Unwrapping the neolithic package: Wadi Shu'ieib and Kholetria-Ortos in perspective

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UNWRAPPING THE NEOLITHIC PACKAGE: WADI SHU'EIB AND KHOLETRIA-ORTOS IN PERSPECTIVE

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Arts

in

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ABSTRACT

Archaeological research of the Neolithic period in Southwest Asia depicts socio-cultural developments and proto-urban villages, resulting from an intensifying agro-economy, emerging simultaneously during the first 5,000 years of the Holocene (11,000 to 6,000 bp). Kholetria-Ortos, Cyprus and Wadi Shu‘eib, Jordan are highlighted in this thesis to illustrate variability found in a proposed "Neolithic package." The "Neolithic package" is a time capsule of items and ideas centered on sedentary villages participating in a domesticated plant/animal driven economy that provided subsistence and surplus to a growing population. Analysis of the recovered artifacts from both sites finds evidence of cultural variability across time and space. Environmental and cultural interactions are speculated upon as possible causation for differences seen between these two sites. A world view for the Neolithic experience is hypothesized by incorporating components of a core/periphery model.

Keywords: Neolithic package, Southwest Asia, proto-urban village, agro-economy, and core/periphery dependency relations.
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Reflecting on the past six years of my involvement in archaeology, I find myself focusing on key moments and opportunities that came my way. Passage into graduated levels of my academic/professional career are marked by definable events. As an unfocused undergraduate at San Diego State University, I was in need of direction and inspiration.
Dr. Lynne Christenson approached me one day while I was slacking around Storm Hall and asked if I was interested in working for the university's CRM research center. Once my foot was in the door I shortly thereafter experienced my first field school and then my first assistant crew chief position, resulting in my first presentation and publication. Integration into San Diego's CRM community financed my undergraduate studies and upon graduation I left southern California behind and initiated the current phase in my life that comes to a close with the completion of this thesis. Thank you for so much Lynne.

My path to the University of Nevada, Las Vegas was an odd one. After graduation from SDSU a brief relocation to the Bay Area was just the prelude to the next three years of constant motion. Devastated that the 1993 'Ain Ghazal project was not able to bring me on board, Dr. Gary Rollefson (SDSU) recommended me to Dr. Geoffrey Clark (ASU) and his project in the Wadi el-Hasa. My first trip abroad, and I was going to the Hashemite Kingdom of Jordan. Toward the end of the project we had gone back to Amman into the American Center for Oriental Research where I was introduced to Dr. Alan Simmons. Previously, Alan and I talked on the phone entertaining the possibility of coming to study at the University of Nevada, Reno but that was for not. Alan, arriving in Jordan from Cyprus, told me the news that he was just hired to teach at UNLV and extended an offer to work on my M.A. in Las Vegas. In 1994, Alan led a team of students from UNLV to Cyprus to work on Kholetria-Ortos. Conditions were rough and accommodations were low profile, yet we managed to have a good time. Since then, two graduate assistantship positions from the department afforded me to complete this thesis. Thank you Alan for the opportunities you have given to me and I hope we can continue our friendship and collab-
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Author's Note-In this thesis, dates are presented using the convention of bp for years before present. The lower case bp denotes uncalibrated years before present, while the usage of BP (0 BP equals 1950) and BC indicates dates that have been calibrated and converted to calendar years. Also, Greek place names have been italicized in the text (i.e., Kholetria-Ortos).
CHAPTER 1

VILLAGES ON THE PERIPHERY

1.1 Introduction

Aggregated populations living in organized communal structures at the beginning of the Holocene (ca. 11,000 bp) in Southwest Asia heralded the origins of early farming/herding villages, commonly referred to as the Neolithic. An intricate cultural-historical sequence established from years of archaeological research from within the modern states of Southwest Asia (also referred to throughout the text as the Middle East, Near East, Levant, and circum-Eastern Mediterranean) is today challenged by current archaeological investigation (Bar-Yosef et al. 1995; Gopher et al. 1993; Harris 1996). Social evolution at this critical period of history is linked by humans technological achievements made in managing domesticated plants and animals. This thesis examines several components of the Early Neolithic by comparing the archaeological perspective presented from Cyprus and Jordan. Data from Kholetria-Orlos, Cyprus and Wadi Shu’eib, west-central Jordan will introduce thematic issues dealing with Neolithic economic realities, social organization, Early Holocene environmental surroundings, and Neolithic technology. These two sites are only "snapshots" of the larger Neolithic world and an attempt to integrate site-specific information toward a greater understanding of regional patterns is made here.

Technological and economic developments, partially as a result of the intensification
of domesticated foodstuffs, radically transformed the way people interacted with their neighbors and environment. Not only am I looking at a post-domestication adaptation within the Levant (Wadi Shu‘eib, Jordan), but also at the introduction and application of the Neolithic package on Cyprus (Kholetria-Ortos). The impact on an island of a Neolithic economy extends the dialogue from the central Levantine mainland into the Eastern Mediterranean Sea. In this thesis, I will project back to the 6th/7th millennia BC to examine the Neolithic world unveiled from these two sites.

A common mention to this period of prehistory can be found under the title of "the Neolithic Revolution." Analogous to the usage of such terms as "the Scientific Revolution" of the seventeenth century or when speaking about economic developments of the nineteenth century as in "the Industrial Revolution," the term Neolithic Revolution has come to represent such a transitional point in the history of our species that even today, almost 10,000 years later, we are still reaping the benefits of an agro-economy that possibly started by accident (Rindos 1984). The gradual transition from a hunting-fishing-gathering subsistence economy principally based on seasonal rounds and the manipulation of wild biota, toward a fully sedentary economy based on acquiring, maintaining, and storing domesticated products profoundly affected the way humans socially organized themselves. Collectively, the Neolithic transition was revolutionary, but an inspection of smaller parts of the collective lends insight into the successes and/or failures made while trying to make those evolutionary steps into the Neolithic. Parallel experiences across the circum-Eastern Mediterranean region may be elucidated by comparing archaeological sites. Conversely, divergent experiences identified in the archaeological record of the Neolithic may be as
insightful to the archaeologists as the recorded similarities. Kholetria-Ortos and Wadi Shu`eib may be unique sites in of themselves, but it is necessary to understand that they also represent villages along a Neolithic continuum of early farming and herding settlements.

1.2 Framework

The framework of the thesis is as follows. After the general introduction in Chapter 1, Chapter 2 introduces the germane literature for discussion; it also describes the terminology used throughout the rest of the paper. The focus of Chapter 3 is the current and past environments associated with each site. An examination of the current physiographic zones and their effect on vegetation communities leads into discussion of the paleoclimatic record of each site. A brief geologic history will give perspective on depositional and erosional processes that have effected both localities. Chapters 4 and 5 introduce the cultural assemblages recovered from Wadi Shu`eib and Kholetria-Ortos, respectively. Along with the analysis of the chipped stone, discussions of other artifactual materials (e.g., architecture, ground stone, ceramics, economic faunal and floral remains, human remains, and ornaments) will familiarize the reader with the "Neolithic package" of both localities. Chronological determinations of each site, using absolute radiometric dating techniques, will temporally place the archaeological context of the material from both sites. In Chapter 6, an evaluation of the salient issues addressed in the above chapters will set up the concluding arguments. Issues dealing with the built environment and organization of space, Neolithic typology, Neolithic social organization and abandonment are all included in the final commentary.
1.3 Wadi Shu‘eib, Jordan

The allure of the Middle East has brought pilgrims, religious crusaders, western explorers, and tourists to the "holy land" for over one thousand years. The birthplace of three world religions (Christianity, Islam, and Judaism), the Middle East is a unique blend of culture and diversity. Centrally located within Southwest Asia, the Hashemite Kingdom of Jordan sits at a critical point in the "Fertile Crescent," flanked by the modern countries of Iraq, Israel, Saudi Arabia, and Syria (Figure 1.1).

The site of Wadi Shu‘eib, located in west-central Jordan (Figure 1.1), contains components of Pre-Pottery and Pottery Neolithic occupations. The site is 20 km west-northwest of the capital Amman and is approximately 1 km north of the modern village of Wadi Shu‘eib. Prehistoric Wadi Shu‘eib came to the attention of archaeologists when portions of it became exposed during the widening of the Salt-Shuna road. In the past (Mellaart 1975:63, 68; Zeuner 1957:23), prehistoric artifacts observed at Wadi Shu‘eib hinted at its significance, but the site had never been systematically investigated before two seasons of reconnaissance and field excavation in 1988-1989. At the time, archaeologists from the neighboring ‘Ain Ghazal Project investigated a small portion of the site and produced several preliminary reports (Kafafi et al. 1993; Rollefson 1987a). Evidence from Wadi Shu‘eib has been beneficial because it supplements arguments made from the ongoing ‘Ain Ghazal Project. The continuing project at ‘Ain Ghazal provides evidence of a well preserved, large, and temporally significant Neolithic occupation. Specifically, the identification of a transitional occupation between the end of the Pre-Pottery Neolithic (PPN) and the earliest Pottery Neolithic (PN) levels at ‘Ain Ghazal and Wadi Shu‘eib argues
Figure 1.1 Map of Southwest Asia and Site Location
against the collapse of central Levantine sites. Known as the Pre-Pottery Neolithic C (PPNC) (Rollefson et al. 1986; Rollefson 1989; Simmons et al. 1988:36), this phase is distinguished in the archaeological record by changes in architectural traditions, burial customs, and chipped stone technology. Moreover, Wadi Shu‘eib is a large site (approximately 5 hectares), fitting a regional pattern of large Neolithic villages taking form in and around intermontane valleys and shallow inland basins (Bar-Yosef et al. 1995: 73-76; Simmons 1995).

The cooperation of the Jordanian Department of Antiquities and American Center of Oriental Research (ACOR) facilitated the excavation at Wadi Shu‘eib. Financial support primarily came from a National Geographic Society grant, while additional funding sources include Center for Field Research Earthwatch Corps., the Lindley Foundation, and the Amoco Foundation. Secondary funding along with undergraduate and graduate students were also supplied by the institutions of the principal investigators: University of Nevada System (UCCSN), San Diego State University, and Yarmouk University (Jordan).

1.4 Kholetria-Ortos, Paphos District, Cyprus

... the passage is an easy one, for hardly have the heights of Lebanon been lost astern when the peak of the Troodos are raised ahead.

H.W. Catling (1970:4)

Located in the eastern Mediterranean Sea, Cyprus is geographically and politically situated between the east and west. Cyprus, the third largest island (9,251 km²) in the Mediterranean, is 70 km from mainland Anatolia and 95 km west of the Syrian Coast (Knapp et al. 1994). The island nation currently maintains a pivotal position in the
geopolitical makeup of the Middle East and its surrounding Mediterranean partners, as it has
done for several millennia. Geographically, Kholetria-Ortos is 20 km from the resort town
of Paphos in the Paphos District of western Cyprus (Figure 1.1) and ca. 8 km from the
Mediterranean Sea. Located adjacent to the Xero potamos drainage, the site (2.4 ha) is atop
a tel-looking but natural outcrop of chalky limestone (Figure 1.2).

The aceramic Neolithic in Cyprus is a late and distinct phenomenon when compared
to the Levantine or Anatolian mainland (LeBrun 1989). Kholetria-Ortos is a large aceramic
site defined from reports that documented the initial discovery and preliminary investigation
(Fox 1987, 1988; Rupp et al. 1984) and three field seasons of multidisciplinary excavation
(Cooper et al. 1996; Simmons 1994a, 1994b, 1994c, 1996a). It has revealed significant
information from what is now the most extensively studied aceramic settlement of western
Cyprus. With the cooperation of the Cypriot Department of Antiquities, the Cyprus
American Archaeological Research Institute (or CAARI), and support from the National
Endowment for the Humanities, National Geographic Society, and the Institute for Aegean
Prehistory, archaeologists from the University of Nevada System (UCCSN) excavated a

1.5 Theoretical Perspective

Spanning thousands of years and bridging the Pleistocene (Paleolithic) and the
Holocene (Neolithic and later) boundary, humans at the end of the ice age were encountering
and to a degree responding to drastic fluctuations in regional faunal/floral populations and
global shifts in the dominant climatic regimes (Hartmann 1994; Straus 1996). The combi-
Figure 1.2 (a, b) Views of Kholetria-Ortos

a. Looking South-East Toward the Site of Kholetria-Ortos

b. Looking North-West from the Site of Kholetria-Ortos Showing Current Vegetation
ation of several interrelated factors played significant roles in the transition from Pleistocene hunters-fishers-gatherers to an early Holocene agricultural-pastoral lifestyle. These factors include: 1) social evolution and resourcefulness, 2) expanding and retreating vegetation zones, 3) migration and extinction of animal populations, and 4) fluctuations in the primary climatic regime. As a result, villages presumably occupied year round and of considerable size became the principal settlement choice of the aceramic and ceramic cultures of the Levantine Neolithic (Bar-Yosef et al. 1995; Byrd 1994a; Rollefson 1996; Simmons 1995) and Cyprus (Held 1992; Knapp et al. 1994).

For this thesis, a theoretical strategy explaining social evolution and the complex relationship between cultural adaptation and/or maladaptation stems from the work of Marvin Harris (1979) and Stephen Sanderson (1995). Sanderson presents a sequence of propositions developed from the work of Marvin Harris explaining the complexity of social evolutionary processes. Proposition III.1 states:

The principal causal factors in social evolution are the material conditions of human existence, i.e., the demographic, ecological, technological, and economic forces at work in social life. Demographic factors basically concern variations in human population, especially the growth and pressure of populations on vital resources. Ecological factors involve all aspects of the natural or physical environment, especially as these interact with technology or demography. Technological factors are those related to the inventory of knowledge, tools, and techniques available to the members of a society or other socio-cultural system. Economic factors relate to the modes of social organization whereby people produce, distribute, and exchange goods and services; an especially important dimension of economics is the nature or ownership of the basic means of production (Sanderson 1995: 8).

"Villages on the periphery" refers to a pluralistic idea of a Neolithic world system. Increased specialization on wild resources and reliance on domesticated products were
shared experiences throughout Southwest Asia. It was a region where active participants were trading obsidian from Anatolia (Runnels et al. 1988), salt from the Dead Sea, shells from the Red Sea and the Mediterranean (Bar-Yosef Mayer 1997), copper from Jordan (Meyers 1997), and sharing agricultural technology (Gopher 1994; Runnels et al. 1988; Wright 1994), and possibly even transmitting ideology and language (Dolukhanov 1994). Is it premature to label a village as "on the periphery" in a Neolithic world order without having definable core areas? I do not think it is a premature usage because, first, several sites that are mentioned below as possible proto-urban villages can all make good arguments for that claim and, second, social and economic adaptations within the Neolithic village altered the ecological interrelatedness of humans and their surrounding environment. Before I explain a village on the periphery further, some cautionary remarks about my use of the terms "periphery" and "centre(core)" are necessary.

Immanuel Wallerstein defined the emergence of the sixteenth century European capitalistic system in his book *The Modern World System* Vol. 1 (1974). Based on concepts of acquisition (raw material), production, and the exchange (profit) of manufactured goods moving from the periphery to the centre (and vice-versa), Wallerstein successfully applied a economic model explaining deep context in a historical setting. This works for AD sixteenth century Europe, but is it applicable to the seventh millennia BC Southwest Asia?

Commentary directed toward the relevancy of the model in precapitalistic/prehistoric societies quickly became focused on developing it to help explain socioeconomic possibilities in greater antiquity. To import the framework of Wallerstein's model into a non-capitalistic society is allowed because of a "heuristic license" granted to social scientists.
A loose application of Wallerstein's world system model is applied to depict the Neolithization process of Southwest Asia in broader terms. Utilizing world system terminology (i.e., core/periphery) I would like to think that I am touching on one of the earliest formations of inter-regional connectedness. Several types of core/periphery dependency relationships have been identified in the literature (Hall et al. 1993) with one classification type as a potential description of the events taking place during the Neolithic in Southwest Asia. Termed a dendritic political economy, this system is characterized by exchanges between core and periphery, but without overt political control.

In general terms, populations living in Southwest Asia from 9500-6000 bp were engaged in an intensifying agro-economy that consisted in the transmission of technology, raw material, finished products, and ideas. The question remains, if Kholetria-Otrtos is on the periphery and Wadi Shu'eib is considered to be located in the Levantine Neolithic core area, where along the proto-urban village continuum does these two sites fall? Possible sites for the regional core areas exist, for example `Ain Ghazal (Rollefson et al. 1992; Simmons 1995; Rollefson 1996), Behida (Byrd 1994a), Çatal Hüyük (Mellaart 1967; Stea et al. 1993), Jericho (Bar-Yosef 1986; Kenyon 1957, 1979), and Khirkitia-Vounoi (Dikaios 1953; Le Brun 1989; Stanley Price 1979), but certainty answering such a question is premature. A core-periphery model, in the case of the Near Eastern Neolithic, implies reciprocity between proto-urban villages and rural compounds such as hamlets and frontier dwellings. The interaction between villages, specific kinship groups, or amongst individuals are invisible co-ops in the archaeological record. Only the artifacts themselves give clues to possible origins.
For example, obsidian quarried in central Anatolia (Tykot 1996) is widely found in Neolithic deposits from across the region. Is the presence of an exotic item, like obsidian, indicative of core-periphery relations? It could after all just be the result of "trickling down" into a village or region by chance and not part of a larger trade-exchange network. That aside, I will contend in this thesis that core-periphery relations, noting the above cautionary remark, emerged during the Neolithic in the circum-Eastern Mediterranean. It is not possible to accurately predict the level of core-periphery dependency relationships, but I believe that as villages moved toward greater urbanization, interdependency amongst farmers, herders, hunters, and gatherers took on new forms.

Research focused on the increasing complexity found within the social organization of the inhabitants of the above sites has hinted at the appearance of ritual elites emerging from the villagers' egalitarian social foundation (Kenyon 1979; Kuijt 1995; Mellaart 1975; Rollefson 1989, 1996). Archaeological evidence depicts an increased awareness and implementation of an organized, standardized, and binding ritual veneration of the dead (Kuijt 1995).

Kuijt arrives at his conclusions by examining burials excavated throughout the region and data provided on architectural trends through the duration of the Early Neolithic. Incorporating data on the material imagery (i.e., figurines, statues, and plastered skulls), Kuijt speculates on the trajectory that villagers in the central Levant took in maintaining egalitarian ethos within a developing heterarchical collective (Kuijt 1995). The identification of ritual elites by way of investigating mortuary trends (e.g., skull caching, skull deformation, and plastering skulls) may be beneficial in isolating sites as either core
or periphery. How did the inhabitants of Neolithic Wadi Shu'eib and Kholetria-Ortos fit into the shared experiences of the circum-Eastern Mediterranean region? And how were these two sites incorporated into the larger proto-urban village continuum? It is the intent of this thesis to examine these questions.
CHAPTER 2
LITERATURE REVIEW

... in the Near East ten millennia ago, a particular combination of climatic, geographic, biological, and cultural conditions existed, which gave rise directly to permanent settlement and agriculture, indirectly to urbanism and the city state.

