastoralists who transferred the developed pottery of the PN cultures originating in the north, to the south (Rollefson et al, 1992: 459; Mellaart, 1981: 69; Koplan, 1958: 159; Banning et al, 1994: 157-158).

b) The PN of the Desert Zone

Slightly later, the arid zones demonstrate the extensive employment of pottery and pastoralism. This is known as the Qatifan culture (a desert facies of the Wadi Raba culture), which is situated within the North and South Sinai and extending to the Dead Sea. It has been identified at sites like Nahal Besor, Y-3 and Tel Qatif (Kuijt and Chesson, 2002: 109-110). The initial pottery at sites settled during the Wadi Raba/ Qatifian phase is generally crude and used only for utilitarian purposes. For instance, pottery near Tel Qatif is composed of a coarse, heavy, crumbly hand made ware, in almost uniform shapes. The majority is straw tempered but some contains mineral temper and does not display decoration. It was also poorly fired (Epstein, 1984: 212).

G. Cyprus

The PN of Cyprus is exceptional as it follows a hiatus in the material record after the PPN. The LPPN sequence on Cyprus corresponds to the LPPNB of the

[26] It is interesting that at Wadi Zilab both herring-bone decoration associated with the Yarmukian

Levant, which entails full domestication of animals and some early glimpses of primitive pottery dating around 7600-7000 BC. The difference is that after about a 1500 year break, the full PN begins in 5000-5400 BC (Le Brun, 1987: 525, Le Brun, 1997: 41; Todd, 1998: 19). It has been suggested that an expansion to the island from the mainland brought pottery technology and the M/LPPNB trait of rectangular architecture[27] to Cyprus (Le Brun, 1987:526,528; Le Brun, 1997: 41).

The early PN on Cyprus contains a pottery reminiscent to the DFBW of Syro-Cilicia (Le Brun, 1987: 528-530). At Philia Drakos A for example, pottery phase 1 consists of a coarse monochrome ware, with a dark brown fabric. The later ceramic on the island, seen in Philia Phase II, corresponds to the decrease of DFBW-like ware and the increase of red painted and red incised wares (Le Brun, 1987: 528-530). It has also been suggested that a thick red polished ware made in the PN of Cyprus has correlations with that one found at Tarsus in Cilicia (see fn. 14, above) (Goldman, 1950: 67). Kalavassos-Tenta and Shillourokambos were also reoccupied during the PN (Todd, 1998: 52; Guilaine et al, 1995: 25). Pottery at Kalavassos is composed of a light fabric, sometimes slipped and includes both unpainted and painted wares. Painted decoration[28] consists of geometric and combed patterns. Bowls and jars make up the majority of shapes (Todd, 1998: 52). Shillourokambos accords with the later PN Sotira culture, which is derived from the site, Sotira-Teppes, corresponding to the Neolithic II on Cyprus. The ceramic at Shillourokambos includes brown to orange round bowls, which are burnished. The only decoration comprised Combed ware, characteristic of the Sotira culture

---

phases and the bowl rim jars related to the Wadi Raba phase were found. This may be a transitional site (Banning et al, 1994: 157).

[27] Others however, propose that the PN on Cyprus is an internal development (Todd, 1998: 19).

[28] It has been suggested that the painted ware form Mersin, Cilicia may be related to the painted ware on Cyprus. Again, the development of Cypriote painted ware may have been a local one (Caneva, 1999: 112).

(Guilaine et al, 1995: 25). Additional PN sites include Khirokitia III, Mari Paliambela and Kalavassos-Kokhinayia (Le Brun, 1987: 526,528).

IV. Conclusion

The pottery cultures represented above, Pre-Halaf, Proto-Hassuna, Zagros Group as well as those developments on Cyprus and in Central Anatolia offer the best evidence for the first stages of clearly marked regional cultures, which were mainly determined by recognizing distinctive pottery traits from individual regions. It has been determined from several factors that the creation of these cultural spheres is strongly related to the socio-economic structure that emerged at that time, which involved pastoralists and agriculturalists. The changes in settlement pattern observed in the EPN illustrate this relationship, because as people adopted pastoralism they moved and lived in camps. This relocation of people allowed the traits from the PPNB to be passively transferred to the PN culture. Thus, in many ways the PN is a modified version of the PPNB culture. Thus it was the mobile peoples of the PPNB culture that maintained and transmitted the Neolithic way of life (Peltenburg et al, 2001b: 57).

Finally but most importantly, in this chapter, it has been determined that the prevalent use of pottery coincides with the arrival of the four domesticates and the *extensive* use of pastoralism.

PART II

The Shape of Technology: Forebearers to the Pot

CHAPTER 5

PREVIOUS KNOWLEDGE OF CLAY

I. Introduction

It is important to emphasize that the knowledge of clay and its properties long preceded its shaping, firing, and modifying into vessel form. It is therefore appropriate to consider clay use in architecture and architectural features as well as other non-utilitarian items including small clay objects and figurines.

II. Architecture

Starting from 14,000 BC, dwellings consisted either of stone or a mixture of lighter materials, (e.g., skins, plant materials, wood and/or clay), but in most instances a combination of stone and organic substances (Fig. 42) (Aurenche and Kozlowski, 1999: 27). So, as early as the Palaeolithic (Kebaran period), the handling of clay was recognized as a material suitable for use in architecture. It was also during this early time that the malleability and fragility (ie, need for temper) of clay was recognized.

A. Palaeolithic/ Kebaran

In the South Levant the first structures appeared during the Kebaran period, around 14000-12000 BC, at the following sites: Ein Guev I, Ohalo II and Jitta II. These constructions consisted of a circular shaped, semi-subterranean pit with a stone foundation and a clay and wood superstructure (Aurenche and Kozlowski, 1999: 27; Cauvin, 1989b: 23).

B. Natufian

During the following Epipaleolithic or Natufian phase, the construction techniques were very similar to those in the Kebaran: pit-dwellings with stone bases and clay and wood superstructures. In addition, superstructures with wood and a sort of clay "plaster" also known as pisé[1], existed as well. This type of seasonal habitat was observed at sites in the South Levant and the Negev such as at Valla, Rosh Zin, as well as at the early Natufian village of Ain Mallaha, where red paint is preserved on the interior walls of one structure (Cauvin, 1989b: 24-25, 27). At Wadi el-Hammah in the same region, the same circular, dug-out habitations prevailed, only they had a slightly different construction method for both the base and the superstructure. In this case, the foundation was composed of clay packing with stone, while the walls had wooden posts. Arrangements of stone circles were placed around the periphery of the habitation in association with certain raised mud features (Aurenche and Kozlowski, 1999: 169; Edwards, 1988: 311).

It was only during the later Natufian period, around the 10th millennium, that clay first became part of the architectural features in the Middle Euphrates region. The structures at Mureybet illustrate the first evidence of clay in architecture so far

in this region. Most dwellings, such as those at Abu Hureyra, show features analogous to those in South Levant: round, pit-dwellings and use of clay and wood for the roof and walls. One slight difference is that clay was only used in plastering the inside of the walls and floors and, in the case of Mureybet they were burnished (Molist and Stordeur 1994: 396-397; Cauvin 1989b: 26; Aurenche and Kozlowski, 1999: 152). At Jerf el-Ahmar, the walls and floors of the circular, dug-out habitation diverged somewhat from the other two sites already mentioned. Instead the walls comprise of a thick clay mortar with vegetal inclusions supported by wooden posts. For the floor, the same clay mortar was employed as an adhesive at the base of a pebbled pavement (Scwartz and Weiss, 1992: 30, 34-35).

C. PPNA/ 9200-7000 BC

These round, semi-subterranean construction type persisted into the PPNA, while rectangular architecture first appeared in the Middle Euphrates. More importantly, most regions contain clay in their architecture by this period, which includes the earliest use of dried mudbrick at certain sites.

At both Jericho and Aswad in the South Levant, superstructures were made of well shaped, plano-convex mudbricks. The mudbricks at Aswad were tempered with vegetal materials (Cauvin 1989b: 35-36; Smith, 1990: 328). The soundings at Dhra' have revealed oval dwellings with superstructures of mud and stone mixed together. The mud for these constructions contains a mixture of clay with mineral temper to make pisé. The mud plaster for the floors was well made and comprised a combination of well-sorted yellow brown clay and straw temper. Additionally,

[1] Pisé is a clay mixed with straw (Cauvin, 1989: 46).

some mudbricks were found at the site (Finlayson et al, 2002: 2-3,19-20). The dwellings at Gilgal I contain walls of small stones mixed with clay (Noy, 1989: 13-15).

During the latter part of the PPNA in the Middle Euphrates the rectangular house appeared, but the round shape continued. The walls of both house types contain small stones covered with pisé such as those found at Jerf al Ahmar and Sheikh Hassan (Molist and Stordeur, 1999: 396-397).

Looking at the Zagros regions, there seems to be quite a range in construction techniques involving clay. In the Upper Zagros at Nemrik in the early part of the PPNA, pisé was used in all of the houses except one, which has sun-dried brick walls with clay plaster. By the end of the PPNA all of the dwellings were constructed with mudbrick, covered with clay plaster and sometimes paint (Kozlowski and Kempisty, 1988: 357, 359). At M'lefaat the superstructures comprise a combination of stone and clay. In the Lower Zagros at Asiab, the walls were made of pisé (Schmand-Besserat, 1974: 11).

Finally in SE Anatolia the first constructions at Çayönü consist of a stone foundation with pisé superstructures (Morales, 1990: 195-197).

D. PPNB

The increase in use of mudbrick architecture is evident during the PPNB. In the South Levant, mudbricks became more widespread from the previous period as seen at Munhata and Kfar HaHoresh[2] (Cauvin 1989b, 48-54; Goring-Morris et al.,

[2] Even though no mudbrick is preserved at Kfar HaHoresh, they probably exist, as chunks or lumps of fired clay and mud were found throughout the site (Goring-Morris et al., 1995: 45).

1995: 45). Clay was also used as a mortar to keep limestone walls together at Es-Sifiya (Mahasneh, 1997: 206).

The first evidence for the combined use of sun-dried mudbrick and lime plastering for walls and floors occurs in the Middle Euphrates region during the PPNB[3] (Molist and Stordeur, 1999: 398). This construction technique was observed at Tell Halula and Bouqras (Molist and Stordeur, 1999: 398; Molist, 1998: 76; Mathews, 2000: 49). At Mureybet, pisé still remains the only material found in habitations (Cauvin, 1989b: 46). The extraordinary use of clay at Jerf el-Ahmar seems to be associated with certain buildings that have special functions. In this instance, clay covered and decorated the wooden posts inside the buildings. This decoration involved shaping the clay into a geometric design and then polishing it (Scwartz and Weiss, 1992: 38-39).

The best example of preserved clay in architecture during the PPNB period is in the Lower Zagros at Ganj Dareh (Figs. 43 and 44). The remains at this site provide evidence that architectural use of clay and/or other degradable materials can exhibit more complexity and innovation than generally is acknowledged (for this area at least) (Smith, 1990: 323). Different construction techniques are observable among the structures at the site, including the use of clay and wood, pisé, packed mudbrick, sun-dried mudbricks and coarse rubble plastered over with mud. The mudbricks were tempered with chaff and other vegetal materials and contain small stone inclusions. In the earlier part of the PPNB, most dwellings were built either with clay and wood or mudbrick with wood support. The roof of these types

[3] This mudbrick wall architecture both for circular buildings continues until the Pre-Halaf stage (Molist and Stordeur1999: 398).

The first houses in Central Anatolia appeared in the PPNB at Aşıklı. The initial dwellings contain mudbrick walls and both walls and floors were covered with clay plaster (Balkan-Atlı, 1994: 555, 556-558). In general, the dominant building material throughout the PPNB and EPN in this region consist of clay and wood (Balkan-Atlı, 1994:115).

The first remains of architecture on Cyprus date to the PPNB at Shilliourokambos. The superstructure to the dwellings consists of wooden posts and pisé (Guilaine et al, 1995: 19-20; Peltenburg et al, 2001a: 42). In the LPPNB, at Khirokitia manifest a combination of construction techniques such as the following: dwellings completely made of stone or mudbrick; houses with stone foundations and mudbrick superstructures; or structures with two concentric walls, the inside composed of mudbrick and the outer one of stone. In all cases, the mudbrick was sun-dried and tempered with straw. Plaster was observed on the interior of walls and floors, occasionally decorated with paint (Le Brun, 1997: 19). At Kalavassos-Tenta remains of both mudbrick and stone houses also exist (Todd, 1998:18, 98).

III. Figurines and other Small Clay Objects

The employment of clay in architecture coincides with its use to shape figurines and other small objects. From the 13th to the 7th millennium, human and animal figurines as well as objects such as beads, balls and spindle whorls made of either dried or baked clay have been discovered throughout the Near East (Fig. 45). It has been suggested that these items also played a part in the emergence of pottery technology (Cauvin, 1976: 101; Mellaart 1981, 69; Rice, 1999: 16).

A. Natufian/Zarzian

Early use of clay before pottery in the Zagros zones is very limited. Around 10500 BC, a single lump of baked clay was discovered at Zawi Chemi. The clay showed no signs of temper; rather it was directly heated in an open fire (Schmandt-Besserat, 1974: 12-13).

B. PPNA

In the Zagros, some small clay geometric objects as well as animal and human figurines were found at Asiab and Karim Shahir Tepe (Schmandt-Besserat, 1974: 11).

In the South Levant, baked clay figurines with schematic shapes were fabricated at Aswad (Cauvin, 2000: 39).

Another case for the non-architectural use of clay occurs in the Middle Euphrates region. The most exceptional instance was at Mureybet, where ritual features located inside houses comprise bucrania and other animal bones covered with clay. These features resemble clay bulges. Evidence for the manufacture of baked clay female figurines was also discovered at this site (Cauvin, 1977: 35; Cauvin, 2000: 44).

C. PPNB

By the PPNB, baked clay animal figurines have greatly increased in number in the Near East. In the Zagros at Sarab, numerous well made clay figurines were found. They were tempered with a diverse range of substances such as grasses,

straw, grain or minerals and then finely shaped, smoothed over and in many cases burnished. Other clay objects at the sites include clay balls, cones, disks, block shapes and pendants (Morales 1990: 18-20, 22-25). One poorly fired female clay figurine and 15 sun-dried figurines of clay were found at Maghzalia. It seems the inhabitants were working much with this substance as many kneaded unfired clay spheres were found throughout the site (Bader, 1993a: 16).

This upsurge of making clay figurines is especially evident in the South Levant. Sites that produced human figurines are Ramad, Beidha, Jericho, Munhata and Ain Ghazal (Cauvin, 2000: 105, 147). The most elaborate examples of figurines were discovered at Ain Ghazal, which consisted of two bull figurines, each "stabbed" with flint blades (Rollefson, 1986: 47). Other interesting finds are human heads made of clay discovered at Munhata, Jericho and Nahal Hemar (Cauvin, 2000: 106).

In the Middle Euphrates at Tell Halula and Abu Hureyra animal figurines and balls were made from unbaked clay (Molist, 1998: 76). Fired clay objects, including stamp seal-like items (described as rectangular plaques) and cylindrical beads were also uncovered from the latter site (Moore, 1975b: 63). At Bouqras, clay was fashioned into figurines and balls (Mathews, 2000: 49).

There were also interesting clay objects and figurines fabricated at sites in Southeastern Anatolia. This includes fired figurines at Cafer Höyük, Göbekli Tepe, Nevalı Çori, Çayönü and Gritille (Balkan-Atlı, 1994: 105; Morales, 1998: 195-197). Other exceptional finds from Cafer Höyük were: mud balls, a plaque and a figurine of a bird, which were all straw tempered and baked (Cauvin et al, 1999: 91, 98).

However, the most intriguing fired clay example was a modeled version of a house in fired clay from Çayönü. The modeled house replicated the actual dwellings, indicating that these houses once had a flat terrace roof and floors made of sticks covered in chaff and plastered (Morales, 1990: 195-197).

In Central Anatolia, baked clay female figurines and balls of geometric shapes were excavated from the PPN XII a-d levels at Çatal Höyük (Cessford, 2001: 725). Clay figurines were also made at Aşıklı (Özbaşaran, 1999: 151).

In contrast to the great increase in clay figurines on the continent, there were only few clay figurines on Cyprus, such as the clay-modeled head from Khirokitia. In contrast to clay, the figurines on the island tended to be made of stone (Le Brun, 1997: 27; Le Brun, 2001: 84).

IV. Conclusion

From the evidence, one gathers that for a long time, people experimented and worked with clay. Over time, various techniques were developed in order to manufacture this substance for different architectural and non-utilitarian uses. These techniques became highly specialized towards the later PPN periods, which involved tempering the clay with vegetal or mineral substances to improve its workability and durability. In some cases, the small clay objects were even heat-treated, further demonstrating that the knowledge of fire to strengthen and maintain the shape of the clay existed prior to the invention of pottery. The long-term handling of clay and familiarity of its qualities are the essential forerunners to making clay pots.

CHAPTER 6

PREHISTORIC PYRO-TECHNOLOGY

I. Introduction

The manipulation of substances by fire began in the Middle Palaeolithic (Meigen et al, 2000: 11). The continuous use and better control of fire is observed throughout the Near East from this time through the PPNB, when pyro-technology reached an advanced stage. The process of transforming materials such as lithics, lime and gypsum, clay, bitumen and metals with heat was highly standardized indicating a degree of sophistication existed during this time. We have looked at the evidence for clay being sun dried and fired in the last chapter. In this chapter, we will examine the ancient knowledge of fire and the treatment of these other substances by heat.

II. Temperature Control and Firing Materials: The Basics

The control and reproduction of a given temperature requires expertise in order to know which materials to fire, how to observe the change in temperature of a fire and especially to repeat a successful heating process (Fig. 46). For example, a keen eye is needed to notice the change in color as temperature increases, when not using a thermometer. The lowest temperature of a fire change seen by the naked eye is about 550 degrees C, which is a faint black red glow that turns to a bright red as the temperature climbs to 850-950 degrees C. Fuels usually consist

of either animal wastes like dung or plant materials[1] such as peat, straw or wood from shrubs and trees (Hauptmannn and Yalçın, 2000: 63; Rehder, 1999: 308). Charcoal[2], however, is the best type of fuel because it burns slowly, intensely and over a long period of time. This material can also be used as a reducing agent (Rehder, 1999: 310).

III. Hearths, Ovens and Kilns

One illustration of fire *control* is demonstrated by the constructions that contain fire, which are hearths, oven and kilns. It should be noted that hearths are open features while ovens (and kilns) are closed constructions. Without these structures fire is not manageable. Some examples of each of these fire enclosures, which are located throughout the Near East, are offered below.

a) Hearths and Ovens

The initial stage for fire manipulation occurred during the Middle Palaeolithic, when hearths were first made. These constructions were seen continuously through the PPNA, at caves in the South Levant such as Oum Qatafa, Tabun and Hayonim. Ovens were also unearthed at these sites (Meigen et al, 2000: 11). Hearths, in particular were usually simple constructions, such as the dug-out type discovered at Cafer Höyük in SE Anatolia during the PPNB. This type of hearth generally consists of holes dug into the floor and smothered with clay although some have a rock border. Clay hearths, which were areas on the surface of burnt clay, were found in the Zagros at Jarmo and Maghzalia as well as at Aşıklı in Central Anatolia (Cauvin, 1989a: 77-78; Porada et al, 1992: 79-80; Balkan-Atlı,

---

[1] Of the vegetal types, only dry waste materials with little water content are used, and they can generate high temperatures in a closed area (Rehder, 1999: 309).

[2] The quality of charcoal depends on the type of wood it came from, for instance (ie, soft versus hard). (Rehder, 1999: 310).

1994: 556-558). The hearths at Aşıklı demonstrate a high degree of sophistication (Balkan-Atlı, 1994: 555, 556-558).

Ovens were constructed at Jarmo, Ali Kosh and Ganj Dareh using advanced techniques. They consisted of tauf, which was molded into a dome, complete with a chimney (Aurenche and Kozlowski, 1999, 154, 165, 176; Schmandt -Besserat, 1974: 17).

b) Kilns

Although no kilns date earlier than the PN, the very complexity of these constructions proves that the knowledge and experience from hearth and oven building must have been rather advanced in order to build the kilns by the 7th millennium. The earliest evidence for kilns belongs to the Hassuna culture, such as at Yarim Tepe I where they were found in various levels and with various attributes.

One type of these structures can be described as a double-chambered updraught kiln, with its combustion chamber dug into the ground. 50 clay flues separate the lower chamber from the upper, baking chamber, the roof of which is domed. Other types of kilns include a single chambered and a two-storied kiln.

The Samarra culture also had pottery kilns, such as at Tell es-Sawwan, Tell Songor A (Fig. 47) and Tell Abada. These kilns were fairly small, mostly oval in shape and some contained stoking channels and/or air flues. The Hassuna kilns could maintain temperatures of 850-1050 degrees C, while the Samarra ones could reach up to 1050-1150 degrees C (Streily, 2000: 70-72).

The pyro-technological experience with hearths, ovens and other related structures used to fire lithics and other substances like limestone and gypsum, (see below) allowed for the quick adaptation to construct the potter's kilns in the 7th

millennium, just after the initial stages of the PN. The need for such an advanced[3] firing system seems to result from the need for more proficient production of ceramics (Streily, 2000: 80-81).

IV. Lithics

Since the Late Palaeolithic, stones have been heat treated in order to facilitate lithic manufacturing[4]. The rocks treated in the Near East are primarily flint and chert, but some examples of chalcedony were heated (Inizan and Tixier, 2000: 28).

In order to heat lithics properly, one must have experience with firing this matter. For example, it is essential to know what changes to observe, which requires skill, since the best indicators are visible alterations. In this case, either a color, shine or luster change will occur. These modifications will appear after the lithic piece(s) is/are fired to 250-300 degrees Celsius for a certain time (depending on the size of the pieces), ranging from 1 hour to 24 hours, followed by slow cooling. The temperature ideal for the treatment of these rocks is about 300 degrees. This heating is done in some sort of fireplace (Inizan and Tixier, 2000: 21-22).

In the Near East this process is mainly observed in the Upper Zagros, at sites like M'lefaat, Jarmo and Nemrik. The evidence for fire treatment and pressure flaking in this region has been recognized by the color and brillance of the flint, and

[3] For example, many of these kilns demonstrate a domed shape roof, a method used to create higher temperatures (Streily, 2000: 80-81).
[4] This process is also associated with the pressure-flaking technique. However, this technique does not imply firing. This is recognized by texture and color changes (Inizan and Tixier, 2000: 24).

the cores produced from pressure-flaking[5]. The application of fire to these stones was not a local development but one that arrived from areas further east.

Lithics were also heat treated at Çatal Höyük in Central Anatolia. For example, fire was applied to a flint dagger found in a LPPNB grave, however, the employment of this technique seems more ritualistic than practical (Inizan and Tixier, 2000: 29, 33). In general this technique was rarely employed in the Near East, these instances were included as they provide an alternative example for prehistoric pyro-technology.

V. Bitumen

The uses of bitumen were noticed since the Middle Palaeolithic and continue through the Natufian, PPNA and PPNB phases. Bitumen is a natural petroleum tar and is found throughout the Near East in liquid and solid forms (Fig. 48). After heating, bitumen may be used as a water-proofing sealant and though it was applied to non-architectural items such as mats, baskets, pottery, it was also used for artistic purposes (Fig. 49). One of the best qualities of bitumen is that it is economical since it could be reheated and reused (Schwartz and Hollander, 2000: 83, 85). Some evidence for bitumen was found at Kfar Hahoresh, in the South Levant (Gorring-Morris, 1995: 53). Bitumen was also used for the eyes in the statues at Ain Ghazal, also in the South Levant (Rollefson et al, 1992: 467). In the Upper Zagros at Maghzalia much bitumen remains were discovered as well (Bader, 1993a: 9).

[5] In contrast the Levant does not demonstrate any use of fire treatment in lithics, and only shows the technique of pressure-flaking at the end of the PPNB (Inizan and Tixier, 2000: 29).

VI. Plaster and Cement

A. Plaster

Since the Kebaran period, 14000-12000 BC, lime plaster has been produced. The first evidence for *quicklime production* occurred during the Natufian at Hayonim Cave. It was noticed as a white porous material inside a round structure with a chimney-like opening and indications of burning, which is thought to be a sort of kiln (Kingery et al., 1988: 223). Since the Natufian, plaster was used for diverse purposes, especially later on, during the PPNB. For instance, it was found in architecture to plaster floors and walls, used to make utilitarian objects like white ware, (better known as 'vaisselle blanche') as well as to make non-utilitarian items like beads and to plaster skulls (Hauptmannn and Yalçın, 2000: 61).

Plaster can refer to any pasty substance that hardens when dry. In the PPN, the basic ingredients for plaster are gypsum and lime. Gypsum plaster was made from either gypsum rock or alabaster while lime plaster was made by burning limestone at a high temperature to make quicklime (Kingery et al., 1988: 219). These processes are described below.

1) Lime Plaster

The production of lime plaster involves taking limestone and heating it until it becomes quicklime. This process is not easy and requires much knowledge of the properties and firing of limestone. Producing quicklime requires heating limestone from 533 degrees C and working slowly up to 800-900 degrees C in slightly moderate reducing conditions (Hauptmann and Yalcın, 2000: 62-63; Kingery et al., 1988: 221). This process uses extensive amounts of limestone and fuel and takes days. For instance, in order to burn 1.8 tons of limestone, more than 4 tons of wood are needed for an open fire, pit fire or a simple kiln (Kingery et al., 1988: 221).

After quicklime has been obtained, water must be added to make it a paste[6]. Finally, in order to apply it, one must grind, slake, shape and smooth this paste. The resulting substance is fairly water resistant and so is useful for vessel making and plastering (Hauptmann and Yalçın, 2000: 62 and Kingery et al., 1988: 221).

2) Gypsum

Making gypsum plaster is easier than making lime plaster because it takes less preparation and requires a lower firing temperature. Gypsum must be heated up to 150-400 degrees, and then made into a paste by adding water[7], which may serve for the same uses as lime plaster. This substance is not as durable as limestone however, because even after it has been processed and hardened, it will become soft and easily chippable after a short time. Furthermore, it is not very water resistant, but can be used on exterior architectural surfaces in dry areas (Hauptmann and Yalçın, 2000: 62 and Kingery et al., 1988: 220).

3) Evidence of plaster

a) Diverse uses of plaster

The original function of plaster was for hafting flints, a practice which began in the Epipalaeolithic, from 14000-12000 BC. An early instance of lime plaster was discovered at Lagama North VIII, where it was used for this purpose (Kingery et al, 1999: 226). During the PPNA, different uses for this substance were developed, for instance, a plaster ball found at Abu Hureyra.

An intense use of plaster is observed in all regions during the PPNB. The best example of the non-utilitarian use of plaster comes from the South Levant, where plastered skulls were found at Ramad, Beisamoun, Jericho, Ain Ghazal, Kfar

[6] After the water evaporates it will become hard again, and the only way to differentiate it from the original limestone is by its microstructure (Hauptmann and Yalçin, 2001: 62; Kingery et al., 1999: 221).

Hahoresh and Nahal Hemar. The skulls usually have sculptured faces in plaster, but may show other plastered designs instead. Additional uses of plaster are seen at both Ain Ghazal and Jericho, where human statues were made from wicker and covered in plaster. (Kingery et al, 1988: 231-233; Goring-Morris et al, 1995:47; Rollefson et al, 1992: 464).

b) Architectural uses

Throughout the Near East, both lime and gypsum plaster were used to cover floors and walls. For instance, during the LPPNB plaster is seen on the floors and/or walls of structures at Çatal Höyük in Central Anatolia and in the Zagros at Ali Kosh and Ganj Dareh (Kingery et al, 1988: 223-225). Many houses in the South Levant displayed lime plaster as well, including Yiftahel, Jericho, Beisamoun, Nahal Oren, Tell Ramad, Abu Gosh, Munhata, Kfar Hahoresh, Es-Sifiya, el-Ghuwayni and Ain Ghazal (Cauvin 1989b, 48-54; Hershkovitz et al., 1986: 73; Kingery et al., 1988: 223-225; Goring-Morris et al, 1995: 39-40, 46; Mahasneh, 1997: 207; Simmons and Najjar, 1997: 96-97). In the Middle Euphrates region, such as at Abu Hureyra, the lime plaster applied to walls and floors, also showed signs for burnishing and painting (in this case, black and red) (Cauvin, 1989b: 46; Moore, 1975b: 55). Plaster was not only found at agricultural sites but at hunting/pastoral herding sites like Qdeir in the Desert zone (Betts, 2001:185). In the Zagros at Ganj Dareh as well as in some sites in the South Levant, mudbricks comprised lime plaster and clay mixed together (Hershkovitz et al., 1986 :73; Kingery et al., 1988: 223-225).

Two sites offer evidence for the fabrication of lime plaster: Yiftahel and Kfar Hahoresh. At Yiftahel, two pits, interpreted as kilns, were filled with tons of

[7] The only way to tell the difference between gypsum rock and gypsum plaster is also from its microstructure (Hauptmann and Yalçın, 2000: 62; Kingery et al., 1988: 220).

limestone fragments. These pits contained plaster remnants from previous firings. Lime plaster slag was also observed within the vicinity of these pits (Garfinkel, 1987b: 208). At another site, Kfar Hahoresh, evidence for burnt limestone chunks noticed throughout the site infers that the local production of lime plaster occurred here as well (Goring-Morris et al., 1995: 39-40,46).

c) Vaisselle Blanche

Plaster was also modeled into storage vessels known as 'vaisselle blanche' seen throughout the Near East (Kingery et al., 1988: 236). These containers will be discussed in Chapter 8.

B. Puzzolanic Reaction or 'Cold' Cement

'Cold' cement is defined as the advanced stage of lime plaster, and there is evidence for it in the PPN. Concrete is formed by adding clay materials, sand, gravel or limestone to quicklime in order to make the latter stronger and augment the quantity of this paste. However, determining how it will react with heat depends on the natural inclusions and clay components of the original limestone. This reaction is known as a puzzolanic reaction (Kingery et al., 1988: 221). Making this substance requires the same temperature as for lime plaster production: 750 degrees C[8] and so it is also 'expensive' to make. Finally, as in the procedure for lime and gypsum plaster, after the heat treatment water is added to the quicklime, followed by tempering (see above). This becomes a form of pasty cement that will dry and harden. If the right inclusions are added to the mix, the puzzalonic reaction will occur and a harder substance will emerge (Hauptmann and Yalçın, 2000: 63-64; Kingery et al., 1988: 221).

[8] The modern reaction takes place at a much higher temperature around 1400 degrees C and is called sintering or melting (Hauptmann and Yalçın, 2000: 63-64).

1) The Evidence

This type of cement is not easy to detect at sites since it is similar to lime plaster. The only major evidence comes from Aşıklı Höyük in Central Anatolia. At Aşıklı Höyük, the plastered floor of one of the houses contained certain inclusions capable of causing a chemical or puzzolanic reaction. In this case, the raw mineral inclusions noticed in the plaster were part of the original clay fabric used to make it. The materials include calcium and volcanic rocks bits found in the clay within the vicinity of the site. These inclusions made a "puzzolanic reaction"[9] when the inhabitants made the plaster (Hauptmann and Yalçın, 2000: 62, 65-67).

VII. Metallurgy

A. The Source and Substance

Colorful minerals and metals have been collected throughout the Near East starting from the Palaeolithic. These substances were made into pendants, however the widespread application of fire to manipulate them is rare until much later. Some examples of early interest in these materials include a pendant from Shanidar cave made from serpentine, which contains malachite, and a piece of secondary copper at the site of Hallan Çemi in Anatolia.

The most common element gathered is copper and its minerals such as malachite, but evidence for lead also exists. This interest in green color minerals may have provoked the beginnings of metallurgy in Anatolia, the Balkans, the Zagros and the Levantine area. Sources of good quality copper are situated throughout Southwestern Asia (Hauptmann, 2000: 141, 162-163).

---

[9] It is not a cement, a puzzolanic reaction equivalent to today's brick dust (Hauptmann and Yalçın, 2000: 66-67).

B. Hot or Cold?

The smelting of copper carbonates demands temperatures of 800-1000 degrees C and high reducing conditions. This temperature was reached for the manipulation of other substances at least by the PPNB (see other parts of essay). As heat is not the only requirement for copper smelting, the proper conditions to fully *melt* metal copper were probably not in place at this time[10]. The problem is related to reduction techniques, which are only advanced enough during the PN (Hauptmann, 2000:141 and Schoop, 1999: 34). This does not mean however that heat treatment was not applied, nor does it infer that no experimentation was taking place. It seems that the initial stages of "metallurgy" had been to collect and treat the metal like a stone where it was drilled, hammered, polished and sometimes fired (Piggott, 1999: 108; Özdoğan and Özdoğan, 1999: 16).

C. Archaeological Evidence

In the early PPNA levels at Çayönü (Fig. 50) (or the round building phase), and Hallan Çemi in SE Anatolia, only unworked malachite lumps were discovered. These were intentionally collected and possibly distributed. In the next phase (grill buildings) at Çayönü, still in the PPNA, copper was hammered and shaped into beads and other objects. This site was located near a natural copper outcrop (Özdoğan and Özdoğan, 1999: 14-15).

The best evidence for the fire manipulation of metal during the PPNB is found at the later levels of Çayönü. More than a kilogram of secondary copper was found throughout the PPNB phases at this site. Copper had been fashioned into

both ornaments and tools, like beads, awls and hooks. After an analysis of the artifacts, it was discovered that better technology was applied to metal at this time. For instance, the artifacts were made under alternative cold and warm manipulation. The application of heat to copper is significant because it proves that knowledge of the physical properties and quality of this substance before and *after* being placed in fire existed by the PPNB (Özdoğan and Özdoğan, 1999: 16; Maddin et al, 1999: 39). It is necessary to note that although many of the metal pieces were still altered by cold hammering, this technique may cause cracks, especially when a piece contains many inclusions. The process of annealing (or heating) is thus useful as it softens the metal and reduces the strain that causes fractures (Maddin et al, 1999: 39, 41). It has been observed that in the Zagros copper sources contain arsenic inclusions, which naturally prevent it from cracking while other areas (i.e. SE Anatolia) needed heating to make the mineral more malleable (Piggott, 1999: 108). Therefore, the working of copper pieces by annealing does not necessarily make them *stronger*, it only increases their malleability. One must hammer this metal again when it is cold to assure hardness (Maddin et al, 1999: 39, 41).

Significant evidence for fire application to metals is also found at Aşıklı (Fig. 51), in the 8th millennium BC, where metal artifacts include worked copper and malachite. The copper finds here were fewer in number than at Çayönü, and were usually small ornaments found in graves (Esin, 1999: 27). Like at Çayönü, the analysis of artifacts indicated that both cold hammering and heating were applied to manufacture these objects. The cold forging of copper involved hammering it into a sheet and then rolling it into a bead. Both copper and

[10] Melting copper in a campfire has been tried, but no confirmed evidence shows copper can be rendered liquid so that its reduction may take place. In order for this reduction to occur the

malachite were perforated to make pendants (Esin, 1999: 27-29; Yalçin and Pernicka, 1999: 45).

In the same region at Çatal Höyük, both copper and lead were found throughout the PPNB levels. For example, in the FPPNB, a piece of copper slag was found confirming that the inhabitants were familiar at least with fire application (Maddin et al, 1999: 42; Moorey, 1975: 41). Furthermore, as lead hardly occurs in its natural state, it has been suggested that heat treatment was needed to work it, which might infer that fire application was used to manipulate the lead artifacts discovered at the site (Schoop, 1999: 34).

Thus, the first experimentation with firing metals was underway during the PPNB period. This point must be emphasized: the metals found at these sites were not just worked by hammering techniques applied to stones, instead certain techniques dealing with heat treatment, although still basic, were specially developed for metal working (Özdoğan and Özdoğan, 1999: 13).

VIII. Conclusion

The use of fire to transform limestone, gypsum, bitumen and lithics as well as to alter the composition of metals, done time after time, demonstrates that pyro-technology was in an advanced stage well before the PN. It should be emphasized that the temperature needed to fire a pot is less or the same as the temperatures necessary and already reached for at least some of these items. The systematic fashion of fire application observed for all of these processes indicates[11] that firing pots could have easily been managed.

---

temperature must reach and be maintained at around 800-1000 degrees C (Hauptmann, 2000:141).

[11] We have seen in chapter 5 that knowledge of clay properties and fire treatment of this substance has already taken place.

CHAPTER 7

THE FUNCTION OF CLAY VESSELS: A COMAPARISON TO OTHER TYPES OF CONTAINERS

I. Introduction

If there was no pottery, then what kind of materials did people use to cook and store foodstuffs? The archaeological evidence as well as ethno-archaeological studies indicate that other objects such as baskets, skins, wood and stone vessels were employed in daily activities. In this section we will look at the evidence for basketry, wood, skins, stone vessels and 'vaisselle blanche' to learn why clay was made into container form.

II. Basketry, Wood and Skins

Unfortunately, these three types of containers: baskets, wood containers and skins are not well documented in the archaeological record because they are organic materials and decompose quickly. These organic materials played a big part in past cultures however (Leroi-Gourhan, 1989: 128). It has been suggested that the shape of some pots imitate containers of wood, skin and baskets (Kingery et al, 1988: 227), and it has also been argued that many basket designs are reflected in pots (Kozlowski, 1999: 227).

In the Near East, there are a few cases where these substances *are* preserved, proving at least that they existed. Nahal Hemar Cave, in the South Levant, is one of the best examples for the preservation of such fragile materials in the MPPNB. This

site includes fragments of well-made cords, strings, mats, woven reed textiles and baskets made of reeds, linen and other vegetal fibers. Furthermore, the remains of a round box made of wood with beads kept inside were also discovered (Aurenche and Kozlowski, 1999: 171). In SE Anatolia, evidence for reed basket impressions on clay vessels existed in the later PPNB at Çayönü (Özdoğan, 1999: 59). In the Desert Region it has been observed that baskets, wood and plaster vessels were manufactured at Qdeir (Betts, 2001: 185). At some other sites in the Lower Zagros, the impressions of mats are evident in the plaster from floors and roofs of houses and other forms of plaster such as the basketry impression on the 'vaisselle blanche' at Choga Sefid and Ali Kosh (Adovasio, 1977: 228).

In the Upper Zagros, early evidence for twill mats and basketry come from Shanidar Cave (Adovasio, 1977: 227). From the PPNB layers at Jarmo and Maghzalia, many clay and bitumen impressions (Figs. 52 and 53) showing textile and basketry were discovered. Clay, but especially bitumen displayed basket impressions because these substances were once smeared on the inside of baskets to keep them water-tight.

Many pieces were analyzed from sites like Jarmo and Ali Kosh and much information concerning their manufacture was extracted. Textiles are defined as loom woven cloth while basketry refers to baskets, matts and bags. Two types of textile techniques[1] (Fig. 54) were recognized while three subclasses of basketry (Fig. 55) techniques were defined as twining[2], coiling[3] and plaiting[4].

---

[1] The first is referred to as the balanced plain weave, the simplest of weaves, where single strands of warps and wefts pass over one another in a 1/1 interval. The other type of weave employs the same technique only with double strands. This is similar to the Plain Weave (Adovasio, 1977: 224-225).
[2] Twining is moving horizontal threads called wafts around stationary vertical threads called warps.
[3] Coiling encompasses the opposite, with vertical "threads" called stitches moving around binding horizontal stationary threads. Some have suggested that Central Anatolia is the original center of the coiling technique (Adovasio, 1977: 229).
[4] Finally, plaiting refers to all sorts of movements passing over and under and is technically an un-sewn item (Adovasio, 1977: 223).

The weaves and basketry methods are of high quality, which even include diagnostic pieces like rims and centers. The textile weaves show tightness and regularity and the probable use of spindle whorls points to a level of standardization. Both of these high quality organic items exhibit an industry that is long developed (Adovasio, 1977: 225-227).

From these small, scattered remains, one can obtain an idea of the forms and uses of organic vessels by using ethno-archaeological comparisons. For instance, comparisons with modern Near Eastern weavers suggest the reeds for the baskets were probably soaked to make them more flexible and easier to work with in order to shape them into one of various shapes (Adovasio, 1977: 227). The use of bark pots by the North American Indians when cooking, by placing them on rocks illustrates one of the diverse uses of organic materials (Leroi-Gourhan, 1989: 128).

III. Stone Vessels

In contrast to these organic materials, inorganic ones like stone stay in the material record for a long time. This is demonstrated by the large amounts of stone vessel fragments excavated in each region of Southwestern Asia (Fig. 56). The manufacture of such items started in the Natufian period and requires much time and skill. As we will see some containers have shapes and decoration reminiscent to those of later pottery.

A. The Fabrication Process

The first stage of stone bowl production was to roughly make a vase shape out of a block of stone. To accomplish this, a scraping technique was used with a certain type of lithic tool (Mahasneh, 1997: 208; Roodenberg, 1986: 142-143). The

flint tools employed in this manufacturing process included blades, pointed implements and sometimes burins or scrapers (Roodenberg, 1986: 144). The markings of this tool may be observed slightly on the exterior of the vase. For an open shape, the next step was to bore out the interior. In some cases this involved pecking and drilling the inside (Mahasneh, 1997: 208; Roodenberg, 1986: 142-143). Another technique (observed in Cyprus) involved cutting a circular channel around the central part of the surface with a lithic tool and then removing the stump in the middle. This process was repeated until the desired depth was achieved (Le Brun, 1997: 33). The bowl was usually smoothened by scraping it with a lithic tool in order to give it a clean surface (Mahasneh, 1997: 208; Roodenberg, 1986: 142-143; Le Brun, 1997: 33).

By the beginning of the 7th millennium closed bowls were made by an advance method of "forage" or drilling to bore out the inside of the bowls. A certain method exists for making a closed shape, which requires the use of specific lithic instruments to drill out[5] the inside. This technique is conducted by placing the perforating tool in a locked position to cut the stone-to-be-a-vessel as it is turned on a lathe.

These bowls were generally finished by burnishing, which leaves marks on the surface while giving it a sheen. Other examples demonstrate polishing, which entailed covering the vessel surface with wax or oil, or buffing it with a piece of leather (Roodenberg, 1986: 143, 144,146).

[5] Drilling and boring were techniques employed at the beginning of the 7th millennium just at the end of the FPPNB and beginning of the PN. These techniques continued to be employed during the EPN on the Middle Euphrates at Bouqras and Tell es Sinn, and in the Desert Region at El Kowm-Caracol (Roodenberg, 1986: 146).

B. Evidence

The amount of skill and effort required to make these stone bowls has been demonstrated. The evidence for stone bowl production in each region will be presented for the Natufian, the PPNA and the PPNB. These examples illustrate the long history of their production before pottery.

1) Natufian

The manufacture of stone bowls began during the Natufian period mainly at sites in the South Levant such as at Hammeh, Mallaha/Eynan and Nahal Oren. The evidence for this production has also been found on the Middle Euphrates at Mureybet (Aurenche and Kozlowski, 1999: 26; Cauvin, 2000: 88; Noy et al, 1973: 86).

2) PPNA

During this period, the manufacture of stone bowls greatly expanded as they appear in all the regions of the Near East. The majority of shapes were open, round bowls, but sometimes shapes included round and rectangular plates and small, deep cups.

In the South Levant the making of stone bowls continued, still with no decoration, such as the few marble ones at Tell Aswad and Nahal Oren. In the Middle Euphrates, the continuation of stone bowl manufacture is seen at Jerf el Ahmar and Dhra'; at the former the vessels displayed grooved type of decorations[6]. The site of M'lefaat in the Upper Zagros has produced examples of stone bowls with incised repeating motifs (Aurenche and Kozlowski, 1999: 43-44; Roodenberg, 1986: 145; Noy et al, 1973: 86; Kuijt, 2001: 108).

[6] These include stripes and other horizontal, meandering and wavy lines (Aurenche and Kozlowski, 1999: 44).

3) PPNB

During this period, the number and characteristics of the stone bowl industry generally stayed the same as in the previous period, except in the Zagros, for instance at Jarmo, where this production greatly increased (Roodenberg, 1986: 146).

The open bowl form was still the most popular throughout the period, but by the LPPNB other shapes become increasingly important: plates and cups. In the Middle Euphrates, in SE Anatolia and the Zagros the bowls display much incised decoration of horizontal, meandering, zigzagging and wavy lines (Aurenche and Kozlowski, 1999: 43-44). Raw materials consisted of diverse assemblages of the following stones depending on region and site: limestone, granite, basalt, marble, chlorite, anorthosite, alabaster, serpentine and even picrolite (on Cyprus) (Roodenberg 1986: 138-140, Akkermans, 1993: 36-37, Aurenche and Kozlowski, 1999: 43-44, Özdoğan, 1999: 59 and Dornemann, 1986: 35).

In the Late and FPPNB the manufacture of bowls developed to an advanced stage, particularly in the Zagros and SE Anatolia (Aurenche and Kozlowski, 1999: 65-66). Progress in techniques and shapes at this time is shown by the boring technique, which is especially noticed at Bouqras. Thus, the Middle Euphrates region indicates some technological advancement as well. At Bouqras (Fig. 57) for instance, stone vessels were made in shapes ranging from bowls to pots and plates as well as miniature fine bowls (Roodenberg 1986: 138-140, 145). Bouqras as well as Umm Damishliyya contain small stone bowls with legs. Stone bowls discovered at both sites integrate the natural bands of colors in the raw material to enhance the container's decorative quality (Akkermans, 1993: 36-37). Similar to these stone bowl types are those discovered at Tell Sotto and Tell Assuoad (Roodenberg, 1986: 145, 147).

One finds unique stone bowls with animal decoration at Hallan Çemi in SE Anatolia. Some bowls were decorated with incisions or relief motifs, however most were plain (Aurenche and Kozlowski, 1999: 43-44 and Rosenberg, 1994: 126; Roodenberg, 1986: 145; Özdöğan, 1999: 59). The production of stone bowls at Çayönü greatly increased during the MPPNB and LPPNB. They are either coarsely or finely made and sometimes decorated and polished (Özdoğan, 1999: 59). Gritille and Cafer Höyük display similar types of stone vessels (Ellis and Voigt, 1982: 325 and Cauvin et al, 1999: 94; Bader, 1993a: 21). In the Zagros, the numerous stone vessel assemblage from Maghzalia comprised both bowls and plates.

In the South Levant during the PPNB, an uninterrupted sequence of stone bowl manufacture is evident at Nahal Oren since the Natufian period (Noy et al., 1973: 86). Diverse amounts of stone bowls are also known from Beisamoun, Atlit-Yam, Es-Sififiya Basta, Beidha, Jericho, Tell es Sinn and El Kowm-Caracol during the PPNB (Aurenche and Kowzlowski, 1999: 157-158; Geva, 1998: 15; Mahnasah, 1997: 208; Roodenberg, 1986: 146).

In the North Levant, at Ras Shamra and Tell Judheida only small amounts of stone vessels were produced in the early 7th millennium (Roodenberg, 1986: 146).

At El Kowm in the Desert region, stone bowls occurred in all levels, with the latest producing the greatest number (Dornemann, 1986: 35). Additionally, in the LPPNB stone vessels have been found at Qdeir and at some Jirat sites (numbers 13, 25 and 26) (Betts, 2001: 185; Garrard et al, 1994: 92-93).

Finally on Cyprus, numerous high quality stone bowls were manufactured at Shillourokambos, Khirokita, Mylouthkia and Cape Andreas Kastris (Fig. 58) (Aurenche and Kozlowski, 1999: 184; Roodenberg, 1986: 146; Peltenburg et al, 2001a: 75; Le Brun, 2001: 113).

It is definitely important to stress that most stone vessels were of miniature size by the L/FPPNB, all demanding much effort to make. Thus, these containers demonstrated the existence of a non-pottery vessel type, which may have been used for cooking and other utilitarian functions as well as appreciated for their artistic value. In any case, there is a specialized manufacturing process for these vessels while unique characteristics existed for each region; hence, they represent an important item in the interregional trade existing at this time (Aurenche and Kozlowski, 1999: 43-44, 65-66; Roodenberg, 1986: 138).

IV. 'Vaisselle Blanche'

Also known as white ware, these containers made of plaster are found at many sites throughout the Near East (Fig. 59).

A. Evidence

The manufacture of 'vaisselle blanche' only became widespread with the LPPNB, around 7500 BC. The earliest evidence of 'vaisselle blanche' dating to the PPNB was at Çayönü in SE Anatolia but it appears slightly later at Gritille. Many sites in the South Levant contain whiteware for example, Nahal Hemar Cave, Beqaa and Ain Ghazal. It was also manufactured at Bouqras, Baghouz and Abu Hureyra on the Middle Euphrates. In the Upper Zagros 'vaisselle blanche' was also produced at sites like Chogha Sefid. By the end of the LPPNB, the plaster containers existed in the desert area at el Kowm I and II (Fig. 60a and b) and Palmyra, for instance. Finally, these vessels were introduced into the Central Levant at Tabbat al Hammam, Tell Soukas, Hama, Tell Ramad, Byblos and Ras Shamra in the EPN

coinciding with the introduction of pottery[7] (Aurenche and Kozlowski, 1999; Kingery et al., 1988: 227, 236; Ellis and Voigt, 1982: 325; Contenson and Courtois, 1979: 177). During the PN plaster vessels are imported to Çatal Höyük (Contenson and Courtois, 1979: 177). This tradition seems to be an unsuccessful attempt to produce containers and it died off. In most regions, the making of whiteware does not continue into the PN, except in the Central and South Levant (at Munhata and Wadi Shu'eib) and in the Desert Region where it ceases totally after the PN (Kingery et al., 1988: 227, 236; Ellis and Voigt, 1982: 325).

