

# WORKING TOWARD AN ANTHROPOLOGICAL PERSPECTIVE ON THAI PREHISTORY: CURRENT RESEARCH ON THE POST-PLEISTOCENE

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## INTRODUCTION

Although Thai archaeology is relatively young in comparison with European or North American archaeology, I find current research very exciting. Over the past three decades both Thai and foreign archaeologists have provided new empirical data for various areas of research; for instance, the transition from the upper Pleistocene to early Holocene (Anderson 1990; Pookajorn 1991), early domestication and the development of agriculture (Gorman 1971, 1977; White 1982; Higham 1989a), early metallurgy (Suchitta 1983; Piggott and Natapintu 1988; Bennett 1990; Nitta 1991; Piggott *et al.* 1992), prehistoric exchange (Welch 1985; Natapintu 1986; Higham 1989b; Welch and McNeill 1991), the development of complex societies (Macdonald 1980; Bayard 1984, 1992; Higham 1989b, 1991; Thosarat 1989), state formation (Vallibhotama 1984; Glover *et al.* 1992, Mudar 1992), ethnoecology (White 1989) and ethnoarchaeology (Suchitta 1980; Pookajorn 1991). In addition, there is progress in fieldwork procedures and analytical techniques such as faunal analysis (Higham 1975a; Kijngam 1979), petrographic analysis (Vincent 1988; Fine Arts Department 1991a; White *et al.* 1991), pollen analysis (Maloney 1991, 1992; Wattanasak 1991), phytolith analysis (Keahofer 1992), macro-floral analysis (Yen 1977; Pyramarn 1989; Thompson 1992), geomorphology (Sinsakul 1992), lithic analysis (Fine Arts Department 1991b), human osteology (Wiriyarom 1984; Tayles 1992) and spatial analysis (Higham *et al.* 1982). These new discoveries have had direct impact on reconstructions of regional prehistory (Bellwood 1985; Higham 1989a), as well as contributing to broadly comparative archaeological and anthropological research elsewhere in the world (e.g., Flannery 1973; Sharer and Ashmore 1987; Wenke 1990; Price and Feinman 1993). Archaeo-

logical research in Thailand can be seen as the direct result of developments in the discipline as a whole.

At the same time, I feel frustrated because Thai as well as Southeast Asian archaeology still has relatively low visibility in the world archaeological community (e.g., Hutterer 1982a; Junker 1993). In an editorial entitled "Early Metallurgy, Trade and Urban Centres in Thailand and Southeast Asia", Ian Glover rightly states that:

...it is probably true to say that of the densely populated parts of the world, Southeast Asia remains archaeologically the least known, and new research there has had far less impact on the awareness of the general public in the West, and of the international academic community, than research taken in, for example, the Near East, China, and Mesopotamia over the same period (Glover *et al.* 1992:7).

Though we have made progress in establishing cultural chronologies, especially in northeastern Thailand (Bayard 1984; Higham 1989a; White 1990), other areas remain little known. It is clear that we still have only a fragmentary picture of Thai prehistory. We continue to emphasize site oriented research, with a particular focus on large sites such as cemeteries and workshops, and data-oriented research. Sophisticated field and laboratory techniques are being applied to the artifacts in the hope that some useful results will emerge. Moreover, there is a heavy emphasis on issues of classification and chronology, with little attention paid to the cultural context of archaeological materials. Only a few research projects endeavor to address specific theoretical issues of cultural process (e.g., Bayard 1984; Higham *et al.* 1982; Macdonald 1980; Welch 1985; Wilen 1987). As a field archaeologist, I do not mean to imply that building chronology is not important. It is, of course, one of the most