Charles Keith Maisels (1990:45)

2.1 Introduction

Archaeological research in the circum-Eastern Mediterranean region, some say, has reached a critical point (Dever 1995). The maturation process of the discipline continues forward but not without hesitation. Archaeologists, not unlike scholars in the other social sciences, are stuck in a quandary of theoretical discourse. Recent attacks on the "New Archaeology" of the 1960s and its processual interpretation of culture change called for researchers who focus on the prehistory of Southwest Asia to reevaluate the dominant paradigms in our discipline (Hodder 1986; Preucel 1991).

Today, various theoretical avenues exist for archaeologists (e.g., Marxist, structuralist, poststructuralist, hermeneutic, feminist (archaeology), and interpretive (archaeologies). Postprocessual critique is considered to be at the center of the interpretive archaeological movement. Hodder states, ". . . postprocessual archaeology is less a movement and more a phase in the development of the discipline. It is no more or less mature than cultural-historical or processual archaeology, but it is different in its acceptance
of debate and diversity regarding fundamental principles" (1991:37). These fundamental principles are based on a reinterpretation of the scientific method. Looking beyond summations based on ecology, technology, and subsistence, Hodder insists "... that there is not one answer, one final solution, a final certainty, a simplicity" (1991:41).

Interest in the circum-Eastern Mediterranean Neolithic prehistory has a long and colorful written record. Currently, the amount of work and publication focusing on the Neolithic and early village life is rapidly expanding with the passing of every field season. Wadi Shu'eib and Kholetria-Ortos present excellent opportunities to analyze and compare the region's current emphasis on Neolithic research. It is the intention here to present a review of the germane literature on the Neolithic occupation of the region and in doing so, various theoretical viewpoints are sometimes explicitly stated, whilst other viewpoints may just be implied. The purpose of the review is to inform the reader of the current emphasis placed on this topic as well as to introduce applicable terminology.

Throughout the history of the discipline Anthropology and its sub-field Archaeology, themes of environmental determinism and cultural ecology periodically were explored to help define and explain culture change (Butzer 1982; Vita-Finzi 1978). Ecology is the study of organism-environment interrelatedness. In my opinion, an approach from a cultural ecological position (Flannery 1972; Henry 1995; Nissen 1988; Steward 1955; Stone 1996) reaches for the middle range in eliciting a weighted perspective on both the biological (environment) and cultural (human resourcefulness) causation for cultural adaptation and settlement choice. For example, site catchment analysis evolved as an explanatory nomothetic model depicting pre-industrial societies attacking their environmental
surroundings and maximizing their return. Central to a position taken by cultural ecologists, and to an applied theory like site catchment (Vita-Finzi 1978), are interpretations of the accessibility of edible biota, proximity of nearest water source, and data from regional climatic models that are associated with global temperature and precipitation.

Settlement systems developed from site catchment analysis, also known as territorial analysis (Stone 1996; Vita-Finzi 1978), predict settlement type, location, and settlement population density based on the carrying capacity of the surrounding biota. Stone (1996) interprets a new form of territorial analysis as it applies to agrarian settlements. Utilizing data from agrarian farmers in modern Nigeria (Kofyar), he attempts to bridge the analogy between the prehistoric past and ethnographic present. Convincingly, he sets forth his model of an agrarian settlement pattern based on the principles of intensification and dispersion. His concept of intensification (population pressure) is based on "...a rising ratio of food demand to the quantity and quality of productive land" (1996:182).

Diagrammed in Figure 2.1 and illustrated in Figure 2.2 are patterns of expected mobility (land use) and a typology of settlement systems respectively (Maisels 1990:119; Nissen 1988:41). Figure 2.1 depicts land use patterns and mobility strategies for Near Eastern early Holocene inhabitants. Beginning with the period prior to 9000 BC, hunter-gatherers engaged in a fully mobile transhumance lifestyle. Moving between campsites based on altitude and season, hunter-gatherers opportunistically exploited localized raw material and hunted available fauna. The second phase represents the period between 9000 BC and c. 7000 BC. Maisels (1990) characterizes this time by a decrease in encampments across the landscape as a whole, with semi-sedentary camps positioned in the low ground
Figure 2.1 Land Use and Mobility Patterns for the Neolithic. (Maisels 1990:199, Fig. 4.4)

Key: Circles indicate site-catchment areas, centered on camps or settlements

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Figure 2.2 A Continuum of Settlement Types. (Nissen 1988:41, Fig. 11)

Key: (a) isolated settlements in narrow valleys; (b) simple settlement system on a small plain; (c) three-tiered and (d) four-tiered settlement systems on larger plains.
attaining a larger lateral extent. Seasonal mobility during the summer and spring was not completely abandoned, yet archaeological data show an increase in fixed artifacts, including architectural remains, burials, and ground stone. During the final phase diagrammed on Figure 2.1, fully sedentary camps (villages) emerged across the landscape relying on agriculture and herding to provide subsistence for the year-round settlement.

Now looking at Figure 2.2, settlement types are illustrated in four phases depicting proto-urban villages through a four-tiered settlement system (Nissen 1988:41). According to Nissen (1988), Neolithic settlement choices (Figure 2.2 a and b) were based upon sufficient land for cultivation and accessible steppe vegetation for animal husbandry. Considerable distances still existed between the larger Neolithic villages in the southern Levant (e.g., Beidha), while in the central Levant large settlements (e.g., 'Ain Ghazal, Jericho, and Wadi Shu'eib) began to develop within the same ecological unit (Nissen 1988). Nissen attributes the close proximity of sites as a result of improvement in agricultural techniques. Eventually, environmental desiccation caught up with Near Eastern Neolithic farmers and areas that were occupied for thousands of years had to be abandoned. Next, I describe the fundamental components of the "Neolithic package" and then, I present relevant literature and terminology for each locality.

2.2 What is the "Neolithic Package"?

The "Neolithic package" (Patton 1996:11) (or the "Np") is the full range of ideas and items that existed and were at the disposal of populations of the time. Patton introduces this term in the context of his larger discussion of the colonization of the Mediterranean Sea. As
his monograph primarily focuses on later developments in the western region of the Mediterranean, his discussion on regional Early Neolithic economies is limited. The "Neolithic package," a time capsule of items and ideas that made up this crucial period of human history, was used and manipulated in a variety of scenarios. Variability in the archaeological record of this period can partially be attributed to the different expressions and degree of implementation of the "Neolithic package" (Figure 2.3).

The climatic and environmental context for the "Np" is first detailed. The Younger Dryas, a colder and drier interval than present, is considered the critical climatic event during the transition to domesticated economies in the Levant (Bar-Yosef 1996; Bar-Yosef et al. 1995; Cheddadi et al. 1991; Moore et al. 1992; Roberts et al. 1993). A combination of steppe vegetation retreat, evergreen and deciduous forest expansion, and decrease of wild cereal stands lead the occupants of the Levantine terminal Paleolithic (or Epipaleolithic) into the domesticated economy of the Early Neolithic. As growing populations became dependent on the availability of wild cereal, the wild cereal itself was responding to deteriorating climatic changes associated with the Younger Dryas. It is believed that in harvesting wild grain (i.e., wheat and barley) genetic changes characteristic of domesticates occurred (Bar-Yosef et al. 1989; Blumler et al. 1991).

In 1926, Nicola Vavilov identified eight ecozones that could support the origins of domesticated crops around the globe. Although Vavilov was unable to pinpoint an exact chronology for when domestication occurred, he analyzed the genetic complexity of a particular region's flora and predicted whether it could support such a transition (Roberts 1989: 94). Classified as hearth 4 by Vavilov, Southwest Asia's climate and topography

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Figure 2.3 A Synopsis of the Near Eastern "Neolithic package"

POSTULATED CLIMATE and ENVIRONMENT:

○ Last Glacial Maximum (18,000 bp)
  - winter temperature 10°C colder than present and summer temperature 1-2°C warmer than present

  ■ Pleistocene/Holocene boundary—Beginning of the Neolithic (PPNA)
    (11,000 to 10,000 bp)

○ Younger Dryas
  - cold/ dry interval
  - evergreen and deciduous forest expansion with steppe vegetation retreat
  - wild cereal stands decrease

  ■ Middle to Late Neolithic (PPNB, PPNC, and PN)
    (10,000 to 6,000 bp)

○ Warmer and wetter conditions, with summer monsoonal rains (less effective moisture)
  - winter temperature 1.5 °C colder than present and summer temperature 2-3°C warmer than present (thermal contrast)
  - inland forest expansion continues until 9,000 bp
  - open vegetation

PARTICIPANTS:

○ Farmers, Herders, Gatherers, Hunters, Fishers, and Pastoralists

ECONOMY:

○ Domesticated Plants - legumes, cereals, flax, and fruit trees

○ Domesticated Animals - goat, sheep, cattle, pig, and dog

○ Non-domesticates - plants (i.e., wild barley and wheat, tubers, and berries); animals - (i.e., gazelle, fallow deer, rabbit, rodent)

MATERIAL CULTURE:

○ Architecture - circular (Early and Late Neolithic) and rectangular (Mid Neolithic) mud brick, plaster, and stone houses with facilities for storage, preparation, and serving of food.
Figure 2.3 cont'd

- painted floors
- massive stone structures (non-domestic)
- workshop areas and communal buildings, ritual?
- increased compartmentalization of structures

○ Craft Specialization & Tools - sickles, arrowheads, "naviform" cores, shaft straighteners, bone implements, wood implements, ground stone, spindle whorls, bead making, plaster and ceramic pottery (only in Late Neolithic)

○ Human Remains - burials outside and/or in abandoned structures
  - cached plastered skulls possibly indicating ancestral veneration

○ Other - imported shell, obsidian, animal and human figurines, plastered statuary, and incised cobbles

**BIOLOGICAL IMPLICATIONS OF AGRO-ECONOMY:**
○ Biological evidence indicates transition to agriculture affected human population in a variety of ways (e.g., reduction in health status and well-being, increase in physiological stress, decline in nutrition, increase in birthrate and population growth, and alteration of activity types and work loads)

**SOCIAL AND ECONOMIC CONNECTIONS:**
○ Transition from principally polygynous extended household to a monogamous nuclear family
○ Intensification and efficiency in agricultural techniques
○ Elevation in importance of secondary products from animals (i.e., dairy products, bone marrow, and skins)
○ Emerging social inequality (i.e., chiefdom, ritual elites, craft specialists, private ownership, and pastoralists)
○ Trading relationships, seasonal markets, and early accounting systems
○ Formation of regional dialects associated with the "language of agriculture"

**ECOLOGICAL EFFECTS:**
○ Overfarming
○ Overgrazing
○ Deforestation
○ Sanitation problems
○ Overpopulation (using Maisels 1990:123-125) begin with 100,000 people at 10,000 bp as the population for the Middle East and by 6,000 bp an estimated population of 3.2 million people inhabited this region.
maintained modern wild progenitors of the initial domesticated crops, suggesting to him great antiquity. Domesticated crops that came out of the farming revolution at the beginning of the Holocene include: wheat (*Triticum sp.*), barley (*Hordeum sp.*), rye (*Secale sp.*), pulses consisting of pea (*Pisum sp.*) and lentil (*Lens sp.*). Due to the wealth of archaeological information from the Levant and other regions of the world, a better understanding of the floral domestication sequence and process is known since Vavilov's early work (e.g., Bar-Yosef et al. 1989, 1995; Blumler et al. 1989; Harris 1996; Henry 1989; Moore 1982, 1992; Runnells et al. 1988; Van Zeist et al. 1991; Zohary et al. 1993).

Another key component of the "Neolithic package" was the presence of domesticated animals. Wild goats (*Capra aegagrus*) and sheep (*Ovis orientalis*) presumably were the first animals to undergo genetic mutation, followed by dog (*Canine sp.*), cattle (*Bos primigenius*), and pig (*Sus scrofa*) (Bar-Yosef et al. 1995; Khöler-Rollefson 1992). The domestication of herd animals will be treated here as part of a single process associated with plant domesticates. Along with the new relationship between humans and plants, a new coevolutionary relatedness emerged amongst humans, plants, and animals. Like the Neolithic inhabitants, wild goat and sheep ate wild grain. As villages developed in and around fields, it was no longer necessary to go far for hunting purposes because animals were coming to them for the available food. Wild animals were not ignored completely, as will be shown in Chapter 5 when the faunal evidence from Kholetria-Ortos is offered. Fallow deer, a staple of the broad spectrum diet found amongst Epipaleolithic hunters and gatherers, appears in the Neolithic context of Cyprus in significant numbers.

Terminology utilized for this region does not fall under one epistemology. Rather,
conventions of terminology are set forth by various scholars. The use and application of certain terminology defines, in many cases, various authors' prejudicial attitude toward a particular convention. Since the attending topic is dealing with archaeological entities in two separate countries (Cyprus and Jordan), multiple trajectories of terminology are being used. For example, the use of terms such as "Pre-Pottery" or "acerbatic" that describe similar cultural phases are used with varying degrees from across the region. The literature is cluttered with multiple terms that are mostly interchangeable.

Dolukhanov (1994) proposes a pool of innovation that inhabitants of the Neolithic Middle East shared. He explains,

This pool accumulated various ideas and concepts related to the economic, social and idealistic life of the communities engaged in the agricultural revolution. These ideas and concepts were randomly used by various social groups, and subsequently memorized in local traditions. The random choice of cultural attributes and their extra-communal transfusion was at the base of the observed diversity of early farming cultures (1994: 253-254).

Freely chosen ideas taken from an acknowledged Neolithic world view would be adopted from a pool of technological innovations. Whether an item or idea was used would be the prerogative of the individual Neolithic villager (or village). Conversely, with a scenario of increasing standardization found in burials and architecture during subsequent phases of the Early Neolithic (Kuijt 1995), the prerogative of the villager may have been infringed upon for the greater good of the community. Contacts made in trading relationships or opportunistic encounters would allow for the dissemination of material culture. The control of raw material by kin groups or by households would eventually lead to inequality of access, which in turn might cause a social division based on who was in possession of the certain limited resources. A familiarization with the cultural material from Wadi Shu'eib...
and Kholetria-oros will allow for discussions on various expressions of social evolution and how it relates to the "Np."

2.3 Wadi Shu'eib

Wadi Shu'eib, known to archaeologists since the 1920s, was first professionally noted by D. Kirkbride in the 1950s. It was not until the late 1950s that Wadi Shu'eib was designated as a Pre-Pottery Neolithic site. Chipped stone tools and a plastered occupational surface were identified in the exposed road cut and leading the site to be labeled Site 44-Shu'eib Bridge (Zeuner 1957:23). Later, the site was identified by Mellaart (1975:63, 68) as exhibiting Pottery Neolithic artifacts.

Early Neolithic chronological terminology for the central Levant divides as follows. The Pre-Pottery Neolithic (PPN) subdivides into three phases: Pre-Pottery Neolithic A (PPNA- ca. 8350-7350 BC), Pre-Pottery Neolithic B (PPNB- ca. 7350-6000 BC), and Pre-Pottery Neolithic C (PPNC-ca. 6000-5500 BC) (Rollefson 1989, 1990a; Simmons et al. 1988) (Table 2.1). Recently, 300+ radiocarbon dates were compiled from sites across the Levantine Neolithic in an attempt to synthesize the region's aceramic/ceramic chronology (Kuijt et al. 1994). It was determined that the majority of \(^{14}\)C dates were coming from deeply stratified large sites (i.e., `Ain Ghazal and Jericho), while smaller sites (<0.5 ha to 1.5 ha) only accounted for a small percentage of the total radiometric dates. Alternate chronological syntheses exist (Gebel 1987; Mellaart 1975; Moore 1982) that employ different terminology (i.e., Neolithic 1, Neolithic 2, etc.), but for this thesis my use of the PPN/PN terminology reflects a current trend in the literature (Bar-Yosef et al. 1995; Gopher...
Table 2.1 Chronology of Selected Pre-Pottery Neolithic Sites in the Central Levant.

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>CENTRAL LEVANT SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPNC</td>
<td>Wadi Shu‘eib</td>
</tr>
<tr>
<td>6000 - 5500 BC</td>
<td>‘Ain Ghazal</td>
</tr>
<tr>
<td></td>
<td>Basta</td>
</tr>
<tr>
<td></td>
<td>Desert Sites?</td>
</tr>
<tr>
<td>Late LPPNB</td>
<td>Wadi Shu‘eib</td>
</tr>
<tr>
<td>6550-6000 BC</td>
<td>‘Ain Ghazal</td>
</tr>
<tr>
<td></td>
<td>Abu Gosh</td>
</tr>
<tr>
<td></td>
<td>Jilat</td>
</tr>
<tr>
<td>Middle MPPNB</td>
<td>Jericho</td>
</tr>
<tr>
<td>7250-6550 BC</td>
<td>Munhata</td>
</tr>
<tr>
<td></td>
<td>‘Ain Ghazal</td>
</tr>
<tr>
<td>Early EPPNB</td>
<td>Jericho</td>
</tr>
<tr>
<td>7350-7250 BC</td>
<td></td>
</tr>
<tr>
<td>PPNA</td>
<td>Jericho</td>
</tr>
<tr>
<td>8350-7350 BC</td>
<td></td>
</tr>
</tbody>
</table>

after Rollefson (1989)

et al. 1993; Rollefson 1989) and the newly evaluated $^{14}$C dates from across the region (Kuijt et al. 1994).

Two factors caused a renewed interest in Wadi Shu‘eib during the late 1980's. First, the continuing success at ‘Ain Ghazal, a nearby Pre-Pottery/Pottery Neolithic settlement, propelled the interest of other contemporary Neolithic sites. Second, additional road work on the Salt-Shuna route exposed a larger portion of Wadi Shu‘eib during construction and the impending destruction was the catalyst for the investigation. A team of archaeologists, that was working at ‘Ain Ghazal, in the hope of further understanding the regions’ Neolithic expression, took on the task of testing a small portion of Wadi Shu‘eib (Kafafi et al. 1993; Rollefson 1987a; Simmons et al. 1989). Since the initial publication of these reports, Wadi
Shu‘eib has been incorporated by other authors into the larger discussion of the region's Neolithic chronology and artifact assemblages (Bar-Yosef et al. 1995; Gopher et al. 1993; Kafafi 1993; Kuijt 1995; Wright 1993).

