TRADE, TECHNOLOGIES & TRADITIONS

THE ANALYSIS OF ARTIFACTS RECOVERED FROM A METAL AGE BURIAL SITE IN DISTRICT UBUJAN, TAGBILARAN CITY, BOHOL

A thesis submitted to the faculty of
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In partial fulfillment of
The requirements for
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Master of Arts
In
Anthropology

by

Andrea Yankowski

San Francisco, California

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CERTIFICATION OF APPROVAL

I certify that I have read *Trade, Technologies and Traditions: The Analysis of Artifacts Recovered from a Metal Age Burial Site in District Ubujan, Tagbilaran City, Bohol* by Andrea Yankowski, and that in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirements for the degree: Master of Arts in Anthropology at San Francisco State University.

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THE ANALYSIS OF ARTIFACTS RECOVERED FROM A METAL AGE BURIAL SITE IN DISTRICT UBUJAN, TAGBILARAN CITY, BOHOL

Andrea Yankowski
San Francisco State University
2005

In August 1998 a Metal Age burial site was discovered during a construction project in District Ubujan, Tagbilaran City, Bohol, Central Philippines. The site was destroyed but many of the artifacts were recovered and donated to the provincial museum in Tagbilaran City. The subsequent analysis of the recovered artifacts from the site provides important information on early trade, technologies and traditions during the Metal Age in this region. Using a quantitative, qualitative and comparative approach, the analysis reveals that Bohol was an active participant in a regional network of maritime trade. Numerous foreign goods reached the island including iron tools and glass beads. There was also an active trade in locally or regionally produced *Sa-Huyhn Kalanay* earthenwares. Furthermore, an analysis of the quantity, quality and variety of grave goods, as well as the type of internment, suggests an overall trend towards variation and elaboration of burial traditions. These results correlate with findings from other Metal Age sites in the Philippines and will provide important data for future comparative studies.

I certify that the Abstract above is a correct representation of the content of this thesis.

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Gary W. Pahl Chair, Thesis Committee Date

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INTRODUCTION

Prior to European contact, the political economy of the Philippine Islands was made up of numerous dispersed trading societies ruled by local chiefs. These societies were independent political entities economically linked together with one another through networks of trade. Early historic records note the existence of "kingdoms" in the Philippines by the early second millennium AD, however, little is known about their formation, development or organization (Scott 1967:61-90; Junker 1998:295-97). Archaeological research suggests that many of the key characteristics of complex political-economies (i.e., chiefdoms) emerged during the Metal Age (500 BC- AD 960) (Bacus 1996b; Junker 1990). This includes the development of long-distance trade in goods, advances in technologies and craft specializations, and signs of increased sociocultural complexity, such as marked social differentiation in housing and burials. These traits manifest themselves more fully during the Protohistoric Period (AD 960 – AD 1521) with the establishment of numerous independent polities and trading centers dispersed throughout the archipelago (Bacus 1996b; Bacus 1997; Nishimura 1988; Junker 1990; Junker 1994a)

Little is known about the development of the island's early political-economies or societies. Numerous Metal Age sites have been identified, but only a handful have been

well-excavated or studied. As a result, there has been a lack of sufficient data to explore questions relating to the long-term socio-political development of the islands.

The aim of this research project is to gain a better understanding of the development of the early political-economy and societies of the Philippine Islands during the Metal Age. In particular, this research focuses on the documentation and analysis of a collection of materials recovered from a Metal Age burial site on the Island of Bohol in the Central Philippines.

Burials are important archaeological sites for analyzing many aspects of early social organization and behavior. This is due to a fundamental principle that individuals treated differently in life are also generally treated differently in death (Wason 1994, Tainter 1978, Peebles & Kus 1977, Pearson 1982, Pearson 1999). This manifests itself archaeologically the same way it does in life, through symbolic representations of wealth and status differentiation.

In the Philippines, prehistoric burials display evidence of increased social differentiation diachronically from the Neolithic Period onwards (Junker 2000:164-180; Junker 1998: 300; Junker 1993a; Tenazas 1974; Nishimura 1988, Fox 1959). Burial practices were often elaborate, with burials frequently containing large quantities of utilitarian, ritual and/or "wealth" items. The analysis of these burials and burial practices provide

important data for analyzing many aspects of changes in the island's early political-economy and society through time.

The focal point of this thesis is the examination and analysis of materials recovered from a burial site in the District of Ubujan on the island of Bohol in the Central Philippines. The Ubujan burial site contained over 1,800 earthenware sherds, 78 earthenware vessels, 130 glass beads, 31 fragments of iron implements, 96 human teeth, and a few glass bracelets and shell and stone artifacts. The range of artifact types, styles and technologies was extensive and provides important information on early trade, technologies and burial traditions in the region. Moreover, this project is the first detailed study of a Metal Age burial site on the island and one of only a handful from the Central Philippines; thus, it contributes to our knowledge of the prehistory of the region.

In my analysis, I used a quantitative, qualitative and comparative approach. Each artifact class was analyzed independently for a range of morphological, stylistic and technological attributes. The sum of these results was then compared with data from other Metal Age burial sites in the region. Comparative data was obtained from both primary and secondary sources, such as published and unpublished site reports (e.g, reports from the National Museum of the Philippines), and from first hand observations of various museum collections. This data is also analyzed within a broader geographical framework, i.e., the Southeast Asia region, to understand the significance of this

particular burial site within the broader political-economy of the region. Some of the particular questions I addressed are the nature and extent of craft production, trade and social interaction in the region; the nature of the socio-political and/or economic relationships that existed among these sites; and the social and cultural meaning of these artifacts within their specific site context.

The main objectives of this project are to 1) gain a better understanding of early trade, technologies and burial traditions in this region, from both a local and regional perspective; 2) to offer theoretical insights into the long-term development of the political-economies in the region; 3) to refine our understanding of Philippine archaeology through comparative site analyses; and 4) to provide comparative data for future research at other relevant sites in the Philippines and/or Southeast Asian region.

The chapters of this thesis are organized as follows: 1) I provide the theoretical background guiding my research and a review of the current literature on the topic; 2) I discuss the methods used and the results of my analysis; and 3) I provide a discussion of the analysis, my conclusions, and suggestions for future research.

BACKGROUND & THEORETICAL FRAMEWORK

The first millennium AD was an important period of sociopolitical change in the Philippines. Many changes took place in the social, economic and political landscape of the islands, which by the second millennium AD, led to the integration of the island's numerous dispersed communities into distinct regional polities with complex economies and political hierarchies, i.e., chiefdoms (Solheim 1981; Bacus 1996b; Bacus 1997; Nishimura 1988; Junker 1994a; Junker 2000). The term chiefdom is commonly used to describe the structure of the Philippine's sociopolitical system during the pre-European contact period (Junker 2000). This term suggests that there was a level of political, economic and social complexity within the society which is considered characteristic of prestate societies (Service 1967, Earle 1978, Earle 1991). This would include a class-based, tiered social structure supporting multiple levels of political authority as well as a social structure organized to support an economic system for the production, acquisition and distribution of goods. Archaeologically, the formation and development of these characteristics are identified by a gradual increase in population and settlement sizes, more pronounced social differentiation and stratification, and an increase in the types and variety of both local and non-local trade goods (Junker 1998; Kirch 1984). In the Philippines, these traits become more pronounced during the first millennium AD, signifying a progressive change towards a more complex socio-political structure in the society at that time.

A number of archaeological research projects have focused on the nature of and the development of chiefdom level societies in the Philippines prior to European contact. These research projects have explored how and why particular types of socio-polical systems emerged and were transformed over time. They also attempt to interpret the various archaeological indicators of social "complexity". Some of the key research themes these projects have addressed include the impact and importance of 1) craft production and specialization (Junker 1994b, Junker 1993b, Longacre et al. 1988); 2) intra-regional and long-distance trade (Nishimura 1988; Junker 1990; Junker 1996; Junker 1994a; Hutterer 1977); 3) inter-polity interaction and alliance networks (Bacus 1996: Junker 2000); 4) agricultural intensification (Bacus 1997); 5) differential access to resources and luxury/prestige goods (Bacus 1999, Junker 1993b; Junker 2000; Junker et al. 1994); and 6) political ideologies (Bacus 1999) to the formation and development of chiefdom societies. These projects have taken a range of methodological and theoretical approaches including comparative site analyses (Junker 2000; Bacus 1996); systematic regional excavations and surveys (Hutterer & Macdonald 1982; Bacus 1997); mortuary studies (Junker 1993a); technological analyses (Dizon 1983; Dizon 1988); and holistic approaches which integrate the use of ethnoarchaeological research (Longacre et al 1988; Longacre and Stark 1992), ethnohistorical texts and oral histories (Junker 2000; Scott 1984).

Traditional theories on the formation of chiefdom societies emphasize the evolutionary nature of societies cross-culturally (Trigger 1989). Mid-nineteenth century western theorists such as Tylor and Morgan proposed unilinear models of cultural evolution in which societies progress through distinct evolutionary stages of socio-cultural development, which they defined as savagery, barbarism and civilization. Similarly, Chinese Marxist models proposed unilinear models which defined the stages of socioeconomic development as progressing from primitive to slave and finally feudal society (Trigger 1989:174-177). More recent western evolutionary models are often referred to as neo-evolutionary theories, or emerging state theories (Trigger 1989:289-328). This includes Service's (1967) four stage typology of social evolution in which evolutionary stages are defined by a society's level of structural organization into "bands, tribes, chiefdoms and states". These theories share a commonality as they all attempt to categorize societies into discreet developmental stages by defining cross-cultural regularities of socio-cultural development.

Hierarchical organization is an important concept underlying these traditional theories of socio-political development and complexity. These theories maintain that there is a direct correlation between the degree of hierarchical organization in a society and the level of sociopolitical complexity. This hierarchy may exist within the political, economic, or social structure of a society. For example, Central Place Theory is a model used in archaeological settlement studies that is derived from geographic theory which

maintains that as societies become more economically advanced, a hierarchical settlement pattern will develop for the collection and distribution of manufactured goods and resources (Christaller 1964; Crumley 1976). According to this theory, under idealized conditions, a primary center will be surrounded by secondary centers which are then surrounded with their own smaller satellite centers and so forth. It assumes a centralized system for the production of goods with an uneven dispersal of these goods from higher to lower-ranked settlements. Similarly, Prestige Goods Exchange Theory assumes a core and periphery model for the exchange of wealth items where tribute is paid "inwards" to paramount leaders and prestige goods flow "outwards" to local chiefs (Preucel & Hodder 1996:102). Both these models suggest that ranking is inherent to societies as they progress and become more complex.

More recent research has expressed dissatisfaction with strict evolutionary and hierarchically based theories of sociopolitical development that equate increased hierarchy as synonymous with increased complexity (Trigger 1984; Potter and King 1995). This skepticism of and the rejection of neo-evolutionary theories developed in the 1970's under the New Archaeology (a.k.a. Processual Archaeology) and became one of the hallmarks of Post-Processual Archaeology, which denounced Processual Archaeology's overwhelming emphasis on using archaeological data to formulate general laws of human behavior (Trigger 1984). Rather, both Post-Processual and Critical Theory challenges us to look at the multiplicity of historical experiences and

circumstances, in order to understand the difference between and among cultures (Trigger 1984). As such, we need to consider the possibility of alternative patterns of socio-cultural development, outside these neatly, predefined evolutionary categories, and consider the particular historical and social circumstances that shaped the region's development.

Carole Crumley's (1995) research has been instrumental in challenging the use of strict hierarchical models to explain the course of socio-political development in Southeast Asia. She suggests that the concept of *heterarchy* may be more appropriate for understanding the region's unique historical development. The term heterarchy posits that structures can coexist in such a way that "each element is either unranked relative to other elements or possesses the potential for being ranked in a number of ways" (Crumley 1987:158). It generally implies a horizontal rather than vertical structuring, or a level of impermanence in vertical structuring in which structures are situationally ranked in relationship to one another and where power relationships are constantly changing in time and space (White 1995). It is a more contextual and flexible explanatory model of social evolution, as it emphasizes the fluidity of social relationships and interactions (O'Reilly 2001).

Many researchers have recognized the value of using a heterarchical model to understand the sociopolitical development of Southeast Asia (White 1995; O'Reilly 2001; Junker

2000; Wolters 1999). It has been suggested that Southeast Asia followed a relatively unique trajectory in state formation characterized by the development of dispersed and inter-dependent politico-economic centers, rather than the classic core and periphery model. This model has been tested in various regions of Southeast Asia and may help to explain why particular types of political, social and economic systems developed in the region.

For example, White (1995:101) has pointed out certain commonalities of socio-cultural developments in the Chao Phraya, Irrawaddy, and lower Mekong rivers, and the central and southern coastal zones of Vietnam. This includes the relatively late development of states regardless of the fact that many key economic and technological features of pre-state societies were present (e.g., extensive agricultural production and metal working). White embraces the concept of heterarchy for the region, noting that from at least the second millennium BC onwards, the areas local economies tended to be characterized by household-based units of production, community-based economic specialization, and competitive, multi-centered or overlapping mechanisms for the distribution of goods, rather than centrally controlled structures (White 1995:104). These traits manifest themselves archaeologically through the marked localization and specialization of material culture (White 1995:105; Wolters 1999).

Likewise, Junker's (2000) research in the Philippines notes that the political landscape of the archipelago between the tenth to sixteenth centuries was characterized by decentralized political structures and a state of political instability which caused oscillations between simple and complex forms of political structures. She refers to this type of internal power shifting as "political cycling" (Junker 2000:85). She attributes political fragmentation, shifting power alliances, changing external trade relations and interpolity warfare as significant factors that shaped the early political landscape of the Philippines.

Ecosystem theories have also played an important role in our understanding of the socio-cultural development of Southeast Asia. Ecosystem theories (e.g., deterministic ecology) emphasize the importance of studying cultures as adaptive systems to specific environmental variables (Trigger 1971:325-329). According to these theories, social evolution results, at least in part, from the interaction of people with their physical and social environment (Hutterer and Macdonald 1982). For example, Hutterer's (1976) research in Southeast Asia notes that the humid, tropical environments of the region tend to favor smaller social units with increasing specialization and interdependence through time accounting for the great diversity in social and economic adaptations in the region. Similarly, Bronson (1977) notes that the diversity of local resources in Southeast Asia tends to favor economic specialization among distinct ecological zones. These zones are generally divided among highland and lowlands with the highlands relying on the

lowlands for littoral products such as fish, salt and imported goods, and conversely, the lowlands relying on the highlands for forest products, livestock and agricultural goods**.** This creates a measure of resource dependence that is more-or-less egalitarian in nature among disparate social groups.

Little is known about the development of chiefdom societies in the Philippines; however, evidence suggests that the island's early socio-political structures were heterarchical in nature. Archaeological research has noted the predominance of household or community-based production and specialization, multi-centered mechanisms for the distribution of goods, flexibility in social systems for personal achievement, and cultural pluralism (Nishimura 1988; Junker 2000). Many of these traits became pronounced during the Metal Age. This includes an expansion of highland and lowland settlements along key coastal and riverine points (Hutterer & MacDonald 1982), and more diversity of craft specialization on a regional basis. For example, burial pottery became more ornate and diversified with elaborate forms and styles, such as pedestaled bowls decorated with incised designs and cut-outs, pouring vessels with multiple spouts, and anthropomorphic vessels and burial jars (Lim 1987; Solheim 1981).

Lateral differentiation or heterarchy should be considered as a heuristic device for understanding the development of early polities in the Philippines. Small (1995:82) points out that "heterarchical formations can be a path to complexity themselves".

Furthermore, by using a more flexible model, such as heterarchy, we are able to uncover the intricacies of early Filipino culture rather than placing it within a rigid model. It may not provide a neat "packaged" explanation, but should help us gain a better understanding of the processes and causalities of change.

LITERATURE REVIEW

The Philippine archipelago is located in Island Southeast Asia, just east of Vietnam, south of Taiwan, and north of Borneo and Celebes. See Figure 1. It is bordered on the west by the South China Sea, on the northeast by the Philippine Sea, and to the south by the Straits of Celebes and the Straits of Sulawesi. The archipelago is made up of over 7,000 islands, which extend over 1,000 miles from the northernmost to southernmost points. Of these 7,000 islands, only about 900 are inhabited and eleven make up the bulk of the landmass.

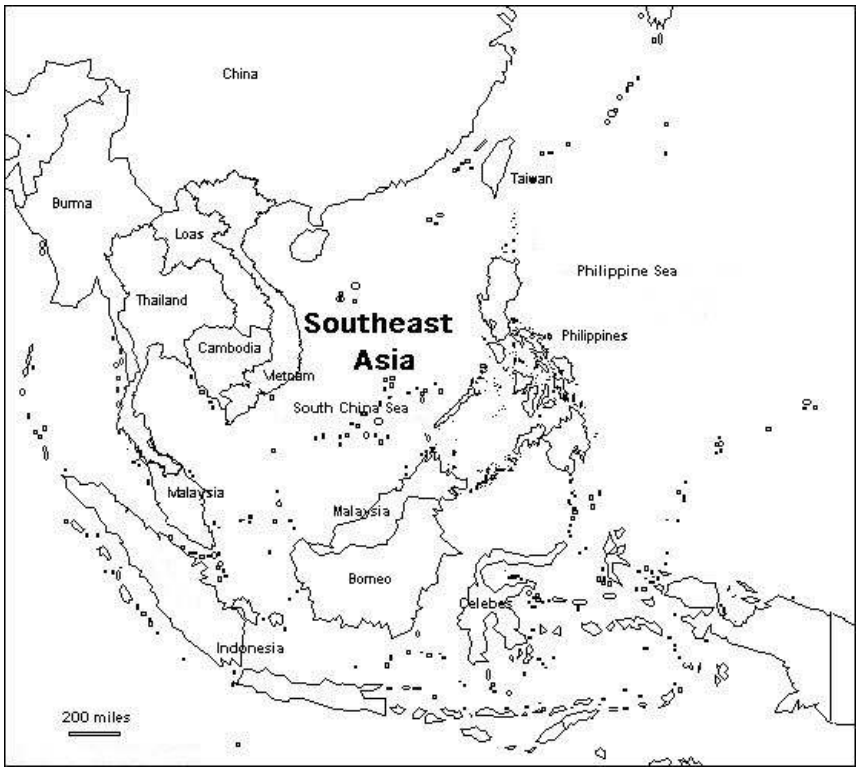

Figure 1: Map of Southeast Asia

The prehistory of the Philippine archipelago has been greatly influenced by the local geography and geology of the region. Being an island environment with a relatively low population density, there has traditionally been a relative amount of isolation among neighboring islands. However, from the late Neolithic onwards, seafaring played a critical role in the increased interaction among the islands bridging many of the isolation gaps among various populations (Solheim 1981; Solheim 1996; Solheim 1999:58; Diem 2004). This has been demonstrated archaeologically by the increase in imported trade goods from approximately 500 BC onwards, and much later, by the large quantities of Chinese ceramics and other Asian tradewares imported into the islands during the Song (AD 960-1279), Yuan (AD 1279-1368) and Ming (AD 1368-1644) Dynasties.

The history of archaeological research in the Philippine is rather limited. The first large scale archaeological project in the islands was headed up by American anthropologist Carl E. Guthe. Guthe led the University of Michigan's archaeological expedition in the Central Philippines from 1922 to 1925. This expedition focused on identifying and documenting the vast array of burial caves in the islands and resulted in a substantial collection of earthenware and porcelain vessels, many which are currently housed in the University of Michigan's collections. Most of the surveyed sites were dated to the Metal Age and Protohistoric Periods and a summary report of the findings was published by Guthe in 1927 (Guthe 1981).

American anthropologist H. Otley Beyer was the first anthropologist who committed his career to anthropological and archaeological research in the Philippines; thus, he is generally considered the founder of Philippine archaeological research (Solheim 1969:17). Beyer graduated from the University of Denver in 1905 with a degree in chemistry and geology. Shortly thereafter, he was assigned to an ethnological survey in the Mountain Provinces of Luzon. After nearly three years in Ifugao, he returned to the United States for graduate training in anthropology and upon completion, returned the Philippines. Beyer was named the Chair of the Anthropology Department at the University of the Philippines in 1925. Shortly thereafter, he became more involved in archaeological research and published his first archaeological paper titled "Recent Discoveries in Philippine Archaeology" in 1926. His career continued throughout the war years and up until the 1950's (Solheim 1969). One of his most important archaeological publications was the *Outline Review of Philippine Archaeology by Islands and Provinces* (Beyer 1947). This publication was a summary report of many of the archaeological sites he surveyed throughout the archipelago during his career.

American anthropologist Wilhelm G. Solheim II is another important figure in the history of Philippine archaeology (Shutler 2004). Solheim graduated from the University of California, Berkeley in 1949 with a master's in anthropology. At U.C. Berkeley, Solheim worked extensively with pottery collections excavated by E.W. Gifford in Fiji. This was

his first experience working with earthenware pottery (Solheim 2003). Solheim started his research in the Philippines in the 1950's, working alongside Beyer for a number of years, pursuing his interest in both ethnographic and archaeological pottery. He received his Phd from the University of Arizona in 1959 with the completion of his dissertation on The Archaeology of the Central Philippines (Solheim 1964).

Throughout his career, Solheim participated in a wide array of excavations and research projects throughout the Southeast Asia region (Solheim et al. 1959; Solheim et al. 1965; Solheim 1968); however, he is perhaps best known for his in-depth research and expertise on prehistoric Southeast Asian earthenwares (Shutler 2004; Stark 2004). His research on Metal Age pottery from the region dates back to the 1950's when Solheim first noted significant similarities in the earthenwares recovered from the Sa-Huynh site in Vietnam and the Kalanay Cave site in the Philippines (Solheim 1961a). These similarities were subsequently noted among pottery recovered from other sites in the region. Based on these similarities, Solheim defined a pottery type known as the Sa-Huyhn Kalanay pottery tradition. This pottery tradition, which will be discussed in more detail later, has formed the basis for subsequent comparative studies on Metal Age pottery in the region. Solheim also published a book in 1964 titled *The Archaeology of the Central Philippines: A Study Chiefly of the Iron Age and its Relationships,* which was recently updated in 2002 *(*Solheim 1964; Solheim 2002*)*. This publication provides the most comprehensive summary of the archaeology of the Metal Age in the Central Philippines, to date. His

research and publications are numerous and have provided an important foundation for archaeologists working in the region today (Ronquillo 2004)

In the 1960's, the National Museum of the Philippines became more active in archaeological research and implemented a large scale survey and excavation project in a complex of caves known at the Tabon Caves, on the southwest coast of Palawan Island. See Map 2. From 1962 to 1966, sixteen caves were excavated with deposits ranging from the Paleolithic to the Protohistoric periods. Most of these sites were burial sites that were rich in artifacts dating from the late Paleolithic to the Protohistoric Period. Project Director Robert Fox (1970) created a chronology of the recovered cultural assemblages, and noted that the Metal Age sites included bronze and iron tools; glass, gold, shell and stone (carnelian and jade) beads; glass and jade bracelets; jade ornaments; and earthenware pottery and burial jars. Carbon-14 dating was used to establish absolute dates for some of these cultural sequences, which became a base-line from which other archaeological sites could be relatively dated. The results of this study have provided a vital resource for comparative studies throughout the archipelago and beyond.

In the 1990's, the National Museum of the Philippines excavated another important burial site, Ayub Cave in Maitum, South Cotabato on the Island of Mindanao in the southern Philippines (Dizon and Santiago 1996). See Map 2. This burial site was unique as it contained anthropomorphic burial jars (secondary burials), which each portrayed the face

of a unique individual. See Figure 2. 29 burial jars were recovered in-situ and another 94 bags of pottery sherds. Associated artifacts included glass and clay beads, glass bracelet fragments, metal fragments, some modified shell fragments and human remains (Dizon & Santiago 1996:72-73). Other similar sites have been reported in the region, but political instability has hindered further archaeological investigations at this time (Dizon & Santiago 1996).

Figure 2: Anthropomorphic Burial Jars from Ayub Cave (from Dizon 1996)

Some other burials which are of particular importance to this study were recovered in Bacong, Negros in the 1970's. (Tenazas 1974; Tenazas 1977; Cadelina & Perez 1986). See Figure 3. Bacong is located in southeastern Negros, within close proximity to Bohol, just southwest across the Mindanao Sea. In 1972, anthropologists from Silliman University, Negros did some extensive surveying of the region and excavated a site known as the Librado Solamillo site, which yielded five burial urns, each surrounded by

clusters of approximately 35 earthenware pots (Cadelina & Perez 1986). These pots were elaborate and highly varied in form and decorative styles, and accompanying artifacts included paste beads and iron tools. Similarly, in 1973, Tenazas (1974; 1977) from the University of San Carlos, Cebu, excavated a site in barrio Magsuhot, Bacong, which yielded three burial jars and at least ninety decorated earthenware vessels, as well as numerous paste beads and iron implements. The artifacts recovered from these two sites were almost identical, signifying that they were contemporary. Many similarities are noted in my analysis between the Bacong and Ubujan burial sites. For example, they both contained extended and secondary jar burials and many similar artifact types/grave goods (e.g., pottery and glass beads). However, each site also had some very unique artifacts. This suggests that there was contact between the islands, through either social interaction or trade, while at the same time each site also retained its own industries and/or cultural preferences for particular goods.