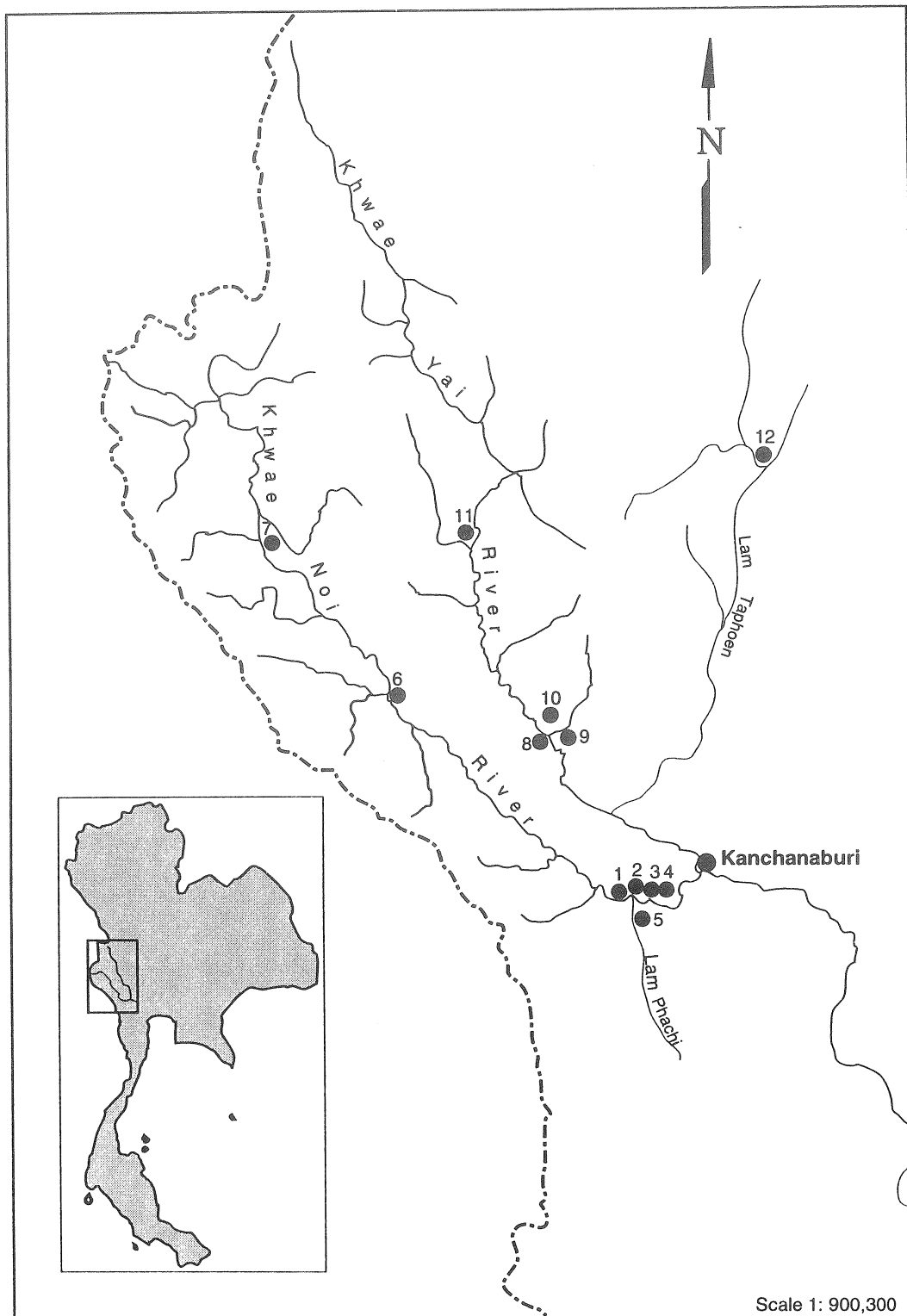


Figure 1: Location of the research area in the Lower Khwae Noi valley, Kanchanaburi Province, western Thailand. 1) Ban Kao, 2) Talu and Heap caves, 3) Sane cave, 4) Lang Kamnan cave, 5) Rai Arnon, 6) Kao cave, 7) Sai Yok cave, 8) Chande cave, 9) Kang Chine, 10) Han Songchram, 11) Khao Sam Liam cave, 12) Ongbah cave and 13) Don Noi.

important archaeological research goals, but at the same time we must pursue archaeology's other goals: reconstructing extinct cultural systems and explaining past cultural processes (Binford 1968). From the available empirical data, it is clear that only a few projects have pursued problem-oriented research from a variety of theoretical orientations. To some extent, cultural chronologies and past lifeways are well enough understood in a general sense, while explaining the process of cultural development has received much less attention among archaeologists. In order to translate our data into the generally meaningful social reality behind the artifacts we deal with, we must adopt an anthropological perspective. Nevertheless, efforts to move Southeast Asian archaeology from a culture-historical (e.g., migration, diffusion) to an anthropological emphasis have only recently received attention (Hutterer 1982a; Junker 1993).

This paper, therefore, attempts to synthesize and examine the available information from an anthropological perspective. First, I provide an overview of the concept of anthropological archaeology. Second, I discuss problems in Thai prehistory viewed with an anthropological emphasis. Finally, the archaeological research from western Thailand will be presented as a case study (Figure 1).

#### WHAT IS ANTHROPOLOGICAL ARCHAEOLOGY?

Since anthropological perspectives may have different meanings to different archaeologists, I wish to define it here. Contemporary American archaeology, for instance, includes diverse schools of thought which present a variety of theoretical orientations (Thomas 1990; Trigger 1989). Two major anthropological schools of thought can be characterized: the ideational approach focuses on the mentalistic, symbolic, and ideological and the adaptational approach focuses on cultural materialism including technology, ecology, economics, and demography (Thomas 1990:108-129; see Meltzer *et al.* 1986 and Renfrew and Bahn 1989 for an overview). As I have stated, the majority of Thai and other Southeast Asian as well as foreign archaeologists have been effected by mainstream western contemporary archaeology, though many times we do not even know what is the logical reasoning behind the theories and methods we apply to our area and where they come from.