The PPNB period further breaks down into Early, Middle, and Late components. It is during the Middle Pre-Pottery Neolithic B (MPPNB), that Kuijt (1995) proposes the culmination of Early Neolithic social development, with periods before and after reflecting an ascension and decline from an attained social complexity. Above the aceramic boundary in central Levant are Pottery Neolithic (PN) horizons, which are also further subdivided and are labeled Yarmoukian, Jericho A, and Wadi Raba (Garfinkel 1993; Gopher et al. 1993; Kafafi 1993; Kenyon 1979; Mellaart 1975; Rollefson 1993a). The deposits and associated radiocarbon dates from Wadi Shu‘eib show an occupation that spans the PPNB, PPNC, and PN. Detailed evidence from Wadi Shu‘eib and its associated deposits will be presented in Chapter 4.

A controversy exists regarding the validity of the last phase during the Pre-Pottery Neolithic in the central Levant. The Pre-Pottery Neolithic C (PPNC) is not universally accepted (Bar-Yosef et al. 1995; Gopher et al. 1993). Above the PPNB and below the PN deposits at some central Levantine settlements, a PPNC layer is stratigraphically and artifactually distinct (Rollefson 1990a; Rollefson et al. 1986; Simmons et al. 1988). Both Wadi Shu‘eib and nearby `Ain Ghazal display this *in situ* transitional layer. The PPNC layers exhibit a different material culture and technology than its PPNB predecessors (Rollefson 1993a:98) and the fact that ceramics are utilized in the PN, or Yarmoukian Phase, distinguishes the PPNC and subsequent developments. Other lines of evidence that confirm the PPNC phase include a change in burial customs and form of architecture (Rollefson 1990a). According to Gopher and Gophna (1993), the classification of PPNC cultural
entities would be premature because, "...we still have no clear geographical parameters, no
details on material culture or behavioral patterns, or even a well-established chronology" for
this period (1993: 307). The sites of Wadi Shu‘eib and `Ain Ghazal have a direct impact on
the current abandonment debate during the Late Neolithic, or as termed by D. Henry "hiatus
palestinienn"(1995: 13); and this topic will be revisited later in Chapter 6.

The excavation at Wadi Shu‘eib employed the use of the "Harris Matrix" helping in
recording the site's stratigraphic interfaces. Developed in the early 1970s by E. Harris, the
matrix, which refers to the accumulation of sediments (i.e., culturally produced residue
and/or geologic formational processes), is excavated in a horizontal plan view. In doing so,
the Harris Matrix allows for stratigraphic interfaces to be encountered and recorded while
excavating instead of later detection in the sidewall. Data accumulated from utilizing this
strategy are displayed in flow chart of numbers that represent subsurface deposits. In
Chapter 4, the reader will be introduced to the results of the "Harris Matrix" from Wadi
Shu‘eib. Preliminary analysis of the data established a relative occupational sequence of the
site that was then validated with the suite of processed radiocarbon dates.

2.4 Kholetria-Ortos

Kholetria-Ortos chronologically correlates to the Late Pre-Pottery Neolithic and
Pottery Neolithic of the central Levant. Discovered in 1983 during a systematic survey of
major western drainages undertaken by Canadian Palaipaphos Survey Project (CPSP), Ortos
was given the designation 83-X-1 (Rupp et al. 1987). Fox (1987, 1988), a crew member of
the CPSP, reported on the preliminary surface finds that were recovered during the survey
and subsequent visits. Simmons (1994a, 1994b) reported significant finds from Ortos that

A unique aspect into the inquiry of the aceramic Neolithic on Cyprus is a geographical fact; Cyprus is an island. A very visible point when looking at a map, but the geographical effect of an island environment on humans, animals, and plants may not be so obvious. Islands have long been the figurative controlled "laboratory" in the natural world. The eminent work of Charles Darwin in the Galapagos Islands is a good example (Darwin 1859). Identifying varieties of species endemic to a particular island, Darwin was able to work with ideas that trace evolutionary histories of plants and animals. More recent, Evans (1973), Lewthwaite (1986), and Patton (1996) illuminated the possibilities of studying colonization, culture change, and archaeology on an island environment.

Patton (1996) deals extensively with interaction between human populations living on Mediterranean islands and the nearby mainland and how it relates to "an island as a laboratory" analogy. Addressing topics of island colonization, the insular effect of island living, human impact on the island's ecology, and larger social interaction spheres, Patton traces the prehistory of Mediterranean colonization and dispersion from east to west.

The aceramic Neolithic period on Cyprus, the Khirokitia Culture (KCU), is defined in recent articles by Cherry (1990), Knapp et al. (1994), and Le Brun (1989). An examination of their chronological sequence finds agreement in dates used for KCU developments. The literature refers to the beginning of this period at 7000 BC, with it culminating around 5000 BC (Table 2.2). A chronological gap between 5800/5500 - 5000 BC suggests an occupational abandonment after the KCU phase and prior to the beginning of pottery Neolithic, or Sotira Culture phase (SCU).

Knapp et al. (1994), while touching on the external forces of cultural influences,
Table 2.2 Chronology of Selected Sites During the Early Prehistory of Cyprus

<table>
<thead>
<tr>
<th>PERIOD</th>
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<tbody>
<tr>
<td>Sotira Culture (SCU)</td>
<td>Dhali-Agridhi, Ayios Epikitos-Vrysi</td>
</tr>
<tr>
<td>5000 - 3900/3700 BC</td>
<td></td>
</tr>
<tr>
<td>Khirokitia Culture (KCU)</td>
<td>Kholetria-Ortos, Khirokitia-Vounoi, Cape</td>
</tr>
<tr>
<td>7000 - 5800/5500 - 5000 BC</td>
<td>Andreas-Kastros, Kalavasos-Tenta, Petra tou</td>
</tr>
<tr>
<td></td>
<td>Liminitii</td>
</tr>
<tr>
<td>Akrotiri Phase</td>
<td>Akrotiri-Aetokremnos</td>
</tr>
<tr>
<td>9000 BC - ?</td>
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</tbody>
</table>

approached the prehistory of Cyprus from an indigenous point of view. He felt the insular nature of an island would produce its own unique biological and cultural deviations. For example, animals will exhibit dwarfism over time due to an impoverished environment and a lack of natural predators (Sondaar 1986). The question is, how does the isolation and insularity of an island effect humans over several millennia? Knapp et al., reaching for the indigenous point of view again said, "...the ebb and flow of sociocultural developments on Cyprus are associated with external forces, or grounded in scholarly preconceptions that anticipate Aegean, Levantine, or Anatolian cultural influences" (Knapp et al. 1994:378). He goes on to make the point that uniformity found amongst the KCU sites throughout the island is awkwardly opposed to the sparse Proto-Neolithic record. This suggests to the above authors, as well as to me, that the homogenous nature of the Khirokitian assemblages are groupings of like-minded people.

Although island colonization is a complicated issue and mostly beyond the scope of this thesis, it is necessary to give a brief description of this phenomenon as it relates to Cyprus because of a recent breakthrough. Until the discovery of Akrotiri-Aetokremnos,
which dates to ca. 8500 BC, it was thought that the KCU phase represented the island's first inhabitants. The recent find of terminal Pleistocene fauna (pygmy hippos-Phanourios nminutus) in association with cultural deposits (hearths and chipped stones) on the island's southern coast at Akrotiri-Aetokremnos (Simmons 1988, 1989, 1991a, 1991b, 1996b) demands a new evaluation of Cypriot prehistory.

In the past, claims for Pleistocene occupation of Cyprus (Vita-Finzi 1973; Stanley Price 1977) were unable to stand the scrutiny of closer investigation. Data from Akrotiri-Aetokremnos, although not universally accepted (see Bunimovitz et al. 1996), demonstrates beyond a reasonable doubt that disarticulated pygmy hippopotami (ca. 500 individuals) were in stratigraphic association with cultural artifacts and cultural features (Simmons 1996b). Add thirty-one radiocarbon dates (Simmons 1991a) that provide strict chronological control for the site and Aetokremnos appears to be the earliest recorded site on Cyprus. The implication that terminal Pleistocene endemic fauna were partially hunted to extinction now has been empirically documented and tested.

With approximately 1,500 to 2,000 years between evidence of the island's first human contact and the floruit of KCU developments, any cultural correlations established between these periods must be considered tenuous. The fact that needs to be further considered, as I move away from the debate of when Cyprus was first occupied, is an aspect of transhumance behavior.

2.5 Mainland/Island Interaction

An emerging dialogue with regard to the spread of Neolithic domestic economies is
the interaction between the inhabitants of the mainland Southwest Asia (Levant and Anatolia) and the occupants of islands in the Mediterranean Sea (Broodbank et al. 1991; Cherry 1981, 1990; Knapp et al. 1994; Patton 1996; Simmons 1988, 1991a, 1991b). Work has primarily focused on the initial interaction or colonization of islands, but as subsequent periods of occupation and habitation become better understood, correlations, albeit tenuous, can be drawn between the mainland and Cyprus.

The relative chronology of the development of Neolithic economies throughout the circum-Eastern Mediterranean region is paralleled with the beginning of the Holocene (Figure 2.4). Also, \(^{14}C\) dates are plotted against a relative timeline. The rise of domesticated plants, believed to have occurred in the Levantine Corridor, was then followed by the domestication of animals in adjacent areas. A complicated process that can be traced through the archaeological record into the late Pleistocene, the domestication of the region's flora and fauna signified the transition between the "last hunter and first farmer" (Price et al. 1995). The mechanisms for transmission of domesticated products, within the mainland, are still an area of puzzlement (Harris 1996). This is also true when looking at the transmittal of domesticated seeds and animals to Cyprus. Several assumptions must be made; 1) sea-worthy vessels for successful voyages are necessary, 2) sealable and dry containers for the domesticated seeds to insure a safe passage is imperative, and 3) a prior knowledge of compatible environments in the new area would help in the selective process of fruitful propagation.

Tying in the above comments to the arrival of domesticated products, the economic and cultural assemblages of the "Neolithic package" apparently arrived on Cyprus quite late
Figure 2.4 Relative Chronological Comparison for Neolithic Jordan and Cyprus with 14C Dates (Note: bp dates indicate non-calibrated dates, while BC dates reflect calibrated/calendar years. There is approximately 1,000 to 1,500 year correction in dates when calibrated.)
and with full force. Debates whether or not the arrival of Neolithic mainland inhabitants came from Aegean, Anatolian, or Levantine areas still ask a final answer. The ephemeral nature of isolated camp sites (frontier sites-Kholetria-Ortos?) versus substantial stratified cultural deposits (Khirokitian Culture) is at the center of this debate. An elaboration of this point will be addressed in Chapter 6.

Hampering a fuller understanding of the Neolithic occupation of Cyprus are the unfortunate political events resulting from the Turkish invasion of 1974. This has effectively closed the northern portion of the island to most archaeological research. In doing so, the moratorium limits the inferential value of the archaeological data that is currently being unearthed on the island because of the inability to develop effectively a macro-regional account of the entire island's prehistory.
CHAPTER 3
ENVIRONMENTAL DATA

3.1 Why Emphasize the Environment?

When considering environmental and climatic commonalities at Wadi Shu‘eib and Kholetria-Ortos, one can maintain that both sites were products of the early Holocene. Humans living during the early days of the Holocene (or geologic recent) experienced a general climatic amelioration with final retreat of the glaciers and onset of the current interglacial episode (Straus 1996). With global conditions returning to interglacial stability, environmental circumstances on the local level experienced periodic fluctuations. Successional changes of circum-Eastern Mediterranean paleovegetation, documented by sea and lake cores (Cheddadi et al. 1991; Roberts et al. 1993; Zohary et al. 1993), did not occur simultaneously across the region. Geographical factors, such as proximity to the Mediterranean Sea or inland elevation, played significant roles in determining the advancement or retreat of a particular plant species. A Mediterranean-type climate, usually isolated to latitude 30-35° on the western boundaries of continents, delivers a seasonal driven rainfall pattern and a mean annual temperature of 15±5°C (Roberts 1989). Depending on the season, topography, latitude, and nearness to the Mediterranean Sea, climatic conditions and precipitation amounts will vary.

This chapter presents environmental and climatic data relevant to both sites. By
looking at information collected on site and findings established from pan-regional work, the environment for the Neolithic inhabitants becomes the integrated backdrop to the socio-cultural developments taking place. For example, climatological evidence points to a scenario of less effective moisture resulting from an increase of summer monsoonal rains during LPPNB/PPNC habitation of Wadi Shu'ëib (Davis et al. 1990) and Mediterranean woodland advancement not only occurring throughout the mainland Levant but also reaching Cyprus by 9000 bp (Roberts et al. 1993).

3.2 The Geology, Climate, and Biota of Cyprus and Jordan: Past and Present

The Quaternary period was (and continues to be) the backdrop for the majority of human evolutionary adaptations, so it would stand to reason the geology, climate, and biota from this period must be adequately understood to comprehend residues and remains of past lifeways. One defining feature of the Quaternary is the vast glacial record of the Northern latitudes. Of course neither Cyprus nor Jordan were directly affected by glaciers, but global climatic conditions waxed and waned with the expanding and retreating ice masses. Climatic fluctuations in the mid-latitudes were recorded by natural recording devices such as tree rings, pollen, loess, and varves (Roberts et al. 1993; Straus et al. 1996). Other important evidence of continental glacial regimes comes from the dramatic drop in global sea levels and pluvial/inter-pluvial conditions in inland valleys and basins of the mid-latitudes. Locations in Jordan show periods of fresh water lake development followed by saline phases (Roberts et al. 1993), succeeded by episodes of dry lake beds and wadi downcutting. Cyprus also presents ample opportunities for the study of palaeogeography.
3.2.1 Cyprus

Palaeogeographic research conducted in the Mediterranean basin depicts the primary post-glacial sea rise occurring between 15,000-14,000 bp and 9000 bp (Gomez et al. 1992: 1). By examining the tectonic and eustatic controls on sea level, researchers have learned that a maximum lowering of 120 m occurred in the Mediterranean around 18,000 bp. By 5000 bp the sea level reached -6 m below the present day shoreline (Gomez et al. 1992: 3-4). The interglacial sea rise reaching approximately 10 meters below the present coastline of Cyprus presumably would not have affected the inhabitants of Kholetria-Ortos significantly.

Even at the point of greatest sea level regression during the Quaternary, a "land bridge" between Cyprus and the mainland Southwest Asia never existed. This infers that the early inhabitants of Cyprus must have possessed seafaring technology and could navigate a safe passage across the water gap (Held 1994). In Chapter 5, the topic of sailing the Mediterranean in Neolithic times will be discussed together with the evidence from Kholetria-Ortos.

Geological research of Cyprus indicates that the island was the result of sea floor separation and plate tectonics. As Africa underthrust the Eurasian land mass during the late Oligocene or early Miocene, the southern mountain-range located on a mid-Tehtyan oceanic ridge was exposed subaerially (Stanley Price 1979). An identifiable feature of Cyprus is chalky Miocene limestone deposits that can be found throughout the island. The site of Ortos, a raised terrace covered by an alluvial soil on an igneous and a calcareous interface (Burnet 1994), is situated atop one of the island's chalk/limestone marls. As Fox describes, "Oertos is steeply sloped and bounded on the northwest and southwest by a bend
in the *Xero Potamus* River. The hilltop provides a commanding view down the valley towards the Mediterranean Sea"(1988: 29).

The most prominent mountain complex exposed during the geologic past on Cyprus is called the Troodos Range. Located in the southern half of the island, the Troodos are at their highest point approximately 2,000 masl (meters above sea level). Described by Fisher, the Troodos "... has been shattered by great upwellings of magma in the core of the folds, so that the central part of the arc now consists of an enormous boss of plutonic material surrounded by broken fold structures"(Fisher 1978: 449). The formation of major water drainages on the southern facing slopes of the Troodos provided run-off to the coast. One such river *kelada* (valley) is the *Xero potamus* (Figure 3.1).

The *Xero potamus* has its origin high in the Troodos Range at an elevation above 1,300 masl. By carving it's way through Jurassic and Triassic deposits near the river's source, Miocene deposits near the site of Ortos, and finally Pliocene deposits along the coast, the river provided a precious natural resource, fresh water. Bonuses from the river, besides a seasonal water supply, are fluvial transports of raw material that come from geologic deposits upstream. Igneous cobbles, vesicular andesitic basalt, and chert cobbles were and are still found in the river bed.

*Ortos'* elevation is approximately 135-152 masl and the site is 2.4 ha in size. Coupled with *Ortos'* strategic position ontop a limestone outcrop, the site's close proximity to the Mediterranean Sea and the *Xero potamus* river were the primary reasons for the attraction to this locality.

*Ortos* has been worked as a grape vineyard for approximately 30 years. Grapes
Figure 3.1 Location of the *Xero potamus* and Site Map of Kholetria-Ortos, Cyprus.
happen to be the largest yielding crops on the island; as they also decrease the probability of massive soil eroding events that transport fertile soil off slope.

Mediterranean lands typically have thin or erodible soils, steep slopes, a vegetation vulnerable to fire, and rainfall that can be intense and erosive. These natural factors made mediterranean ecosystems fragile under human impact. The replacement of forest by terraced vineyards and olive groves acted to conserve the soil, so long as this agricultural system was maintained land degradation was avoidable. (Roberts 1989:142)

Fisher (1978) describes three problems faced by present day farmers regarding the island's soil and growing seasons. First, the organic content is relatively low, and second, there is a higher frequency of heavy erosional episodes. Plus, the most crucial problem faced by farmers on the island is the lack of precipitation. An adequate amount of rainfall does occur during the winter months, but the amount of effective moisture is decreased due to overgrazing (of animals) and as a result, less vegetational cover. The island's topography and geographic location have made it susceptible to a large number of low pressure systems. This factor has been suggested for a longer growing season on the island, compared to similar ecozones on mainland Anatolia or Levant (Fisher 1978). Average rainfall for the western region of the island today is between 300-500 mm/year (Stanley Price 1979). As Fisher (1978) states, the percentage of water that does not percolate into the porous rock measures either evaporates quickly or becomes run-off swiftly. The results are areas of good soil becoming too saline. Precipitation during the winter months of December, January, and February must replenish the above and below ground aquifers, because rain during the remaining nine months is extremely rare.

If it is assumed that for the last 5,000 years global temperature has remained within the restricted deviation of the present climatic regime (Hartmann 1994), the probability of
intact paleosols at Ortos would be low. Knowledge of the amount and type of farming over the last 5,000 years and accurate paleoclimatic data from the region would be necessary before a complete paleoenvironmental picture could be illustrated. The aim of the geoarchaeological investigation during the 1993 field season proved the above hypothesis (a lack of intact paleosols) correct (Nials nd). Intact soils producing organic material and subsurface architecture in situ remained elusive.