B. Production and Characteristics

First, the plaster vessel had to be molded: to do so the quicklime was poured into another container: a basket, for instance, or into a depression in the ground in order to obtain its shape. In many cases it retained the imprint of the basket or other type of mold on the external surface. These were wet smoothed on the inside while many stayed rough on the outside. Some of these 'vaisselle blanche' show evidence for reed inclusions to support the body of the vessel. Burnt examples of white ware exist but it is unknown if the burning occurred before or while they were used. Other plaster containers were sun-dried.

Surface treatment includes smoothing of both the external and internal surfaces as well as burnishing. Some vessels were decorated with parallel wavy lines incised with a reed as well as small circular impressions and seals of geometric designs.

The most common shapes were round, open, deep bowls with either flat or round bases; the basin was the next biggest group of vessels, followed by small

[7] Possibly why it stayed around longer in the Central and North Levant.

bowls, platters and jugs in various lesser quantities. The majority of these vessels had thick low walls[8] (Dornemann, 1986: 17-22).

V. A Note on Form and Function

In order for a vessel to carry out its function, it is necessary to construct it properly. Certain factors such as volume, rim type for access, stability, transportation, duration, surface treatment, clay type, how it is fired, but most importantly shape, must be accounted for when making a specific type of container. For example, a liquid storage jar usually is large and has a wide mouth for easy access. It can be gathered that the traits, in particular the shape of the vessel will denote its use. Therefore, various combinations of these factors give the vessel type a unique set of traits that will allow the container to serve its purpose, and diverse forms are needed for different functions. These observations must be taken into consideration when a vessel is analyzed.

The importance of these observations becomes clear when vessels in stone and in plaster are compared to both PPNB container forms and EPN pottery shapes; they are mostly bowls and jars. Ethno-archaeological comparisons are useful to learn the purpose these shapes served. For instance, the assemblage of a Native American group from Southern Florida contained many jars and bowls: the former for transport, storage and serving of liquids and the latter for serving food (Lesure, 1998: 20, 22-23). It can be suggested therefore that the bowls and jars made from any material were used for the same purpose throughout the PPNB and EPN.

[8] At el Kowm, the 'vaisselle blanche' technique is modified to resemble that of pottery when it is introduced to sites in the Desert region. For example, the walls become thinner and the sun-drying of

VI. Conclusion

Four important points have been made in this chapter. The first is that other materials were in use before pottery for both utilitarian and non-utilitarian purposes. The second is that most of the PPN shapes of containers made of diverse substances consist of bowls (open or closed), and sometimes plates, cups and jars. These forms, especially the bowls and jars, were also the primary shape of the early pottery vessels in the EPN. Third, the decrease in the manufacture of both plaster and stone vessels[9] occurred when pottery was introduced. The fourth, and most important point is that if the shape of a vessel reflects its function, then these pottery vessels have definitely *replaced* these other types of containers in order to serve the same purpose.

whiteware increases when they both are manufactured concurrently (Dornemann, 1986: 17-22).

[9] The making of organic containers probably lessens as well, but with hardly any evidence in the archaeological record it is impossible to state either way.

CHAPTER 8

HOW TO MAKE A POT

I. Introduction

It is important to demonstrate the process of manufacturing pots and compare it with other procedures that we have examined in prior chapters like mud brick and figurine production, pyro-technology including plaster-making, the fabrication of stone and other containers, in order to determine their influence in early pottery making. Furthermore knowing how pots are made, clarifies just how significant the familiarity and use of clay in architecture and other objects had towards making clay vessels.

Firstly, this section will involve discussing and defining some of the terms associated with ceramic manufacture. Next, the procedure of making a pot will be shown in steps and compared to the technologies already existing throughout the Near East in the PPNB.

II. Terminology

The definition of clay in geological terms is a family of minerals, known as phyllosilicates, which have a grain size of less than 2μm in diameter. In practical terms however, clays are mixed with other non-clay materials, and so the definition of clay refers to the higher proportion of clay substances in a certain material. For

potters, the meaning of clay is any substance that is plastic enough when wet and worked to be formed into an object, (usually a vessel) and hard when dried.

Earthenware indicates pottery with a porous body that has been waterproofed and is fired to less than 1100 degrees C, which defines the early pottery of the Near East in most cases (Hamer and Hamer, 1997: 115, 139-140).

The leatherhard stage of a pot is when the plastic quality of the clay reaches a state when the particles making it up are just touching each other and give the clay pot stability. In this stage a pot may be handled but not deformed, while it is just soft enough to apply surface treatment. The most shrinkage takes place during the time it becomes leatherhard, after it reaches this stage it will not shrink much more, even though it may become harder. Certain surface applications include slip, burnishing and polishing. Slip refers to a homogenous mixture of clay and water and is used for coating to give color or texture to a surface. Burnishing[1] is rubbing leatherhard clay vessel with a hard object like a smooth pebble, which leaves marks and is not an even shine (Hamer and Hamer, 1997: 41, 335).

Polishing consists of rubbing or brushing gums, sealers or resins over a fired pot giving it a homogeneous sheen (Rye 1981:25-26). These processes may be done for decorative purposes but also to give a hard dense coating that makes the pot more waterproof and durable (Hamer and Hamer, 1997: 41; Rye 1981:25-26).

III. Procedure and Comparisons

A. Clay Selection

The basic process of making pottery requires skill and familiarity with the substance being used. The first step to making a pot is to select the clay with which

[1] It is noted that pinched and coiled pots are usually burnished.

one will work. Ethnographic studies[2] show that the potters choose[3] clay with specific properties; they do not just take any section of clay. The selection of a clay is important because it is only those clays with specific properties such as enough plasticity to work with, but to retain a shape when drying, and that will harden when fired that will make a lasting pot (Velde and Druc, 1999: 152; Rye, 1981:16). The familiarity with clay has been demonstrated by its uses in architecture and shaping other objects like figurines. The previous knowledge of clay characteristics, both fired and unfired has been recognized for sites in all regions throughout the Near East.

B. Preparation of Clay (Fig. 61)

The next step is to prepare the clay, first by removing the unwanted inclusions. Secondly, it is kneaded to take out the air bubbles. Then water is mixed with it and it is tempered by adding certain materials. This process is done in order to make the clay more workable as water is needed to make the clay plastic, while the temper is added to adjust its plasticity. Temper enhances the quality of clay to make it stronger, to keep the pot from shrinking and cracking when it dries and gives it a higher thermal resistance (Velde and Druc, 1999: 152; Rye, 1981: 18-20; Vandiver, 1987: 27-29).

Temper consists of any substance that reduces the plasticity of clay, and can be found naturally in the clay as non-clay particles or minerals. Natural temper is a rare case and it is usually insufficient, so substances are added by the potter to most clays. Materials added by the potters themselves comprise minerals, plant particles

---

[2] Also see: "Greek Neolithic Pottery by Experiment" by K.D. Vitelli, Pp. 113-132 in *Pots and Potters*. Edited by P. Rice. Monograph XXIV, Institute of Archaeology, University of California, 1984.

[3] The knowledge of which clay to select is done by trial and error.

or even animal dung, which is actually one of the best sort of temper (Velde and Druc, 1999: 140-141). Fiber and chaff tempering were used to prepare mud bricks to reduce the plasticity of the clay to make it stronger. Mineral temper was added to plaster for the same reasons, making the substance more workable and stronger. The manufacture of plaster has also been acknowledged for all regions within the Near East.

C. Construction of Pot

Some techniques employed by early potters to build a vessel, involve either coiling up layers of clay or slabbing pieces of clay together. Other hand made methods are pinching, molding or casting. Pinching is usually a finishing technique to make the rim or base. Constructing a base using the pinching technique, means taking a clay lump formed with the hand or in a mold to make a cup like shape. In many cases, the pinching technique is used along with the coiling technique, which starts by making long rolls of clay that are stacked on top of each other to make a pot. Then the pot is smoothed over to form a nice wall, and left to dry until it becomes leather hard. The paddle and anvil technique is used to smooth out and mend the desired shape of a pot. This procedure involves rotating the pot around while holding the anvil inside the vessel and hitting the outside with a paddle (Rye 1981: 21).

The slabbing method is also observed throughout the Near East, which involves stacking slabs of clay one on top of the other to make a vessel wall (Smith and Crepeau, 1983: 55, 57; Cooper, 1988, Rye, 1981: 21-23; Velde and Druc, 1999: 164-165). These slabs are stacked in particular ways[4], in most cases, with the larger

[4] In studying vessels made in this way, the porosity gave clues as to how the slabs were arranged, joined and stacked. For more on the construction technique see Vandiver 1987: 11-17.

slabs on the bottom, the medium in the body part and the smallest for the rim. The vessel is thicker where the slabs join but made so that an upper slab does not deform the plastic support of the wall beneath it. It is then smoothed over by either wiping or slipping and usually burnished. Slabbing was used most abundantly for chaff or vegetal tempered clay, and resulted in a coarse ware used for utilitarian items (cooking, preparing, storing and serving). This technique is attested for at the following sites: Abu Hureyra, Ganj Dareh and later Sarab (Vandiver, 1987: 9).

A study of the construction methods for some containers found at Ganj Dareh show one of them was made by a particular technique. This small, round vase was found with a vertical cut through the middle creating two perfect halves. It was suggested that the weakness at this point resulted from the construction technique. Most likely, the bottom half was molded over a round stone while the top half was molded by coiling and then both halves were fastened together. The orientation of inclusions supports that the pot was made using a combination of these two techniques (Smith and Crepeau, 1983: 55, 56, 58, 60).

Therefore, a pot can be made using various techniques, and in many cases, more than one method may be employed to form a single pot (van As, Jacobs and Nieuwenhuyse, 1997:31-33).

The plastic components of clay have already been recognized with its use in architecture and manufacture of smaller objects. Of all the techniques seen above, the slabbing method in particular has been applied in clay architecture. Both of these techniques; slabbing and coiling are observed in the making of 'vaisselle blanche' (Vandiver, 1987: 27-29).

D. Surface Treatment

After reaching the leather hard stage[5], surface treatment is applied. This treatment involves burnishing and slipping, which makes the pot less porous and more durable (Rye, 1981: 24). Slips also give the pot a smooth surface (Fig. 62). Painting is also applied before the firing stage, and it should be noted that both slip and paint are fired below 1000 degrees C, but some pyro-technological background is required to fire them correctly (Velde and Druc, 1999: 168). Other decoration such as incisions and impressions of various designs are also applied at the leather hard stage. This decoration does not only have an artistic purpose, it has a useful function as well. It aids in heat transfer and thermal shock resistance when firing and cooking (Rice, 1999).

Finally, additional treatment after firing and cooling, consists of polishing the pot (Rye 1981:25-26).

The application and usefulness of surface treatments have been observed in stone vessel making, whiteware production, lime/gypsum and mud plaster finishing, as well in some other clay objects. The surface application of these diverse materials includes burnishing, red ochre and black maganese paint and incisions or impressions (Vandiver, 1989: 27-29; Kingery et al, 1988: 240).

E. Firing the Clay Vessel

Finally the pot is fired (Rye 1981: 24-25). It is suggested that during the early PN, this procedure was done with open fires. There may have been open-kilns, pit-kilns (Fig. 63), or semi-closed structures as well. Open fires may only heat

[5] This term 'leather hard' refers to the vessel when it is dry but before firing.

a certain number of pots at a time. The fuel[6] is placed under and over as well as mixed in with the pots, which are stacked onto one another either lying on the surface or in a shallow pit. How the pots are stacked and their level of contact with the fire offer different outcomes for the same material and prepared pots. The fire, which cannot exceed 1000 degrees C, is controlled by adding fuel and its placement. Fire may be manipulated by using different types of fuel, for example, a long low fire is made with dung while straw is added for a rapid hot fire (Velde and Druc, 1999: 170-172; Rice, 1984: 25).

All of the elements explained above, especially the clay properties and the temper, will determine how the pot will fire. When firing the non-plastic grains expand. If the correct materials have been employed (ie, the right amounts of clay and temper) the pot will not crack. Sometimes agents such as lime were employed to speed the heating process and reduce firing costs as well as to strengthen the pot (Velde and Druc, 1999: 131, 156; Rice, 1984: 27).

Furthermore, firing requires the knowledge to create oxidizing and reducing conditions. For instance, to obtain smudging, a pot must be fired in a reduced atmosphere. These conditions are achieved in an open fire by completely covering a fire with wet grass or ashes (also referred to as smothering) to create a barrier so that oxygen will escape. These conditions are usually only applied to cooking vessels in the last stages of firing to make them impermeable in food preparation. Other times this process is done to give the pot a black color. After firing, the pots must be let to cool down but at a set rate so they will not crack (Velde and Druc, 1999: 168-169). Thus, a great amount of knowledge and skill is needed to control the firing

[6] Fuel as seen in Chapter 5 is made up of vegetal or animal materials such as leaves, straw or animal dung (171).

conditions to know how it will affect the clay vessel, as well as firing a pot successfully more than once.

Pyro-technology had been in place for millennia before this was applied to firing pottery and is demonstrated in all regions within the Near East. Even higher temperatures were required and already reached to make lime plaster. Finally, the heat treatment of both gypsum and lime plaster, metals, lithics, bitumen and bone proves that the PPNB society sustained the capability to reach high temperatures time and again in controlled conditions, as well as the skill to reproduce the temperature and conditions in order to transform these different substances.

IV. Relation to Ceramic Technology

Two processes relate to the pottery manufacturing procedure the most: plaster-making and mud brick making. Although plaster making is comparable to that of pottery manufacturing, the architectural uses of clay are more analogous to the process of producing clay pots. For example, clay must undergo certain modifications before it is employed in architecture, hence, similar procedures would be required to shape clay into a pot. Thus, the manufacture of mud brick has much influence on clay vessel making because it requires the preparation of the clay with straw and water, molding it into standard sized bricks using a certain technique (i.e., slabbing) and then sun-drying the bricks. Other techniques however to mold earthenware container were derived from 'vaisselle blanche' making such as the coiling method. Furthermore, the application of fire to making lime plaster allowed the control and maintenance of higher temperatures than for pottery, but the order is reversed; firing is done before molding and drying and thus the processes were not

used for producing whiteware only to make the substance from which whiteware and plaster is formed.

To conclude, it seems that many preceding technological processes were involved in influencing pottery making, each having been developed, and from each a small part was contributed and transferred to making a pot. The order of techniques is more analogous to mud brick making due to the similar material and knowledge of clay. Overall, it seems both the preparation of clay for pots was learnt from forming mud brick, while the advanced firing techniques were taken from plaster making (Vandiver, 1987: 27-29).

PART III

Invention and Innovation: Why the Pot?

"The discovery of Epi-Paleolithic microliths bonded into a haft with lime plaster at Lagama North VIII dating to 12,000 B.C., lime plaster produced in modest amounts at Hayonim Cave ca. 10,400-10,000 B.C., and lime plaster used architecturally at the Natufian base camp at Eynan (' Ain Mallaha), ca 9000 B.C. support the hypothesis that the invention to a new technology occurs long before its widespread adoption. Invention is essentially an individual achievement (e.g., Usher 1954) that will recur from time to time but only rarely becomes part of the archaeological record. Innovation brings an invention into technological practice and has usually been treated by economic theorists (Schumpeter 1934; Schmookler 1966; Fellner 1971) as involving both perceived utility and entrepreneurial action. Once adopted, a proven, safe, and reliable technology invariably becomes conservative and subsequent modifying innovations are gradual and incremental (Sahal 1981)." (Vandiver 1998: 239).

CHAPTER 9

TRADE, SPECIALIZATION, TECHNOLOGY AND SOCIAL COMPLEXITY: FOREBEARERS TO WIDESPREAD POTTERY MAKING

> 'It will be among nomads rather than settled peoples that we can expect the emergence and evidence of any inherent social dynamic processes generating interactional communities of a certain size and character' (Tapper in Cribb, 1991: 371).

I. Foreword

It has been observed that in modern systems two factors are strongly linked to technology: economy and trade (Renfrew, 1984: 391-392). The qualities of the economic conditions will determine whether a new technology is adopted on a large scale, while trade constitutes one important medium for it to be spread elsewhere. It should be noted that the trade network must maintain a certain level of sophistication for a technology to be distributed (Adams, 1996; Moore, 1995: 44; Renfrew, 1984: 391-392; Runnels, 1989: 152). An invention may also spread by other contacts such as the migration of a population to a new area (Renfrew, 1984: 391-392). However, there must be some stimulus for an indigenous population to create a new technology and/or for immigrants to move and introduce an innovation where they resettled (Runnels, 1989: 152). In the case of pottery, both social complexity and a sophisticated inter-regional exchange system involving mobile groups already existed during the PPNB, which facilitated the spread of this new technology (Moore, 1995:44).

II. Intense Exchanges

The vast exchange system of the PPNB is important to examine because it reflects the high degree of social organization that existed for this time span. The exchange system entailed the circulation of goods such as obsidian and flint (both as raw materials and finished forms), stone bracelets and bowls, precious stones, shells and by the EPN, clay vessels. Luxury items like shells and precious or rare stone hint at social differentiation since not all members of a community had access to them. Trade was also important because it enhanced cultural contacts, which is illustrated by the similar architecture, bone and flint industries, plaster manufacture and other technologies displayed throughout Western Asia by the LPPNB.

The exchange network had a long tradition beginning in the Natufian, and by the latter part of the PPNB it had intensified much. By the LPPNB, the exchange network covered the whole Near East (Aurenche and Kozlowski, 1999: 85-86).

These materials were dispersed to surrounding sites and those much further away in a succession of exchanges, which involved the interaction between sedentary and nomadic peoples (Balkan-Atlı et al, 1999: 134; Aurenche and Kozlowski, 1999). Different kinds of goods were traded from up to distances of 400 km, which shows much cooperation and organization between settled communities and mobile peoples. The existence of an exchange system further implies that the manufacture of items was not out of necessity but for exportation as well.

A. Obsidian [1]

Since 14,000 BC obsidian from Anatolia was distributed throughout the Near East (Balkan-Atlı et al, 1999: 134; Cauvin, 1991: 163). The obsidian from many sites in the Near East has been analyzed to learn from which source it came and how the material traveled through different regions. All the sources of obsidian found within this vast area are from one of two primary sources in Anatolia: the Cappadocian area in Central Anatolia and the Nemrut Dağ and Bingöl areas in Eastern Anatolia (Fig. 64). Until about 9500 BP, the main source for the Near East (South Levant, North Levant, Desert and Middle Euphrates) was Central Anatolia. After this date obsidian comes from both Anatolian sources, concurrent to the appearance of sites in SE Anatolia (Cauvin, 1991: 134, 166-167, 175).

1) Trade

Sites in both Central and SE Anatolia that are located close to obsidian sources are able to obtain raw materials directly from the outcrop. The obsidian is extracted into transportable blocks and brought to the site in order to make tools. For example, the obsidian found at Cafer Höyük was conveyed in this manner from a relatively nearby source at Çavuşlar in Bingöl, Eastern Turkey. Musular also obtained its obsidian from a local source (Cauvin et al, 1986: 96-97; Özbaşaron, 1999: 149, 152). Most sites that are further away from an outcrop only contain imported items such as blades or bladelets rather than raw material. The obsidian bladelets discovered at both Tarsus and Mersin in Cilicia (Fig. 65) were imported ready-made from a distant source in Cappadocia in Central Anatolia[2] (Caneva,

---

[1] Obsidian is a volcanic glass, a variety of rhyolite and the product of lava coming in contact with water usually, when lava flows into a lake, sea or ocean and is cooled quickly. Iron and magnesium contents in the lava give the obsidian its dark green to black color (http://mineral.galleries.com/minerals/mineralo/obsidian/obsidian.htm).

[2] Both sites also obtain their chert from the same source (Garstang, 1953: 255-256).

1999: 110-112; Garstang, 1953: 255-256). However, some sites such as Maghzalia and Jarmo in the Zagros contain large quantities of obsidian even though they are a long distance away distant from the outcrops situated at Bingöl and Nemrut Dağ[3] (Badar et al, 1994: 6-7; Matthews, 2000: 45). Finally, even though some sites were located near natural resources of obsidian, like Musular, ready-made blades were still imported from an exterior specialized workshop (Özbaşaran, 1999: 149, 152).

The obsidian uncovered in the South Levant and Cyprus proves that long distance trade existed as they are located very far from obsidian sources. Just a miniscule amount of obsidian is attested at Yiftahel, Beisamoun and Mevorah in the South Levant (Yellin and Garfinkel, 1986: 99-100, 103). A small amount of obsidian also made its way to Shillourokambos, Mylouthkia and Kalavassos-Tenta on Cyprus from Göllü Dağ in Central Anatolia, a long distance that included travel overseas[4] (Fig. 66). Such small amounts discovered in these regions are attributed to the long distance (Peltenburg et al, 2001a: 78; Peltenburg et al, 2001b: 52).

B. Flint

It should be noted that exploitation of flint started in the Paleolithic like that of obsidian (Calley, 1986: 50). As flint is located naturally in most regions, it was not traded to far distances like obsidian, although it was traded locally, in the form of exported blades (Calley, 1986: 49, 56; Balkan-Atlı et al, 1999: 139).

---

[3] For chemical analysis on these sources see: C. Chataigner, 1994: 9-17. "Les propriétés géochimiques des obsidiennes et la distinction des sources de Bingöl et du Nemrut Dağ." Paléorient: 20/2. For more information on the obsidian at these sites see the same volume of Paléorient: V. Francavigli, "L'origine des outils en obsidienne de Tell Maghzalia, Tell Sotto, Yarim Tepe et Kültepe."

[4] Interestingly, from the EPPNB to the MPPNB the amount of obsidian increased but by the LPPNB it dwindled to almost nothing (Peltenburg et al, 2001a: 78; Peltenburg et al, 2001b: 52).

C. Stone Bowl Trade

The exchange network also includes the circulation of other finished items like stone vessels (Fig. 67). These travelled along two routes: north to south or east to west. The trade from north to south involved the transfer of SE Anatolian vessels to the Middle Euphrates, about 300 km away. Slightly later the east-to-west route opened, when vessels circulated from Bouqras in the Middle Euphrates to both the Deh Luran Plain in the Lower Zagros and to the oasis of El Kowm, in the Desert zone: a total distance of 750 km (Aurenche and Kozlowski, 1999: 86).

D. Other Items

Polished stone bracelets, a class of artistic, non-utilitarian objects, were manufactured during the Middle and LPPNB. Contemporary stone bracelets were circulated throughout most regions including the Upper and Lower Zagros, South Levant, Middle Euphrates, but especially in Southeast Anatolia. For instance, bracelets made at Cafer Höyük (Fig. 68), traveled from SE Antatolia to Maghzalia in the Upper Zagros, a distance of about 400 km (Aurenche and Kozlowski, 1999: 66, 86).

Alongside the exchange of raw and finished products is the trade of exotic materials (Aurenche and Kozlowski, 1999: 86), which include bitumen, seashells, beads (Fig. 69), and semi-precious stone (Le Mière and Picon, 1987: 133-134). The trade of these items also involved long distances such as the exchange of SE Anatolian malachite and turquoise for the South Levantine shells like the murex (Cauvin, 1991: 176).

E. The Way of Trade

Although the details of this vast exchange network are not fully known, it is informative to examine workshops and the 'chaîne opératoire', because it offers suggestions as to how these products were processed and traded throughout Southwestern Asia (Peltenburg et al, 2001a: 78; Balkan-Atlı et al, 1999: 137-140, 142).

The circulation of items is linked to a number of factors like distance, the availability of natural resources and geographical pathways or certain cultural corridors connecting sites (Aurenche and Kozlowski, 1999: 86; Cauvin, 1991: 175). The movement of goods along corridors, such as the Levantine or Middle Euphrates ones[5], facilitated their circulation. Most likely, the big villages located in these corridors aided in the distribution of raw materials and other items, but were not principally responsible for controlling the trade (Aurenche and Kozlowski, 1999: 86).

Instead, it has been suggested that raw materials and finished goods throughout the Near East were primarily circulated in a succession of exchanges involving migrations of early pastoralists and movements of hunters (Badar et al, 1994: 6-7; Yellin and Garfinkel 1986: 99-100, 103; Cauvin et al, 1986: 96-97). For example, the obsidian found at Cafer Höyük was brought there by pastoralists, who acquired this raw material when visiting the adjacent outcrop on their seasonal transhumance (Cauvin et al, 1986: 96-97).

The appearance of a material at a site is also related to social choice. The trade of obsidian as a unique item along with other exotic artifacts in small amounts

[5] Other routes also contributed to the transfer of goods and materials, like the Cilician Gates, which pass through the Taurus Mountains and allow access from Cappadocia to the Levant. The east-to-west movements require passing the Amanus Gates through the Amanus mountains and the interior villages of Syria (Cauvin, 1991: 175).

from SE Anatolia to the South Levant is significant because it was not out of necessity that they maintained long distance contacts, but instead related to social factors (Aurenche and Kozlowski, 1999: 86; Cauvin, 1991: 178).

III. PN Ceramic Exchange

At the start of the PN, evidence exists not only for the appearance of similar types of clay pots, but for their circulation as well (Fig. 70). An investigation on the exchange of pots in the EPN[6] demonstrated that although the majority of pots were made locally, the importation of pots occurred frequently. Imported pots were distinguished primarily through clay analysis[7], but slight differences in form, construction techniques and decoration, also aided in detecting vessel origins.

For instance, DFBW was exported to Bouqras from Mersin, over 400 km away. The origin of this ware was discerned by the limestone soil characteristic of Cilicia, but foreign to the Middle Euphrates region.

Le Mière and Picon's study showed that most of the traded items were fine wares or quality ceramics. Their circulation did not exactly follow the obsidian trade route and thus, it is a unique type of trade. This circulation of well-made pots is significant because it shows the continuation into the EPN, of a well-organized trade stimulated by nomadic activity (Le Mière and Picon, 1987: 133-135, 140-145).

---

[6] This study involved chemical analyses done on clays and pots from certain sites throughout the Near East, located in Syro-Cilicia, the Middle Euphrates and the Upper Zagros area such as: Bouqras, Ras Shamra, Byblos, Tell Ramad, Mersin, Abu Hureyra and Umm Dabaghiya (Le Mière and Picon, 1987: 133-135, 140-145).

[7] Differences in clay compositions between local and foreign clays distinguish a pot as being imported versus locally made (Le Mière and Picon, 1987: 133-135, 140-145).

IV. Extensive Trade and Social Complexity

A. Foreword

The acceptance of an innovation is also strongly linked to the existing socio-political structure. The rise of craft specialization constitutes one aspect of a complex society, which develops the capacity of a culture to accept new technological innovations (Dobres and Hoffman, 1999: 218; Rice, 1999: 45). For example, this exchange network encompassed the control and exploitation of raw materials, standardized manufacturing techniques, the production of finished goods, and finally their exportation (Hays 1993: 86; Aurenche and Kozlowski, 1999: 85-87). The standardized manufacture of goods and the different 'chaînes opératoires' that existed for items including obsidian and flint tools, and stone bowls, during the PPNB supports the notion that specialization existed during this time (Aurenche and Kozlowski, 1999: 87; Balkan-Atlı et al, 1999: 139, 142-143).

B. A Closer Look: Workshops in the Lithic Industry

The circulation of obsidian and flint encompassed the exchange of raw materials as well as finished tools, usually blades. The exploitation obsidian existed in Anatolia while the management of flint endured in the Levant. The preparation of raw materials and the making of tools for trade are referred to as the 'chaîne opératoire'. The 'chaîne opératoire', an elaborate process, entails the extraction of the substance from the outcrop, preparing it at a workshop, either on the outcrop area itself or at another designated site, fabricating it to produce specific products like blades and finally exporting it to outside sites (Balkan-Atlı et al, 1999: 137-140,

142; Aurenche and Kozlowski, 1999). [8] To illustrate the rationale of the 'chaîne opératiore' for the lithic industry: it involves the preparation of a core type suitable for producing a specific 'tool kit' for the sole purpose of exportation. An example of a 'tool kit', is a core used to produce lateral blades, which are sometimes used as blanks for PPNB projectiles points found in the Levant as well as in Anatolia (Balkan-Atlı et al, 1999: 137-140, 142).

1) Obsidian Workshops

a) Kaletepe

Studies on the Cappadocian sources[9], in particular at Göllu Dağ, offered much insight to the circulation system, which involved various workshops, particular knapping strategies and contact between workshops before entering into the exchange network.

The most important sources in Göllu Dağ are those situated in Kömürcü, which had several workshops and knapping areas. The best example of an obsidian workshop is at Kaletepe (Fig. 71), which has revealed a sequential, in situ stratigraphical deposit of blade debitage. Each sequential layer indicates an evolution of techniques over time, which suggests highly specialized knapping strategies[10]. Furthermore, this workshop contains the full 'chaîne opératoire' for each level and further demonstrates that there was more than one 'chaîne opératoire' to produce different types of cores and blades (Balkan-Atli et al, 1999: 137-140, 142).

---

[8] The principally exported item was long pointed blades but the trade of other sub-products like lateral and upsilon blades was also important (Balkan-Atli et al, 1999: 137-140, 142).

[9] The volcanoes in this area that contain obsidian are: Acigöl and Göllü Dağlar (known as the Çiftlik obsidians) and the Nenezi Dağ[9], Kayirli and Hasan Dağlar (Balkan-Atlı et al, 1999: 139, 142).

[10] For example, the uppermost layer of the sequence contains different types of unipolar cores like the pyramidal type core and evidence for both narrow and wide blades and bladelets. The next level contains a majority of bipolar and naviform cores (Balkan-Atlı et al, 1999: 139, 142).

b) Nemrut Dağ and Bingöl: From Site to Source

Although there have been no full excavations at the sources in Eastern Anatolia near Lake Van, chemical analysis has determined that these sources were exploited and tools were produced through the 'chaîne opératoire' as well (Cauvin et al, 1986: 96-97).

2) Flint Workshops

Evidence shows that sites were also located directly at flint resources. These observations suggest that workshops and the 'chaîne opératoire', operated in a similar way to those in the Anatolian obsidian system (Calley, 1986: 49, 56; Balkan-Atlı et al, 1999: 139).

a) Qdeir

One of the LPPNB flint workshops is at Qdeir, a desert site (Calley, 1986: 49, 56). Evidence at Qdeir does not display the full 'chaîne opératoire' as seen for many of the obsidian workshops mainly because it is not situated on a natural outcrop, but instead constitutes a link in the chain of activities, in collaboration with other sites in the El Kowm Basin. In this basin, the system commences at an outcrop, such as 'localité 35' where blocks of flint were broken down and imported to a workshop like Qdeir to be further processed into blades[11]. The stratigraphy shows that similar to the obsidian workshops, a series of knapping techniques to produce certain items evolved over time (Calley, 1986: 44, 49, 50, 54, 65-66).

b) SE Anatolia: Hayaz Höyük Workshop

In SE Anatolia, Hayaz Höyük has been identified as a LPPNB flint knapping site. The flint mainly consisted of blank tools such as blades and flakes as well as

[11] The preparation of the raw material involved producing a rough outline for the naviform cores in order to fabricate blades (Calley, 1986: 44, 49, 50, 54, 65-66).

debitage from cores. It may be compared to the flint knapping site at Qdeir in Syria (Roodenberg, 1989: 91-92).

C. Stone Bowl

The techniques behind manufacturing stone bowls were labor-intensive. Since most of these bowls were made from local materials they were generally produced on site. One instance of a burnt house at Bouqras contained both tools and materials relating to stone bowl production pointing to specialization (Roodenberg, 1986: 173). Due to the quality of the stone bowls and their long distance exchange (Aurenche and Kozlowski, 1999: 66; Le Brun, 1997: 33) it may be inferred that specialized craftsmen made them.

D. Copper Working

The working of native copper and mineral ores of this substance is found throughout the Near East (Fig. 72). The cold and hot treatments of metals in SE and Central Anatolia have been examined in Chapter 6. Other regions exhibiting advanced techniques in cold forging of copper include the Zagros zones, the South Levant and the Middle Euphrates (Hauptmann, 2000: 162-165).

The Zagros has many natural surface outcrops of copper and so it was easy to collect (Pigott, 1999: 108). Among the earliest artefacts collected in this region, is the pendant from Shanidar Cave made during the Zarzian or Epipaleolithic period (Pigott, 1999: 108 and Schoop, 1999:31). Later in the PPNB, copper working is evident at Ali Kosh, Nemrik, Jarmo and Maghzalia. At these sites copper has been made into tools or ornaments by using specific techniques involving cold

hammering[12]. For instance, beads were made by either rolling small strips of sheet metal into a tubular form or simply by perforating small lumps of copper (Bader 1993a: 25; Schoop, 1999: 31-32, 34; Pigott, 1999: 108).

In the South Levant[13], the primary sources for copper are situated in Palestine and the Transjordan. The earliest instances of accumulated copper in this region were revealed at Wadi Fidan 11 and Wadi Ghwair around 8000 BC. Although much copper was collected in this region[14], only little evidence exists for the application of cold techniques to shape it into a tool or an ornament (Goring-Morris et al, 1995: 53; Hauptmannn, 2000: 163, 165; Garfinkel, 1987b: 209).

Finally, in the Middle Euphrates region, the only metal findings were the copper beads discovered at Kerkh 2 (Tsunkei and Miyake, 1996: 124). The methods of making beads and tools in these regions, but especially in the Zagros exhibit similarities, skill and experience that point to artisans manufacturing these items with advanced cold techniques.

E. Plaster

In the previous section we have learned that the use of either lime or gypsum plaster was found throughout the Near East, and from Chapter 6 we know that a standardized manufacturing process existed to produce both types of plaster. It has been demonstrated that the production of plaster involves many costs like energy, time and materials, and requires skill. For example, at Çayönü the terrazzo floor used up about 1800 kg of limestone material, while at Jericho calculations indicate

---

[12] Studies on the copper sources showed that it contains a degree of arsenic, which made it more malleable and thus productions of objects required less treatment (Pigott, 1999: 108).
[13] The copper found at sites in the South Levant represents the earliest "mining" of natural copper sources (Hauptmann, 2000:162-165).
[14] 'Green stone', excavated from other PPNB sites in this region including: Basta, Beidha, Barga, and in Fenan, Kfar Hahoresh, Wadi Fidan A, Nahar Issaron, Yiftahel and Uvda-Tal, originated from this source as well (Goring-Morris, 1995:53; Hauptmannn, 2000: 163, 165; Garfinkel, 1987b: 209).

that covering one room's floor needed about 45 kg of plaster. These observations show that there must have been some sort of communal organization to obtain such vast amount of raw material and fuel (Garfinkel, 1987a: 71, 73; Kingery et al, 1988: 238-239).

The intra-site and inter-regional distribution of plaster is also a good indication of social differentiation and communal organization during the PPNB. For example, various amounts of plaster were applied to different houses at sites including Beidha, Munhata Yiftahal, Ain Ghazal, Çatal Höyük, Tell Ramad, Jericho. To clarify this observation; some houses contained large quantities of plaster while others were not plastered at all.

The notion of social differentiation is also supported by the amounts of plaster varying between sites. For example, many small villages such as Jarmo, Ali Kosh, Can Hasan III, Mersin and Ganj Dareh contain no lime or gypsum plaster whereas at most bigger towns like Jericho, Beidha, Byblos, Hacılar, Çayönü and Çatal Höyük there is evidence for much plaster (Kingery et al., 1988: 238-239; Garfinkel, 1987a: 70).

It has been proposed that a certain level of social complexity is needed for plastering these floors, since the making of this substance requires much labor, raw materials and fuel. For instance, to organize labor and obtain resources requires some sort of authority. Furthermore, as the application of this substance varies within sites and between sites a degree of social differentiation must have existed. Finally, a technically trained person or a specialized artisan was probably in charge of the producing and applying this substance (Garfinkel, 1987a: 71, 73; Kingery et al, 1988: 238-239).

V. Summary: Socio-Political Organization

The vast trade network of the PPNB was not only important for the movement of raw materials and finished or exotic goods, but for the exchange of culture and technology as well. The similarities in architecture, the use of clay, plaster making, lithic, stone and bone industry and subsistence strategies (i.e., agriculture and domestication of animals) between each region confirm that communication, cultural transmission and cohesion had existed through the whole Neolithic (Aurenche and Kozlowski, 1999: 86; Vandiver, 1987: 28-29; Le Miere and Piçon, 1987: 133-134). The rise of pastoralism at the same period (PPNB) contributed to the circulation of items as well as to the emergence of complex social organization.

The existence of different 'chaînes opératoires', uniform production techniques, high quality, and quantity of items exchanged consistently between all regions of the Near East suppose that a form of craft specialization existed. The complex exchange network, the uneven distribution of goods and products and the standardization of manufacturing techniques all support that the PPNB was a sophisticated and complex society.

As trade, interaction and social organization were in advanced stages, an innovation like pottery could be rapidly accepted throughout the Near East (Aurenche and Kozlowski, 1999; Garfinkel, 1987b: 207-208). Thus, the similarity of pottery types (i.e., employing the same technology and construction techniques) throughout the Near East at the start of the PN must have resulted from similar cultural interactions, exchange networks and maintenance of complex social organization (Vandiver, 1987: 28-29; Aurenche and Kozlowski, 1999: 86).

Thus, the conditions for the introduction of a new technology like pottery were in place: the level of organization and sophistication in the PPNB displayed by the complex trade (involving mobile groups like pastoralists), the production process of goods, advanced technology, familiarity with the substance of the future (clay), permitted the innovation, rapid acceptance and distribution of this new technology, pottery.

CHAPTER 10

PASTORALISM AND THE ETHNO-ARCHAEOLOGICAL APPROACH

> "Attempts to dismiss our lack of archaeological evidence for pastoral camps, by claiming that pastoralists do not use pottery or are so thorough in packing belongings that they leave nothing behind when they migrate are not supported by recent, early modern or early medieval observations by travelers and ethnographers (Banning and Kohler-Rollefson, 1992: 181)."

I. Introduction

Pastoralism as an autonomous practice emerged at the end of the PPNB. In the PN, it became a subsistence method that played a significant socio-political and economic role in the Late Neolithic way of life. The role and lifestyle of pastoralists must be examined in order to better comprehend the adoption of pottery technology in the PN. This subsistence strategy comes in different flavors (ie, semi-pastoralism and nomadic pastoralism) and each will be examined. After differentiating these terms, the use and importance of pottery for nomadic peoples will be examined using cross-cultural and ethno-archaeological studies.

II. The meaning of Pastoralism and Nomadism

Fully developed pastoralism denotes a specific way of life. Although there are many variants of this subsistence strategy usually in combination with agriculture (these are defined below), the most intense type of this survival method is nomadism. This term will be clarified below to illustrate the lifestyle and work of a nomadic pastoralist.

A. General Terms

Pastoralism consists essentially in the total control and management of a herd from which the pastoralist intentionally selects the animals to be killed, resulting in the manipulation of the herd's sex and age profile (Ingold, 1999: 78). Nomadism is defined as the regular migration of nomads with their herd "within a single, narrow, though geologically extensive, ecological niche" (Cribb, 1991:372). In strict terms, this definition applies only to pastoralists, while hunters, the other major type of mobile group, exploit a variety of resources and niches and focus on consumption, not production. In this sense the pastoralist's focus resembles that of the farmer: pastoralists concentrate on one strip of pastureland while a farmer deals with one plot of farmland (Cribb, 1991a: 372-373). Therefore, pastoralism is defined as a separate form of subsistence economy in which the majority of a population can be taken into periodical pastoral migrations when they are constantly moving and living in camps. They survive off their animal products and trade for other types of goods (Kohler-Rollefson, 1992: 11; Bernbeck, 1992: 83).

1) To be a Herder

The life of a pastoralist entails making seasonal cycles and following regular migration tracks.[1] A pastoralist is focused on maintaining the balance between production and consumption, where the main objective is not exploiting the animal in order to survive, rather making the animals *produce* goods for *both* daily and long term needs such as items for trade (Meadows, 1992: 262; Cribb, 1991b: 17; Cribb, 1991a: 373). These items are also referred to as secondary products and include wool, hides, meat, blood, labor and dung. Furthermore, owning a herd also offers

other advantages like prestige, trading surplus and subsistence security (Kuznar, 1990: 142).

The migrations associated with pastoralism are based on the seasonal availability of pasturelands and of adequate water[2]; they also involve moving all necessary needs like staple foods and housing. All these factors will affect how long a place will be used, when to move, where to go, group structure (for a certain season), and how to get around. Pastoralists are thus dependant on their environment for their own survival and because the appropriate pasture for the animals occurs at different places in different seasons (Rosen, 1992: 141, 158; Cribb, 1991: 373).

Socio-economic factors also play an important role in migration. The pastoralist must concentrate on finding pastureland, which proves more difficult in a degraded environment. The competition for grazing land between different nomadic groups as well as arable land between farmers and pastoralists caused the development of a particular territorial system in order to manage good land. This system involved physically separating the farmland and pastureland, so that the pastoralists either lived permanently in sparsely vegetated and watered areas, or made long migrations to marginal areas part of the year[3]. Therefore, the pastoralist usually has no choice but to be at least partially mobile, practicing seasonal movements or transhumance, while in other examples the group needs to be totally mobile (Rosen, 1992: 141, 158, 159; Cribb, 1991: 373).

---

[1] Some nomads frequently change their migration paths, and a great shift from a regularly traveled path can have significant impacts on the distribution of migratory groups (See below) (Cribb, 1991a: 371).
[2] The location of campsites also depends on the distribution of pasturelands (i.e., side by side or dispersed among different areas), quality of the pasture, size of group and the ratio of humans to animals. Most campsites are made to accommodate the humans herding the animals, which is why for example, they have nearby water such as a spring or stream, and firewood. Dung may also be used for fire, but a camp must be occupied for a certain amount of time to collect and dry the dung (Cribb, 1991: 373-374).
[3] Hence, their campsites are usually too high topographically or in regions too arid to maintain agriculture themselves (Cribb, 1991: 374).

The pastoralists' way of life, however, is also not devoid of uncertainties, as the risk for a natural disaster persists, such as an epidemic when the whole herd dies (Ingold, 1999: 78). Pastoralists will only revert to agricultural practices and incorporate themselves into a sedentary society in times of stress or when forced by some authority (Cribb, 1991: 374). It is important to stress that once this lifestyle (pastoralism) is firmly established, it is not easy to revert back to hunting due to both social and environmental factors (Kuznar, 1990: 142).

Therefore, pastoralism is a time-consuming and laborious work that requires incessantly watching over tamed animals to protect them from predators, to provide them with adequate resources and to manage them (by selective killing) so as to not disrupt the reproductive process (Ingold, 1999: 77, 113; Kuznar, 1990: 141; Smith 1974: 7).

2) Agriculture and Pastoralism: Various Combinations of Subsistence Methods

Different forms of pastoralism have been recognized based on two factors: the amount of mobility or sedentism a unit has and to what level they practice agriculture versus pastoralism. A unit may represent a household, a tribe or an entire village.

Attempts to denote terms to define the different types of pastoralism are useful, but are not concrete and many times confusion arises or definitions become mixed (Meadows, 1992: 262; Cribb, 1991b: 19-20). The reason why it is so difficult to define the different forms of agro-pastoralism is because the relationship between the herder and the farmer is a very intricate one. The balance between mobile/sedentary, agricultural/pastoral will define to what extent pastoralism is practiced (Bernbeck, 1992: 83; Cribb, 1991b: 18-20, 25). Examples of suggested terms include the following: nomadic pastoralism, semi-nomadism, semi-sedentism and semi-pastoralism. The definition of full nomadism is precise as is the idea a full

or 'pure' agriculturalist, but the terminology for semi-mobile/sedentary and semi-agricultural/pastoral peoples is still ambiguous. For example, nomadic pastoralism, also referred to as 'pure' or full nomadism indicates those who make seasonal movements annually and do not practice agriculture, and if so only in a primitive form. These regular migrations, however, encompass sporadic movements that eventually cause a shift in their overall entire movements. These shifts occur in some groups more than others (Cribb, 1991b: 18-20, 25).

Semi-pastoralism[4], semi-sedentism and semi-nomadism are different terms that refer to various groups who practice both agriculture and pastoralism. The group may comprise a whole village that farms and herds seasonally, or a certain group from within an agricultural village such as a family, tribe or several tribes who leave the village seasonally. Other forms of this complex relationship include a household member leaving the village to practice nomadism or the agreement between two different villages, one pastoral and the other agricultural, to conduct mutual exchange. It should be noted that almost any group can interchange between agriculture and pastoralism. For instance, one year a family may stay and farm, while the next year the same family may migrate with the herds. Thus, semi-pastoralism involves the seasonal movements of individuals to exploit a specific ecological niche, which either requires a long or short travel to different geographical locations (Bernbeck, 1992: 83; Cribb, 1991b: 18-20, 25).

In general, transhumance refers to the seasonal movements of all types of pastoralists with their flocks to different pastures in the same ecological niche (Cribb, 1991b: 18-20). Transhumance corresponds to two general types of transfers known as horizontal nomadism and vertical nomadism. Horizontal nomadism concerns treks

between different ecological niches on the same elevation whereas vertical nomadism refers to seasonal movements from the highlands to the lowlands (Bernbeck, 1992: 83). Studies on nomads of different periods show that the distribution of campsites reflects the type of nomadism and migration (Cribb, 1991: 19). Large sites are associated with vertical nomadism, which entails the use of lowlands in the winter and spring and traveling to the highlands in the summer and fall. Conversely, horizontal nomadism is seen with smaller sites such as tent camps, which are used during any season and dispersed throughout the landscape (Rosen, 1992: 160-161).

B. Ethno-Archaeology: Pastoralist Campsites

As we have seen in Chapter 4, from modern ethno-archaeological studies the pastoral campsites match the archaeological record in many ways. The general characteristics of pastoral campsites will be described in more detail in order to compare these traits to an EPN campsite in order to further strengthen the arguments that: 1) campsites did exist and can be seen archaeologically and a major indicator in uncovering and understanding a pastoral campsite is its ceramic assemblage.

Identifying the type of subsistence economy practiced at a site and its degree of permanence is hard. This observation applies particularly to pastoralist campsites, because they have not been intensely studied (Gilead, 1992: 30-33; Haiman, 1992: 94-95). Recent ethnographic studies have shown the kinds of artifacts and features associated with the lifestyle of the herder. For instance, a permanent base for portable dwellings is very important for the nomad. This base consists of a repeatedly occupied area such as leveled floors, stone storage platforms or a stone footing marking out the living space, over which a tent is placed. Other features of campsites

[4] I will use the term semi-pastoralism to designate any reference to semi-pastoralists who practice a

are stone lined hearths, alcoves and even substantial walls. In most cases of modern campsites, the camp area is surrounded by a wall. The internal space of a tent cannot be expanded onto like a house, thus it is organized and maintained in a strict manner to avoid overcrowding. Within the dwellings, hearths and drainage ditches are also found. The use of adjacent, outdoor areas is also fairly standardized (Cribb, 1991a: 236-237; Cribb, 1991b: 66-68). For example, underground storage and bell shaped pits located in the courtyard, (which are also used by sedentary societies) are employed by semi-nomadic peoples who seal them off when they abandon a site and open them when they return (Rocek, 1998: 207; Russo, 1998: 143, 160). Thanks to the fairly uniform and unchanging use of dwelling and outdoor space, a comparison of these studies and the archaeological data is very useful.

Attempts have been made to find factors that distinguish sedentary sites from mobile ones. Through ethno-archaeological studies, defining factors between temporary and permanent sites have been recognized in: architecture, water sources, vegetation, size and location of sites and the presence of certain artifacts and features (Gilead, 1992: 30-33; Haiman, 1992: 94-95; Banning and Kohler-Rollefson, 1992: 203). For instance, although the features of temporary sites illustrate certain aspects of permanent constructions such as large stones as foundations, they are distinguished by the existence of improvised light superstructures. More particular to temporary campsites is the construction of round rooms with attached or separate pens and the production of stone objects and pottery (Haiman, 1992: 97-98).

Thus pottery, which is still used by many mobile groups today, must have been much more common before the appearance of glass, metal and plastic. Furthermore, the use of these other containers in place of pottery is observed in

---

combination of the agro-pastoralist subsistence strategy.

present-day villages as well, and so we can presume that pottery was employed much more for both settlement types in the past (Cribb, 1991b: 66, 75).

C. Pastoralism of the PPN and PN of the Near East

Archaeologically it is much more difficult to differentiate among the types of pastoralism represented at any site than to determine whether a site is permanent or temporary (Finkelstein, 1992: 134). Although it is difficult to pinpoint exactly what degree or type of pastoralism was practiced during the transitional period from the end of the PPNB to the start of the PN, it has been suggested that both nomadism and semi-pastoralism existed. Studies of early pastoralism in the Transjordan Plateau as well as in the Deh Luran and Susiana Plains in Iran illustrate that early semi-pastoralists did exist, for instance. In this region, they made seasonal, long (vs short) patterned migration routes to marginal environments (Cribb, 1991b: 80-83, 212; Bernbeck, 1992: 84-85).

1) Tepe Tula'i, Iran: A Closer Look

Tepe Tula'i is an early campsite of semi-pastoralists dating to the end of the 7th millennium in the EPN. Herders migrated seasonally there with their herds from their village in the Khuzistan Plain to the mountains. Remains from the layers at this site included ashes, stone clusters and ceramic.