Let me be more specific regarding the term "anthropological archeology". The most explicit definition, perhaps, is given by Robert Whallon (1982a) as follows

Anthropological archaeology aims primarily to explain the organization, operation, and evolution of human cultural systems. ...[it] is undeniably and inextricably linked to a great number of other disciplines in the social and biological sciences, which either study the same phenomena among contemporary, living human groups or examine strictly analogous phenomena of organization and evolution in other species, either contemporaneously or paleontologically. As a consequence, anthropological archaeology must share a wide range of theoretical and methodological concerns with these other disciplines, and it is entirely expectable, therefore, that there will be a significant degree of overlap among theoretical and methodological foundations of all these related sciences, archaeology included. ...anthropological archaeology seeks to explain a number of phenomena that also are studied by other social sciences, the subjects of interest in these cases being, in fact, identical. Here the differences among disciplines lie, rather, in archaeology's long-term time perspective on evolutionary processes, or in the anthropological emphasis upon a holistic view of human cultures, as well as the obvious differences occasioned by the nature of the primary empirical data available to the different disciplines (Whallon 1982a:1-3).

Moreover, anthropological archaeologists develop models and methodological procedures to explain and identify past human behavior and material correlates using various sources of cross-cultural comparative data such as the ethnographic record (e.g., Schott 1986; Kelly 1992), ethnohistory (e.g., Marcus 1989), ethnoarchaeology (e.g., Longacre and Skibo 1994), experimental archaeology (e.g., Mauldin and Amick 1989) as well as borrowing techniques and perspectives from other disciplines.

I consider archaeology as a part of the discipline of anthropology and take a holistic view of culture. Anthropology encompasses the entire human experience, including ideology, subsistence economy, technology, social organization, and so on. I believe that a holistic view of culture is essential to structure archaeological research and explanations of the past. The ultimate goal of anthropological archaeology is to explain the total range of cultural similarities and differences, and *explain processes* of cultural change (Binford 1972; Whallon 1982a, 1982b). Explanation is defined as follows

...something of more general significance and applicability. It covers the specific data at hand as a case in which certain general principles, processes, variables,

and relationships are given particular form at a given time and space. In other words, a scientific explanation (of any given phenomenon or class of phenomena) specifies both 1) the relevant and critical variables, and 2) the precise form of the relationships among these variables (Whallon 1982b: 156).

While anthropological archaeologists often take a holistic view of culture, research tends to focus on questions of cultural subsystems in order to explain how the overall cultural system works. For example, research on prehistoric hunter-gatherers often focuses on subsistence and adaptation to the natural and social environment. This is the perspective I take in my discussion of mobility organization that follows a discussion of the archaeology of the post-Pleistocene period. In other words, my research focuses on subsistence and settlement of a larger cultural system. The result of my research will provide a ground work for putting together a piece of a past Pleistocene cultural system. Archaeologists, of course, define the concept of culture differently, according to their own interests. For instance, structural archaeologists view culture as "the shared symbolic structures that are cumulative creations of the mind" (Thomas 1990: 122). I value the concept of culture and define it based on an ecological model as the means of adaptation to the physical and social environment (Binford 1972). Here, "culture" can be conceptualized as a system which consists of a series of rules for guiding behavior in human societies. Our task is to search for information about the organization and operation of cultural systems in the past. We rely on scientific inquiry to obtain an objective evaluation of the utility and accuracy of our proposed ideas about the past (Binford 1983, 1989).

#### WORKING TOWARD AN ANTHROPOLOGICAL PERSPECTIVE ON THAI PREHISTORY: AN EXAMPLE FROM THE ARCHAEOLOGY OF THE POST-PLEISTOCENE PERIOD

Here I would like to take an "emic" point of view as a participant in the Thai archaeological community as well as take an "etic" view from the world professional community, to share my thoughts on this topic. In examining the current status of Thai prehistory, I will step back and take a global perspective. I will limit myself to the question of the underlying factors of why and how populations move around. Specifically, I will focus on a study of the mobility organization of hunter-gatherers as one adaptive mechanism within the context of subsistence and settlement systems.

This section is organized by following three major goals of archaeological research: establishing chronol-

ogy, reconstructing past cultural systems and explaining cultural process (Binford 1968). Archaeological examples focus on the post-Pleistocene period.