Natural vegetation adjacent to Kholetria-Ortos exhibits several different plant species. Species identified by Burnet (1994) include trees—Crataegus sp., Pinus brutia (Pine), Cupressus sempervirons, and Quercus lusitanica; shrubbery—Quercus coccifera, Pistacia terebinthus (Pistachio), Crataegus azaroulus and Olea europea (Olive-wild and cultivated); ground cover—Amemone coronaria, Asparagus acutifolius, Asphodelus microcarpus, Capparis spinosa, Papaver rhoeas, Sinapis arvensis and Thymus capitatus; and floodplain vegetation—Platanus orientalis, Alnus orientalia, and Nerium oleander. A dichotomy in the current vegetation distribution can be found by examining the depth and make-up of soil, with trees and larger plants preferring deep soil atop Moni formations.

During the occupation of Ortos, the brutia would have been limited to growing over pillow lava formations, the sempervirons would have only grown around limestone deposits, and lusitanica would be expected to be found growing in a wide distribution over the entire site (Simmons 1994a, 1994b, 1994c). Relics of an early Holocene vegetation community point to an open woodland environment with a rich vegetational coverage fed by active springs and populated by indigenous animals (Burnet 1994).

The sub-humid forest environment and its subsequent decline are topics for
considerable debate. Evergreen trees and shrubs during the later Holocene expanded in the circum-Eastern Mediterranean environment at the expense of the sub-humid forest. Scientists debate the agents of causation for the retreat of the sub-humid forest. Was it simply a reflection of minor shifts in the dominant climatic regime? Were humans responsible for the change in the ecosystem? Data support the contention that even though humans impacted the landscape, the expanses of evergreen communities in some Mediterranean ecosystems were just the result of shifts in the climate (Cheddadi et al. 1991; Roberts et al. 1993). In the case of Cyprus, where there is only one securely dated site before 9000 bp (Simmons 1991a) the forested environment reached its maximum extent before humans made a significant impact on the island.

An assumed forested environment surrounding aceramic Kholetria-Ortos would promote populations of small animals, such as hare and fowl. It would also allow for browsing by fallow deer. The trees would also provide for easily accessible natural res- sources that could be exploited by the inhabitants for fuel or building supplies. A cleared area within the forest would be opportunistic for farming, while the raised outcropping of Ortos fosters a defensible locality. Foraging excursions down to the river bed or to the coastal littoral for marine/fresh water resources would not have taken significant amounts of energy, because of the close proximity of both the river and sea.

An aspect that needs to be further considered is the distance of aceramic settlements from the coast. A longer travel time for the inhabitants to obtain coastal resources would have an effect on site selection. This topic touches on the ongoing colonization debate of Cyprus. The choice of an inland site that had reasonable access to marine resources, fresh
water, indigenous animals, and arable land for agriculture would be the criteria needed for
the selection of a suitable location. Defensibility might have been yet another aspect for site
selection.

3.2.2 Jordan

Wadi Shu‘eib is positioned on the Jordanian Plateau surrounded by a steppe-
Woodland environment to use Henry's (1989) and Roberts' et al. (1993) descriptions of the
current physiographic, rainfall, and vegetation communities. Equal access west through the
Rift Valley (Dead Sea) and east into the steppe-desert ecozones was provided by this
locality. The current steppe-desert vegetation is treeless except along drainages and provides
only enough moisture to maintain dwarf shrubs, herbs, sedges, and annual grasses. A
steppe-forest transitional zone also exists made up of deciduous pine, oak, pistachio and
juniper, ranging between xeric woodland and steppe trees and shrubs (Roberts et al. 1993).

The steppe and arable desert during the Neolithic provided relief for overworked
agriculture fields that had become deficient in organic material. Proximity to this open-land
allowed for an accessible grazing terrain for the inhabitant's domesticated fauna. Early
animal husbandry (pastoralism) has been suggested (Rollefson et al. 1989; Köhler-Rollefson
1992; Rollefson 1996) as an adaptational response by the inhabitants of central Jordanian
"mega-sites" (e.g., 'Ain Ghazal and Wadi Shu‘eib) toward the end of the seventh millennia
BC.

Wadi Shu‘eib is located 20 km west of Amman and is approximately 1 km north of
the modern village of the same name (Figure 3.2). Situated approximately 370 masl, the site
is positioned on the north bank of the wadi and is dominated by Mediterranean Woodland vegetation. Steppe vegetation is also locally abundant in and around the wadi. Available plant resources include shrubby grey-leaved and aromatic sage (*Salvia graveolens*), pitch trefoil (*Psoralea bituminosa*), trichodesma (*Trichodesma boissieri*), Lebanese fritillary (*Fritillaria persica*), yellow crocus (*Stembergia clusiana*), cininthe (*Cerinthe palastina*), and Indian sage (*Salvia indica*) (rare) (Camerapix 1994). On average, Wadi Shu‘eib receives nearly 400 mm of precipitation (Beaumont 1985). Ethnographic data and estimates from agriculturalists show that a minimum of 220 mm of precipitation/year would be necessary for successful planting, sowing, and harvesting (Fisher 1978).

Geology of Jordan reflects the above mentioned plate tectonic forces as Africa and Eurasia collided and then separated (Bender 1968). Extension of the great Rift Valley from sub-Saharan Africa through the Red Sea and the Gulf of Aqaba, finally terminating north of the Dead Sea, constitutes evidence of tremendous geologic forces at work. Noted by Bender (1968), Wadi Shu‘eib, along with several other secondary order drainages, empties its water into the Rift Valley system. The above ground drainage of the Jordanian Plateau is through a network of wadis that empty (east to west) into the Dead Sea, the Jordan River, and Lake Tiberias.

It has been suggested that an emerging scenario of less effective moisture during the PPN occupation of Wadi Shu‘eib was associated with increased rainfall as a result of a higher frequency of summer monsoons (Davis et al. 1990). Summer monsoons promoted heavy isolated run-off, hence not being "effective," and coupled with farming techniques in an early stage of technological development exaggerated environmental deterioration. It may
Figure 3.2 Site Map of Wadi Shu'eib
not have been the intent of the Neolithic villager perpetuating top soil erosion by ways of unmanaged forest clearings, overgrazing of goats and sheep, and overused fields, but erosion nevertheless reflects humans' nature toward mismanagement of the environment.

Massive sorted cobble layers in the upper strata of late PPNB and PPNC sites (Wadi Shu‘eib, ‘Ain Ghazal, and Abu Thawwab) may be indications of this period of increased erosion (Davis et al. 1990; Simmons in press). Evidence of a similar period of increased erosion might be shown at PPNA Jericho and its flood diversion wall complex (Bar-Yosef 1986). Bar-Yosef hypothesized that the wall was built and equipped for sheet-washing and severe erosional conditions. This topic will be further investigated when the question of abandonment of PPN communities is addressed in the final chapter. Next, Chapters 4 and 5 will now present the archaeological data recovered from Wadi Shu‘eib and Kholetria-Ortos.
CHAPTER 4
WADI SHU'EB SITE REPORT

4.1 Introduction
In this section, data recovered from two seasons of excavation (1988 and 1989) at Wadi Shu'eib will be shown to support several relevant issues dealing with PPN and PN occupation (Kafafi et al. 1993; Rollefson 1987a; Simmons et al. 1989). Excavation results, chipped stone assemblage, ceramics, human burials, and architectural remains from Wadi Shu'eib will be partially detailed before leading into the discussion of site chronology.

4.2 Excavation Results
Excavation of Wadi Shu'eib was conducted in three areas labeled Area I (12 m²), Area II (10 m²), and Area III (1.5 m²) (see Figure 3.1). Excavation areas were selected by examining the roadcut exposure where in some areas cultural deposits approximately 4 m. in depth were visible. Laterally, the site was exposed approximately 800 m. in a SW-NE direction (Kafafi et al. 1993; Rollefson 1987a; Simmons et al. 1989). The archaeologists were especially interested in an artifact-bearing horizon described as a "... gray ashy sediment mixed with rubble, chipped stone artifacts, and architectural features, mainly in the form of plastered floors" (Kafafi et al. 1993:236). Below the cultural material lays a sterile reddish-brown clay, a remnant of the geologic past. Similarly, Zeuner mentioned the same
red soil mixed with gravel stratigraphically below an observed plastered floor in the exposed roadcut when he visited the site in the 1950s (1957).

Using a stratigraphic analytical tool, the Harris Matrix, Wadi Shu‘eib’s excavators carefully peeled back stratigraphic interfaces one after the other. Developed in the early 1970s by E. Harris, the matrix refers to the accumulation of sediments either from culturally produced residues or from geologic formational processes. The Harris Matrix theoretically allows for stratigraphic interfaces to be encountered and recorded during the excavation in a horizontal plan view. Assigning each interface a locus number, a relative chronology develops from the total sequence of accumulated loci.

Because a stratigraphic sequence is a type of calendar, an ‘image’ of time, it will always be an abstract, diagrammatic representation of the physical nature of stratification. A Harris Matrix diagram is to archaeological stratification what a normal calendar is the days and weeks of a year (Harris et al. 1993:18).

**Area I** - Five meters of cultural deposits were excavated in Area I that covered a horizontal area of 12 m². This locus was chosen for excavation because of the four plaster floors that were visible in the section. Also visible in the section were the remains of a human burial. During the 1988 season it was determined that PPNB, PPNC, and PN bearing horizons were situated in Area I. These relative chronological assessments were based solely on the recovered artifactual material because radiocarbon dates had yet to be processed.

It was the goal of the 1989 excavation to reach a sterile level or bedrock. Bedrock was found in Area I, thus assigning the earliest phase of Wadi Shu‘eib to the PPNB. Cultural deposits in Area I were primarily from the PPNB, while the one exception was a dugout pit, labeled locus 113, that originated in a PPNC horizon. A total of four phases and
Table 4.1 Cultural Horizons Identified in Area I (1989), Wadi Shu‘eib

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>PHASE</th>
<th>SUBPHASE</th>
<th>LOCI (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPNC</td>
<td>8</td>
<td>a-b</td>
<td>111, 112, 113</td>
</tr>
<tr>
<td>PPNB</td>
<td>3</td>
<td>b</td>
<td>058</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>h</td>
<td>059, 122, 064, 067, 124</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>g</td>
<td>069, 096, 132, 123</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>e</td>
<td>068, 083, 131</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>d</td>
<td>095</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>c</td>
<td>094, 126, 091</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>b</td>
<td>125, 130, 129, 128, 127</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>b</td>
<td>093, 090, 137, 136</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>a</td>
<td>085</td>
</tr>
<tr>
<td>PPNB</td>
<td>2</td>
<td>a</td>
<td>135, 134, 138, 139, 082</td>
</tr>
<tr>
<td>PPNB</td>
<td>1</td>
<td>a</td>
<td>140, 141</td>
</tr>
<tr>
<td>PPNB</td>
<td>1</td>
<td>b</td>
<td>081(=145), 143, 146</td>
</tr>
</tbody>
</table>

(*) Bold loci indicate plastered floors or replastering events

Thirteen subphases was excavated during the 1989 season (Table 4.1).

Excavation in Area I demonstrated a total of seven plastered floors in various states of preservation. In addition, evidence of floor replastering was noted during the excavation. Field notes attest to the similarity in plastering techniques for the seven floors as plaster was laid down over a prepared foundation that consisted of a layer of small cobbles (c. 5-10 cm) and larger flat stones (locus 131). Of special interest were the findings of red painted plastered floors. A complete discussion of the use of plaster at Wadi Shu‘eib will be addressed together with data from `Ain Ghazal at the conclusion of this chapter.
Area II - The selection of Area II for excavation was based on pottery sherds identified on the surface and in the upper horizons of the roadcut (Kafafi et al. 1993). This area was the primary focus of excavation. Along with pottery, stone walls were located in the exposed roadcut and once excavated revealed standing architecture, much of it over 1.5 m. in height, preserved with an example of a sealed doorway (Simmons 1991b). Approximately eight meters of cultural deposits were excavated in Area II. Area II provided evidence of continuous occupation spanning the PPNB, PPNC, and PN periods.

Area III - Area III, a small test pit on the northern end of the site, uncovered five meters of deposition. Artifacts found here also suggest an occupational bridge between the PPN and PN.

4.3 Cultural Package Identified at Wadi Sh‘eib

4.3.1 Chipped Stone

A major component of both Wadi Shu‘eib and Kholetria-Ortoj are their chipped stone assemblages. A raw count of Wadi Shu‘eib’s chipped stone is presented in Table 4.2. A total of 47,130 pieces of chipped stone was recovered from the site during the two seasons of data recovery. The categories of chipped stone recovered are as follows blades, bladelets, flakes, core trimming elements, burin spalls, microflakes, debris, cores and other tools. PPNB chipped stone deposits were distinguished from PPNC deposits by stratigraphic superposition and/or a change in the blade:flake ratios (Rollefson 1990a). Approximately 7% of the assemblage consists of identified tools (e.g., projectile points, notches, denticu-
Table 4.2 Raw Count and Percentage of the Chipped Stone from Wadi Shu‘eib

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PN</th>
<th>PPNC</th>
<th>PPNB</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Blades</td>
<td>1358</td>
<td>21.8</td>
<td>5,829</td>
<td>18.5</td>
</tr>
<tr>
<td>Bladelets</td>
<td>307</td>
<td>4.9</td>
<td>1,578</td>
<td>5.0</td>
</tr>
<tr>
<td>flakes</td>
<td>2,508</td>
<td>40.3</td>
<td>9,835</td>
<td>31.3</td>
</tr>
<tr>
<td>Core Trimming</td>
<td>111</td>
<td>1.8</td>
<td>557</td>
<td>1.8</td>
</tr>
<tr>
<td>Burin Spalls</td>
<td>53</td>
<td>0.8</td>
<td>311</td>
<td>1.0</td>
</tr>
<tr>
<td>Microflakes</td>
<td>877</td>
<td>14.1</td>
<td>5,988</td>
<td>19.1</td>
</tr>
<tr>
<td>Debris</td>
<td>480</td>
<td>7.7</td>
<td>4,579</td>
<td>14.6</td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>0.3</td>
<td>52</td>
<td>0.2</td>
</tr>
<tr>
<td>Cores</td>
<td>98</td>
<td>1.6</td>
<td>233</td>
<td>0.7</td>
</tr>
<tr>
<td>Tools</td>
<td>409</td>
<td>6.6</td>
<td>2,466</td>
<td>7.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6,218</td>
<td>99.9</td>
<td>31,438</td>
<td>100.0</td>
</tr>
</tbody>
</table>

lates, retouched flakes and blades, and scrapers (Table 4.3; Figure 4.1).

The assemblage from Wadi Shu‘eib is dominated by a large sample from the PPNC horizon. It makes up 67% of the entire chipped stone assemblage. The nearby site of ‘Ain Ghazal comes close to possessing such a large collection of chipped stone during the final Pre-Pottery Neolithic phase. A PPNB chipping floor or "dump" was identified in Area I and as Simmons (nd) points out, the few square meters from where the artifacts were recovered constitute approximately 72% (n=6,851) of all PPNB chipped stone recovered from Wadi Shu‘eib.
Table 4.3 Identified Tools from in situ Wadi Shu‘eib Samples

<table>
<thead>
<tr>
<th>TOOLS</th>
<th>PN</th>
<th>PPNC</th>
<th>LPPNB</th>
<th>MPPNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spear points</td>
<td>7</td>
<td>21</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Arrowheads</td>
<td>6</td>
<td>11</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sickles</td>
<td>2</td>
<td>52</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Burins</td>
<td>17</td>
<td>126</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td>Truncations</td>
<td>4</td>
<td>32</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Scrapers</td>
<td>12</td>
<td>82</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Denticulates</td>
<td>12</td>
<td>86</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Notches</td>
<td>12</td>
<td>133</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>Perf/awl/drills</td>
<td>5</td>
<td>83</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Bifaces</td>
<td>2</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Axe/adze/celts</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chisels</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wedges</td>
<td>3</td>
<td>18</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Knives</td>
<td>6</td>
<td>49</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Backed blades</td>
<td>4</td>
<td>26</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Tanged blades</td>
<td>-</td>
<td>11</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Retouched blades</td>
<td>7</td>
<td>92</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Utilized blades</td>
<td>9</td>
<td>97</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Retouched flakes</td>
<td>9</td>
<td>93</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Utilized flakes</td>
<td>4</td>
<td>71</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>3</td>
<td>39</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL/(n%) of total tool assemblage</strong></td>
<td><strong>125</strong></td>
<td><strong>1,139</strong></td>
<td><strong>174</strong></td>
<td><strong>27(6.5%)</strong></td>
</tr>
<tr>
<td>Combined tool counts (88-'89)</td>
<td><strong>409</strong></td>
<td><strong>2,466</strong></td>
<td>-</td>
<td><strong>413 (all PPNB)</strong></td>
</tr>
</tbody>
</table>
Figure 4.1 Assorted Projectile Points from Wadi Shu'eib
4.3.2 Ceramics

Pottery sherds dating to the Yarmoukian and Jericho phase of the Pottery Neolithic A (PNA) were found inside architectural remains in Area II. Similar artifacts have been recorded from `Ain Ghazal, Tell Wadi Feinan, Jebel Abu Thawwab, and `Ain Rahub (Garfinkel 1993; Kafafi 1993). Vessel forms included bowls and jars and were characterized with herring-bone incision motifs (Simmons nd). Along with Neolithic pottery, surface finds indicate later habitation of this locality by examples of Chalcolithic, Roman, and Byzantine ceramics.

4.3.3 Human Remains

Analysis of the burials from Wadi Shu’eib was completed by K. Roler in 1988 and 1989. She reported on a total of 12 burials with 21 individuals stemming from the excavation in Area I, II, and III. Partial remains of 12 more individuals (minimum) from portions of the roadcut and other areas excavated were also reported (see Simmons et al. 1989).

A multiple burial was uncovered in unit 1 of Area I during the excavation in 1989. Sealed underneath a plastered floor (locus 68), the burial (locus 83) contained a minimum of three individuals and associated grave goods. These items included twenty plastered beads, a poorly preserved plaster figurine, and two fragmented figurines (Roler 1988).

The burial collection at Wadi Shu’eib was determined to fit the general PPNB practice for the internment of the dead (i.e., primary, flexed, etc.) except for the secondary burials with associated grave goods identified in Area I. Both aspects are uncommon.
features in PPNB deposits (Kafafi et al. 1993; Simmons nd). No plastered skulls, like the specimens from 'Ain Ghazal and Jericho, were recovered from Wadi Shu'eib.