Four groups of wares were discovered at the site: plain wares, (straw tempered surface treatment varies), red slipped wares, black painted wares and a red painted ware. As these same wares were found throughout the region, it was first thought that the distribution resulted from exchange. Intense studies on the ceramic assemblages revealed, however, that these wares were distributed throughout the region mainly because they were carried along with a pastoral group when it migrated, though this is

not to say that no exchanges occurred. The evidence also indicates that the pastoralists were moving around with their tents. In addition, the faunal remains of Tepe Tula'i show that few young aniimals were killed there, which suggests that fallow herds were kept at the location. The significance of this observation can be explained in the following way: sedentary villages usually contain a subsistence herd, comprised of mostly younger animals, whereas a fallow herd is kept away from the agricultural village and lands and includes older, non-lactating and sub-adult animals. Additionally, the fact that more goat than sheep bones were found suggests that this site is a seasonal transhumant camp because goats are harder to manage than sheep, who are controlled more easily and thus able to stay near the village.

The evidence from Tepe Tula'i shows that a combination of sedentary and mobile populations existed. The features, assemblages and faunal remains indicate that this site was primarily visited by semi-pastoral people or village based herders, who moved "periodically along the Zagros foothills and exploit[ed] favorable niches." The sedentary sites, Chogha Sefid and Chogha Bonut are the likely origin for the seasonal pastoralists of Tepe Tula'i. The migrations in the Deh Luran and Susiana comprised horizontal movements leading east and west[5]. As the herders migrated, intense and continuous contacts were created amongst these migratory peoples from different villages, as well as between them and the sedentary population of other villages. Thus, based on ethno-archaeological comparisons, it has been determined that semi-pastoralists visited Tepe Tula'i, subsisted off their animal products and gathering during their transhumance, carried all necessary belongings (i.e., pots) and stayed in contact with the villages in the vicinity of their movements (Bernbeck, 1992: 77, 78, 84-87).

III. Pastoralists and Pottery: Cross Cultural and Ethno-archaeological Studies

In this section we will observe the evidence for the relationship between clay vessels and both fully and semi-nomadic pastoralists. Cases include cross-cultural studies of various areas during the Neolithic, Bronze Age, Arab and Byzantine periods as well as ethnographic and ethno-archaeological research concerning modern nomadic pastoralists.

A. Foreword

Ethno-archaeological and cross-cultural comparisons are essential because they further our understanding of ancient technology, such as pottery technology, by offering insights on the development of an innovation, manufacturing techniques and the socio-economic organization involved in craft production (Dobres and Hoffman, 1999: 4; Dobres, 2000: 213).

B. Cross Cultural Examples of Pastoral Activities and Pots

1) Neolithic Sardinia, Italy

During the early Neolithic of Italy, residents of a cave in Sardinia practiced hunting-gathering alongside herding and some agriculture[6]. In the middle Neolithic period the archaeological evidence indicates that the cave was visited less frequently, domesticated animals were fully incorporated into the economy and most significantly, pottery appeared. The type of pottery found here also occurred on contemporary open-air agricultural sites. The main agricultural settlement connected to this pastoralists' cave was probably located at an open-air site in the vicinity. In

[5] Pottery types show that at Tepe Tula'i transhumant peoples were coming from both east and west at

this case, the pastoralist activities were not totally isolated from the sedentary sites, rather they were interrelated (Lazrus, 1999: 125).

2) Byzantine and Arab Pastoralists

According to historians and geographers of the Byzantine and Early Arabic Periods in the Central Negev, pastoralists lived on the fringes of the empires, and thanks to recent research[7] they have been recognized archaeologically. Hundreds of sites including large and small camps have been found, but there were probably thousands. Large camps show many living structures, and different types of building and installations including pens, silos and storage pits. At these sites, there was also much pottery, consisting of a small range of shapes like jars, juglets and cooking vessels. Some of these pots comprise crude, locally made wares. The rest of the pottery was imported from the cities in the Negev.

Small camps are similar, except they contain fewer structures and a smaller range of other features. The tent camps show stone lines, cleared areas, fire pits and ceramic scatters. Pottery also existed at these small sites in both local and imported wares (Rosen, 1992: 154-155).

3) Middle Bronze Age Central Negev

During the MBA in the Central Negev there are two basic classes of settlements: normal villages and small campsites. The small sites are interpreted as the seasonal camps of semi-pastoralists or full pastoralists who migrate with their herds. The artifacts associated with these pastoral sites such as at Horvat 'Ein Ziq, are round or elliptical multi-roomed dwellings that contained pottery including storage jars, bowls, jug and juglets (Cohen, 1992: 109-111, 116, 123).

---

first and later only from the east (Bernbeck, 1992: 77, 78, 84-87).

C. Ethno-archaeological Cases

The following ethnographic case studies provide more modern examples of herders using and making earthenware pots. From these studies it has been observed that clay vessels are manufactured and used largely by semi-mobile groups like semi-pastoralists, frequently by sedentary ones like agricultural villagers, as well as occasionally by fully mobile groups. For example, even modern hunter-gatherers employ pottery in their daily life (Rice, 1999: 21). Thus, according to ethnographic documents, pottery is definitely included in a non-sedentary, pastoral way of life.

1) Bedouins (Fig. 73)

a) Iraq

The Bedouins in Iraq made straw and chaff tempered unfired clay vessels. These were recorded to have long lives and if well cared for they could last up to 6 ½ years. Among the diverse items crafted, were dishes, storage jars, ovens, and even jewelry for the dead (Rice, 1999: 29).

b) Southern Israel

An ethno-archaeological comparison of both agricultural and pastoral Chalcolithic sites in Southern Israel and similar modern day settlements illustrates the use of pottery by pastoralists. The Chalcolithic herding station of Nahal Sekher contains pottery fragments that are similar to the wares found at agricultural sites, only the former are of lesser quality. The pottery of this campsite also illustrates basic shapes, such as bowls and jars, which have utilitarian functions like storing and food processing, or cooking. In comparison, the Bedouins (semi-pastoralists) of Southern Israel also employed earthen pots in their daily use, although they did not make their own clay vessels (Gilead, 1992: 32-33).

---

[6] There is no pottery in these early levels (Lazrus, 1999: 125).

c) Jordan

References to the Bedouins of Jordan in the 19th century indicate that they used earthenware containers and cooking pots. Modern-day pastoral camps in the Beidha area have been examined[8], and evidence for occupational features like dung accumulations, plant use and pottery have been recorded. Other remains include bed platforms, cairns, corrals, chicken houses, ditches, hearths, ovens, pits and screen walls as well as portable objects: batteries, cans, combs, saddles, shoes, spoons and textiles. The Ammarin, a pastoralist group near Beidha, remarked that they had used pottery very much until recently, when they replaced most of the clay vessels with metal and plastic containers, having kept only small clay cups (Banning and Kohler-Rollefson, 1992: 183, 195).

d) Negev

A survey on the abandoned campsites of the Bedouins in the Negev Highlands indicated that these nomads used pottery. Many of these sites were difficult to locate as they contained no architectural remains, but could be recognized thanks to fragmentary lines of stones, round installations and most importantly by ceramic concentrations. The pottery from this campsite mainly consisted of black "Gazean Ware" jars, which were made in the city of Gaza. They are found throughout the Negev and the southern Judean Hills. The assemblage also included fragments of small ceramic cups (Avni, 1992: 245, 247).

e) Tur Imdai, Jordan

The cave of Tur Imdai was usually associated with the Bedouin of Petra who raised sheep and goats. The traditional owner of this area was the sub-tribe al-

---

[7] The Negev Emergency Survey.

[8] Certain criteria apparently determined the selection of nomadic sites: elevation, distance from hilltops, valley bottoms and sources of water, and wind exposure (Banning and Kohler-Rollefson, 1992: 182).

Fuqarah, who used it mainly for agricultural purposes, but now this area is claimed by the Sa'idugin tribe. In the 17th century a climatic shift occurred from warm and dry to cold and moist weather. Concurrently, this cave began to be visited seasonally during the winter by the Bedouins when it is still warm, while in the summer they migrated to the Petra Plateau. The artifacts inside the cave include fireplaces, semi-circular enclosures for goats and platforms of flat slabs for shelves. Debris consisted of goat dung, lithics and ceramics. In total, there were 72 sherds found of hand-made coarse ware comprising mostly cooking pots but possibly one storage jar. It is proposed that these vessels were expediently manufactured at the site (Simms and Russel, 1997: 459-467).

D. Darfur, Sudan: Case Study 1

This case concerns present-day semi-nomadic potters in Darfur, Sudan. The village of Kebkebiya is a sedentary agricultural village. The peoples of Zaghawa are a migrant group, who set up camp outside Kebkebiya in the dry season. Some of the migrants stay the whole dry season, which lasts for 6 months, while others remain for less time, and continue on migrating to other centers. Groups are made up of female potters and their husbands, who are blacksmiths. They all return home in the rainy season to cultivate their fields. They also own animals like cows and camels. They provide pots for Kebkebiya, or for other villages if they move on.

The potters work for up to seven days and altogether fire up to about 30 vessels a day. These include a variety of types: water jars for storage and transportation, other storage jars, and those for cooking and preparing food etc. They do not use ceramic for serving food.

Clay is gathered from three places, two on the riverbank opposite the camp and one a kilometer away. They must be mixed together in equal proportions because any other combination will be unusable. First, the clay of the body part is tempered with crushed millet husks kneaded in 1:1 proportions with the clay. The neck is made with clay mixed with crushed donkey dung. It should be noted that no water is added to this preparation as the temper provides sufficient plasticity, suitable enough for arid climates. The body and neck are prepared differently because the neck requires more plasticity to be formed. Shapes of all vessels are primarily round or semi-spherical, with a trumpet like neck. The body is "beaten out with a rounded hammerstone on a fibre mat, using a hollow in the sand as a mould" (Tobert, 1984: 143). After the body dries and hardens a bit, the neck is made using the coiling technique. Before firing, vessels are coated with a haematite and mica slip, burnished with plaited leather thonging or a stone and then polished with a soft cloth. Firing entails a two-step process. Firstly, the vessels are preheated around a small fire with the mouth of the clay pot pointing towards the fire. Next the 'real' firing is carried out in a bonfire using a shallow circular dug-out in the sand, between one to three meters in diameter. The bottom of this pit is smothered with a layer of broken up goat or cattle dung mixed with straw. The positioning of the vessels in the bonfire is important to control the effects of oxidation and reduction on the surface. The large vessels are placed in the center, so that the mouth of one lies behind the base of another, and around them are the smaller vessels. Other types of vessels, such as water storage jars have special requirements; they are fired red on both surfaces and placed on their sides so that air is allowed inside. By contrast, water transportation jars have a black interior and so are placed upside-down to create reducing conditions inside the vessel. It should be emphasized that this particular firing technique is used

to create vessels with different functions[9]. Once the vessels have been properly positioned, the bonfire and pots are covered with a thin layer of dried cow dung. The bonfire pit is surrounded with bricks and/or stones to control the fire, keep the heat in, and to protect the fuel from fast combustion if there is high wind. Finally the fuel is lit with some dry straw bundles, which are placed according to the wind. The wind is a significant factor in this case; if there is no wind the fire is left to burn out, but if the wind is high it must be checked regularly. The firing temperatures are judged on color changes. The firing of these vessels must not reach or surpass 900 degrees C or else cracks would develop. Technical studies on these pots demonstrated that at every 50-100 degree interval the surface color changed. In sum, these potters show sophisticated pottery manufacturing methods as they are experienced in choosing clay, fuel, in preparing the clay, skilled in forming and firing the pots (Tobert, 1984: 141-155).

E. Negbite Pottery: Case Study 2

Some answers on the relationship between pastoralists and pottery may be sought by looking at the case of Negbite pottery (Fig. 74). There is evidence for a long, uninterrupted tradition for this pottery type, extending from the Early Bronze Age to the Islamic period. This pottery was made locally, and characterized as a handmade, straw tempered coarseware. It is principally found during the Iron Age in the central and southern Negev, the Arvah Valley, and Israel, but surveys have shown that it was made during other times, and that its distribution included the western Negev.

[9] The red oxidation on the inside of a water storage jar makes the fabric more porous, which is more suited for storage, whereas a black reducted interior has less porosity because of the carbonized surface and is better for transportation (Tobert, 1984: 115).

The consistency of the Negbite ware over this time is remarkable, for throughout this entire region, the selection of clay remained constant, with little exception: a silty light tan to brown, rich in shales found throughout this desert geographical region. Also, the temper remained the same, usually dung or vegetal (straw) inclusions, but sometimes sand was included in combination with one of the other two. The organic temper left a gray to black core. All of these vessels were hand made using the coiling technique. This pottery was fired to a high temperature, as much as 900-1000 degrees C, which can be achieved by blowing air into the hearths and in the absence of kilns, this would seem to be the case. The end result is a crude ware. It is generally accepted that this ware was made by desert populations.

Other ceramic wares called "normal wares", which are diagnostic of a certain period were manufactured alongside the Negbite pottery in villages or cities. These wares were distributed throughout the countryside as a result of population movements or trade, as is indicated by the occurrence of "normal wares" at desert sites that also contained Negbite pottery.

As Negbite pottery is only recorded in small, temporary settlements it has been associated with pastoralism. The materials to make this pottery are readily accessible to a pastoralist society and would support this suggestion. For example, dung is a very good temper especially in the case of cooking pots. It gives clay the same qualities as vegetal temper because it increases plasticity, reduces shrinkage and creates voids when fired, which reduce the risk of cracking while cooking. This ware shows that its potters were not full-time specialists, but conservative artisans, probably working seasonally.

Such a long continuum of technology within this large area suggests one of three observations: 1) local pastoralists are not innovative, 2) they have an

unchanging socio-political system, or 3) the unbroken procedure of vessel making simply implies that pottery is not related to political or social changes but instead to economic circumstances.

In this case, it was concluded that the manufacture of a continuously similar clay vessel type was related to economic factors. Firstly, they were made for local and household use like preparing foods. As cooking pots break readily, local manufacture was an easier and cheaper alternative to importing this type of vessel. Furthermore, they were made with cheap, easily available resources such as dung for temper. However, the importation of "normal" wares shows that the Negbite wares did not suffice for all the community needs. These imports also reflect the relation between the sedentary and nomadic communities (Haiman and Goren, 1992: 145-150).

IV. Summary

A. Pastoral Lifestyle and Clay Vessels

It has been determined from the ethno-archaeological and cross-cultural studies that pastoralists can be observed in the archaeological record. Most significant is that nomadic campsites not only contain sherds; they are identified by assemblages of pottery (Banning and Kohler-Rollefson, 1992: 192). This observation proves that pottery was and is used much by peoples exhibiting different types of pastoralism. These case studies also show that most pastoralists travel with their essentials, generally including their pots, tents and other household goods, on seasonal and year-long migrations. Finally, these examples demonstrated that not only did both nomad and semi-nomadic people use and carry their pots from camp to camp, they also made their clay vessels on site. This observation will be examined more closely below.

B. A Comparison

From the two case studies it has been determined that an important relation exists between a non-sedentary lifestyle and the development of pottery making. From the first case one learned that a complex manufacturing process and pottery of high quality is obtained by pastoralists, in particular semi-pastoralists. The second case study informed us that pottery tradition in a pastoral lifestyle tends to be very traditional due to economic factors.

Based on all the studies, it has been observed that mobile societies transfer pottery in order to use it in their daily life, while a non-mobile society transports pots to be traded. Also observed in the studies, although the majority of totally mobile groups do not make high quality pottery, they produce expedient wares. In most cases, nomads employ well-made pottery in their daily activities.

The relationship between semi-mobile peoples and pots is more significant however because they use and make high quality clay vessels as illustrated by ethnographic comparisons. Semi-nomadism may be the ideal subsistence strategy for making earthenware, as semi-nomads have enough permanence to have the time to fabricate pots, and also enjoy the advantage of moving from place to place to increase the possibility of obtaining the right resources and environmental conditions necessary to produce a clay pot [10], as is seen in both case studies. It is important to note however, that both were semi-pastoral groups rather than fully sedentary or fully mobile, which infers that they are more inclined to develop the *initial stages* of pottery making on a *large scale*. However, to make pottery a full-time craft, a sedentary society is needed, situated in an area with good resources, large population and high demand (Arnold, 1988: 113, 119, 124-125).

V. Pottery and Pastoralists: Conclusion

The evidence attests that argillaceous pots are employed and made by nomadic and semi-nomadic peoples. The evidence for the Late and FPPNB and EPN suggests that different forms of pastoralism, for instance, semi-pastoralism and nomadic pastoralism existed. It has also been noticed that in the course of pastoral migrations, interactions between different nomadic groups as well as between herders and agriculturalists occur, setting the stage for cultural exchanges.

The comparison of modern pastoralism and the evidence for the PN, seen in chapter 4 demonstrates the existence of pastoral campsites during the FPPNB and the EPN. Features common to both, such as: dug-out pits or stone bases and the reuse of older (PPNB) structures and floors (by digging down to make dug-outs and to use floors and structures as bases), over which there are no permanent superstructures but instead tents, hearths, pits, 'the four' domesticated, or proto-domesticated animals, and in many cases pottery further confirm that when full blown pastoralism appeared so did pottery.

Therefore, the evidence from the transitional stage matches cross-cultural and ethno-archaeological examples and further demonstrates that archaeologists have known about the employment and manufacture of pottery by mobile and semi-mobile herders, but have not realized to what extent pastoralists have played a key role in the development of pottery on a widespread scale. In particular, the balance of sedentism and nomadism observed in semi-pastoralism was essential to the initial stages of sophisticated, widespread pottery production observed in the EPN.

It seems that the conditions of the FPPNB and the EPN allowed for the development and adoption of pottery technology by pastoralists. Therefore, the link

---

[10] The ecological conditions needed are a dry enough climate so the clay may easily dry after being

of pastoralists to ceramic making and the daily use of clay vessels must not be overlooked, for it constitutes the main force behind the development and widespread distribution of the first clay pots in the transitional period from the PPNB to the PN.

prepared, as well as enough water in the vicinity to water the clay.

CHAPTER 11

ENVIRONMENTAL CONDITIONS AND HUMAND CHOICE: THE SPARKS THAT SET THE FLAME

I. Introduction

Certain scholars emphasize that the limits imposed on a population by the environment control the way they evolve while others stress that the progression of a society is based on human choice (Sanlaville, 1996: 8). However, the majority of scholars agree that both environmental circumstances and socio-economic processes are key factors involved in the developments of a culture, which in this case concerns the invention and innovation of pottery technology (Rice, 1999: 3, 46).

II. Paleoclimate

In the early Holocene climatic fluctuations played a major role in shaping human lifestyles. In the PPNB, ecological factors still played a large role, but due to the social complexity of this culture and their part in modifying the surrounding ecosystem, people acquired more control over the way they adapted to any given circumstances (Goldberg and Bar-Yosef, 1990: 69, 71).

A. Sea and Lake Levels

The Holocene optimum defines a time when temperatures increased, causing sea levels to rise (Sanlaville, 1996: 23). Studies on the changing level of the Black Sea, the Mediterranean Sea, the Dead Sea and several lakes suggest that the climatic

conditions from 13000-10500 BC were more humid. After a short dry spell, the climate became wetter and warmer again from about 9000-7500 BC. Dating to 7500-6500 BC, a dryer climatic phase started that corresponds to the reduction in size of the Mediterranean Sea. Later, around 6500 BC, warmer and wetter weather returned but to a mediocre level (Sanlaville, 1996: 17; Roberts, 1998: 87, 92-94).

B. Vegetation

The increase in moisture in the atmosphere during the Holocene climatic change brought about modifications in vegetation, such as the decrease of deserts and tundras and the increase of grasslands, tree growth and forest expansion (Sanlaville, 1996: 11; Roberts, 1998:106, 123). The changes in the environmental conditions also saw new fauna (Buitenhuis, 1990: 195; Roberts, 1998: 123; Sanlaville, 1996: 25). The climate was wettest and warmest during the PPNB or 8300-6900 BC. The peak of this vegetation growth occurred around 7600 BC, but after this date the climate became increasingly dry until about 6900 BC. The vegetation increased moderately after 6900 BC, showing the return of a more favorable climate (Sanlaville, 1996: 11; Roberts, 1998:106, 123).

III. Human Impact on the Environment

Even non-industrial societies, such as that of the PPNB, induce changes in their surrounding environment. Agriculture and pastoralism are still responsible for most of the serious environmental problems and changes in the landscape today (Goudie, 1990: 322-323). In practicing agriculture and pastoralism, humans become dependant on the plants and animals they exploit. Conversely, they rely on humans as well, for instance plants need humans to germinate while animals require feeding

and protection (Roberts, 1998: 151). In this section, social factors will be examined to see how they play a part in altering natural processes and the environment.

A. Agriculture

Although mobile societies do practice farming or shifting cultivation and hunter-gatherers may be sedentary, it is the combination of a sedentary and agricultural way of life that has a significant effect on the surrounding environment. Cultivating fields means the clearing of trees and taking of land, which causes wild animals to relocate to other habitats. Additionally, erosion from agriculture pollutes waters and activates desertification and salinization of soils (Roberts, 1998: 151; Goudie, 1990: 323-324).

B. Pastoralism

Since pastoralism emerged, it has manifested itself in different forms that exploit sets of different ecological settings. The introduction of pastoralism, like agriculture, had an impact on nature (Roberts, 1998: 178).

The constant grazing of animals causes excessive trampling that eventually reduces the size of soil particles and plant sprouts so that soil is carried away by erosion (Goudie, 1990: 34-35). The overgrazing of pastures by herded animals does not allow the natural grasses or trees to regenerate because they are constantly eaten. The decrease in grasses and trees furthers the erosion process while allowing less palatable/resistant species like heath and macchia to cover the landscape that renders it useless for both pastoral and agricultural activities[1] (Goudie, 1990: 35; Roberts,

[1] If the natural ecological process were permitted to continue over a long period of time, woodlands and grasslands would be the predominant vegetation in the Mediterranean (Roberts, 1998: 187).

1998: 187). Caprines[2] cause the most damage to the surrounding ecology especially in a semi-arid ecosystem. (Rollefson and Rollefson, 1990: 9).

C. Plaster making

It should be noted that the process of plaster making requires much fuel, especially trees, which can contribute to the desiccation of the environment. The depletion of trees used for fuel, combined with slash and burn agriculture can result in accelerated erosion, causing the loss of nutrients in the soil. Grazing of animals in the same area where trees have been cut down further exacerbates the situation, as it does not allow the trees to regenerate (Rollefson and Rollefson, 1990: 4).

IV. The Environmental Factors of the PPNB and PN

A. The Influence of Climatic Change on Culture

Throughout Western Asia, the climate not only varies according to region, it also fluctuates within regions (Henry, 1986: 8; Geyer and Besançon, 1996: 6). For example, in the South Levant rainfall decreases greatly towards the Negev area (Sanlaville, 1996: 8).

It has been observed that climatic changes do not always synchronize exactly with cultural changes because their eventual impact is felt only after a certain delay. For example, the vegetation needs time to adapt to any conditions, causing a change in fauna, which together have a greater impact on humans and their survival methods. Therefore, the gap in time does not mean that cultures have no attachment to ecological conditions; on the contrary it takes time to react or to adapt to a given set of circumstances (Sanlaville, 1996: 24).

---

[2] Like cattle and sheep, goat eat grasses, but are more destructive as they prefer the young sprouts of trees and plants and so stunt the growth of productive vegetation (Rollefson and Rollefson, 1990: 9).

B. The Environment and the PPNB Culture: An Overview

Human populations are affected by environmental changes, and must adapt to them. Thus, the environment has given one cause for social evolution, but is not the only factor and does not determine the exact path a society may take to adapt to any given circumstances (Sanlaville, 1996: 8, 25). The human impact on the environment is also very significant and agriculture and pastoralism affected local vegetation and fauna distributions that triggered changes in the ecosystem to which people had to adjust (Bar-Yosef, 2001: 151; Goldberg and Bar-Yosef, 1990: 79; Buitenhuis, 1990: 195).

It is useful to compare the general climatic sequence for the entire Near East for the PPNB and EPN with the cultural sequence as it gives a good idea of the relationship of the society with its environment. Firstly, because of higher lake levels, stabilized sand dunes and a shift from desert to semi-desert or savanna grassland vegetation, the PPNB (8300-6900 BC) had overall favorable climatic conditions involving hotter and wetter conditions with a high point at around 7500 BC. The increased precipitation was evenly distributed making it beneficial, which promoted farming in a new way and allowed for the growth of site size, the settlement of new sites and expansion to new areas, such as the settlement of agricultural sites in marginal regions (Sanlaville, 1996: 25; Goldberg and Bar-Yosef, 1990: 83; Simmons, 1997: 313).

While this wetter climate offered benefits, it also exacerbated erosion, which had been intensifying already from the overexploitation of the large PPNB villages (Moore, 1995:44-45; Copeland and Hours, 1983 : 75; Cauvin and Cauvin 1993:24-25; Bar-Yosef 2001; Zarins 1989; Sanlaville, 1996: 25). Overuse of the surrounding

ecosystem by these villages is illustrated by the use of wood for architecture and fuel for plaster, the clearance of forests for agriculture creating deforestation as well as overgrazing by domestic animals during the PPNB. All of these factors had devastating consequences (Goldberg and Bar-Yosef, 1990: 84). Such conditions left soils bare and rain enhanced runoff and loss of good soil for crops (Cauvin and Cauvin, 1993: 24-25). This adverse ecological situation is harsher in marginal environments such as the South Levant (Buitenhuis, 1990: 200; Goldberg and Bar-Yosef, 1990: 84; Sanlaville, 1996: 26).

C. The Effect of the Environmental Circumstances: The EPN

These unfavorable conditions became worse when the arid fluctuation commenced after the peak at 7500 BC, or L/FPPNB and by the PN (6900 BC) regional climatic deterioration is indicated by decrease in precipitation[3] (Bar-Yosef, 2001: 133; Sanlaville, 1996: 23, 25; Roberts, 1998: 123; Simmons, 1997: 313). It had been argued that many sites in the Near East were abandoned around 7000 BC, due to climatic stress arising from gradually dryer conditions. It is now realized that the settlement patterns underwent some major changes due to the cultural degradation of a fragile ecological system along with climatic pressures. Although many large sites were abandoned[4], some continued into the next phase but had reduced in size, some areas were resettled while the expansion of sites into new areas such as the desert and coastal regions occurred (Rollefson, 1989b:168-169; Sanlaville, 1996: 25; Bottema and Woldring, 1984:150). People needed to use the

[3] This increasing aridity may be due to summer monsoons, since the rainfall was not dispersed evenly throughout the year (Bar-Yosef, 2001: 133; Sanlaville, 1996: 23, 25; Roberts, 1998: 123; Simmons, 1997: 313).

[4] In most cases, the whole or partial abandonment of a site will result in a restructuring of societies (Bar-Yosef, 2001: 149-150).

space differently as land was still required for agriculture and pastures[5]. Hence, there was a dispersal of small farming villages to better watered areas and the movements of pastoralists with their herds, either nomadically or seasonally, to marginal areas (Cauvin and Cauvin, 1993: 34-35; Bar-Yosef, 2001: 149; Zarins, 1989: 43; Sanlaville, 1996: 25; Buitenhuis, 1990: 195; Goldberg and Bar-Yosef, 1990: 80, 83).

The increasingly bad ecological situation led to the collapse of the social structure, which caused a total reorganization of the PPNB culture, evident in the PN, at a faster rate in certain regions than in others[6] (Goldberg and Bar-Yosef, 1990: 84). The resort to pastoralism occurred because it was a more flexible way of life, and thus made very marginal exploitation possible regardless of most conditions (Zarins, 1989: 43; Bar-Yosef, 2001: 151; Goldberg and Bar-Yosef, 1990: 79; Buitenhuis, 1990: 195).

Thus, the effects of humans on the environment not only caused the settlement pattern to change at the end of the PPNB, it meant the application of an alternative survival strategy, pastoralism, during the transitional phase from the FPPNB to the EPN, since pastoralism exists full blown in the EPN along with the sudden widespread application of pottery technology (Rollefson, 1989b: 168-169; Sanlaville, 1996: 25; Bottema and Woldring, 1984: 150).

---

[5] These unfavorable conditions caused a decrease in vegetation and wild animals and as the amount of available fauna to hunt decreased, while intense forms of agriculture tied people to the land, people had no choice but to exploit and further rely on domesticated animals instead of hunting (Davis, 1982: 13-14).

[6] As mentioned the climate and environmental circumstances vary according to region and within a region, which can be applied to the South Levant to explain why there was a delay in accepting the PN culture. For example, as the environmental conditions were slightly different in the South Levant than the rest of the Near East, its involvement and development occurred at a somewhat slower pace but in no way inconsistent with the events corresponding to the development of the PN in the rest of the Near East. In the case of the South Levant, the next phase after the FPPNB corresponds to the PPNC (Rollefson, 2001:168-169; Sanlaville, 1996: 25; Bottema and Woldring, 1984:150).

V. Ecology and Pottery

A. Invention and Innovation

The invention of pottery making occurred sporadically in the Near East from the PPNA to the L/FPPNB, but no fixed date or place are known thus far for the initial stages of the complex, extensive ceramic production evident in the PN (Fig. 75). The observation of isolated pottery at random sites supports a major point of this thesis: invention occurs sporadically in different places and for diverse purposes before widespread distribution (Le Miere, 1989: 61-62 and Kingery et al, 1988: 239; Renfrew, 1984: 391; Rice, 1999: 47; Adams, 1996: 29-31).

The evidence for trials with clay containers was found at the following sites in Southeastern Anatolia: the PPNA levels at *Demirköy Höyük* (Rosenberg and Peasnell, 1998: 197), the EPPNB levels at *Cayönü* (Özdöğan 1999: 59) and the LPPNB levels at *Gritille* (Voigt, 1985: 21). Early pottery is also found in the EPPNB layers at *Suberde* (Bordaz, 1968: 51-52) and the LPPNB layers at *Çatal Höyük* (Özbaşaran and Buitenhuis, 2002, 70-71; Cessford, 2001: 717, 725), both in Central Anatolia. The LPPNB levels at *Khirokitia* demonstrate experimentation with pottery as well (Le Brun 1998: 305; Le Brun, 1989s: 161-167). Additionally, sites in both the Upper and Lower Zagros such as the EPPNB-MPPNB levels at *Ganj Dareh* (Smith and Crépeau, 1983: 53, 56; Smith, 1990: 328), the LPPNB levels at *Guran Tepe* (Smith, 1974: 9), *Tell Maghzaliyah*, (Bader 1993a: 25) (See Fig. 76) and *Tepe Sarab* (Morales, 1990: 18-20) offer evidence for trials with clay pots. In the South Levant[7], the LPPNB layers at *Ba'ja* (Fig. 77) (Bienert and Gebel, 1997: 222) and *Beidha* (Kirkbride, 1966: 59) and the MPPNB-PPNC levels at *Ain Ghazal* (Fig. 78) (Rollefson et al., 1992: 449) all contain primitive clay containers.

[7] An additional site in southern Jordan is the village of al-Ghuwayni located near Wadi Faynan. In this early to MPPNB site, five potsherds were discovered, which could be evidence for trial instances with pottery, but they are possibly from a later time (Simmons and Najjar, 1998).

Finally, the FPPNB layers at Mureybet (Fig. 79) (Cauvin, 1974: 204) and the LPPNB levels at *Tell Aswad*[8] [9] (Akkermans, 1989:123-125 and Cauvin, 1974: 204) both on the *Middle Euphrates*, contain early instances of clay vessels.

It should be emphasized that pottery is not widely used at any of the sites above, but instead it shows experimentation with clay, a substance with which these societies had much familiarity. In some cases, the sites that demonstrated early uses of clay vessels during the PPNA to the LPPNB, continued on into the PN, and at the later EPN levels at the site, pottery was produced on a large scale (Cauvin, 1974: 204).

The sporadic invention of pottery took place when the climate was still wet and warm, vegetation was plentiful and agriculture and hunting was practiced in intense forms (the latter involving early stages of the domestication process). Initially during the PPNB until the LPPNB, clay vessels were used in various places for cooking and storage and seemed to be just another way of using already familiar natural resources. Thus, when agriculture and good environmental conditions existed, pottery was not employed because people found that other containers were more beneficial than clay pots. However, these early instances of clay vessels are significant because they show that the knowledge of clay in container form existed prior to the production of earthenware throughout the Near East.

Controversially, when environmental circumstances became increasingly poorer causing people to move and adopt pastoralism as a subsistence strategy, pottery became a universal necessity because it was more practical than other utilitarian objects. The spread of this technology throughout the Near East was

[8] At Tell Assouad, no ceramic was found in the upper layers when agricultural is in place. This is unusual because pottery appears with hunting-gathering and does not continue. It has been suggested that erosion may have damaged these upper levels.

[9] In layers I-VI at this site (or its upper layers), the finds show similarities to the Pre-Halaf culture at other sites, only without pottery (Cauvin, 1974).

prompted by the circumstances of the time such as the emerging pastoral lifestyle, the already established trade network and the increasingly poorer environmental conditions. This observation further supports that pottery technology was only adopted when specific circumstances existed by those who found it a better or necessary alternative to those materials previously employed in making vessels.

VI. Social Choice

Invention in modern times is a technology "which allows an existing process to be carried out more cheaply and efficiently without any compensating disadvantages and without substantial capital costs" (Renfrew, 1984: 396). This can be applied in a (modified form) to the past.

A. The Person behind the Pot

The acceptance of a technology is strongly attached to social factors (Renfrew, 1984, 396; Dobres and Hoffman, 1999: 211-215). Technology consists of skill and knowledge (technique), which is reflected differently by each individual. An individual's activities are integrated or blended with certain cultural codes and overall communal technological activities of a time and place. These factors influence each person while each person's choice influences the society's technical processes on a whole. Thus, a technology is also the consequence of the social circumstances, which involves individual people. To clarify this statement, a technology has cultural meaning that reflects the social choice to accept an innovation not just for its practical use, but also for its symbolic meaning to the culture in which it is embedded (Ingold, 1999: x-xi; Dobres and Hoffman, 1999: 211, 215-216, 219; Dobres, 2000: 217). The social aspect offers additional reasons

for how and why an invention and innovation were developed (Dobres and Hoffman: 1999: 3).

B. Why the Pot?

Why would pottery be preferred over other materials? Firstly, the technological advantages of clay vessels include its plastic qualities, which permit fabrication into a wide range of shapes and sizes for different functions. Baskets, hides, wood and stone all have limitations due to the " nature of the materials". Furthermore, pots may be easily replaced as they take little time to make, even less time than that required to construct other vessels. Additionally, the use of slips, polishing and burnishing allow more control over the permeability and porosity of the container (Arnold, 1988: 138-139).

Pottery is also excellent for storage, since pots resist intrusion by animals, fungus and insects. This would be ideal for pastoralists as well as agriculturalists, who come back after long periods of time (seasonally) to a site with closed containers of stored food (Arnold, 1988:140; Rice, 1999: 8). The porous walls of fired pots make them especially good for storing liquids like water and milk as they keeps them cool especially in hot climates (Arnold, 1988: 139). Clay pots last longer than other containers when used for cooking and soaking (Arnold, 1988:140; Rice, 1999: 8).

When cooking, clay pots are advantageous because they retain nutrients better and offer a better channel for nutrient flow than basketry, hides, wood, stone, etc. The properties of a fired pot allow it (and thus food) to be heated at a higher temperature and for a longer time. Diverse forms of cooking such as boiling or steaming can be managed, which makes it easier to process foods. All of these

processes render food more digestible. As many plants, both wild and agricultural contain toxins that must be removed through heating, the fact that preparing meals with clay vessels detoxifies food better is significant because it increases the range of potential food sources. This allows one to exploit more foods in this period's diverse ecological settings, (i.e. shellfish in coastal zone) (Arnold, 1988:128, 135 Rice, 1999: 8-9).

In addition, using clay vessels requires less attention than boiling in baskets, wood or hide and stone boiling, in which constant watching is needed. Food preparation thus becomes easier, and may be left unattended allowing other activities to be carried out simultaneously. Overall, it increases the efficiency of preparing foods (Arnold, 1988:128, 135 Rice, 1999: 8-9).

Finally, but most importantly, clay is more universally widespread than other materials, thus making it inexpensive and its components disposable (Arnold, 1986: 141).

C. Human Factors and Technology

Cauvin (2001) reminds us of the importance of human choice in deciding the outcome of certain events. For example, agriculture developed in response to social and climatic stress because the Natufians chose to employ it as a means of dealing with a stressful situation, whereas the Harifians chose to resort to hunting and gathering (Cauvin 2001). Choice of technology can also be seen in modern times, as the semi-nomadic group, now living around Beidha had replaced their pottery with metals, or plastic ("modern things") in just the last few years (Banning and Rollefson, 1992). A reason why people did not use ceramics before the Pottery Neolithic even though the technology to produce it was available in the LPPNB is

essentially that they preferred other materials to clay pots. Different circumstances caused these people to resort to this material in the PN, because *then* pottery had acquired benefits that enabled a better adaptation to the new conditions (Rice, 1999: 40).

VII. Conclusion

Many changes occurred in the L/FPPNB, bringing about the PN. For instance, the climatic conditions and human impact on the environment resulted in a major settlement change to deal with the harsh conditions. This site relocation is illustrated by the expansion to the desert and the coastal region, and by a general dispersal of sites to favorable or marginal areas. The resort to semi or full pastoralism allowed for these movements in the degraded environment, and initiated the rise of pastoralism in the EPN as its own entity, alongside but interdependent with agriculture.

Pottery had already been invented sporadically throughout the Near East; hence it was already known. Under the stressful conditions of a degraded environment and during a time when pastoral migrations were occurring, in particular to marginal areas, containers made of other materials were less efficient. Thus, pottery was an advantage over other types of containers because clay is found in almost every landscape, making it a cheap resource. The fact that clay is readily available aided in the distribution of clay pots throughout the Near East. Most importantly though, not only was pottery practical, it also had social implications for the Neolithic peoples.

CHAPTER 12

CONCLUSION

The purpose of this research was to examine why and how pottery technology became widespread in the Near East when:

1) There was no evidence for an experimental stage at the end of the Pre-Pottery Neolithic.
2) Presumed a so-called gap existed in the archaeological record between the Pre-Pottery Neolithic and the Pottery Neolithic.

In this thesis I adhered to one principal theme to help explain why and how pottery technology became distributed throughout the Near East, which is: the invention of a technology usually occurs sporadically and always precedes its innovation, or widespread adoption. As we have learned, pottery had been sporadically invented at random sites throughout the Near East from the PPNA until the Late PPNB. The sporadic invention of clay containers is well known and referred to as Stage 1 after Faura and Le Mière (1999: 281).

However, the widespread acceptance of pottery occurring during the EPN was due to the existence of particular circumstances that allowed for this development to take place. In my approach I examined the archaeological evidence that exists for the PPNB and PN cultures to learn what combination of factors permitted the innovation of pottery technology. These factors include the following technological, historical, economic, environmental and social circumstances.

I. Technology

In examining this perspective I learned that pre-existing technologies were comparable to pottery making. Each region within Southwestern Asia shared common factors, including the technological precursor to pottery making. For instance, familiarity with clay is attested in mud brick architecture and clay objects, while the skill with fire was developed by the continued experience of heat treatment in hearths or ovens on substances including lithics, bitumen and metal. The knowledge of high firing temperatures was essentially obtained by plaster making in the LPPNB. The various surface treatments and decoration were already achieved on lime, gypsum and clay plaster in architecture, and on baskets, stone bowls and whiteware.

The knowledge of these preceding technologies was transferred to producing clay pots and thus an experimental stage had not been necessary.

II. Historical and Economical Factors

In adhering to this approach, I also examined the historical context in which pottery was developed. The historical circumstances include the characteristics of the time before pottery was adopted in the Late and FPPNB and during the time it was introduced, the EPN.

During the PPNB, a vast exchange system was developed that involved the circulation of raw materials, finished goods, precious items, culture and technology. Mobile groups, nomads and hunters were the agents of exchange during this period. The evidence for such a dynamic society during the PPNB indicates that a high level of complexity prevailed at that time. Social complexity is demonstrated by the

standardization of goods and the 'chaîne opératoire' as well as the complex exchange system.

I found that the characteristics of the Late and Final PPNB such as the vast trade network and the sophisticated social structure allowed for the spread of pottery in the relatively short time spanning the FPPNB and the EPN.

A. Domestication, Movements and Pastoralism

During the Final PPNB and the Early PN the domestication of animals and the adoption of pastoralism as a subsistence strategy intensified. In conjunction with the emergence of pastoralism during the FPPNB, the settlement pattern changed from a conglomerated to a dispersed one by the EPN. Both farmers and herders migrating to different areas resorted to pastoralism, which either took place on long seasonal movements, or full nomadic movements. Some of the people continued to live as nomadic pastoralists while others resettled and continued on practicing different combinations of agriculture and herding, referred to as semi-pastoralism.

The evidence for increasing pastoralism in the FPPNB and the EPN is observed in the archaeological record by the existence of the 4 domesticates throughout the Near East, many times outside their natural habitat. Also based on ethno-archaeological comparisons the remains at some FPPNB, but especially at EPN sites resemble modern pastoral campsites: for example, the reuse of PPNB architectural features at abandoned sites, the construction of pit-dwellings, the evidence for other features like pits and hearths, and in most cases, the findings of pottery.

By the EPN, the development of regional designations was recognized by slight differences in pottery types. The fact that pottery containing similar traits at

sites appeared throughout the Near East is significant because it shows that the spread of this technology took place through contacts during these migrations.

To sum up these observations: The settlement change and the findings for the Final PPNB and Early PN such as the development of pottery technology, resulted from the movements of pastoralists and their herds to new areas. The innovation and spread of pottery technology took place during these pastoral movements.

Thus, there is no gap in the archaeological record; instead peoples relocated to new areas.

III. Pastoralists and Pottery: Ethno-archaeology

The comparisons of the data to ethno-archaeological and cross-cultural studies in Chapter 10 confirmed the relationship between pottery and pastoralists. I found that not only was pottery present at pastoral campsites, but abandoned campsites were identified by pottery scatters. Furthermore, not only do all types of pastoralists use pottery, they make it as well. In general, nomads use makeshift or expedient unfired, or low-fired pottery, resulting in a very simple ware, while semi-pastoralists produce better-quality pottery on a grander scale.

Thus, it was these mobile groups, resorting to pastoralism in different forms that were responsible for making pottery. Those herders constantly moving would require expedient ware, whereas others practicing forms of semi-pastoralism and making seasonal movements would be able to apply the preceding technologies of the PPNB in a more intensive fashion. Therefore, the local and simple wares observed just before the production of regional pottery types were the consequences of these actions. These simple and local wares are the 2nd Stage of Faura and Le

Mière's model (1999: 282). The movements of pastoralists further allowed for the spread of a pottery-making process and by the PN, more sophisticated regional wares appeared such as the Pre-Halaf, Proto-Hassuna, Syro-Cilician, Upper Khabur, Balikh Valley, Middle Euphrates and SE Anatolian, Zagros Group and Central Anatolian wares. This is the final or 3rd Stage in the emergence of early pottery in the Near East (Faura and Le Mière, 1999: 282).

IV. Environmental and Social Factors: Why and How?

I also learned that environmental factors, both climatic and human-induced, put stress on the PPNB lifestyle and prompted the changes seen in the Final PPNB, which resulted in the Early PN culture.

However, the acceptance of pottery technology essentially boils down to human choice. It was a deliberate decision to adopt pottery technology during the Early PN because humans found it a better alternative to the pre-existing technologies. Pottery was a more attractive solution as pastoralists were moving from place to place, and clay is found everywhere. Also the abundant availability of clay in a degraded environment and the fact that pottery is faster to make than other containers serving the same purpose made it a cheap alternative.

Evidence exists for the invention of pottery at random sites throughout the Near East. It was only the specific combination of technological, economical, historical, environmental and social factors existing during the Late and FPPNB that allowed pastoralists to develop and spread pottery technology by the EPN.

V. Contribution

I propose that pottery technology in the Near East was developed by pastoralists. Previous, discussions had always assumed that pottery was developed

by agriculturalists even though (as we know) agriculture occurred in the PPNA, 3000 years before pottery became widespread. The evidence for the Late and FPPNB and the EPN for the Near East has never been examined closely from the range of perspectives presented here, so it has been maintained that pottery technology is inseparable from agriculture.

It has also been assumed that pottery is not used and definitely not made by mobile groups like pastoralists. Even though, more recently, the development of pottery technology by hunter-gathers has been acknowledged for other regions, to my knowledge it has never before been suggested that pottery was developed by pastoralists.

After thoroughly studying the archaeological evidence for the Near East, I observed that the employment of pastoralism on a large scale coincides with the appearance of clay vessels throughout the Near East and concluded that the origins of pottery technology were in the hands and minds of Neolithic pastoralists.

VI. Implications

My 5-pronged approach was useful for many reasons, mainly because it allowed me to examine an invention within its full context in order to better understand why it became adopted into a society. More precisely, this approach provided me with a framework, within which I was able to examine all the events surrounding the introduction of this new technology. This methodology also made it possible to examine a transitional period when many changes were occurring simultaneously. For example, in researching the original factors before the technology was widespread, and the factors that existed once the technology was in

place, I was able to draw upon what changes occurred and to suggest why and how they did.

For future studies, I think it would be useful to investigate the introduction of another invention in the same manner. For instance, it would be informative to study the introduction of metal working by looking at cases of sporadic invention before its widespread distribution, and then examining the circumstances or factors (economical, technological, environmental, social and historical) that permitted the adoption of this technology on a large scale.

In addition, I think it would be useful to apply the same methodology to research the development of pottery in another region, like the Far East or Africa, to see what kind of conclusions we can make about the origins of pottery technology in these regions, and further make cross-cultural comparisons. For example, is pottery in these cases innovated by pastoralists as well, or was it only the circumstances in the L/FPPNB and EPN in the Near East that allowed for this relationship?

BIBLIOGRAPHY

Adams, R. (Mc). 1983. "The Jarmo Stone and Pottery Vessel Industry." In L. Braidwood, R. Braidwood, B. Howe, C. Reed and P. J. Watson, eds., *Prehistoric Archeology along the Zagros Flanks.* Chicago: University of Chicago Press, 209-232.

--------. 1996. *Paths of Fire: An Anthropologist's Inquiry into Western Technology.* Princeton: Princeton University Press.

Adovasio, J. M. 1977. "The Textile and Basketry Impressions from Jarmo," *Paléorient* 3: 223-230.

Akkermans, P. M.M.A. 1989. "The Neolithic of the Balikh Valley, North Syria: A First Assessment," *Paléorient* 15(1): 122-153.

--------. 1993. *Village in the Steppe: Late Neolithic Settlement and Subsistence in the Balikh Valley, Northwest Syria.* Ann Arbor: International Monographs in Prehistory Archaeological, Series 5.

--------. 1999. "PPNB settlement along the Balikh and Euphrates-Fact or Fiction?" In G. de Olmo Lete and J. M. Montero Fenollòs, eds., *Archaeology of the Upper Syrian Euphrates: The Tishrin Dam Area.* Barcelona: Editorial Ausa, 523-533.

Akkermans, P.M.M.A (ed.) 1996. *Tell Sabi Abyad: The Late Neolithic Settlement. Volume 1.* Istanbul: Nederlands Historisch-Archaeologisch Intituut.

Arnold, D. E. 1988. *Ceramic Theory and Cultural Process.* New Studies in Archaeology. Cambridge: Cambridge University Press.

As, van, A.and et al. 1997. The Transitional Fine Ware Pottery of Tell Sabi Abyad, Syria. A Pilot Study. Leiden University: Newsletter of the Department of Pottery Technology 14/15, 25-48.

Aurenche, O. 1992. "L'apport français au développement de la préhistoire du Levant, 1960-1987," *Paléorient* 17(2): 9-31.

Aurenche, O. and S. Kozlowski. 1999. *La naissance du néolithique au Proche Orient.* Paris: Éditions Errance.

Aurenche, O. and et al. 1987. *Chronologies in the Near East: Relative and Absolute Chronologies 16000-4000 BP.* CNRS International Symposium. Oxford: BAR International Series 379.

Avni, G. 1992. "Survey of Deserted Bedouin Campsites in the Negev Highlands and its Implication for Archaeological Research." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 241-254.

Bader, N. 1993a. "Tell Maghzalia: An Early Site in Northern Iraq." In N. Yoffee and J. Clark eds., *Early Stages in the Evolution of Mesopotamian Civilization: Soviet Excavations in Northern Iraq.* Tucson: University of Arizona Press, 7-40.

--------. 1993b. "The Early Agricultural Settlement of Tell Sotto." In N. Yoffee and J. Clark eds., Early Stages in the Evolution of Mesopotamian Civilization: Soviet Excavations in Northern Iraq. Tucson: University of Arizona Press, 41-54.

--------. 1993c. "Results of the Excavation at an Early Agricultural Site of Kultepe in Northern Iraq." In N. Yoffee and J. Clark eds., *Early Stages in the Evolution of Mesopotamian Civilization: Soviet Excavations in Northern Iraq.* Tucson: University of Arizona Press, 55-62.

--------. 1993d. "Summary of the Earliest Agriculturalists in Northern Mesopotamia." In N. Yoffee and J. Clark eds., *Early Stages in the Evolution of Mesopotamian Civilization: Soviet Excavations in Northern Iraq.* Tucson: University of Arizona Press, 63-72.

Bader, N. and et al. 1994. "Les importations d'obsidienne sur les sites des IX-VII millénaires BP du Djebel-Sinjar, Iraq," *Paléorient* 20(20): 6-8.

Balkan-Atlı, N. 1994. *Néolithisation de l'Anatolie.* Institut français d'études anatoliennes d'Istanbul. Paris: De Boccard.

Balkan- Atlı, N. and et al. 1999. "Obsidian: Sources, Workshops and Trade in Central Anatolia." In M. Özdoğan, and N. Başgelen eds., *Neolithic in Turkey.* Istanbul: Arkeoloji ve Sanat, 133-145.