There have also been some important research projects addressing similar theoretical questions as are posed in this research project. From 1979-1981, a team from the University of Michigan, under the direction of Karl L. Hutterer and William K. Macdonald, implemented a long-term research project in Negros Oriental, Central Philippines known as the Bais Archaeological Project (Hutterer and Macdonald 1982). This research was rather unique for the time as it espoused a processual approach with an emphasis on gaining a better understanding of the long-term social and cultural

development of this region. This was accomplished by studying the regions settlement patterns diachronically, rather than focusing on any one particular site or artifact type. Many individual research projects were incorporated into this project which provided the data to address these large-scale social questions. For example, Laura Lee Junker (1982) completed an analysis of plain earthenware sherds recovered from several sites in the region and identified changes in the quantities and types of local earthenwares over-time. Some of the other projects included regional site surveys, ethnographic studies, and studies on the local geological and biological history of the region. Several archaeologists have continued to build upon this collaborative research which has allowed for a more comprehensive analysis of the changes in the sociopolitical organization in this region from the late 1st millennium BC to the mid-2nd millennium AD (Bacus 1997, Junker 2000; Bacus 2003). It has also provided an important model for other long-term research projects in the Philippines.

The sites and research listed above provide the bulk of the data for my comparative study; however, this list is not exhaustive. Many other summary publications and museum reports were reviewed, as well as provincial museum collections. A list of some of the other Metal Age sites that were important for my comparative studies is included in Appendix 1.

Figure 3: Locations of Archaeological Sites Mentioned in this Text

CHRONOLOGICAL FRAMEWORK

A number of different chronologies have been developed to classify the various periods of Philippine prehistory. See Figure 4. The most common chronology found in the literature is based on European terminologies which classify periods of prehistory based on the presence and/or absence of specific artifact types, such as stone tools, metal implements, earthenware pottery, trade beads, and tradewares. While these time periods are defined by the presence or absence of specific artifact types, they more importantly reflect aspects of non-material culture, such as the island's political, social and economic organization. For example, the Paleolithic Period (400,000 BC – 3,000 BC) is characterized by the prevalence of hunting and gathering activities along with the development of core and flake stone tool technologies; the Neolithic (3,000 BC – 500 BC) is characterized by the introduction of shifting agriculture based on 'dry' rice, gabi, millet and other root crops, jade and nephrite, and polished ground stone tool technologies, shell tool technologies, the first earthenware pottery, and new (e.g., jar) burial practices; the Metal Age (500 BC – AD 960) is characterized by the introduction of metal tools, glass and stone beads, and more diverse and sophisticated pottery types, an increase in trade and regional craft specializations, more permanent settlement patterns, wet rice agriculture, and more elaborate burial practices; and the Protohistoric Period (AD 960 – 1521) witnessed the growth of complex polities in the islands, and the expansion of external contact and trade noted by the first appearance of Asian stonewares

and porcelains and the first foreign written references (e.g., Chinese) about the islands (Dizon 1983).

There has been some controversy about the use of these chronological terms to categorize the prehistory of the archipelago. Filipino anthropologist F. Landa Jocano (1998:11-12) criticized Southeast Asian archaeologists' unquestioning reliance on these "western" terms to describe the sequence of cultural developments in the Philippine Islands. He deemed it inappropriate to place indigenous developments within a system based on the European archaeological record, arguing that it can lead to misinterpretations of the data. For example, the Paleolithic and Neolithic periods are defined by changes in lithic technology, which may not have been as important of a raw material in Southeast Asian island societies as it was in Europe; therefore, he argues that by using these naming conventions, researchers may be misled from analyzing other material evidence which may be equally or more significant. In lieu of using these European naming conventions, Jocano proposed a five-phase system based on "recognizable and dominant features of technological artifacts and cultural elaborations" (Jocano 1998:97). The five phases consist of the *Mythic* (predating the archaeological record), *Formative* (50,000 to 500 BC), *Incipient* (800 BC to AD 1), *Emergent (*AD 1 to 1400) and *Baranganic* phases (AD 1400 to 1600) (Jocano 1975; 1998).

In the 1970's, archaeologist Wilhelm G. Solheim II refined Jocano's five-phase model. His system used similar terminology, but he revised the dating to be more inclusive of archaeological data, rather than basing the divisions solely on "theoretical levels of social and cultural development" (Solheim 1981:22). He divided Filipino prehistory into the *Archaic* (up to 5,000 BC), *Incipient* (5,000 to 1,000 BC), *Formative* (1,000 BC to AD 500) and the *Established Filipino* (AD 500 to 1521).

Both Jocano's and Solheim's models have been useful for characterizing and understanding indigenous sociocultural and economic developments in the Philippines; nevertheless, the more standard European terms still predominate as a more practical system for comparative studies. This is because if each country self-defined their periods of prehistory with their own terminologies, it would be difficult to understand the literature and make cross-cultural comparisons. But at the same time, the Periods defined by Solheim allow for a more introspective analysis of the archaeological data. Therefore, in my thesis, I have chosen to use the more encompassing term "Metal Age", while also keeping in mind that these terms correlate with the *Late Formative*/*Early Established* periods as defined by Solheim.

Lastly, it is important to note that in other parts of the word, the Metal Age is divided into distinct subdivisions known as the Copper, Bronze and Iron Ages, each representing discreet time divisions. In much of Mainland Southeast Asia, these differentiations are

made; however, in Island Southeast Asia bronze and iron were introduced more-or-less simultaneously. Robert B. Fox's research in Palawan noted a distinction between an "Early" and "Developed" Metal Age, but he defined the Early Metal Age to be of "extremely short duration when only bronze, copper, and gold may have been present and the Developed Metal Age commenced with the introduction of iron" (Fox 1979:238). Likewise, Dizon (1998c:123) notes that the copper and bronze phases in Palawan were "brief and transitional", but important. However, in most of the Philippine Islands, bronze and iron appeared relatively simultaneously, as a result of trade rather than local innovation, thereby rendering these subdivisions as of minor relevance, if of any relevance at all in Island Southeast Asia.

Figure 4: Comparative Chronologies of Philippine Prehistory

<table>
<tr><th>Traditional Chronology</th><th>Solheim (1981)</th><th>Jocano (1975)</th><th>Chinese Dynasties (Lowe & Shaughnessy 1999)</th></tr>
<tr><td rowspan="2">Paleolithic
(up to 3,000 BC)</td><td rowspan="2">Archaic
(up to 5,000 BC)</td><td>Mythic
(up to 50,000 BC)</td><td rowspan="2">Mythic</td></tr>
<tr><td rowspan="6">Formative Phase
(50,000 - 500 BC)</td></tr>
<tr><td rowspan="4">Neolithic
(3,000 - 500 BC)</td><td rowspan="3">Incipient
(5,000 - 1,000 BC)</td><td>Xia (2100-1700 BC)</td></tr>
<tr><td>Shang (1700-1027 BC)</td></tr>
<tr><td></td><td>Zhou (1027-771BC)</td></tr>
<tr><td rowspan="3">Formative
(1,000 BC - AD 500)</td><td>Spring & Autumn Period (770-481BC)</td></tr>
<tr><td rowspan="8">Metal Age
(500 BC - AD 960)</td><td rowspan="8">Emergent Phase
(1st - 14th Centuries AD)</td><td>Warring States (480-221 BC)</td></tr>
<tr><td>Qin (221-207 BC)</td></tr>
<tr><td>Han (206 BC - AD 220)</td></tr>
<tr><td rowspan="4">Established Filipino
(AD 500 - 1521)</td><td>Six Dynasties (AD 220 - 589)</td></tr>
<tr><td>Sui (AD 581 - 618)</td></tr>
<tr><td>Tang (AD 618 - 906)</td></tr>
<tr><td>Five Dynasties (AD 907 - 960)</td></tr>
<tr><td rowspan="2">Prohistoric (AD 960 - 1521)</td><td>Sung (AD 960 - 1279)</td></tr>
<tr><td>Yuan (AD 1279 - 1368)</td></tr>
<tr><td rowspan="2">Baranganic Phase
(14th - 16th Centuries AD)</td><td rowspan="2">Ming (AD 1368 - 1644)</td></tr>
<tr><td>Historic
(1521 - present)</td><td>Historic
(1521 - present)</td><td>Historic
(1521 - present)</td><td>Qing (1644 - 1911)</td></tr>
</table>

GEOGRAPHY, GEOLOGY AND ARCHAEOLOGY IN BOHOL

Bohol is the 10th largest island in the Philippines with a landmass of 4,117 square kilometers. See Figure 5. It is located in the southern part of the central group of islands collectively known as the Visayas, with the island of Cebu to the northwest, Leyte to the northeast, and Mindanao to the south.

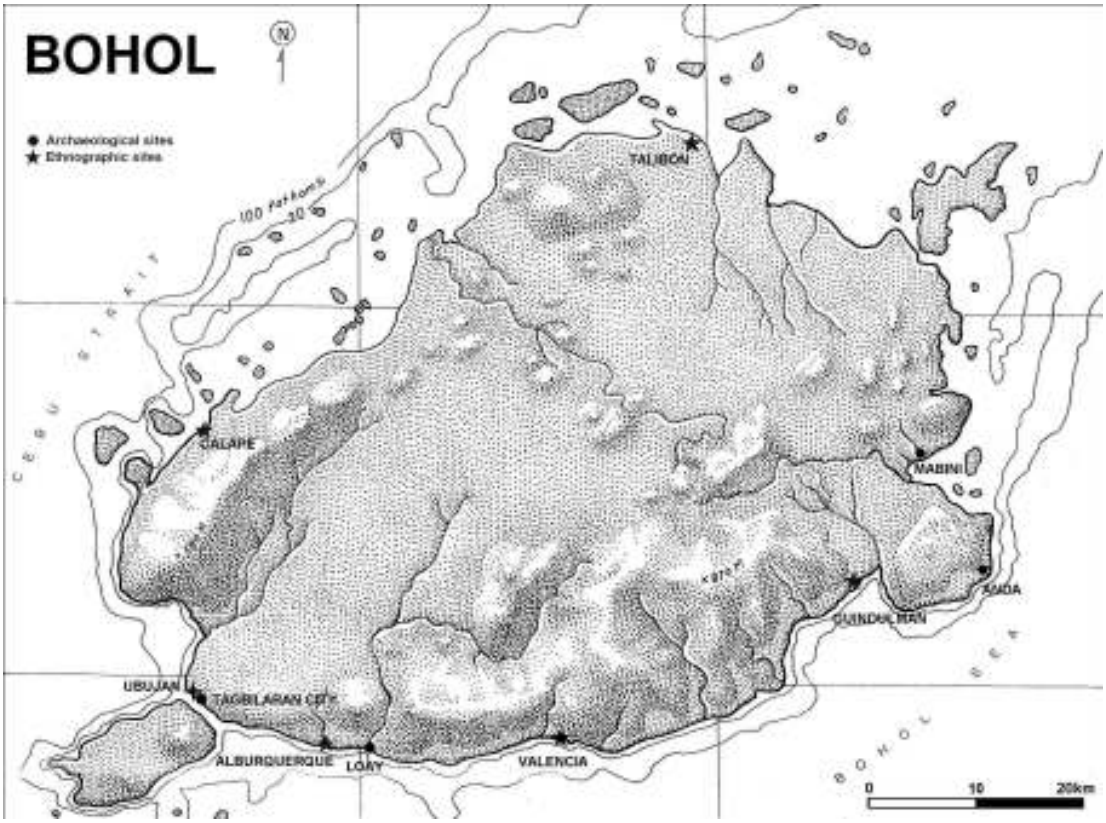

Figure 5: Map of the Island of Bohol (modified after Santiago, n.d.)

The Island of Bohol was formed during the Eocene Epoch, a period of great volcanic and tectonic activity. As a result, the island is heterogenous in lithological character and structural-tectonic fabric. Recent field mapping has helped to clarify the complex geological stratigraphy of the island, including the identification of three distinct basement rock formations overlain by Miocene to Pleistocene carbonate and clastic sedimentary rocks and igneous units (Faustino et al. 1993). Uplifting, characteristic of island arc system, has also left much of the central and southern regions of the island covered by Plio-Pleistocene limestone formations.

The terrain in Bohol varies significantly. The northern and central part of the island is dominated by low rolling hills and broad valleys. Much of this region is rich rice farming plateaus. The southeastern landscape consists of mountainous terrain dissected by deep gulleys and gorges and the island's largest navigatable river. The island's soils are generally clay and silt with sandy soils limited to coastal areas. Much of the coastline, especially in the south, is fringed by mangroves and vast coral reefs.

A number of archaeological research projects have been carried out in Bohol over the last century. These have primarily been mapping and surveying projects, mostly concentrated in and around the numerous cave sites on the eastern coast of the island. Following is a summary of these research projects as well as background information on the location and discovery of the Ubujan burial site and a chronology of the events that

led up to the turnover of the Ubujan artifacts to the Bohol Museum in Tagbilaran City, Bohol.

Background Research in Bohol

Most of the archaeological research carried out in Bohol has been exploratory, i.e., surveying and/or mapping. The first documented explorations on the island were headed by Dr. Carle Guthe in the early 1920's in the Visayas, Mindanao and Sulu (Central and Southern Philippines). During this expedition Guthe reported on the prevalence of cave burials, containing both primary and secondary jar burials, throughout the region. Associated with these burials were large quantities of earthenwares vessels of various forms and styles, including footed vessels with perforations, and vessels with incised curvilinear and rectangular designs. He also noted the prevalence of tradewares, iron tools, shell bracelets and pendants, and glass, shell and clay beads (Guthe 1981). Unfortunately, Guthe's report provides only a summary of his findings, and does not provide detailed information on the locations of the sites or the provenience of individual artifacts by island.

The second major archaeological expedition undertaken in Bohol was by American anthropologist H. Otley Beyer. Beyer surveyed and excavated numerous sites throughout the archipelago, and published a comprehensive report in 1947 titled "An Outline Review of Philippine archaeology by islands and provinces" (Beyer 1947). This was an

important publication, however, Beyer's research in Bohol must have been cursory, as he reported that he did not find any "tektites, true Stone-Age or Iron-Age remains, or early jar-burials" in Bohol, only later porcelain age sites (Beyer 1947:276). This is surprising since each of these site types have been readily noted by subsequent researchers, including this author. The porcelain age sites Beyer documented included several coastal cave burial sites that contained wooden coffins with a variety of burial goods including iron tools, stone, copper, and bronze bracelets, glass beads, shell ornaments, Chinese ceramics and plain earthenwares. He also noted the practice of skull deformation among many of the recovered human remains.

In the mid-1960's, archaeologist Rosas Tenazas surveyed the coastal caves along the eastern towns of Loay, Mabini, Anda and Guindulman to investigate the wooden coffin burials reported by Beyer (Tenazas 1966; Tenazas 1983). See Figure 5. She was able to locate a number of these sites and reported finding some scattered pottery sherds (both earthenwares and blue and white wares) and human remains in association with the coffins. In addition, she identified several rock art sites with images painted in hematite (a locally available material) on the coastal rockshelters in Anda and Mabini. These are the first reported rock art sites from the Central Philippines.

This same area was also the focus of a three-season surveying and mapping project by the National Museum in the 1980's. This project resulted in the identification of numerous

Stone Age, Metal Age and Protohistoric sites primarily in the eastern coastal region in and around Anda and Mabini. From this research, the National Museum compiled a detailed map of archaeological sites, but once again, most of the surveys and findings remain unpublished.

There were also a couple ethnographic pottery studies done in the 1970's and 1980's in Bohol. In the 1970's, Scheans (1977) interviewed potters from the towns of Alburquerque and Valencia as part of an extensive study on lowland Filipino earthenware industries in the Philippines. He collected data on both technological and social aspects of pottery production, including materials used, techniques of manufacture, forms, decorations, functional uses, division of labor, and types of specialization and patterns of distribution (Scheans 1977). Likewise, in 1982, a survey was conducted by Thelma M. Roales (1983) of the National Museum of the Philippines. She interviewed potters from five different pot-producing areas of Bohol, located in the towns of Guindulman, Talibon, Inabangga, Anda, and Valencia. Her research focused on the history and provenance of the local pottery industries as well as the technologies involved, and markets for the distribution of the finished goods.

Lastly, there are a limited number of historical references to archaeological sites and burial practices in Bohol from the Spanish colonial period. William Henry Scott (1994) documents that in 1668, Father Alcina reported the discovery of a jar burial site in

Baklongan, Bohol, which contained secondary burials in Chinese 'dragon jars'. In this same report, Alcino also noted that it was common practice in the Visayas to inter infants and newborns in jars, as well as adults in large, glazed jars accompanied with "all the wealth they had when alive" (Scott 1994:90)

Past research demonstrates that there are numerous archaeological sites in Bohol, dating from the Paleolithic period and extending up to the recent Historical period. Many archaeological sites have been identified, but there has been a lack of consistent or detailed research which is needed to gain a more in-depth understanding of the prehistory of the island. This research at Ubujan provides the first detailed archaeological study of a Metal Age site in Bohol. It therefore begins to give us a better picture of early Boholano society and culture, and provides important comparative data for the region and archipelago as a whole.

Project Background

The Ubujan burial site was located on the southwestern coast of Bohol in the Sitio of Kabisi, District of Ubujan, Tagbilaran City. See Figure 5. Tagbilaran City is the capital city of Bohol and is located at 9° 39' 20.6" North Longitude and 123° 51' 55.05" East Latitude (City of Tagbilaran, Office of the City Planning and Development Coordinator 2002). The city sits on a relatively flat limestone formation with a very thin soil cover derived from insitu, residual weathering of the underlying coralline limestone. Bedrocks

are exposed even in low lying areas, and much of the surrounding hills and ridges lack sufficient soil cover. Furthermore, a lack of rivers and natural channel ways for surface waters has led to the gradual formation of a network of underground caverns below the city (City of Tagbilaran, Office of the City Planning and Development Coordinator 2002).

The Ubujan burial site was situated within a limestone cavern adjacent to the coastline and at an elevation of approximately 5 meters above sea-level. It was discovered on August 28, 1998 on the private property of Mr. & Mrs. Gunther Gutknecht of Sitio Cabisi, District of Ubujan, Bohol by laborers hired to construct a swimming pool at their private residence. Unaware of its significance, most of the site was destroyed by the laborers before the property owner was able to halt construction. As a result, the stratigraphy and context of the burial and artifacts was lost.

However, upon learning about the discovery of the site, Mr. Gutnecht halted further construction and contacted the local authorities. He was referred to Mr. Jes Tirol, a local engineer and history professor at the University of Bohol. In September 1998, Mr. Jes Tirol visited the site on several occasions and commenced a limited excavation of the parts of the site that remained intact; however, since he was not trained as an archaeologist, he did not follow standard archaeological procedures and methodologies during his excavation.

In October 1991, a research team from the National Museum of the Philippines consisting of Mr. Angel P. Bautista, Ms. Mary Jane Louise Bolunia and Mr. Rodolfo Agnasin learned about the discovery of the site in Ubujan while conducting research at a historical site in the town of Dimiao, Bohol. They visited Ubujan and met with Mr. Gunther Gutknecht, Mr. Jes Tirol, Mr. Ernesto Toribio, Engr. Marcial Lim, and Fr. Ted Torralba. The National Museum team informed those involved of Section 12 of Presidential Decree 374, also known as the "Cultural Properties, Preservation and Protection Act", which prohibits the excavation of sites deemed to be of cultural heritage without the permission of the National Museum. A few samples of bone and earthenware materials were given to the National Museum personnel to take back with them to Manila. Using standard museum protocol, the artifacts were recorded and the site was assigned an accession code (Accession Code #VII-1998-P2) so that it would be officially registered and recognized as an archaeological site.

On February 8, 2000, the artifacts, which remained in Mr. Gunther Gutknecht possession were turned over to the Bohol Museum, Tagbilaran City, Bohol. On March 20, 2000, the Bohol Heritage Foundation, Inc. notified the National Museum of the turn-over of these artifacts to the Bohol Museum. Mr Tirol also returned many of the artifacts in his possession over the following months, but retained a small quantity of the artifacts in his possession (mostly glass beads and some human teeth).

From May 15-June 29, 2000 I commenced the first phase of my research at the Bohol Museum, Tagbilaran City, Bohol. The second phase continued from July 17-August 9, 2000 and the last phase in September 2000. This included a detailed documentation and analysis of the recovered artifacts, as well as interviews with the property owners, Mr. Jes Tirol and one of the laborers who discovered the site. I was also provided access to the materials that were collected from the site by Mr. Jes Tirol, which at the time, were being housed at his residence.

ANALYSIS OF MATERIALS

The materials recovered and analyzed from the Ubujan burial site included earthenware sherds, glass beads, metal tools, two fragments of glass bracelets, and a few shell and stone artifacts and human teeth. Earthenwares made up the bulk of the collection, and therefore, provided the largest data set; however, each artifact class was individually catalogued and analyzed for a variety of quantitative, morphological, stylistic, technological and functional attributes. The results of this analysis are presented, explained and interpreted below.

Earthenware Pottery

Pottery is one of the most important artifact classes studied by archaeologist to understand the past, once it is introduced into a culture. This is in large part due to the fact that pottery preserves well under a wide range of environmental conditions and thus, tends to be one of the most abundant artifacts recovered from archaeological sites. Pottery is also common to many cultures because it is made from materials that are naturally abundant throughout the world, i.e., a combination of clay and naturally occurring tempering materials. Furthermore, pottery production requires a relatively low level of technological know-how. The skill can be learned relatively easily, and artifacts can be produced relatively quickly and inexpensively.

Pottery analysis can provide rich data for interpretation. This is because pottery is culturally constructed and can take on an infinite range of forms, styles and functions. This starts with the selection of raw materials, the forming and firing methods, and the choices of decorative elements. Once made, pottery can be used for personal or household consumption, individual or community rituals, gift giving, trade or exchange. As a result, pottery analysis can provide a range of information on cultural technology, chronology, subsistence, ecology, trade and exchange, daily and ritual activities, and social and symbolic meanings (Rice 1987).

Pottery analysis has been an important part of archaeological research since the beginning of the discipline. Early pottery studies were generally art-historical in nature. During the eighteenth century, there was an avid interest in pottery collecting, especially of classical Greek, Etruscan and Roman wares. As such, collectors were interested in studying the artistry of the individual vessels and the interpretation of classical scenes (Orton et al. 1993:5). By the late 19th century, more modern archaeological principals were adopted within the field of pottery studies and classificatory systems were developed to deal with the large quantities of pottery that were being recovered from archaeological sites. For example, in 1874 Plique developed a type-series system for classifying samain ware recovered from Lezoux, France, and by 1891, Flinders Petrie was using a typological system for sorting out the stratigraphic sequences of pottery in Lachish, Palestine (Orton et al. 1993:9).

Classificatory systems (e.g., typologies) became an integral part of ceramic studies and continue to play an important role in archaeological research today. Classificatory systems are generally used to establish temporal and spatial relationships within and among sites by grouping artifacts with recognizably distinct and related attributes. Different types of classificatory systems have been developed to address specific archaeological questions. For example, *seriation* is a typological methodology that studies changes in artifact attributes to ascertain the chronological sequence of a site, and Wheat, Gifford and Wasley (1958) developed the *type-variety* method of ceramic classification in order to link local ceramic assemblages into broader regional classifications (Sinopoli 1991:52). Traditionally, typologies have been used for a number of purposes such as to establish chronological sequences, provide a method for cross-dating sites, and to determine cultural-historical relationships of sites throughout time.

Recent research has taken a more technological approach to pottery analysis. Technological approaches emphasize the need to understand the process of how pots are made and used, and the relationship between the raw materials and the local environment. This requires an understanding of the local geography and geology of a region in order to determine the range of possible resources (e.g., clay and temper sourced). Technological studies are usually used in combination with descriptive-stylistic analysis, to generate more in-depth analyses of pottery production, distribution, use and origins, as well as to

study the relationship between social progress, behavioral choices and social identity (Rice 1996a; Rice 1996b).