#### Problems of Cultural Chronology

Let me first turn to an initial step in archaeological research. The temporal scale here is the early post-Pleistocene period which has been called the "Mesolithic" in many areas in the world, and was referred to as the "Hoabinhain" period of Southeast Asia in the pioneering investigations in northern Vietnam in the 1930s (Colani 1927 cited in Matthews 1968; van Heekeren and Knuth 1967). This period has been the subject of lengthy reviews (Matthews 1968; Solheim 1974; Gorman 1971; Glover 1977; Hutterer 1977; Reynolds 1990). Reynolds has done an especially excellent review, the contents of which I will not attempt to repeat here. I only touch briefly on the general observations that are relevant to this discussion.

When Hoabinhian sites were first identified, radiometric dating was not available and the term was created to establish a basic chronology for the region. The definition of the diagnostic artifactual sequence was defined by the dominance of unifacial tools made on pebbles and large flakes, constructed along traditional typological lines. In Thailand, van Heekeren compared the archaeological evidence found from Sai Yok cave to the Vietnamese finds. Since the 1960s, after van Heekeren's work, the Hoabinhian has been assigned to the "Mesolithic" period of Thai prehistory. From the 1970s to the present we have gained absolute dates from many sites in Southeast Asia, spanning from the late Pleistocene to the Christian era (Ha Van Tan 1976:1994; Bellwood 1985; Bronson and White 1992). In Thailand, carbon 14 determinations come from Spirit, Tham Pha Chan and Banyan Valley Caves in the northwest (Gorman 1972; Bronson and White 1992; Reynolds 1992); from Ongbah (Tauber 1973; Sørensen 1988), Khao Talu and Heap Caves (Pookajorn 1984) in the west; and from Buang Baeb, Pak Om and Khao Khi Chan caves (Fine Arts Department 1986; Srisuchat 1987), Khao Thao Ha (Chaimongkon 1989) and Lang Rongrien Rockshelter (Anderson 1990) in the south. The dates fall within the early to middle Holocene (Figure 2). In general, the time frame of the "Hoabinhian" period can be given a rough length of 10,000 years, ranging from *circa* 9000 BC to AD 1200 (Bronson and White 1992).

The published cultural chronologies from these 11 sites all use the formal typological categories of "Sumatralith", "short-axe" and "grinding-stone" as diagnostic types to define the temporal boundaries of the time