Banning, E. and I. Kohler-Rollefson. 1992. "Ethnographic Lessons for the Pastoral Past: Camp Locations and Material Remains near Beidha, Southern Jordan." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 181-204.

Banning, E. and et al. 1994. "The Late Neolithic of the Southern Levant: Hiatus, Settlement Shift or Observer Bias? A Perspective from Wadi Ziqlab," *Paléorient* 20(2): 151-156.

Bar-Yosef, O. 2001. "The World around Cyprus from Epi-paleolithic Foragers to the Collapse of the PPNB Civilization." In S. Swiny ed., *The Earliest Prehistory of Cyprus from Colonization to Exploitation*. CAARI Monograph Series 5. Nicosia: ASOR Archaeological Reports, 129-151.

Bennett, C.M. 1980. "Soundings at Dhra', Jordan," *Levant* XII: 30-39.

Bernbeck, R. 1992. "Migratory Patterns in Early Nomadism: A Reconsideration of Tepe Tula'I," *Paléorient* 18(1): 77-89.

Betts, A. 2001. "Book Review of El Kowm 2, une île dans le désert: la fin du Néolithique précéramique dans la steppe syrienne by D. Stordeur," *Paléorient* 2(1): 184-185.

Bienert, D. and Gebel H. 1997. "Ba'ja, Hidden in the Petra Mountains: Preliminary Report on the 1997 Excavations." In H. Gebel, Z. Kafafi and G. Rollefson eds., *The Prehistory of Jordan II: Perspectives from 1997*. Berlin: Studies in Early Near Eastern Production, Subsistence and Environment 4, 221-262.

Binder, D. 2002. "Stones Making Sense: What Obsidian Could Tell about the Origins of the Central Anatolian Neolithic." In F. Gérard and L. Thissen eds., *The Neolithic of Central Anatolia: Internal Developments and External Relations during the 9th to 6th Millennia cal. BC*. Central Anatolian Neolithic e-Workshop. Istanbul: ECE Yayınları, 79-90.

Bordaz, J. 1968. "The Suberde Excavations, Southwestern Turkey: An Interim Report," *TAD* 12: 43-71.

Bordaz, J. and L. Bordaz. 1982. Erbaba: the 1977 and 1978 Seasons in Perspective," *TAD* 26: 85-92.

Bottema, S. and H. Woldring. 1984. Late Quarterly Vegetation and Climate of Southwestern Turkey: Part II," *Paleohistoria* 26: 123-150.

Braidwood, R. (ed.) 1983. "The Site of Jarmo and its Architectural Remains." In *Prehistoric Archaeology along the Zagros Flanks*. Chicago: University of Chicago Press, 155-208.

Braidwood, R. and L. Braidwood (eds.) 1960. *Excavations in the Plain of Antioch I: The Earlier Assemblages: Phases A-J. Amuq Sequence. New Soundings Reconsidering the Amuq Chronology in the Rorig Basin (NW Syria).*

Buitenhuis, H. 1990. Archaeozoological Aspects of the Late Holocene Economy and Environment in the Near East." In S. Bottema, G. Entjes-Nieborg and W. Van Zeist eds., *Man's Role in the Shaping of the Eastern Mediterranean.* Rotterdam: A.A. Balkema,195-219.

Calley, S. 1986. L'atelier de Qdeir 1 en Syrie: exploitation des nucléus naviformes à la fin du PPNB, 6e millénaire. Première approche," *Paléorient* 12/2: 49-67.

Campbell, S. and D. Baird. 1990. "Excavations at Ginnig: The Aceramic to Early Ceramic Neolithic Sequence in N. Iraq," *Paléorient* 16(2): 65-77.

Caneva, I. 1999. "Early Farmers on the Cilician Coast: Yumuk Tepe in the 7th Millenium BC." In M. Özdoğan, and N. Başgelen eds., *Neolithic in Turkey.* Istanbul: Arkeoloji ve Sanat, 105-114.

Cauvin, J. 1974. "Les débuts de la céramique sur le Moyen-Euphrate: nouveaux documents," *Paléorient* 21: 199-205.

---------. 1977. "Les fouilles de Mureybet (1971-1974) et leur signification pour les origins de la sédentarisation au Proche-Orient," *AASOR* 44: 19-48.

---------. 1976. *Les premiers villages de Syrie-Palestine du XIe au VIIe millénaire avant J-C.* Lyon: Maison de l'Orient méditerranéen.

---------. 1987. "Chronologie relative et absolue dans le néolithique du Levant nord et de l'Anatolie entre 10000 et 8000 BP." In O. Aurenche, J. Evin and F. Hours eds., *Chronologies in the Near East: Relative and Absolute Chronologies 16000-4000 BP.* CNRS International Symposium. Oxford: BAR International Series 379, 325-343.

---------. 1988. "La néolithisation de la Turquie du Sud-Est dans son contexte proche-oriental," *Anatolica* XV: 69-79.

---------. 1989a. "La stratigraphie de Cafer Höyük-est (Turquie) et les origines du PPNB du Taurus," *Paléorient* 15(1): 75-86.

---------. 1989b. "La néolithisation au Levant et sa première diffusion." In J. Cauvin and O. Aurenche eds., *Neolithisations: Proche et Moyen Orient, Mediterranée orientale, Nord de l'Afrique, Europe méridionale, Chine, Amérique du Sud.* Lyon: BAR International Series 516, 3-36.

--------. 1991. "El Khabra: un poste de chasse neolithique du PPNB final de Facies Qdeir. (Oasis d'el Kowm, Syrie)." In J. Cauvin ed., *Cahiers de l'Euphrate 5-6*. Paris: Éditions Recherches sur les civilizations, 47-52.

--------. 2000. *Birth of Gods and the Origins of Agriculture.* Cambridge: University of Cambridge.

Cauvin, M-C. 1991. "L'obsidienne au Levant pré-historique: provenance et fonction." In J. Cauvin ed., *Cahiers de l'Euphrate 5-6*. Paris: Éditions Recherches sur les civilizations, 163-178.

Cauvin, M-C., and J. Cauvin. 1993. "La séquence néolithique PPNB au Levant Nord," *Paléorient*: 19(1): 23-28.

Cauvin, J. and et al. 1999. "The Pre-Pottery Site of Cafer Höyük." In M. Özdoğan, and N. Başgelen eds., *Neolithic in Turkey*. Istanbul: Arkeoloji ve Sanat, 87-103.

Cauvin, M-C. and et al. 1986. "Origine de l'obsidienne de Cafer Höyük (Turquie), Premiers resultants," *Paléorient* 12(2): 89-97.

Cessford, C. 2002. "A New Dating Sequence for Çatal Höyük," *Antiquity* 75: 717-725.

Childe, V. G. 1951. *Man Makes Himself.* New York: Mentor Books, The New American Library.

Cohen, R. 1992. "The Nomadic or Semi-Nomadic Middle Bronze Age I Settlements in the Central Negev." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant*. Monographs in World Archaeology No. 10. Madison: Prehistory Press, 105-132.

Contenson, H. (de) 1982. "Les phases préhistoriques de Ras Shamra et de l'Amuq," *Paléorient* 8(1): 95-98.

--------. 1992. *Préhistoire de Ras Shamra : les sondages stratigraphiques de 1955 à 1976.* Paris: Éditions Recherches sur les civilizations.

--------. 1994. "Remarques sur la Damascène et le Levant sud au néolithique," *Paléorient* 20(2): 167-168.

Contenson, H. (de) and L. Courtois. 1979. "À propos des vases en chaux: recherches sur leur fabrication et leur origine," *Paléorient* 5(2): 177-181.

Cooper, E. 1988. *A History of World Pottery.* Chilton Trade Book Pub. Radnor.

Copeland, L. and Hours, F. 1983. "Les rapports entre l'Anatolie et la Syrie du nord à l'époque des premières communautés villageoises de bergers et de paysans." In T. C. Young, P. Smith and P. Mortensen eds., *Hilly Flanks: Essays on the Archaeology of Southwestern Asia. Presented to R. Braidwood.* Studies in Ancient Oriental Civilizations: 36. Chicago: University of Chicago, 75-90.

--------. 1987. "Halafians, their Predecessors and their Contemporaries in Northern Syria and the Levant: Relative and Absolute Chronologies." In O. Aurenche, J. Evin and F. Hours eds., *Chronologies in the Near East: Relative and Absolute Chronologies 16000-4000 BP*. Oxford: BAR International Series 379, 401-427.

Cribb, R. 1991a. "Mobile Villagers: The Structure and Organization of Nomadic Pastoral Campsites in the Near East." In C.S. Gamble and W.A. Boismier, *Ethno-archaeological Approaches to Mobile Campsites*. International Monographs in Prehistory. Ann Arbor: Ethno-archaeological Series 1, 371-394.

--------. 1991b. *Nomads in Archaeology*. Cambridge: Cambridge University Press.

Davis, S. 1982. "Climate Change and the Advent of Domestication: The Succession of Ruminant Artiodactyls in the Late Pleistocene-Holocene period in the Israel Region," *Paléorient* 8(2): 5-16.

Dobres, M-A. 2000. *Technology and Social Agency*. Oxford: Blackwell Publishers.

Dobres, M-A. and Hoffman, C., (eds.) 1999. *The Social Dynamics of Technology: Practice, Politics, and World Views*. Washington: Smithsonian Institution Press.

Dornemann, R. H. 1986. *A Neolithic Village at Tell el Kowm in the Syrian Desert.* Studies in Ancient Oriental Civilizations 43. Chicago: The Oriental Institute, University of Chicago.

Dollfus, G. 1989. "Les processus de néolithisation en Iran: Bilan des connaissances." In J. Cauvin and O. Aurenche eds., *Neolithisations: Proche et Moyen Orient, Mediterranée orientale, Nord de l'Afrique, Europe méridionale, Chine, Amérique du Sud*. Lyon: BAR International Series 516, 37-64.

Ducos, P. 1994. "À propos du modèle du pastoralisme PPNC proposé par G. Rollefson et I. Kohler-Rollefson," *Paléorient* 20(2): 165-169.

Edwards, P. C. 1988. "Natufian Settlement in Wadi-al-Hammeh," *Paléorient* 14(2):309-319.

Ehrich, R. (ed.) 1992. *Chronologies in Old World Archaeology*. Chicago: University of Chicago Press.

Ellis, R. and Voigt, M. 1982. "1981 Excavations at Gritille, Turkey," *AJA* 86: 319-332.

Esin, U. 1999. "Copper Objects from the Pre-Pottery Neolithic Site of Aşıklı (Kizilkaya Village, Province of Aksaray, Turkey)." In A. Hauptmann, E. Pernicka, T. Rehren and U. Yalçın eds., *The Beginnings of Metallurgy.* Beiheft 9. Bochum: Der Anschnitt, 23-31

Esin, U. and Harmankaya, S. 1999. "Aşıklı." In M. Özdoğan, and N. Başgelen eds., *Neolithic in Turkey.* Istanbul: Arkeoloji ve Sanat, 89-102.

Epstein, C. 1984. "A Pottery Neolithic Site near Tel Qatif," *IEJ* 34(4): 211-218.

Ervynck, A. and et al. 2001. "Born Free? New Evidence for the Status of Sus Scrofa at Neolithic Çayönü Tepesi (Southeastern Anatolia, Turkey)," *Paléorient* 27: 47-73.

Evin, J. (ed.) 1987. "Problèmes posés par certains materiaux de datation à propos du Proche-Orient." In *Chronologies in the Near East: Relative and Absolute Chronologies 16000-4000 BP.* Oxford: BAR International Series 379, 105-120.

--------. 1995. "Possibilité et nécessité de la calibration des datations C-14 de l'archéologie du Proche-Orient," *Paléorient* 21(1): 5-16.

Faura, J-M. and M. Le Mière, 1999. "La céramique néolithique du haut Euphrate syrien." In G. de Olmo Lete and J. M. Montero Fenollòs, eds., *Archaeology of the Upper Syrian Euphrates: The Tishrin Dam Area.* Barcelona: Editorial Ausa, 281-286.

Finkelstein, I. 1992. "Pastoralism in the Highlands of Canaan in the Third and Second Millennia B.C.E." In O. Bar-Yosef and A. Khazanov eds., in *Pastoralism in the Levant. Monographs in World Archaeology No. 10.* Madison: Prehistory Press, 133-142.

Finlayson, B. and et al. 2002. "Dhra', Excavation Project, 2002 Interim report," *Levant* 35: 1-38.

Galili, E. and et al. 1993. "Atlit-Yam: A Prehistoric Site on the Sea Floor off the Israeli Coast," *JFA* 20/2: 133-157.

Garfinkel, Y. 1987a. "Burnt Lime Products and Social Implications in the Pre-Pottery Neolithic B Villages of the Near East," *Paléorient* 13(1): 69-76.

--------. 1987b. "Yiftahel: A Neolithic Village from the 7th Millennium B.C. in Lower Galilee, Israel," *JFA* 14/2: 199-209.

--------. 1999. *The Yarmukians: Neolithic Art from Sha'ar Hagolan.* Jerusalem: Bible Lands Museum.

Garrard, A. and et al. 1994. "Prehistoric Environment and Settlement in the Azraq Basin," *Levant* 26: 73-111.

Garstang, J. 1953. *Prehistoric Mersin: Yümük Tepe in Southern Turkey: the Neilsen Expedition.* Oxford: Clarendon Press.

Geva, H. 1998. *Archaeological Sites in Israel.* No. 3. Jerusalem: Israel Information Center.

Geyer, B. and J. Besançon. 1996. "Environment et occupation du sol dans la vallée de l'Euphrate syrien durant le Néolithique et le Chalcolithique," *Paléorient* 22/2: 5-16.

Gilead, I. 1992. "Farmers and Herders in Southern Israel during the Chalcolithic Period." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 29-42.

Goldberg, P. and O. Bar-Yosef, 1989. "The Effect on Geomorphological Process Based Upon Evidence from the Levant and Adjacent Areas." In S. Bottema, G. Entjes-Nieborg and W. Van Zeist eds., *Man's Role in the Shaping of the Eastern Mediterranean.* Rotterdam: A.A. Balkema, 53-71.

Goldman. H., (ed.) 1950. *Excavations at Gözlü Kule, Tarsus. Vol. II Part 1: From the Neolithic through the Bronze Age.* Princeton: Princeton University Press.

Gopher, A. and et al. 1992. "The Pottery Assemblage of Nahal Beset I: A Neolithic Site in the Upper Galilee," *IEJ* 42: 4-16.

Goring-Morris, N. and et al. 1995. "Investigations at an Early Neolithic Settlement in Lower Galilee: Results of the 1991 Season at Kefar Hahoresh," *Atiqot* 27: 45-63.

Goudie, A. 1990. *The Human Impact on the Natural Environment.* Cambridge: MIT Press.

Guilaine, J. and et al. 1995. "L'établissement néolithique de Shillourokambos-Pareklisha, Chypre: Premiers resultats," *RDAC*: 11-32.

Haiman, M. 1992. "Sedentarism and Pastoralism in the Negev Highlands in the Early Bronze Age: Results of the Western Negev Highlands Emergency Survey." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 93-104.

Haiman, M. and Y. Goren. 1992. "'Negbite' Pottery: New Aspects and Interpretations and the Role of Pastoralism in Designating Ceramic Technology." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 143-152.

Hamer, F. and Hamer, J. 1997. *The Potter's dictionary of materials and techniques.* London. A and C Black.

Hauptmann, A. 2000. *Zur frühen Metallurgie des Kupfers in Fenan/Jordanien.* Beiheft 11. Bochum: Der Anschitt.

Hauptmann, A. and Ü. Yalçın. 2000. "Lime Plaster, Cement and the First Puzzolanic Reaction," *Paléorient* 26(2): 61-69.

Hays, K. A. 1993. "When is a symbol meaningful? Meaning, Function, and Prehistoric Visual Arts." In N. Yoffee and A. Sherratt eds., *Archaeological Theory: Who Sets the Agenda?* Cambridge: Cambridge University Press, 81-92.

Helmer, D. 1991. "Les changements de stratégies de chasse dans le néolithique préceramique de Cafer Höyük est." In J. Cauvin ed., *Cahiers de l'Euphrate 5-6.* Paris: Éditions Recherches sur les civilizations, 131-135.

Helmer, D. and M. Saña Segui. 1999. "The Process of Animal Domestication in the North of the Euphrates Valley (Syria): Socio-Economic Implications." In G. del Olmo Lete and J-L. Montero-Fenollòs eds., *Archaeology of the Upper Syrian Euphrates in the Tishrin Dam Area.* Barcelona: Editorial Ausa, 257-278.

Henry, D.O. 1986. "Prehistory and Paleoenvironment of Jordan: An Overview," *Paléorient*: 12(2): 5-26.

Henry, D. and et al. 2001. "Survey of Prehistory of Sites, Wadi Araba, Southern Jordan," *AASOR* 323: 1-15.

Hershkovitz, I. and et al. 1986. "Neolithic Skeletal Remains at Yiftahel in Area C (Israel)," *Paléorient* 12(1): 73-82.

Hijara, I. 1997. *The Halaf Period in Northern Mesopotamia.* London: Nabu Publications.

Hole, F. 2001. "A Radiocarbon Chronology for the Middle Khabur, Syria," *Iraq* 63: 67-72.

Hole, F. and et al. 1969. *Prehistory and the Human Ecology of the Deh Luran Plain.* Memoire of the Museum of Anthropology. Ann Arbor: University of Michigan.

Hours, F and et al. 1994. *Atlas de Sites du Proche-Orient 14000-5700 BP.* Lyon: Maison de l'orient méditerranéen.

Inizan, M-L. and Tixier, J. 2000. "L'émergence des arts du feu: le traitement thermique des roches siliceuses," *Paléorient* 26(2): 9-22.

Ingold, T. 1997. "Forward." In M-A. Dobres and C. R. Hoffman eds. *The Social Dynamics of Technology: Practice, Politics, and World Views*. Washington: Smithsonian Institution Press, vii-xiii.

Kingery, D. and et al. 1988. "Beginnings of Pyrotechnology," *JAA* 15/2: 219-242.

Kirkbride, K. 1966. "Five Seasons at Beidha," *PEQ* 98(1): 8-61.

--------. 1968. "Beidha 1967: An Interim Report," *PEQ* 100/101: 91-96.

Kohler-Rollefson, I. 1992. "A Model for the Development of Nomadic Pastoralism on the Transjordanian Plateau." In O. Bar-Yosef and A. Khazanov, eds. *Pastoralism in the Levant*. Monographs in World Archaeology No. 10. Madison: Prehistory Press, 11-18.

Koplan, J. 1958. "Excavations at Wadi Rabah," *IEJ*: 149-169.

Kozlowski, S. 1999. *The Eastern Wing of the Fertile Crescent: Late Prehistory of the Greater Mesopotamian Lithic Industries*. BAR International Series: 760.

Kozlowski, S. and A. Kempisty. 1988. "Architecture of the Pre-Pottery Neolithic Settlement in Nemrik, Iraq," *World Archaeology* 21(3): 348-361.

Kuijt, I. 2001. "Lithic Inter-assemblage Variability and Cultural-historical Sequences: A Consideration of the PPNA Occupation of Dhra', Jordan," *Paléorient* 27(1): 107-126.

Kuijt, I. and M. Chesson. 2002. "Excavations at 'Ain Waida', Jordan: New Insights into Pottery Neolithic Lifeways in the Southern Levant," *Paléorient* 28(2): 105-108.

Kuijt, I. and Mahasneh, H. 1998. "Dhra': An Early Neolithic Village in the Southern Jordan Valley," *JFA* 25(2): 153-161.

Kuznar, L.A. 1990. *Economic Models, Ethnoarchaeology, and Early Pastoralism in the High Sierra of the South Central Andes*. Ann Arbor: Northwestern University.

Lazrus, P. 1999. "Farmers or Pastoralists in Sardinian Prehistory? Settlement and Environment." In R. H. Tykot, J. Morter and J. E. Robb eds., *Social Dynamics of the Prehistoric Central Mediterranean*. Accordia Research Institute. London: University of London, 123-136.

Le Brun, A. 1987. "Chronologie relative et chronologie absolue dans le Néolithique chypriote." In O. Aurenche, J. Evin and F. Hours eds., *Chronologies in the Near East: Relative and Absolute Chronologies 16000-4000 BP.* Oxford: CNRS International Symposium. BAR International Series 379, 549-558.

--------. 1989. "Le Néolithique de Chypre et sa relation avec le PPNB du Levant," *Paléorient* Vol. 15(1): 161-167.

--------. 1997. *Khirokitia: A Neolithic Site.* The Bank of Cyprus Cultural Foundation. Nicosia.

--------. 2001. "At the Other End of the Sequence: the Cypriot Aceramic Neolithic as Seen from Khirokitia." In S. Swiny ed., *The Earliest Prehistory of Cyprus from Colonization to Exploitation.* CAARI Monograph Series 5. Nicosia: ASOR Archaeological Reports, 109-117.

Le Mière, M. 1989. "Les débuts de la céramique sur le Moyen-Euphrate (6500-5500 BC)." In O.M.C. Haex, H.H. Curvers and P.M.M.G Akkermans eds., *To the Euphrates and Beyond.* Rotterdam: A.A. Balkema, 53-64.

Le Mière, M. and M. Picon. 1987. "Productions locales et circulation des céramiques au VI millénaire au Proche-Orient," *Paléorient* 13(2): 133-145.

Le Mière, M. and O. Nieuwesenhuyse. 1996. "The Prehistoric Pottery." In P. Akkermans ed., *Tell Sabi Abyad: The Late Neolithic Settlement, Volume 1.* Istanbul: Nederlands Historisch-Archaeologisch Intituut, 119-132.

Leroi-Gourhan, A. 1989. *The Hunters of Prehistory.* New York: Atheneum.

Levine, L. and T.C. Young. 1987. "Ceramic Assemblage of the Central-Western Zagros." In *Préhistoire de la Mesopotamie.* Paris: CNRS, 15-19.

MacDonald, B. 1988. *The Wadi el-Hasa Archaeological Survey 1979-1983, West-Central Jordan.* Waterloo: Wilfred Laurier Press.

Maddin, R. and et al. 1999. "Early Metalworking at Çayönü." In A. Hauptmann, E. Pernicka, T. Rehren, Ü. Yalçin eds., *The Beginnings of Metallurgy.* Beiheft 9. Bochum: Der Anshnitt, 37-44.

Mahasneh, H. 1997. "The 1995 Season at the Neolithic Site of Es-Sifiya, Wadi Mujib, Jordan." In H. Gebel, Z. Kafafi, and G. Rollefson, eds. *The Prehistory of Jordan II: Perspectives from 1997.* Berlin: Studies in Early Near Eastern Production, Subsistence and Environment 4, 203-214.

Martin, L. and et al. 2002. "Animal Remains from the Central Anatolian Neolithic." In F. Gérard and L. Thissen eds., *The Neolithic of Central Anatolia: Internal Developments and External Relations during the 9th to 6th Millennia cal. BC.* Central Anatolian Neolithic e-Workshop. Istanbul: ECE Yayınları, 193-216.

Matthews, R. 2000. *The Early Prehistory of Mesopotamia: 500000 to 4500 BC. Subartu V.* Brepols: Turnhout.

Meadow, R. 1992. "Inconclusive Remarks on Pastoralism, Nomadism and other Animal Related Matters." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 260-272.

Meigen, L. and et. al. 2000. "Le feu au Paléolithique Moyen: recherches sur les structures de combustion et le statut des foyers. L'éxemple du Proche-Orient," *Paléorient* 26(2): 9-22.

Mellaart. J. 1981. *The Neolithic of the Near East.* Thames and Hudson. London.

Mellink, M. 1950. "The Pottery from the Neolithic." In H. Goldman ed., *Excavations at Gözlü Kule, Tarsus. Vol. II Part 1: From the Neolithic through the Bronze Age.* Princeton: Princeton University Press, 68-85.

Merpert, N. and R. Munchaev. 1986. "Earliest Levels at Yarim Tepe I and Yarim Tepe II in Northern Iraq," *Iraq* 49: 1-11.

Molist, M. 1998. "Le Néolithique du IX ème et VIII ème millénaire BP du nord de la Syrie: Apports du site de Tell Hulula (Vallée de l'Euphrate, Syrie)," *Les Annales Archéologiques Arabes Syriennes* 42: 63-74.

Molist, M. and J. Cauvin. 1991. "Les niveaux inférieurs de Cafer Höyük (Malatya, Turquie): Stratigraphie et architecture (Fouilles 1984-1986)." In J. Cauvin ed., *Cahiers de l'Euphrate 5-6.* Paris: Éditions Recherches sur les civilizations, 85-114.

Molist, M. and D. Stordeur. 1999. "Le moyen Euphrate syrien et son role dans la néolithisation. Spécifité et évolution des architectures." In G. de Olmo Lete and J. M. Montero Fenollòs eds, *Archaeology of the Upper Syrian Euphrates: The Tishrin Dam Area.* Barcelona: Editorial Ausa, 395-412.

Moore, A. 1975a. "The Excavations at Tell Abu Hureira," *Les Annales Arabes Syriennes* 25: 118-127.

--------. 1975b. "The Excavation of Tell Abu Hureyra in Syria: A Preliminary Report," *PPS* 41: 50-78.

--------. 1995. "The Inception of Pottery in Western Anatolia and its Impact on Economy and Society." In J. Hoopes and W. Barnett eds., *The Emergence of Pottery Technology and Innovation in Ancient Societies.* Washington, D.C.: Smithsonian Institute, 39-54.

Moore, A. and et al. 2000. *Village on the Euphrates: From Foraging to Farming at Abu Hureyra.* Oxford: Oxford University Press.

Moorey, P. 1975. "Near Eastern Metals." In H. Coghlan, T. Pemnimant and B. Blackwood eds., *Notes on Prehistoric Metallurgy of Copper and Bronze in the Old World.* Oxford: Oxford University Press, 41-59.

Morales, V. 1983. "Jarmo Figurines and Other Clay Objects." In L. Braidwood, R. Braidwood, B. Howe, C. Reed and P. J. Watson eds., *Prehistoric Archaeology along the Zagros Flanks.* Chicago: University of Chicago Press, 369-424.

--------. 1990. "*Figurines and Other Clay Objects from Sarab and Çayönü.*" Chicago Oriental Institute Communications 25. Chicago: University of Chicago.

Mortensen, P. 1963. "Early Village Farming Occupation at Tepe Guran, Luristan," *Acta Archaeologica* 34: 110-121.

--------. 1974. "A Survey of Prehistoric Settlements in Northern Luristan," *Acta Archaeologica* 45: 1-48.

--------. 1983. "Patterns of Interaction between Seasonal Settlements and Early Villages in Mesopotamia." In T.C. Young, P. Smith and P. Mortensen eds., *Hilly Flanks: Essays on the Archaeology of Southwestern Asia. Presented to R. Braidwood.* Studies in Ancient Oriental Civilization 36. Chicago: University of Chicago, 207-230.

Noy, T. 1989. "Gilgal, A Pre-Pottery Neolithic Site, Israel: The 1985-1987 Seasons," *Paléorient* 15(1): 11-18.

Noy, T. and et al. 1973. "Recent Excavations at Nahal Oren, Israel," *PPS* 39: 75-100.

Oppenheim, M. (von) 1943. *Tel Halaf 1: Die Prehistorische Funde.* Berlin:.Walter de Gruyter and Co.

Özbaşaran, M. 1999. "Musular: A General Assessment on a New Neolithic Site in Central Anatolia." In M. Özdoğan and N. Başgelen eds., *Neolithic in Turkey.* Istanbul: Arkeoloji ve Sanat, 147-154.

Özbaşaran, M. and H. Buitenhuis. 2002. "Proposal for a Regional Terminology for Central Anatolia." In F. Gérard and L. Thissen eds., *The Neolithic of Central Anatolia: Internal Developments and External Relations during the 9th to 6th Millennia cal. BC.* Central Anatolian Neolithic e-Workshop Istanbul: ECE Yayınları, 67-79.

Özdoğan, A. 1999. "Çayönü." In M. Özdoğan and N. Başgelen eds.*Neolithic in Turkey.* Istanbul: Arkeoloji ve Sanat, 35-63.

Özdoğan, M. and A. Özdoğan, 1999. "Archaeological Evidence on the Early Metallurgy at Çayönü Tepesi." In A. Hauptmann, E. Pernicka, T. Rehren and Ü. Yalçın eds., *The Beginning of Metallurgy.* Beiheft 9. Bochum: Der Anschnitt, 13-23.

Peltenburg, E. and et al. 2001a. "Well Established Colonists at Mylouthkia and the Cypriot Pre-Pottery Neolithic B." In S. Swiny ed., *The Earliest Prehistory of Cyprus from Colonization to Exploitation.* CAARI Monograph Series 5. Nocosia: ASOR Archaeological Reports, 61-87.

--------. 2001b. "Neolithic Reprisals from the Levantine Corridor: A Mediterranean Perspective," *Levant* 33: 35-64.

Perrot, J. 1993. "Remarques introductives," *Paléorient* 19(1): 9-21.

--------. 2000. "Réflexions sur l'état des recherches concernant la préhistoire récente du Proche et du Moyen-Orient," Paléorient 26(1): 5-28.

Peters, J. and et al. 1999. "Early Animal Husbandry in the Northern Levant," *Paléorient* 25(2): 27-47.

Pigott, V. 1998. "A Heartland of Metallurgy: Neolithic/Chalcolithic Metallurgical Origins on the Iranian Plateau." In A. Hauptmann, E. Pernicka, T. Rehren and Ü. Yalçın eds., *The Beginning of Metallurgy.*. Beiheft 9. Bochum: Der Anschnitt, 107-120.

Porada, E. and et al. 1992. "Mesopotamia." In R. Ehrich ed., *Chronologies in Old World Archaeology.* 77-121. Chicago: University of Chicago Press.

Rehder, J. 1999. "High Temperature Technology in Antiquity: A Sourcebook on the Design and Operation of Ancient Furnaces." In A. Hauptmann, E. Pernicka, T. Rehren and Ü. Yalçın eds., *The Beginning of Metallurgy.* Beiheft 9. Bochum: Der Anschnitt, 305-315.

Renfrew, C. 1984. *Approaches to Social Archaeology.* Edinburgh: Edinburgh University Press.

Rice, P. M. (ed.) 1984. "The Archaeological Study of Specialized Pottery Production: Some Aspects of Method and Theory." In *Pots and Potters: Current Approaches in Ceramic Archaeology.* Monograph 24. Los Angeles: Institute of Archaeology, University of California, 45-54.

Rice, P. M. 1999. "On the Origins of Pottery," *Journal of Archaeological Method and Theory* 6(1): 2-43.

Roberts, N. 1998. *The Holocene: An Environment History.* Oxford: Blackwell Publishers.

Rocek, T. 1998. "Pithouses and Pueblos on Two Continents: Interpretations of Sedentism and Mobility in the Southwestern US and Southwestern Asia." In O. Bar-Yosef and T. Rocek eds., *Seasonality and Sedentism: Perspective from Old and New World Sites.* Cambridge: Peabody Museum of Archaeology, 199-212.

Rollefson, G. 1989. "The Late Aceramic Neolithic of the Levant: A Synthesis," *Paléorient* 15(1): 168-193.

--------. 1998. "'Ain Ghazal (Jordan): Ritual and Ceremony III," *Paléorient* 24(1): 43-58.

Rollefson, G. and I. Kohler-Rollefson. 1990. "The Impact of Neolithic Subsistence Strategies on the Environment." In S. Bottema, G. Entjes-Nieborg, and W. Van Zeist eds., *Man's Role in the Shaping of the Eastern Mediterranean Landscape.* Rotterdam: A.A. Balkema, 3-14.

Rollefson, G. and et al. 1992. "Neolithic Cultures at 'Ain Ghazal, Jordan. *JFA* 19(4): 443-469.

Roodenberg, J. 1986. *Le mobilier en pierre de Bouqras: Utilization de la pierre dans un site néolithique sur le Moyen-Euphrate (Syrie).* Istanbul: Nederlands Historisch-Archaeologische Instituut.

--------. 1989. "Hayaz Höyük and the Final PPNB in the Taurus Foothills," *Paléorient* 15(1): 91-101.

Rosen, B. and A. Perevolotsky. 1998. "The Function of Desert Kites: Hunting or Livestock Husbandry," *Paléorient* 24(1): 107-111.

Rosen, S. 1992. "The Case for Seasonal Movement of Pastoral Nomads in the Late Byzantine/Early Arabic Period in the South Central Negev." In O. Bar-Yosef and A. Khazanov eds., *Pastoralism in the Levant.* Monographs in World Archaeology No. 10. Madison: Prehistory Press, 153-164.

Rosenberg, M. 1994. "Hallan Çemi: Excavation Reports," *Anatolica* 20: 121-140.

Rosenberg, M. and B. Peasnell. 1997. "A Report on Soundings at Demirköy Höyük: An Aceramic Neolithic Site in Eastern Anatolia," *Anatolica* 24: 195-201.

Runnels, C. 1989. "Trade Models in the Study of Agricultural Origins and Dispersals," *Journal of Mediterranean Archaeology* 2(1): 149-156.

Russo, M. 1998. "Measuring Sedentism with Fauna: Archaic Cultures along the Southwest Florida Coast." In O. Bar-Yosef and T. Rocek eds., *Seasonality and Sedentism: Prespective from Old and New World Sites*. Cambridge: Peabody Museum of Archaeology, 143-160.

Rye, O. 1981. *Pottery Technology: Principles and Reconstruction*. Washington, D.C.: Taraxacum.

Sanlaville, P. 1996. "Changements dans la région à la fin du Pléistocène superieur et au début de l'Holocène. Leurs relations avec l'évolution des sociétés humaines," *Paléorient* 22(1): 7-30.

Schirmer, W. 1990. "Some Aspects of Building at the 'Aceramic Neolithic' Settlement of Çayönü-Tepesi," *World Archaeology* 21(3): 363-387.

Schmandt-Besserat, D. 1974. "The Use of Clay before Pottery in the Zagros," *Expedition* 16(2): 11-17.

Schmidt, K. 2000. "Göbekli Tepe, Southeastern Turkey: A Preliminary Report on the 1995-1999 Excavations," *Paléorient* 26(1): 45-54.

Schoop, U-D. 1999. "Aspects of Early Metal Use in Neolithic Mesopotamia." In A. Hauptman, E. Pernicka, T. Rehren and Ü. Yalçın eds., *The Beginning of Metallurgy*. Beiheft 9. Bochum: Der Anschnitt, 31-37.

Schwartz, G. and H. Weiss. 1992. "Syria." In R. Ehrich ed., *Chronologies in Old World Archaeology*. Chicago: University of Chicago Press, 221-243.

Schwartz, M. and D. Hollander. 2000. "Annealing, Distilling, Reheating and Recycling: Bitumen Processing in the Ancient Near East," *Paléorient* 26(2):83-91.

Şevketoğlu, M. 2000. *Archaeological Field Survey of the Neolithic and Chalcolithic Settlement Sites in Kyrenia District, North Cyprus: Systematic Surface Collection and the Interpretation of Artefact Scatters*. Oxford: John and Erica Hedges.

Simmons, A. 1997. "Ecological Changes During the Late Neolithic in Jordan: A Case Study." *In H. Gebel, Z. Kafafi and G. Rollefson eds., The Prehistory of Jordan II: Perspectives from 1997.* Berlin: Studies in Early Near Eastern Production, Subsistence and Environment 4, 309-318.

Simmons, A. and et al. 2001. "Wadi Shu'eib. A Large Neolithic Community in Central Jordan: Final Report of Test Investigations," *BASOR* 321: 1-39.

Simmons, A. and N. Najjar. 1997. "Al-Ghuwayni: A PPN Village in Wadi Faynan, Southern Jordan Preliminary Report of the 1996/97/98 Seasons," *Annual of the Department of Antiquities of Jordan* 42: 91-102.

Simmons, A. and et al. 1992. "Neolithic at Ain Ghazal, Jordan," *JFA* 19: 443-470.

Simms, S. and K. Russell. 1997. "Tur Imdai Rockshelter: Archaeology of Recent Pastoralists in Jordan," *JFA* 24(4): 459-472.

Smith,P. 1974. "Iran 9000-4000 BC: The Neolithic," *Expedition* 13(3):6-12.

--------. 1990. "Architectural Innovation and Experimentation at Ganj Dareh, Iran," *World Archaeology* 21: 323-335.

Smith, P. and R. Crepeau. 1983. "Fabrication experimentale de repliques d'un vase néolithique du site de Ganj Dareh: Recherche technologique," *Paléorient* 9(2): 55-62.

Smith, P. and T. C. Young (eds.) 1983. "The Force of Numbers: Population Pressure in the Central Western Zagros 12000-4500 BC." In *Hilly Flanks: Essays on the Archaeology of Southwestern Asia. Presented to R. Braidwood.* Studies in Ancient Oriental Civilisations 36. Chicago. University of Chicago, 141-162.

Streily, A. 2001. "Early Pottery Kilns in the Middle East," *Paléorient* 26(2): 69-81.

Tchernov, E. 1993. "The Impact of Sedentism on Animal Exploitation in the Southern Levant." In H. Buitenhuis and A. Clason eds., *Archaeozoology of the Near East.* Leiden: Universal Book Series, 10-26.

Thissen, L. 2002. "Time Trajectories for the Neolithic of Central Anatolia." In F. Gérard and L. Thissen eds., *The Neolithic of Central Anatolia: Internal Developments and External Relations during the 9th to 6th Millennia cal. BC.* Central Anatolian Neolithic e-Workshop. Istanbul: ECE Yayınları, 13-27.

Yellin, J. and Y. Garfinkel. 1986. "The Source of Archaeological Obsidian from a Pre-Pottery Neolithic B Site at Yiftahel, Israel," *Paléorient* 12(2): 99-103.

Zarins, J. 1989. "Jebel Bishri and the Amorite Homeland: The PPNB Phase." In O.M.C. Haex, H.H. Curvers and P.M.M.G Akkermans eds., *To the Euphrates and Beyond.* Rotterdam: A.A. Balkema, 29-52.

Zeder, M.A. 1999. "Animal Domestication in the Zagros. A Review of Pastoralism and Current Research," *Paléorient* 25(2): 11-27.

The Museum of Anatolian Civilizations, Ankara.

TAY-Site, Teleilat Höyük:
http://www.tayproject.org/NeoIng.fm$Retrieve?RecNum=36&html=NeodetailEng.html

Tobert, N. 1984. "Ethno-archaeology of Pottery Firing in Darfur, Sudan: Implications for Ceramic Technological Studies," *Oxford Journal of Archaeology* 3(2): 141-155.

Todd, I. 1998. *Kalavassos-Tenta.* Nicosia: The Bank of Cyprus Cultural Foundation.

--------. 2001. "Kalavassos-Tenta Revisited." In S. Swiny ed., *The Earliest Prehistory of Cyprus from Colonization to Exploitation.* CAARI Monograph Series 5. ASOR Archaeological Reports, 95-108.

Tsuneki, A. and Y. Miyake. 1996. "The Earliest Pottery Sequence of the Levant: New Data from Tell el-Kerkh 2, Northern Syria," *Paléorient* 22(1): 109-125.

Vandiver, P. 1987. "Sequential Slab Construction: A Conservative Southwest Asiatic Ceramic Tradition: 7000-3000 BC," *Paléorient* 13(2): 9-29.

Vandiver, P. and et al. 1997. "The Beginnings of Pyrotechnology, Part II: Production and Use of Lime and Gypsum Plaster in the Neolithic Near East," *JFA*, 15: 219-244.

Velde, B. and C. Druc. 1999. *Archaeological Ceramic Materials.* Berlin: Springer.

Verhoeven, M. 2002. "Ritual and Ideology in the Pre-Pottery Neolithic B of the Levant and Southeast Anatolia," *Paléorient* 28(1): 5-13.

Vigne, J. and et al. 1999a. "Les débuts de l'élevage au Proche Orient: Données nouvelles et réflexions," *Paléorient* 25(2): 5-8.

Vigne, J. and et al. 1999b. "Les premiers pas de la domestication animale à l'ouest de l'Euphrate: Chypre et l'Anatolie centrale," *Paléorient* 25(2): 49-62.

Voigt, M. 1985. "Village on the Euphrates: Excavations at Neolithic Gritille in Turkey," *Expedition* 27(1): 10-25.

Voigt, M. and R. Dyson. 1992. "Chronologies of Iran 8000-2000 BC." In R. Ehrich ed., *Chronologies in Old World Archaeology*. Chicago: University of Chicago Press, 122-178.

World atlas of nations. 1993. Chicago: Rand McNally and Company.

Yalçın, Ü. 2000. "Anfänge der Metallverwendung in Anatolien. In Ü. Yalçın ed., *Anatolian Metal I.* Beiheft 13. Bochum: Der Anschnitt, 17-31.

Yalçın, Ü. and E. Pernicka. 1999. "Frühneolithische Metallurgie von Aşıklı Höyük." In A. Hauptmann, E. Pernicka, T. Rehren and Ü. Yalçın eds., *The Beginning of Metallurgy.* Beiheft 9. Bochum: Der Anschnitt, 45-55.

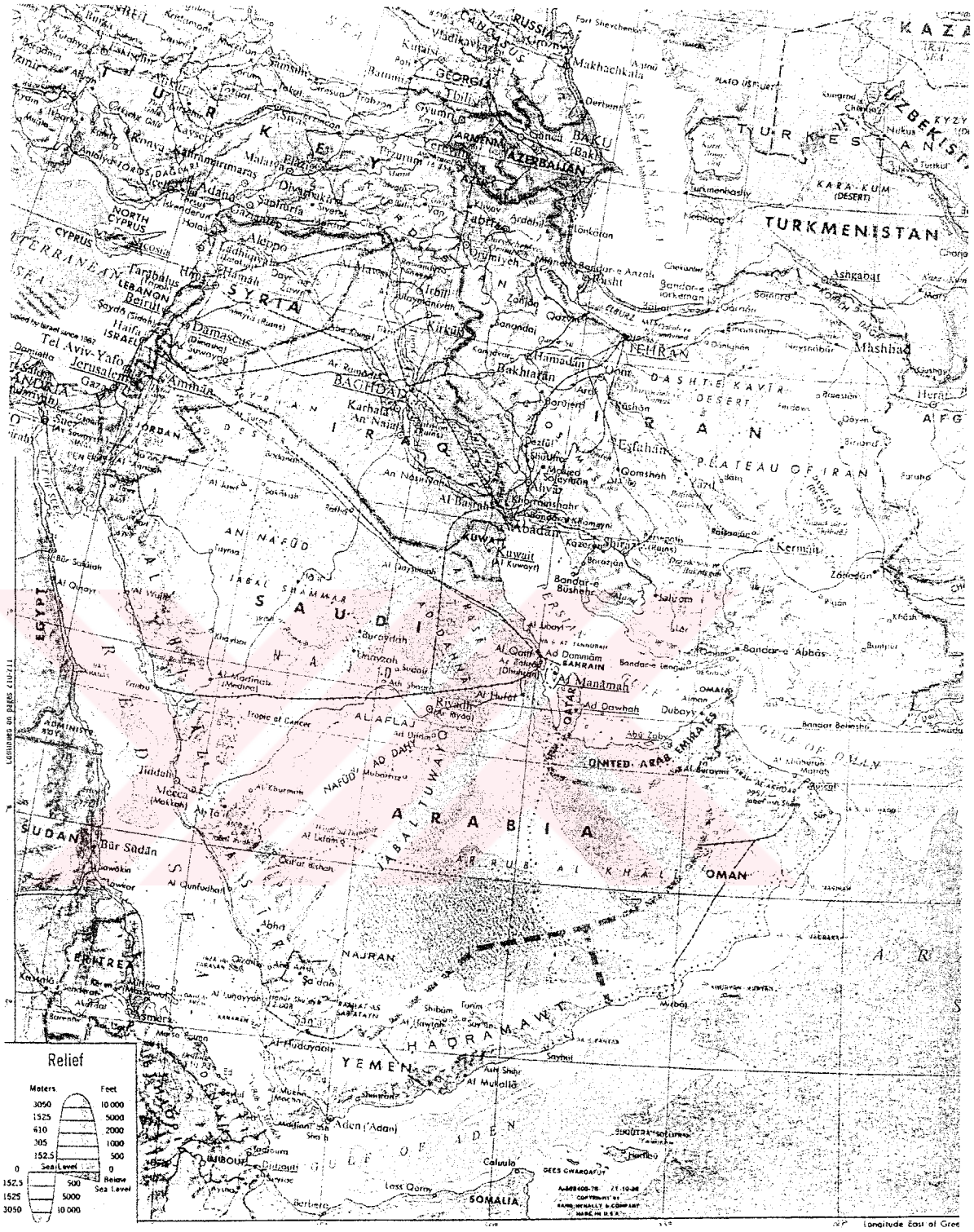


Fig. 1 Present day Near Eastern Countries

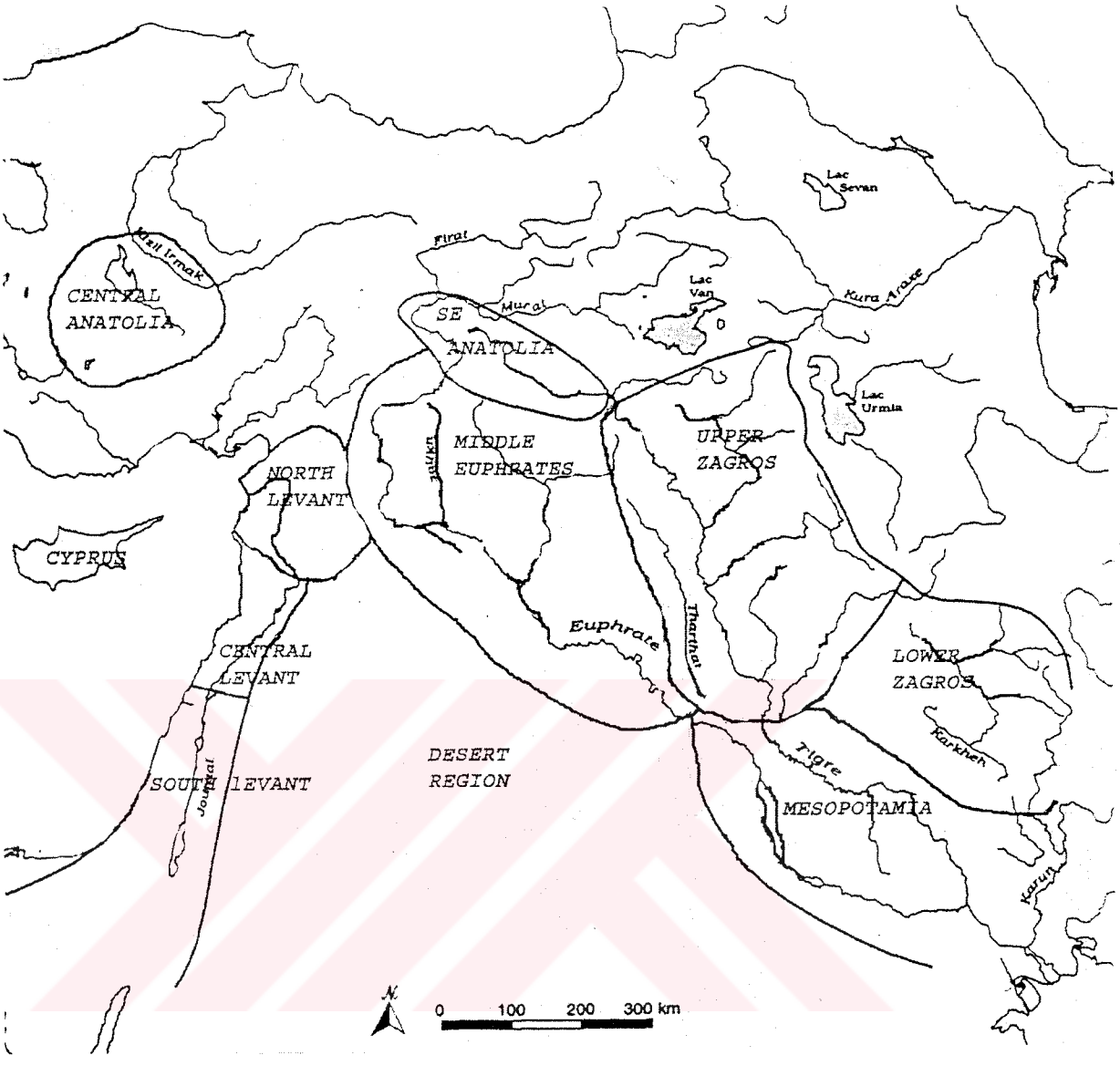


Fig. 2 Regional Designations

Fig. 3 Old Chronology

LE PROCHE ORIENT DE 14.000 à 3.700 av. J.C. (de 16.000 à 5.700 B.P.)

Schéma chronologique

Période 0 (14.000 - 10.000)

Levant : *kébarien.*
Zagros : *zarzien.*

Période 1 (10.000 - 8.300)

Levant : *natoufien* (Mallaha).
Zagros : *zarzien final.*
Caspienne : *épipaléolithique.*

Période 2 (8.300 - 7.600)

Syrie-Palestine : *protoneolithic, PPNA* (Jéricho, Mureybet).