Ethnoarchaeology is another important methodology used in ceramic studies. Ethnoarchaeological research uses first-hand observation and ethnographic interviews to understand the ways in which contemporary cultures make and use pottery. It attempts to understand the social and cultural factors that influence pottery production, as well as the social role of potters within their communities. One of the strengths of this method is that it challenges us to ask in-depth questions about cultural behavior, and can be used as a direct historical method, or on a broader scale, used to generate cultural analogies (David and Kramer 2001; Griffin and Solheim 1990; Stark 1991).

This research combines morphological, stylistic, technological and ethnoarchaeological methodologies as analytical tools to understand the geographical distribution of the recovered earthenwares within the regional political-economy. In addition, it also explores the functional and social meanings of pottery at the site. Due to a lack of previous research in the region, little comparative material is available; therefore, non-local ceramic distribution studies are emphasized, which seek to distinguish locally produced goods from foreign trade goods (Arnold 1981). There is also an attempt to understand the artifacts within their social context, on both a local and individual level. I explore the idea that the region's local communities, households, or individuals may have

specialized in particular types of wares that were recovered at the site. These may have been produced by full-time craft specialists or part-time and/or seasonal potters, and pottery production and distribution may have been informal or highly organized. Rice (1984:48) points out that "specialized production can only exist where the environment provides suitable resources for the specialization and where a sizeable and diverse social polity can support the craftsmen." She further argues that occupational diversification arises "as a response to two interacting sets of preconditions, environmental diversity and sociocultural diversity." (Rice 1984:46). These are factors that need to be further explored and tested.

Pottery production and use also needs to be understood within its functional realm. Particular wares often serve particular social functions in societies. For example, in the Philippines, ethnographic research has demonstrated that trade ceramics (e.g., Chinese, Annamese and Siamese porcelains) were valued as wealth and prestige items, and as such, were often reserved for particular ritual or social functions. They were often used as serving vessels for food and ritual offerings (e.g., the storing and serving of rice wine), as primary and secondary burial urns, and as heirlooms (Solheim 1965; Barbosa 1992; Scott 1994:66-67). Likewise, archaeological research in the region has demonstrated that prehistoric burial pottery is generally more diverse and elaborate in form and design than pottery recovered from household contexts. This is likely a reflection of the value that is placed upon burial practices and rituals.

In the Philippines, people began making and using pottery during the late Neolithic Period. The earliest known pottery is a paddle-impressed earthenware of a style that has been identified in a number of sites throughout Island Southeast Asia (Solheim 2003a:1). This paddle-impressed ware includes both basket-marked and cord-marked patterns, as well as some plain and burnished wares. In the Philippines, carved paddle-impressed pottery has been recovered from Ngipe't Duldug Cave and Leta Leta Cave, Palawan, as well as Sanga Sanga Rock Shelter in the Sulu Archipelago (Solheim 2003a:1). No absolute dating has been undertaken on these particular pottery samples, but they are estimated to be at least 3,000 – 3,500 years old (Fox 1970:162; Ronquillo 2003:36-37).

A second early pottery type identified at a number of sites in the Philippines is referred to as Marianas Red Ware. The identifying features of Marianas Red Ware includes red-slipping, small impressed circles often inlaid with lime, and incised or dentate lines forming "v" patterns, again lime-filled, on or just below the rims (Solheim 1998, Solheim 2003a:5-6). Marianas Red Ware was first reported in the Marianas by Alexander Spoehr (1973). In the Philippines, Marianas Red Wares have been recovered in Palawan, Batanes, Masbate, northern Luzon and Sanga-Sanga (Solheim 1998). The regional similarities in these earthenwares suggest a historical link between the islands of western Micronesia and the Philippines (Kirch 1997). Many of these decorative elements are also found on early Lapita pottery and on later Sa-Huyhn-Kalanay earthenwares (Solheim

2003:17). Unfortunately, most of the Marianas Red Ware in the Philippines has not been dated, but those that have been generally date to the late third to the second millennium BC (Solheim 1998).

Another important pottery type identified in Southeast Asia, including the Philippines, is known as Sa-Huyhn-Kalanay earthenware. The Sa-Huyhn-Kalanay earthenware tradition is named after the Sa Huyhn site in Vietnam and the Kalanay cave site in the Philippines. Solheim's research in the late 1950's brought to light the close similarities among earthenware assemblages from these two sites, as well as a number of other sites in the Southeast Asian region (Solheim 1961a; Solheim 1961b; Solheim 1961c; Diem 2004). Common vessel forms include round-bottom jars with carinations and footed vessels with perforated ring bases. Similar decorative techniques include incising of curvilinear scrolls and geometric motifs, "scalloping and notching" on the angles and rims of the vessels, fingernail impressions, and red slipping.

During the first millennium AD, Sa-Huyhn-Kalanay pottery was gradually replaced by a carved-paddle-impressed pottery, commonly referred to as Bau-Malay pottery or Tajong Kubor Ware (Solheim 2003a:17; Bellwood 1997). These paddle-impressed wares are believed to have diffused from Borneo into the southern island of Mindanao around 600 AD (Solheim 2005, personal communication). A late variant of Bau-Malay pottery also included elaborate carved-stamp geometric designs believed to be Islamic in origin

(Solheim 2003a:18). This pottery is sometimes also referred to as Pilar Incised or Stamp-Impressed Red Ware (Solheim 2003a:18).

By 960 AD, Chinese ceramics began to dominate the pottery markets in the Philippines, quickly followed by other Asian export wares, e.g., wares from Thailand and Vietnam. Coinciding with the increase of trade goods was a marked decline in the native pottery industry under competition from the new exotic imports (Lim 1987:4). As a result, most of the native pottery recovered from archaeological sites around this time is undecorated, utilitarian wares.

Little is known about the specific function of most of the recovered prehistoric earthenwares. From ethnographic analogy and historic records we know that pottery was commonly used for everyday uses such as cooking, storing, and serving food, water, and rice wine, as well as for ceremonial uses such as spirit offerings and for wedding ceremonies (Solheim 1965:255-260). Vessel morphology and styles can provide some clues. For example, Rice's (1987:229) experimental research has demonstrated that vessels with angles incur more thermal shock when heated than rounded vessels and are therefore less optimal as cooking vessels. Experimental studies can also identifying other characteristics that suggest vessel function. For example, Skibo's (1992) use-alternation studies note that cooking utensils can leave identifiable traces on the interior surface of a

vessel, thus allowing us to infer usage. More experimental and ethnographic research can provide additional analogies that can be tested against the archaeological record.

Archaeological context is also critical for determining the function of artifacts. For example, in the Southeast Asia, earthenware vessels are often recovered from burial sites, indicating that the vessels were offered as some type of burial good or used as a burial urn. Jars burials have been a common practice in the region up into the twentieth century (Solheim 1965:261-262; Janse 1961:109-110; Beauclair 1972; Metcalf 1982). Large vessels are often used for the primary internments, and smaller vessels are often used for secondary burials, or infant burials. Likewise, pottery has been used as burial offerings up until recent times in the region (Harrison 1956:154). Bellwood (1997:151-152) notes that many groups in Southeast Asia today that have not been influenced by Islamic, Christian or Indian traditions still practice folk religions and some of them, forms of secondary burials.

The tradition of jar burials is believed to date back to the 2nd to 1st millennium BC in Southeast Asia. The origins of the tradition are questionable, with suggestions of South Chinese/Vietnamese origins, with diffusion through the Malay Peninsula, Indonesia and/or Borneo into the Philippines around 1,000-500 BC (Dizon & Santiago 1996; Bellwood 1997; Solheim 1998). Early jar burials in the Philippines were often elaborate. One of the most famous earthenware burial jars recovered in the Philippines is from

Palawan and is known as the Manunggul Jar. It features a lid with the carved image of two individuals rowing a boat, referred to as a "ship-of-the-dead". This artifact has been adopted as a national symbol and the image is featured on the 1,000 Philippine pesos bill.

Some other unique earthenware burial jars recovered from the Philippines are the anthropomorphic burial jars recovered from Ayub Cave, South Cotabato, Mindanao, as mentioned earlier in this text. See Figure 2. The quantity of anthropomorphic jars recovered from this cave, and reported from the surrounding area, suggests that secondary burials were an important cultural tradition in this region.

The shear quantity and diversity of earthenware pottery recovered in the Philippines from various archaeological contexts demonstrates that there is great potential in pursuing more detailed pottery analysis studies. Future research into the manufacture, use, distribution and the social meaning of pottery within specific geographic and cultural contexts should greatly aid our interpretation of the past.

Methodology

I commenced my analysis of the collection in May 2000 at the Bohol Provincial Museum, Tagbiliran City, Bohol. I was assisted by museum researcher Joselito Alipala. Earthenwares made up the bulk of the collection and were the first artifacts to be analyzed. My analysis took a three step approach which included:

1) cataloguing the sherds and reconstructing a limited number of vessels;
2) a morphological and stylistic analyses of the sherds and vessels;
3) a limited technological analyses of a select number of sherds.

I began by grouping sherds with similar attributes. This included distinct sherd types such as rim sherds, body sherds, decorated sherds and slipped sherds. I started with a grouping methodology because I wanted to attempt to reconstruct some of the vessels. The laborers who worked at the site claimed that many of the pots were intact when they were found but were broken during their removal from the site and/or handling afterwards. As a result, after separating out the sherds by the above physical characteristics, I was able to partially reconstruct a number of the vessels. This allowed me to obtain a more accurate assessment of the range of forms in the collection, as well as record vessel sizes and other important quantitative measurements.

After completing this general grouping of the sherds, I catalogued the sherds using a standard twelve digit alpha-numeric ascension code based on guidelines established by the National Museum of the Philippines. The first nine digits are the same for all the artifacts and references the location of the site and the year of discovery (VII-1998-P2). The last three digits are a unique number assigned to each individual artifact.

A number of descriptive-stylistic attributes were recorded for each sherd and/or vessel, including vessel form (if available), the presence/absence of slips, and a range of decorative techniques. The descriptive-stylistic attributes were based on traits defined by

Solheim (1961b;1961c) and expanded upon by Flavel (1997). Vessel form categories included round bottom pots, footed vessels, bowls/lids, jarlets, large flat-bottomed vessels, and a category called "other/undetermined". Decorative techniques included straight-line incising (marks cut into the clay body before firing), finger nail impressions, punctate "stamping", and engraved (post-firing) spiral and geometric designs.

Calipers were used to take quantitative measurements such as rim height and width, and the height and width of complete or nearly complete vessels. Rim diameters were recorded using a rim chart.

Other attributes were recorded but were not used as part of the typological classifications. For example, the exterior surface color of the sherds was recorded using a Munsell soil chart (Munsell Color Company 1975). Munsell soil charts are reference guides for recording the colors of soils and artifacts. The chart displays a range of colors, each which is assigned a corresponding alpha-numeric code. Surface coloration ranged from brown to dark-reddish brown to bright red-brown. Color variations are important because they provide information on the mineral composition of the clay (e.g., iron content) and firing conditions (e.g., oxidizing conditions). Consistency of color can indicate that a ware was made under very controlled conditions, e.g., fired in a kiln (Shepard 1976:102-106). However, the sherds in the collection were almost all non-uniform in color. This irregularity of surface coloration signifies that the pots were open-

air fired rather than kiln fired. As a result, the recording of this attribute was not particularly relevant to the analysis.

The cores of the sherds were also examined for color variation. Many of the cores were partially black or gray in color. This color variation is due to the presence of carbon in the fabric. Carbon often remains present in the fabric due to the incomplete burning of organic material under open-air firing conditions (Matson 1951:111). It also signifies that oxygen did not reach the core during firing, which is a common when pottery is fired at low to moderate temperatures, e.g., below 900 degrees Celsius (Shepard 1976:103).

Lastly, from visual analysis (naked eye and hand lens), I noted a wide range of tempering materials in the clay fabrics. In order to determine some of the range of this variation, I had a sample of thin sections submitted for petrographic analysis. The results are presented in the following section titled Petrographic Analysis. This analysis provided information on the compositional characteristics of the sherds, which will aid with future studies on pottery classifications, trade and sourcing.

Results & Analysis

It is fortunate that a number of the vessels were relatively intact in the collection or were complete enough to be partially reconstructed to reflect their original form. This allowed me to create a typological classification of a limited number of wares based on vessel

morphology. Seventy-eight vessels were included in this analysis and six vessel types were noted, which were further divided into subtypes. A description of each of these is presented in Figure 6 along with sample illustrations, and a chart showing the percentage of each vessel type is presented in Figure 7.

Figure 6: Description of Earthenware Vessel Forms

I. ROUND BOTTOMED VESSELS

Round base with either short or high necks and generally everted rims. Ethnographically known as the *kon*, *kolon* or *palayok*, and is used for cooking. More elaborate forms have angles near the base of the pot and/or on the body. The base angles are often decorated with scalloping (a.k.a. "lenticular cut-outs") and notching designs. The angled ("carinated") forms are common throughout the Philippines during the late Neolithic and Metal Age, and the globular forms from the late Neolithic until the present.

A. GLOBULAR WITH SHORT NECK
B. GLOBULAR WITH HIGH NECK

II. FOOTED VESSELS – "Pedestaled Dishes/Bowls"

Shallow wide-rimmed "dish" or "bowl" sitting upon an elevated stand. From ethnographic examples, they are generally interpreted as presentation dishes. The stands often have round of triangular cut-outs or perforations. This vessel type is commonly recovered from Metal Age burial sites in the Philippines; however, the tetrapod forms (four-legged vessel) are rare.

A. RING-FOOTED VESSEL
   a) With cut-outs/perforations
   b) Without cut-outs/perforations
B. TETRAPOD VESSEL
   a) Legs with cut-outs
   b) Solid circular legs

III. BOWLS/LIDS

Shallow vessels with wide rims (the rim diameter is the maximum diameter of the vessel). Usually broader than is tall and has straight or inverted rim. Appearance resembles a bowl, but from other archaeological examples, we know that this form (e.g., vessels with handles) was also used as a lid.

A) FLAT BOTTOMED
   a) With decorations/handles
   b) Without decorations/handles
B) ROUND BOTTOMED
   a) With decorations/handles
   b) Without decorations/handles

IV. FLAT BOTTOMED, NARROW MOUTHED VESSELS – "jarlet"

Narrowest point of the vessel is at the mouth, and the widest point is at the base. Only one vessel of this type was recovered from Ubujan, and the form is unique and unknown from other archaeological sites.

V. NON-SYMETRICAL VESSELS

Only one vessel of this type is in the Ubujan collection, and its final form and function is undetermined.

VI. LARGE VESSELS

Only one vessel of this type was identified in the collection. It is defined as large relative to the other vessels in the collection, with size suggesting a different function, i.e., probably a storage or burial vessel rather than a cooking or serving vessel.

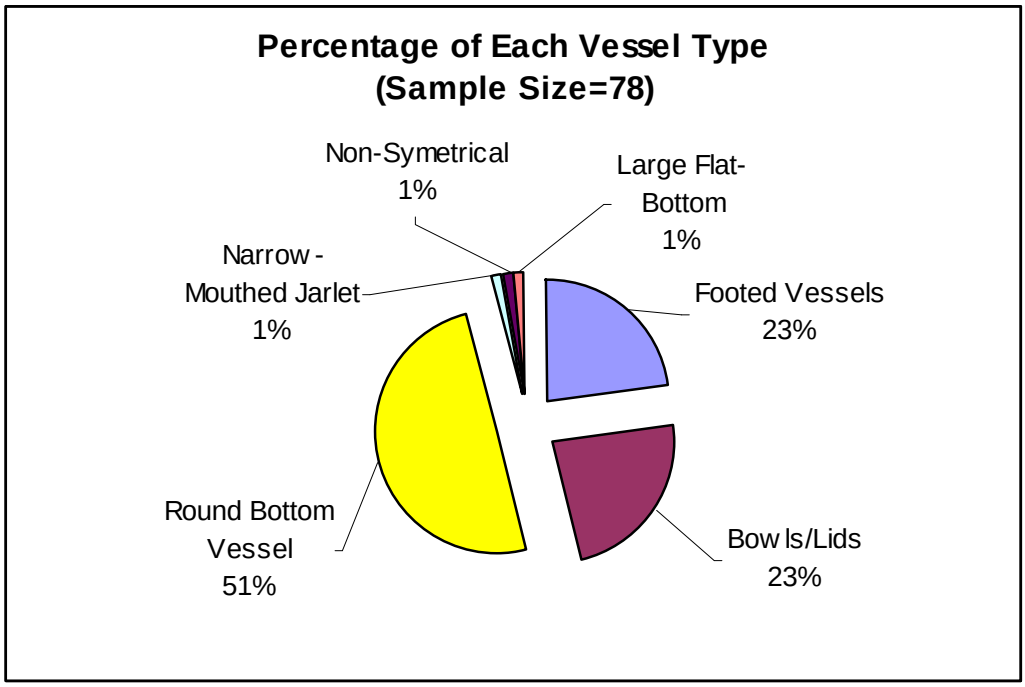

FIGURE 7: Chart of Vessel Types

Round-bottom pots were the most common vessel forms. This category included vessels with short-necks and high-necks. See Figure 8 and Figure 9. The length of the necks on the high-neck vessels ranged from 3.2 cm to 9.0 cm. Vessel sizes varied greatly with recorded heights ranging from 8.5 cm to 29.5 cm tall and maximum body diameters from 10.2 cm to 19.8 cm. Rim types included everted and thickened, everted and thinned, and direct and thinned. Some of the rims were also flattened along the top side or were grooved on the interior surface.

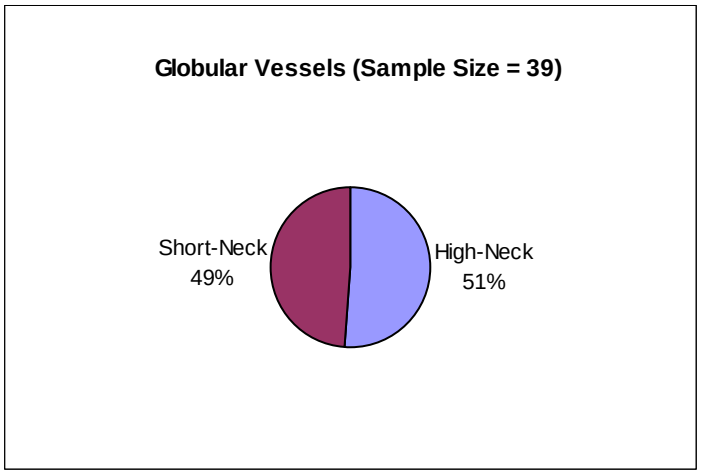

FIGURE 8: Chart of Round Bottom Pots

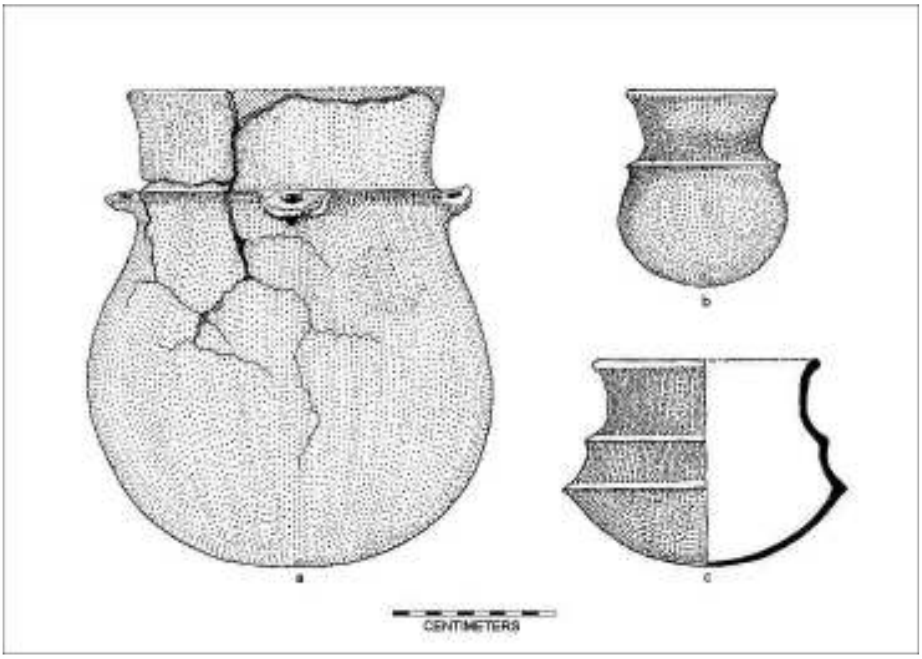

Figure 9: Illustration of Round-Bottom Pots
a. VII-98-P2-384; b. VII-98-P2-386; c. VII-98-P2-404

The second largest categories of vessel forms were the footed vessels and the bowls/lids.

The footed vessels were divided into two subcategories, which are ringfeet and tetrapods

(4-legged vessels). The ringfeet were further divided into: 1) ringfoot with cutouts/perforations and 2) solid ringfoot; and the tetrapods into 1) legs with cutouts/perforations and 2) solid legs. The breakdown for each of these categories is presented in Table 1 and Figure 10 below, and some sample illustrations in Figure 11.

TABLE 1: Footed Vessels from Ubujan

Type of Footed Vessel	Quantity	Percentage
Ringfoot with Cutouts/Perforations	11	61%
Solid Ringfoot	5	28%
Tetrapod with Solid Legs	1	5.5%
Tetrapod with Cutouts/Perforations	1	5.5%

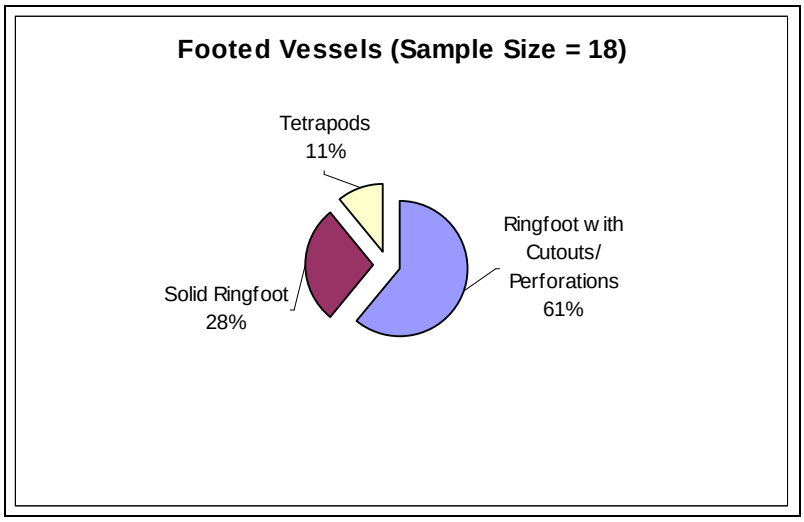

FIGURE 10: Chart of Footed Vessels

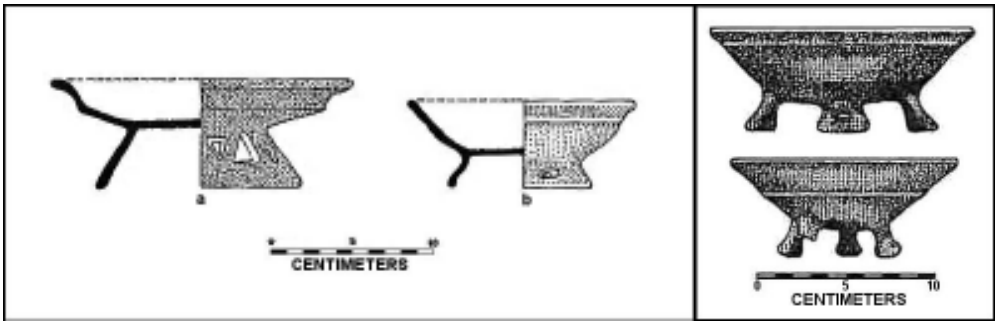

Figure 11: Illustration of Footed Vessels
a) VII-98-P2-409; b) VII-98-P2-373; c) VII-98-P2-217; d) VII-98-P2-349

The bowls/lids are vessels that have wide mouths, shallow bowls and either flat or rounded bottoms. It is difficult to determine the function of these vessels, i.e., whether the individual vessels were used as bowls or lids. As such, I have included them in a single category. Three of the vessels had handles suggesting that they were probably used as lids or were multi-functional. Five of the eighteen vessels had scallop & notching designs around the base. Other decorative elements included red slipping/burnishing and one vessel had crudely engraved spiral designs. See Table 2 and Figure 12.