### 4.3.4 Architecture

A basic unit of the Neolithic farming village was the house. Domestic activities took place within and around the house daily, while outside activities in the surrounding village would take on complex social relationships maintaining the group's social ethos. Village life for farmers and herders of Wadi Shu'eib would have been linked by households, kinship, marriages, and common ownership (Voigt 1990).

Households of the Neolithic, accounting for intra-site and inter-site variability, are exhibited in the archaeological record in the form of architecture and related cultural material. An architectural tradition that has an origin in Southwest Asia during terminal Paleolithic Natufian occupation (Bar-Yosef et al. 1989, 1992, 1995; Dolukhanov 1994; Harris 1996; Henry 1989, 1995; Maisels 1990; Nissen 1988), consists of circular structures (PPNA) followed by the introduction of rectangular forms dominating the built environment by the PPNB. Constructed from locally available raw material, these structures were built with stone, brick, mud, plaster, dung, wood, and brush (Banning et al. 1987; Rollefson 1990b; Voigt 1990). The use of plaster in the construction of residential units can be found at all PPNB sites in the Levant. Rollefson states, "The ubiquity of plaster in PPNB villages throughout the Levant underscores the reliance placed on this material by the farmers and herders who enjoyed its benefits" (1990b:34). Rollefson identified several types of plaster manufactured in the Levant for the construction of buildings and other objects, such as
gypsum plaster, lime plaster, and huwwar. Differences for energy needed to produce the material and the local abundance of lime deposits affect the range of use (Rollefson 1990b; Ronen et al. 1991). Nearby, 'Ain Ghazal has evidence of plaster being used for floors, casing of interior walls, floor hearths, installations, and other building features. The painting of plaster with red pigment prompts speculation on interior decorative practices and motifs. Also very important was the use of plaster for non-architectural purposes. Plaster recovered in the form of ritual objects, vessels, ornamentation, and tokens illustrate a good working knowledge of the material by regional inhabitants. Figuratively and literally, inhabitants were providing a sound foundation for the emerging Neolithic village economy.

Examples of Early Neolithic architecture are seen in the deposits found at Wadi Shu‘eib (Figure 4.2). Prehistoric Wadi Shu‘eib preserves architectural remains that have become synonymous with this period. In Area II, walls were built of two rows of medium to big dressed stones, and unhewn stones, adjoined at right angles, and formed rectangular structures. Floors inside buildings of Area II were made from white plaster (locus 59) laid ontop of a leveling pebble foundation. Mud plaster (or huwwar) was also used as an indoor living surface. Small stones and light brown mud were placed between the bigger stones in order to stabilize the wall structure (Kareem 1989). The practice of painting plastered floors was identified in Area II. Painted in dark red without design, the two painted floors (loci 129-131) either represent two occupational phases or indicate a period of renovation. This was determined because of a sterile layer of brownish soil located between the two painted floors (Kareem 1989). Hearths were excavated within the structures indicating
Figure 4.2 Example of PPNB Architecture at Wadi Shu'eb. (Illustrated by M. Dahash)
domestic duties were taking place within the buildings. In some cases, storage rooms were inferred to be adjacent to the central hearth rooms.

4.3.5 Economic Animal and Plant Remains

The faunal assemblage from Wadi Shu‘eib consists of approximately 1,750 identifiable fragments of animal bones and teeth. Distribution of the material from across the three areas of excavation are as follows; Area I (51.5%), Area II (44.8%), and Area III (3.72%) (Baldwin et al. 1992). Chronological association found 6.3% derived from mixed deposits, 16% came from the PN, 63% from the PPNC, less than 14% from the Late PPNB, and less than 1% came from Middle PPNB (Baldwin et al. 1992).

Taxonomically, ovicaprids (domestic/wild goats and possibly sheep) were found with the most frequency. Wild boar or domestic pig (*Sus scrofa*) is the next most common species in the deposits of Wadi Shu‘eib. Gazelles (*Gazelle sp.*) and cattle (*Bos primigenius*) were also found in significant quantities. Species that were found but in numerically insignificant amounts include equid, fox, wolf or dog, wild cat, squirrel, rat, unidentified bird, tortoise, and the sweetwater crab (Baldwin et al. 1992). It appears the primary concentration on five ungulate species (i.e., goat, sheep, pig, gazelle, and cattle) conforms with other contemporary Neolithic sites in the area. The identification of domesticated forms is problematic, because the larger size of many of the ovicaprine remains indicate a wild rather than a domestic state (Baldwin et al. 1992).

An array of bone tools were recovered from the two seasons of excavation. Manufactured from animal bones, the inhabitants of Wadi Shu‘eib were making bone awls,
spatulas, perforators, and polished bone implements.

In regard to the economic plants used during the Neolithic occupation of Wadi Shu‘eib, no identifiable plants were recovered during the floatation process (Neef 1995).

4.4 Chronology

A total of ten radiocarbon dates (Table 4.4) has been obtained from Wadi Shu‘eib. The C-13 adjusted dates cluster from 8240±250 to 5690±210 BC, with the suggestion of occupation being between 7500 to 5500 BC (Rollefson et al. 1991; Simmons nd). Calibrated determinations from Wadi Shu‘eib, processed using Calib (rev. 3.0.3) computer program, depict an older occupation for the site. The new calibrated dates bracket the age of the site at 9990±250 to 6450±210 BC, some 1,500 to 1,000 years older than previously thought. Data from dendrochronological calibration of 14C dates and uranium series dating techniques on marine samples suggest "... that at circa 10,000 radiocarbon years, real ages are about 1,500 years older" (Straus 1996:6). A problem might exist with the high standard deviation of the collected dates. This error factor, along with the above mentioned 1,500 to 1,000 year correction, might offset the calibration program and produce older dates.

It is safe to assume that the accepted chronology of the Levantine Neolithic is not as skewed as one is led to believe by the calibrated data set. The question remains, whether enough radiocarbon dates have been calibrated panregionally to dismiss the calibrated PPNA dates from Wadi Shu‘eib. In all likelihood, if a collection of PPNA dates were to be calibrated, they would also become older.
**Table 4.4 Chronological Assessment of Neolithic Wadi Shu’eib**

<table>
<thead>
<tr>
<th>SAMPLE NO.¹</th>
<th>DATES C-13 ADJUSTED (BC)</th>
<th>CALIBRATED C-14 DATES (BC)²</th>
<th>LOCATION</th>
<th>STRATIGRAPHIC/ CULTURAL PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-35080 WS 1</td>
<td>8240±250</td>
<td>9990±250</td>
<td>Area I Locus 090</td>
<td>Late PPNB?</td>
</tr>
<tr>
<td>Beta-35081 WS 2</td>
<td>6620±100</td>
<td>7550±100</td>
<td>Area I Locus 145</td>
<td>PPNB</td>
</tr>
<tr>
<td>Beta-35082 WS 3</td>
<td>6700±210</td>
<td>7590±210</td>
<td>Area I Locus 081</td>
<td>PPNB</td>
</tr>
<tr>
<td>Beta-35083 WS 5&amp;8</td>
<td>6780±280</td>
<td>7860 or 7820 or 7710±280</td>
<td>Area II Locus 073</td>
<td>PPNC?</td>
</tr>
<tr>
<td>Beta-35084 WS 6</td>
<td>5690±210</td>
<td>6450±210</td>
<td>Area II Locus 086</td>
<td>Late PPNB</td>
</tr>
<tr>
<td>Beta-35085 WS 7</td>
<td>6160±280</td>
<td>7040±280</td>
<td>Area II Locus 103</td>
<td>PPNC</td>
</tr>
<tr>
<td>Beta-35086 WS 9</td>
<td>6540±160</td>
<td>7500±160</td>
<td>Area II Locus 146</td>
<td>Late PPNB</td>
</tr>
<tr>
<td>Beta-35087 WS 10&amp;12</td>
<td>7120±140</td>
<td>8070±140</td>
<td>Area II Locus 132</td>
<td>Late PPNB?</td>
</tr>
<tr>
<td>Beta-35088 WS 11</td>
<td>5820±340</td>
<td>6550±340</td>
<td>Area II Locus 116</td>
<td>Late PPNB</td>
</tr>
<tr>
<td>Beta-35089 WS 13&amp;14</td>
<td>7180±190</td>
<td>8090±190</td>
<td>Area III Locus 048</td>
<td>Middle PPNB</td>
</tr>
</tbody>
</table>

¹ - All samples were charcoal.
² - C-14 calibration, CALIB (rev. 3.0.3); Stuiver and Reimer 1993
? - Question mark denotes possible problem with C13 adjusted date
CHAPTER 5
KHOLETRIA-ORTOS SITE REPORT

5.1 Introduction

Kholetria-Ortos (Figure 5.1) presents itself as a perplexing aceramic Neolithic site. Artifactual evidence on the surface indicated a substantial settlement comparable to Khirokitia-Vounoi (Dikaios 1953; LeBrun 1984, 1989) and Kalavasos-Tenta (Todd 1978, 1987), "type-sites" for the Khirokitia Cultural phase (KCU). It became apparent after a portion of the site was excavated that indeed Ortos was a prominent KCU settlement, but a settlement without preserved architecture. Both Khirokitia-Vounoi and Kalavasos-Tenta exhibit circular dwellings (3 to 6 m. in diameter) constructed of stone, mud bricks, and pisé of remarkable conformity (Dikaios 1953; Dolukhanov 1994; Karageorghis 1982; Knapp et al. 1994; Kostof 1995:49; Le Brun 1984, 1989; Stanley Price 1977; Todd 1978, 1987) (Figure 5.2). It was this aspect of cultural uniformity found in the built environment (Held 1990:4) of the Eteocyprains (Karageorghis 1982:11; Pantel 1995:8) that confirmed an island wide cultural phenomenon. So, what happened to the architecture at Ortos? Was there ever any architecture? Is the lack of durability of the architecture indicative of the settlement type? Or are cultural and natural disturbances in a post-occupation setting the reason for the non-preserved architecture? Evidence suggests that there was once architecture at Ortos (e.g., mud brick and pisé fragments), but speculation on the cause of its demise or disappearance does not satisfactorily answer the question. First, before I address Ortos in
specifics, it is necessary to give a brief overview of the KCU material culture package.

Over twenty sites and a dozen "findspots" document KCU occupation on the island (Cherry 1990:155; Held 1992; Knapp et al. 1994), but with only four sites systematically excavated the need for more data were ever present. The four sites excavated include the above mentioned Khirikitia-Vounoi and Kalavasos-Tenta, Cape Andreas-Kastros (LeBrun 1981), and Petra-tou Liminiti (Gjerstad et al. 1934:1-13). Aside from the above mentioned architecture, other items of cultural continuity exist between the definitive KCU sites. But questions of settlement distribution (inter/intrasite variability) and aspects of the material culture uniformities were left unanswered because the lack of data from a major settlement in the west (Held 1990; Knapp et al. 1994). The addition of Ortos to sites systematically excavated finally extends the aceramic artifactual database to include information from the western region of the island.

Chronological dates were provided earlier in Chapter 2 placing KCU developments in context with events taking place on the mainland Levant. KCU occupation of Cyprus lasted for approximately two thousand years (7000-5000 BC) (see Figure 2.4), while coinciding developments in the Levant witnessed the ascension and decline of many PPNB sites west and south of the Jordan River (Kuijt 1995). At sites east of the Jordan River (i.e., Wadi Shu‘eib and ‘Ain Ghazal) an in situ cultural transition (PPNC) was identified bridging the aceramic and ceramic levels (Simmons et al. 1988).

Paleoeconomic data demonstrate a reliance by the island's aceramic inhabitants on introduced animal species. The practice of hunting Persian fallow deer (*Dama Mesopotamica*) was supplemented by the herding of ovicaprines and pig.
Figure 5.2 (a, b) Views of Circular Architecture from Khirokitia-Vounoi

a. View of Circular buildings at Khirokitia-Vounoi

b. Circular "tholoi" building at Khirokitia-Vounoi

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Cattle are primarily absent from known aceramic sites, with one recent exception (Guilaine et al. 1993), but by Bronze Age occupation of the island, pig and deer were replaced by domesticated cattle (Knapp et al. 1994). Paleobotanical evidence shows aceramic inhabitants were complementing their practice of animal husbandry by growing einkorn and emmer wheat, barley, lentil, and pea (Hansen 1991). In addition, the practice of foraging for wild fruits and plants provided subsistence beyond domesticated species.

Variability in settlement types and artifacts of the KCU period has been attributed to function rather than temporal (Cherry 1990). In regard to settlement type, island core/periphery relations between proto-urban villages (i.e., Khirokitia-Vounoi or Kalavasos-Tenta) and smaller ephemeral frontier sites might be indicative of the redistribution of aceramic populations. The appearance of an untempered gray ware ceramic in the deposits at Khirokitia (Dikaios 1953) possibly illustrates post-colonization connection between Cyprus and the mainland Levant when looking at KCU material culture (Held 1990). Similar "white ware" vessels are known from Late PPNB and PN sites in Syria and Jordan (Contenson 1977; Kafafi 1993). Chipped stone technology recognized at KCU sites shows raw material uniformity (e.g., chert) and a "lack of distinctive typological features" (Held 1990:17). The addition of the chipped stone assemblage from Kholetria-Ortos allows for 1) a discussion on the ubiquity of chert as the primary raw material choice and 2) a comparison of techno-typological characteristics found in the island's Neolithic chipped stone assemblage.
5.2 Ortos' Cultural Package

5.2.1 Chipped Stone

A significant component of the cultural assemblage recovered at Ortos is the chipped stone artifacts. The chipped stone assemblage from Ortos exceeds 60,000 pieces and represents one of the largest assemblages on the island (Table 5.1). Recovered homogeneously throughout the deposits of Ortos, the chipped stone concentration was dense. An explanation for many of the secondarily and tertiary broken chipped stone (e.g., debitage and shatter) may come from the years of crop plowing and cultivation.

Typologically, the tool assemblage from Ortos is consistent with other aceramic Neolithic sites, although the range represented suggests a broader variety than previously reported (Fox 1987, 1988; Le Brun 1989; Stanley Price 1977). The distribution of raw material overwhelmingly shows a reliance on chert as the primary stone for chipping (Table 5.2). Several grades of chert stone were identified ranging from coarse grained to fine grained with or without inclusions. Besides chert, chalcedony and igneous stone were used with the next highest frequency. No obsidian flakes were recovered during the excavation. The practice of pre-treating raw material by heating in fire was not significantly recorded.

Beyond retouched pieces, the most common class of tool is a variety of distinctive sickle blades (n=208; Table 5.3). Similar tools are reported from both Khirokitia (Le Brun 1984) and Cape Andreas-Kastros (Le Brun 1981), but their abundance at Ortos is striking. Of the 208 sickle tools identified, 134 (64.4%) exhibit gloss or sheen. Research into the formation of sickle gloss indicate that the gloss is the byproduct of the sickle tool coming into contact with plants during harvesting. As humans used these tools repeatedly to harvest
### Table 5.1 Chipped Stone Artifacts from Kholetria-Ortos, 1992-1994 Seasons (Note: "R%" deletes "Debris" category)

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1993</th>
<th>1994</th>
<th>N</th>
<th>%</th>
<th>R%</th>
</tr>
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<tr>
<td><strong>Tools</strong></td>
<td>46</td>
<td>666</td>
<td>538</td>
<td>1,250</td>
<td>2.0</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Debitage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cortical flakes</td>
<td>23</td>
<td>345</td>
<td>492</td>
<td>860</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>secondary flakes</td>
<td>103</td>
<td>2,099</td>
<td>2,614</td>
<td>4,816</td>
<td>7.4</td>
<td>12.5</td>
</tr>
<tr>
<td>tertiary flakes</td>
<td>374</td>
<td>8,540</td>
<td>8,877</td>
<td>17,791</td>
<td>27.4</td>
<td>46.1</td>
</tr>
<tr>
<td>cortical blades</td>
<td>2</td>
<td>54</td>
<td>51</td>
<td>107</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>secondary blades</td>
<td>32</td>
<td>510</td>
<td>497</td>
<td>1,039</td>
<td>1.6</td>
<td>2.7</td>
</tr>
<tr>
<td>tertiary blades</td>
<td>139</td>
<td>952</td>
<td>760</td>
<td>1,851</td>
<td>2.9</td>
<td>4.9</td>
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<tr>
<td>bladelets</td>
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<td>355</td>
<td>689</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>core trimming</td>
<td>-</td>
<td>20</td>
<td>15</td>
<td>35</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>core tablets</td>
<td>1</td>
<td>19</td>
<td>7</td>
<td>27</td>
<td>0.04</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>burin spalls</td>
<td>-</td>
<td>14</td>
<td>30</td>
<td>44</td>
<td>0.06</td>
<td>0.1</td>
</tr>
<tr>
<td>microflakes</td>
<td>194</td>
<td>2,199</td>
<td>5,934</td>
<td>8,327</td>
<td>12.8</td>
<td>22.0</td>
</tr>
<tr>
<td>debris</td>
<td>1,728</td>
<td>15,743</td>
<td>8,804</td>
<td>26,275</td>
<td>40.5</td>
<td>-</td>
</tr>
<tr>
<td><strong>Cores</strong></td>
<td>55</td>
<td>769</td>
<td>932</td>
<td>1,756</td>
<td>2.7</td>
<td>4.6</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td></td>
<td></td>
<td>64,867</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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Table 5.2 Raw Material Distribution of Complete Flakes and Blades from Kholetria-Ortos.

<table>
<thead>
<tr>
<th></th>
<th>Cortical Flakes</th>
<th>Secondary Flakes</th>
<th>Tertiary Flakes</th>
<th>Cortical Blades</th>
<th>Secondary Blades</th>
<th>Tertiary Blades</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2*</td>
<td>25</td>
<td>57</td>
<td>48</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>143</td>
</tr>
<tr>
<td>3*</td>
<td>4</td>
<td>29</td>
<td>82</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>126</td>
</tr>
<tr>
<td>4*</td>
<td>60</td>
<td>254</td>
<td>453</td>
<td>7</td>
<td>54</td>
<td>67</td>
<td>895</td>
</tr>
<tr>
<td>5*</td>
<td>149</td>
<td>1,185</td>
<td>2,951</td>
<td>32</td>
<td>220</td>
<td>337</td>
<td>4,874</td>
</tr>
<tr>
<td>6*</td>
<td>14</td>
<td>119</td>
<td>285</td>
<td>5</td>
<td>29</td>
<td>54</td>
<td>506</td>
</tr>
<tr>
<td>7*</td>
<td>80</td>
<td>564</td>
<td>1,504</td>
<td>6</td>
<td>83</td>
<td>113</td>
<td>2,350</td>
</tr>
<tr>
<td>10*</td>
<td>13</td>
<td>17</td>
<td>25</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>2,225</td>
<td>5,348</td>
<td>55</td>
<td>395</td>
<td>586</td>
<td>8,954</td>
</tr>
</tbody>
</table>

(1*-Obsidian; 2*-Igneous; 3*-Chalcedony; 4*-Coarse Grained Chert; 5*-Fine Grained Chert; 6*-Fine Grained Chert with Inclusions; 7*-Fine Grained Chert, dark; 10*-Other)
their grain or legumes, microscopic amounts of resin build-up on the sharp edge. Other notable tool types include scrapers, burins, truncations, bifaces, retouched blades and flakes, and large crescents (Table 5.4).