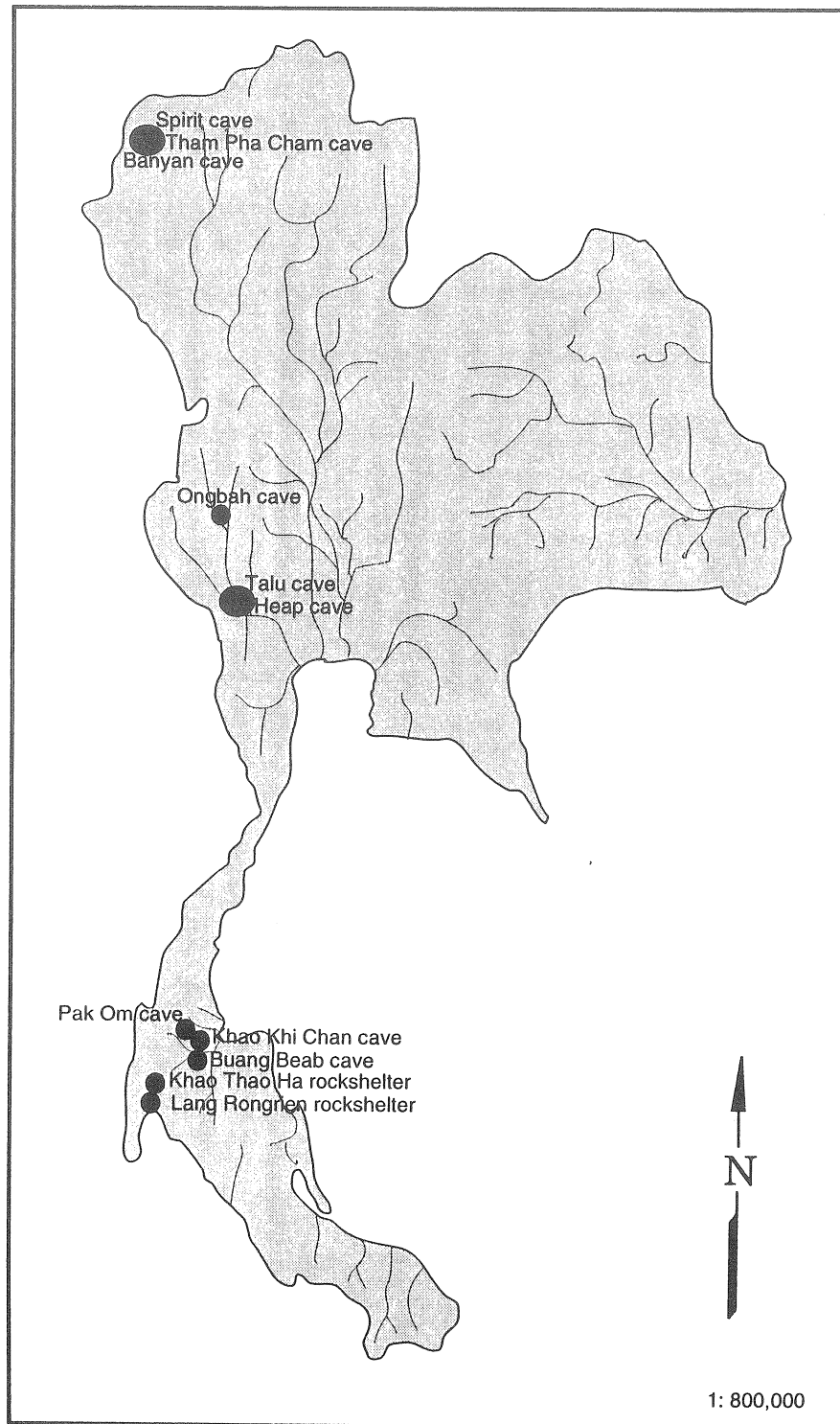


Figure 2: Radiocarbon dated "Hoabinhian" sites in Thailand

period. However, in some sites, for instance, Lang Ron-grien rockshelter, the "typical" stone tools are absent, even though the time scale remains the same. This shows that the use of diagnostic types in constructing chronologies does not fit all regions. Previous research has also shown that there are *no changes* in lithic technology throughout the Pleistocene (Gorman 1971; Hutterer 1977). Clearly, focusing on diagnostic types or technological criteria has not helped to establish an ordered typological sequence for the region. It is important to explain the factors that influence the form and composition of lithic assemblages and to investigate their distributions over time and space through detailed qualitative and quantitative studies of entire archaeological assemblages.

From a methodological viewpoint, several problems still remain. First, few excavated sites have been dated. The local sequences of these sites are then used to represent regional sequences throughout Thailand and Southeast Asia (Bellwood 1985; Higham 1989a). Second, relative dating remains largely used in Thai archaeology, based in particular on formal typological criteria. Survey data and excavated sites are often compared with well-dated sites. In fact, typologies can be constructed by using quantitative techniques (e.g., Whallon and Brown 1982) and employed to generate chronological sequences, but the relative chronologies derived in this way depend on the results of systematic excavation and laboratory analysis (seriation can also be done on surface collections). Third, very detailed site reports detailing stratigraphy and detailed descriptions of artefacts should be made available. Many researchers selectively publish only diagnostic artifact types and this makes it more difficult to establish a confident cultural chronology using relative dating techniques. Finally, caves and rockshelters can be stratigraphically very complex places because of the intensity of deposition and disturbances caused by both natural and cultural processes (Straus 1990). The question of site formation processes in caves and rockshelters has not yet received much attention in our area (Reynolds 1990). Understanding such processes of critical importance for the development of cultural chronologies and the interpretation of site use. We cannot simply assume that all cave deposits lie stratigraphically in correct order from past to present. We need to evaluate critically previously dated cave sites from this perspective.

#### PROBLEMS OF RECONSTRUCTING POST- PLEISTOCENE CULTURAL SYSTEMS

It is clear from the problems of establishing cultural chronologies that the available information does not give us confidence for reconstructing the "post-Pleistocene" cultural system. We are still a long way from having a complete picture of the lifeways of this period. However, let us break down the broader cultural system and take a closer look at each subsystem. I suspect there are an infinite number of "subsystems" to look at; here I look at the ones that I consider as relevant.

##### Subsistence System

Only a dozen sites in the whole country provide faunal and floral remains (e.g., van Heekeren and Knuth 1967; Gorman 1971; Higham 1977; Pookajorn 1984; Fine Arts Department 1986; Anderson 1990; Shoocongdej 1991). Small to medium sized animals, as well as freshwater shellfish and landsnails are found in most "Hoabinhian" sites. The available reports provide information on species identification, the number of identified species and the minimum numbers of individuals. There is no evidence of specialized hunting. Plant remains have also been discovered in a few excavated sites. Most of the plants are found wild today in primary and secondary forests in the area (Yen 1977). So far, there is no concrete evidence of plant domestication. Reconstructions of subsistence economy have been strongly influenced by Gorman's (1971, 1972) interpretation of a broad-spectrum economy, but very little is known about the variability of fauna, floral or shellfish remains from region to region.