TABLE 2: List and Description of Bowls/Lids from Ubujan

Ascension #	Base Type	Decorative Elements
VII-1998-P2-147	Rounded	Handles/Scallop & Notching
VII-1998-P2-151	Flat	None
VII-1998-P2-154	Flat	None
VII-1998-P2-164	Rounded	None
VII-1998-P2-175	Rounded	Slipping/Burnishing
VII-1998-P2-182	Rounded	None
VII-1998-P2-190	Flat	None
VII-1998-P2-193	Rounded	Scallop & Notching
VII-1998-P2-197	Rounded	Scallop & Notching
VII-1998-P2-214	Rounded	None
VII-1998-P2-354	Rounded	Handles
VII-1998-P2-365	Flat	None
VII-1998-P2-368	Rounded	None
VII-1998-P2-371	Rounded	None
VII-1998-P2-388	Rounded	Handles/Scallop & Notching
VII-1998-P2-390	Rounded	Scallop & Notching
VII-1998-P2-430	Flat	Crude engraved spiral designs
VII-1998-P2-452	Flat	None

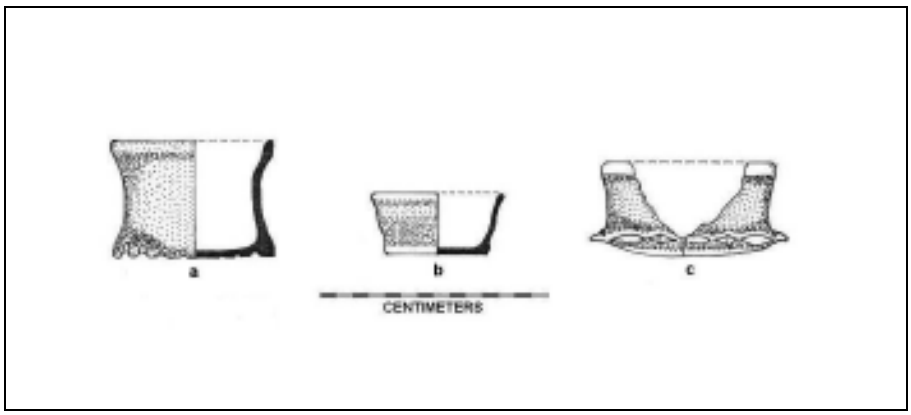

Figure 12: Illustration of Bowls/Lids
a) VII-98-P2-151; b) VII-98-P2-365; c) VII-98-P2-193

The other three categories of vessel types are “jarlets”, “large flat-bottomed vessels” and “unsymmetrical vessels”. There was only one jarlet in the collection. See Figure 13. It

had a flat bottom, was widest at the base and narrowest at the mouth. It measured only 9.8 cm in height with a maximum diameter of 6.7 cm. It had four handles, one at the base and body of each side, which were probably used for hanging the vessel.

Figure 13: Small Jarlet
VII-1998-P2-160

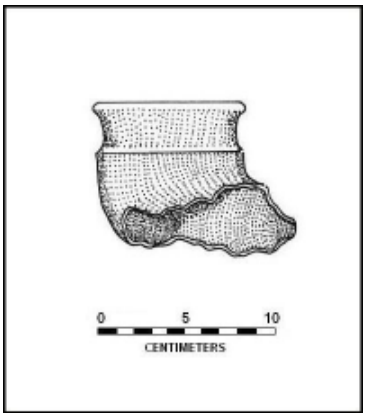

Figure 14: Unsymmetrical Vessel
VII-1998-P2-408

The unsymmetrical vessel had an unusual shape, somewhat resembling a spout or funnel; however, it was broken and therefore difficult to determine its complete shape or possible function. See Figure 14. The "large flat-bottomed" vessel (VII-1998-P2-385) was assigned a category of its own because of its size difference, which suggests a possible functional difference, i.e., it is unlikely that it was cooking or serving vessel, but rather, was probably a storage vessel or possibly a burial urn. The height of this vessel was 20.5 centimeters, its base was flat, and its walls were straight and very thick, i.e., up to 16 millimeters at its maximum width.

Only a handful of the complete collection of sherds had red slipping on the exterior surface; however, it is possible that the low firing of the vessels may have made the slips hard to detect. I include slipping as a decorative technique because based on Schean's (1977) ethnographic research in the Philippines, he suggested that slipping was generally a stylistic rather than a functional attribute, e.g. to reduce permeability (Snow 1985:18). Other decorative elements included incising, engraving, fingernail impressions and punctations. See Figure 15 and Figure 16. Most of these decorative techniques are common in the Southeast Asian region, except engraving. The only other examples of engraving (a post-firing technique) as a decorative technique in the region are from Thailand (Solheim 2005, pers.comm.).

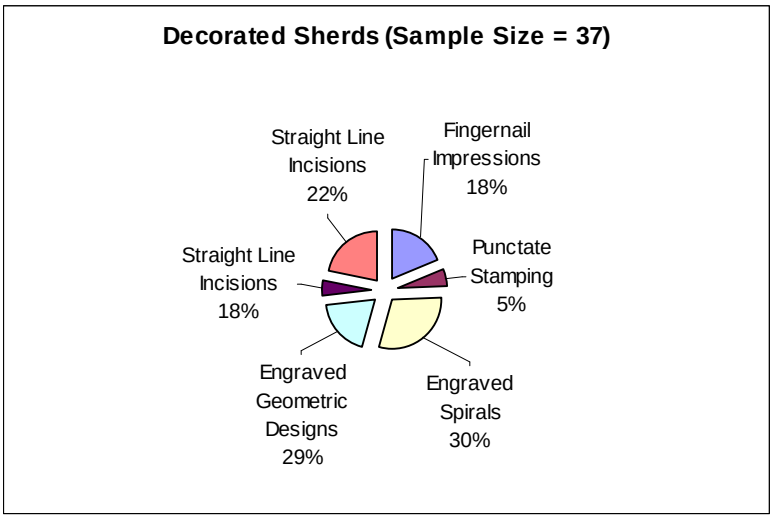

FIGURE 15: Chart of Decorated Wares

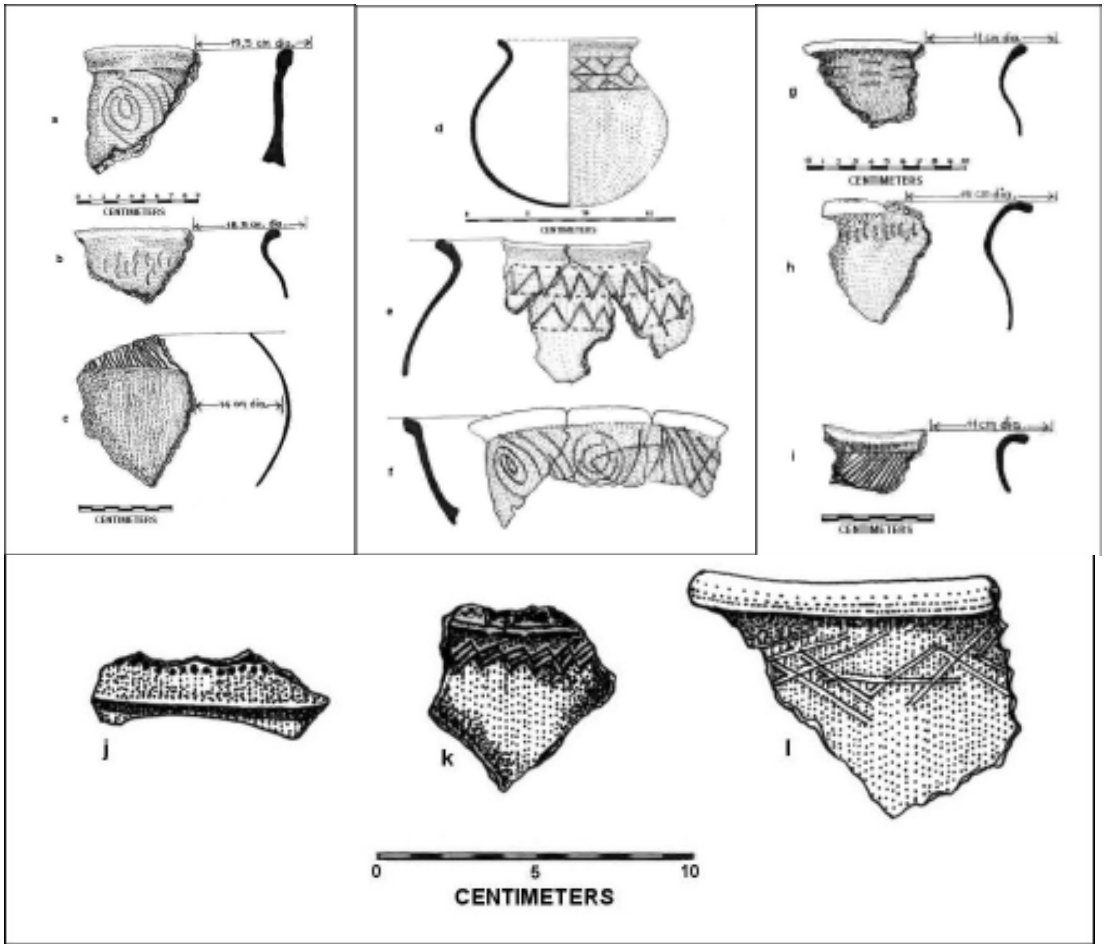

Figure 16: Illustration of Decorated Earthenwares

a) VII-98-P2-430; b) VII-98-P2-420 c) VII-98-P2-402 ; d) VII-98-P2-267 ; e) VII-98-P2-432 f) VII-98-P2-430 ;g) VII-98-P2-417 ; h) VII-98-P2- ; i) VII-98-P2-352; j) VII-98-P2-186; k) VII-98-P2-156; l) VII-98-P2-245

The technological analyses of the sherds were primarily descriptive. Based on the surface coloration and uneven firing of the cores, it was determined that the almost all of the earthenwares were open-air fired. The exception was a small number of sherds (VII-98-P2-438) classified as Fine Paste ware. Fine Paste ware has been noted at archaeological sites throughout Southeast Asia and is identified by its surface texture and

color, the fineness of its paste, and its relatively thin body width (Miksic and Yap 1990). These qualities indicate that it was a kiln fired ware. A more complete description of this ware is provided under the section on Petrographic Analysis.

Other technological attributes related to manufacturing methods were noted on a case-by-case basis. For example, some sherds showed evidence of anvil impressions on the interior surface indicating that the pots were probably formed with a paddle and anvil. Also, a preliminary analysis of the paste of the sherds indicated a high variability in the clay and/or tempering materials. To confirm this variability, a small sample was submitted for petrographic analysis and the results are presented in the section on Petrographic Analysis.

Discussion

The analysis of the pottery recovered at Ubujan provides informative data on early pottery production, use and distribution in Bohol. The stylistic and morphological analysis provided the largest data set to work with and using a comparative approach, revealed that overall, there were many similar characteristics with other pottery assemblages in the region. The Ubujan pottery can be broadly classified as part of the Sa Huynh-Kalanay pottery tradition. See Figure 17 and Figure 18. In particular, close similarities are noted with the Kalanay/Bagupantao tradition. This includes similar morphological and decorative elements such as round-bottom jars with carinations,

footed vessels with perforated ring bases, incised curvilinear scrolls and geometric motifs, scalloping and notching on the angles and rims, fingernail impressions, and red slipping.

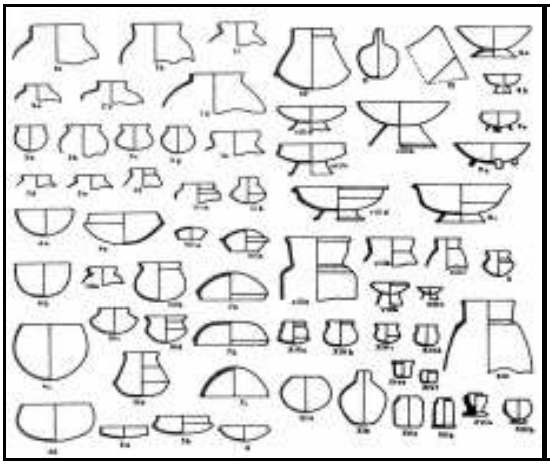

Figure 17: Kalanay Pottery Forms
(From Solheim 2002:12)

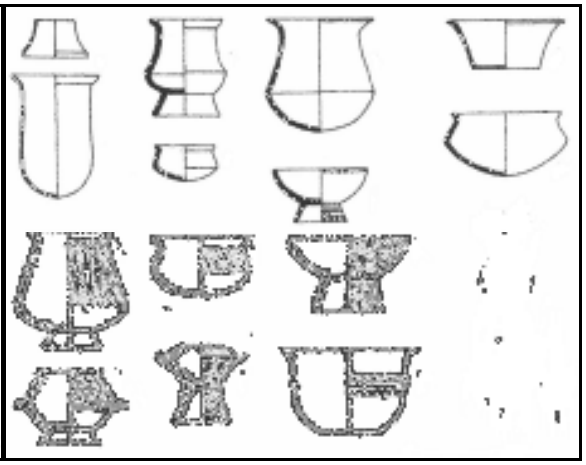

Figure 18: Sa Huynh Pottery Forms
(Modified from Bellwood 1997:273)

It has been noted that the Sa Huynh-Kalanay tradition is a very diverse pottery tradition with a highly varied decorative repertoire and numerous regional variations (Flavel 1997; Solheim 1967). Bacus (2003) noted particularly close similarities among the Sa Huynh-Kalanay earthenwares from the central Philippines islands of Bohol, Negros, Siquior and Kalanay during the Late Prehistoric (1st millennium AD) and Protohistoric Periods (11th-16th century). As such, she (2003) defined several regional variations (styles) based on decorative elements within the region. The Ubujan pottery most closely resembles what she defines as the "Kalanay/Solamillo" style. The defining decorative feature of the Kalanay/Solamillo pottery is the carved and impressed scallop & notching, which she

notes are generally encircling the vessel at the point of the vessels maximum width (Bacus 2003:44).

Other similarities are noted among the Ubujan pottery and other Metal Age pottery assemblages in the Visayan region. One particularly interesting finding from this study is that both the Kalanay and Ubujan sites had tetrapods, which are the only known examples of this vessel type from the Philippines. Close similarities were also noted between the Bacong and Ubujan burial sites. For example, both sites had numerous carinated vessels with scallop and notching designs around the base angles; both had very similar ring-footed vessels with perforations; both had large straight walled vessels, which were identified as burial vessels at Bacong; and the incised/engraved designs from both assemblages were rather simple and crude compared to the more elaborate designs that are found at other Sa Huyhn-Kalanay sites. Both these sites also had similar glass bead types and metal implements.

However, there were also some very unique vessel types at each of these sites as well, suggesting that the areas were independent polities with their own local industries or local trade in specific wares. For example, the Bacong sites had a number of round-bottomed pots with multiple perforations that resembled colanders; several cylindrical, conical and ovoid shaped open-bottomed vessels; a highly stylized zoomorphic vessel and anthropomorphic figure; and many small gourd shaped vessels, all which are forms

that are absent from Ubujan. Conversely, Ubujan had two tetrapods, which again, are unique to this site and the Kalanay site and one small jarlet, which is unknown from other sites and may likely represent the artistic expression of an individual potter within the community.

On a broader scale, many forms which are part of the Sa Huyhn-Kalanay repertoire in other areas were absent at Ubujan. For example, flaring rims and vessels with cylindrical bodies are common vessel forms found at many Sa Huyhn-Kalanay sites in the region, such as Gua Cha, Malayasia, Niah Cave, Sarawak and the Kalanay Cave site in Masbate; however, they are absent at Ubujan or any known sites in Bohol. The decorative motifs at Ubujan are also less varied and elaborate than seen elsewhere. For example, *Arca* shell impressions, and incised scrolls and meanders filled with punctuations are common Sa Huyhn-Kalanay motifs, but again, are not found at Ubujan.

Outside the Philippines, close similarities are noted with the artifact assemblages from sites in Northeastern Indonesia. Bellwood (1976:267-279) has pointed out some of the shared similarities between the Metal Age jar-burial site of Leang Buidane in the Talaud Islands of Northeastern Indonesia with the Kalanay site assemblages, noting that they share the "general forms of the burial jars, the carinated pots, bottles, and tripods or tetrapods, although it lacks the complex cutout ring-feet of the Bagupantao vessels from Kalanay Cave" (Bellwood 1976:272). Bellwood (1976:272) also noted almost identical

ring-foot vessels with scroll-shaped cutouts from the central Philippine island of Siquijor and from the site of Leang Buidane; in fact, the similarities were so close that he suggested the possibility of a single source of manufacture. Another interesting parallel in pottery forms are the similarities in footed vessels from the Kamassi, Kalumpang site complex on the west coast of Sulawesi (Callenfel 1951), the Minanga Sipakko site, in Kalumpang, Sulawesi (Bulbeck, pers comm) and Ubujan. Tetrapods with triangular cut-outs were recovered from these Kalumpang sites that closely resemble vessel VII-1998-P2-217 (illustrated in Figure 11). These are just a few examples of some regional similarities in pottery forms and styles throughout the Island Southeast Asian region.

The similarities noted among the earthenware pottery within the Visayan region, as well as the broader Southeast Asian region, suggests that there was frequent inter-island contact and trade among the communities of the region during the Metal Age. This may be due to a regional trade in earthenwares or a movement of people (e.g., intermarriage) and/or ideas, which resulted in the addition and mixing of pottery styles or a sharing of ideologies/artistic ideas. Flavel (1997) suggests that exotic motifs were often selectively adopted among communities, resulting in the distribution of similar decorative motifs over large areas for several millennium. Bacus (2003:39) has suggested that stylistic similarities "may result not only from exchange, but also from shared elite symbolism and participation in the same alliance systems". The local difference may also be a form of ethnic expression, i.e., as a way in which ancient communities maintained their ethnic

identity (Hutterer & MacDonald 1982:334), such as noted among contemporary textile weavers of the islands. More detailed comparative research should help sort out the reasons for the particular patterns that we see in earthenware styles and distribution in the region.

Petrographic Analysis

Petrography has long been recognized as a valuable methodology for ceramic characterization studies (Matson 1951:112-113). Ceramic petrography is derived from the field of geology and optical mineralogy, and is used in archaeology to identify the mineral components of the clay fabric of ceramic artifacts. This is done by analyzing thin sections of a ceramic object under a polarized light microscope, which provides a micro view of the geologic fabric of the material. With this information, ceramics objects can be characterized based on their mineralogical constituents and compared to possible geological sources and/or other ceramic materials (Orton et al. 1993:140-144; Rice 1987).

One the primary uses of petrographic studies is to help locate the area or region where a ceramic object was manufactured. Ceramic sourcing can be invaluable for archaeological studies, as it can potentially allow us to trace the movement and trade of ceramic artifacts over large geographic landscapes (Shepard 1942). It is most successfully used in areas that have unique geological formations or specific geological characteristics that can be identified in both the clay sources and the ceramic matrixes being studied and where in-depth geological information is available, as well as a large body of comparative materials and data.

In areas where clay sources are abundant, and/or geological conditions are less regionally distinctive, it is often difficult to sample enough clay sources or obtain enough specific geological information to match the mineralogical components of an object with specific clay sources (Arnold 1992). Instead, ceramic samples can be characterized and compared to each other to note analogous characteristics. While this does not provide information on where an object was made, it can provide data that may indicate if particular items were made in the same region, using similar clay sources and technologies. This is valuable for analyzing interaction and trade among various regions, as well as to help establish relative chronologies at sites throughout time.

When doing any kind of technological analyses of ceramics, it is important to remember that potters rarely use clay in its natural state. Tempering material is often added to make the clay more workable and resilient (Bronitsky 1986). The addition of temper tends to complicate thin section analyses because it can be difficult to determine if the mineral constituents are derived from the natural clay matrix and/or the additives. However, when this distinction can be made, it provides an additional variable for analysis. Tempering materials are both ecologically and culturally informative and can reveal information on the technological know-how and choices, as well as the environmental resources that are available to potters. For example, in coastal regions, potters commonly use sand as a tempering agent, but if sand is unavailable or other materials are preferred, alternatives may be used. This may include organic materials, such as rice or dung, a

variety of mineralogical materials, or even manufactured tempers such as grog (crushed, fired clay).

Petrographic techniques have been successfully used in archaeological studies throughout many areas of the world. In general, these studies have been most effectively used in broad-scale regional studies or inter-site analysis (Vincent 2002). In Southeast Asia, petrographic studies have been successfully carried out in Thailand where there is now a substantial database of comparative samples from several regions. This research has provided multi-faceted results. For example, Vincent's (1991, 2002) research identified a cultural change in tempering material throughout time at the site of Khok Phanom Di, in Central Thailand. He has also been able to locate clay sources used at particular potting centers, such as Ban Na Di, Thailand. This regional data has allowed him to explore large-scale questions such as the extent of inter-regional pottery distribution, and the correlation between the introduction of culturally produced tempers, such as grog, rice and blebs (a combination of clay and plant materials), and bronze metallurgy and agriculture in the region (Vincent 2002). It demonstrates the potential of in-depth petrographic studies when applied within a regional framework.

Very few petrographic studies have been carried out on archaeological materials from the Philippines (Snow and Shutler Jr. 1985). This is primarily due to a lack of funding and expertise in the field of ceramic petrography. However, as noted above, this

methodology can be very valuable for addressing archaeological questions of regional significance. This methodology could prove to be particularly useful in the Philippines where earthenwares make up a large part of prehistoric archaeological collections from the late Neolithic onwards. Furthermore, one of the benefits of that this methodology is that it is relatively inexpensive compared to other types of analyses, such as chemical studies, which require specialized laboratory equipment and expertise.

Methodology

In April 2003, nine sherds were sent to David V. Hill at Archaeological Research and Technology, Inc., in Austin Texas for petrographic analysis. Five of the nine sherds were from the Ubujan burial site. See Table 3. These five sherds were selected because they represented visually distinct pottery types, based on a combination of their exterior surface properties and a preliminary microscopic analysis of the mineral inclusions. They were chosen to represent *some* of the attribute variability (e.g., surface design, slip, paste composition) within the collection and were visually classified as follows:

TABLE 3: Sherds Submitted for Petrographic Analysis

Sample #	Ascension #	From	Description
1	VII-98-P2-15b	Ubujan	Incised sherd
2	VII-98-P2-438	Ubujan	Fine Paste ware
3	N/A	Ubujan	Red slipped ware
4	N/A	Ubujan	Plain sherd with high content of limestone/sand in body fabric
5	VII-98-P2-280	Ubujan	Plain sherd/No distinguishing features
6	N/A	Valencia	Ethnographic sample
7	N/A	Calape	Ethnographic sample
8	N/A	Bagacay	Ethnographic sample
9	N/A	Alburquerque	Ethnographic sample

The other four samples were collected from present-day potters on the island. They were collected in 2000 during an ethnographic study of the island's traditional pottery industry. There are only four towns in Bohol where potters continue to produce pottery using traditional methods. See Figure 5. Most of them use coiling and/or hand molding methods and a paddle and anvil to form the pots, and then open-air fire the pots using a combination of wood and coconut husks. Wheels and kilns are not used except in the town of Calape where they were recently introduced from the neighboring island of Cebu.

I wanted to get as wide of a geographic sample as possible from the island; therefore, I selected one sample from each of the four towns. I also interviewed the potters to document their clay sources and their manufacturing techniques. This allowed me to identify the intentional use of additives to the clay, which is often difficult to differentiate from natural occurring non-plastic inclusions. These interviews also allowed me to understand the particular behavioral and technological choices and knowledge of the individual potters. For example, I learned how the potters learned their craft, the types of pots they produced, the economics of production, and the social history of production, e.g., the transmission of knowledge, gendered aspects of production, and cultural taboos surrounding pottery production.

Cumulatively, these nine samples provide some preliminary data on the island's potters, pottery industry and trade in pottery, over time. My main objectives in having this small sample analyzed were to: 1) obtain detailed information on the compositional makeup of each of these sherds to see if distinct geological differences could point to differences in clay sources (pottery production centers) or pottery technologies; 2) determine if a relationship could be noted between the archaeological and ethnographic samples; 3) assess the potential of ceramic petrography for future studies in the region; and 4) start a database from which future archaeological samples can be compared in order to address questions of archaeological interest.

Analysis & Results

Hill was able to identify a number of properties about the ceramic samples that are important for the comparative analyses. He identified specific mineral and volcanic inclusions in the clay fabric of the samples, estimated the approximate percentages of specific combinations of inclusions, provided general information on the shapes and sizes of the grains of the inclusions, noted the colors of the clay matrixes, and noted some other technical properties of the clay, such as the clay's relative birefringence (indices of refraction).