Période 3 (7.600 - 6.600)

Syrie-Palestine : *PPNB* (Jéricho, Beidha).
Anatolie : Hacılar *pre-ceramic*, Çayönü.
Zagros : Ganj Dareh, Ali Kosh *(Bus Mordeh).*

Période 4 (6.600 - 6.000)

Syrie-Palestine : *PPNB final* (Abu Hureyra, Bouqras, Ramad, Ras Shamra *V C*, Abou Gosh, Beisamoun).
Anatolie : Çatal Hüyük *(XII-IX)*, Can Hasan III, Suberde.
Zagros : Jarmo *(a-ceramic)*, Ali Kosh, Sefid *(Ali Kosh).*

Période 5 (6.000 - 5.600)

Syrie-Palestine : Byblos *(néo. ancien)*, Ras Shamra *V B.*
Anatolie-Cilicie : Çatal Hüyük *(VIII-II), Amuq A.*
Mésopotamie : Umm Dabaghiyah, Yarim I *(XII-IX).*
Zagros-Khuzistan : Ali Kosh *(Mohammed Jaffar)*, Choga Mish *(Susiana archaic I).*

Période 6 (5.600 - 5.000)

Levant : Byblos *(néo. ancien final)*, Ras Shamra *V A, phase Sha'ar Hagolan, Amuq B*, Chypre.
Mésopotamie : *Hassuna, Halaf, Samarra, Obeid I* (Oates).
Zagros-Khuzistan : Sefid *(Surkh), Susiana archaic II (Susiana a).*
Turkménistan : *Jeitun.*

Période 7 (5.000 - 4.500)

Levant : Byblos *(néo. moyen)*, Ras-Shamra *IV C-B, PNA, Amuq C.*
Mésopotamie : *Halaf final, Obeid II.*
Zagros-Khuzistan : *Sabz Khazineh, Choga Mami trans., Susiana archaic III, early Susiana, middle Susiana 1-2 (Susiana b).*
Turkménistan : *Anau I A.*

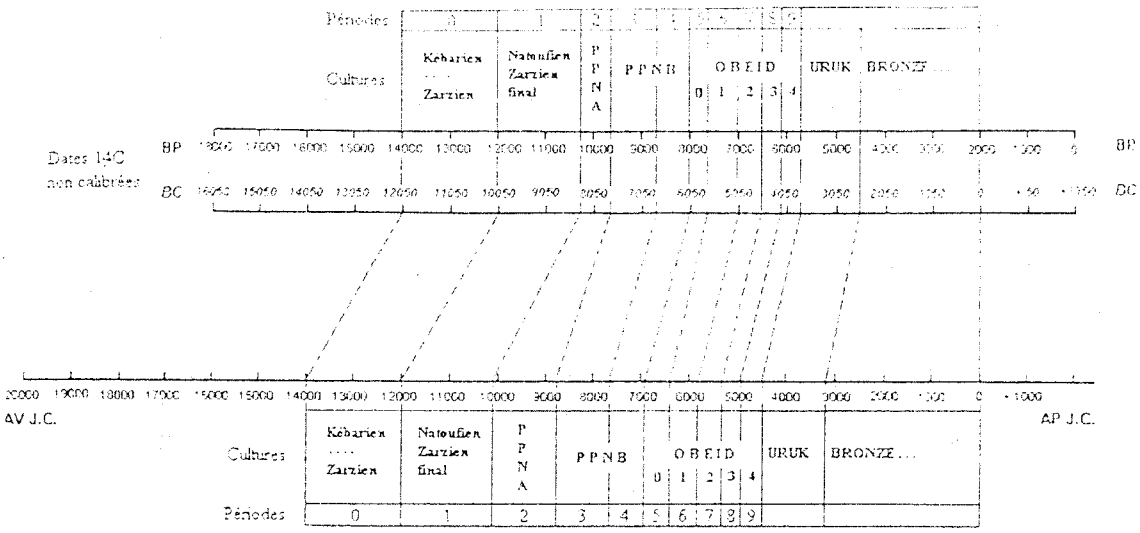
Période 8 (4.500 - 4.100)

Levant : Byblos *(néo. récent), PNB, Amuq D.*
Mésopotamie : *Obeid III.*
Zagros-Khuzistan : *Mehmeh, Dalma, middle Susiana 3 (Susiana c).*
Turkménistan : *Anau I B, Namazga I.*

Période 9 (4.100 - 3.700)

Levant : Byblos *(énéo. ancien), Amuq E.*
Mésopotamie : *Obeid IV.*
Zagros-Khuzistan : *Bayat, late Susiana (Susiana d).*
Turkménistan : *Namazga II.*

N.B. Les dates sont données avant J.C. (B.C.), calculées sur la base de la demi-vie «courte» (Libby), et non calibrées.



Périodes	Dates ^{14}C B.P.	Durée en années B.P.	Dates calibrées av. J.-C.	Durée en années réelles	
Période 0	14000-12000	2000	14000-12000	2000	Kébarien à géométriques - Moschabien - Zarzien
Période 1	12000-10300	1700	12000-10200	1800	Natoufien - Zarzien final
Période 2	10300-9600	700	10200-8800	1400	Protonéolithique - PPNA - Khiamien - Sultanien - Harifien
Période 3	9600-8600	1000	8800-7600	1200	PPNB ancien et moyen
Période 4	8600-8000	600	7600-6900	700	PPNB récent
Période 5	8000-7600	600	6900-6400	500	DFBW - Çatal Hüyük - Umm Dabaghiyah - Sotto - Obeid 0
Période 6	7600-7000	600	6400-5800	600	Hassouna - Samarra - Halaf - Obeid 1
Période 7	7000-6500	500	5800-5400	400	PNA - Halaf final - Obeid 2
Période 8	6500-6100	400	5400-5000	400	PNB - Obeid 3
Période 9	6100-5700	400	5000-4500	500	Obeid 4

Fig. 4 New Chronology

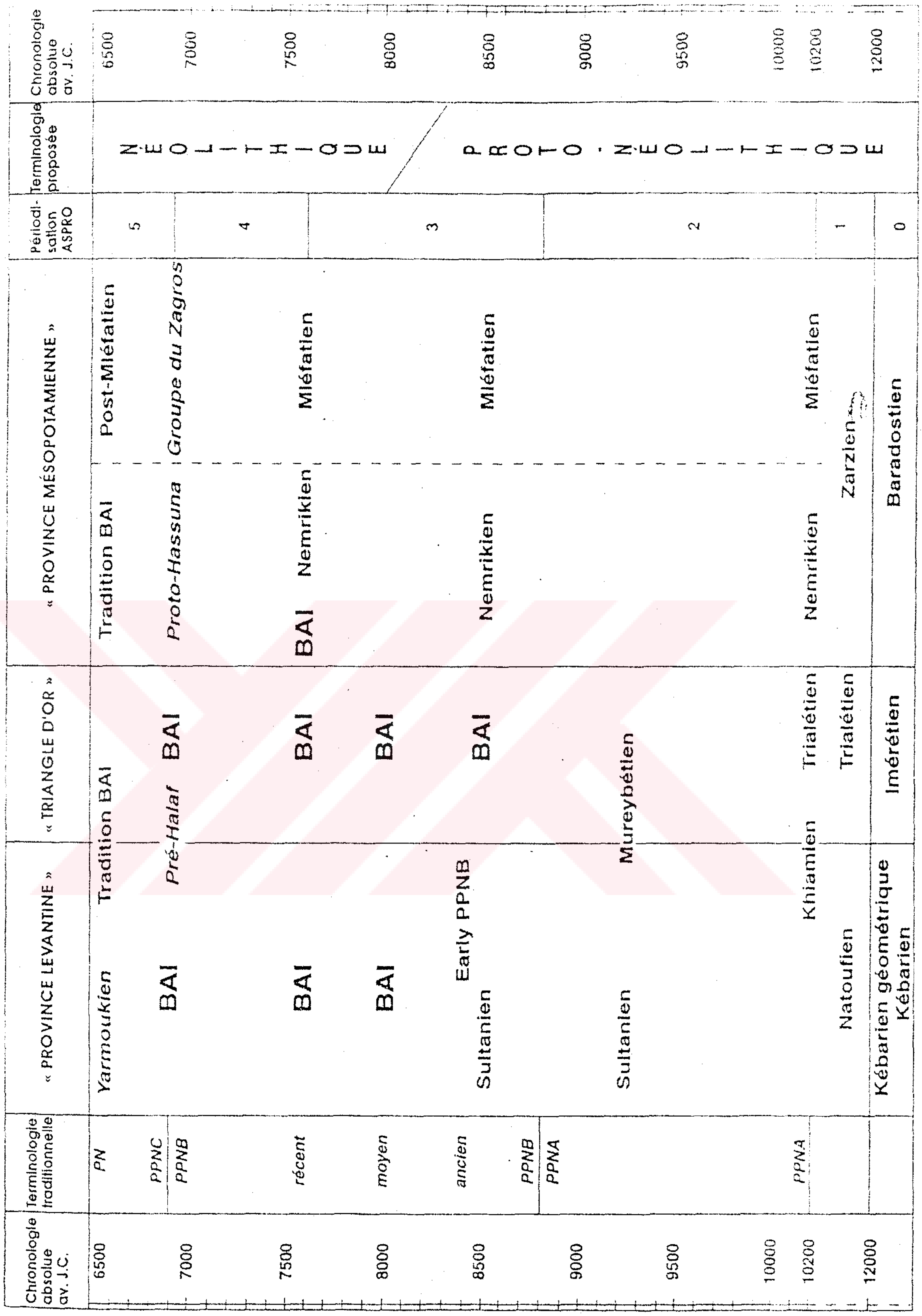


Fig. 5 Chart showing new chronology and corresponding cultures

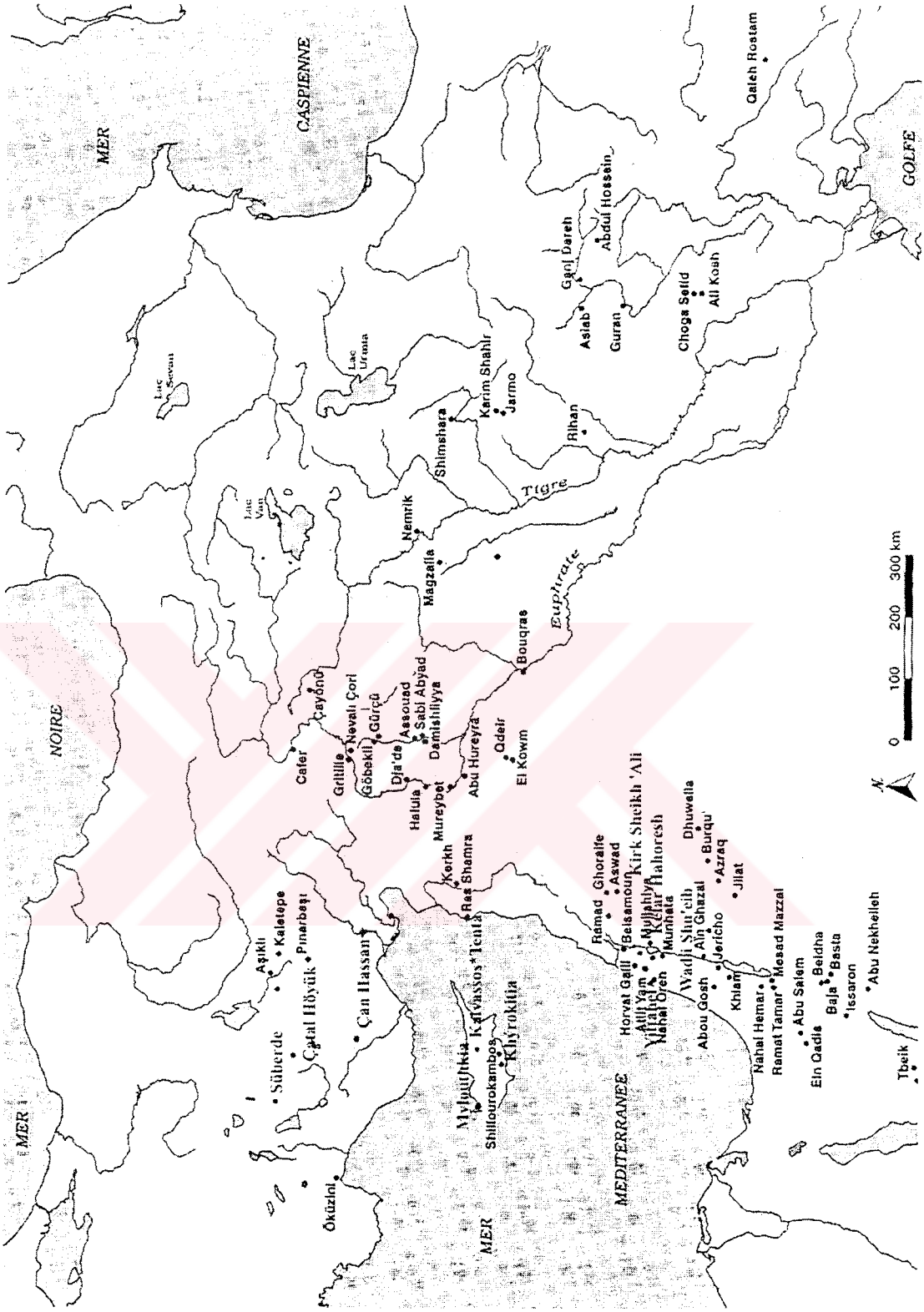


Fig. 6 PPNB sites in the Near East

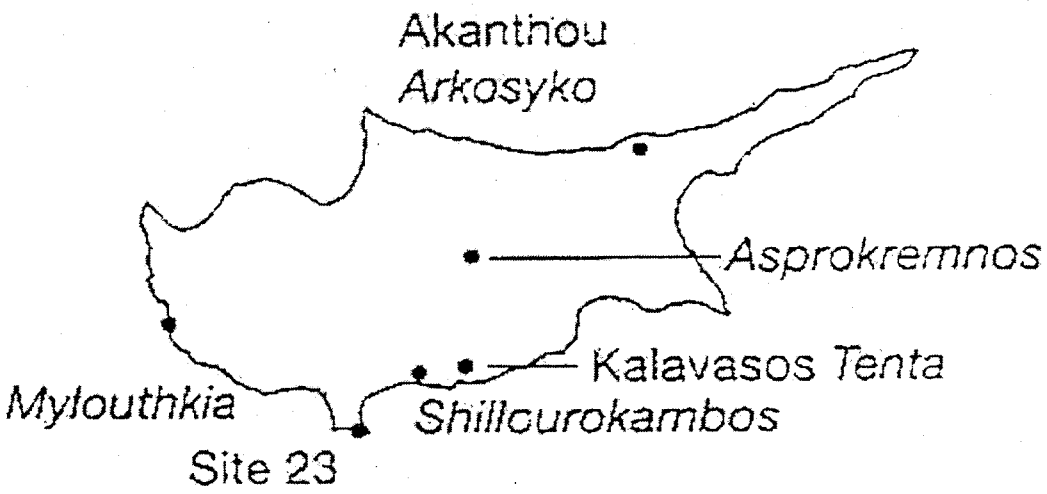


Fig. 7 Map of PPNB sites on Cyprus

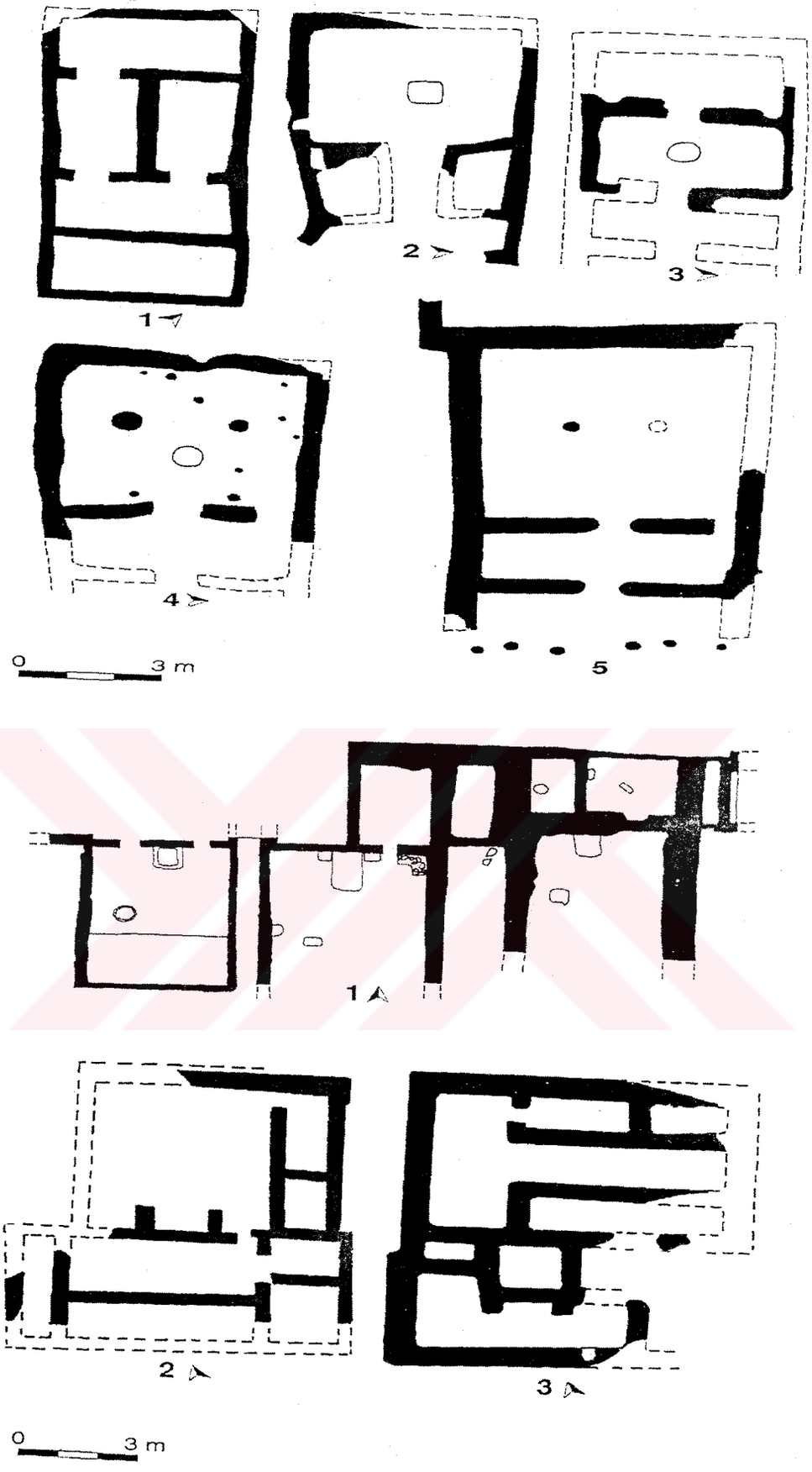


Fig. 8 Examples of PPNB Rectangular Houses

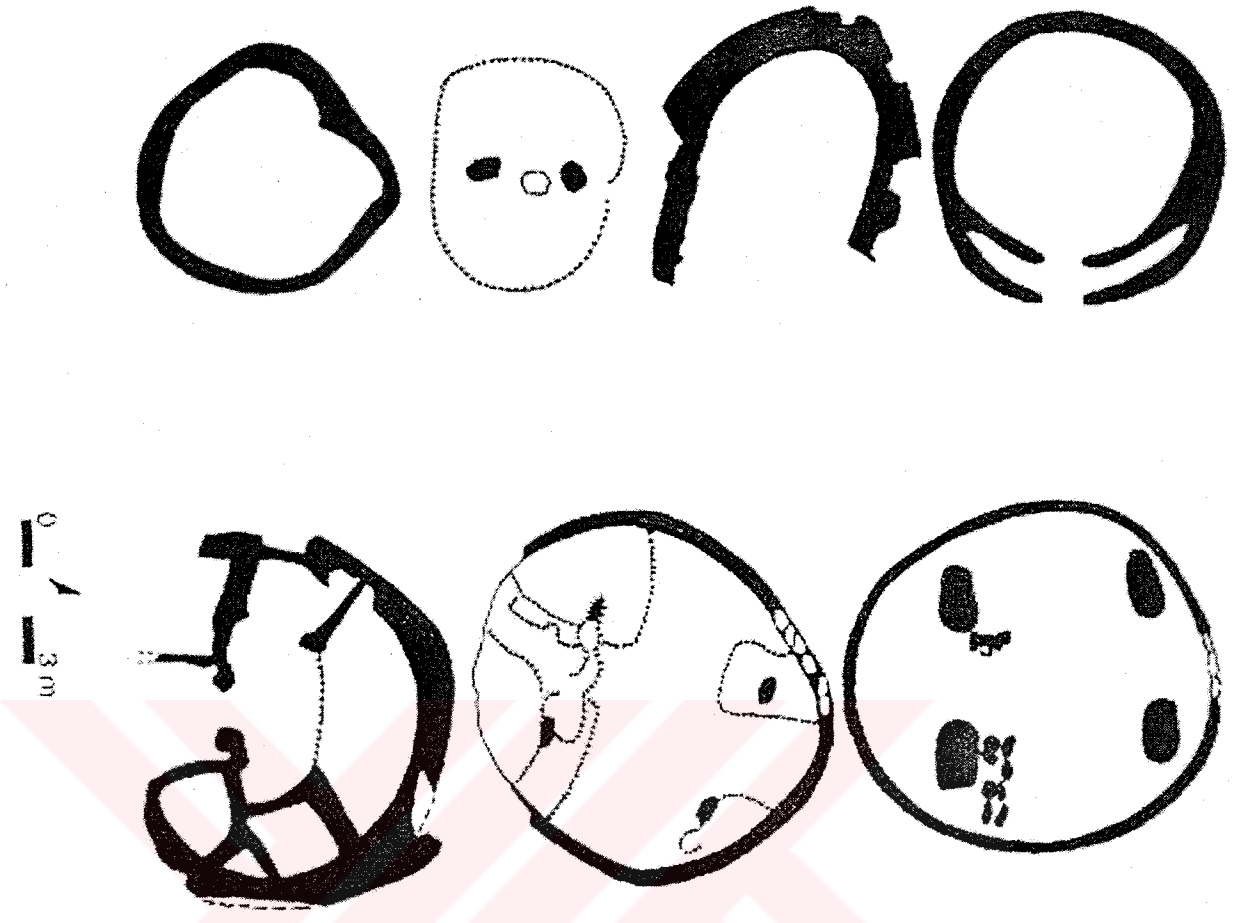


Fig. 9 Examples of PPNB Round Architecture

Fig. 10a Round architecture from Kalavassos-Tenta, Cyprus

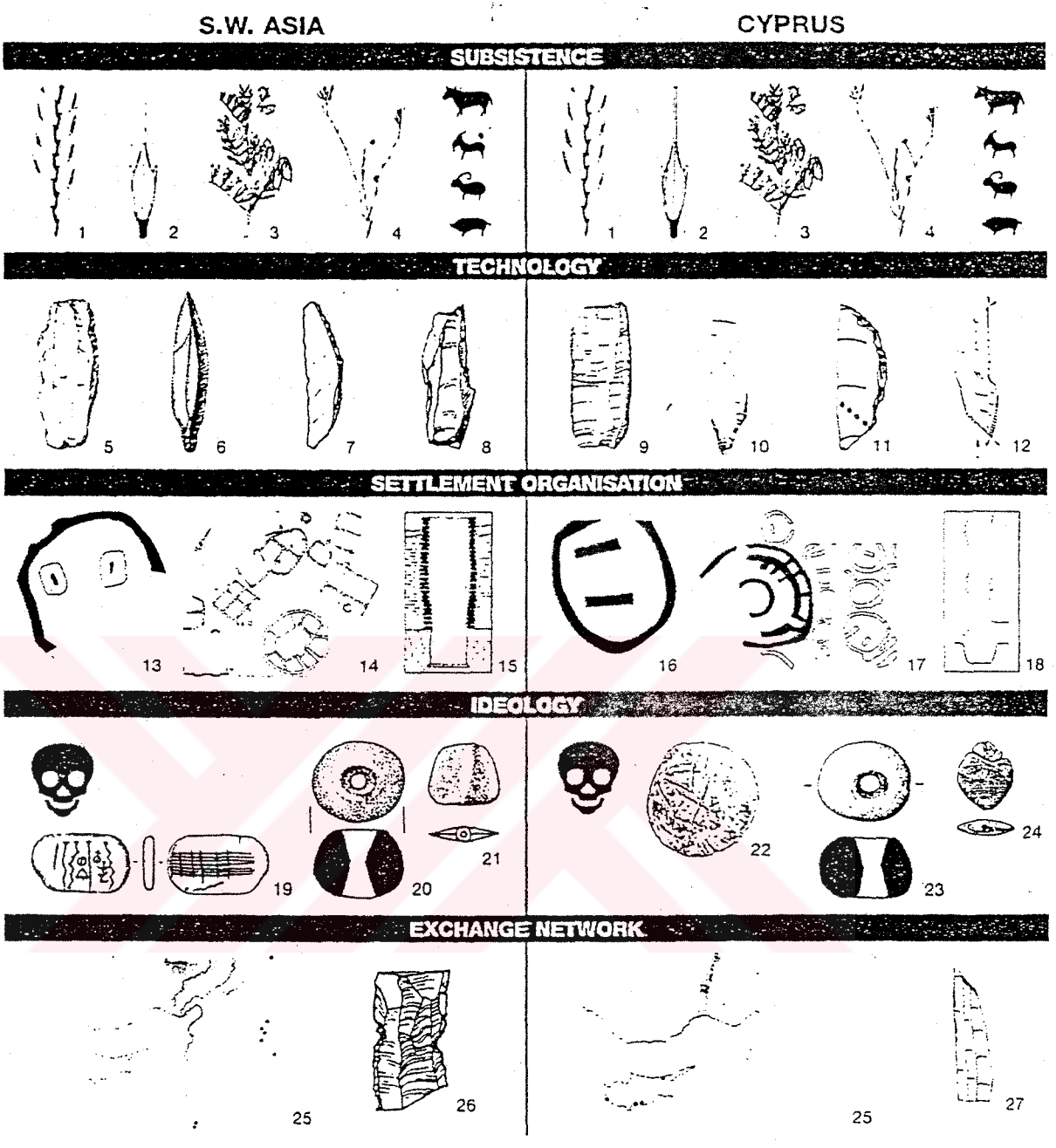


Fig. 10b Chart comparing the PPNB of Cyprus and the Mainland

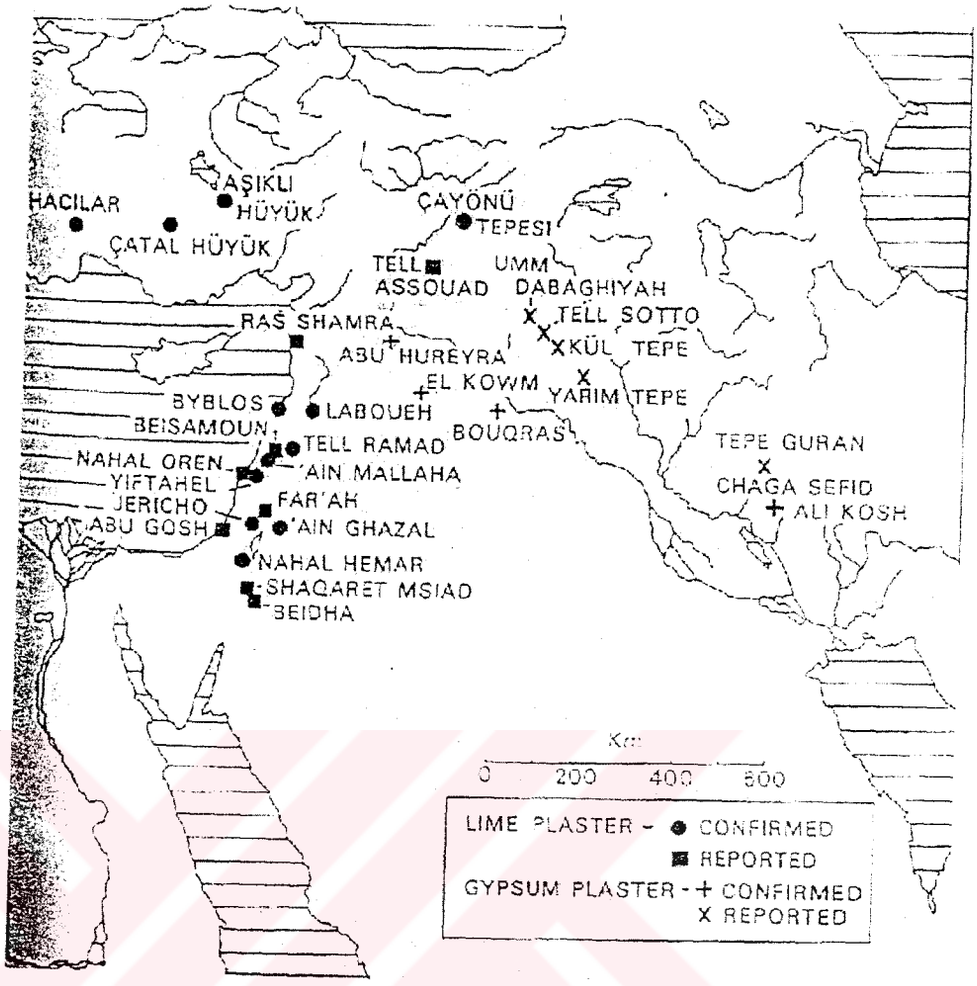


Fig. 11 Distribution of lime and gypsum plaster

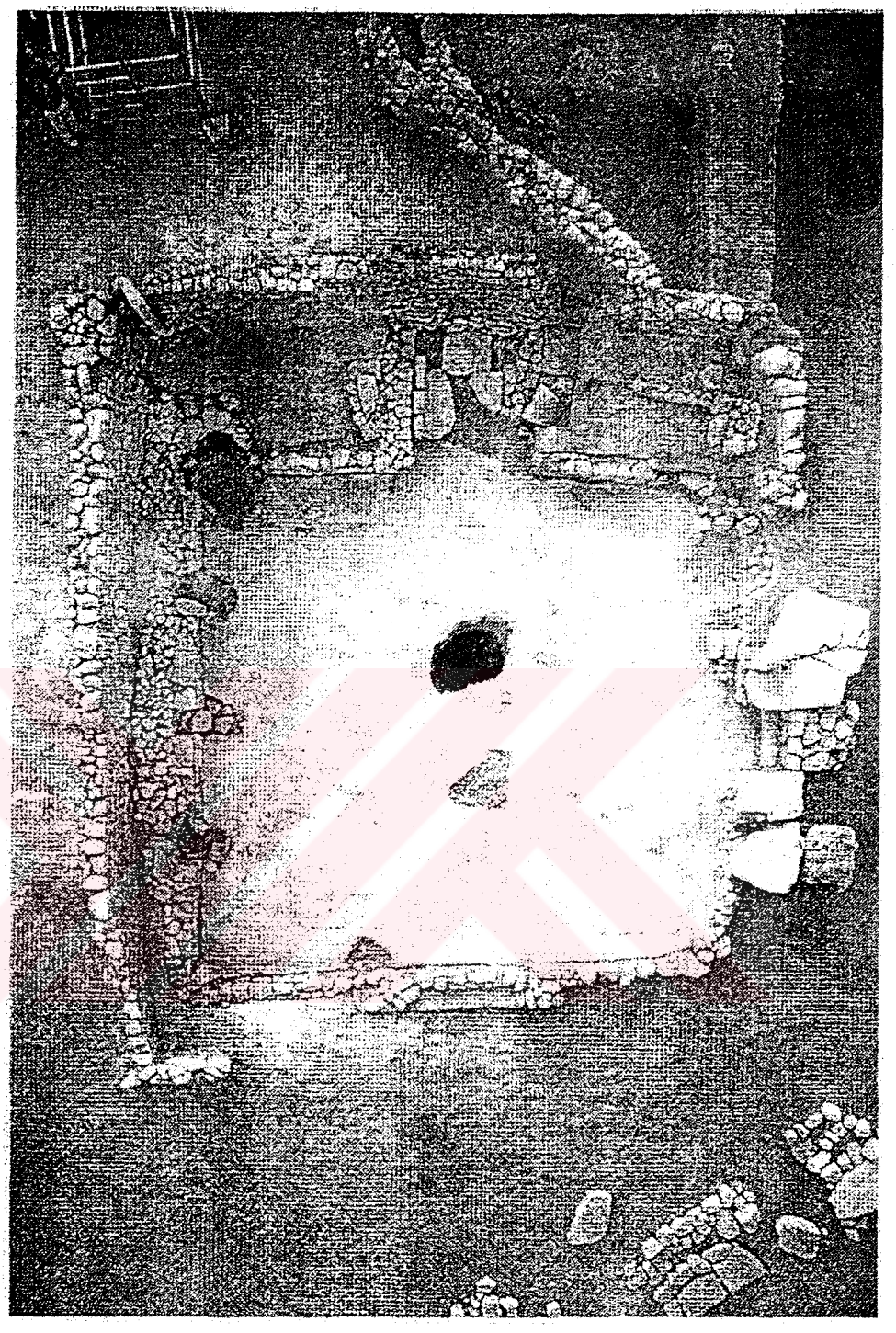


Fig. 12 Temple at Nevalı Çori

Fig. 13 A temple at Göbekli Tepe

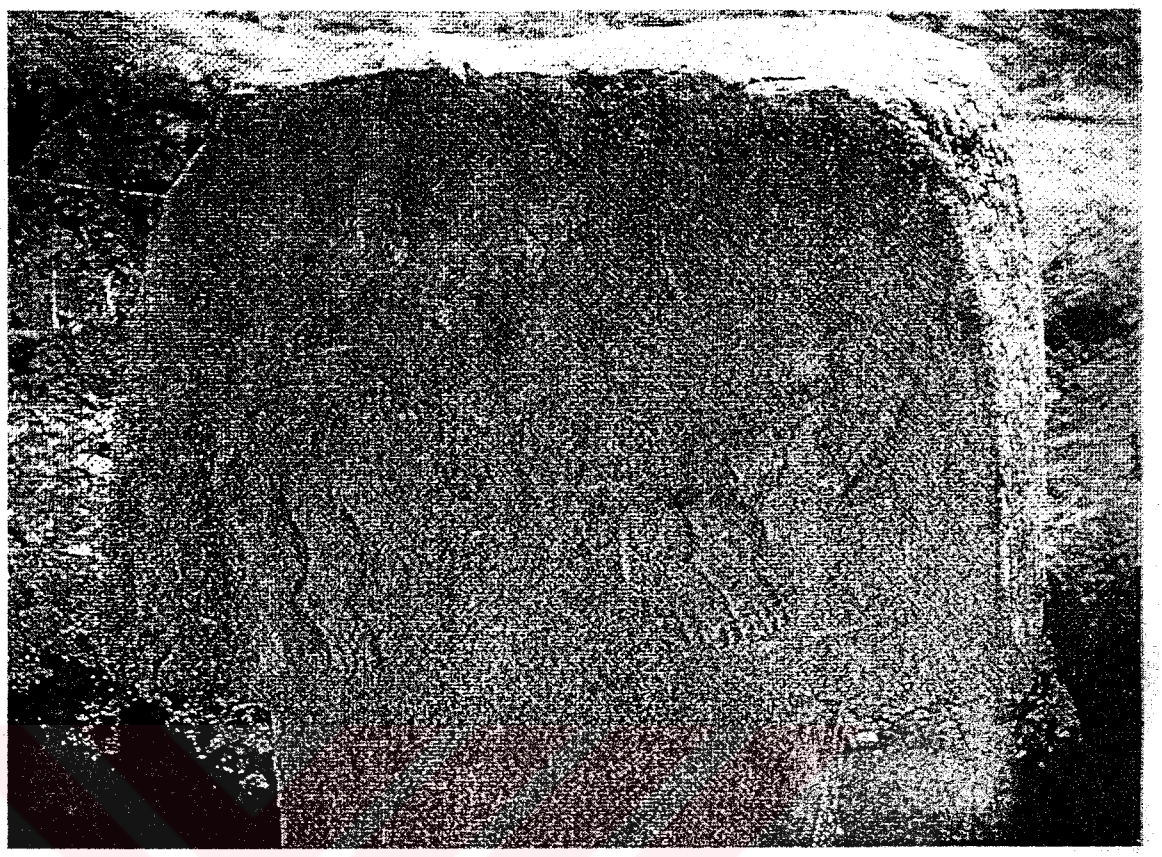


Fig. 14 Standing stone with lion relief from Göbekli Tepe

Fig. 15 Plastered skull from Ain Ghazal

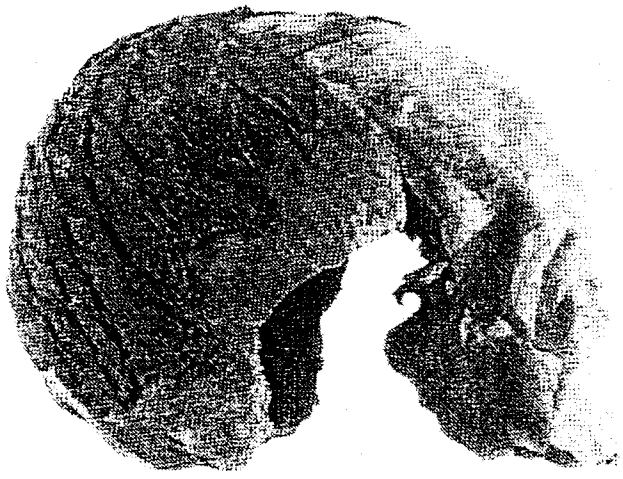


Fig.16a Bitumen design on skull from Nehal Hemar

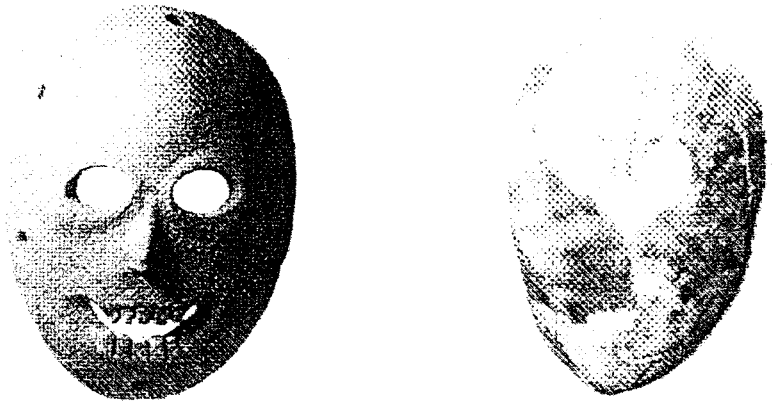


Fig. 16b Stone masks from Nehal Hemar

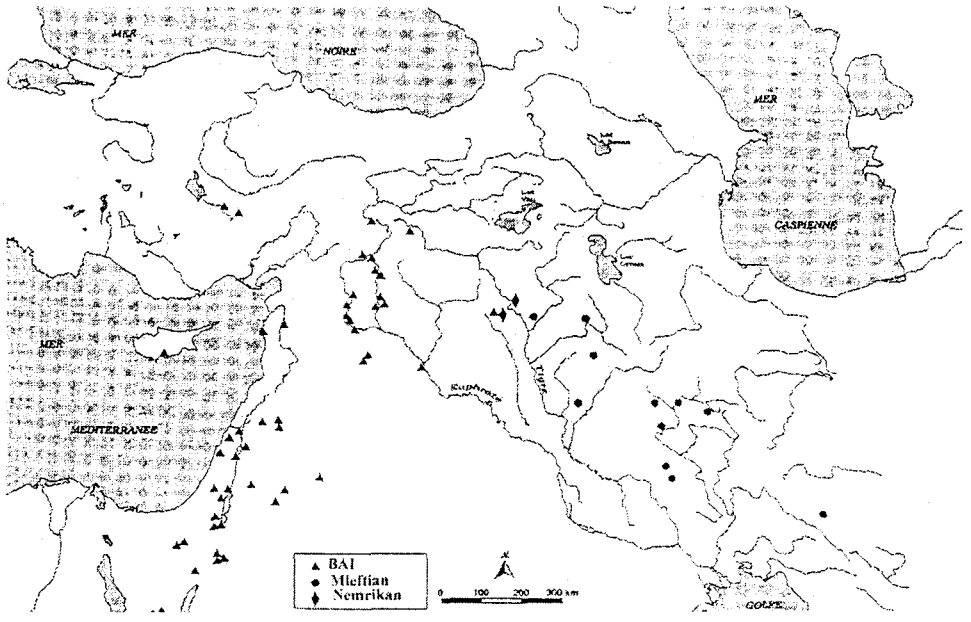


Fig. 17 PPNB Lithic Industry Distribution in the Near East

Figs. 18a b and c Examples from BAI Lithic Industry

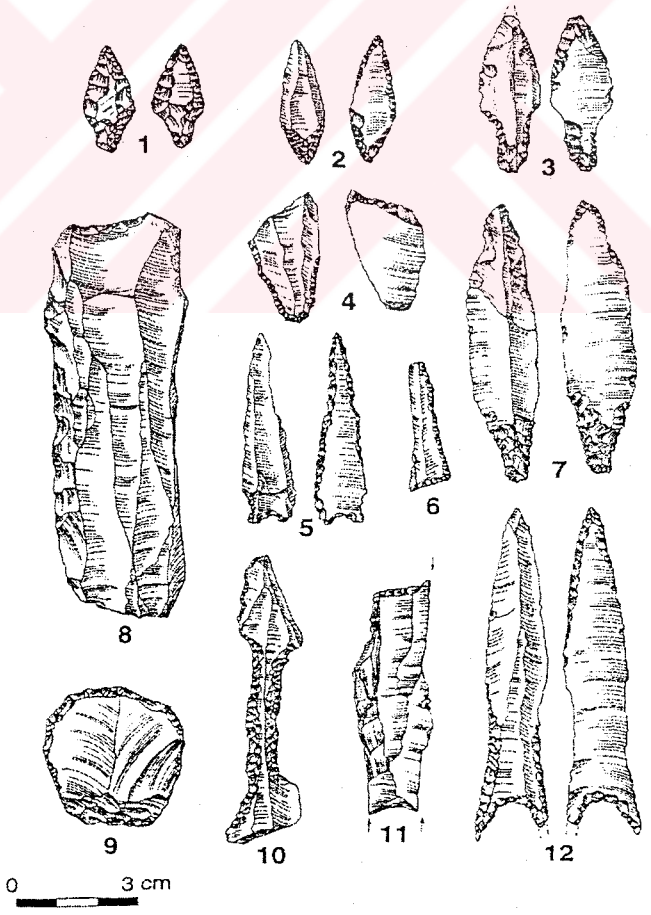


Fig. 18a

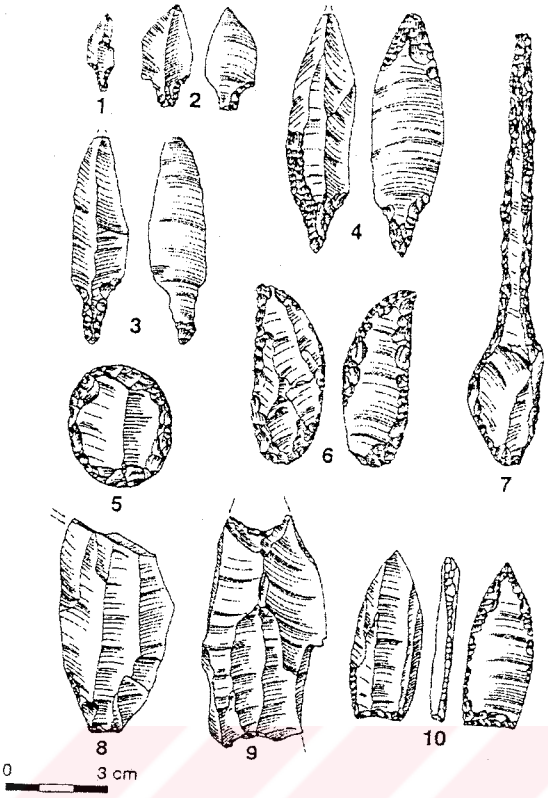


Fig. 18b

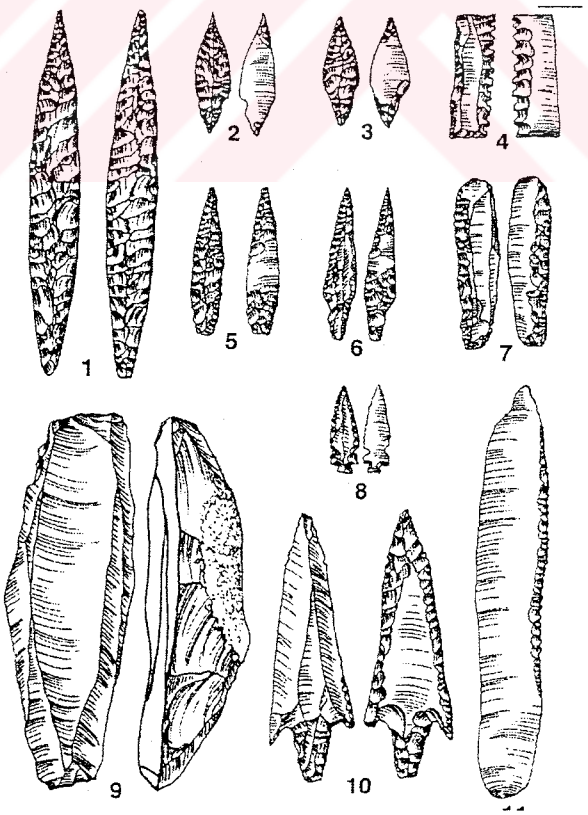


Fig. 18c

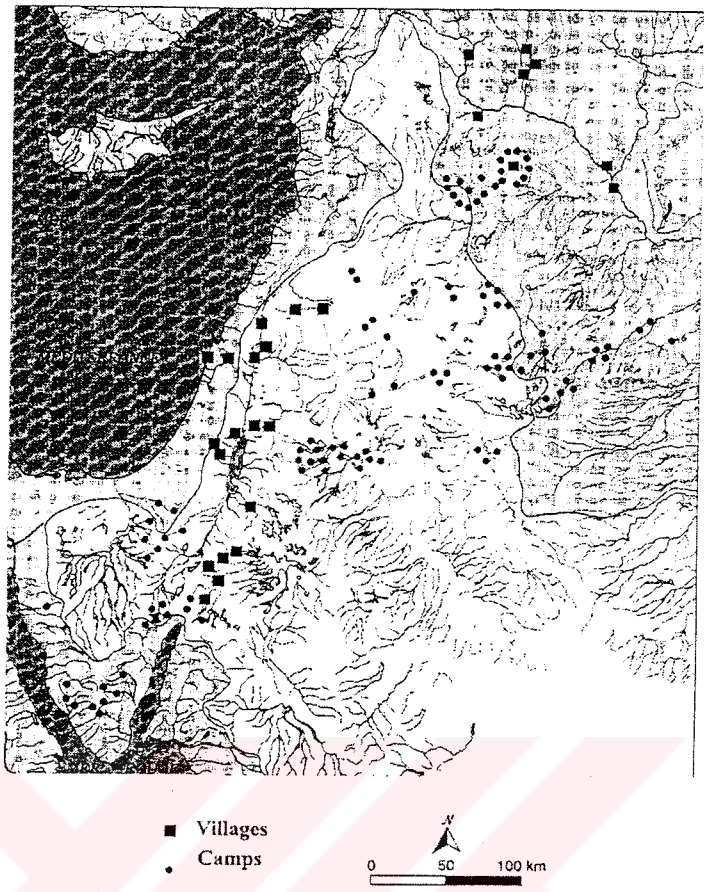


Fig. 19 Village and Camp distribution in the Near East during the PPNB

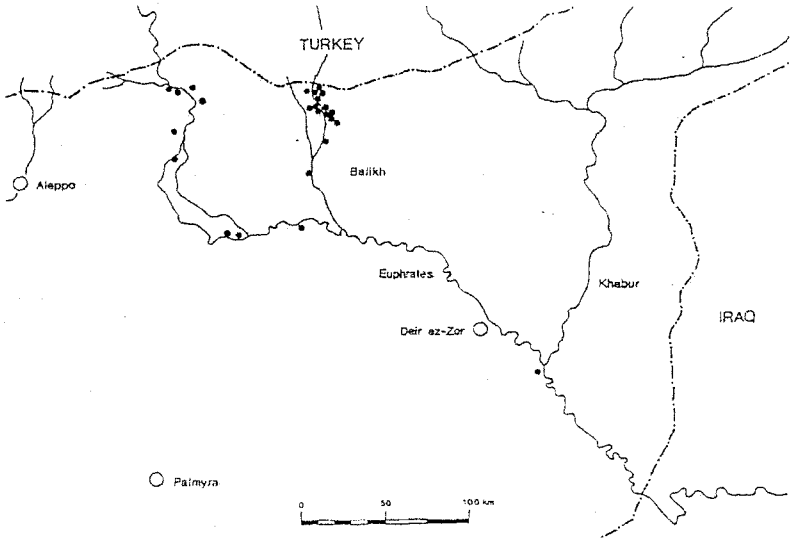


Fig. 20a Distribution of PPNB site in the Balikh Valley

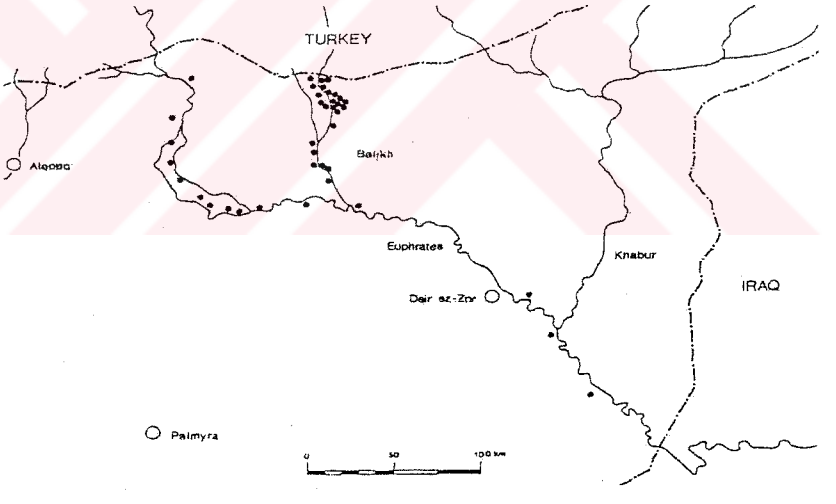


Fig. 20b Distribution of EPN sites in the Balikh Valley

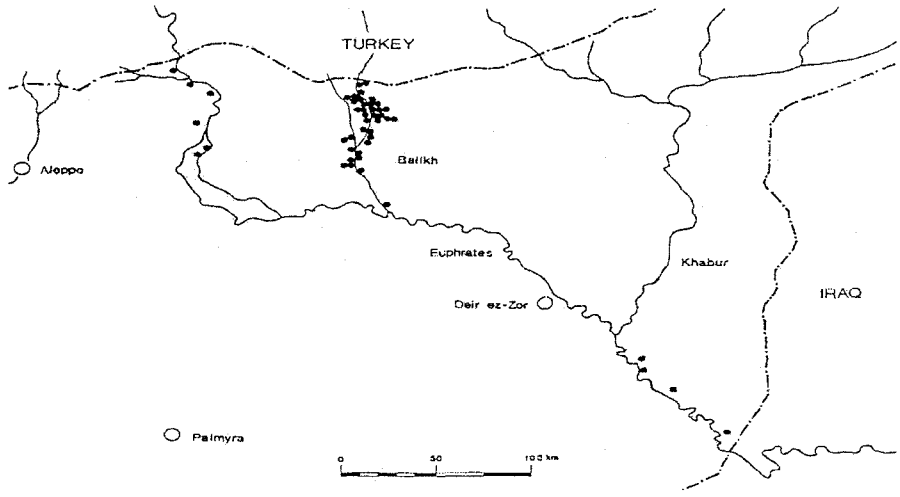


Fig. 20c Distribution of Halaf sites in the Balikh Valley

Figs. 21a-d Regional distribution of the 4 domesticates from the EPPNB to the PN

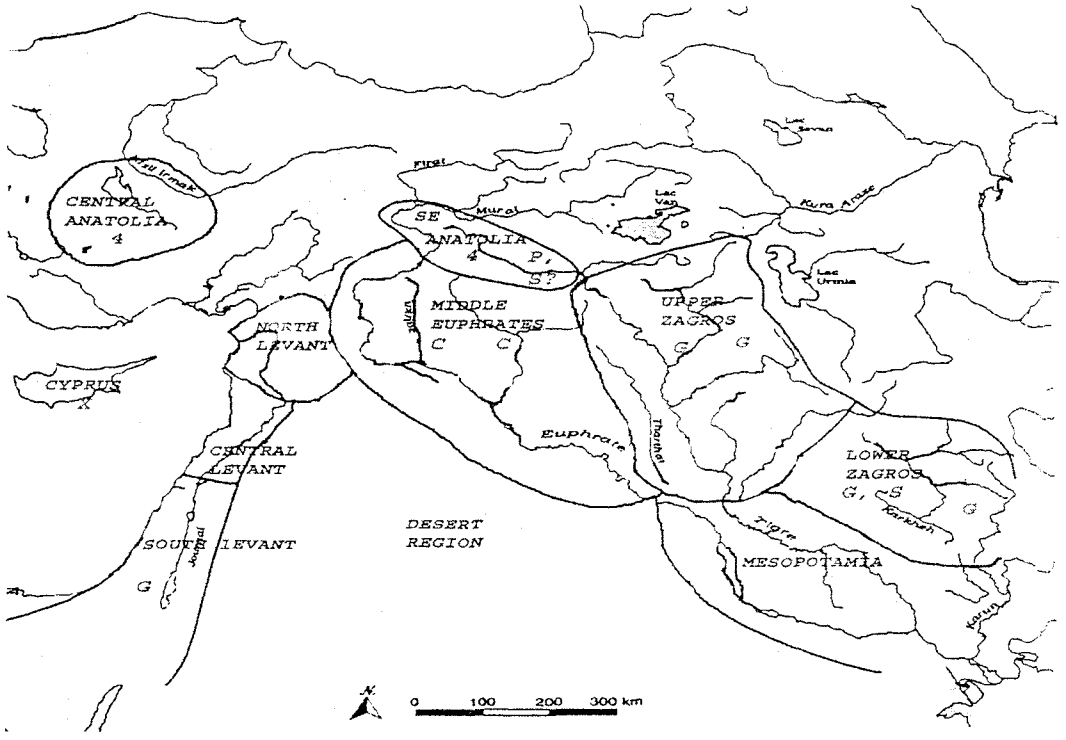


Fig. 21a Location of the natural habitat of the each of the four domesticates according to region