Part of the problem is that there are no reference collections for comparative study. Most researchers compare their data with published descriptions of Spirit Cave (e.g., Pookajorn 1984). I feel that much more information exists in the archaeological record than we are presently obtaining. Given the data we have to hand we can try to answer questions concerning hunting patterns, seasonal differences in utilization of different habitats, season of death of faunal assemblages, patterns of plant use through time, methods of plant procurement and so on. Regarding animal bones, answering questions requires quantitative methods (e.g., Binford 1981; Speth 1983; Grayson 1984; Lyman 1987) and detailed information on frequencies of animal bones by age, sex, body parts and weight. Floral studies also suffer from similar problems, including a lack of comparative collections as well as problems in excavation and recovery procedures. Flotation, which helps us increase the recovery of plant re-

mains, has never been applied in previously excavated sites.

#### Settlement System

A general assumption concerning "Hoabinhian" settlement patterns, first made by Gorman (1971), was that prehistoric hunter-gatherers occupied caves, rockshelters and the coastal area. Cave sites have been the major focus. No doubt, the largest concentration of "Hoabinhian" sites in Thailand are cave sites found in the limestone mountain ranges along the western border of the country. So far only two shell-midden sites have been excavated and there have been debates as to whether they were created by human or natural processes (Chaimongkon 1989; Prishanchit 1988). The cave sites were occupied seasonally; terrestrial gastropods indicate wet season occupation and freshwater bivalves indicate dry season occupation. We have no information on group sizes, site functions, or densities of archaeological remains relative to lengths and periodicities of occupation of the sites. We also lack data from open-air sites such as workshops, kill sites and butchering sites. The interpretation of archaeological spatial patterns has still not received major attention in our research. Regional survey has only been focused on later prehistoric sites in northeast and central Thailand (e.g., Kijngam *et al.* 1980; Higham and Kijngam 1984; Piggott and Natapintu 1988; Wilen 1989; Welch and McNeill 1991; Mudar 1992).

#### Technological System

The "Hoabinhian" is often identified by the dominance of Sumatraliths and short-axes, as well as by the presence of unifacially flaked tools (scrapers, discoid scrapers, choppers and picks), edge-ground stones, large flakes, utilized flakes and a large amount of debitage. Furthermore, in some sites, bone and shell tools are found. So far, "Hoabinhian" technology cannot be differentiated from the technology found throughout Pleistocene Southeast Asia (Gorman 1971; Hutterer 1977). Stone tools are generally assumed to be primarily related to maintenance activities, in particular, for wood-working and production of bamboo tools (Gorman 1971). Previous studies of stone artifacts in Thailand have either concentrated on the pebble tool industry or dealt primarily with collections from poorly dated surface finds. Contemporary studies of lithic artifacts tend to focus on three major problems: classification of tool types, analyses of use-wear on stone tools in order to infer their functions, and lithic reduction sequences. The majority of studies still tend to emphasise a formal typological approach (e.g., Pookajorn 1984; Anderson 1990; Ha Van Tan 1994;

Nishimura 1994; Reynolds 1990) and there are a handful of studies which attempt to conduct detailed investigations of reduction sequences (White and Gorman 1979; Suksom 1986; Ketdhat 1987; Reynolds 1989, 1992) and functional aspects through use-wear analyses of core tools (Bannanurag 1988) and flake tools (Pookajorn 1985). Residue analysis may help to detect plant remains and thus define stone tool functions (e.g., Loy *et al.* 1992). Nevertheless, it is clear that many fundamental problems remain; concerning processes of stone procurement, manufacture, use, maintenance and discard, and temporal changes in lithic technology organization. Moreover, lithics usually comprise only a small portion of complete technologies (Shott 1986; Nelson 1991) and we should pay more attention to shell and bone technology.

#### Social System

I use the term "band" as a conceptual framework to study the data of this period. Bands are social groups composed of mobile groups of hunter-gatherers who occupied their sites on mainly a seasonal cycle, with low population densities. Such societies tend to form relatively small and fluid social units, often characterized by a relative lack of institutionalized internal social inequality (Fried 1967; Service 1962). In Thailand, the scale of social organization in this period has still not received much attention compared to technology and subsistence. Ethnoarchaeological and comparative cross-cultural studies, together with regional surveys, are all essential for gaining insights into social systems.

#### PROBLEMS OF CULTURAL PROCESS: THE ORGANIZATION OF MOBILITY

The post-Pleistocene period in Southeast Asia has been viewed as one which experienced major economic changes, particularly in the context of domestication. Unfortunately, no convincing explanations for these changes have been given. I am interested in explaining this adaptive process through considering the role of mobility. To study the process of domestication, we must first develop a framework for understanding the organization of hunter-gatherer mobility and how it changed over time.