From this data, Hill was able to propose some preliminary theories about the relationship of the sherd samples. He noted that sample #1 and sample #3 were probably derived

from the same clay source. They had similar mineral inclusions, and each had two distinct clay matrixes, probably representing the same source material at different stages of weathering. From this we can infer that incised wares and slipped wares were being made by the same potters or potters using the same source materials. Sample #5 was similar, as well, but had added tempering sands derived from micritic limestone, and lacked volcanic tuff. It is possible that the additional tempering materials were used for plain, utilitarian wares, e.g., cooking wares. This hypothesis is based on Rye's (1976:116-117) research, which demonstrated that particular types of temper can increase the thermal shock resistance of a vessel. This would include tempers whose coefficients are similar to or less than the clay, such as calcites and crushed burned shell.

Sample #4 was significantly different than samples #1, 3 and 5. The matrix was a gray clay and was only weakly birefringent. It was also highly tempered with well sorted carbonate sands derived from a biomicritic limestone. Likewise, sample #2 had a completely different ceramic fabric from the other samples, and Hill suggested that it was probably brought to the site by trade.

Hill's conclusions about sample #2 are interesting because in my analysis, it was noted that this pottery type was distinctly different from the other sherds in the collection. This pottery resembles the physical description of a tradeware known as Fine Paste (FP) ware. Some of the distinguishing physical characteristics of FP ware include: 1) very fine,

untempered paste; 2) very thin bodies, generally 3-4mm thick; 3) very smooth body texture; 4) generally a white or pale/light cream to peach uniform color; 5) vessel surface is often chalky or shows signs of exfoliation; 6) forms vary from bowls to spouted vessels (e.g., kendis) and decorations include incised linear lines and red painted strips; and 7) the uniformity in form, firing and color suggests this ware was wheel-thrown and kiln fired (Miksic and Yap 1990). This last point is significant because there is no evidence of prehistoric kiln technology in the Philippines, supporting the assumption that it was an imported ware.

Fine Paste ware has been noted at various sites throughout Southeast Asia including sites in Indonesia, Malaysia, Singapore, Vietnam, Borneo and the Philippines. At these sites, it is usually found as a small sample among a much larger assemblage (Naranjo 1993; Miksic and Yap 1990). Furthermore, it is found not only over a broad geographic region, but also within a broad chronological range of sites, from as early as the late sixth or early seventh century (e.g., at the Funanese sites of the Delta region of Vietnam), up to the late 14th century in Sumatra and Java (Miksic and Yap 1990). In the Philippines, Fine Paste ware has been found in association with 9th and 10th century Chinese wares at Butuan, Mindanao, southern Philippines.

Due to the fact that it is widely distributed and very distinctive from local assemblages, Fine Paste (FP) ware has been the focus of some in-depth studies on tradewares in the

region. Miksic and Yap (1990; 1992) did some petrographic and compositional analyses of FP wares recovered from several sites throughout Southeast Asia to try to determine if all FP ware was derived from the same clay source and/or made at the same pottery production centers. The clay used for FP ware is a relatively pure kaolin clay derived from the primary weathering of feldspar and is limited to specific geological regions in the area. Therefore, this limits the number of possible production sites to specific regions. Miksic and Yap's (1990; 1992) analysis of sherds recovered from the twelfth to fourteen century trade port of Kota Cina, Sumatra revealed that the pottery was probably produced in eastern Java and obtained at the site through trade; however, two distinct groupings were noted suggesting there may have been more than one production center in the region. A similar study was done by Naranjo (1993) on FP wares from the Philippines, Brunei, Indonesia, Malaysia and Singapore. She noted close similarities between the Butuan FP wares and those examined from sites in both Brunei and Sarawak with a slightly closer relationship of mineral contents and trace elements between the Butuan and Sarawak samples. However, she also noted two different groupings among the sherds, again suggesting that the FP ware was derived from separate production centers.

These studies suggest that FP ware was not produced in one particular region but rather, was a widespread tradition. Miksic and Yap (1990; 1992) proposed the idea that because FP ware is such a homogenous pottery type, which clearly stands out from other locally

produced potteries and pottery assemblages, that its distribution might be used to delineate the shape of an early maritime trade network in Southeast Asia. This hypothesis warrants further research on the subject.

The four ethnographic samples examined by Hill demonstrated distinct, individual mineralogical characteristics, as would be expected since they were collected from four separate regions of the island. No relationship was noted between the ethnographic and archaeological samples.

Discussion

The results obtained from the analysis of these earthenware sherds suggest that petrographic characterization studies could be useful for future archaeological studies in the Philippines. Several distinct "signatures" were noted among the sherd samples suggesting that there may be easily identifiable regional differentiations in sherd compositions. Furthermore, many of these differences can be visually recognized with either a low-powered microscope or hand-lens, thus potentially providing a relatively low-tech method for being able to make systematic correlations between pottery forms, styles, and fabrics in large scale collections.

Probably the greatest obstacle to being able to successfully carry out petrographic studies in the Philippines is the difficulty of obtaining the type of detailed geological information

that is needed. Most geological maps provide only cursory information, and written reports are generally geared towards large-scaled evolutionary questions rather than area specific analyses. Rice (1984:314-415) points out the importance of understanding the local ceramic environment, including the range of geological deposits in an area, their relative age, the types of soils, sediments and hydrological conditions, the history of ancient or modern deforestation, reforestation and/or erosion, and the history of local earthquakes or volcanic eruptions. To date, there is a lack of fine-scaled geological research or information to satisfactorily answer these types of questions.

The ethnographic sherds were an important component of this study. Potters tend to be conservative in their methods and usually obtain potting clays from localized deposits (Vincent 1991:344). It is therefore possible that today's potters exploited some of the same clay resources that were also used in the past. However, this research demonstrated an absence of any direct mineralogical correlations between the archaeological and ethnographic samples; but, the data collected was minimal, and only future comparative studies of this kind can address this question in more detail.

Archaeologists have noted the problem of determining what are locally made versus imported wares until more petrographic studies, or other ceramic characterization studies are undertaken (Vincent 1991; Snow and Shutler Jr., 1985). To date, archaeologists have relied primarily on vessel forms and styles to determine regional typologies. Vincent

(1991:342) and others have argued for a “form-plus-fabric” definition of ceramic types, stating that the fabric is equally as important as shapes, textures, colors and design in defining a ceramic type. In fact, it is probably even more important for the analysis of plain, undecorated sherds whose visible attributes could mask the underlying diversity of a collection. (Snow and Shutler Jr., 1985). Characterization studies provide not only a method of sourcing pottery to specific production locations, but a more complete and sophisticated method for addressing the intricacies of questions relating to regional trade, technologies and cultural interactions of the past.

Glass Beads and Bracelets

Glass beads first appear in the archaeological record of Southeast Asia in the 4th to 3rd century BC. Some of the earliest recovered archaeological examples are from Viet Nam, Thailand and Malaysia (Basa et al. 1991:366-367). By the first millennium AD beads were widely traded throughout the region and can be found in archaeological sites extending from India to Korea, commonly recovered as grave goods, and often appearing simultaneously with the earliest iron artifacts

Early Southeast Asian glass beads are referred to as Indo-Pacific beads (Francis 2002). Indo-Pacific beads are classified by a number of shared characteristics, the most important being the specific technology used to produce them. Indo-Pacific beads are "drawn" beads, meaning they are made by drawing molten glass into long tubes which are then cut into short segments, perforated and finished. This method leaves visually identifiable striation marks, which run parallel to the beads aperture. They also rarely exceed more than 5mm in diameter, and exist in a limited range of colors which includes opaque reddish-brown, orange, yellow, green and black; semi-translucent greens and blues; and translucent amber and violet (Francis 2002:19). Indo-Pacific beads have been found over a far-reaching area extending from Ghana and South Africa, to China and South Korea and to the Island of Bali in eastern Indonesia and Palau in western Micronesia over a period exceeding 2,000 years (Francis 2002:19-20)

Indo-Pacific glass bead technology is believed to have originated in India. The city of Arikamedu on the southeastern coast of India is to date, the earliest known Indo-Pacific bead making site. It was also an important early trading port with the west. Glass bead production waste at Arikamedu has been dated to the 2nd century BC and extends through at least the 7th to 8th century AD (Francis 2002). A number of other early production sites have been dated to the early to mid 1st millennium AD throughout the Southeast Asia region. Some of the more well-known include: Karaikadu, located just south of Arikamedu, which may have been a satellite production site for Arikamedu; Mantai, Sri Lanka, which was a key trading center between the east and west from the 1st to 10th century AD; Oc Eo, Vietnam, which was part of the State of Funan from the 2nd to 6th century AD; Klong Thom, Thailand, locally referred to as "bead hill" which dates to the 1st to 6th century AD; and Kuala Selinsing, Malaysia, which may have been a minor port of the State of Funan (Francis 2002:31-33; Francis 1989a). There are also strong cultural relationships noted among these sites, evidenced by similarities in beads & other artifact types. For example, a carnelian seal with a Sanskrit inscription and glazed Chinese ceramics have been recovered at Kuala Selinsing, and seals with Brahmi and Pallava script have been recovered at Khlong Thom. Francis (1990) suggests that these sites may have formed an informal polity, or a federation based on trade (Francis 1990b:18). He also suggests that it was likely that bead production was brought to these sites by the physical emigration of Indian beadmakers as part of what is often referred to as the

"Indianization" of Southeast Asia (Francis 2002:35; Francis 1989a). He points out that beadmakers are generally conservative with their craft, keeping their skills within their families and handing down their craft from father to son and that it would be extremely hard to replicate this skill from observation alone. If so, this would explain why the industry disappeared by 1200 when Indian beadmaking also declined (Francis 2002).

Early Chinese beads differed significantly from Indo-Pacific beads. There are distinct differences in the technologies and raw materials, and resulting bead types. Chinese beads are often referred to as "coil" beads, because the beads are formed by coiling molten glass around a mandrel. The mandrel also serves to form the beads perforation, after which the glass just needs to be cut into individual beads and finished.

Chinese coil beads are generally smaller than Indo-Pacific beads, often measuring 3mm or less in diameter. They also tend to contain high levels of lead and barium in the chemical makeup of the glass. Chinese glass technology was introduced during the late Zhou Dynasty (5^{th}-3^{rd} century BC), and "lead-barium" glass is recognized as distinctly Chinese up until the Han Period (Francis 2002:72-73). Numerous glassmaking centers have been identified in China, but the most well known ones in the south were the Nan Yue (non-ethnic Chinese) beadmakers in Guangzhou, Suzhou and Quanzhou (Francis 2002:58-59).

During the 7th century AD, Southeast Asian maritime trade routes shifted significantly and there was a corresponding shift in beadmaking centers. The early trade routes that linked India to Southeast Asia and southern China hugged the coastlines of India and Burma, crossed the Thai peninsula, and continued along the coastlines of Cambodia and Vietnam. By the 7th century AD, trade vessels started sailing around the Malay Peninsula and through the Straits of Malacca. As a result, the Straits of Malacca came to dominate the trade route, and there was a shift in trade centers away from Funan to polities located along this new route. Many of these trade centers became important beadmaking centers, including Srivijaya, Sumatra, Sungai Mas, Malaysia, Sating Pra, Thailand and Takua Pa, Thailand (Francis 1989a:6). Chinese beadmaking, which declined during the Han Dynasty (202 BC – AD 220), increased again by the Song Dynasty (10th century); however, Chinese beads were not prolific in Southeast Asia until around the 12th century, when consequently, we see a parallel decline in Indo-Pacific beads.

Glass beads were highly valued throughout the prehistoric period in Asia, and in many regions, up until modern times. Large quantities of beads have been recovered from the Han Dynasty tombs of southern China, the royal Paekche and Silla Dynasty tombs in Korea, and the Yayoi and Kofun period tombs in Japan. (Francis 2002:46-48). For example, in Kongju, Korea, the tombs of Paekche King Muryong and his wife, buried in 526 and 529 respectively, contained more than 10,000 Indo-Pacific beads (Francis 2002:46). Likewise, throughout Southeast Asia, it is common to find beads in the burials

of high status individuals. This remained true until foreign religious ideologies (e.g., Hinduism, Buddhism and Christianity) infiltrated the region, which brought about changes in burial practices.

In the Philippines, beads are found as grave goods from the late Neolithic onwards. The earliest beads were made from *Conus, Cypreae, Nassarius* and *Tridacna* shells, or less frequently from soft stones, jade or teeth. Glass beads were introduced into the islands during the Metal Age. Many of the earliest glass beads are found in association with imported stone beads, such as carnelian and etched beads from India (Fox & Santiago 1985). The earliest glass beads recovered in the Philippines are from a series of burial caves located on the west coast of the Island of Palawan. The glass beads recovered from Uyaw Cave, Palawan are tentatively dated from 500-200 BC, and beads from Manunggul Cave, Chamber B, Palawan have been dated from 100-200 BC (Basa et al 1991:367). Other glass objects that have been recovered from this area including a large green glass bead shaped like a cicada that closely resembles jade Chinese carvings from the same period (Roces et. al. 1977). There were also ear pendant forms locally referred to as *ling-ling-o's*. *Ling-ling-o's* were commonly made from jade, and glass versions have only been recovered in Vietnam and the Philippines, thereby demonstrating the close ties between these two regions during the 1st millennium AD.

There is very little evidence of bead production or glass working during the Prehistoric Period in the Philippines. Fragments of raw green glass have been recovered in Calatagon, Luzon, and the cullet of an opaque light blue glass has been found near Pila, Laguna, Luzon; however, no tools, i.e., crucibles, rods or pinchers have been recovered suggesting that glass was probably being reworked at these sites, rather than produced.

According to data compiled by Fox and analyzed by Francis, Indo-Pacific beads accounted for 66.2% of all beads excavated in the Philippines from 200 BC – AD 1200 (Francis 2002:48). The earliest beads were generally very small, e.g., some less than 2mm in length. The most common colors were translucent blue, opaque red and white (Fox & Santiago 1985; Francis 2002). Francis (2002:204) suggests that most of the Indo-Pacific beads found in the Philippines during the Metal Age were probably made in Funan and Srivijaya. This is based on his chemical analysis from which he identified four or five distinct chemical signatures among Indo-Pacific glasses of which two were the most common among glass recovered in the Philippines (Francis 2002:210-220).

By AD 1200, Indo-Pacific beads are more-or-less replaced by Chinese coil beads in Southeast Asia, which persist in the archaeological record up until the 16th century (Francis 1989a:7). Historic references to ancient bead production and trade in the Philippines are rare, but there are a few Chinese references that have confirmed that there was some direct trade in beads between the two regions. For example, in 1225, a Chinese

official named Chau Ju-Kua advised Chinese mariners to take beads to several different islands in the Philippines, identified as Mindoro and probably Luzon, Palawan and the Visayas (Francis 1989:5-6). Likewise, in 1349, Chinese official Wang Ta-yuan advised mariners to take beads to San Tao (probably the island of Luzon) and blue beads to the Sulu Islands in the south (Francis 1989b:5-6).

Another important class of glass artifacts dating to the Metal Age are glass bracelets (bangles). Glass bracelets recovered in Southeast Asian contexts are generally triangular, semi-circular or house-shaped in cross-section and resemble earlier Neolithic forms that were made from the *Conus* shell. An early production site has been identified at the Sa Huynh site of Giong Ca Vo, Can Gio district, near Ho Chi Minh City (Haidle 2002:201). Glass bangles were widely distributed in Southeast Asia, and the triangular forms are fairly common in the Philippines, Eastern Cambodia and Southern Vietnam.

Archaeological and ethnohistorical research has demonstrated that glass beads and bracelets were highly valued throughout the prehistoric and historic periods in the Philippines. Likewise, ethnographic research from this last century has documented that many communities still place great societal value on these items. For example, beads and bracelets are often valued as family heirlooms, so much so that they are rarely sold or traded but rather given as bridal or inheritance gifts (Francis 1992). The value and preferences for specific types of beads also varies greatly by region and ethnic group.

For example, some ethnic groups prefer to wear beads in single strands or multiple strands, while other groups prefer them for beadwork. Beads are also known to have been used as currency, e.g., within the early 20th century, the Hanunoo of Mindoro were using small red beads with a white core as their local currency (Roces et al. 1977). It is likely that similar regional and ethnic differences and preferences also existed in the past.

Methodology

The manufacturing methods and chemical composition of glass are important factors for determining the regional origins of specific types of glass beads. The two most important technological types of beads in Southeast Asia are drawn and coil beads. The technological differences between these bead types can often be distinguished by the naked eye, with drawn beads displaying striations parallel to the length of the bead and wound beads displaying striations or inclusions, which encircle the bead perpendicular to the perforation. Wound beads also tend to be less regular in shape, often resembling a section of a spring. This is especially true if a bead is not well-finished, i.e., if the edges are not smoothed out. Wound beads also tend to have a more uniform perforation than drawn beads, because the perforation is formed by a mandrel, rather than bored afterwards, which can result in a larger aperture at one or both ends than in the middle. Other beads types include faceted or molded beads, which are formed as a result of secondary lapidary industries. These beads are not dealt with in detail in this study, because there was only one bead in the collection that fits this category, which was a 14-sided faceted orange bead.

The basic constituents of glass are silica, soda/potash and lime. These are generally combined as 60-70% silica (SiO_2), 15-20% alkalis, e.g. soda (Na_2O) and potash (K_2O), and 2%-8% lime (CaO). Sand or quartz pebbles are the most common sources of silica (Francis 1990a:4). Alkaline materials are commonly sought from limestone, dolomite, potash and plant ash, and lime is obtained from shells.

The coloration of glass is determined by additives and impurities. It is generally desirable to procure silica sources that are low in mineral impurities, unless the color produced by that impurity is desired. For example, iron (Fe) will produce a "bottle green" color, cobalt (Co) a blue color, manganese (MN) a pink to black color, and copper (Cu) a red color. Common impurities include alumina ($Al2O_3$), magnesia (MgO), iron (Fe), manganese (MN), and lead (Pb) (Francis 1990a:4). Tin (Sn) is often used to opacify glass (Francis 1991:231) and color is further dependent on whether oxidizing or reducing agents are present in the raw material as it is heated (Lugaw 1974:154).

Francis (1990a) provides a chemical analysis of beads recovered from several important early bead centers of Southeast Asia, including Arikamedu and Oc-Eo. One important finding was that Oc-Eo beads have a higher concentration of aluminum (Al) than the beads analyzed from Arikamedu, Malaysia, Sumatra, Sa-Huynh or Laos (although he notes that this was a small sample). Further chemical analyses may allow us to

fingerprint the chemical compositions of beads to specific production centers. Francis (1990b:19) also suggests that a beads color may help identify where a bead is (or isn't) from. For example, his research has demonstrated that Arikamedu did not make orange beads, but most of the other sites he studied did; however Arikamedu made violet beads, which are rare elsewhere. He also noted that very few black beads were made at Kuala Selinsing.

Results & Analysis

One hundred and thirty beads were recovered from Ubujan. A preliminary technological analysis was done that clearly indicated a mix of both drawn beads and coil beads in the collection. This mixing most likely suggests that there was a prolific amount of bead trade in the region resulting in the collection of beads from various production centers.

The beads were categorized by their shape/type and color. See Figure 9. The most common bead type in the collection was the annular bead, which is a donut shaped bead whose width is greater than its height. One hundred and twenty four of the one hundred and thirty beads were annular, and the majority of these were either opaque red or opaque yellow. There were also a limited number or opaque orange (N=3), opaque green (N=5), opaque blue (N=3), and translucent blue (N=3) annular beads. Other bead types included spherical (round) beads; barrel beads, which have a diameter that is widest at the center and narrows at the ends; cylindrical beads; and one fourteen-sided bead. All the

beads in the collection were monochrome and the majority of them were opaque rather than translucent.

FIGURE 19: Description of Bead Types

A. ANNULAR - doughnut shaped beads whose width is greater than its height. This bead type is by far the most prevalent bead type from Ubujan (124 out of 130 beads). Opaque red (64) and opaque yellow (46) are the most common colors, but there are also a few opaque orange (3), opaque green (5), opaque blue (3) and translucent blue (3) beads of various sizes in the collection

B. 14-FACETED –has fourteen sides. There is only one bead of this type in the collection. It's shape was probably fashioned after stone, faceted beads (e.g., carnelian) which are quite common in many areas of Southeast Asia, such as Vietnam, Thailand and Indonesia (Basa, Glover and Henderson, 1991).

C. SPHERICAL – round beads. There are only three (3) beads of this type in the collection - one orange, one green and one opaque blue. They are all relatively large in size, averaging about 1.5cm in diameter.

D. BARREL – diameter is widest at the center, and narrows towards the ends. There was only one barrel shaped bead in the collection and it was opaque red.

E. CYLINDRICAL – tube shaped. There was only one cylindrical bead in the collection and it was a drawn, opaque red bead.

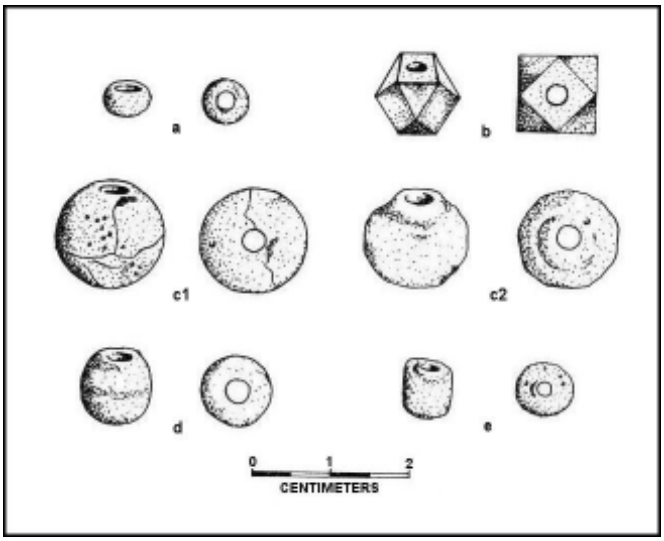

FIGURE 20: Illustration of Beads
a) annular; b) 14-faceted; c1) spherical; c2) "wound" spherical d) barrel e) cylindrical

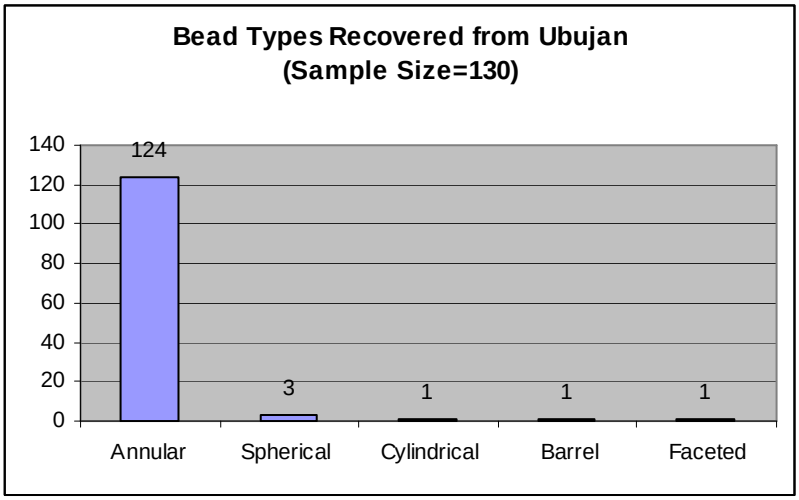

FIGURE 21: Chart of Bead Forms

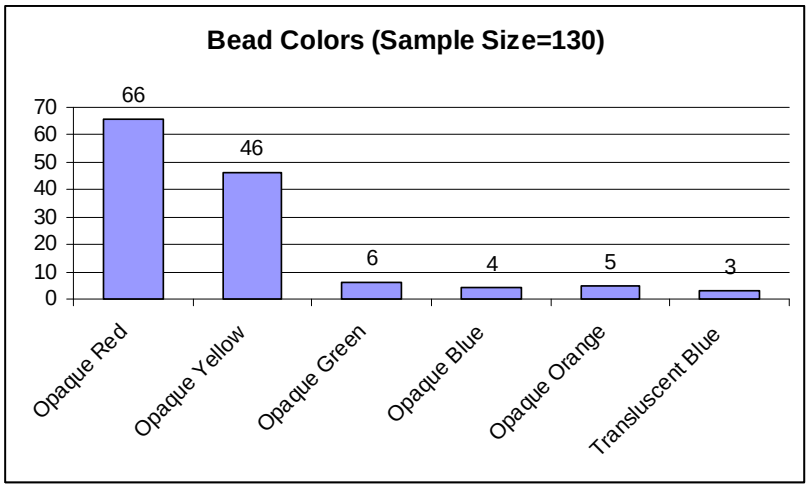

FIGURE 22: Chart of Bead Colors

If Francis' assumptions are correct that Arikamedu did not produce orange beads, but produced violet beads, than we can infer that the beads recovered at Ubujan were

probably not produced there, but rather within the more immediate Southeast Asian region. The variety of bead types and colors also suggests that beads were being procured from a number of different sources, and that red and yellow (which represent 86% of the collection) were either the most preferred colors or the most readily available.