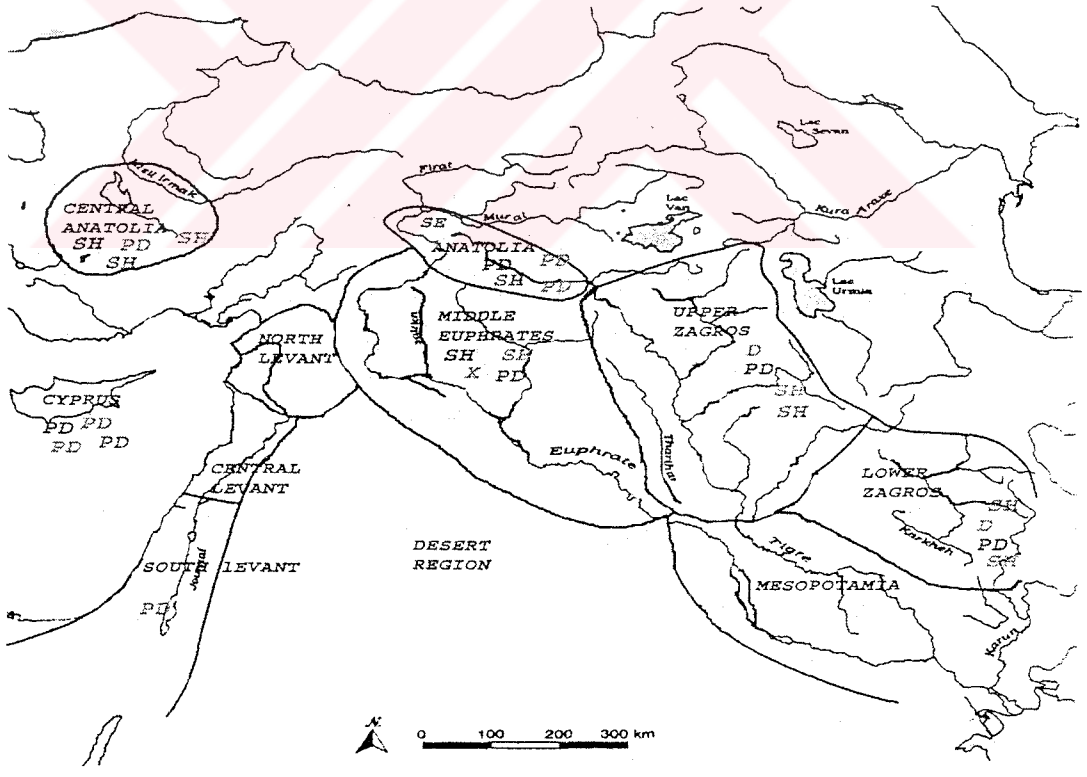


Fig. 21b Distribution of 4 domesticates in the E/MPPNB in the Near East

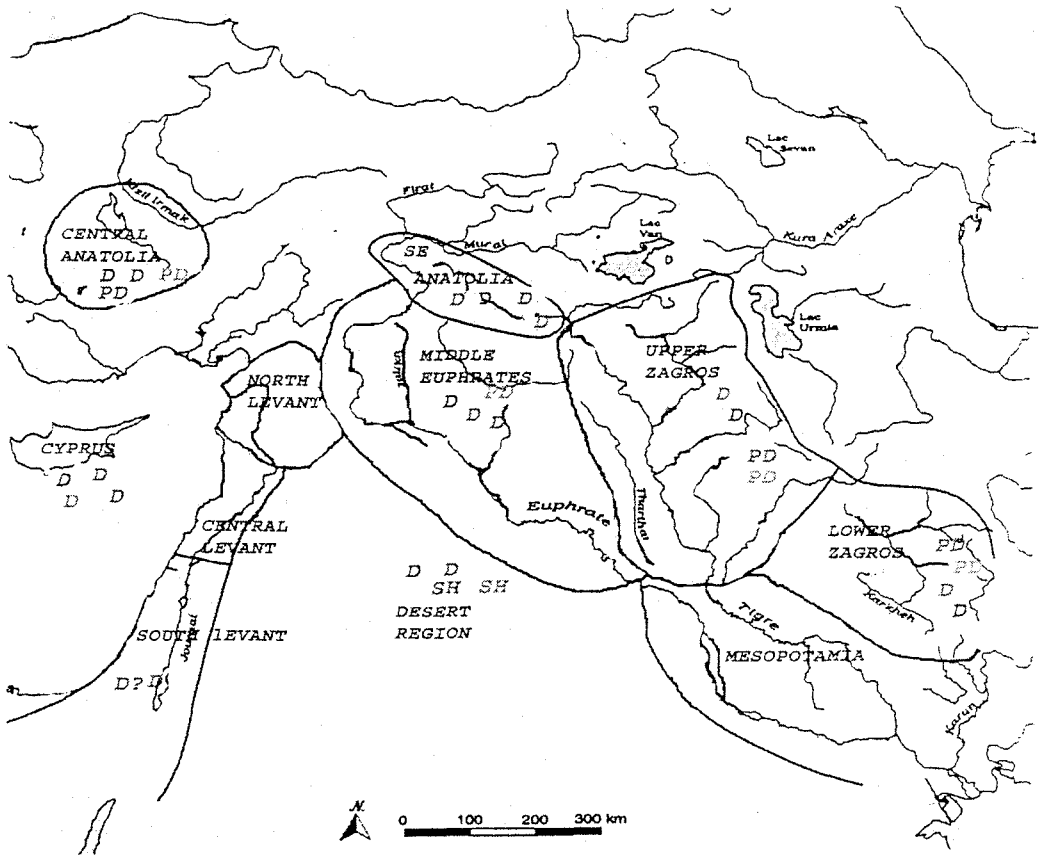


Fig. 21c Distribution of the 4 domesticates in the L/FPPNB in the Near East

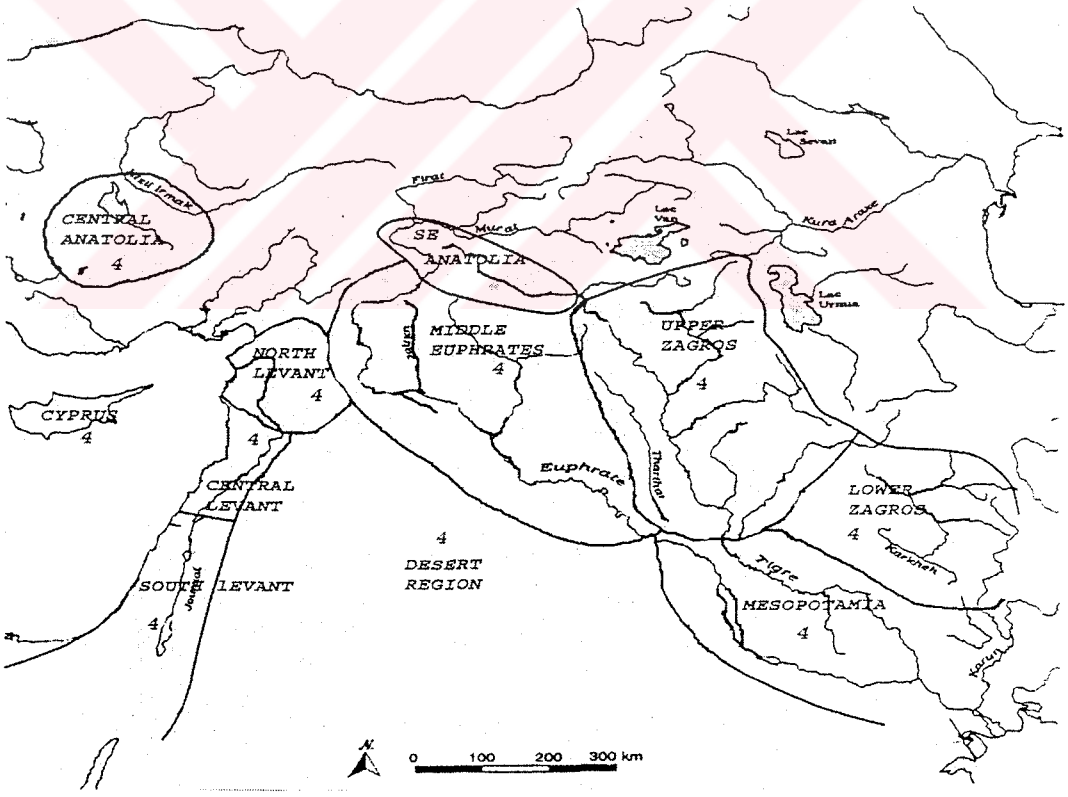


Fig. 21d Distribution of the 4 domesticates during the EPN.

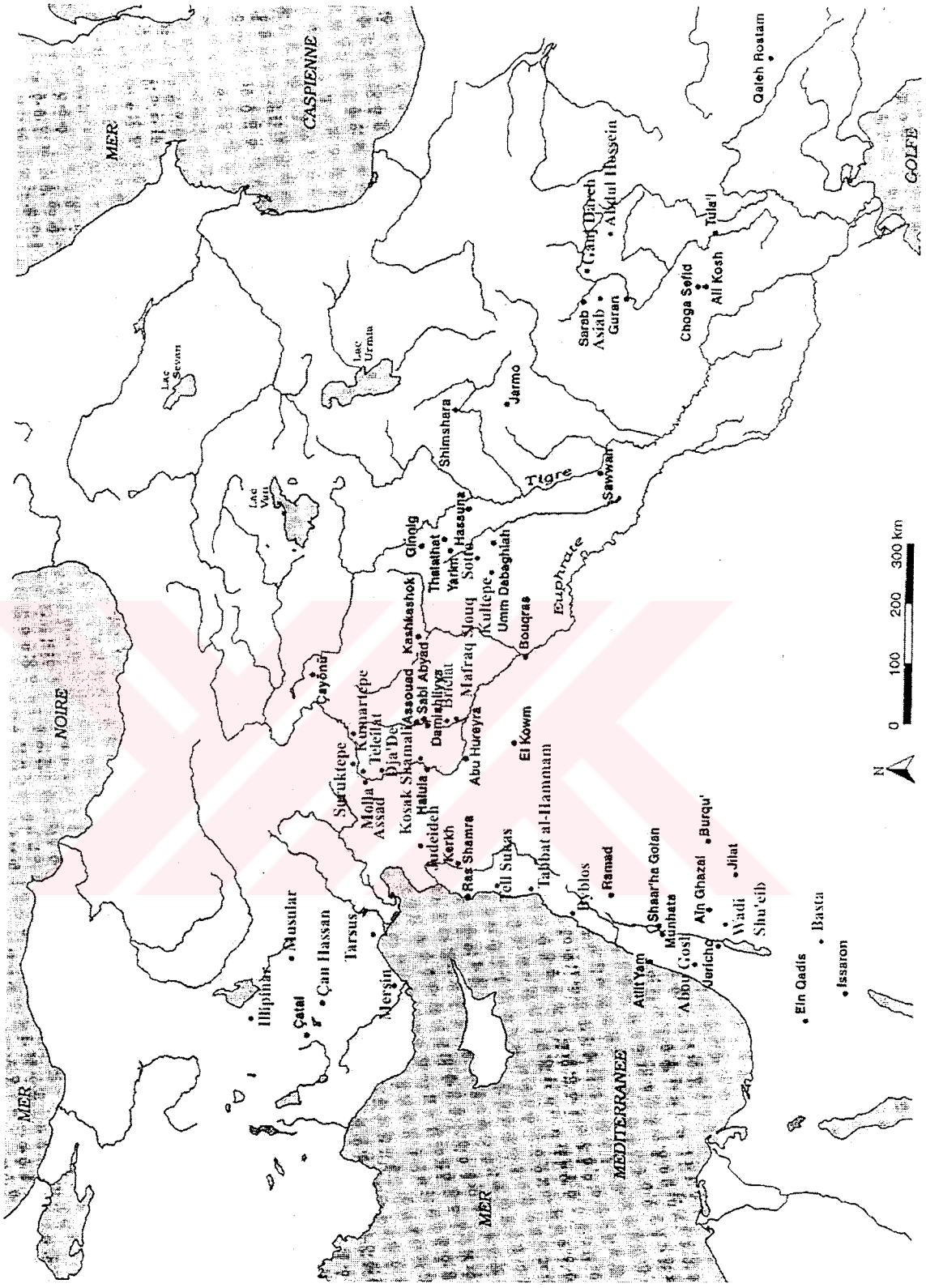


Fig. 22 EPN sites in the Near East

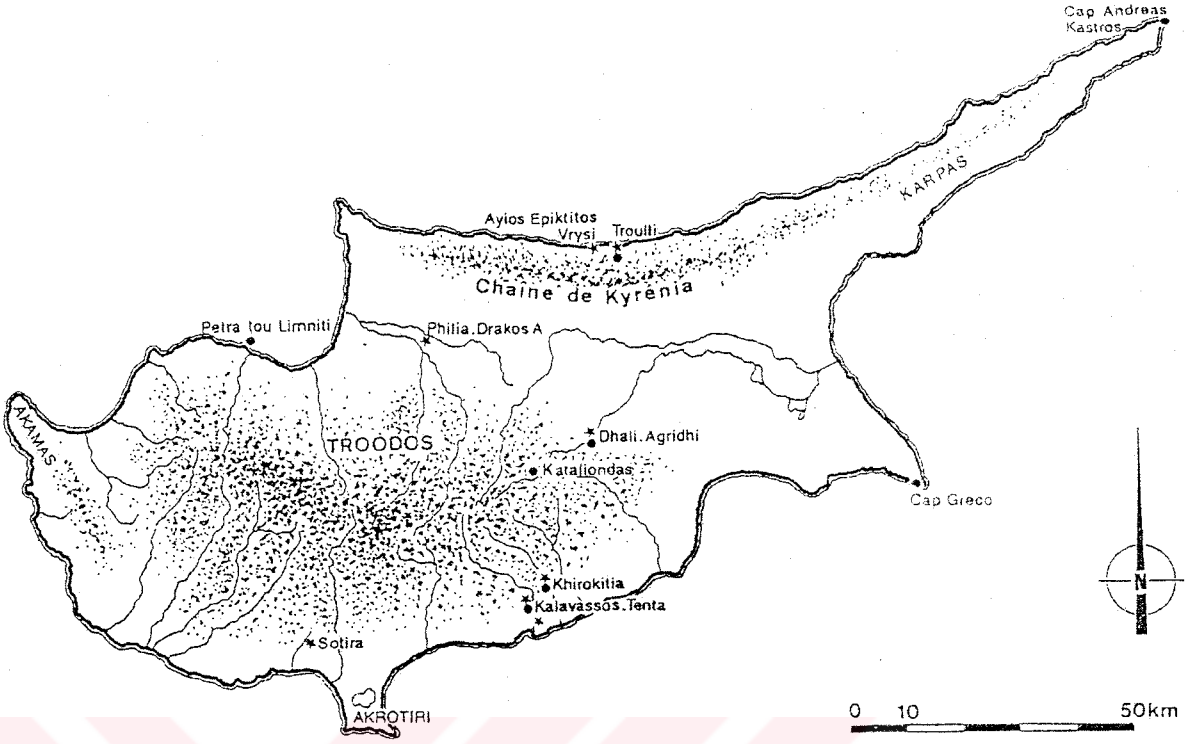


Fig. 23 Distribution of PN Sites on Cyprus

Fig. 24 and 25 Examples of EPN clay vessel shapes

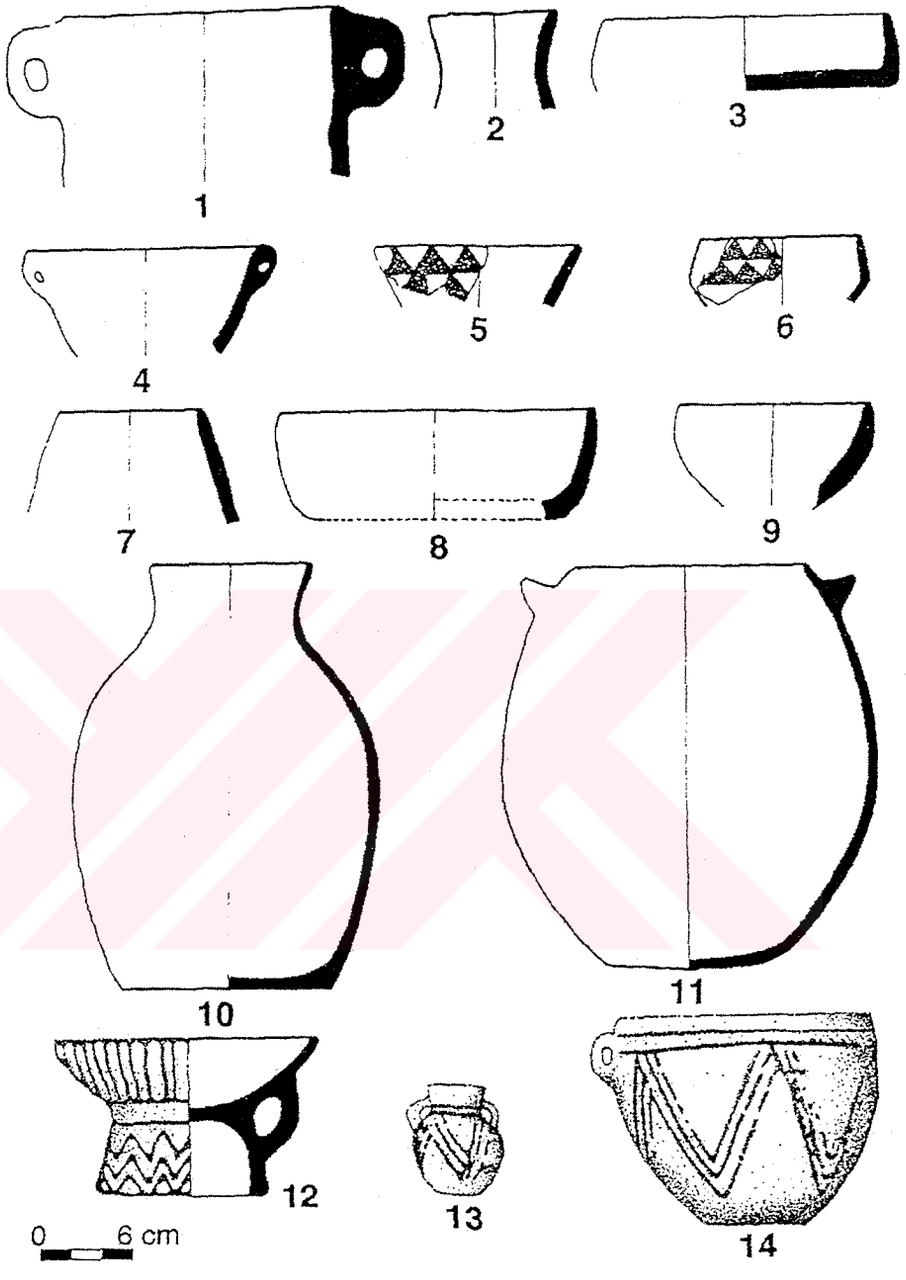


Fig. 24 Pre-Halaf (1-9) and Yarmukian (10-14) shapes

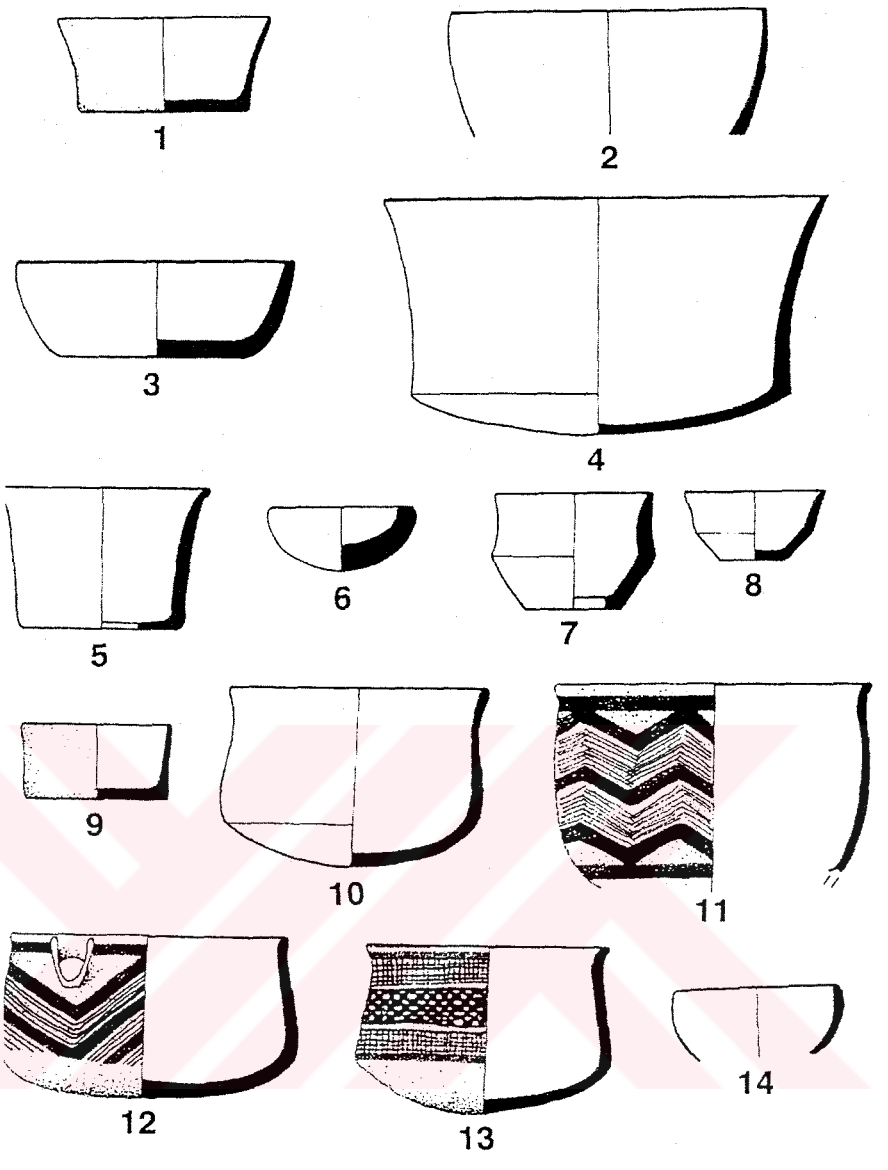


Fig. 25 Zagros Group shapes

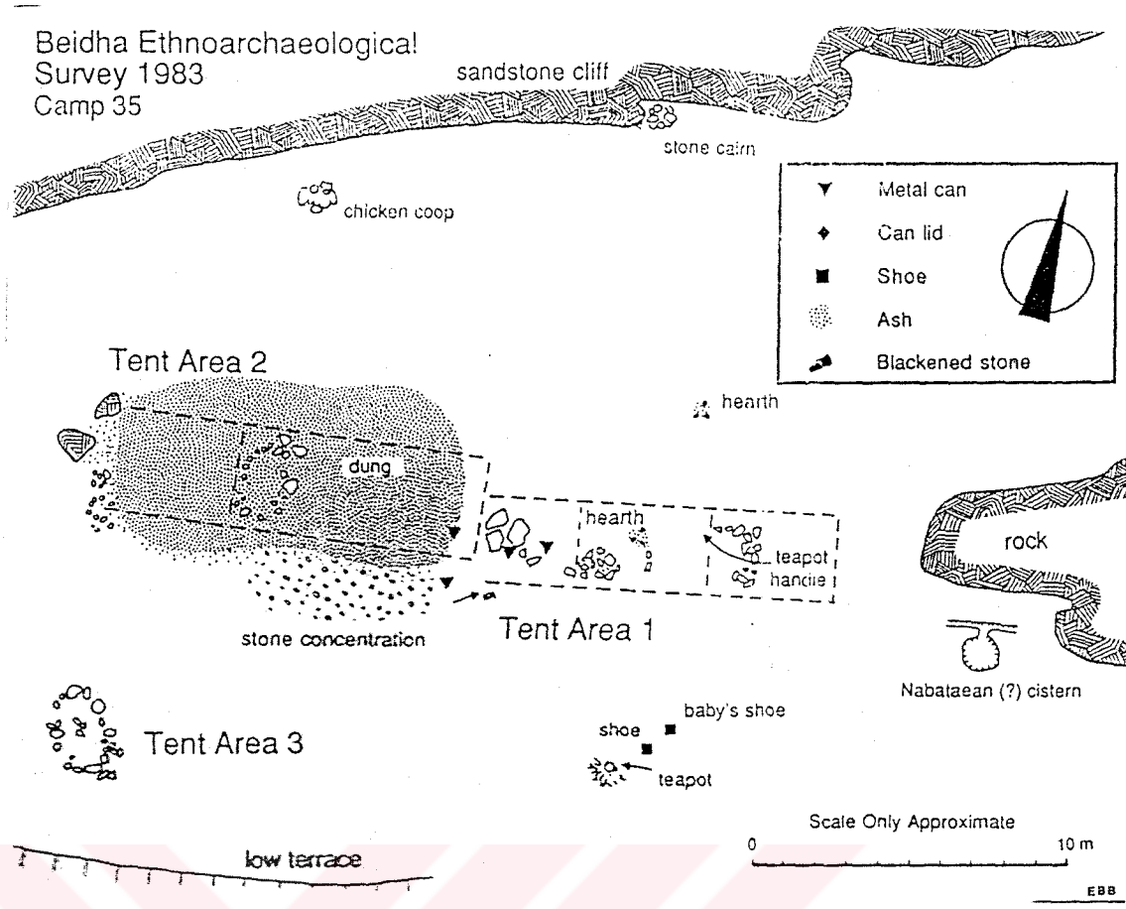


Fig. 26a

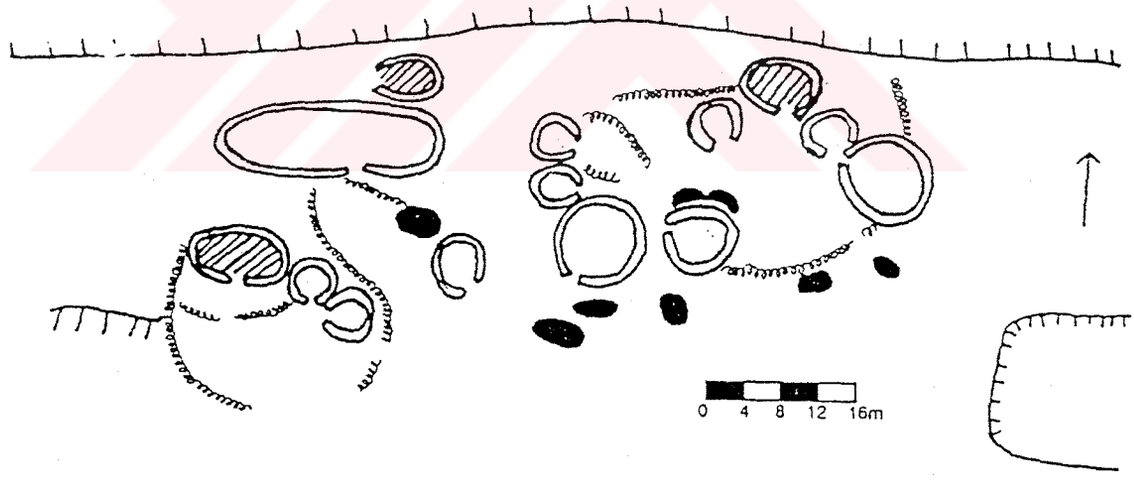


Fig. 26b

Figs. 26a and b Ethno-archaeological comparisons of pastoralist campsites with hearths and round stone platforms for tents

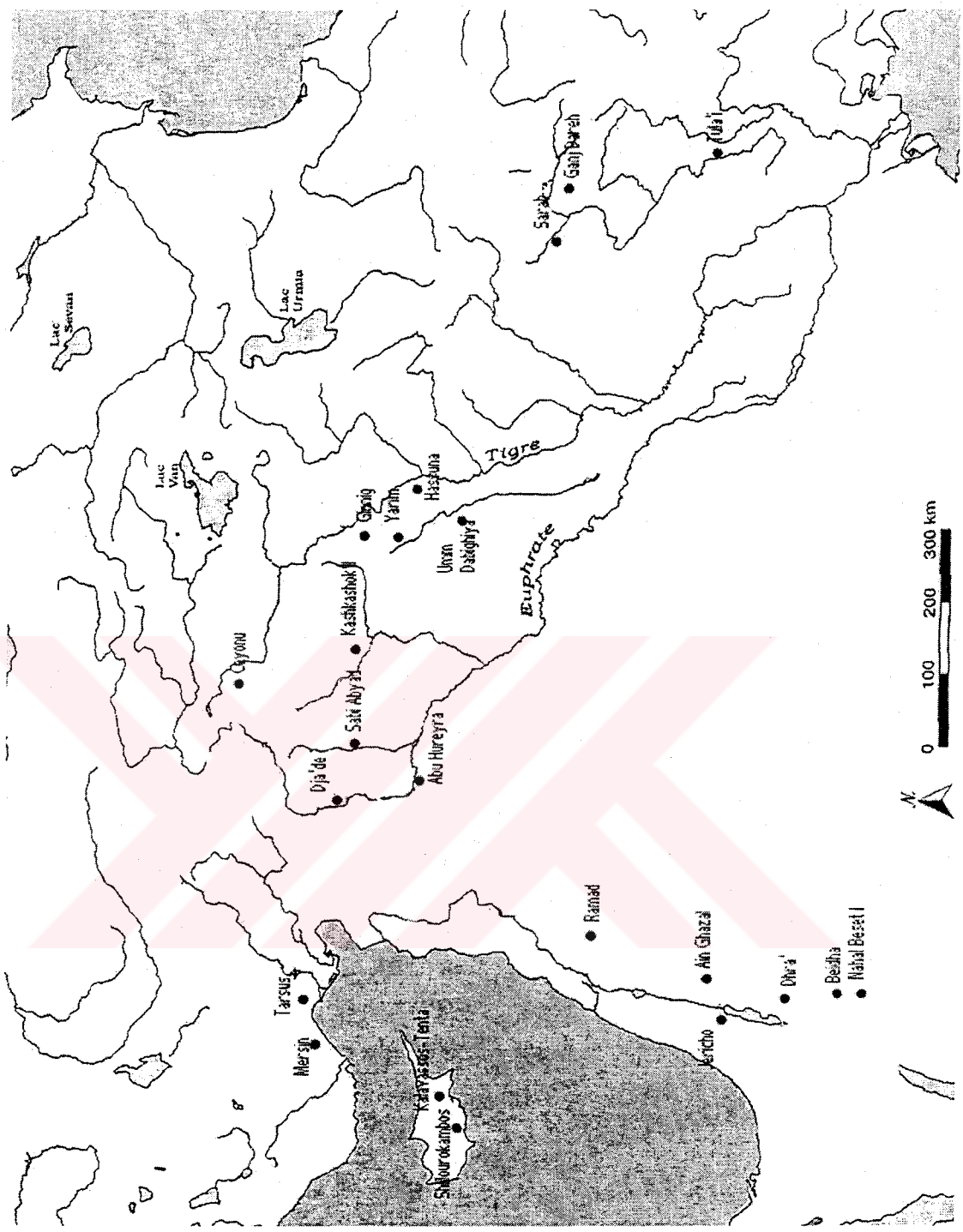


Fig. 27 Location of EPN sites that contain pastoral camp characteristics, including pottery before village type settlement

Figs. 28 and 29 Evidence for initial settlement of pastoralists in the EPN

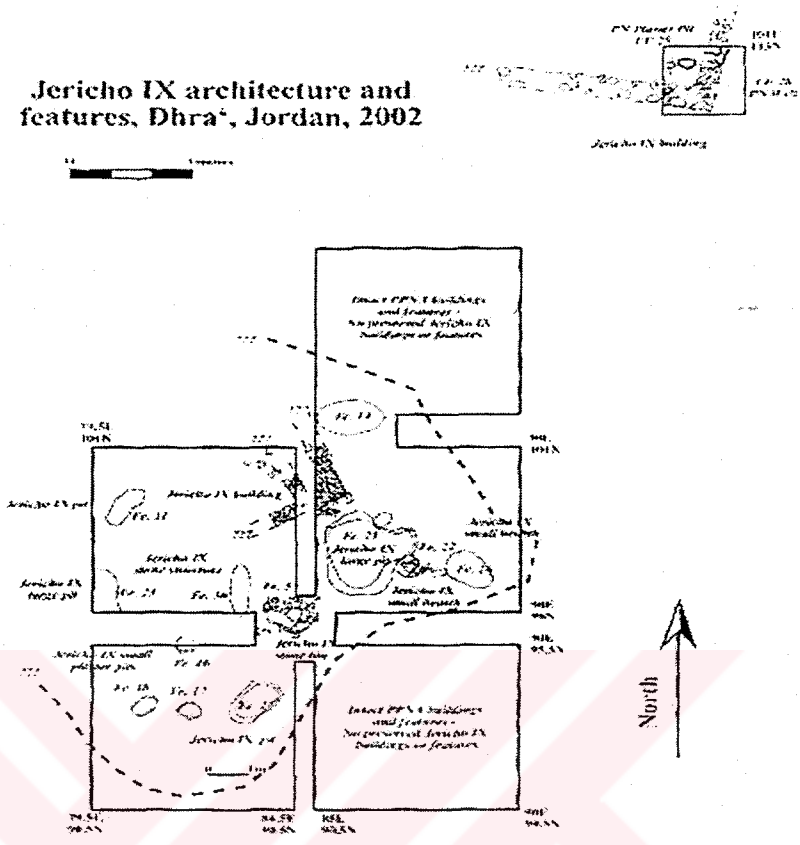


Fig. 28 EPN pastoral camp at Dhra' in the South Levant

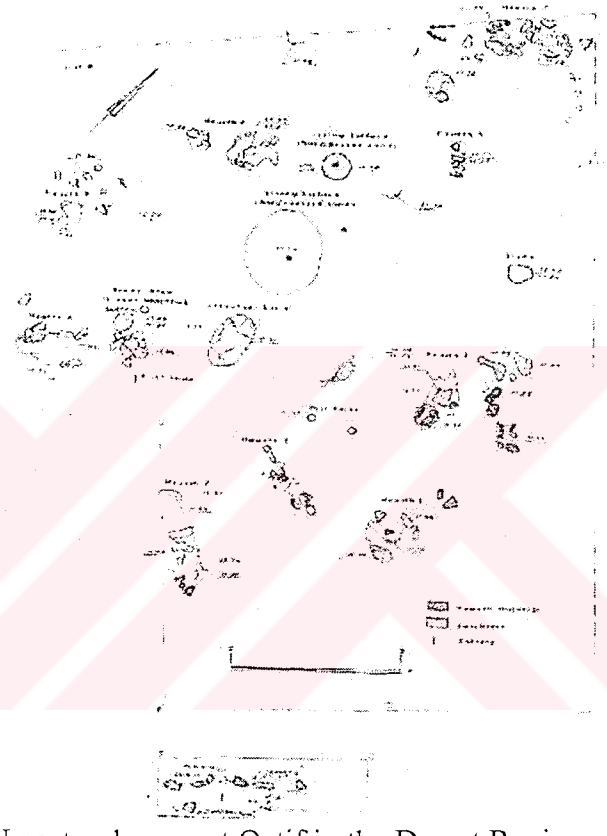


Fig. 29 EPN pastoral camp at Qatif in the Desert Region

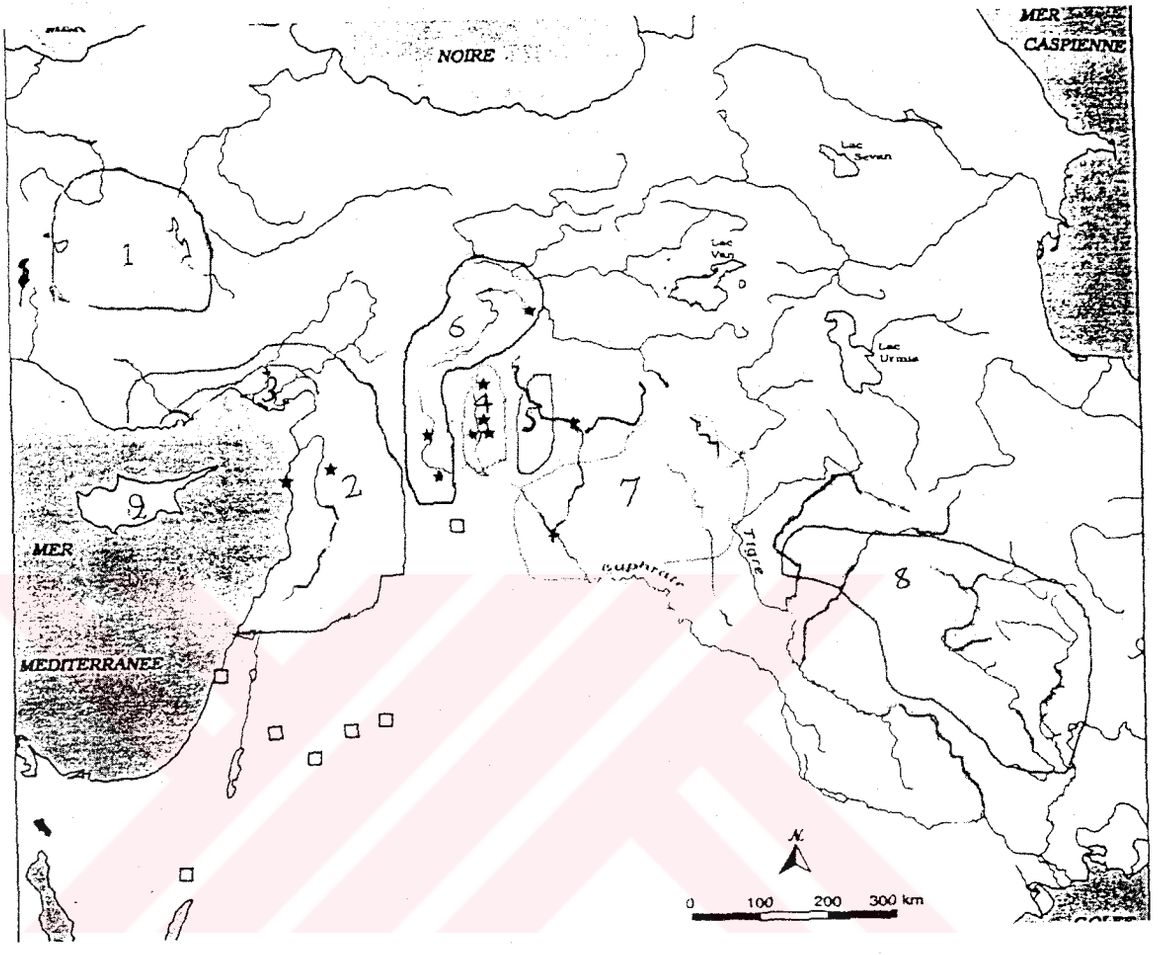


Fig. 30 PN regional designations

*- Pre-Halaf Wares
1- Central Anatolia
2- Amuq A and B*
3- Cilicia*
4- Balikh Valley*
5- Upper Khabur and Altmonochrome*
6- Southeast Anatolia and Middle Euphrates*
7- Hassuna
8- Zagros
9- Cyprus

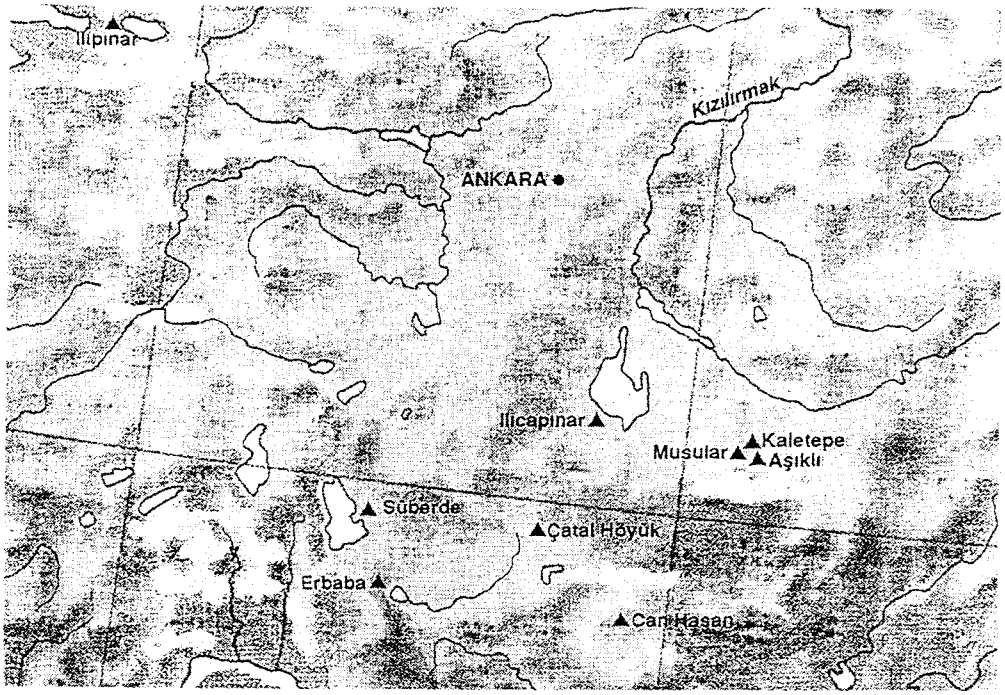


Fig. 31 Map of PN sites in Central Anatolia

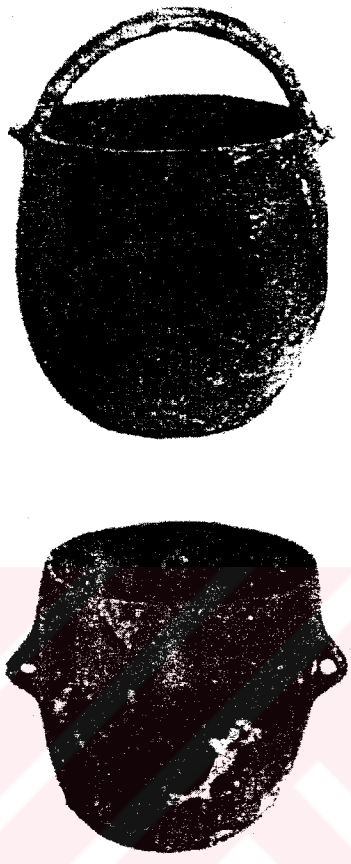


Fig. 32 Pottery from Çatal Höyük

Fig. 33 Straw Grit Tempered, Slipped and Burnished Ware from Musular

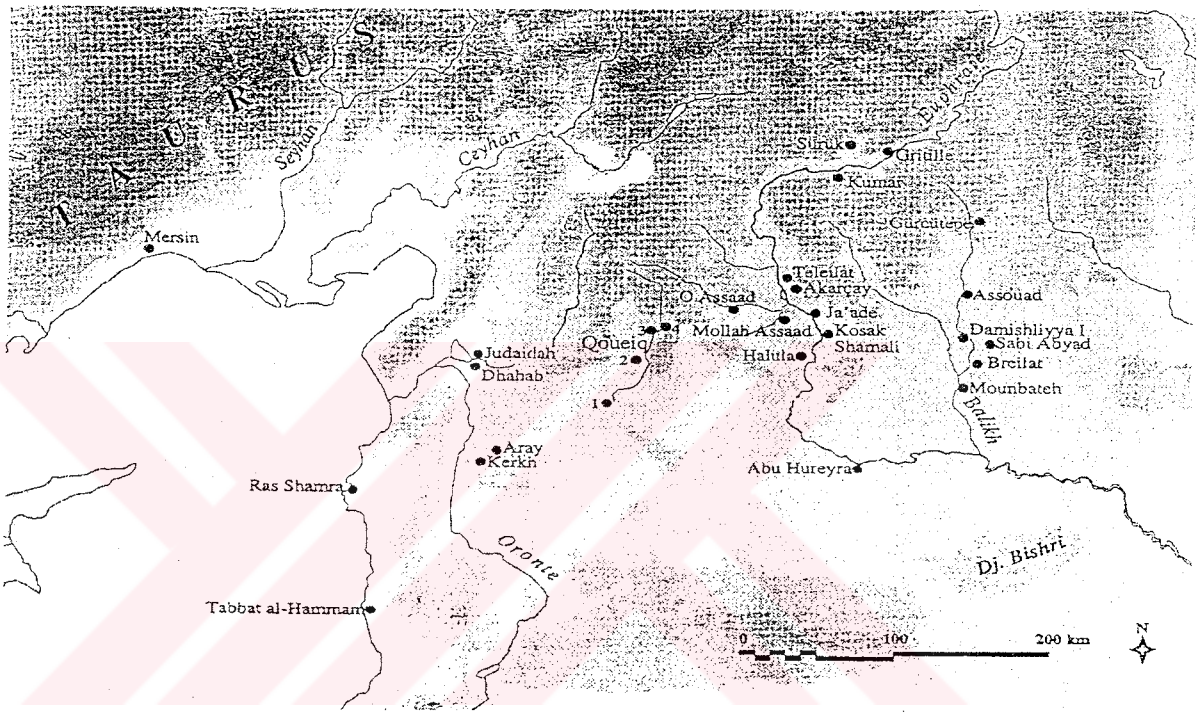


Fig. 34 PN sites in the SE Anatolian and Middle Euphrates regions and Balikh Valley