Researchers (e.g., Yellen 1977; Hayden 1981; Binford 1982, 1990; Eder 1984; Kelly 1983, 1992; Shott 1986) have shown that the mobility patterns of hunter-gatherers are closely tied to the distributions of resources. Recent models conceptualize mobility as of two different types: logistic and residential (e.g., Binford 1980, 1990; Kelly 1983, 1992). These two types, idealized endpoints

of a continuum, are responses to the temporal (seasonal) and spatial clustering of resources. Residential mobility is characterized by frequent moves of all members of a camp from one place to another, low inputs of time and energy to the food search) and regular daily foraging activities within a relatively homogeneous environment. Logistical mobility involves a base camp from which task groups fan out to exploit specific resources, high time and energy inputs, food storage and less regular daily foraging within a relatively heterogeneous environment. Two additional factors are important in seasonal environments - resource accessibility and resource monitoring potential (Kelly 1983). In regions such as the humid tropics with high effective temperatures and a high ratio of primary to secondary biomass, accessibility is low. Seeds and nourishing roots are small, dispersed and often poisonous. The costs of monitoring various resources are affected by seasonality and primary biomass.

To construct a specific theoretical framework applicable to Thailand, we need to consider the nature of environments in Southeast Asia with one or two dry seasons each year. Many plants and animals are only available and abundant during particular seasons. Primary biomass is lower than in everwet rainforests but relatively more accessible for herbivore and human consumption (e.g., Hutterer 1982b; Bourliere 1983; Golley 1983). I have recently investigated tropical savanna environments in western Thailand in order to formulate a model appropriate for hunter-gatherer settlement and subsistence strategies in the seasonal tropics. The basics of this model are:

- 1) In the wet season, a time of high temperatures and high rainfall, there will be greater resource abundance and diversity, greater spatial homogeneity in resource availability, more spatial dispersion of resources, and more unpredictability in locating and monitoring them because plants and animals are spatially available and abundant during the rainy period. These circumstances will increase the use of residential mobility strategies involving more frequent moves of camps closer to resources. Moreover, foragers will tend toward greater dispersion into smaller groups.
- 2) In the dry season, a time of high temperatures and low rainfall, there will be lower resource abundance and diversity, higher spatial heterogeneity in resource availability, more spatial clustering of resources and greater predictability in locating and monitoring them. In particular, underground primary biomass (i.e., roots) is more important and available during the long dry period. It is expected that logistical mobility

strategies and storage will be employed to cope with the spatial and temporal heterogeneity in resource availability. Foragers will tend toward aggregation at a central place and the formation of specialized task groups for resource extraction and processing.

Based on the above, how is such variability in seasonal resource availability and in mobility strategy expressed in the archaeological record? The first hypothesis above proposes that residential mobility strategies in the wet season should involve comparatively small groups and be effective in exploiting a relatively large variety of resources distributed evenly over the landscape. Under such conditions, emphasis in the settlement pattern should be on residential camps smaller in size than those occupied during the dry season. The foraging radius around each camp should be relatively small (c. 5 km). In addition, due to the high frequency of residential moves, the durations of occupancy of individual camps will tend to be short. Therefore, sites deriving from such wet season camps are likely to be small and have very low archaeological visibility.

The following patterns would be expected in the archaeological assemblages associated with such wet season sites:

- 1) A relatively high diversity in both floral and faunal remains, indicating resource diversity.
- 2) Among the faunal remains a relatively unbiased representation of different animal parts indicating field processing and transport of complete animals back to the camp, due to the relatively short foraging radius.
- 3) Tool kits should be relatively small, lightweight and multifunctional indicating both relatively high diversity in extractive activities and constraints in transporting elaborate assemblages in the context of frequent residential moves.
- 4) Relatively limited used of storage.
- 5) Predominantly local lithic raw materials and an expedient stone tool technology.

The second hypothesis above proposes that, in the dry season, a preference for logistical mobility strategies should occur in response to the temporal and spatial heterogeneity in resource availability. Such strategies would involve a small number of residential moves, the organization of task groups to procure specific resources from a wider foraging radius, the transport of these resources to the residential camps, and provisions for storage. Consequently, logistical mobility strategies can be recognized in terms of settlement patterns involving residential camps, specialized extractive locations, and caches. The residential camps are the centers of subsistence activities, the loci out of which foraging parties operated and where



some processing and manufacturing occurred. They should be represented by large and highly visible sites. Specialized extractive locations refer to places away from the central camp, where particular subsistence tasks were carried out (e.g., plant harvesting and processing, lithic processing, animal killing and butchering). Such specialized sites generally will have relatively low visibility, except where a single location was visited and used consistently for many years. Dry season archaeological assemblages would be expected to exhibit the following patterns :

- 1) Relatively low diversity of floral and faunal remains in the residential camps, indicating lower resource diversity and a higher degree of "targeting" by specialized task groups.
- 2) A strong bias in the proportional representation of different body parts (particularly of larger animals) among the faunal remains in residential camps, indicating field processing and transport of high utility portions over relatively long distance.
- 3) Tool kits in the residential camps should show a relatively high level of diversity of functionally specialized tool types, indicating the activities of specialized task groups rather than the transport of complete residential inventories.
- 4) Artifactual assemblages, faunal remains and floral remains in special activity sites should be of very low diversity and highly specialized.
- 5) High density and low diversity of floral or faunal remains as well as their association with special archaeological features should indicate storage and caching facilities.