There are some other bead shapes that are common by the late Metal Age which are not represented here. This includes hexagonal, octagonal, and oblate shapes. The 14-sided bead that was recovered is unusual as there are no other known examples of this bead type from the Philippines. The only other example of this bead type that I was able to find information on was from Malleret's (1962:1198) report on Oc-Eo where he documents a translucent green fourteen-sided glass bead as follows:

> Grain cubo-octaedrique, vert clair, theoriquement derive d'un cube don't les angles auaient ete tronques. Il se present donc comme un solide a quatorze faces don't six sont des carres et huit autres des triangles. Ce type exceptionnel, parmi les perles en pierres dures et en verre, est par contre tres commun pour les grains d'or. Il a pu etre inspire soit par une forme naturelle de cristallisation de la fluorine, soit par celle de l'or natif.

Two glass bracelet fragments were also recovered from Ubujan. See Figure 22. The larger fragment is orange and the smaller fragment is brick red and they are both triangular in cross-section. Glass bracelets (bangles) similar to these have been recovered at numerous Metal Age sites throughout Southeast Asia. They are generally triangular, semi-circular or "house shaped" in cross-section and tend to range in color from dark to light green, black, violet, blue-green or translucent blue (Haidle 2002:202; Beauclair

1962). For example, five green bracelets were recently recovered from Krek 52/62 in Cambodia; several dark green, black and violet bracelets are reported from the glass production and jar burial site of Giong Ca Vo near Ho Chi Minh city; and numerous green, blue-green to blue translucent glass bracelets have been recovered from Sa Huynh jar burial sites and Dong Son graves in Vietnam (Haidle 2002:201-202). Some examples from the Philippines include three clear green glass bracelets triangular in cross-section from Manunggul Cave Chamber B, Palawan (Fox 1970:118); fragments of a dark-blue bracelet from Makabog, Masbate (Solheim 1954:59); an opaque blue glass bracelet recovered from a burial site in Siquijor (Solheim 2002:66); a translucent blue glass bracelet from Eastern Negros (Solheim 2002:83); a light green bracelet from a rock shelter site in Calamianes (Solheim 2002:115); green, orange, yellow and blue bracelets recovered from Puerto Galera, Mindoro (Solheim 1982:69); and one red opaque and one black opaque triangular bracelet recovered from a cave site in Sucgang Barrio, Bohol (Solheim 2002:89).

It is interesting to note that only the sites in Bohol (Ubujan and Sucgang) had red opaque bracelets. Likewise, from the sites listed above, only Mindoro and Ubujan had orange bracelets. Solheim (1982:69) has suggested that blue and green glass was from an earlier period of glass production than the opaque, yellow, orange and red glass. If this is true, it would suggest that the Ubujan burial dates to the later part of the Metal Age and that the

bracelets are probably from an origin outside the Sa Huyhn/Dong Son glass production area and trading spheres.

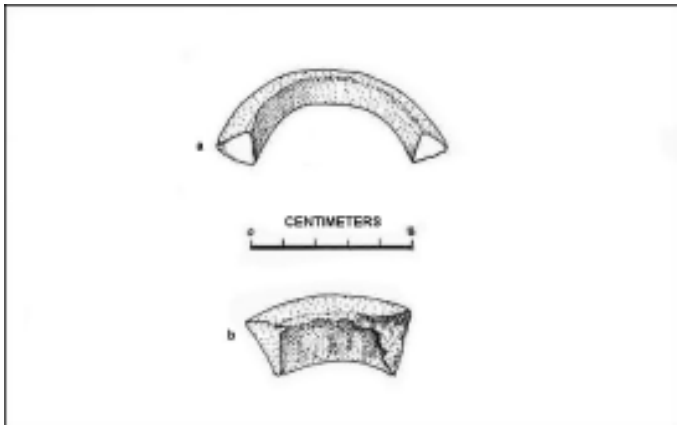

Figure 23: Glass Bracelet Fragments from Ubujan
(VII-98-P2-436; VII-98-P2-437)

Much more research needs to be done on glass artifacts recovered in the region. Francis' research has demonstrated the value of stylistic and technological analyses for comparative research; however, we need to gain a much better understanding of what types of beads and bracelets were being made at various production centers in the region. This requires a lot more comparative data. For example, Francis' data from the Philippines was obtained almost exclusively from the islands of Palawan and Luzon, and to date, there is little information available from other major regions of the archipelago, such as the Visayas or Mindanao. Further analysis can provide data for more in-depth studies on the nature and extent of trade networks in the region as well as provide a better understanding of cultural practices and preferences for specific bead and bracelet types.

Metal Implements

There is much controversy surrounding the origins of metallurgy in Southeast (Bennett 1989). The earliest securely dated metalworking sites in the region are located in Thailand dating to 1500-1000 BC (Higham 2002:13), and perhaps earlier, e.g., circa 2,200 BC (Solheim, personal communication). Chinese metalworking predates this by several centuries leading many researchers to believe that metal working technology may have been introduced into the region from China rather than locally invented (Higham 2002:113-116). Similar bronze artifacts and casting technologies have been noted from Hong Kong to Yunnan, and into Bac Bo and down the Mekong Valley into Central Thailand (Higham 2002). However, although the technologies are similar, artifacts produced in Southeast Asia are significantly different from those produced in China, i.e., local artifacts took on indigenous forms. For example, in Thailand, the earliest bronze artifacts were primarily items of personal adornment, such as bangles, anklets and rings, or socketed implements, such as adzes and axes. This is in contrast to objects made in China, which tended to be militaristic or ceremonial in nature, such as weapons and elaborate ritual vessels (White 1988:177-179). These differences strongly suggest that the artifacts were being locally produced in Southeast Asia rather than obtained from China through trade.

There is little evidence of prehistoric metal smelting or forging in the Philippines, or the mining of tin, which is needed to make bronze. Rather, alloyed metals are believed to

have been introduced into the islands as a result of the expansion of maritime trade. Socketed bronze adzes and spears have been excavated from the Tabon Cave Complex sites on the western island of Palawan which date to circa 500-200 B.C. (Fox 1979). Moulds for casting adzes have also been recovered demonstrating the while metals weren't being forged, they were being locally reworked (Fox 1970). This "secondary use" of metals probably involved the reworking, repairing, recycling, forging, smithing, and in the case of iron, steeling of available metals (Dizon 1998c:124). For example, pottery moulds have been found in both Duyong Cave and Batu Puti Cave in the Tabon Caves Complex that match the adze forms found nearby in Uyaw Cave (Jocano 1988:123). Dizon (1998c:123) has suggested that metal working was probably being done on a local scale by community metal smiths throughout the islands, as there did not appear to be any type of mass production or standardization of manufacturing forms or techniques.

The earliest evidence of iron implements in the Philippines is from Manunggul Cave, Chamber B in the Tabon Caves Complex, Palawan dating to approximately 370 BC (Dizon 1998c:122). These dates are almost synonymous with bronze dates suggesting that the two metals were introduced more-or-less simultaneously. As a result, prehistorians in this region do not differentiate between a Bronze and Iron Age, but generally refer to the period as the Metal Age.

Bellwood (1997:271-272) has suggested that the Sa Huynh culture may have been involved with the transmission of metalworking techniques into Island Southeast Asia (Bellwood 1997:271-272). The Sa Huynh culture was an Austronesian speaking population who inhabited the southern coastal region of Vietnam and who possibly settled the area from the Indo-Malaysian Islands. Archaeological research has noted extensive cultural contacts between this area of southern Vietnam, the Philippines, Borneo, and Sulawesi during the Metal Age. There are a number of similar artifact types, including earthenware pottery, socketed and unsocketed metal tools and tanged knives, glass beads and bracelets, and specialized stone artifacts such as jade and glass *ling-ling'o* ear-pendants. Many of these sites also have similar banded agate beads and round, cigar-shaped and faceted carnelian beads probably originating from India or possibly Thailand. These similarities clearly indicate that there was maritime interaction among Island and Mainland Southeast Asia by the early first millennium AD, if not earlier.

Analysis & Results

Thirty (30) metal objects were recovered from Ubujan. The analysis of these objects was based on morphology alone, i.e., no compositional analyses were undertaken. Eight different tool forms ("types") were identified. These were categorized based on contemporary indigenous tool forms. I have included ethnographic information on the functional uses of each of these tool types, as this could be relevant to their prehistoric uses as well. What is most significant is that these tools appear to be predominately

agricultural or utilitarian in nature, i.e., not for warfare. The larger tools tend to have flat or slanted blades that resemble farming tools, e.g., for tilling the soil. Smaller tools appear to be utilitarian. For example, there is a small single-sided blade that resembles the form of a contemporary household knife.

Table 4. Iron Tool Forms Recovered from Ubujan

Tool Types	**Quantity**	**Percentage**
Knife	1	4%
Chisel	1	4%
Dagger	6	22%
Diagonal-Edged Bolo	3	11%
Round-Edged Bolo	1	4%
Small Square-Edged Bolo	8	30%
Large Sq-Edged Bolo	2	7%
Small Square-Edged Knife	2	7%
Unidentified	3	11%

Figure 24: Description of Tools Forms

A) KNIFE ("punyal") – This form is known locally by the Spanish name "punyal". It is a single-sided blade, i.e., designed to be used for cutting on only one side, and has a pointed tip and a tang for hafting. Per Peralta (1977:328), this is the most common type of blade found in Developed Metal Age sites. Knives of this type are found in Late Metal Age sites in Batangas, Masbate and Palawan, and similar forms are also documented from Magsuhot.

B) **CHISEL** ("tigib**")** One end of this instrument is flattened (e.g., for hammering) and it is rectangular in cross section. Only one instrument of this type is identified in the Ubujan collection and only half of the tool (the flattened end) remains, but based on the form (thickening of the circumference from the flat end), it appears to be a chisel.

C) **DAGGER** ("**bangkaw**") – This blade is symmetrically balanced and its base is triangular in shape and has a tang for hafting. Blade is probably primarily used on the pointed end.

D) **DIAGONAL-EDGED BOLO** ("**bungay**") – This blade is flat or slanted. Ethnographically, this blade type is used for tilling the soil or slashing/weeding.

E) **ROUND-EDGED BOLO ("lugi")** – This tool has a very rounded edge. Ethnographically, this form is used for agriculture or commonly used for scraping the meat out of coconuts.

F) **SQUARE-EDGED BOLO** – Similar to the pang-gi but larger in size. Also resembles an agricultural tool.

G) **LARGE SQUARE-EDGED BOLO ("bara")** - This is a large, heavy tool that was probably also used for agricultural tasks such as digging and removing stones.

H) **SMALL SQUARE EDGED KNIFE** ("**pang-gi**") – This is a small knife that was probably used for cooking, household tasks or possibly for basket and mat weaving (Legaspi 1974:38).

Other Artifacts (Shell, Stone, Bone & Teeth)

Other artifacts recovered from Ubujan include some shell and stone artifacts/ ecofacts and some fragmented osteological/zooarchaeological remains.

Shell

Only a small quantity of shell items was recovered from Ubujan. This included both artifactual (modified) and geofactual (unmodified) shells, comprised of a mix of sea, land and brackish species, all native to the area. Artifacts included a round, perforated shell disk (species=*Conus*) 4.3 cm in diameter that appears to have been a pendant. There was also a fragmented piece of the inner lining of a pearl oyster shell that was probably an ornamental piece. However, most of the shells were unmodified and the most common species were *Trochus*, *Conus*, and *Tridacna*, and there was one operculum ("cats eye") from a *Turbo* shell.

Shell pendants are commonly found in burials sites from the late Neolithic Period onwards in the Philippines. At Duyong Cave, Palawan perforated shell pendants were recovered dating to approximately the 3rd millennium BC (Fox 1970) Other common shell artifacts recovered at archaeological sites in the Philippines include *Tridacna* adzes, *Trochus* bracelets, *Nautilus/Turbo* spoons, and *Nautilus* disks/beads.

It is likely that other shell artifacts were present in the burial but were not collected as they may not have been recognized as artifacts and/or were probably not deemed to be significant by the laborers who collected the materials from the burial. Many of the land and brackish species are also more fragile and probably would not survive as well as many of the recovered sea species.

Stone

Only one stone artifact was recovered from Ubujan and it appears to have been an anvil/burnishing stone used for forming and burnishing pots. Its length is 7.6 cm, width is 6.2 cm and height is 4.5 cm and it has a smooth, concave, inner surface as well as a smooth, rounded, outer surface. It's presence in the burial may possibly suggest that one of the individuals interred was a potter who was buried with his/her tools of trade.

Human/Animal Remains

There was a considerable amount of bone material recovered from the site, both human and animal; but, unfortunately, most of it was in very fragmentary condition due to the improper recovery and handling of the materials. As a result, no analysis was done on the human remains except the teeth. A total of ninety-six (96) teeth were recovered. Approximately half of these (47) are at the Bohol Museum, Tagbilaran City; two (2) teeth are with the small collection of artifacts kept at the National Museum in Manila; and the

remaining forty-seven (47) teeth remain in the private collection of Mr. Jes B. Tirol of Tagbilaran City.

Only the teeth from the Bohol Museum and the National Museum were catalogued. See Appendix 5. However, I was also able to do a brief count and classification of the teeth in the collection of Mr. Jes B. Tirol. I recorded each of the tooth types, if it could be positively identified, and noted whether it belonged to an adult or subadult, and if subadult, whether it was a permanent of deciduous tooth. From this analysis, I was able to identify the minimum number of adults, children and infants represented as follows:

Minimum # of adult individuals represented: THREE (3)
- Minimum # of incisors: 28
- Minimum # of cuspids: 6
- Minimum # of premolars: 14
- Minimum # of molars: 28

Minimum # of children represented by small, permanent teeth: ONE (1)
Minimum # of infants represented by deciduous teeth: ONE (1)

There was also red staining on a number of the teeth. This probably resulted from a common local custom of chewing betel nut, an indigenous stimulant. Betel nut is the fruit from an areca palm, which is combined with lime and wrapped in betel piper vine and chewed. When chewed, it creates a blood-red spittle that stains the teeth. It is still common practice among the older generations in many areas of the Philippines to chew

betel nut. Ethnohistoric research has demonstrated that it served an important social function in the past as well (Scott 1994:49).

DISCUSSION, CONCLUSIONS & SUGGESTIONS FOR FUTURE RESEARCH

The analysis of the materials recovered from Ubujan contributes important data on the early political-economy and society of the Central Philippines during the Metal Age. The quantity and variety of recovered artifacts was extensive, allowing for a detailed multi-leveled comparative analysis. This included an in-depth morphological, stylistic, and technological analysis of the individual artifact types as well as a broad-scale comparative analysis of the artifacts within a regional context.

In my analysis, I chose to focus on trade, technologies and traditions as important societal indicators for understanding the nature and development of the island's early political-economy and society. Maritime trade in particular has been recognized as an important catalyst to the development of the early polities of Southeast Asia (Reid 1988). With the opening of trade routes between India and China during the first millennium AD, we witnessed the emergence of a succession of early maritime-trading polities in the region (Hall 1999; Wolter 1999; Bellwood 1997:275-276). The earliest known polity in the region was Funan, located in the Mekong Delta of what is now Vietnam (Wolter 1999:109). Funan developed into a lively trading port and city from the 1st to 5th centuries AD with Indian, Chinese, Persian and Malay traders passing through and settling within the city (Hall 1999:192-193). By the fourth century AD, when an all sea trade route was established between India and China via the Straits of Malacca, numerous

other polities and trade centers emerged such Perak, Malaysia, Srivijaya, Sumatra and somewhat later, Majahapit, Java, each with their own local products and industries (Hall 1999:197-226; Wolter 1999:31-36; Bellwood 1997:275-276).

Maritime trade also played a role in the development of the early political-economy of the Philippines. Archaeological research has noted a gradual increase in the quantity and variety of imported goods into the archipelago during the first millennium AD, and by the second millennium AD, foreign goods dominated many of the local markets and trade. Corresponding with this increase in trade goods was a gradual decrease in some local products and industries. For example, there was a marked decline in local pottery industries (e.g., decorated earthenwares) when imported stonewares and porcelains were introduced into the islands.

Yet, the impact of maritime trade was probably minimal during the 1st millennium AD. The quantity of foreign goods in the islands was still relatively small compared to indigenous products. Rather, local technologies played an important role in the regional economies during this period. For example, throughout the archipelago, there was a proliferation of highly elaborate and varied earthenware industries, of both utilitarian and ceremonial wares, that were being traded among the island's communities. Foreign goods were also being relocalized, i.e., metal was being reworked by local craft specialists for local needs.

Hutterer (1991:232) has suggested that foreign goods were introduced into the local economies of the Philippines, as well as other areas of Southeast Asia, through existing trade networks. These trade networks tended to be centered around river ways forming "dendritic" networks between highland agricultural areas and lowland coastal areas (Bronson 1977). This allowed each area to specialize in specific resources unique to their environmental and geographical zone (Bronson 1977; Hall 1999:197-198). As such, a symbiotic relationship developed among and highland and lowlands populations with trade retaining a non-centralized character as each geographical zone become dependent on the other for a variety of both basic and luxury goods. This trade pattern is well documented during the Spanish historical period (Junker 2000:241) and recent ethnohistorical and ethnographic research has noted similar patterns of economic interdependence among more contemporary populations in the archipelago. For example, Schlegel's (1979) ethnohistorical research in Mindanao described the highland Tiruray people as dependent on the lowland Magindanao polity for critical household goods such as salt, earthenware pots, metal tools and textiles (Junker 2000:241). In exchange, the Magindinaos received needed forest products such as beeswax, rattan and sap. The Magindanao chiefs would also trade these products further down the coast to the maritime port of Cotabato, where they could obtain foreign goods such as Chinese porcelains and silks. Likewise, a recent ethnographic study of the contemporary, but traditionally-based, salt-making and pottery industries in the southern coastal towns of

Bohol demonstrates a similar pattern of exchange still occurring today. The coastal communities produce sea salt in earthenware pottery and trade it inland for agricultural goods such as rice (Yankowski 2004b). A symbiotic relationship exists for the regular exchange of goods between highland and lowland populations which appears to be routed within the past.

In this thesis, I have suggested a heterarchical model for understanding the nature of sociocultural development in the Philippines during the 1st millennium AD. Research in Southeast Asia has demonstrated that the early polities of the region did not develop in a classic linear fashion, but rather, retained a decentralized "mandalic" character (Wolter 1999). This was in large part due to the fact that political power was not absolute, i.e., political control was more dependent on personal alliances rather than hereditary or territorial control. As a result, power roles and alliances were always shifting creating a structure of "segmentary polities" throughout the archipelago (Junker 2000:58). Other important characteristics of the region's early polities that fit well with a heterarchical model include a pattern of dispersed yet interdependent polities; multi-centered or overlapping mechanisms for the distribution of goods; marked localization and specialization of material culture; and, household and/or community based production and economic specialization. For this reason, a heterarchical model is appropriate, as it allows more flexibility than traditional models to explain these particular patterns of development.

Ideally, in order to gain a better understanding of the nature and development of early polities in the region, we need to be able to identify and trace more detailed information about trade, technologies and traditions such as changes in economic production and specialization; changes in settlement and trade patterns; environmental changes that may effect agriculture, production or trade; the relationship of production to population growth; and ideological factors that influence social choices. This requires a more thorough understanding of local resources, chronologies and interaction spheres.

Ceramic studies (e.g, comparative technological studies) offer a promising method for addressing some of these questions. For example, Miksic and Yaps (1990;1992) analyses of Fine Paste wares demonstrates the potential of technological studies for mapping out early maritime trade in the Island Southeast Asian region. Similar studies should be undertaken on FP wares recovered in the Philippines. There is also a need for more in-depth technological studies of local earthenwares. Research in the Philippines has noted that there are both regional and local variations in pottery styles and decorative techniques (Kress 1978). This suggests that pottery was being produced at many independent locations. However, stylistic studies alone are not indicative of production centers. For example, Bacus (2004) carried out a small scale study on the paste composition of sherds with the same decorative styles in the Visayan region and noted that very few of the sherds had similar paste characteristics (Bacus 2005:145). This

indicates that particular pottery styles were produced at more than one location and demonstrates the need for more technological studies in order to address questions relating to ceramic production areas.

In order to successfully carry out more technological studies, we need to learn more about local ceramic environments in the archipelago. This requires more in-depth geological studies of the range of clay sources and tempering materials in the islands. Ethnographic studies can help provide some of this information. By analyzing sherds that are provenienced to particular clay sources, we can identify particular "signatures" (e.g., mineral constituents) of clay sources, and possibly match it to prehistoric sources. Ethnographic studies can also assists archaeologists in determining possible manufacturing methods and cultural preferences for particular sources or materials.

Lastly, burials provide a rather unique opportunity for analyzing ideological and symbolic aspects of culture. This is because in nearly all cultures, burials constitute a highly symbolic act intimately related to religious beliefs (Renfew 1994:52). These beliefs are acted out through rituals, which can be materially represented in burials (Binford 1971:16).

Secondary jar burials, in particular, have offered some interesting insights into prehistoric beliefs and traditions. This is because secondary burials tend to be associated with

elaborate ceremonial rituals, at least one at the initial time of burial and another during the second burial. Ethnographic research in the Philippines has noted that only the most important members of elite families receive secondary burials, for it requires relatives to contribute a substantial amount of money and labor for an accompanying ritual ceremony (Solheim 1981). Grave goods are offered in the belief that the deceased needs his/her earthly belonging for the journey to the other world (Jocano 1975:219). And among the Visayan, it is believed that the souls of poor people remain in the underworld if none of their living relatives offer sacrifices for their redemption (Jocano 1975:224).

Furthermore, death itself is viewed differently than in western cultures. Rather than viewing the body as a machine that suddenly stops working, the experience of death is a temporary state through which the soul(s) pass on their way to the next existence in the upper or underworld (Metcalf 1982). It can be described as an intermediary or liminal period or as a rite of passage through a transitory stage of existence (Turner 1969). Liminal states following death are characteristic of societies that practice secondary burials. During this period the soul is considered homeless but exists nearby with the capability of inflicting illness upon the living due to its ambiguous and unstable nature. The living must therefore make offerings of elaborate feasts to divert the souls evil intentions (Dizon & Santiago 1996:92).

For archaeologist, this means that the burials are often accompanied by an abundance of material offerings, which are the end products of these rituals. It therefore provides a unique opportunity to study this cultural tradition.

Unfortunately, much information was lost from the Ubujan site during its discovery and the subsequent recovery of the artifacts. This includes the specific placement of individual burials and burial goods, as well as the stratigraphy of the site. However, there is still a lot to learn from the artifacts themselves. In the Philippines, we are still in the preliminary stages of constructing prehistoric cultural sequences and understanding cultural variations among the archipelagos many islands. The range of materials recovered from Ubujan provided a wealth of data, which is needed for more detailed, regional, comparative studies.

Lastly, we must remember that archaeology is an on-going process with no final or definitive answers or explanations (Shanks & Hodder 1998:70). Each new piece of evidence just brings us one-step closer to our goal of constructing a broader more encompassing interpretation of the past. It is my hope that this thesis contributes to this goal.

BIBLIOGRAPHY & REFERENCES CITED

Alekshin, V. A.

1983 Burial Customs as an Archaeological Source. In *Current Anthropology* v24 (2): 137-149.

Arnold, D.E.

1981 A Model for the Identification of Non-Local Ceramic Distribution: A View from the Present. In *BAR International Series*, v120:31-44.

1992 Commentary on Section II. In H. Neff (ed.) *Chemical Characterization of Ceramic Pastes in Archaeology*, pp. 159-166. Madison: Prehistory Press.

Bacus, Elisabeth A.

1996a Late Prehistoric Chiefly Polities in the Dumaguete-Bacong Area and Central Philippine Islands. In *Philippine Quarterly of Culture & Society*, v24:5-58.

1996b Politcal Economy and Interaction: Late Prehistoric Polities in the Central Philippine Islands: Current Research in the Dumaguete-Bacong Area of Southeastern Negros. In *Indo-Pacific Prehistory Association Bulletin 14, The Chiang Mai Papers, Vol 1*: pp. 226-241.

1997 The Unto Site: Excavations at a Late First Millennium BC and Mid-Second Millennium AD Habitation Site in Southeastern Negros Island, the Philippines. In *Asian Perspectives*, v36(1):106-141.