Cores are abundant at Ortos, with more than 1,750 in the collection (Table 5.5). Of these, 594 (33.8%) are fragmentary. Even with the fragments subtracted, the remaining cores are of considerable variety. The abundance of exhausted cores indicates that efficient reduction was practiced on site. A small number of material test, or rejected cores (n=46) were recovered indicating that raw material was transported to the site, presumably from the Xero potamus, for subsequent reduction. A distribution of the raw material selected for core reduction reiterates the above mentioned point of reliance on chert as the primary material (Table 5.6).

An intriguing aspect of the collection is the presence of a rare core type of an unique morphology previously reported only from the Akrotiri Peninsula, Sites 2 and 3 (Simmons 1991b). These exhausted, Akrotiri type cores (12.7%; n=148) are tiny artifacts that resemble small marbles. A closer inspection of the batch of Akrotiri type cores from Ortos indicates a sizable difference in the mean size of the cores and the standard deviation compared to the limited data recovered from excavation on the Akrotiri Peninsula (Table 5.7). The association of cores from Ortos with the possible proto-Neolithic(?) examples from the Akrotiri Peninsula is not fully understood.

Only two obsidian artifacts were recovered from Kholetria-Ortos. In relation to the total chipped stone assemblage, they fit the general pattern of exotic imports onto the island - that is, obsidian is rare. The two pieces analyzed by Robert Tykot (1996) determined that
Table 5.3 Sickle Assemblage from Kholetria-Ortos

<table>
<thead>
<tr>
<th>Tool Class</th>
<th>Sickles w/ Gloss</th>
<th>% of total Sickle Assemblage (N=208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backed Sickle, Stage 3, Variant 1</td>
<td>45</td>
<td>21.6</td>
</tr>
<tr>
<td>Sickle, sheen</td>
<td>18</td>
<td>8.7</td>
</tr>
<tr>
<td>Sickle, sheen and serrated</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Backed Sickle, Stage 1 (unfinished)</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Backed Sickle, Stage 4 (exhausted)</td>
<td>16</td>
<td>7.7</td>
</tr>
<tr>
<td>Retouched Sickle</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>Backed Sickle, Stage 2, Variant 2</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Backed Sickle w/ Truncated End, Variant 3</td>
<td>20</td>
<td>9.6</td>
</tr>
<tr>
<td>Large Crescent</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Sickle Gloss, Straight Backed w/ Single Truncation (Trapeze)</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>Backed Sickle</td>
<td>17</td>
<td>8.1</td>
</tr>
<tr>
<td>Sickle Gloss, Double Truncation (one oblique, one straight)</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>64.4</td>
</tr>
</tbody>
</table>
Table 5.4 Distribution of Tools from Kholetria-Ortos, 1992-1994

<table>
<thead>
<tr>
<th>TOOL TYPE</th>
<th>NUMBER</th>
<th>CLASS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickles</td>
<td>(208)</td>
<td>16.6</td>
</tr>
<tr>
<td>&quot;Ortos&quot; Crescent</td>
<td>51</td>
<td>-</td>
</tr>
<tr>
<td>variants</td>
<td>69</td>
<td>-</td>
</tr>
<tr>
<td>backed, no sheen</td>
<td>41</td>
<td>-</td>
</tr>
<tr>
<td>sheen only</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td>exhausted</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>Scrappers</td>
<td>(93)</td>
<td>7.4</td>
</tr>
<tr>
<td>end</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>side</td>
<td>34</td>
<td>-</td>
</tr>
<tr>
<td>double side</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>end/side</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>thumbnail</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>&quot;Ortos&quot; scraper</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>keeled</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Burins</td>
<td>(33)</td>
<td>2.6</td>
</tr>
<tr>
<td>angle</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>plan</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>on truncation</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>semi-transverse</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>multiple</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>on end scraper</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>other</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Perforators</td>
<td>(6)</td>
<td>0.5</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denticulates</td>
<td>25</td>
<td>2.0</td>
</tr>
<tr>
<td>Notches</td>
<td>85</td>
<td>6.8</td>
</tr>
<tr>
<td>Bifaces</td>
<td>49</td>
<td>3.9</td>
</tr>
<tr>
<td>Unifaces</td>
<td>17</td>
<td>1.4</td>
</tr>
<tr>
<td>Retouched Blades</td>
<td>125</td>
<td>10.0</td>
</tr>
<tr>
<td>Retouched Flakes</td>
<td>179</td>
<td>14.3</td>
</tr>
<tr>
<td>Heavy Duty Tool</td>
<td>35</td>
<td>2.8</td>
</tr>
<tr>
<td>Retouched blades</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Retouched flakes</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chopper/axes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Massive pieces</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Heavy notches</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Heavy denticulates</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>&quot;Tangs&quot;</td>
<td>24</td>
<td>1.9</td>
</tr>
<tr>
<td>Single shoulder</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Double shoulder</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Backed Pieces</td>
<td>36</td>
<td>2.9</td>
</tr>
<tr>
<td>Microliths</td>
<td>14</td>
<td>1.1</td>
</tr>
<tr>
<td>Retouched bladelets</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Lunates</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bilaterally backed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Trapeze</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Wedges</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>Truncations</td>
<td>148</td>
<td>11.8</td>
</tr>
<tr>
<td>Partial</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Oblique</td>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>straight</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>others</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Large Crescents</td>
<td>(48)</td>
<td>3.8</td>
</tr>
<tr>
<td>Varia</td>
<td>(30)</td>
<td>2.4</td>
</tr>
<tr>
<td>backed scraper/tang</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>battered pieces</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>&quot;limace&quot;</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Tool Fragments</td>
<td>(90)</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,250</td>
<td>99.8%</td>
</tr>
</tbody>
</table>
Table 5.5 Core Typology and Raw Count from Kholetria-Ortos.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>%</th>
<th>R % (excludes fragments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bidirectional</td>
<td>19</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>90 degree</td>
<td>11</td>
<td>.6</td>
<td>.9</td>
</tr>
<tr>
<td>multidirectional</td>
<td>310</td>
<td>17.6</td>
<td>26.7</td>
</tr>
<tr>
<td>globular</td>
<td>215</td>
<td>12.2</td>
<td>18.5</td>
</tr>
<tr>
<td>single platform</td>
<td>60</td>
<td>3.4</td>
<td>5.2</td>
</tr>
<tr>
<td>sub-discoidal</td>
<td>224</td>
<td>12.7</td>
<td>19.3</td>
</tr>
<tr>
<td>sub-pyramidal</td>
<td>14</td>
<td>.8</td>
<td>1.2</td>
</tr>
<tr>
<td>tabular</td>
<td>9</td>
<td>.5</td>
<td>.8</td>
</tr>
<tr>
<td>blade, single platform</td>
<td>27</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>bladelet</td>
<td>18</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>core on flake</td>
<td>41</td>
<td>2.3</td>
<td>3.5</td>
</tr>
<tr>
<td>opposed platform</td>
<td>5</td>
<td>.3</td>
<td>.4</td>
</tr>
<tr>
<td>Akrotiri type</td>
<td>148</td>
<td>8.4</td>
<td>12.7</td>
</tr>
<tr>
<td>spheroidal</td>
<td>13</td>
<td>.7</td>
<td>1.1</td>
</tr>
<tr>
<td>material test</td>
<td>46</td>
<td>2.6</td>
<td>4.0</td>
</tr>
<tr>
<td>indeterminant</td>
<td>2</td>
<td>.1</td>
<td>.2</td>
</tr>
<tr>
<td>fragments</td>
<td>594</td>
<td>33.8</td>
<td>--</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1756</td>
<td>100.0</td>
<td>99.7</td>
</tr>
</tbody>
</table>
the obsidian came from central Anatolia (Göllüdağ [Çiftlik]). Through visual and chemical analysis Tykot could substantiate the Cypriot/Anatolian connection for the distribution of obsidian.

With only approximately 100 pieces of obsidian chipped stone in the entire aceramic Neolithic inventory (Knapp et al. 1994:406) an argument can be made for the early settlers having only a rudimentary trading relationship with Anatolia. A hypothesis for the origin of the obsidian on aceramic Cyprus suggests that the limited collection of obsidian was introduced during a single colonization event (Karageorghis 1982; Ronen 1995). Todd (1978) felt the assemblage of obsidian blades and lack of debitage (e.g., pressure flakes, tertiary flakes or shatter) from Kalavasos-Tenta indicated the obsidian was imported in finished form rather than being manufactured on the island. It is possible that the arrival of obsidian, quarried and already worked in Anatolia, was introduced to Cyprus during the initial phase of aceramic Neolithic occupation. The appearance of obsidian in the deposits at Ortos, as well as other aceramic Neolithic sites on the island, acknowledges an awareness by the inhabitants of the raw material distribution network that emanated from central Anatolia. But as Karageorghis states,

The occurrence in small quantities of obsidian blades from Çiftlik in central Anatolia... would suggest that these early settlers brought with them these uncommon raw materials which gradually became more rare and finally disappeared (1982:25).

5.2.2 Ground Stone

Ground stone unearthed from Ortos mirrors the assemblages from other KCU sites on the island. A variety of vessels and bowl fragments made from igneous rock and lime-
Table 5.6 Distribution of the Raw Material Used for Cores at Kholetria-Ortos.

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1993</th>
<th>1994</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2*</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>3*</td>
<td>4</td>
<td>29</td>
<td>28</td>
<td>61</td>
</tr>
<tr>
<td>4*</td>
<td>6</td>
<td>82</td>
<td>116</td>
<td>204</td>
</tr>
<tr>
<td>5*</td>
<td>23</td>
<td>374</td>
<td>541</td>
<td>938</td>
</tr>
<tr>
<td>6*</td>
<td>3</td>
<td>79</td>
<td>77</td>
<td>159</td>
</tr>
<tr>
<td>7*</td>
<td>15</td>
<td>193</td>
<td>166</td>
<td>371</td>
</tr>
<tr>
<td>10*</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>769±3</td>
<td>934±2</td>
<td>1756</td>
</tr>
</tbody>
</table>

(1*- Obsidian; 2*-Igneous; 3*-Chalcedony; 4*-Coarse Grained Chert; 5*-Fine Grained Chert; 6*-Fine Grained Chert with Inclusions; 7*-Fine Grained Chert, dark; 10*-Other)
Table 5.7 Akrotiri Type Cores from Kholetria-Ortos.

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \bar{x} )</td>
<td>36.6* (22.5)*</td>
<td>29.5 (17.5)</td>
<td>21.1 (11.0)</td>
</tr>
<tr>
<td>( s )</td>
<td>5.8 (4.4)*</td>
<td>5.7 (2.9)</td>
<td>4.5 (2.0)</td>
</tr>
<tr>
<td>( s_1 )</td>
<td>30.8 - 42.4</td>
<td>23.8 - 35.2</td>
<td>16.6 - 25.6</td>
</tr>
<tr>
<td>( m_1 )</td>
<td>19.9</td>
<td>15.5</td>
<td>11.9</td>
</tr>
<tr>
<td>( m_2 )</td>
<td>50.7</td>
<td>41.2</td>
<td>31.6</td>
</tr>
<tr>
<td>( v )</td>
<td>34.1</td>
<td>32.0</td>
<td>20.1</td>
</tr>
</tbody>
</table>

* All values are in centimeters.
* Numbers in parentheses are data from Site 2, Akrotiri Peninsula (n=33).

where

\( \bar{x} \) is the mean of the length, width, and thickness;
\( s \) is the standard deviation;
\( s_1 \) is one standard deviation from the mean;
\( m_1 \) is the minimum measurement recorded;
\( m_2 \) is the maximum measurement recorded;
\( v \) is the variance (distance from the mean).
stone are augmented by pounding implements, axes, pecking stones, and incised cobbles. The unique assemblage of decorated and spouted vessels attests to excellent technical achievement with both hard and soft stone by the aceramic occupants. The villagers of the KCU phase on Cyprus may have been "aceramic," but they were definitely not without quality manufactured cooking and dry storage containers. Stone axes recovered during the initial surface collection of the site (Fox 1988) identified a range of axes made from igneous rock (e.g., diabase, gabbro, and basalt).

The collection of 25 incised cobbles (Figure 5.3) recorded at Kholetria-Ortos appends to more than two dozen grooved cobbles noted in the deposits at Khirokitia-Vounoi. Conspicuously, these cobbles are absent from the record at Kalavasos-Tenta (Todd 1978). Similar cobbles recovered from aceramic and ceramic Neolithic horizons in Greece (Makkay 1984), Jordan (Kafafi 1993), Syria (Contenson 1977), and Israel (Garfinkel 1993) just adds confusion to these obscure stone vestiges. Various designs (e.g., checker board, star burst, chevron, and parallel incisions) are often incised on just one side of the cobble. No conclusive evidence exists on how exactly the incisions were made but it is safe to assume that a sharp stone tool or worked bone might carry out the job. Some examples exhibit a domed or conical shape on the dorsal side. Fox (1987:23), citing data from microscopic wear analysis, suggests a function that would require rubbing the cobbles over soft plants, others suggest (Cooper et al. 1996) a function related to early examples of stamp seals. The demarcation (branding?) of domesticated or wild animals, suggesting some degree of ownership, comes to mind for the possible function in a pre-pottery context. Conversely, the incised cobbles could represent only a manipulation of surrounding cobbles during idle
Figure 5.3 Selection of Incised Cobbles from Kholetria-Ortos. (Illustrated by R. Corona)
time, whilst manufacturing stone bowls or working with chipped stone implements. This topic will be explored further in the final chapter.

5.2.3 Economic Animal and Plant Remains

A focus of the research at Kholetria-Ortos has been the reconstruction of the paleodiet. Paleodietary data, in the form of plant, shellfish, and animal remains, offers insight on possible food preference and abundance. An important aspect of that needs to be considered is preservation because a large part in the recovery of food remains in prehistory is due to differences in food preparation and food perishability. Moreover, identified plant and animal species found on site may be intrusive. It is possible species died on site from natural causes and became part of the archaeological record as part of the natural site transformational processes.

Zooarchaeological research and tabulation of the faunal remains recovered from Ortos depict a reliance on domesticated caprines as a major economic contributor (Croft 1996). Fallow deer, pig, and fox also occur. Remains of a robust cat (resembling a wild Felis lybica from western Asia) were also identified in the Ortos collection. Not "uncommon" in aceramic Neolithic assemblages on the island, cats according to Croft "may have been behaviourally domestic, living within human settlements and perhaps tame and approachable" (1996).

The animal remains from Ortos reflect analogous patterns with the reported faunal assemblages from Khirokitia and Kalavasos. The larger collection of animal bones from Khirokitia consists of deer, sheep, goat, pig, and to lesser degrees mouse, shrew, dog and cat
Marked differences in the proportional occurrences of certain species were to be expected due to Ortos' location in the western portion of the island, but the similarities identified attest to the uniformity found in the island's KCU preference and reliance on several imported animals.

The dietary contribution of particular species shows a decrease for hunted deer being replaced by a greater reliance on herded sheep and goat (Knapp et al. 1994). Simmons states, "the faunal remains from Cypriot aceramic Neolithic sites are interesting in that they contain not only domesticated species, but also fallow deer, which is not believed to have been an endemic species" (1994a:3). Therefore, a practice of animal importation (fallow deer from the Levant or Anatolia) by the early aceramic colonizers must be posited. Initially using them as protection against starvation, the inhabitants choice for fallow deer shows a preference toward a singular wild species and possibly a control against another wild/domesticated species, cattle (Ronen 1995). Similar findings of gazelle or fallow deer exploitation are noted on mainland Levantine Neolithic sites (Bar-Yosef et al. 1995), but these animals primarily were hunted during the terminal Paleolithic (or Epipaleolithic).

A staple of many Neolithic villagers' diet on the mainland, cattle were elevated to a position of ideological primacy at several sites throughout Anatolia and the Levant (Mellaart 1975; Rollefson 1993b). Ronen (1995) recently argues for a cultural food preference by the island's Neolithic colonizers against cattle. Ronen discredits possibilities that the inhabitants were unaware of cattle as a viable food source, as it was a staple of northern and southern Levant diet, and he provides information that showed cattle could live in the "impoverished" environment of Cyprus. Ronen's interpretations of cattles' religious significance as it appears
in Anatolia and central Levant and an apparent absence from Cyprus are intriguing.

Recovery of plant remains from Cyprus has increasingly become a more significant goal of archaeological research over the last thirty years. Information that comes from meticulously recovering and analyzing charred plant remains lends insight into the economic resources exploited by the island's inhabitants (Hansen 1991). Unfortunately, the process of preservation does not occur equally with all botanical material, due in part to the acidic nature of the soil on Cyprus and to the preparation of the food. Plants cooked with fire have a greater tendency to show up in the archaeological record compared to plants prepared raw. Zohary and Hopf (1993) list the paleobotanical assemblages from two prominent sites from the aceramic Neolithic, Khirokitia-Vounoi and Cape Andreas-Kastros. It is now possible to reconstruct the domesticated plants exploited from across the island by including data from Kalavasos-Tenta and Kholetria-Ortos (Table 5.8).