During 1989 and 1990 I conducted fieldwork in the Lower Khwae Noi basin in Thailand, which provide data necessary to test these hypotheses. The fieldwork involved both systematic surface survey and test excavations in an area of 225 km<sup>2</sup>. The survey area was chosen because it included maximal topographic and environmental variability from karstic uplands to alluvial lowlands. Test excavations were carried out in two sites representative of the major site classes. The latter were defined in terms of location and content. These investigations, with additional information from previous research in the region (e.g., Pookajorn 1984; van Heekeren and Knuth 1967), provide data for analyzing the size and organization of settlement systems during the Late Pleistocene and early Holocene, as well as for reconstructing early post-Pleistocene environments and subsistence patterns, determining aspects of seasonal usage of sites and constructing an absolute and relative chronological sequence. One major aim of these analyses is to deter-

mine whether different settlement sizes and artifact assemblages were used in wet and dry season occupations. Seasonality will be investigated using faunal and botanical remains. Qualitative and quantitative analyses of the data are currently being conducted. The information derived from the various laboratory analyses will show the extent of both spatial and temporal variability and its patterning. The patterns established in this way will be compared with the hypotheses outlined above.

#### CONCLUSION

Research on the post-Pleistocene in Thailand is at an exciting stage because the available data can make a significant contribution to our future research directions. This paper synthesizes and examines the current research status relevant to the three goals of anthropological archaeology. In addition, based on an ecological approach I provide an example of mobility organization as one adaptive process to explain the subsistence and settlement subsystems of the post-Pleistocene cultural systems through the material remains in western Thailand. I show how we can develop concepts and techniques for systematically assigning cultural meaning to variability in the archaeological record from an anthropological perspective. Moreover, we have to work back and forth between our conceptual frameworks and data. Evidently, there is still much to be done on fundamental issues before a regional synthesis of cultural developments in the post-Pleistocene can be constructed, and a higher level of interpretation and explanation achieved.

To close, I would like to offer several suggestions for advancing Thai archeology. First, we need to adopt a problem-oriented approach to our research, by establishing the linkage between our conceptual frameworks and the archaeological record by employing cross-cultural comparative studies. The pursuit of this task, and the examination of the temporal and spatial variability in cultural systems, will not be simple. It is important to collect adequate data in a systematic manner within a regional context. Second, there must be a recognition of the high degree of temporal and spatial variability in the archaeological record in Thailand. There exists the danger that we will lose sight of our ultimate goal of archaeology if we rely heavily on interpretations of the past based on a few sites in specific regions to explain all of the cultural developments in this period. Over the past several decades archaeologists have grown more sophisticated in methods of data collection; we now have to be more skeptical about the reliability of the material collected. Third, I respect all archaeologists who have different theoretical frameworks from me, I think as far as

possible we should explicitly define the issues we are working on and lay out criteria or reasons behind our methodological applications. Results of our work are always significant contributions to future research. Finally, it is necessary and important for all archaeologists to publish high quality reports on data they have collected, analyzed and described. This is a thorny problem for all of us because we have very few publishing arenas for such detailed reports. Without such publication it will be very hard to correlate and evaluate inter-site variability, as well as develop syntheses of regional contexts, with full confidence.

#### ACKNOWLEDGEMENTS

I would like to thank Elisabeth Bacus, Frances Hayashida and Carla Sinopoli for their comments on various drafts of this paper. I wish to express my gratitude to John Speth, Karl Hutterer and Henry Wright for their encouragements, comments, advice, and in particular their patient reading of my dissertation proposal which partially appears in this paper. Also, I wish to thank my students at Silpakorn University who shared various experiences with me in the field. This paper was made possible by a number of grants. The survey in 1989 and excavation in 1990 were supported by the Development and Research Institution, Silpakorn University. Writing this paper at the University of Michigan was assisted by a grant from the Museum of Anthropology, University of Michigan, a Developing Training fellowship from the Wenner-Gren Foundation for Anthropological Research, and a Southeast Asian Introductory Fellowship. Finally, I thank the Rachkam School of Graduate Studies for sponsoring my trip to the 15th IPPA congress and the Indo-Pacific Prehistory Association for my accommodation in Chiang Mai. Any mistakes are to be blamed on me.

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