1999 Prestige & Potency: Political Economies of Protohistoric Visayan Polities. In Elizabeth A Bacus and Lisa J. Lucero (eds.) *Complex Polities in the Ancient Tropical World*. Arlington, VA: American Anthropological Association.

2003 Styles of Alliance? Decorated Earthenwares in Late Prehistoric and Protohistoric Philipppine Polities. In John N. Miksic (ed.) *Earthenware in Southeast Asia – Proceedings of the Singapore Symposium on Premodern Southeast Asian Earthenwares*, pp. 39-51. Singapore: Singapore University Press.

Barbosa, Artemio C.

1992 Heirloom Jars in Philippine Rituals. In Cynthia O. Valdes, Kerry Nguyen Long and Artemio C. Barbosa (eds.) *A Thousand Years of Stoneware Jars in the Philippines*. Metro Manila: Jar Collectors (Philippines).

Barlett, Harley Harris

1937 Jar Burials in the Babuyan Group, Philippines Islands, Especially Those of Dalupiri Island. *The Michigan Academy of Science, Arts, and Letters*, v23: 1-20.

Barnes, Gina Lee

1993 *China, Korea and Japan – The Rise of Civilization in East Asia*. London: Thames and Hudson.

Barretto-Tesoro, Grace

2003 Burial Goods in the Philippines: An Attempt to Quantify Prestige Values. *Southeast Asian Studies*, v41(3):299-315.

Basa, Kishor K, Ian Glover and Julian Henderson

1991 The Relationship Between Early Southeast Asian and Indian Glass. *Bulletin of the Indo-Pacific Prehistory Association 1990, Vol 1*.

Bay-Peterson, Jan

1982-83 Excavations at Bagumbayan, Masbate, Central Philippines: An Economic Analysis. *Asian Perspectives*, v25(2):67-98.

Beauclair, Inez de

1962 Addenda to 'Ken-Pai': A Glass Bracelet from Yap. *Asian Perspectives* v6(2):232-255.

1972 Jar Burial in Botel Togabo. In *Asian Perspectives*, v.15(2): 167-176

Bellwood, Peter

1976 Archaeological Research in Minhasa and the Talaud Islands, Northeastern Indonesia. In *Asian Perspectives*, v19(2):240-288.

1997 *Prehistory of the Indo-Malaysian Archipelago*. Honolulu: University of Hawai'i Press.

1999 Southeast Asia before History. In Nicolas Tarling (ed.) *The Cambridge History of Southeast Asia, Volume One, From early times to c. 1500,* pp.55-136. Cambridge: Cambridge University Press.

Beyer, H. Otley

1926 Recent discoveries in Philippine archaeology. In *Proceedings, Third Pan-Pacific Science Congress, October 30-November 11, 1926*: 469-491.

1947 Outline Review of Philippine Archaeology by Islands and Provinces. In *The Philippine Journal of Science*, v77(3-4):205-390.

1948 *Philippine and East Asian Archaeology and Its Relation to the Origin of the Pacific Islands Populations*. Manila: National Research Council of the Philippines, Bulletin No. 29.

Binford, Lewis R.
1971 Mortuary Practices: Their Study and Their Potential. In James A. Brown (ed.) *Approaches to the Social Dimensions of Mortuary Practices, Memoirs of the Society for American Archaeology, Number 25*. The Society for American Archaeology.

Bintari, D.D.
1994 Burial Traditions in Indonesia. In *Jurnal Arkeologi Malaysia,* v7:41-45.

Bronitsky, G.
1986 The Use of Materials Science Techniques in the Study of Pottery Construction and Use. In M. B. Schiffer (ed.) *Advances in Archaeological Methods and Theory* v9, pp.209-276. Orlando: Academic Press.

Bronson, Anna
1989 The contribution of metallurgical studies to South-East Asian archaeology. *World Archaeology*, v20(3):329-351.

Bronson, Bennet
1977 Exchange at the upstream and downstream ends: Notes towards a functional model of the coastal state in Southeast Asia. In Karl Huterrer (ed.) *Economic Exchange and Social Interaction in Southeast Asia*, pp 39-52. Michigan Papers on South and Southeast Asia, no. 13. Ann Arbor: University of Michigan Center for South and Southeast Asian Studies.

Burton, Linda
1977 Settlement and Burial Sites in Butuan City: A Preliminary Report. In *Philippine Studies*, v25: 95-112.

Cadelina, Rowe V. and Joy G. Perez
1986 *Artifacts from the Visayan Communities*. Dumaguete City: Silliman University.

Calderon, Mary Jane and Thelma Roales
1987 A Description of Pottery Making in Talibon, Bohol. *SPAFA Digest*, v8(1): 9-14.

Cayron, J.G.
1999 Report on the archaeological survey and exploration in Barangay New Ibajay, El Nido, Palawan (Feb 19 to 25, 1999). In *Hukay*, v1:47-53.

Chang, Kwang-chih
1986 *The Archaeology of Ancient China, 4th Edition*. New Haven: Yale University Press.

Chao-mei, Lien
1990 The Neolithic Archaeology of Taiwan and the Peinan Excavations. In *The Indo-Pacific Prehistory Association Bulletin,* v11:339-352.

Christaller, Walter
1964 *Central Places in Southern Germany*. C.W. Baskin, trans. Englewood Cliffs: Prentice-Hall (First published in 1933).

City of Tagbilaran, Office of the City Planning and Development Coordinator
2002 Socio-Economic Profile: City of Tagbilaran. Electronic document, http://www.tagbilaran.gov.ph/tland.html, accessed 10/31/03.

Crumley, Carole L.
1976 Towards a Locational Definition of State Systems of Settlement. *American Anthropologist*, v78(1): 59-73.

1987 A dialectical critique of hierarchy. In T.C. Patterson and C. W. Gailey (eds.) *Power Relations and State Formation*, pp.155-169. Washington, DC: American Anthropological Association.

1995 Heterarchy and the Analysis of Complex Societies. In M. Ehrenreich, Carole L. Crumley and Janet E. Levy (eds.) *Heterarchy and the Analysis of Complex Societies*. The Archaeological Papers of the American Anthropological Association Number 6. Washington DC: American Anthropological Association.

David, Nicholas and Carol Kramer
2001 *Ethnoarchaeology in Action*. Cambridge: Cambridge University Press.

De Loarca, Miguel
1582 Relation of the Philippine Islands – The Inhabitants of the Pintados Islands and Their Mode of Life. In Mauro Garcia (ed.) *Readings in*

Philippine prehistory, pp.197-220. Manila: Filipiniana Book Guild Inc., 1979.

Diem, Allison I.

2004 Ceramic Evidence of Ancient Maritime Relationships between Central Viet Nam and the Philippine Archipelago. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 463-490. Quezon City: The University of the Philippines Press.

Dizon, Eusebio Z.

1979 Tigkiw na Saday: A Jar Burial Site. Anthropological Papers No. 2. Manila: National Museum of the Philippines.

1983 *The Metal Age in the Philippines: An Archaeometallurgical Investigation*. Anthropological Papers No.12. Manila: National Museum of the Philippines.

1996 The anthropomorphic pottery from Ayub Cave, Pinol, Maitum, South Cotabato, Mindanao, Philippines. In *The Indo-Pacific Prehistory Association Bulletin 14, 1996, v1:186-196.*

1998a Archaeology of Batanes Province, Northern Philippines: The 1996-1997 Status Report. Paper presented at the 16th Congress of the Indo-Pacific Prehistory Association held in Melaka, Malaysia July 1998.

1998b Vessels to the Afterlife. In Fr. Gabriel S. Casal, Eusebio Z. Dizon, Wilfredo Ronquillo and Cecilio G. Salcedo (eds.) *Kasaysayan- The Story of the Filipino People, Volume II The Earliest Filipinos*, pp. 93-111. Hong Kong: Asia Publishing Company Limited.

1998c The Metals of Civilization. In Fr. Gabriel S. Casal, Eusebio Z. Dizon, Wilfredo Ronquillo and Cecilio G. Salcedo (eds.) *Kasaysayan- The Story of the Filipino People, Volume II The Earliest Filipinos*, pp. 113-125. Hong Kong: Asia Publishing Company Limited.

Dizon, Eusebio Z. and Rey A. Santiago

1996 *Faces from Maitum: The Archaeological Excavation of Ayub Cave*. Manila: The National Museum of the Philippines.

Dizon, Eusebio Z., Rey A. Santiago and Mary Jane Louise A. Bolunia

1998 Report on the Archaeological Activities in Ivuhos and Sabtang Islands from February to March 1998. In *Ivatan Studies Journal*, vII, III & IV: 30-63.

Earle, Timothy K

1978 *Economic and Social Organization of a Complex Chiefdom: The Halelea District, Kaua'I, Hawaii*. Ann Arbor: Regents of the University of Michigan.

1991 *Chiefdoms: Power, Economy, and Ideology*. Cambridge: Cambridge University Press.

Fauslino, D.V. et al.

1993 Geology of southeast Bohol, central Philippines: accretion and sedimentation in a marginal basin. In *Australian Journal of Earth Sciences*, v50(4):571-583.

Flavel, Ambika

1997 *Sa-Huhny Kalanay? Analysis of the Prehistoric Decorated Earthenware of South Sulawesi in an Island Southeast Asian Context*. Bachelors of Science Thesis, Centre for Archaeology University of Western Australia.

Fox, Robert B.

1959 The Calatagan Excavations. In *Philippines Studies*, v7: 325-390.

1967 The Archaeological Record of Chinese Influence in the Philippines. In *Philippine Studies*, v15(1): 41-62.

1970 *The Tabon Caves – Archaeological Explorations and Excavations on Palawan Island, Philippines*. Manila: National Museum of the Philippines.

1979a The Philippines during the First Millennium B.C. In R.B. Smith and W.Watson (eds.) *Early South East Asia: Essays in Archaeology, History and Historical Geography*. New York: Oxford University Press.

1979b Chinese Pottery in the Philippines. In Mauro Garcia (ed.) *Readings in Philippine Prehistory Vol 1*, pp.278-193. Manila: Filipiniana Book Guild Inc.

Fox, Robert B. and Alfredo Evangelista

1957a The Bato Caves, Sorsogon Province, Philippines. A Preliminary Report of a Jar Burial-Stone Tool Assemblage. In *University of Manila Journal of East Asiatic Stuides*, v6 (1):49-56.

1957b The Cave Archaeology of Cagraray Island, Albay Province, Philippines. A Preliminary Report of Explorations and Excavations. In *University of Manila Journal of East Asiatic Stuides*, v6(1): 57-68.

Fox, Robert B. and Rey A. Santiago

1985 Ancient Beads from Philippine Archaeological Sites. In *SPAFA Digest*, v6 (1):4-13.

Francis Jr., Peter

1989a Beads and the bead trade in Southeast Asia. *Contributions of the Center for Bead Research 4*, Lake Placid.

1989b The type collection of beads from archaeological contexts in the Philippine National Museum. *Contributions fo the Center for Bead Research 5*, Lake Placid.

1990a Glass Beads in Asia Part I- Introduction. In *Asian Perspectives*, v 28(1).

1990b Glass Beads in Asia Part II- Indo-Pacific Beads. In *Asian Perspectives*, v29(1).

1991 Beads in Indonesia. In *Asian Perspectives*, v15(2).

1992 *Beads and People 1: Heirlooms of the Hills*. Lake Placid, NY: The Center for Bead Research.

2002 *Asia's Maritime Bead Trade 300 B.C. to the Present*. Honolulu: University of Hawai'i Press.

Gibson, Alex and Ann Woods

1997 Prehistoric Pottery for the Archaeologist (second edition). London: Leicester University Press.

Griffin, P. Bion and Wilhelm G. Solheim

1990 Ethnoarcheological Research in Asia. In *Asian Perspectives*, v 28(2): 145-162.

Guthe, Carl E.

1981 The University of Michigan Philippine Expedition. In F. Landa Jocano & Fred Evangelista (eds.) *Explorations in Philippine Prehistory – A Sourcebook*, pp. 69-76. Manila: Asian Center, University of the Philippines, Diliman.

1985 A burial site on the island of Samar, Philippine Islands. *Papers of the Michigan Academy of Science, Arts and Letters*, v28:29-35

Haidle, Miriam Noel

2002 Fragments of Glass Bangles from Krek 52/62 and Their Implications for the Dating of the Mimotien Culture. In *Asian Perspectives*, v40(2):195-208.

Hall, Kenneth R.

1985 *Maritime Trade and State Development in Early Southeast Asia*. Honolulu: University of Hawai'i Press.

1999 Economic History of early Southeast Asia. In N. Tarling (ed.) *The Cambridge history of Southeast Asia Volume One Part One: From Early Times to c. 1500*, pp183-275. Cambridge: Cambridge University Press.

Harrisson, Tom

1975 Early "Jar Burials" in Borneo and Elsewhere. In *Asian Perspectives* v.17(2): 141-144.

Higham, Charles

2002 *Early Cultures of Mainland Southeast Asia*. Chicago: Art Media Resources, Ltd.

Hutterer, K.L.

1974 The evolution of Philippine lowland societies. *Mankind* v9:287-299

1976 An evolutionary approach to the Southeast Asian cultural sequence. *Current Anthropology* v17:221-242.

1977 Prehistoric trade and the evolution of Philippine societies: a reconsideration. In K.L. Hutterer (ed.) *Economic exchange and social interaction in Southeast Asia*, pp. 177-196. Michigan Papers on South and Southeast Asia No. 13. Ann Arbor: Center for South and Southeast Asian Studies, University of Michigan.

1991 Losing Track of the Tribes: Evolutionary Sequences in Southeast Asia. In A. Terry Rambo and Kathleen Gillogly (eds.), *Profiles of Cultural Evolution – Papers from a Conference in Honor of Elman R. Service*. Ann Arbor: Regents of the University of Michigan.

Hutterer, Karl L. and William K. Macdonald

1982 *Houses Built on Scattered Poles: Prehistory and Ecology in Negros Oriental, Philippines*. Cebu City: The University of San Carlos.

Janse, Olav

1941 An archaeological expedition to Indo-China and the Philippines. In *Harvard Journal of Asiatic Studies,* v6:1-21.

Jocano, F. Landa

1975 *Philippine Prehistory: An Anthropological Overview of the Beginning of Filipino Society and Culture.* Quezon City: Philippines Center for Advanced Studies, University of the Philippines.

1998 *Filipino Prehistory- Rediscovering Precolonial Heritage*. Metro Manila: Punlod Research House, Inc.

Junker, Laura Lee

1982 Analysis of an Earthenware Sample from Southeastern Negros. In Karl L. Hutterer and William K. Macdonald (eds.) *Houses Built on Scattered Poles: Prehistory and Ecology in Negros Oriental, Philippines*. Cebu City: University of San Carlos.

1990 The organization of intra-regional and long-distance trade in prehistoric Philippine complex societies. In *Asian Perspectives*, v29(2):167-209.

1993a Archaeological excavations at the late first millennium and early second millennium A.D. settlement of Tanjay, Negros Oriental: household organization, chiefly production and social ranking. In *Philippine Quarterly of Culture & Society*, v21(2): p146 -225.

1993b Craft Goods Specialization and Prestige Goods Exchange in Philippine Chiefdoms of the Fifteenth and Sixteenth Centuries. In *Asian Perspectives*, v32(1): 1-35.

1993c Archaeological Excavations at the 12th-16th Century Settlement of Tanjay, Negros Oriental: The Burial Evidence for Social Status-Symbolism, head-taking and Inter-polity Raiding. In *Philippine Quarterly of Culture and Society*, v21: 39-82.

1994a Trade, Competition, Conflict, and Political Transformations in Sixth- to Sixteenth-Century Philippine Chiefdoms. *Asian Perspectives*, v33(2):229-260.

1994b The development of centralized craft production systems in A.D. 500-1600 Philippine chiefdoms. In *Journal of Southeast Asian Studies*, v25(1):1-30.

1996 Hunter-gatherer landscapes and lowland trade in the Prehispanic Philippines. *World Archaeology*, v27(2):389-410.

2000 *Raiding Trading and Feasting: The Political Economy of Philippine Chiefdoms*. Honolulu: University of Hawaii Press.

Junker, Laura Lee, Karen Mudar and Marla Schwaller

1994 Social stratification, household wealth, and competitive feasting in 15th/16th-century Philippine chiefdoms. In *Economic Anthropology*, v15:307-358.

Keightley, David N.

1985 *Dead But Not Gone: The Role of Mortuary Practices in the Formation of Neolithic and Early Bronze Age Chinese Culture, ca 8000 to 1000 BC*. Berkeley: Department of History, University of California.

Kirch, Patrick Vinton

1994 *The evolution of the Polynesian chiefdoms*. Cambridge: Cambridge University Press.

Kress, Jonathan H.

1979 Tom Harrisson, North Borneo, and Palawan: A Preliminary Assessment. In *Asian Perspectives* v20(1): 75-86.

1978 The Ceramics from Pilanduk Cave and Sa'gung Rockshelter, Quezon Municipality, Palawan Island, the Philippines. In *Asian Perspectives* v21(1): 58-85.

2004 The Necrology of Sa'gung Rockshelter and Its Place in Philippine Prehistory. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 239-275. Quezon City: The University of the Philippines Press.

Kurjak, Edward B., Craig T. Sheldon

1970 The archaeology of Seminoho Cave in Lebak, Cotabato. In *Silliman Journal* v17:5-18.

Kurjak, Edward B., Craig T. Sheldon and Maria E. Keller

1971 The Urn Burial Caves of Southern Cotabato, Mindanao, Philippines. In *Silliman Journal* v18:127-153.

Legaspi, Avelino M.

1974 Metal Artifacts in Some Philippine Archaeological Sites. In *Proceedings of the First Regional Seminar on Southeast Asian Prehistory and Archaeology*, pp37-43. Manila: National Museum of the Philippines.

Lim, Aurora Roxas

1987 *The Evidence of Ceramics as an Aid in Understanding the Pattern of Trade in the Philippines and Southeast Asia: final report submitted to the Institute of Asian Studies, Chulalongkorn University in fulfillment of ASEAN teaching/research fellowship*. Bangkok: Institute of Asian Studies, Chulalongkorn University.

London, Gloria Anne
1991 Standardization and Variation in the Work of Craft Specialists. In W.A. Longacre (ed.) *Ceramic Ethnoarchaeology*, pp. 182-207. Tucson:University of Arizona Press.

Longacre, William A.
1994 Ceramic Ethnoarchaeology: An Introduction. In W.A. Longacre (ed.) *Ceramic Ethnoarchaeology*, pp.1-10. Tucson: University of Arizona Press.

Longacre, William A., Kenneth L, Kvamme and Masashi Kobayashi
1988 Southwestern pottery standardization: an ethnoarcheaological view from the Philippines. In *The Kiva*, v53(2):101-112.

Longacre, William A. and Miriam T. Stark
1992 Ceramics, Kinship, and Space: A Kalinga Example. In *Journal of Anthropological Archaeology*, v11:125-136.

Lowe, Michael and Edward L. Shaughnessy (eds.)
1999 *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C., Volume 1*. Cambridge: Cambridge University Press.

Lugay, Jose B.
1974 Determination of the methods of manufacture of glass beads. In *Proceedings of the First, Regional Seminar on Southeast Asian Prehistory and Archaeology*. Manila: National Museum of the Philippines.

Madulid, Domingo A.
1998 Bases of Biodiversity. In Gregorio Magdaraog (ed.) *Environment and Natural Resources Atlas of the Philippines*, pp. 42-67. Manila: Environment Center for the Philippines Foundation.

Malleret, Louis
1962 L'*Archeologie du Delta du Mekong*, v. XLIII. Paris: Publications de l'Ecole Francaise d'Extreme Orient.

Matson, Frederick R.
1951 Ceramic Technology as an Aid to Cultural Interpretation – Techniques and Problems. In James B. Griffin (ed.) *Essays on Archaeological Methods*, pp. 102-116. Anthropological Papers No. 8, Museum of Anthropology, University of Michigan. Ann Arbor: University of Michigan Press.

Metcalf, Peter
1982 *A Borneo Journey into Death*. Philadelphia: University of Pennsylvania Press.

Miksic, John N. and Choon Teck Yap
1990 Fine-Bodied White Earthenwares of Southeast Asia: Some X-Ray Fluorescence Tests. In *Asian Perspectives*, v28(1):45-60.

1992 Compositional analysis of pottery from Kota Cina, North Sumatra: implications for regional trade during the twelfth to fourteenth centuries A.D. In *Asian Perspectives*, v31(1):57-76.

Mulvaney, D.J. and Soejono, R.P.
1970 The Australian-Indonesian Archaeological Expedition to Sulawesi. In *Asian Perspectives*, v13:163-78.

Munsell Color Company
1975 *Munsell soil color charts*. Baltimore, MD: Munsell Color Company.

Naranjo, Susan Sr.
1993 *Mineralogical Characterization of Archaeological Pottery: Preliminary Study of the Butuan Potsherds*. Unpublished report sponsored by the UNESCO-Hirayama Silk Roads Project.

Nelson, Sarah Milledge
1993 *The Archaeology of Korea*. Cambridge: Cambridge University Press.

Nishimura, Masao
1988 Long distance trade and the development of complex societies in the prehistory of the Central Philippines – the Cebu archaeological project: Basic concept and first results. In *Philippine Quarterly of Culture & Society*, v16(2):107-157.

Office of the City Planning and Development Coordinator
2002 Socio-Economic Profile: City of Tagbilaran. Electronic Document, http://www.tagbilaran.gov.ph/tland.html, accessed 10/31/03.

Ogawa, Hidefumi
2004 Chronological Context of Nondecorated Black Pottery Phase from Lal-lo Shell Middens, Cagayan Province, Philippines. In Victor Paz (ed.) *Southeast*

Asian Archaeology Wilhelm G. Solheim II Festschrift, pp. 184-208. Quezon City: The University of the Philippines Press.

O'Reilly, Dougald J. W.
2001 From the Bronze Age to the Iron Age in Thailand: Applying the Heterarchical Approach. In *Asian Perspectives*, v39(1-2):1-19.

Orton, Clive, Paul Tyers and Alan Vince
1993 *Pottery in Archaeology*. Cambridge: Cambridge University Press.

Pearson, Michael Parker
1999 *The Archaeology of Death & Burial*. College Station: Texas A&M University Press.

1982 Mortuary Practices, Society and Ideology: an Ethnoarchaeological Study. In Ian Hodder (ed.) *Symbolic and Structural Archaeology*. Cambridge: Cambridge University Press.

Peebles, Christopher S. and Susan M. Kus
1977 Some archaeological correlates of ranked societies. In *American Antiquity*, v42(3):421-448.

Peralta, Jesus T.
1977 Tools in the Philippine Age of Metals. In *Filipino Heritage: The Making of a Nation*, pp. 324-329. Singapore: Lahing Philipino Publishing, Inc.

Potter, Daniel R. and Eleanor M. King
1995 A Heterarchical Approach to Lowland Maya Socioeconomies. In Robert M. Ehrenreich, Carole L. Crumley and Janet E. Levy (eds.) *Heterarchy and the Analysis of Complex Societies.* The Archaeological Papers of the American Anthropological Association Number 6.

Pruecel & Hodder
1996 *Contemporary Archaeology in Theory*. Oxford: Blackwell Publishers.

Reid, Anthony
1988 *Southeast Asia in the Age of Commerce, 1450-1680, vol 1: The Lands below the Winds*. New Haven: Yale University Press.

Renfrew, Colin

1994 The Archaeology of Religion. In Colin Renfrew and Ezra B.W. Zubrow (eds.) *The Ancient Mind: Elements of Cognitive Archaeology*. Cambridge: Cambridge University Press.

1996 Peer Polity Interaction and Socio-Political Change. In Robert W. Pruecel and Ian Hodder (eds.) *Contemporary Archaeology in Theory- A Reader*. Cambridge: Blackwell Press.

Rice, Prudence M.

1984 The Archaeological Study of Specialized Pottery Production: Some Aspects of Method and Theory. In Prudence M. Rice (ed.) *Pots and Potters: Current Approaches in Ceramic Archaeology*. Los Angeles: Regents of the University of California.

1987 *Pottery Analysis: A Sourcebook.* Chicago: University of Chicago Press.

1991 Specialization, standardization and diversity: A retrospective. In R. Bishop and F. Lange (eds.) *The Ceramic Legacy of Anna O. Shepard*, 257-279. Niwot: University Press of Colorado.

1996a Recent Ceramic Analysis: 2. Composition, Production, and Theory. In *Journal of Archaeological Research*, v4(3):165-202.

1996b Recent Ceramic Analysis: 1. Function, Style, and Origins. In *Journal of Archaeological Research*, v4(2):133-163.