Economic plants utilized at Ortos include einkorn wheat, emmer wheat, barley, lentil, and peas, with lentil being the most prevailing. In situ domestication of the island's plant communities, at this point, has not been proven. Therefore, the assumption is made here that domesticated crops along with a harvesting technology were brought over from mainland Anatolia/Levantine farmers and herders. Not only were they farmers and herders, they were sailors. The ability to navigate the Mediterranean Sea during the Neolithic, although no evidence of maritime vessels from this period exist to date, reflects a new phase of human colonization. The use of containers for keeping domesticated seeds dry and the know-how to transport wild/domesticated livestock indicates a priori of the physical and/or cultural environments compatible with their own working knowledge.
Table 5.8 Paleobotanical Domesticated Remains from Aceramic Neolithic Cyprus

<table>
<thead>
<tr>
<th>sites: Kholetria-Ortos</th>
<th>Khirokitia-Vounoi</th>
<th>Cape Andreas-Kastros</th>
<th>Kalavasos-Tenta</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>einkorn wheat</em> (<em>T. monococcum</em> and <em>T. dicoccum</em>)</td>
<td>few</td>
<td>prevailing</td>
<td>frequent</td>
</tr>
<tr>
<td><em>emmer wheat</em> (<em>T. turgidum</em>)</td>
<td>rare</td>
<td>frequent</td>
<td>prevailing</td>
</tr>
<tr>
<td><em>barley</em> (<em>Hordeum sp.</em>)</td>
<td>frequent</td>
<td>frequent</td>
<td>few</td>
</tr>
<tr>
<td><em>lentil</em> (<em>Lens culinaris</em>)</td>
<td>prevailing</td>
<td>frequent</td>
<td>frequent</td>
</tr>
<tr>
<td><em>pea</em> (<em>Pisum sativum</em>)</td>
<td>rare</td>
<td>few</td>
<td>rare</td>
</tr>
</tbody>
</table>

*Note: The table shows the frequency of domesticated plant remains at different sites.*
Besides the plants and terrestrial animals used on by the island's inhabitants, fresh water and marine shell fish were also eaten. The collection of shells recovered (n=396), analyzed by Dr. David Reese (1995), documented *Astraea operculum* as the most common species utilized. Other fresh water and marine shells exploited include *Charonia sequenzae*, *Monodonta turbinata*, *Helix*, *Dentalium*, *Columbella*, and *Murex*. Reese believes that occurrence of *Murex* in the deposits at *Ortos* is the result of ornament production rather than food debris (1995). A complete listing of the shells recovered from *Ortos* is presented in Table 5.9.

5.2.4 Human Remains

The fragmentary collection of human remains from Kholertia-Ortos confirms the disturbed nature of the site. Intermixed with animal bones, a minimum number of four individuals have been identified. Sexing is indeterminate, while the individuals are believed to be two adults and two sub-adults (Fox 1993).

5.2.5 Figurines and Other Artifacts

Rounding out the rich artifactual collection are (2) clay human figurines recovered during the 1994 field season. Asexual, headless, and rotund, the two figurines represent early use and knowledge of clay firing (Figure 5.4). Other artifacts of note included a basalt cruciform object ("idol") (Fox 1988), a limestone statuette, the "*Ortos* head" (Karageorghis 1989:790 fig. 4a-b; Pearlman 1993), worked bone implements, and an assemblage of picrolite and shell ornaments. A total of (27) ornaments, (4) unworked pebbles, and (18)
Table 5.9 Economic Shells from Kholetria-Ortos (D. Reese 1995)

<table>
<thead>
<tr>
<th>SHELLS</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthocardia</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Astraea operculum</td>
<td>195</td>
<td>49.0</td>
</tr>
<tr>
<td>Astraea rugosa</td>
<td>6</td>
<td>2.0</td>
</tr>
<tr>
<td>Cerastoderma</td>
<td>5</td>
<td>1.3</td>
</tr>
<tr>
<td>Cerithium vulgatum</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Charonia sequenzae</td>
<td>38</td>
<td>9.6</td>
</tr>
<tr>
<td>Columbella</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td>Conus</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>Cowrie</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Dentalium</td>
<td>14</td>
<td>3.5</td>
</tr>
<tr>
<td>D. dentalis</td>
<td>7</td>
<td>1.8</td>
</tr>
<tr>
<td>Eripha (crab)</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>fossil ammonite</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>fossil bivalve</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>fossil oyster</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Gibbula</td>
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<td>1.8</td>
</tr>
<tr>
<td>Glycymeris</td>
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<td>.8</td>
</tr>
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<td>G. pilosa</td>
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</tr>
<tr>
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<td>8.6</td>
</tr>
<tr>
<td>Monodonta articulata</td>
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<td>.5</td>
</tr>
<tr>
<td>Pinna</td>
<td>3</td>
<td>.8</td>
</tr>
<tr>
<td>Spondylus</td>
<td>3</td>
<td>.8</td>
</tr>
<tr>
<td>Thais</td>
<td>5</td>
<td>1.3</td>
</tr>
<tr>
<td>Turritella</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>392</td>
<td>99.6</td>
</tr>
</tbody>
</table>
Figure 5.4  Asexual and Headless Clay Human Figures from Kholetria-Ortos. (Illustrated by M. Miller)
dentalia shells make up the assemblage of ornaments. Ceramics were recovered and identified as pottery dating from Iron Age and Roman era occupation of the island.

5.3 Site Chronology

Chronometric assessments taken from organic material recovered during the excavation and flotation process produced six datable samples (Table 5.10). The suite of dates, processed by conventional radiocarbon techniques and Accelerated Mass Spectrometer (AMS), produced a weighted average of 7330±30 BP, firmly placing the site in the KCU phase. The established chronology of prehistoric Cyprus (see Chapter 2) places the Khirokitia Cultural phase between 9000-7000 bp. Bone produced the youngest calibrated date of 5420 BC, whilst charcoal and charred material were dated and calibrated to 6385-5950 BC. An intriguing aspect of the chronometric dates generated from Ortos impacts the supposed occupational "gap" debate of Cyprus (Held 1990). During the sixth millennium BC (5800/5500-5000 BC) an occupational hiatus or abandonment by the island's inhabitants can be interpreted from the body of radiocarbon dates. It is now believed that the "gap" reflects an insufficient number of radiocarbon dates (Knapp et al. 1994), rather than an abandonment. Late seventh millennium BC and early sixth millennium BC occupation of Ortos does not fill the occupational "gap," even though one determination (Beta-56869) does fall within the hiatus; the need for more dates from stratified aceramic and ceramic sites remains.
Table 5.10 Calibration of Radiocarbon Dates from Kholetria-Ortos, Cyprus

<table>
<thead>
<tr>
<th>SAMPLE DATA</th>
<th>CONVENTIONAL RADIOCARBON AGE (bp) C13 CORRECTED</th>
<th>CALIBRATED RESULTS (95% PROBABILITY/2σ)</th>
<th>INTERCEPT OF C14 AGE WITH CALIBRATION CURVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kholetria-Ortos, Cyprus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta-56868 SFN 3 Charcoal AMS</td>
<td>7550 ±70</td>
<td>cal BC 6465-6205</td>
<td>cal BC 6385</td>
</tr>
<tr>
<td>Beta-56869 SFN 29 Bone</td>
<td>6480 ±230</td>
<td>cal BC 5735-4900</td>
<td>cal BC 5420</td>
</tr>
<tr>
<td>Beta-82074 SFN 90 AMS Charred material</td>
<td>7500 ±60</td>
<td>cal BC 6420-6190</td>
<td>cal BC 6365</td>
</tr>
<tr>
<td>Beta-82075 SFN 102 AMS Charred material</td>
<td>7080 ±60</td>
<td>cal BC 6010-5770</td>
<td>cal BC 5950</td>
</tr>
<tr>
<td>Beta-82076 SFN 121 AMS Charred material</td>
<td>7360 ±60</td>
<td>cal BC 6360-6315 6305-6280 6260-6020</td>
<td>cal BC 6175</td>
</tr>
<tr>
<td>Beta-86688 SFN 92 AMS (Oxford) Charred material</td>
<td>7280 ±60</td>
<td>cal BC 6195-5980</td>
<td>cal BC 6115</td>
</tr>
</tbody>
</table>

Reference: Calibration-1993 (computer program)
Stuiver, M. and P.J.Reimer, Radiocarbon 35(1)
5.4 Architecture

The observed material culture and subsistence strategy of inhabitants from *Ortos* reflects an aceramic KCU occupation in many respects, but the lack of architecture is perceived as a "problem" with this site. Mud brick fragments and *pisé* chunks removed during the excavation, along with a collection of unimpressive features, does not come close to the dramatic architecture at Khirokitia-Vounoi or Kalavasos-Tenta. *Ortos' lack of architecture may be the result of several natural or cultural transformations. Erosional forces atop the limestone marl may have been responsible for the removal of residential units or it is very likely that later people utilized the building material from *Ortos* as a convenient source for their own needs.

Circular tholoi type buildings on Cyprus during the Neolithic stand in contrast to the developed rectilinear form in during the PPNB Levant. In the final chapter, a discussion of Neolithic architectural form and its implications in the circum-Eastern Mediterranean region will conclude the commentary on the built environment.

5.5 Field Results

Three seasons of field excavation (1992, 1993, and 1994) yielded an array of artifacts firmly establishing *Kholetria-Ortos* as a regional aceramic site in the western province of the island. Excavation of nine test pits, c. 12 m², in 1992 allowed a team of archaeologists to identify several components of the cultural history and stratigraphic history of the site. Except intrusive Iron/Roman Age pottery sherds, the only signature found in the material record was one that reflected a KCU occupation. Stratigraphic evidence depicted at least 1m
of matrix above bedrock and a modern day plow zone extending for 30 cm below ground level (Simmons 1994a, 1994b, 1994c).

More time and money in 1993 permitted archaeologists a summer of locating intact subsurface sediments and (allowed them to continue) searching for the elusive architecture. Two areas identified by geomorphologist Dr. Fred Niais (nd) as potentially "less disturbed" resulted in the excavation of 18 m². The exposed units delineated a stratigraphic interface extending for 30 cm above the bedrock. Described as a "hard-packed clayey deposit rich in artifacts and faunal materials" (Simmons 1994a:4), the in situ layer provided circumstantial evidence in the form of mud brick and pisé fragments for the existence of architecture.

During the summer of 1994, excavation continued in a large unit located in Area 2 (Figure 5.5). The total area excavated is c. 60 m². Along with the quest for architecture, the focus of the field season was the recovery of paleobotanical data. Soil samples, 10%-50% of the represented matrix in a given level, were processed by a water flotation device. Retrieving paleobotanical evidence from its stratigraphic resting place is an involved and painstaking task. Researchers sift the chosen sediments through a series of size sorts, beginning by removing the large non-cultural ecofacts. Reducing the size of the sort eventually leaves several grams of precious matter for further analysis. After the material dries, the removal of tiny burnt seed remains, charred food stuff, and other carbonized materials will hopefully demonstrate naturally occurring paleovegetation in the area of Ortos and possible dietary choices made by the inhabitants.

The additional excavation in Area 2 during the summer of 1994 (28 m²) presented archaeologists further opportunities to find buried architectural features. Unfortunately,
Figure 5.5 (a, b) Views of the 1994 Excavation of Kholetria-Ortos

a. View of West Wall Profile of Units N54/56 E21.5

b. Excavation of Kholetria-Ortos by Graduate Students (top to bottom: M. Miller, B. Holz, and S. Rose)
none were located, but the excavation did produce exciting finds and gave a better understanding of the site's stratigraphic history.

*Unit N50 E21.5* - Periodic plowing of *Ortos* repeatedly tilled the top 30+ cm. of dirt. Due to the disturbed condition of the upper sediments, artifacts were collected when encountered, but most of the dirt was not screened. When "less disturbed" horizons were encountered, all material was either screened or removed for flotation samples. An impacted sediment with small cobbles on top of limestone rocks was initially interpreted as a feature in this unit. Further excavation revealed an odd concentration and assortment of angular limestone rock, rounded igneous cobbles, human modified chipped stone, and large animal bones isolated in the SE corner of the unit. *Kafkalla*, a hardpan calccrete (Christodoulou 1959; Stanley Price 1979), is a compacted horizon common on Cyprus formed by accumulation of calcium carbonate and several underground geochemical processes during the late Pleistocene and early Holocene. The *kafkalla* layers at *Ortos* were found undulating on top of the bedrock with thin layers of loose sediments intermixed by root activity (see Figure 5.5). Artifacts included: chipped stone, picrolite fragments, a stone bead, a perforated sphere, worked bone, and a bowl fragment.

*Unit N50 E23.5* - Similar subsurface interfaces encountered in the above unit were also found in this adjacent unit. Sloping *kafkalla* to the NW terminated the excavation. Artifacts included: chipped stone, a bone awl, mud brick fragments, a perforated sphere, igneous chopper/axe, and a stone ornament.
Unit N52 E21.5 *northern half-1m x 2m* - Partially excavated in 1993, the southern half of this unit isolated two strata interpreted as features. Feature 9, a pit (?) dug into the *kafkalla*, had large angular rocks mixed with limestone cobbles. An artifact concentration was noted in and around the pit. Feature 11, described as an ash lens, was located in the SE portion of the unit and removed for flotation purposes. Excavation in 1994 relocated Feature 9 in the northern half of the unit and followed it down into the *kafkalla* reached during the previous season. Artifacts included: chipped stone, (1) intrusive pottery shard, a picrolite ornament, a "thumbnail" scraper, a bone point, and limited human remains.

Unit N54 E21.5 - The upper stratum, as mentioned above, continues in this unit. Yellowish clay nodules were identified mixed with limestone rocks and cobbles below the plow zone. Feature 15, a gray, ashy lens, contained burned animal bone and a broken stone bowl. Underneath the feature was a sterile reddish fine grain sediment. Referring once again to Figure 5.5, the photographs depict the western profile of units N54/N56 E21.5 and the excavation of the units by UNLV graduate students, respectively. The western profile is also represented by a section illustration (Figure 5.6). Artifacts included: chipped stone, an incised cobble, stone bowls, intrusive pottery, humanly modified shells, and mud brick fragments.

Unit N56 E21.5 - More of the same depositional record encountered in N54 E21.5 was found to exist in this unit with exception of heavier concentration of limestone cobbles and a deeper sloping *kafkalla* horizon. Artifacts included: chipped stone, a smashed incised
Figure 5.6 Section Drawing of Units N54/56 E21.5, Kholteria-Ortos.
cobble recovered during the screening process, a denticulum bead, a bone awl, and pisé rubble.

*Unit N55 E25.5* - The location of this 2 m x 2 m unit, situated east of the main excavation pit, was subjectively placed to expose a feature identified in 1993. Flotation samples (10%) were taken from all levels. Sediments below the plow zone ranged from a light colored matrix, granular, and compact, to a dark and richer less compact interface. Feature 5, a pit dug in the kafkalla, was lined with small cobbles on the bottom. Artifacts included: 8 limestone bowl fragments, chipped stone, a picrolite ornament, a partial articulated spinal column from a large fauna, and mud brick chunks.

*Unit N52 E15.5 (trench-1m x 2m)* - The western most portion of excavation in Area 2, unit N52 E15.5, depicts the undulating and sloping nature of the subsurface topography. A plow zone in the upper horizon rests atop a more compact dirt with chalky limestone rocks intermixed. Pockets of gray to yellow crumbly matrix were also recorded during the excavation. Kafkalla was reached quickly in this unit once the cobble/artifact bearing horizon was removed. Artifacts included: chipped stone, intrusive pottery, worked bone, mud bricks, and a figurine(?).

*Unit N52 E17.5 (trench-1m x 2m)* - The middle unit of the six-meter trench, N52 E17.5, exhibited similar subsurface patterns as found in the above units. Root activity below the plow zone reconfirmed the disturbed condition of the sites buried deposits. Artifacts...
included: chipped stone, a picrolite ornament, a bone point, and a clay human figurine.

Unit N52 E19.5 (trench-1m x 2m) - Unit N52 E19.5 exhibited similar subsurface patterns as found in N52 E15.5 with the exception the deposits were slightly deeper closer to the main excavation pit. A flotation sample (10%) taken from deposits below the chalky limestone rock provided minimal information. Feature 16(?), identified as a pit dug down in the kafkalla, is questionable at best. Artifacts included: chipped stone, a picrolite ornament, a polished bone, and a clay human figurine (found in the screen).
CHAPTER 6

DISCUSSION AND CONCLUSION

Taking part in the excavation at Kholetria-Ortos in 1994 and having worked closely with two of three principal investigators from Wadi Shu'eib, I felt my knowledge was competent to address both sites equally. Are Kholetria-Ortos and Wadi Shu'eib representative of the "Neolithic package" proposed in this thesis? First, the use of data from Kholetria-Ortos and Wadi Shu'eib are indicative of my own research bias. Granted, there were many other sites that could have been taken under consideration for this thesis, but it was necessary to limit the discussion. Second, the "Neolithic package" is a time capsule of ideas and items centered on sedentary villages participating in a domesticated plant/animal driven economy. Kholetria-Ortos and Wadi Shu'eib are suitable representatives of proto-urban settlements found across the circum-Eastern Mediterranean. They may not possess or preserve the quantity of material culture that has been recorded from other contemporaneous sites, but the quality of information retrieved from both sites conserved a piece of the heritage left behind by these ancient farmers and herders.

Equally important is the connection of both sites to core/periphery dependency relationships. As ideas and items filtered outward from the emerging proto-urban villages, possibly by way of "trickling down" (or diffusion), peripheral hamlets may have freely chosen certain things and incorporated them into their own way-of-life. In return, if there
was such a reciprocal rural to urban relationship, it might be expected that raw material or secondary products constituted potential bartering objects.

Neolithic farmers and herders of Kholetria-Ortos and Wadi Shu‘eib shared a similar animal and plant inventory. Presumably, certain domesticated and wild species were preferred. Variability found in the exploitation of species is attributed to variability found in distinct environmental niches. The inhabitants of Neolithic Cyprus, according to the archeo-faunal evidence, did not bring cattle with them to the island. Villagers at Wadi Shu‘eib exploited the full range of ungulates and ovicaprids, but analysis of the animal remains is inconclusive for establishing the existence of a homogenous domesticated population. The surrounding environment of Wadi Shu‘eib, along with other central Levatine sites, took a heavy toll from approximately two thousand years of an intensifying agro-economy, and as a result, there were localized abandonments of settlements and a redistribution of the region’s population. Human adaptational responses to a deteriorating environment included improving on their agriculture technology, grazing stock animals away from prime farming land, and possibly developing cultural mechanisms to maintain egalitarian ethos within a heterarchical collective (i.e., ritual elites or gender specific fertility rituals).

Chipped stone technology witnessed a decrease of the flake:blade ratio in the deposits of Wadi Shu‘eib, while expedient flake technology seems to be the preferred reduction scenario at Kholetria-Ortos. The high ratio of flakes to blades in the deposits of Ortos might be indicative of the fine grain chert used for making their stone tools and less of an indicator of skill and/or cultural affinity. The overwhelming percentage of the Wadi

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Shu`eib assemblage comes from the PPNC period. An increase in the amount of notched and denticulated tools were observed during this period, along with the appearance of burins in significant quantities. Overall, the chipped stone from Kholetria-Ortos presents evidence to suggest that the site may have been maintained on a seasonal basis to accommodate grazing of herd animals, hunting wild fauna, gathering edible resources, and the collection of abundant raw material in the Xero potamus. Chipped stone data presented from Wadi Shu`eib demonstrate a reliance on blades over flakes during PPNB occupation and with time, a move toward greater usage of flakes during the PPNC and Yarmoukian phases. Once again, this may by indicative of the raw material used (i.e., reduction in the availability of quality flint), but in the case of Wadi Shu`eib where stratified deposits show long term occupation, a greater flake to blade ratio might be the result of in situ craft specialization.

