

**Prehistoric Chamorro household activities and refuse disposal patterns on the Micronesian Island of Tinian, Commonwealth of the Northern Mariana Islands**

BOYD DIXON

*PBS&J, 6504 Bridge Point Parkway, Suite 200, Austin, Texas 78730*

TINA MANGIERI

*Department of Geography, University of North Carolina  
Chapel Hill, North Carolina 27549*

EPHRAIM MCDOWELL

*P.O. Box 78377 Nairobi, Kenya*

KANANI PARASO

*Department of Anthropology, University of Arizona  
Tucson, Arizona 85721*

TIM RIETH

*International Archaeological Research Institute Inc.  
2081 Young Street, Honolulu, Hawai'i 96826*

**Abstract**—This study presents new data from the investigation of six prehistoric habitation sites on the Micronesian island of Tinian in the Commonwealth of the Northern Mariana Islands (CNMI) to interpret the nature of domestic activities and refuse disposal patterns associated with Latte Period households and their communities. Domestic refuse around elevated house foundations (called *latte* sets in the Mariana Islands) was examined through the medium of systematic shovel tests and limited excavation to reveal the extent and composition of subsurface deposits. Five groups of cultural materials (*lusong* or stone mortars, pottery / burned clay daub, unworked marine shell remains / faunal bone, stone and shell tools / debitage, and human remains) were used as indicators of various domestic activities. Artifact assemblages and their spatial distribution around each household appeared to indicate the sharing of food preparation, cooking or food and water storage, eating, tool manufacture or use, and human burial between habitations regardless of structure size or date of occupation, suggesting the importance of communal daily

activities and ritual events within the larger community. These activities and events also appear to reflect values of modern indigenous Chamorro society, since family sharing of food and labor is an integral part of *fiestas*, *novenas*, and rosaries in the Mariana Islands today.

### Introduction

Following Ferdinand Magellan's fortuitous landing on Guam in 1521, the indigenous population of the Mariana Islands (today calling themselves Chamorro) underwent over a century and a half of sporadic contact with Spanish sailors and Roman Catholic priests en route to the Philippines (Pobre de Zamora in Driver 1983, Levesque 1992). Clerical documents after 1668 and the establishment of the first Jesuit mission to the islands (Garcia 1985) clearly state that Chamorro villages on the coast were constructed of elevated houses built on top of stone columns and *tasas* (or cup-shaped capstones). The recorded function of these structures is somewhat ambiguous, since some Jesuit clergy (Coomans 1997) differentiated between those houses used for storage and those used as family dormitories. At least three types of other structures were also mentioned in these same documents (Coomans 1997, Garcia 1985, Pobre de Zamora in Driver 1983), including: 1) low houses on the ground where food was prepared and cooked, 2) young men's houses where they resided with unmarried women, and 3) much larger barn like structures for canoe storage and periodic meetings. Importantly, no mention is made of elaborate chiefly residences or royal palaces (Cordy 1983, 1995) such as were later observed elsewhere in traditional Micronesia and Polynesia.

When viewed together, daily activities recorded as occurring within elevated 17th century Chamorro houses included: 1) sleeping, 2) eating and drinking, 3) weaving of mats, hats, and baskets, 4) storing personal valuables, and 5) curating and periodically venerating certain human skulls. Some of the larger structures might be expected to be the setting for other outdoor domestic activities that probably occurred underneath the elevated house floor, such as: 1) baking breadfruit in rock ovens, 2) preparing rice drinks using a stone mortar or *lusong*, 3) dyeing teeth and hair, 4) extracting coconut oil, 5) raising caged doves for gambling purposes, 6) manufacturing of fishing gear, weaponry, digging sticks, and turtle shell ornaments, 7) weaving sails, and 8) constructing and finishing dugouts and sailing canoes. The burial of certain high status individuals also required the temporary construction of small platforms in front of the house to rest the body before the burial ceremony (Coomans 1997), and the erection of similar structures with woven mats erected over the grave after the burial underneath or around the house.