Roales, Thelma M.

1983 Survey of pot-making areas, Bohol Province, Philippines. Unpublished report from the National Museum, Manila, Philippines.

Roces, Alfredo R., Carlos Quirino and Gilda Cordero-Fernando

1977 Ancient Beads, Unstringing the history of old beads. In *Filipino Heritage- The Making of a Nation*. Manila: Lahing Pilipino Publishing Inc.

Ronquillo, Wilfredo P.

2003 Philippine Earthenware Pottery from the Early Prehistoric Period. In John N. Miksic (ed.) *Earthenware in Southeast Asia – Proceedings of the Singapore Symposium on Premodern Southeast Asian Earthenwares,* pp. 32 - 38 Singapore: Singapore University Press.

2004 The Contributions of Wilhelm G. Solheim to Philippine Prehistory and Archaeology. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 26-33. Quezon City: The University of the Philippines Press.

Ronquillo, Wilfredo P, Alfredo E. Evangelista and Reynaldo G. Flores
1992 Report on a jar burial in Cagayan Province, Northern Luzon, Philippines. In *National Museum Papers*, v3(1):19-36.

Salcedo, Cecilio G.
1998 The Potter's Genius. In Fr. Gabriel S. Casal, Eusebio Z. Dizon, Wilfredo Ronquillo and Cecilio G. Salcedo (eds.) *Kasaysayan- The Story of the Filipino People, Volume II The Earliest Filipinos*, pp. 93-111. Hong Kong: Asia Publishing Company Limited.

Santiago, Rey
n.d. Unpublished map from the National Museum of the Philippines, Manila.

Scheans, Daniel J.
1977 *Filipino Market Potteries*. National Museum Monograph No. 3. Manila: National Museum.

Schlegel, S.
1979 *Tiruray Subsistence*. Quezon City: Ateneo de Manila University Press.

Scott, W. H.
1984 *Prehispanic Source Material for the Study of Philippine Prehistory*. Quezon City: New Day Press.

1994 *Barangay: Sixteenth Century Philippine Culture and Society*. Quezon City: Ateneo de Manila University.

Service, E.
1967 *Primitive Social Organization: An Evolutionary Perspective*. New York: Random House.

Shepard, Anna O.
1942 *Rio Grande glaze paint ware, a study illustrating the place of ceramic technological analysis in archaeological research*. Washington DC: Carnegie Institution of Washington.

1956 *Ceramics for the Archaeologist*. Washington DC: Carnegie Institution of Washington.

Shutler Jr. , Richard

2004 Wilhelm G. Solheim II: Pioneer in Southeast Asian Pottery Studies. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 3-7. Quezon City: The University of the Philippines Press.

Sinopoli, Carla M.
1991 *Approaches to Archaeological Ceramics*. New York: Plenum Press.

Skibo, J.M.
1992 *Pottery Function: A Use-Alteration Perspective*. New York: Plenum Press.

Small, David B.
1995 Heterarchical Paths to Evolution: The role of External Economies. In Robert M. Ehrenreich, Carole L. Crumley and Janet E. Levy (eds.) *Heterarchy and the Analysis of Complex Societies*. The Archaeological Papers of the American Anthropological Association Number 6. Washington DC: American Anthropological Association.

Snow, Bryan E.
1985 Earthenware. In Bryan E. Snow and Richard Shutler Jr. (eds.) *The Archaeology of Fuga Mora Island: New Approaches to the Isolation Explanation of Diagnostic Ceramic Assemblages in Northern Luzon, Philippines*, pp. 17-78. Cebu City: University of San Carlos.

Snow, Bryan E. and Richard Shutler Jr.
1985 *The Archaeology of Fuga Mora Island: New Approaches to the Isolation Explanation of Diagnostic Ceramic Assemblages in Northern Luzon, Philippines*. Cebu City: University of San Carlos.

Solheim II, Wilhelm G.
1951 Preliminary report on archaeological fieldwork in San Narciso, Tayabas, Philippine Islands. In *Journal of East Asiatic Studies*, v1(1):170-176.

1954 The Makabog Burial-Jar Site. In *The Philippine Journal of Science*, v.83(1): 57-68.

1961a Introduction to Sa-huynh. In *Asian Perspectives* v3(2):97-108.

1961b Further notes on the Kalanay Pottery Complex in the Pacific Islands. In *Asian Perspectives* v3(2):157-165.

1961c Sa-huynh related pottery in Southeast Asia. In *Asian Perspectives*, v3(2):177-188.

1961d Jar Burial in the Babuyan and Batanes Islands an in central Philippines, and its relationship to jar burial elsewhere in the Far East. In *Philippine Journal of Science*, v 89(1):115-148.

1964 *The Archaeology of the Central Philippines – a study chiefly of the iron age and its relationships*. Manila: Bureau of Printing.

1965 The Functions of Pottery in Southeast Asia: From the Past to the Present. In Frederick R. Matson (ed.) *Ceramics and Man*, pp. 254-276. Chicago: Aldine Publishing Company.

1967 The Sa-Huynh-Kalanay Pottery Tradition: Past and Future Research. In Mario D. Zamora (ed.) *Studies in Philippine Archaeology*, pp. 151-174. Quezon City: Alemar Press.

1968 Early Bronze in northeastern Thailand. In *Current Anthropology*, v9(1):59-62.

1969 H. Otley Beyer. In *Asian Perspectives*, v12:1-18.

1981 Philippine Prehistory. In Casals, G., Jose, R., Casino, E., Ellis, G., and Solheim, W. (eds). *The People and the Art of the Philippines*, pp. 16-83. Los Angeles: Museum of Cultural History, University of California.

1996 The Nusantao and north south dispersals. In *Indo-Pacific Prehistory Association Bulletin 14, The Chiang Mai Papers, Vol 2*:101-109.

1999 Southeast Asian prehistory in relation to the Philippines. *Hukay* v2(1):54-65.

2002 *The Archaeology of the Central Philippines: a study chiefly of the iron age and its relationships (revised edition).* Manila: University of the Philippines.

2003a Southeast Asian Earthenware Pottery and Its Spread. In John N. Miksic (ed.) *Earthenware in Southeast Asia* – Proceedings *of the Singapore Symposium on Premodern Southeast Asian Earthenwares*, pp. 1-21. Singapore: Singapore University Press.

2003b History of the Study of Southeast Asian Earthenware. In John N. Miksic (ed.) *Earthenware in Southeast Asia* – Proceedings *of the Singapore Symposium on Premodern Southeast Asian Earthenwares*, pp. 22-31. Singapore: Singapore University Press.

2005 A brief history of Mainland Southeast Asian Prehistory: Archaeology to 1960 (Part I). *Southeast Asian Archaeology International Newsletter,* Issue No. 19: 29-55.

Solheim, Wilhelm G. II and Ernestene Green

1965 Johore Lama excavations, 1960. In *Federation Museums Journal*, v10: 1-78.

Solheim, Wilhelm G. II, Barbara Harrisson and Lindsey Wall
1959 Niah "Three Colour Ware" and related prehistoric pottery fro Borneo. *Asian Perspectives* v3(2): 167-176.

Spoehr, Alexander
1973 *Zamboanga and Sulu: An Archaeological Approach to Ethnic Diversity*. University of Pittsburgh Ethnology Monograph No. 1. Pittsburgh.

Stark, Mariam
1991 Ceramic change in ethnoarchaeological perspective: A Kalinga case study. *Asian Perspectives*, v30: 193-216.

2004 Pottery, People, and Wilhelm Solheim II in Southeast Asia. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 37-52. Quezon City: The University of the Philippines Press.

Szabo, Katherine, Mary Clare Swete Kelly and Antonio Penalosa
2004 Preliminary Results from Excavations in the Eastern Mouth of Ille Cave, Northern Palawan. In Victor Paz (ed.) *Southeast Asian Archaeology Wilhelm G. Solheim II Festschrift*, pp. 209-238. Quezon City: The University of the Philippines Press.

Tainter, Joseph A.
1978 Mortuary practices and the study of prehistoric social systems. In M. B. Schiffer (ed.) *Advances in Archaeological Method and Theory*, Vol 1, pp. 105-143. New York: Academic Press.

Tenazas, R.C.P. and I.T. Chiong
1966 Unpublished report of field investigations in Bohol, February 21-27, 1966.

1974 A progress report on the Magsuhot excavations in Bacong, Negros Oriental, Summer 1974. *Philippine Quarterly of Culture and Society*, v2:133-155.

1977 A comparative study of Iron Age communities in the Philippines. PhD. Dissertation, University of San Carlos, Cebu City, Philippines.

1983 The boat-coffin burial complex in the Philippines and its relation to practices in Southeast Asia. In *SPAFA Digest*, v3(1): 11-25.

Theunissen, Robert, Peter Grave and Grahame Bailey

2000 Doubt on diffusion: challenging the assumed Indian origin of Iron Age agate and carnelian beads in Southeast Asia. In *World Archaeology*, v32(1): 84-105.

Thiel, Barbara

1989 Excavations at the Lal-lo Shellmiddens, Northeastern Luzon, Philippines. In *Asian Perspectives* v27(1): 71-94.

1990 Excavations at Arku Cave, Northeast Luzon, Philippines. In *Asian Perspectives* v27(2): 229-264.

Trigger, Bruce G.

1971 Archaeology and Ecology. In *World Archaeology*, v2: 321-36.

1984 Archaeology at the Crossroads: What's New? In *Annual Review of Anthropology*, v13: 275-300.

1989 *A History of Archaeological Thought*. Cambridge: Cambridge University Press.

Turner, V.C.

1969 The Ritual Process: structure and anti-structure. London: Routledge & Kegan Paul.

Umali, Ricardo M.

1998 Minerals and Soils. In Gregorio Magdaraog (ed.) *Environment and Natural Resources Atlas of the Philippines*, pp.202-235. Manila: Environment Center for the Philippines Foundation.

Valdez, Cynithia Ongpin

1998 From Earthen Pots to Ceramic Wares. In Fr. Gabriel S. Casal, Eusebio Z. Dizon, Wilfredo Ronquillo and Cecilio G. Salcedo (eds.) *Kasaysayan- The Story of the Filipino People, Volume II The Earliest Filipinos*, pp. 93-111. Hong Kong: Asia Publishing Company Limited.

Vincent, Brian

1991 Ceramic technology in Thailand. In *Bulletin of the Indo-Pacific Prehistory Association 1990*, v10: 341-348.

2002 Ceramic technologies in Bronze Age Thailand. In *Bulletin of the Indo-Pacific Prehistory Association 2002*, v22: 73-82.

Wason, Paul K.

1994 *The Archaeology of Rank*. Cambridge: Cambridge University Press.

Wheat, J.B., J.C. Gifford and W.W. Wasley
1958 Ceramic variety, type cluster, and ceramic system in Southwestern pottery analysis. In *American Antiquity* v24(1):34-47.

White, Joyce C.
1988 Early East Asian Metallurgy: The Southern Tradition. *Papers from the Second International Conference on the Beginning of the Use of Metals and Alloys, Zhengzhou, China, 21-26 October 1986,* pp. 175-181. Cambridge: MIT Press.

1995 Incorporating Heterarchy into Theory on Socio-Political Development: The Case for Southeast Asia. In Robert M. Ehrenrich, Carole L. Crumley and Janet E. Levy (eds.) *Heterarchy and the Analysis of Complex Societies*. The Archaeological Papers of the American Anthropological Association Number 6.

Wolters, O.W.
1999 *History, Culture, and Region in Southeast Asian Perspectives*. Ithaca: Cornell University.

Yankowski, Andrea
2002 The Preliminary Analysis of Artifacts Recovered from a Metal-Age Burial Site in Tagbiliran City, Bohol, Central Philippines. In *Southeast Asian Archaeology International Newsletter,* Issue No. 13: 3-4.

2004a Trade, technology and tradition: analysis of a Metal Age burial from Bohol, Central Philippines. In *Indo-Pacific Prehistory Association Bulletin 24, The Taipei Papers, Vol 2*: pp. 226-241.

2004b Traditional Technologies & Ancient Commodities: An Ethnoarchaeological Study of the Salt Manufacturing the Pottery Production Industries in Bohol, Central Philippines. Paper presented at the 69th Annual Meeting of the Society for American Archaeology, Montreal, March 31- April 4, 2004.

Zamora, Mario D.
1975 The Hispanization process: traditions and methods in colonial change in village Philippines. In *The Eastern Anthropologist*, v28 (3): 231-240.

APPENDIX A: Glossary

Applique: A decorative technique in which molded clay is added to a vessel's surface.

Assemblage: A group of culturally related artifacts from the same archaeological site.

Carination: A sharp change in the direction or profile of a pot, often forming a shoulder.

Coiling: A hand-building technique that involves forming and joining together narrow coils of clay to build up the wall of a vessel (Sinopoli 1991).

Earthenwares: Pottery fired at low temperatures, generally ranging from 400-1200° centigrade. Earthenwares are generally porous, and often brown or red in color (Sinopoli 1991).

Engraving: A decorative technique in which the clay of an earthenware vessel is incised post-firing.

Fabric: The term used to describe the clay and inclusions of a ceramic vessel. This term is synonymous with "paste".

Fire clouds: Black patches on the surface of an earthenware vessel produced during open air firings. Fire clouds are caused by the deposition of carbon on the pot generally occurring where the pot has been in direct contact with the smoky part of the flame or with incompletely burnt fuel.

Grog: Fragments of fired ceramics ground to small size and added to clays as temper (Sinopoli 1991).

Hematite: Red iron (ferric) oxide, Fe2O3. It is the iron oxide that is most commonly responsible for the yellow, red or brown color of clays and of fired pottery. The pulverized pigment is also sometimes applied as a slip (Gibson & Woods 1997).

Jar: An upright vessel usually with a rim diameter narrower than the vessel's maximum diameter.

Jar/Urn Burial: The inhumation of a corpse or the bones of a corpse in a pottery or stone vessel. A secondary jar burial is when an individual's bones are reburied in a jar. This may include all the individual's bones or only select bones.

Neck: The part of a jar or restricted vessel between the body and rim, marked by constriction and change in orientation of vessel walls (Sinopoli 1991).

Paddle & Anvil: A potting technique which involves using implements known as a paddle and anvil to form the desired shape of a vessel. The Anvil (generally made of stone or some other hard material) is held on the inside of the vessel while the paddle (generally made of wood) is used to pound the outside of the vessel. Anvil impressions are often visible on the inside walls of the finished pot.

Paste: The term used to describe the clay and natural or added inclusions of a ceramic vessel. This term is synonymous with "fabric".

Petrology: The study of rocks and minerals. Ceramic Petrology is a specialized sub-discipline which studies the mineral components of ceramic artifacts.

Punctation: A decorative technique which involves pressing a pointy object into the clay body of a ceramic vessel before it is fired to create small indentations.

Scalloping & Notching: A decorative technique which consists of a series of alternating incised lines and impressed indentations. This decoration is usually found on a vessel's rims or angles.

Shard: A fragment or piece of a porcelain, stoneware or glass object with sharp edges.

Sherd: A fragment or piece of a broken earthenware vessel without sharp edges like shards.

Shoulder: The area of a vessel above the body's maximum diameter but below the neck or rim.

Slip: A fine-grained liquid mixture of clay and water applied over the surface of a vessel imparting a smooth texture and often a reddish color. A slip can be applied before firing for "true" slip, or after firing for "fugitive" slip.

Stonewares: Ceramic vessels fired to temperatures of 1200-1350° C. Stonewares have partially or fully vitrified bodies, and most often are brown, gray or white in color (Sinopoli 1991).

Temper: Nonplastic inclusions (e.g., shell, sand, fine rocks, ground pottery etc.) that are deliberately added to clay to improve its workability and reduce shrinkage and promote even firing.

Tetrapod: A four-legged vessel.

Thin section: An ultra-thin (*c*. 0.03mm) slice of a pottery sample that is mounted on a slide and examined under a petrographic (polarized light) microscope to determine the mineral and/or organic properties of the clay body (Orton et al, 1993:14).

APPENDIX B: Partial List of Metal Age Burial Sites in the Philippines

LUZON (Northern Philippines)

Pilar, Sorsogon: Open area short distance from the sea where Beyer excavated 24 jars with clay or paste beads in yellow, orange, blue and green & one iron implement, probably a spearhead (Dizon 1998b:94).

Bato Caves, Sorsogon – Coastal caves with secondary and possibly primary burials. Recovered stone tools, shell and stone beads and pottery (Dizon 1998b; Solheim 1961d:131-132; Fox and Evangelista 1957a).

Cagrarary Islands, Sorsogon – Elevated coastal caves with primary and possibly secondary burials. Recovered shell spoons, bracelets and beads, stone tools and pottery. Pottery was plain, incised and cord-marked, red-slipped, and some had high flaring necks, and a couple had handles (Fox & Evangelista 1957:57-68) Burials also recovered at inland sites (Dizon 1998b:97).

Tigkiw na Saday, Sorsogon: Inland, open-air site with both primary and secondary burials. Pottery included ovaloid jars with simple impressed designs and stone covers of volcanic tuff. Also recovered glass beads and iron implements (Dizon 1979).

Fuga, Babuyan – Several burial sites located both along the coast and on a rolling plateau. Site #1 had jars that were too small for primary burials. One of the jars had a few fragmentary bones, 2 pieces of metal and a shell disk. Site #2 had a primary burial with beads, iron, human and animal bones, bronze rings, and porcelain. Site #3 had a few bone fragments and a large quantity of shells (Dizon 1998; Solheim 1951; Solheim 1960).

Recudo, San Narcisco, Quezon: Coastal, open-air site with six jar burials both large and small. Recovered skeletal remains, iron points, beads, shell-bone artifacts, possibly a glass bracelet (Solheim 1961:131-132)

Tumagodtud, San Narcisco, Quezon: Coastal, open-air site with thirteen burial jars, two extended burials and three nonburial jars. Some of the burial jars had associated pots (2-4) alongside. Also recovered paste and glass beads, spear points, shell disks and fragments of shell and glass bracelets (Dizon 1998:95; Solheim 1960).

Lal'lo Shell Middens:

A series of scattered middens located along the Cagayan River in northeast Luzon. Extended burials with earthenwares vessels/sherds. Metal Age period is characterized by black pottery, which is blackened by smudging of charcoal. (Thiel 1989; Ogawa 2004)

Batanes Islands: Protohistoric burials with "boat-shaped" grave markers constructed of stone, as well as some jar burial similar to those found in other parts of the Philippines and Southern Taiwan, that are believed to date to the Metal Age (Solheim 1961d; Dizon 1998a)

Arku Cave, Penablanca: Cave site located in the western foothills of the Sierra Madre Mountains that contained secondary burials dating from approximately 2200 to 50 BC, and evidence of some cremations. Grave goods included pottery, shell beads and bracelets, adzes, spindle whorls, bone points, a sandstone barkcloth beater, and earrings made of clay, stone, shell and jade. (Thiel 1990)

VISAYAS (Central Philippines)

Kalanay, Masbate: Elevated coastal cave which contained plain, incised, impressed and slipped pottery in a variety of forms and sizes. Also recovered jade and glass beads, iron tool fragments, a bronze bell and shell artifacts (Solheim 1964:22-78)

Makabog, Masbate: Elevated, inland, open-air site which contained five possible burial jars (no skeletal remains recovered) with round bottoms and limestone covers. Jars contained a few small carinated pots with incised decorations, stone tools, and agate, glass and paste beads and a fragment of a blue glass bracelet (Solheim 1964:57-68; Dizon 1998b:94).

Egid, Samar. Coastal, open-air site with child jar burials and extended adult burials. Beads were associated with the jar burials and iron implements were associated with the adult burials. Burial jars were large, plain and globular with narrow shoulders, short vertical rims and wide mouths (Solheim 1964:178)

Magsuhot, Negros: Inland, open-air site with multiple burials (adults and children). Contained a variety of pottery forms and styles including carinated, perforated and footed vessels both plain and incised. Also had unusual double-rim pots, round-bottom pots with multiple perforations (resembling a colander) and elongated gourd shaped vessels. Other recovered artifacts included numerous paste and glass beads and some iron implements (Tenazas 1974; Tenazas 1977; Cadelina and Perez 1986)

MINDANAO (Southern Philippines)

Ayub Cave, South Cotabato: Cave site with anthropomorphic earthenware burial jars, and cord-marked, incised and impressed pottery vessels. Also recovered glass beads and bracelets, earthenware beads and shell ornaments (Dizon and Santiago 1996: Dizon 1996).

Seminoho Cave, Lebak, Cotabato: Located on the western edge of the Kulaman Plateau, this cave contained twenty-eight whole or nearly whole limestone burial urns and eight bottoms of broken urns. The urns were either circular or quadrilateral in shape and some had pedestals or fluting. Lids were also recovered, some with anthropomorphic images carved in the stone. Nineteen of the urns contained human bones. The only artifacts recovered from the burials were two iron bracelets, and a few pottery fragments were recovered from the cave. A single radiocarbon date from skeletal material yielded a date of approximately 585 AD (Kurjak and Sheldon 1970).

Kulaman Plateau, South Cotabato: Several inland open-air sites with secondary burials in limestone and earthenware urns. The shapes of the urns were either round or quadrilateral and some had anthropomorphic covers. There was also wide range of pottery types and styles including globular and carinated pots and bowls with cord-marking, incisions and impressed designs (Kurjak and Sheldon 1970; Kurjak, Sheldon and Keller 1971).

PALAWAN (Western Philippines)

Duyong Cave: Elevated coastal cave with pottery, jade *ling-ling-o* earrings, jade bracelets and beads, shell bracelets and beads (Fox 1970).

Manunggul Cave, Chamber B: Elevated coastal cave with predominantly undecorated pottery, glass and jade bracelets, glass, jade, carnelian, shell and stone beads, and iron fragments (Fox 1970)

Rito-Fabian Cave: Elevated coastal cave with pottery, glass *ling-ling-o* earrings, glass, shell and jade beads and bracelets, iron copper and bronze fragments (Fox 1970:15,123)

Sa'gung Rockshelter: Rockshelter located 9km east of the town of Quezon. Eleven (11) burials were recovered at the site, one which was probably a secondary Iron Age burial. Grave goods recovered with the secondary burial included a small iron fragment, fragments of pottery, shell beads, pieces of flint, and pig bones. Pottery is part of the Sa-Huynh Kalanay tradition (Kress 1980; Kress 2004:254-255)

Pilandok Cave: Elevated, inland cave. Contained globular burial jars with high flaring rims and lids, accompanied by a diverse range of pottery types, some demonstrating overlapping forms and decorative styles with the pottery from Duyong Cave and Leta Leta Cave, Palawan (Kress 1980)

Ille Cave, El Nido: Inland cave site with deposits expanding over a period of 10,000 years. Extensive grave diggings appear to have cut into post-Neolothic Levels 1 through 3, leading to a mixing of materials, but recovered artifacts from these levels included earthenware pottery, stoneware, ceramics, a small number of tiny metal rings, Indo-Pacific glass beads and hundreds of small shell beads (Szabo, Kelly and Penalosa 2004)

APPENDIX C: Pottery Attributes

This appendix includes a catalog of the earthenware sherds recovered from Ubujan. Recorded attributes included:

Ascension #: A unique identifying number given to each individual artifact.

Quantity: The number of individual sherd pieces that make up a vessel (if applicable).

Location: The location where the artifact is kept/stored. There are three possible locations which include:

NM = The National Museum, Manila
BM = The Bohol Museum, Tagbilaran City
JT = Housed at the private residence of Jes Tirol

Sherd Type: Sherds were categorized as Rim, Body, Foot or Handles, or if a vessel form was nearly complete, this field indicated "Vessel".

Vessel Type: Vessel forms were classified as follows (if identifiable):

I = Round Bottom Vessels
- A = Short-Neck
- B = High-Neck

II = Footed Vessels
- A = Ring-Footed Vessels
  - a = with cut-outs/perforations
  - b = without cut-outs/perforations
- B = Tetrapod
  - a = legs with cut-outs
  - b = solid circular legs

III = Bowls/Lids
- A = Flat Bottomed
  - a = with decorations/handles
  - b = without decorations/handles
- B = Route Bottomed
  - a = with decorations/handles
  - b = without decorations/handles

IV = Jarlets

V = Non-Symmetrical

VI = Large Vessels

Decorative Elements: The decorative elements were classified as follows:

1 = Engraved Spiral Designs
2 = Engraved Geometric Designs
3 = Incised Linear Design
4 = Incised Geometric Designs
4 = Fingernail Impressions
5 = Punctate “Stamping”
6 = Scallop & Notching
7 = Red Slipping
8 = Handles
9 = Carinations