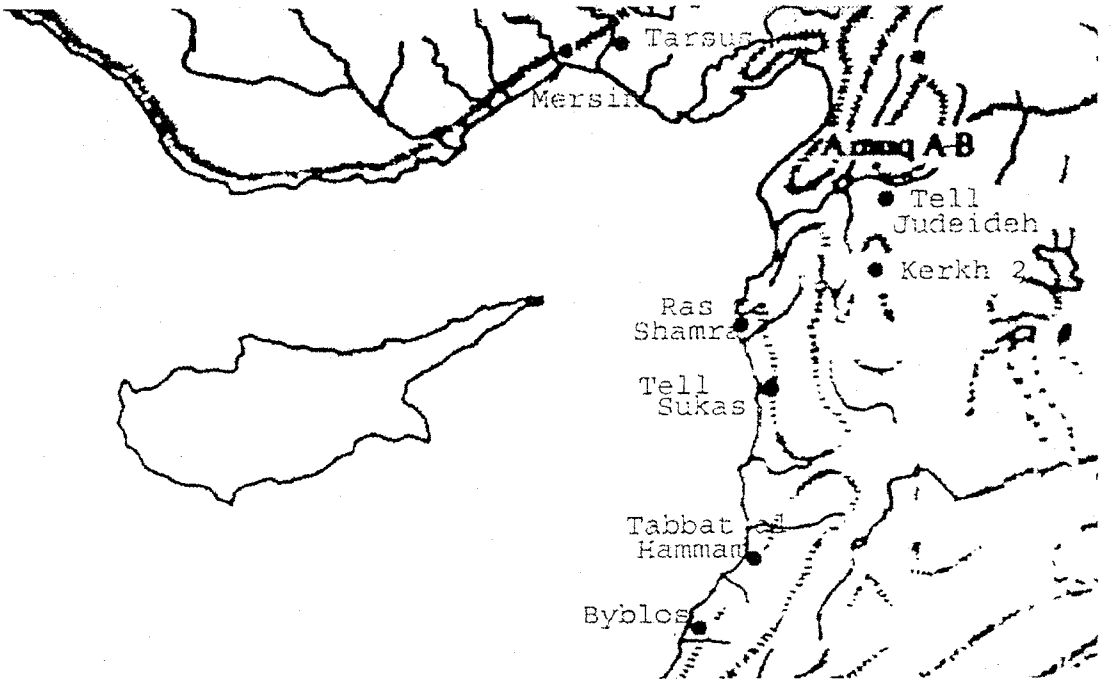


Fig. 35 EPN Sites in the Amuq Plain and Cilicia

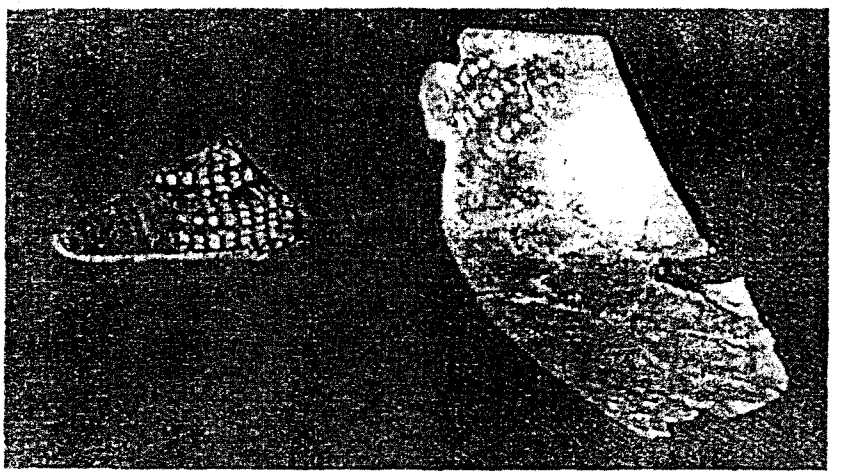


Fig. 36a Dark Faced Burnished Ware from Mersin

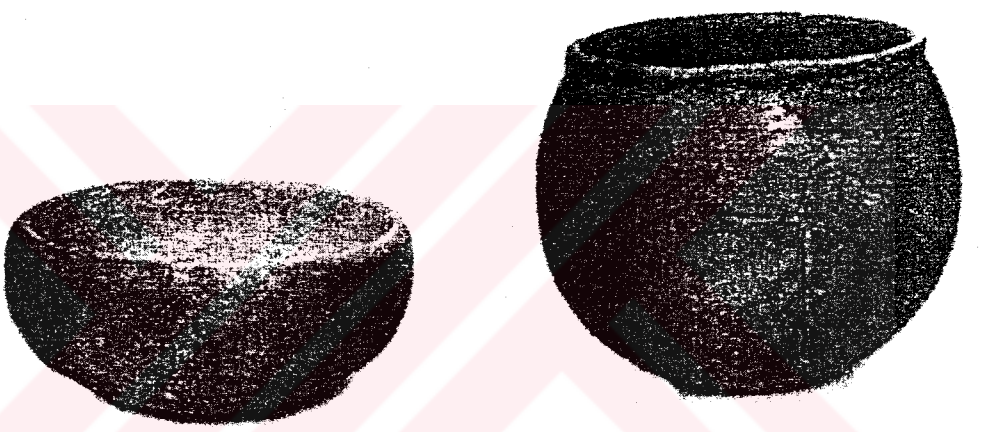
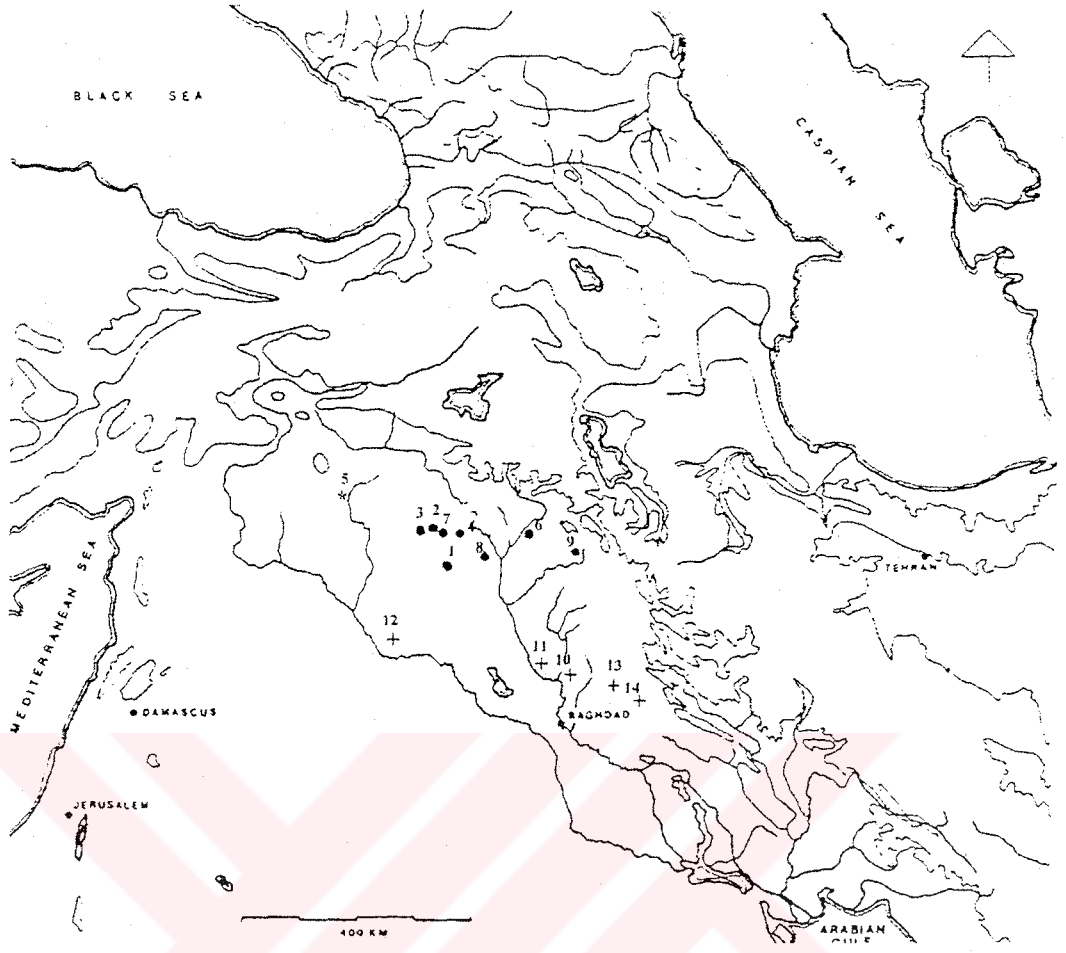


Fig. 36b Local Kerkh Ware from Ras Shamra in the Amuq Plain



Proto Hassuna= ● Samarra= + Upper Khabur Basin= *

Proto-Hassuna, Samarra and Upper Khabur Basin Sites

1- Umm Dabighiya	6- Girdaliagha	11- Samarra
2- Tell Sotto	7- Yarim Tepe I	12- Baghouz
3- Kültepe	8- Hassuna	13- Songor A
4- Telul eth-Thalathat	9- Shimshara	14- Choga Mami
5- Kashkashok II	10- Tell es-Sawwan	

Fig. 37 Location of Hassuna and Sammara PN sites

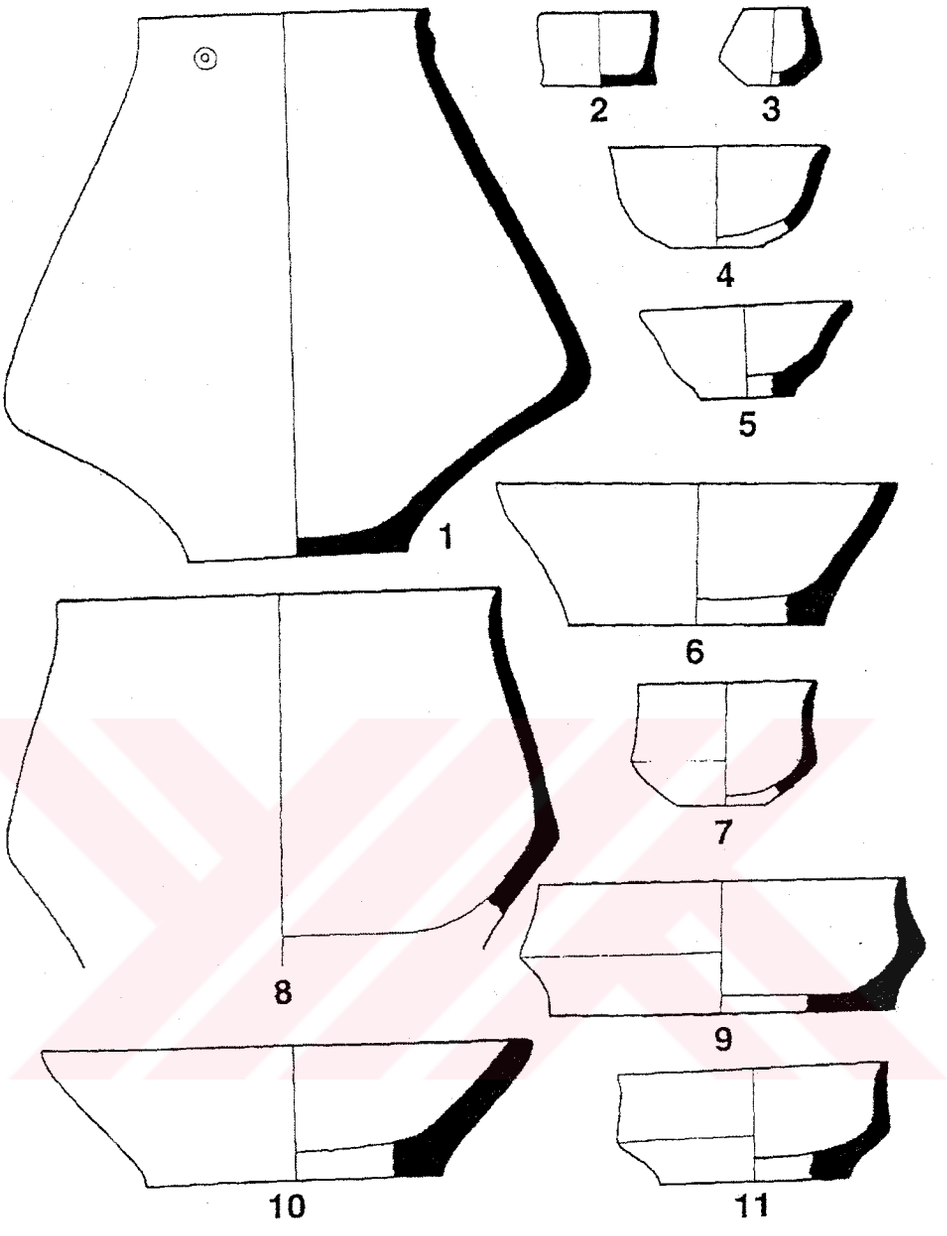


Fig. 38 Proto-Hassuna pottery shapes

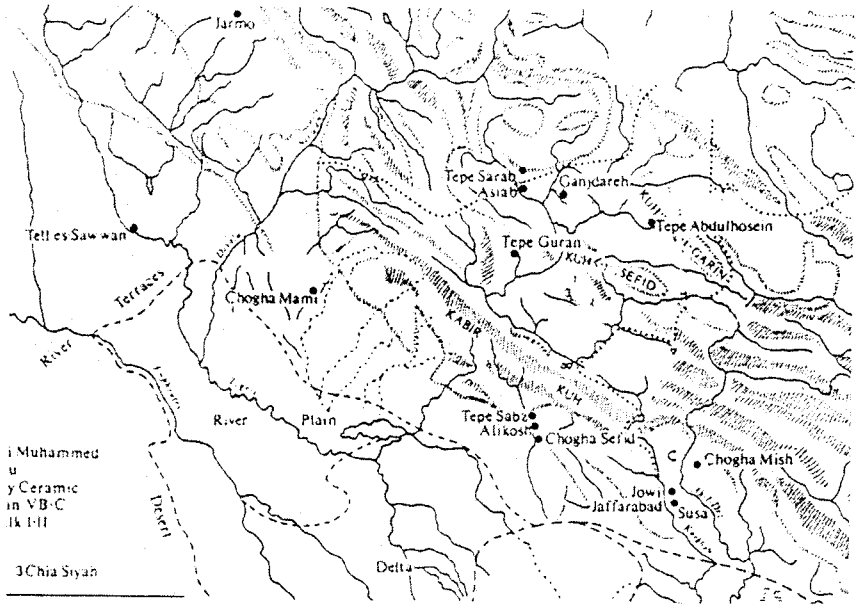


Fig. 39a

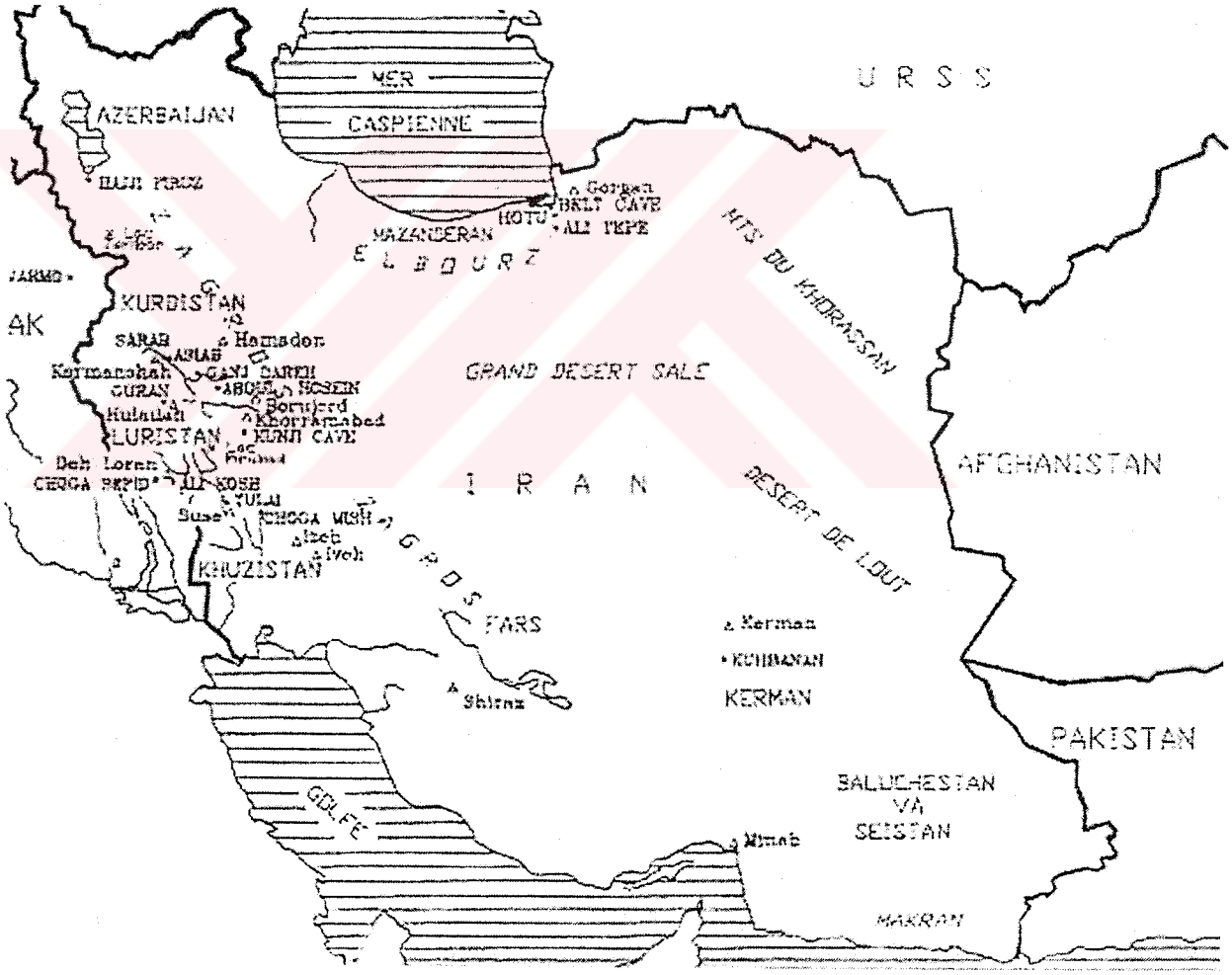


Fig. 39b

Figs. 39a and b Maps showing the PN sites in the Zagros

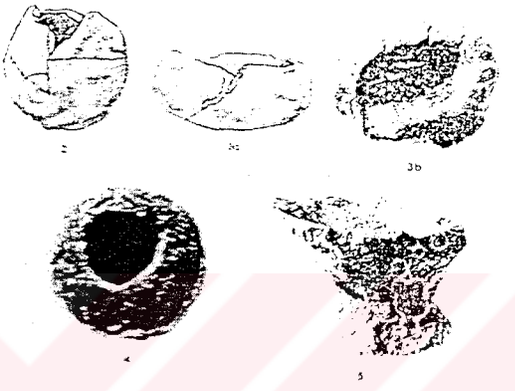


Fig. 40 EPN pottery from Jarmo

Fig. 41 Yarmukian pottery

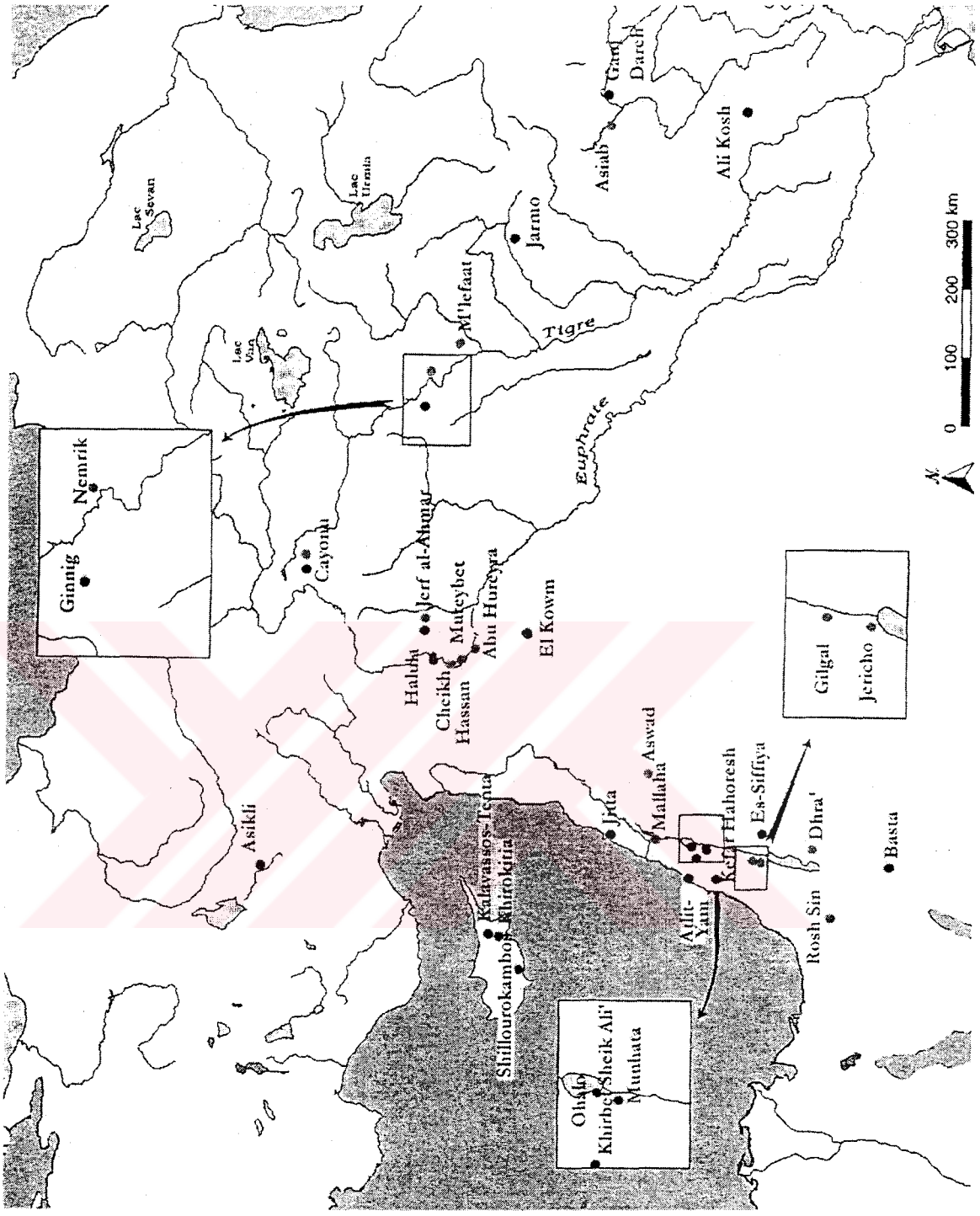


Fig. 42 Location of sites in text showing the use of clay in architecture

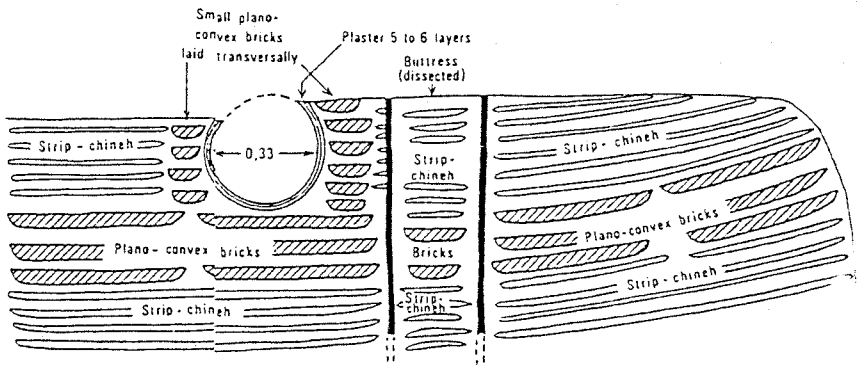


Fig. 43 Representation of mud brick architecture from Ganj Dareh

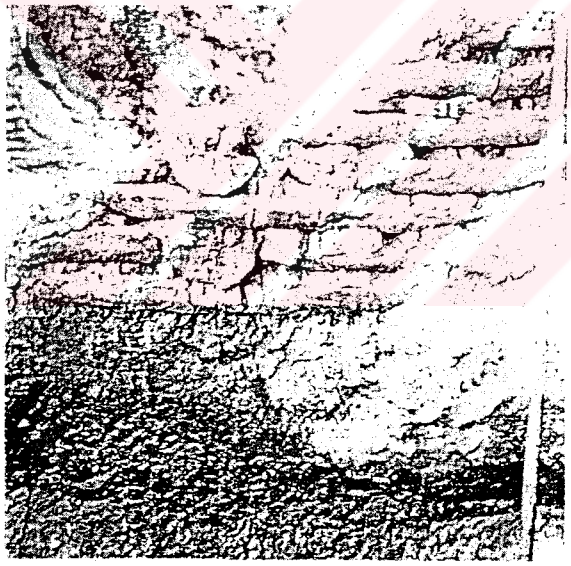


Fig 44 Photograph of mud brick architecture from Ganj Dareh

Fig 44b Photograph of mud brick architecture from Ganj Dareh

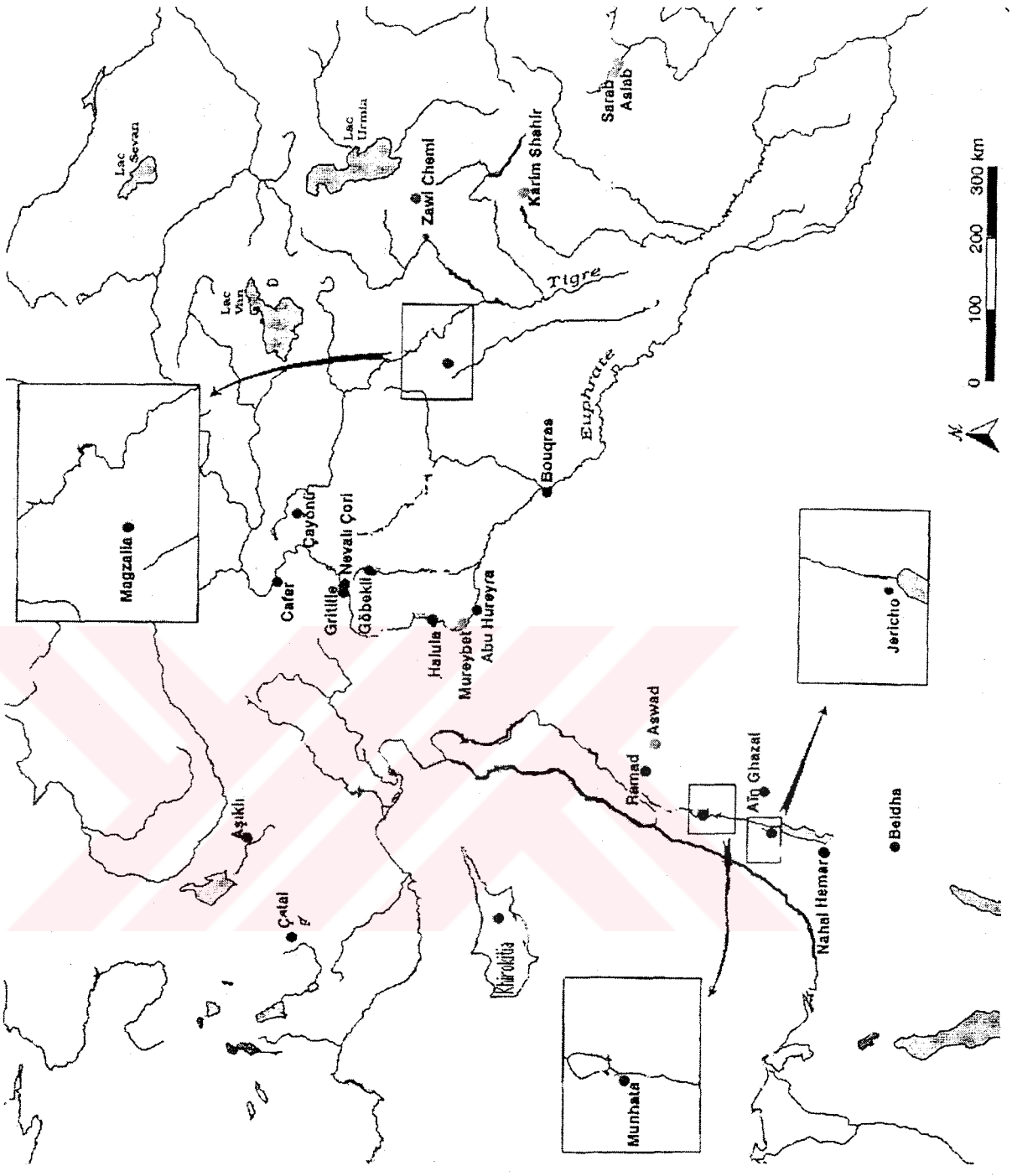


Fig. 45 Location of sites in text containing clay figurines and other objects

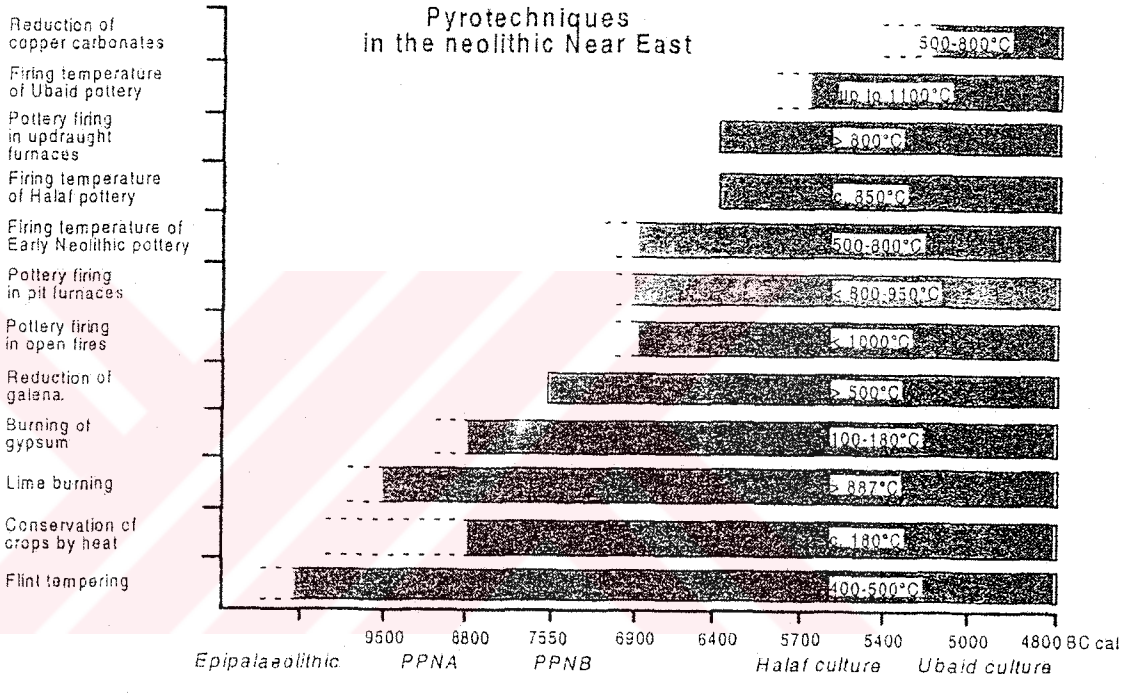


Fig. 46 Chart showing the temperatures reached since the Epipalaeolithic for various substances

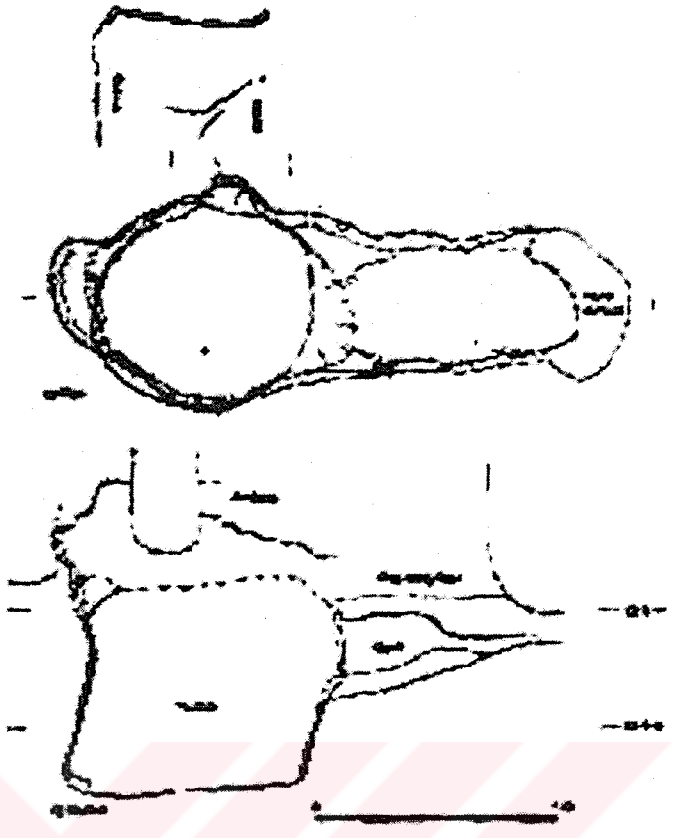


Fig. 47 EPN Kiln from Songer A

Figs 48 Piece of raw bitumen for transport

Fig 49 Bitumen lining ceramic bowl

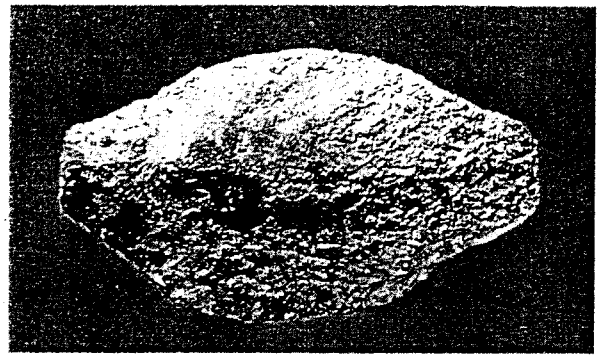


Fig. 50a Heat-treated bead from Çayönü

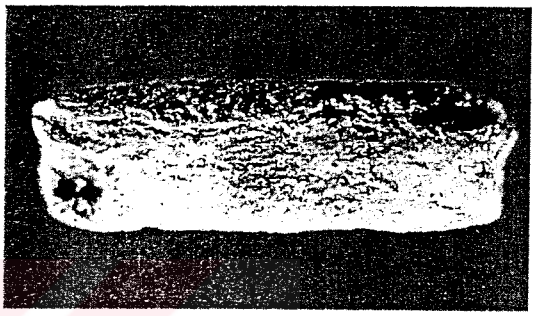


Fig. 50b Rolled copper bead from Çayönü

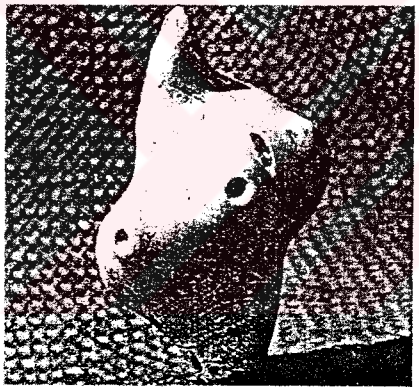


Fig. 50c Malachite inlay from Çayönü

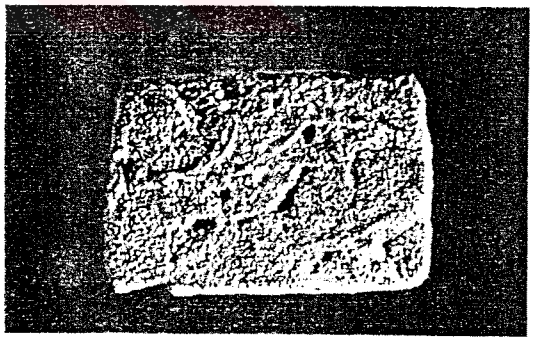


Fig. 50d Malachite inlay from Çayönü

Fig. 51 Heat-treated beads from Aşıklı

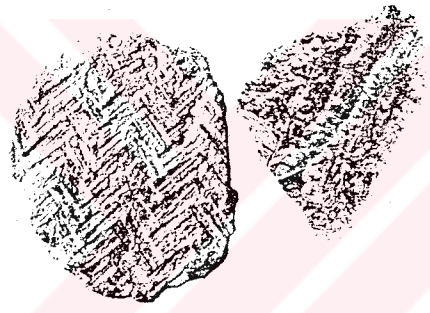


Fig. 52a

Fig. 52b

Fig. 52a and b Reed and basket impressions on plaster from Jarmo

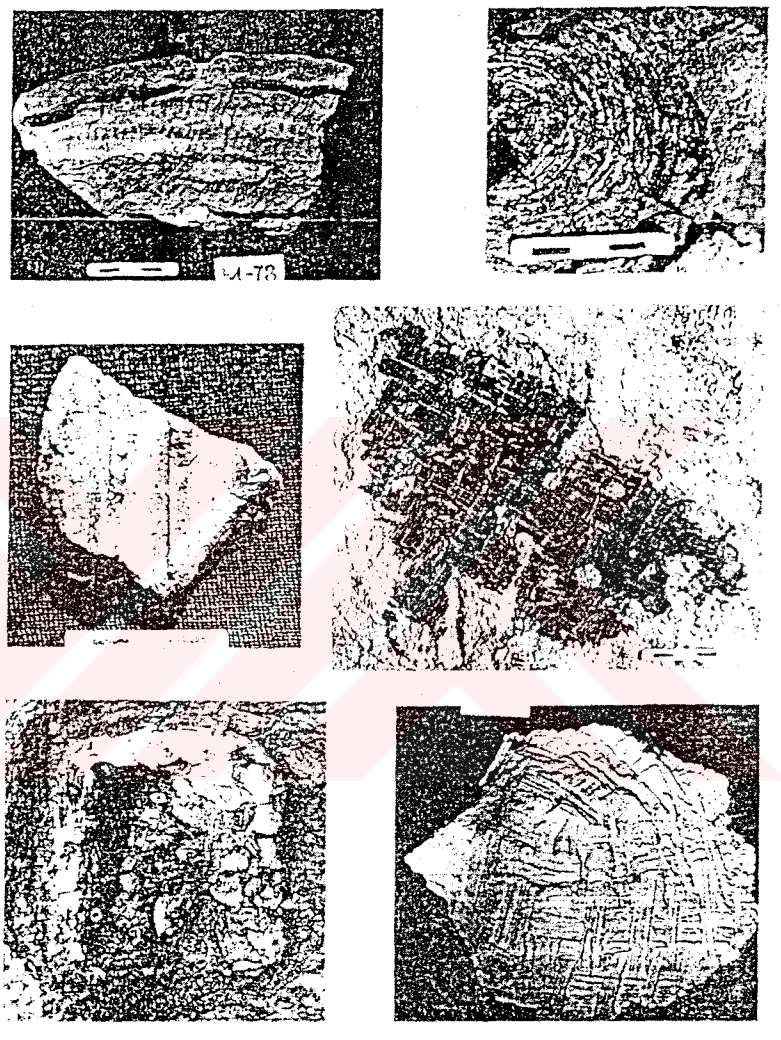


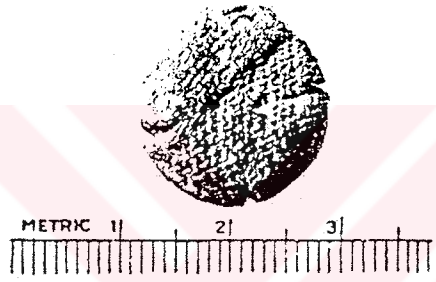
Fig. 53 Reed and basket impressions on plaster from Maghzalia

TEXTILES

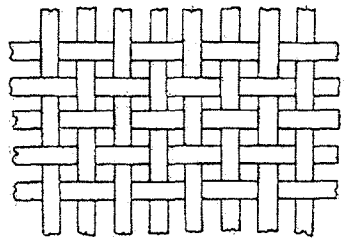
Type I: Balanced plain weave: single warps and wefts

Technique and Comments: This is the simplest of all textile techniques. Single ply warps and wefts of generally equal size pass over and under each other in a 1/1 interval. Each warp and weft passes over and under successive warp units, and each successive weft reverses the procedure of the one before it. All warps that lie above one passage of the weft lie below the next passage and so on. The number of warp and weft elements per centimeter is equal, hence the assignation of the term "balanced" to this type. No selvages are represented. The specimen is unmended and undecorated and appears to represent a portion of a cloth fabric of unknown configuration.

Raw Materials: The source of the fiber used for the Type I textile is unknown.



Clay spheroid with impression of Type I: Balanced plain weave, single warp and weft textile.

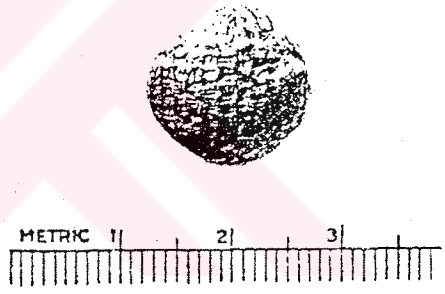


Schematic of Type I:
Balanced plain weave, single warp and weft textile.
Note : This schematic actually illustrates simple plaited basketry with a 1/1 interval. The manufacturing technique is, however, identical to Type I textiles.

Type II: Balanced plain weave: double warps and wefts

Technique and Comments: Identical to Type I except that paired single ply warp and weft elements are employed resulting in an over two, under two interval of engagement (2/2). The number of warp and weft elements per centimeter is equal. The single specimen is unmended, undecorated and appears to represent a portion of cloth fabric, again of unknown configuration.

Raw Materials: The source of the fiber used for the Type II textile is unknown.



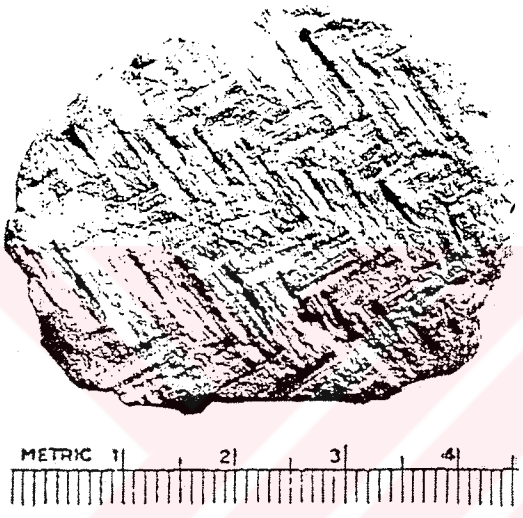
Clay spheroid with negative impression of Type II:
Balanced plain weave, double warp and weft textile.

Fig. 54 Information on textile weaves

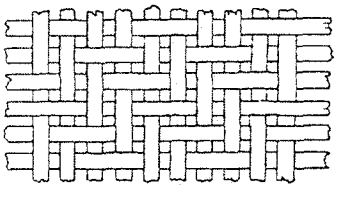
Type III: Twill plaiting

Technique and Comments: Technically, twill plaiting is the basketry equivalent of plain weaving in cloth fabrics. Plaiting is subdivided into two varieties, simple and twill, on the basis of interval. Interval denotes the number of elements or strips in each set that are crossed over by strips in the other set. Intervals, as noted above, are usually designated numerically. In simple plaiting, the interval is over one, under one (1/1). Twill plaiting is a variety of plaited basketry in which the weaving elements pass over each other in intervals of two or more. All specimens of plaiting found at Jarmo have a basic 2/2 construction interval though several exhibit 2/3/2 shifts. These shifts may be accidental or they may represent fragments of intentionally produced geometric designs. No selvages are represented. All specimens are unmended and appear to be portions of baskets, mats or bags. Some Type III impressions on bitumen may represent pitching applied to the inner surface of baskets to render them watertight.

Raw Materials: All twill plaiting from Jarmo is made of longitudinally split reeds, genus and species unknown.



Negative impression in clay of Type III:
Twill plaited basketry with a 2/2 interval.
Note: Specimen exhibits several 2/3/2 shifts.

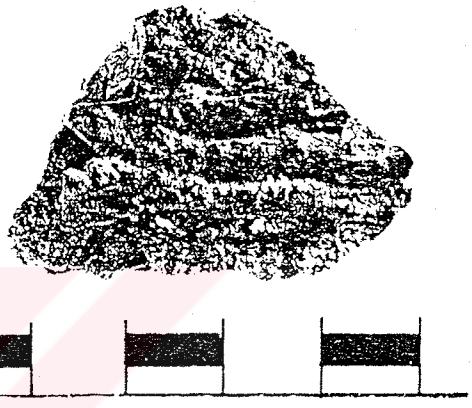


Schematic of Type III:
Twill plaited basketry with a 2/2 interval.

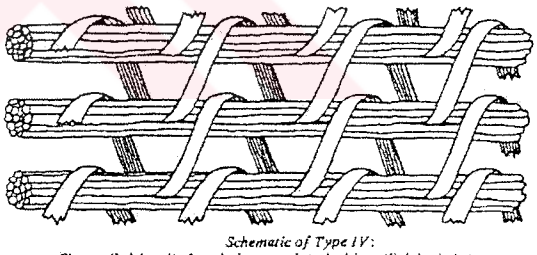
Type IV: Close coiling, bundle foundation, non-interlocking stitch

Technique and Comments: A foundation consisting of a bundle of unsplit reeds is sewn with a non-interlocking stitch which pierces rather than wraps the bundle. The gap is minimal, though the foundation is exposed. No accidental splitting of the stitch is apparent. Work direction is left to right though work surface, for obvious reasons, is undetectable. No rims or centers are represented nor is splice type discernible. The available specimens are unmended and undecorated and appear to be portions of large circular trays or bowls. As all of these impressions are on bitumen, they may in fact represent remnants of pitching applied to the inner surfaces of the baskets to render them watertight.

Raw Materials: Bundles are unsplit reeds, genus and species unknown. Stitches appear to be longitudinally split reeds of the same material.



Bitumen impression of Type IV:
Close coiled, bundle foundation, non-interlocking stitch basketry.



Schematic of Type IV:
Close coiled, bundle foundation, non-interlocking stitch basketry.