With regard to craft specialization, the emergence of ceramics in the late stages of some pre-pottery (or aceramic) sites argues for early pyro-technology (Kafafi 1993; Ronen et al. 1991). Examples of lime plaster vessels are found in both Cypriot and mainland Levantine "pre-pottery" sites (Garfinkel 1993; Kafafi 1993; Le Brun 1984, 1989). Ground stone assemblages provide proxy data for the milling of grain and other plant material. It may be hypothesized that ground stone was manufactured for utilitarian purposes, while the progenitor of ceramics, lime "Gray/White ware" vessels, were made for ritual purposes and not for everyday use.

Biological factors from an intensifying agro-economy affect human populations in a variety of ways. A sedentary population suffers diminished health status and physical well being, increased physiological stress, reduced nutritional intake, an increased number of live
births, and altered activity types and work loads (Larsen 1995). Social and economic ramifications of an intensifying agro-economy include a transition from principally a patrilineal polygynous extended household to a matrilineal monogamous nuclear family (Flannery 1972; Levi-Strauss 1963).

Secondary products (i.e., dairy products, bone marrow, skins, and possibly alcohol) from herded animals and plants took on greater significance across time (Blumler et al. 1991; Harris 1996). As a result, trading relationships may have emerged forming seasonal markets where the distribution of goods may have taken place (Dolukhanov 1994). Early accounting systems developed as a by product of the "Neolithic package" (Rollefson 1993b, 1996). And very possibly, the formation of regional dialects associated with the language of agriculture.

Addressing the above mentioned early accounting systems, the incised cobbles from Kholetria-Ortos might indicate an ancient strategy for counting or identifying personal property by way of branding. A later hypothesis (Cooper et al. 1996) suggests that the incised cobbles may have been proto-stamp seals. Stamp seals are well recognized in Pottery Neolithic deposits throughout the circum-Eastern Mediterranean and Mesopotamian regions, although they were made primarily from clay. The Neolithic site of Ras Shamra (level V C), on the coast of Syria, contains incised stone cobbles or stamp seals in pre-pottery context (Makkay 1984). The two meters of deposition that produced the steatite stamp seals did not unearth a single potsherd. De Contenson (1963) felt assured by the absence of pottery in level V C to label it an aceramic horizon. One of the steatite cobbles from Ras Shamra was described as exhibiting a "domed back." Coincidentally or not, many
examples of the incised cobbles from Ortos share a similar morphology (see Figure 5.3). It was not until the art of ceramic production reached a presumed level of proficiency that clay stamp seals began appearing in the archaeological record. A natural precursor to clay stamp seals would have been the locally abundant stone. The inhabitants of Ortos have already proved proficiency with stone by their examples of ground stone vessels.

Human's interrelatedness with the environment during this time radically changed in several capacities. Two specific results of the transition to reliance on domesticates were that humans over-farmed and overgrazed the land to near sterility. In addition, the practice of logging timber for houses would have contributed to the arable top soil steadily disappearing (Rollefson et al. 1989). Estimates of the region's population reaching 3.2 million people by 6,000 bp indicate proto-urban villages were successful in cooperating, maintaining, and perpetuating the agro-economy for several millennia (Maisels 1990).

6.1 The Built Environment: Architecture and its Implications

An overall theme of this thesis is the built environment. The remains of prehistoric dwellings can help inform the archaeologist about an array of subjects from social organization, raw material preference or availability, ritual and communal activities, and also help in the effort to reconstruct prehistoric populations. It is the purpose here to discuss the implications of the architectural findings, or the lack there of, at Wadi Shu'eib and Kholetria-Ortos in a local and regional context. Issues that will be addressed in the following discussion are durability of the built environment, building form (circular or rectangle), and the insular nature of Cypriot aceramic architecture. A few of the above
rectangle), and the insular nature of Cypriot aceramic architecture. A few of the above issues may overlap one another and might have been mentioned earlier in the text, but it is my intent to reach a satisfactory answer to the questions of Neolithic social organization, community identity, and village life.

The architectural record from Neolithic Wadi Shu‘eib, more so than Kholetria-Ortos, depicts an integrated community with an understanding of refined house-building techniques. Evidence of definable building episodes (i.e., periods of renovation, rebuilding, and remodeling) can be seen through time. Eventually, the raw materials that were originally extracted from the natural surroundings were no longer readily available, and it was necessary to utilize materials from older structures. Sometimes instead of tearing down a building and removing the material for construction at a separate locus, a new building was built directly on the antiquated foundation. Evidence of this kind has come to light from the better understood and more extensively excavated sites of `Ain Ghazal, Beidha, Jericho and Khirokitia-Vounoi (Banning et al. 1987; Bar-Yosef 1986; Bryd 1994a, 1994b; Dikaios 1953; Kostof 1995).

Neolithic buildings preserve insights into how the site was selected and prepared for construction, wall preparation, location of load-bearing posts, roofing, floor and wall plastering, decoration, and renovation (Banning et al. 1987). Indoor activities and habitation areas within the rectangular structures of PPNB occupations are inferred by the location of hearths, ovens, storage containers, and other associated household features. The interpretation of site size, house size and contents have helped archaeologists define the means for the analysis of social complexity and interaction (Bar-Yosef et al. 1989:462).
Through time and across space, houses built at Wadi Shu’eib represent a shared knowledge and technological ingenuity that were hallmarks of the "Neolithic package."

Recently, the form of the house (e.g., circular, rectangular, or apsidal) has received considerable attention because of an assumed underlying cultural connotation to the shape of the building (Ember et al. 1995; Flannery 1972, 1993; Saidel 1993; Stea et al. 1993; Wright 1995). Ember and Ember feel the form of the house shows a degree of stability and permanence of a community (1995). Collecting evidence from cross cultural studies, they report that 80% of societies that built and occupied rectangular, quadrilateral, or elliptical house forms were fully sedentary. Their data also suggest 78% of societies living in curvilinear structures tend to exhibit semi-nomadic behavior (Ember et al. 1995:100). Incorporating the concept of vernacular architecture, the study of tradition and social consensus seen in architecture, permits dialogue by way of ethnographic analogy.

The archaeological record during the PPN and early PN in the central Levant demonstrates circular and rectangular units as the most popular form of residential housing. The florescence of PPNA circular structures was followed by a rectangular house phase in the PPNB. That was then frequently followed by the reintroduction of round units again during the Pottery Neolithic. A dichotomy between communal storage and private storage is at the center of the architectural transition according to Flannery (1972).

The reductionist approach of Lévi-Strauss, as Flannery (1972) noted, is at the center of the architectural form debate. The "thornier" issue Lévi-Strauss touched on in his 1963 work, *Structural Anthropology*, engages concepts of dual form and binary opposition seen in circular and rectangular forms. Lévi-Strauss identifies circular buildings with gender
stratified societies, small population densities, and occupation of the huts by men. The rectangular form to Lévi-Strauss distinguishes extended nuclear families, a larger population base, and family occupation of the household. He continues by identifying a diametric opposition found in the directional placement of rectangular buildings (i.e., east/west situated) (Lévi-Strauss 1963:139), along with assigning color schemes to the cardinal points of the building. Accumulating data from cross cultural examples, Lévi-Strauss depicted vernacular architecture for better understanding the cosmology or maize-way of a particular culture. Can archaeologists incorporate a vernacular architectural interpretation into the prehistory? The answer is yes as will be explained below.

Flannery has argued (1972) for an evolutionary selective advantage in villages made up of rectangular shaped buildings as opposed to compounds made up of circular dwellings, based on ethnographic literature. According to Flannery, the form of the building is not the paramount issue.

"...it is not the "circular" or "rectangular" shape of the house which is critical, but whether it is intended for a single individual or a family - in other words, whether the minimal unit of production and storage is polygynous extended household or a (primarily) monogamous nuclear family" (Flannery 1972:42).

Flannery does not exclude the possibility of later rectangular houses supporting polygynous extended families, but the compartmentalized nature of rectangular structures with an adjacent courtyard would select for monogamous nuclear families. Looking for a "catalyst" to help explain the morphological transition in Neolithic vernacular architecture, Saidel recently (1993) incorporating Flannery's 1972 model identified several "prime movers" inducing the transition in house form.
Saidel attributed the transition in house form to a changing social organization during the Early Neolithic, but also raises issues of anticipated mobility, more effective agricultural techniques (intensification of production), and increased personal wealth as interwoven explanations for the observed architectural transition. Saidel believes that variation in house size and form implies the emergence of personal wealth and/or increase in the size of the nuclear family to cope with the demands of an agricultural economy (Saidel 1993). A change in personal wealth, according to Saidel, is documented by the existence of long distance trade networks (i.e., Anatolian obsidian and Red Sea shells) and the development of small craft manufacturing (Saidel 1993).

In response, the journal allowed a rebuttal commentary in the same issue by Flannery (1993). Flannery dismisses the new interpretation as a distortion of what he actually said. He defended his twenty years old model by explaining a "prime mover" was not necessary for culture change, and feels that Saidel misinterpreted and even misquoted his work. A result of the debate between Flannery and Saidel has been a new period of vernacular architectural interpretation of the Early Neolithic in Southwest Asia (Byrd 1994a; Kuijt 1995; Wright 1995).

Now to turn attention to architectural developments on Cyprus during the Neolithic occupation, round buildings were introduced while rectilinear forms on the Levantine mainland continued to be used. Circular houses remained dominant on Cyprus and it has been suggested that the "tholoi" can be traced from the eastern Mediterranean to third-millennium Crete and eventually onto the Greek mainland (Wright 1995). Following Flannery's model, the introduction of curvilinear houses to Cyprus would have occurred
during a period of polygynous extended households. The assumed progenitors of the round houses are the peoples of Syria and Palestine who colonized the not so far away island (Wright 1995). "Thus, not only has round-house culture become perhaps the most salient feature of Cypriot archaeology, but Cypriot round-house Neolithic is probably known better than any other regional development of the culture" (Wright 1995:16). Wright continued by adding, "...this round house was seen to be both the temple and the tomb of Early Neolithic Man" (1995:23). Some of Wrights' interpretations are startling, yet his contentions of the round house phenomena of the KCU phase promoting social ethos through a vernacular pretense, in my opinion, is very credible.

Ethnographic accounts from Mediterranean island architecture suggest that the form of the building stems from the foreseen function (Branch 1966). The residential unit is tied to its natural environment, which is being built from locally available materials. The house, therefore, is clearly associated with the character of the landscape. Is the character of the landscape surrounding Kholetria-Ortos that much different than areas surrounding Khirokitia-Vounoi or Kalavasos-Tenta? Once again referring to ethnographic research on the circum-Eastem Mediterranean architecture, patterns of house form, use of certain raw materials, and the number of houses in a specific location were correlated to the occurrence of certain geologic formations (Branch 1966). Does the limestone marl formation, where Ortos is situated, promote durable architecture, or due to the extreme erosional episodes on the steep marl, were less durable shelters more practical? This aspect of Ortos remains unresolved and provides an avenue for future research.
6.2 "Asprots" or Not: Occupation of Neolithic Cyprus

"A civilisation exists in the Mediterranean which in its essentials is shared by all the countries along its shores."

A. Siegfried (no date)

Unwrapping the "Neolithic package" and identifying its core components is a much easier task than identifying disseminated parts of the package in peripheral zones. During the period of Neolithic expansion on the mainland (PPNA - LPPNB; 9500-7500 bp), deployment and implementation of the package onto the island of Cyprus represents a monumental prehistoric event. Who were these people that either by force or choice relocated to an island in the Mediterranean Sea? What hardships did these people endure being separated from the Neolithic collective? Or did they feel liberated and free from developing social inequality that has been identified by Kuijt (1995) and Ronen (1995). Answers to these questions can be at best speculative, and at worst, gross misrepresentations.

Ronen (1995) in a recent article interprets the archaeological record of Aceramic Cyprus as containing evidence of the earliest religious sect in human history. His conclusions are based from the archaeological record collected from the known Aceramic sites and "findspots" on the island. Examining aspects of circular architecture, floral and faunal remains, and the material culture, Ronen was able to discern a distinct cultural identity for the inhabitants of the island. Calling them "Asprots," (I believe by combining the words Aceramic and Cypriot, as Ronen does not explicitly state the derivation), he discusses the cultural differences between the archaeological expression of Aceramic Cyprus and sites from the mainland Levant and Anatolia. By incorporating several historic analogies of sects (i.e., Amish and Hutterites) Ronen defined the parameters necessary for identifying
a religious sect in the prehistoric archaeological record.

Unanswered questions of the occupation of Aceramic Cyprus permit the dialogue introduced by Ronen. Although certain aspects of his hypothesis do warrant further commentary, I have concerns about the label "Asprot" and his use of the comparative rule for the historic analogies he introduced. In labeling the inhabitants of Aceramic Cyprus, Ronen has permanently carved his name into the literature of the region. Whether or not that was his intention, confusion in terminology is the sure outcome of this type of research. Terminology already exists describing the earliest inhabitants of the islands, such as the Akrotiri Phase, Khirokitia Culture (KCU) or Eteocyprians. (The prefix eteo derives from the Greek word meaning origin.)

Although the use of ethnographic analogy in contemporary archaeological research is common, the tenuous relationship established between the prehistoric past and historic analogy must be carefully merged. Ronen explicitly states, "Are we allowed to "translate" events ten millenia old and to render them in modern concepts? I contend that we are, because the only thing we can do is to use our own judgement upon the other's behaviour" (1995:195).

I do not deny that some evidence from the mainland Levant and Anatolia points toward a grouping of like minded people engaging in similar symbolic actions (i.e., rectangular vs. circular houses, plastered skull veneration, or cattle deification) during the Neolithic. In fact, the proposed "Neolithic package" maintains that a shared template of ideas and technology persisted in the circum-Eastern Mediterranean region. Transmitted through the spread of domesticated products, communities and villages engaged freely, in
varying degrees of participation, in the Neolithic world that surrounded them. Is it possible to demonstrate the emergence of a prehistoric religious sect from the archaeological deposits of Wadi Shu‘eib and more importantly from Kholetria-Ortos? No, I do not think it is a feasible task in such great antiquity.

One of Ronen's key points involves the absence of cattle from Neolithic Cyprus. Calling the KCU villagers "a cultural isolate" (1995:183), Ronen breaks down the possibilities for why cattle were not initially brought over to the island. In light of recent evidence of cattle in the deposits of 7th millennium BC Paraklesia-Shillourokampos (cf. Guilaine et al. 1993), it appears the cultural preference observed by Ronen might be due to a sampling bias. Following other lines of evidence besides the absence of cattle (e.g., burial customs, circular architecture, absence of gazelle, and lacking the icon imagery of the mainland Levant), he posits human behavior and culture remained isolated for 2,000+ years without cultural involution. Trying to identify the origin of the Asprot sect, he looked toward the central Levant for answers.

"...the Asprot sect had originated prior to the colonization of Cyprus, perhaps during the PPNA. The sect must have existed on the mainland for quite some time. ...the archaeological presence of an Asprot minority in a mainland site may have been blurred by the conforming majority" (Ronen 1995:199).

6.3 Abandonment of the Levantine Neolithic

According to Ronen (1995), social developments as early as the PPNA and continuing on into the PPNB disenfranchised a group of Neolithic villagers so egregiously that they decided to load their "Aceramic Ark" and sail off into the Mediterranean.
Interesting as that may sound, this hypothetical exodus or excommunication did not register in the archaeological record at all. Conversely, abandonment of many PPNB sites (or "hiatus palestinienne") west and south of the Dead Sea constitutes a period of considerable social and demographic flux (Henry 1995:13). Meanwhile, sites east of the Dead Sea (i.e., Wadi Shu‘eib and ‘Ain Ghazal) hypothetically became centers of displaced population.

Simmons (in press) proposes a speculative model that entertains population oscillations, environmental change, and regional settlement shifts at the end of the PPNB, resulting in the "abandonment" recorded in the archaeological record. In three stages (Stage 1—aggradation into large regional centers; Stage 2—disharmony during the PPNC; and Stage 3—the solution: the return to tribal society and consequent social fragmentation), Simmons highlights the ascension and decline of proto-urban villages from the Late Natufian to LPPNB. Key to the development of the larger PPNB villages was a redefinition of the mechanisms of social control and cohesion (Simmons in press). Next, looking at the evidence east of the Jordan River, Simmons discusses the in situ transformation from aceramic to ceramic producing societies. In the context of a deteriorating environment, PPNC inhabitants of Wadi Shu‘eib and ‘Ain Ghazal "...were finding it increasingly difficult to maintain the viable and diverse economy they had enjoyed during the PPNB" (Simmons in press). In the final stage proposed by Simmons, PN habitation lacked the dramatic architecture seen in PPNB times and lateral extent of sites usually decreased often to no more that a few circular huts. It is believed that the emergence of nomadic pastoralism during the PN period was the end result of an increased reliance on ovicaprines (i.e., sheep and goat) and a decreasing carry capacity of the over-farmed agricultural fields.
6.4 Conclusion

It is the responsibility of archaeology in the 1990s to illuminate applied generalizations that can be incorporated into modern discourse. Extrapolating on the dynamic behaviors of ancient societies with only static archaeological remains as our evidence leaves an incredible amount of room for inferences and speculation. Neolithic occupation of Southwest Asia spans a period of human history that is increasingly becoming better understood. Today, research investigating the natural perturbations of global climate is finding evidence of human-induced environmental atrophy. Evidence of the Neolithic agro-economy likewise shows humans mismanagement of their environment. Dealing with population levels on a much smaller scale, Neolithic farmers and herders for approximately four thousand years exploited a narrow environmental niche, presumably quite successfully. Six thousand years later, humanity still finds itself reliant on narrow ecological farming belts (on a global scale), yet the majority of the population does not directly partake in our agriculture based global economy. Industrialization of the 1800s and 1900s brought our world into the modern age and began a period of urbanization, the likes never seen before.

Natural climatic fluctuations are a reality. Human's propinicity to pollute and destroy the environment is not new. Technological and social cohesive mechanisms were able to maintain stability for several millennia during the Neolithic against the backdrop of a naturally changing global climate and a mishandling of the surrounding environment. Who is to predict when our global warming episode might turn catastrophic? And how long can our own technology out pace our humanity?
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