Fig. 55 Information on Basketry Weaves

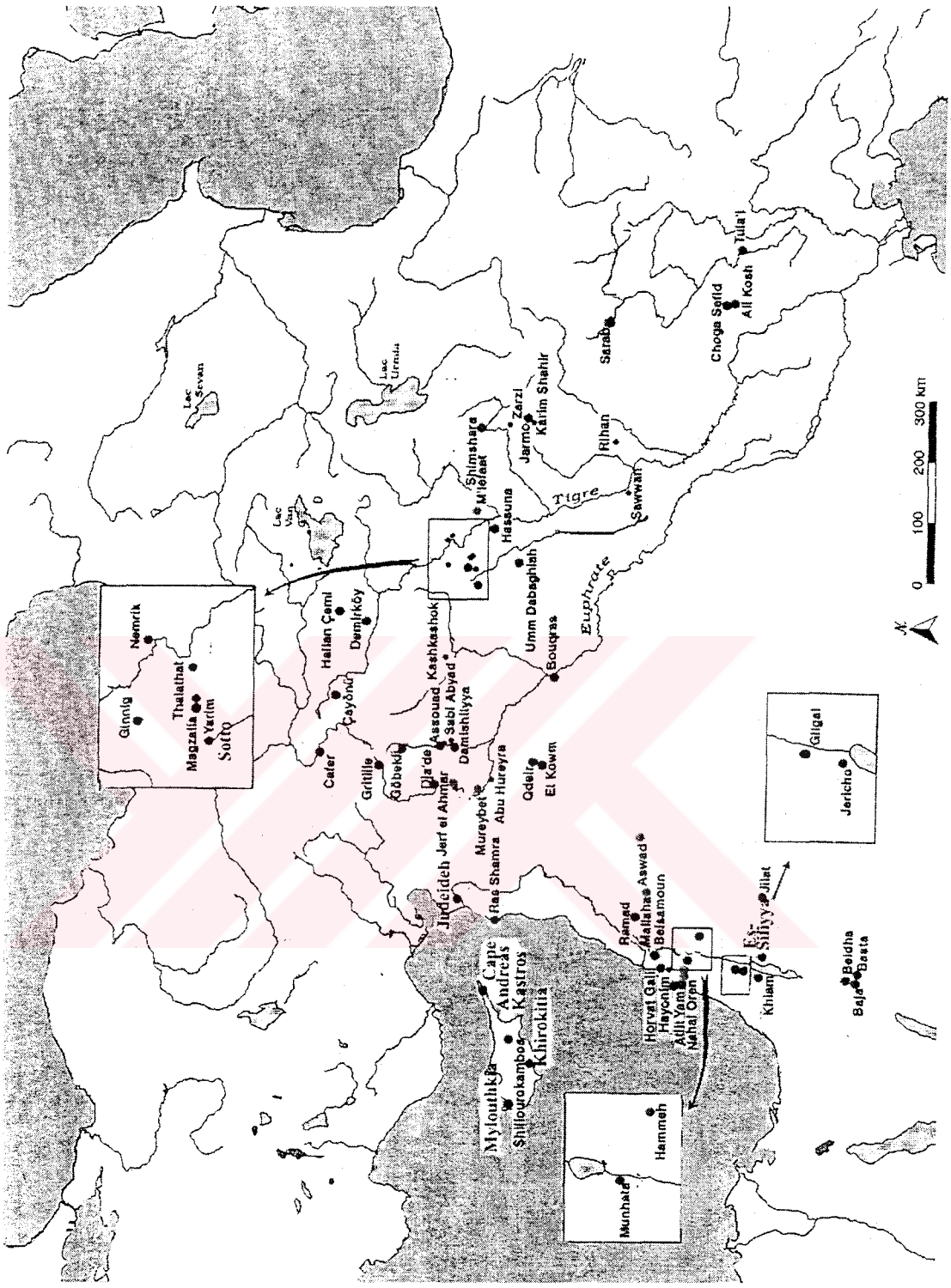


Fig. 56 Location of sites with Stone Bowls

Fig. 57a and b Examples of stone bowls from Bouqras

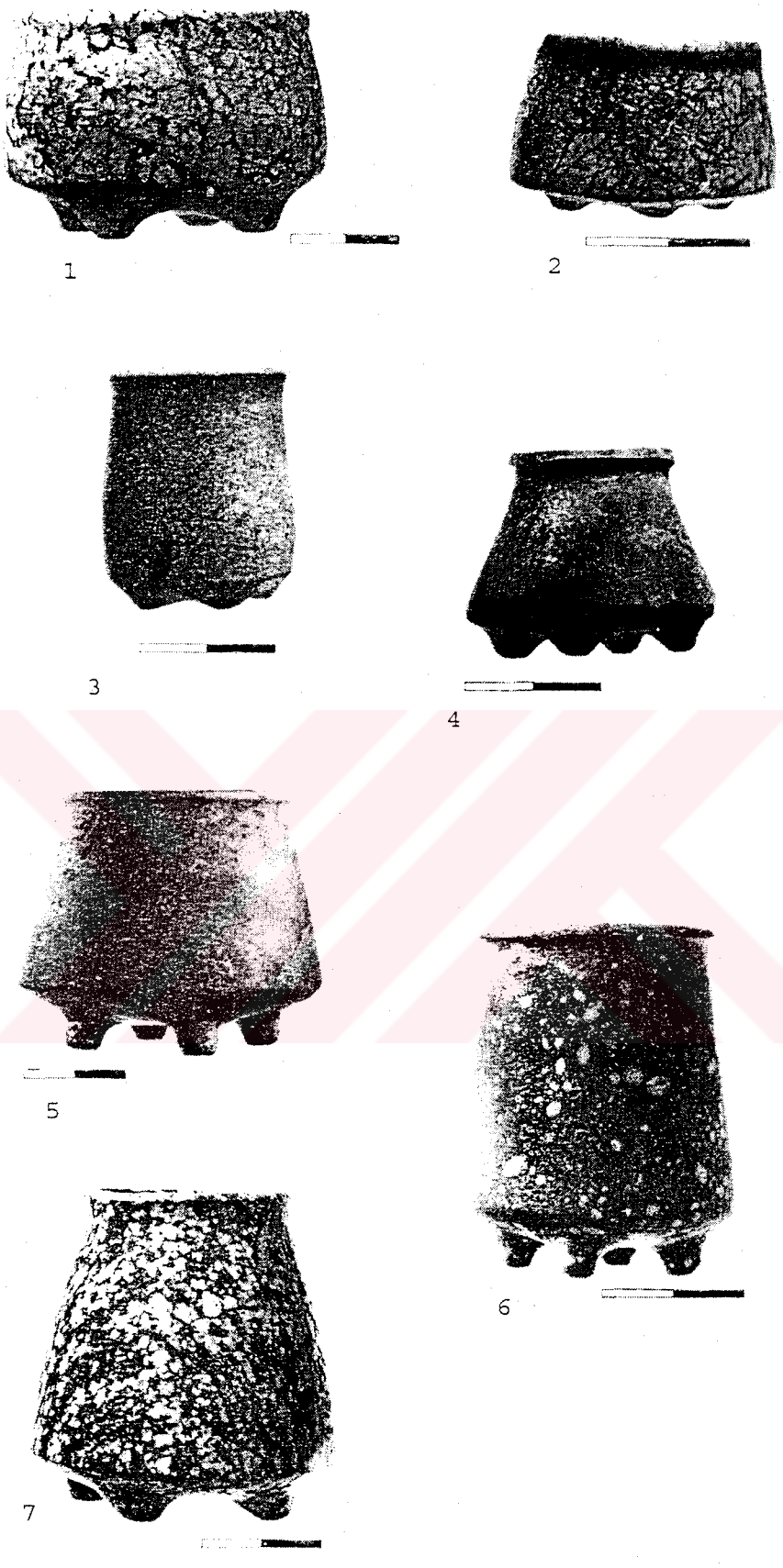


Fig. 57a 1-7 Stone bowls with feet

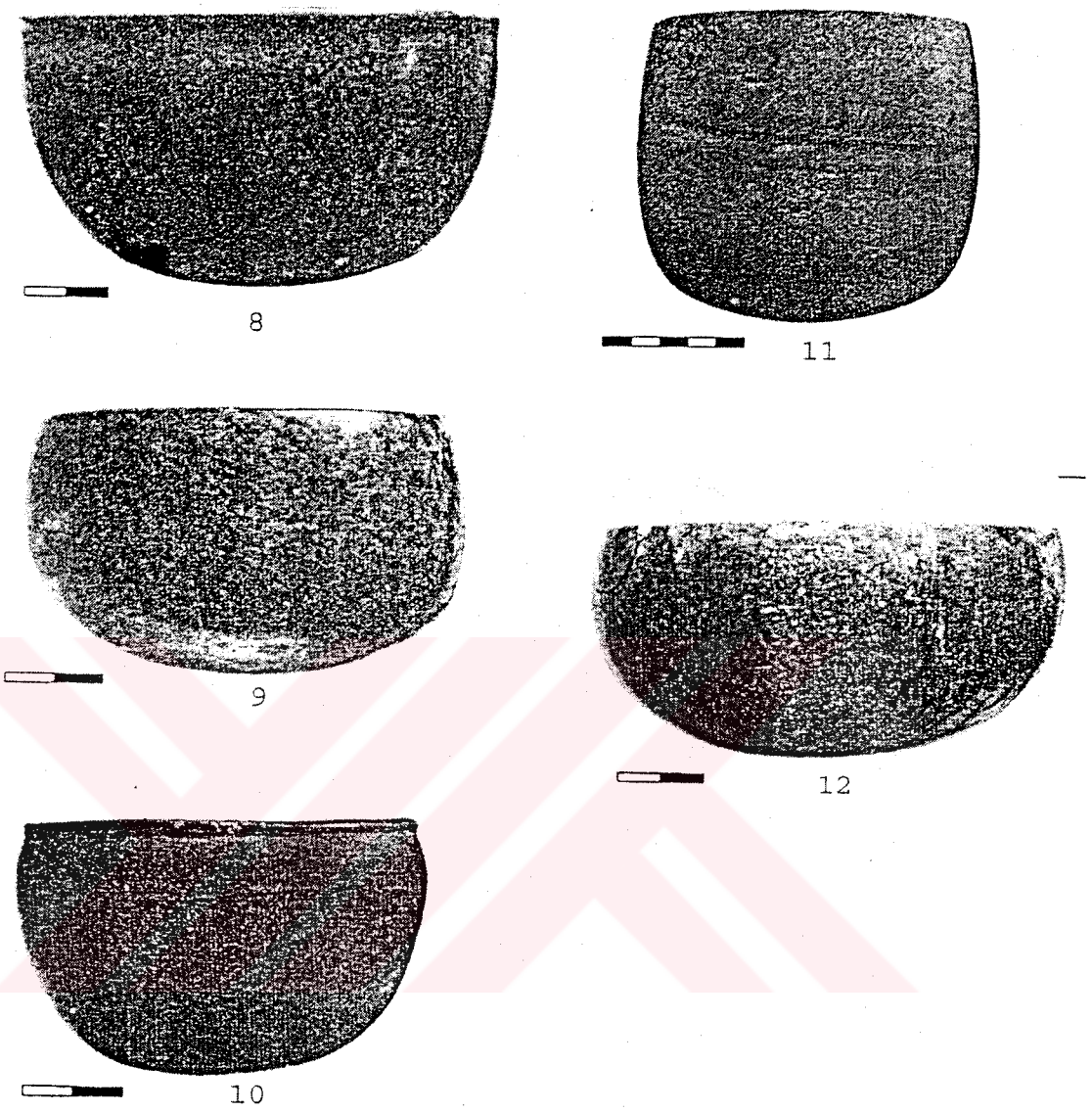


Fig. 57b 8-12 Stone bowls

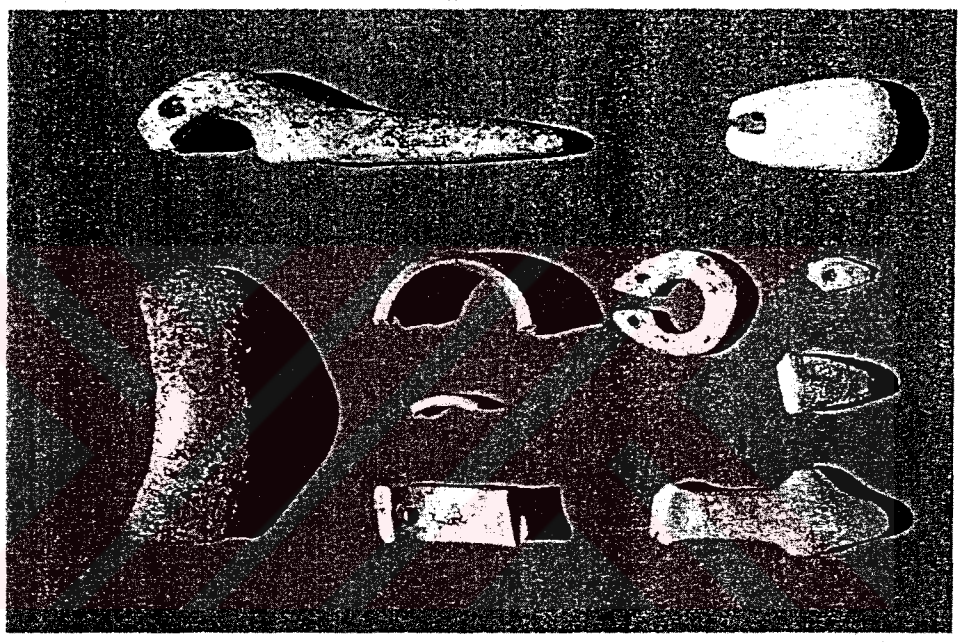


Fig. 58 Picrolite stone implements and rims of bowls from Kalavassos-Tenta

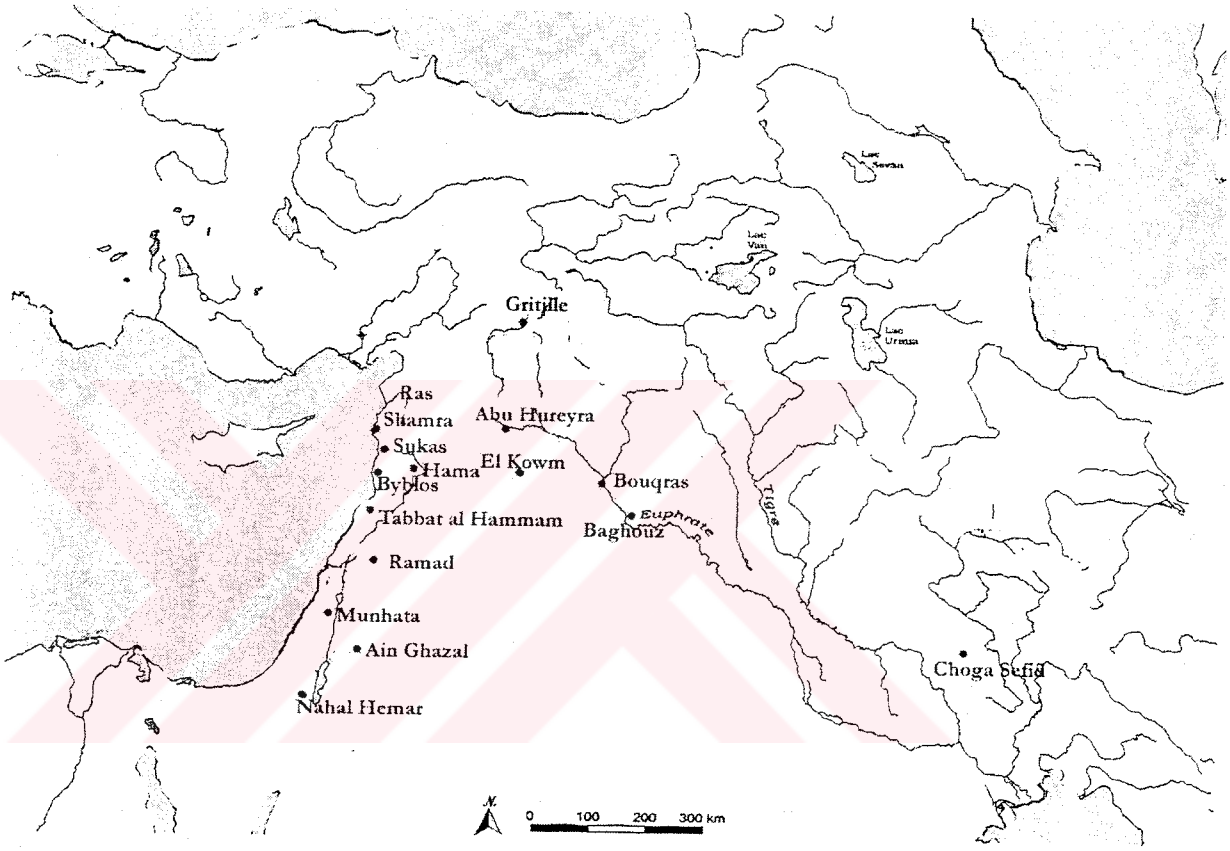


Fig. 59 Distribution of sites with Whiteware

Fig. 60a Photograph of plaster vessel fragments from el Kowm

Fig. 60b Reconstruction of plaster vessels from el Kowm

Fig. 61 Person preparing clay by adding temper and kneading it.

Fig. 62 Person slipping a pot

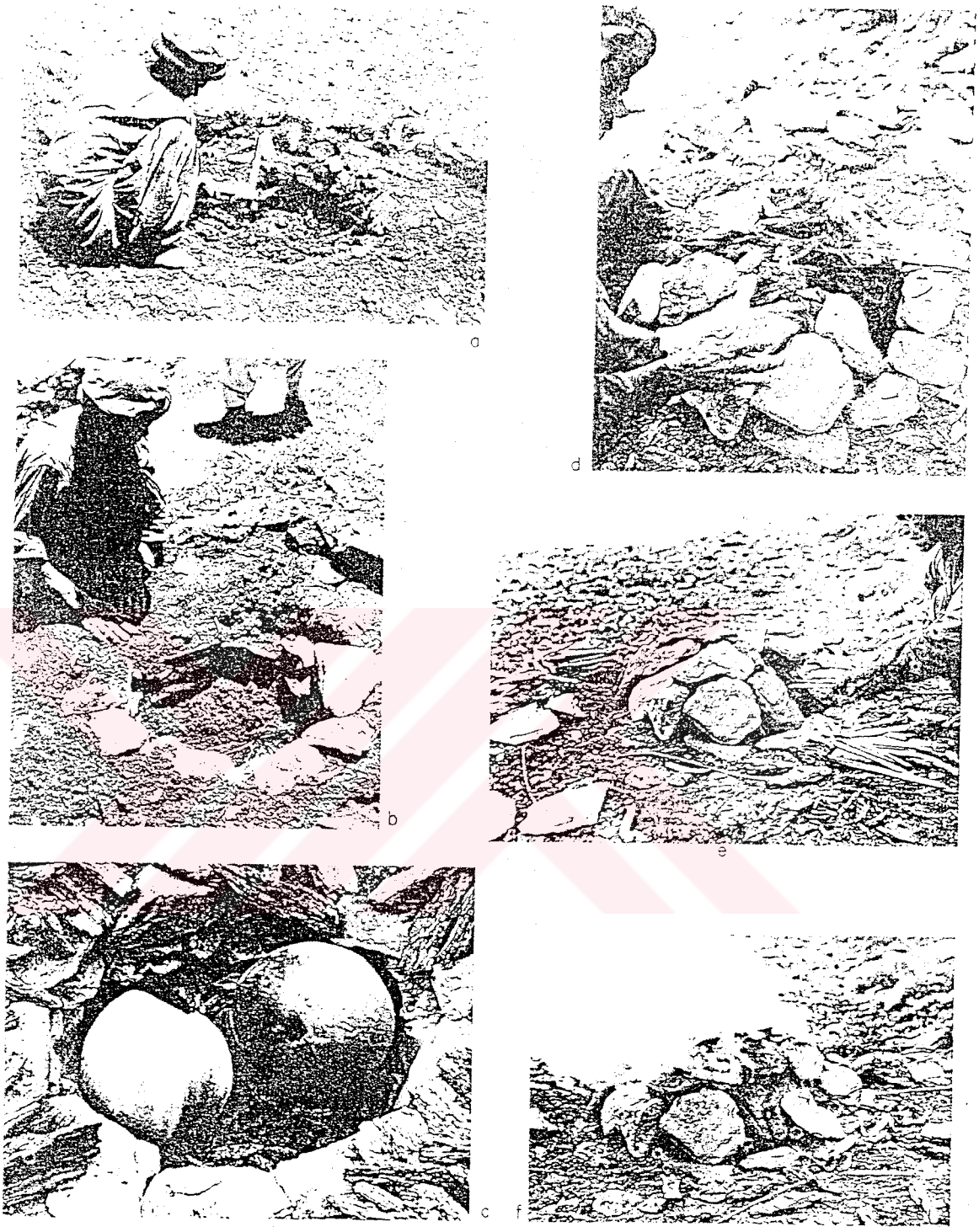


Fig. 63 Person firing pots in a pit kiln

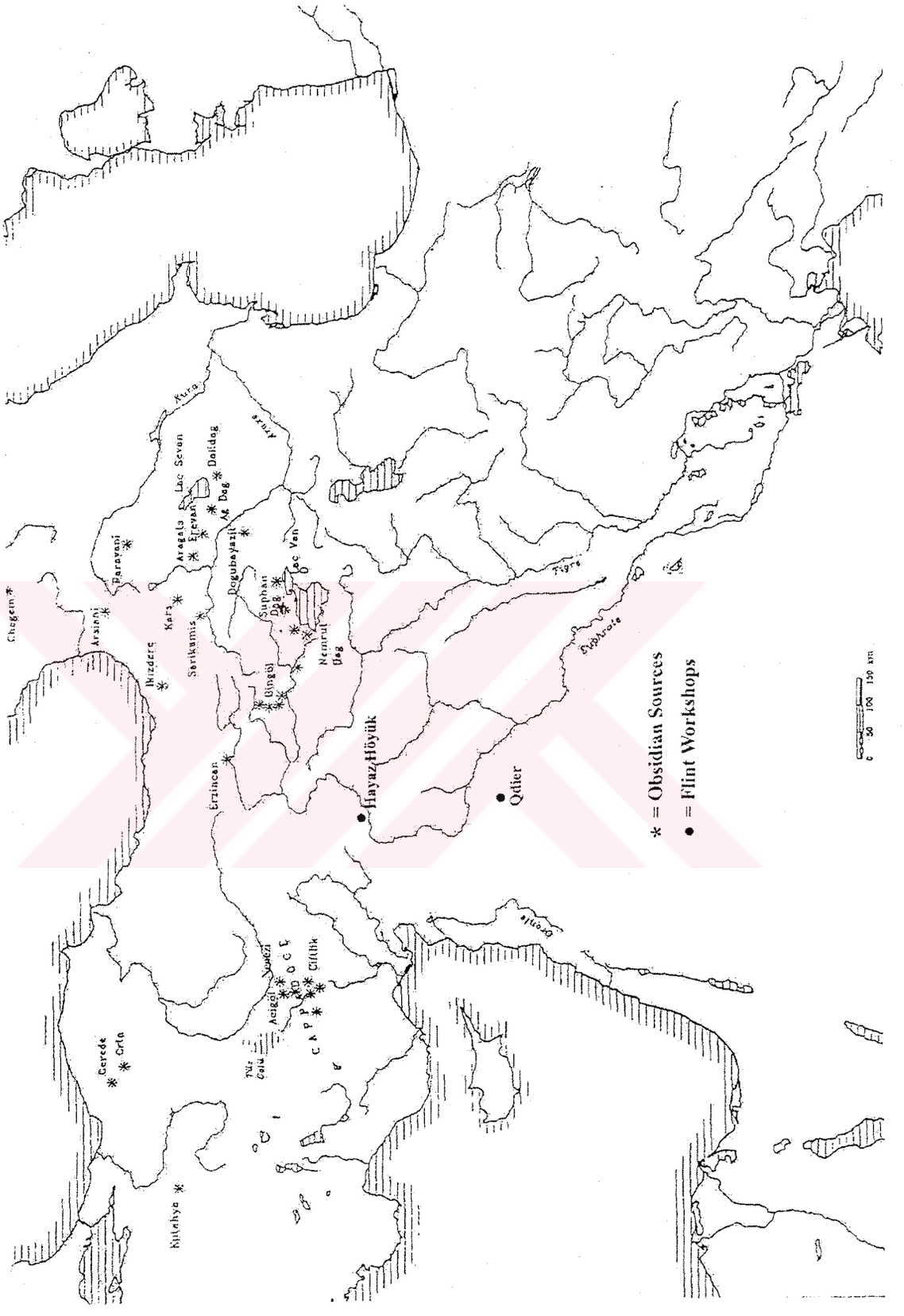


Fig. 64 Location of Obsidian sources and workshops in the Near East

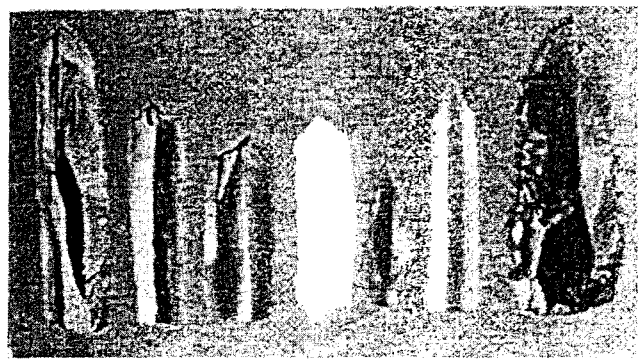


Fig. 65 EPN obsidian bladelets from Mersin

Fig. 66 Obsidian bladelets from Kalavassos-Tenta

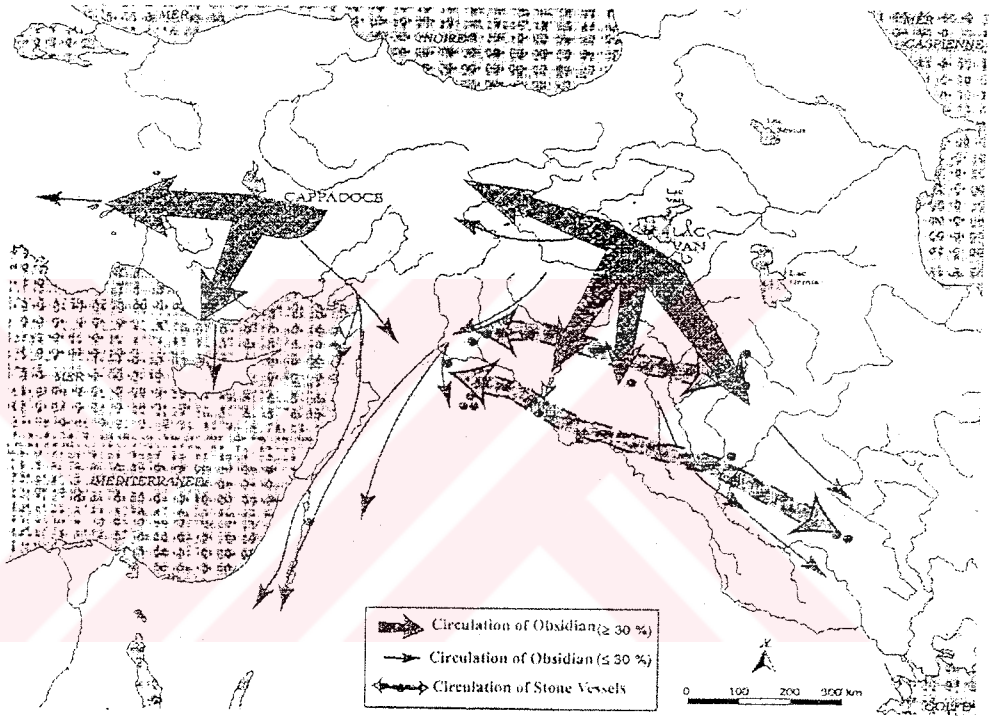


Fig. 67 Circulation of obsidian and stone bowls in the Near East

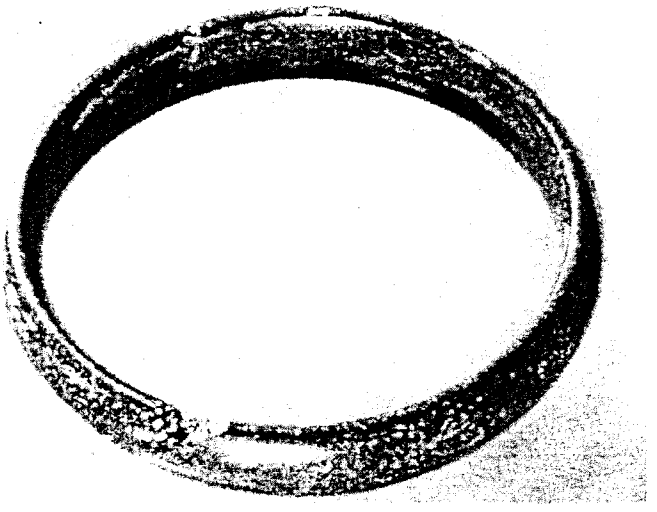


Fig. 68a Basalt bracelet from Cafer Höyük

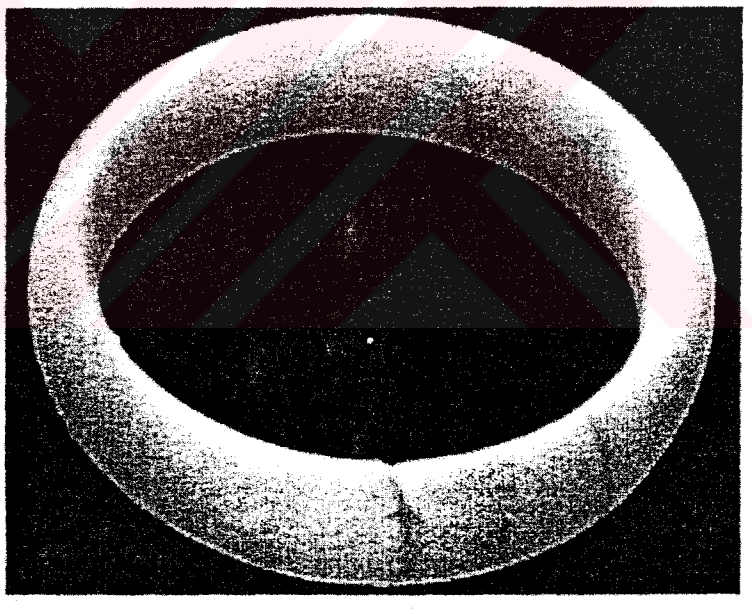


Fig. 68b Marble bracelet from Cafer Höyük

Fig. 69a Bone beads from Çayönü

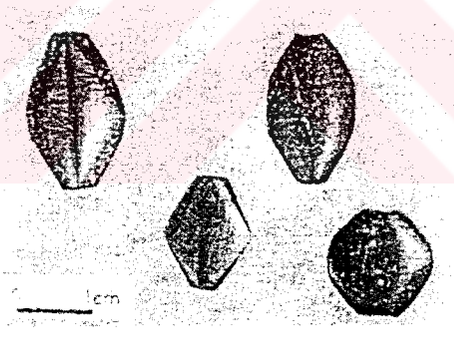


Fig. 69b Stone beads from Çayönü

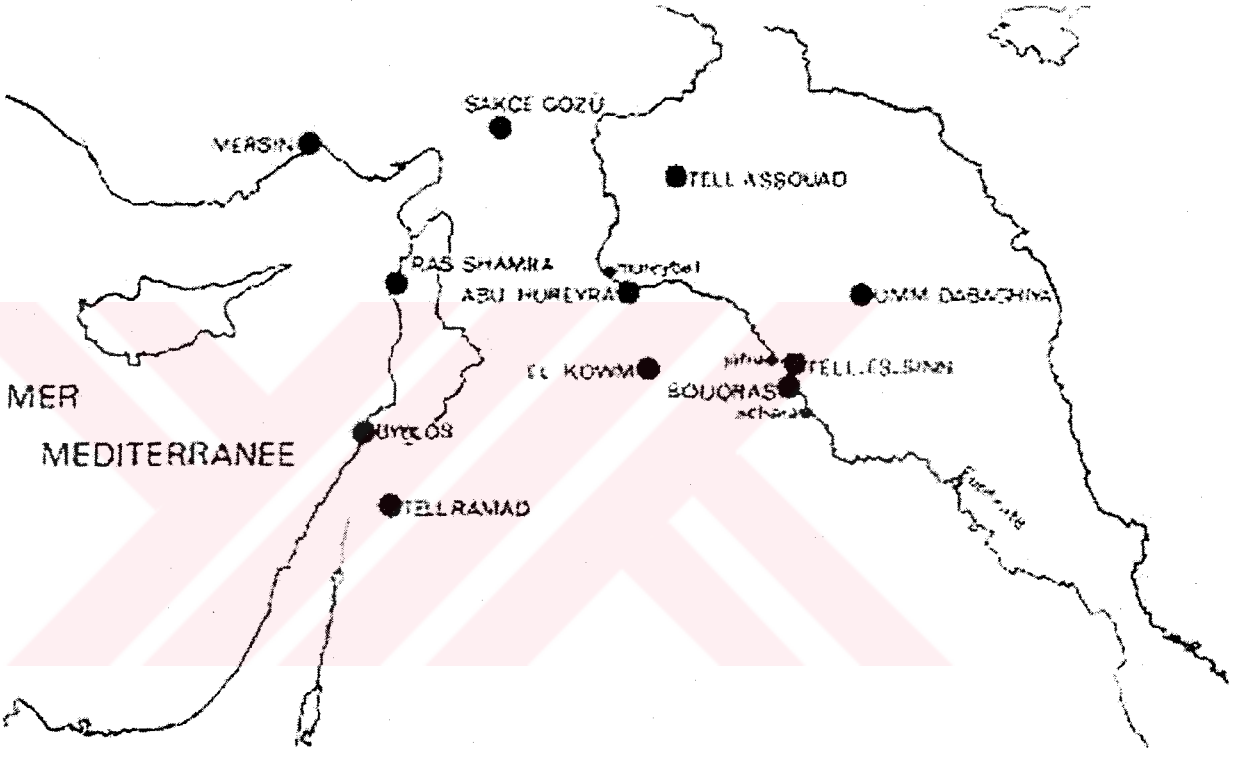


Fig. 70 Location of PN sites that were examined

Fig. 71a Photograph of obsidian outcrop at Kömürcü

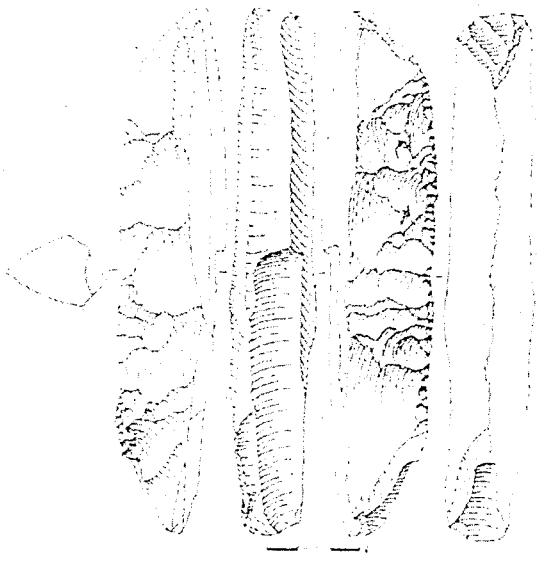


Fig. 71b Kaletepe core form Bitlikeler

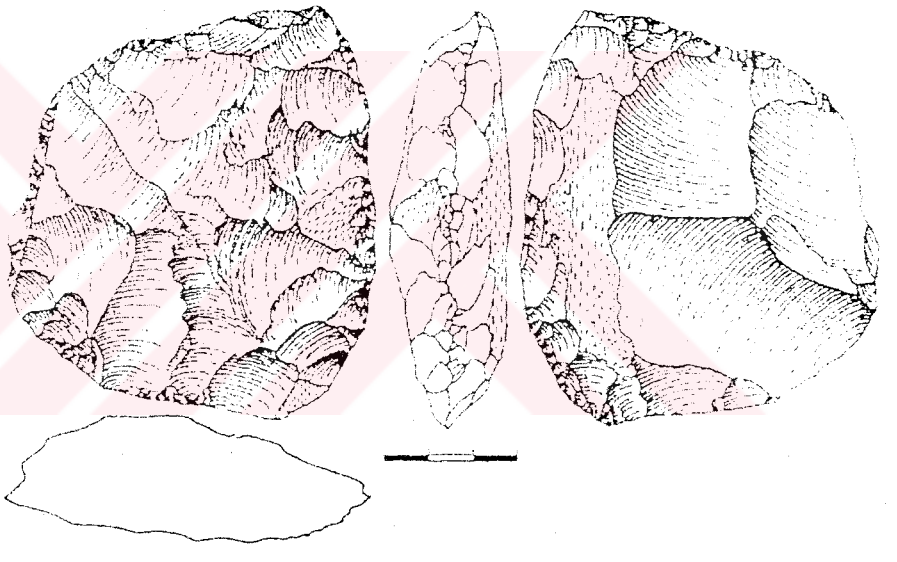


Fig. 71c Preform from Bitlikeler

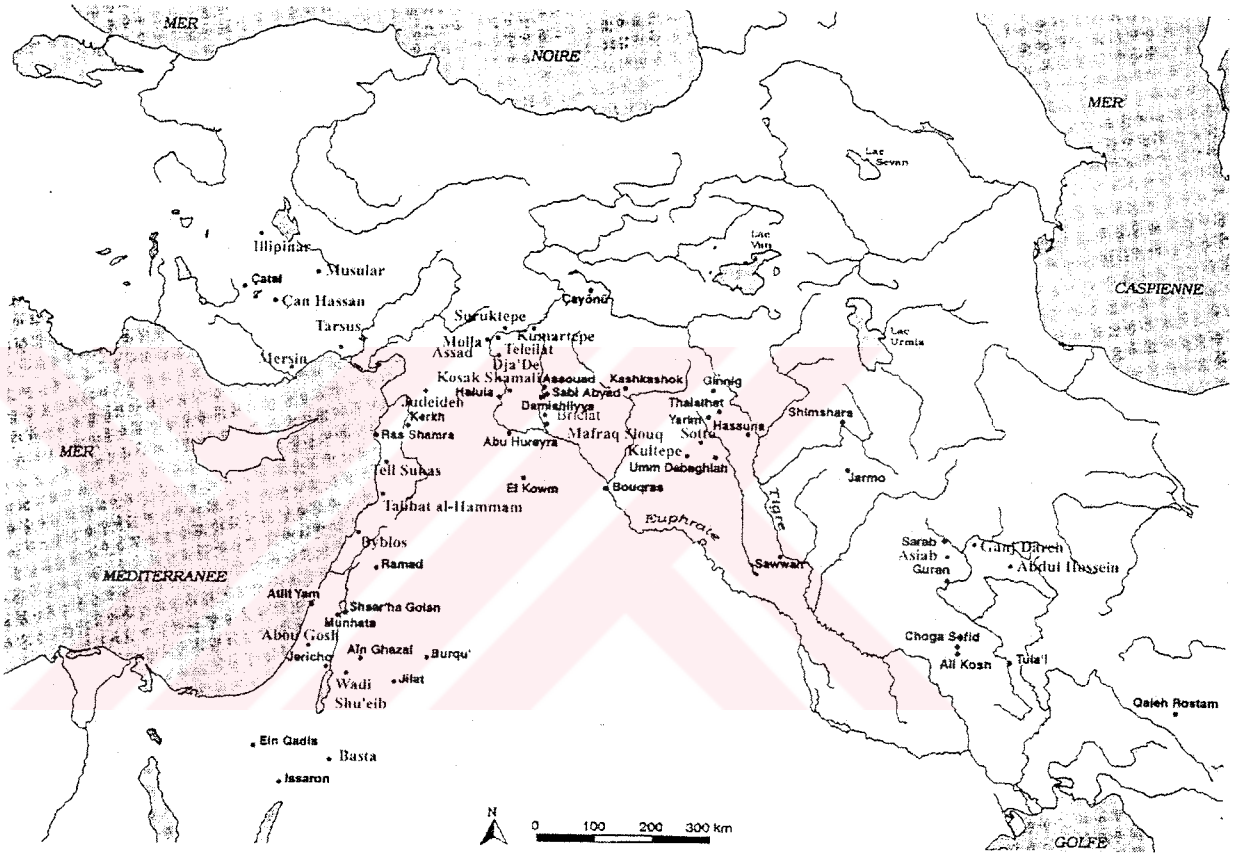


Fig. 72 Distribution of PPNB sites with metal artifacts

Fig. 73 Pottery left behind on an abandoned Bedouin camp site

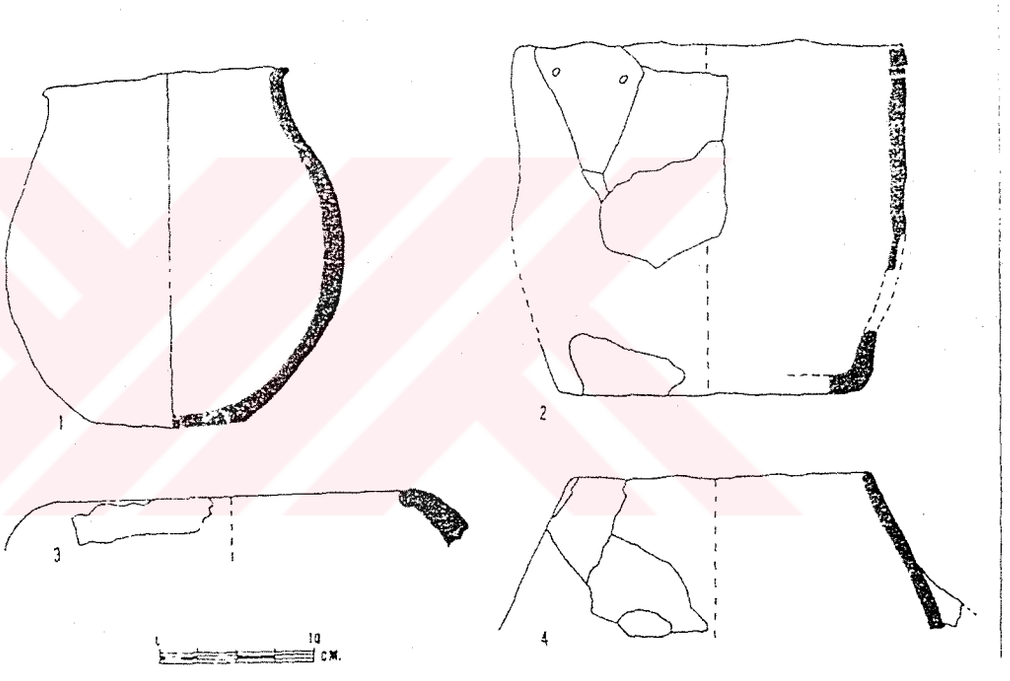


Fig. 74 Examples of 'Negbite' pottery shapes

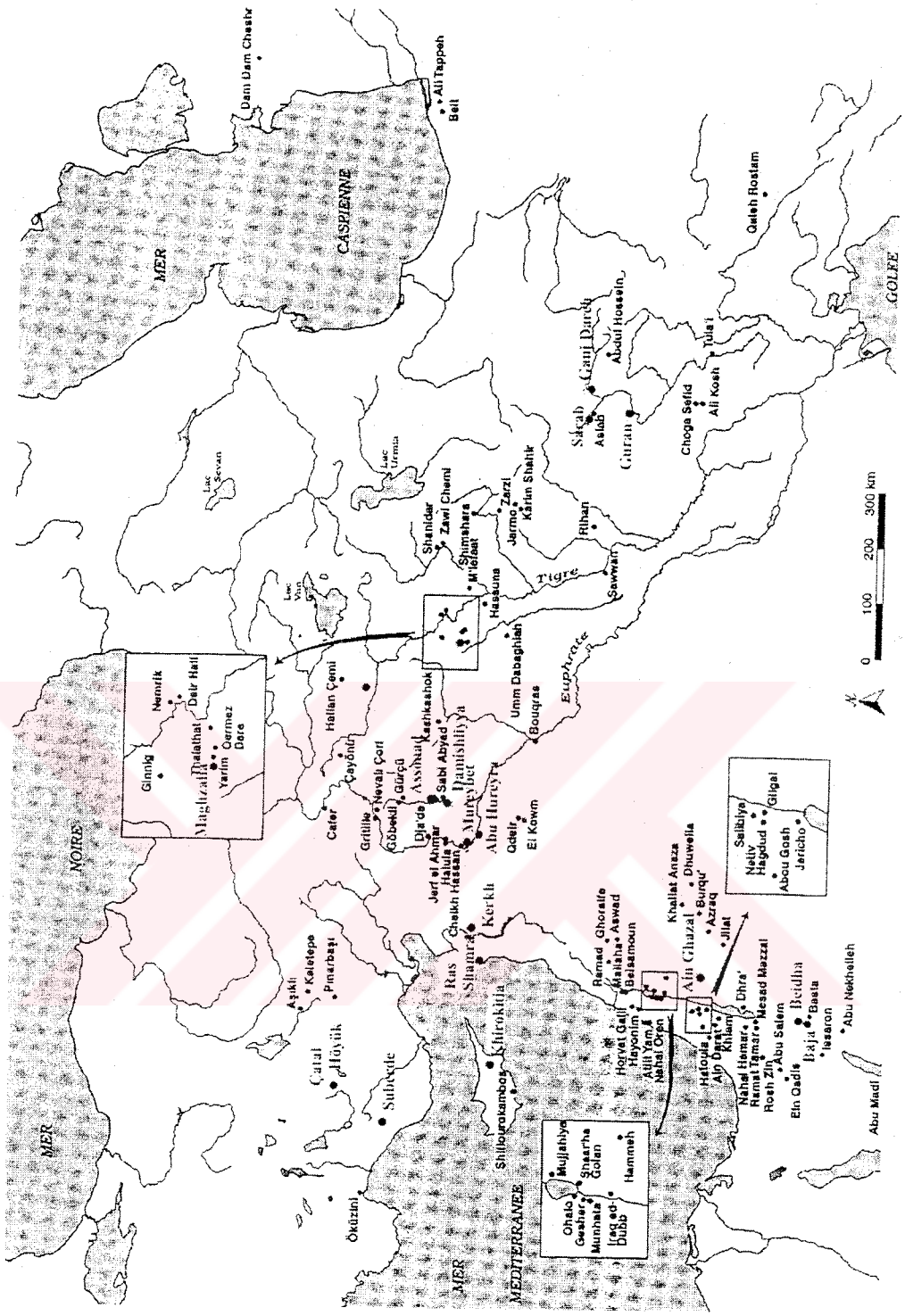


Fig. 75 Location of sites with early pottery

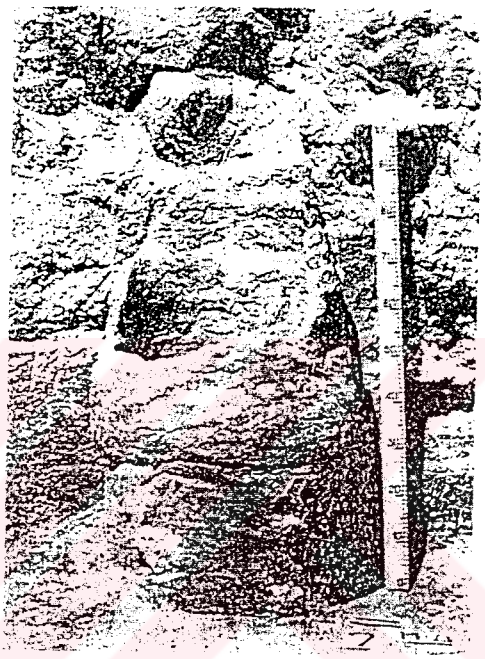


Fig. 76 Early pottery from Maghzalia

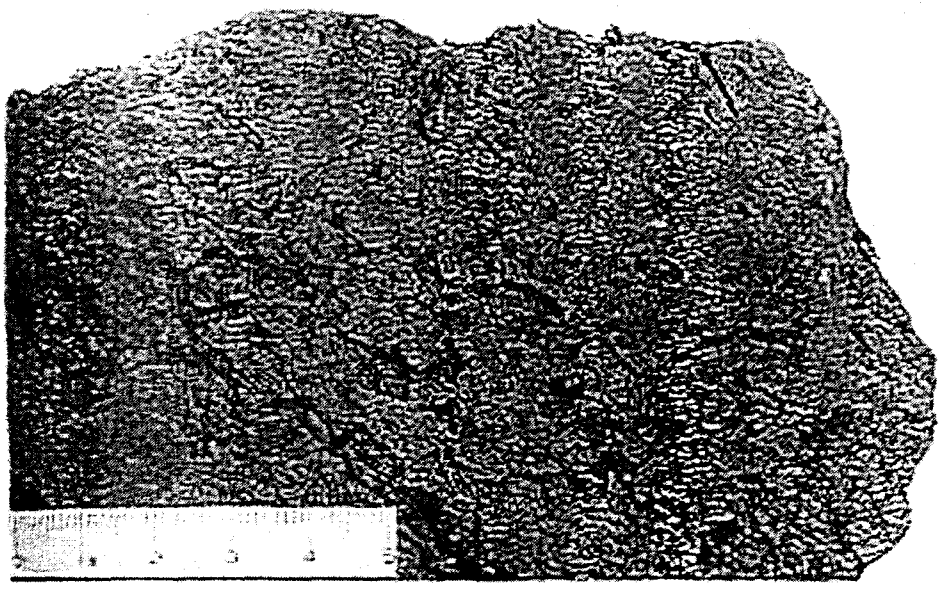


Fig. 77 Early Pottery from Baja'

Fig. 78 Early pottery from Ain Ghazal (PPNB level)

Fig. 79 Example of early pottery from Mureybet

Wares	Fabric	Temper	Surface	Surface Treatment	Decoration
Pre-Halaf *Balikh and Upper Khabur Basin*	*Light*	*Vegetal* (Mineral)	*Light* (Dark)	*Burnishing, Polishing* (Reduction techniques: to obtain dark surface color, Slip)	(Impressions, Incisions, Paint)
Pre-Halaf *Altmonochrom*	*Dark*	*Mineral* (Vegetal)	*Dark*	*Burnishing, Gray, Red or Black Slip*	(Painting, Impressions)
Pre-Halaf *SE Anatolia/ Middle Euphrates*	*Light*	*Vegetal* (No temper, mineral or combined mineral and vegetal)	*Medium to Dark*	*Burnishing, Polishing* (Slip)	*Painting, Incisions*
Pre-Halaf *Amuq A*	*Dark*	*Mineral*	*Dark*	*Burnishing* (Reduction and oxidation techniques: to obtain range of darker colored surfaces)	(Impressions, Incisions)

Table 1: Comparison of the Pre-Halaf Wares

* NOTE: The majority, or a frequently applied trait is in italics, while the minority or rarely applied trait is in parenthesis.

Wares	Fabric	Temper	Surface	Surface Treatment	Decoration
Proto-Hassuna	*Light*	*Mineral, Vegetal* (Untempered)	Medium to Dark	*Burnishing* (Red or Gray Slip, Smoothened)	*Ochre Paint, Relief, Impressions, Incisions*
Zagros Group	*Light* (Dark)	*Vegetal*	Medium to Dark	*Burnishing, Smoothing* (Slip)	(Red Paint w/ geometric design or Incisions w/Paint)
Central Anatolia	*Light*	*Mineral* (Vegetal)	*Dark* (Light)	*Burnishing* (Slip)	(Impressions, Incised geometric patterns)
Cyprus	**Early:** *Dark* **Late:** *Light*	**Early:** *Mineral* **Late:** *Mineral*	**Early:** *Dark* **Late:** *Light*	**Early:** *Burnishing* **Late:** *Burnishing* (Slip)	**Late:** *Red Paint, Red Incised w/combed patterns*
Yarmoukian	*Light*	*Mineral or Vegetal*	*Light*	*Burnishing, Slip*	*Painting, Incised herring bone patterns*

Table 2: Comparison of Other Regional Wares in the Near East