Outdoor activities recorded by the Jesuits (Coomans 1997; Garcia 1985; Pobre de Zamora in Driver 1983) were often shared by the community, including: 1) sporting events using weaponry, 2) public debates, 3) communal feasting, dancing, and singing, 4) cleaning and salting fish, 5) the sharing of betel nut, and 6) personal bathing. A seminal study of *latte* sites on Guam (Craib 1986) and sub-

sequent research on mound features often found nearby (Craib 1990, 1994, 1998, Pantaleo et al. 1996, Bulgrin 2000) determined that earth ovens and hearths were generally located at some distance from the residences with pottery and fire altered rock concentrations accumulating on the periphery of the cooking areas. Agricultural pursuits should also be added to this list of outdoor activities, since archaeological excavations near inland habitation sites have revealed refuse or midden with agricultural tools of stone and shell (Hunter-Anderson et al. 1994a and 1994b; Moore 2005) and sets of possible postholes suggesting the existence of perishable structures have been located near probable fields at some distance from the nearest *latte* set (Dixon et al. 2001, Dixon and Welch 2000).

The extent to which subsurface archaeological deposits relate physically to the occupation of Latte Period habitations has been a topic of archaeological interest since Hans Hornbostel's excavations of *latte* sets in Guam and the Northern

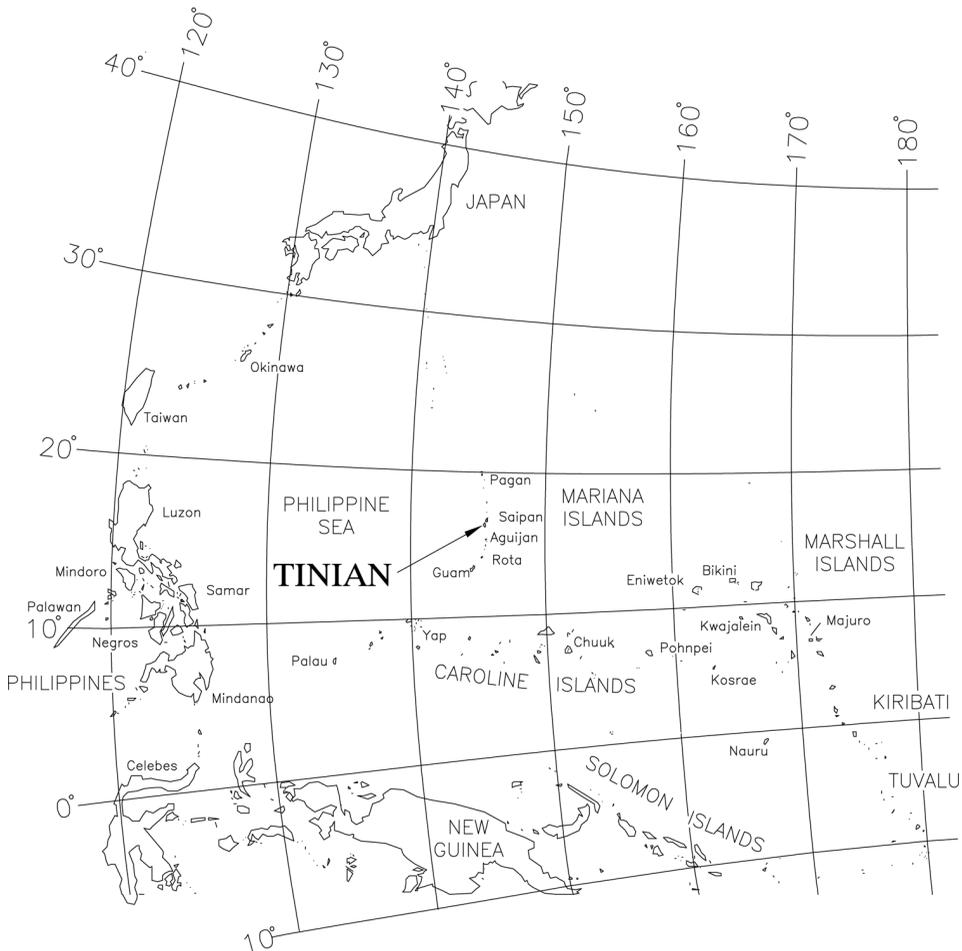


Figure 1. Location of Tinian in the western Pacific.

Mariana Islands in the early 20th century (Hornbostel 1924–1925). Human burials found in these settings led Hornbostel to postulate that *haligi* or individual pillars were erected as grave markers. Later investigators recorded the remains of pottery, marine shell, faunal bone, and stone tools underneath *latte* sets, indicating their primary use as domestic residences (Thompson 1932, 1945, Spoehr 1957, Reinman 1977). Some inland *latte* sets on Guam may even been erected as territorial markers (Hunter-Anderson et al. 1994c), with Latte Period farmers never intending to erect a house on these foundation stones. Complicating the archaeological site formation processes is over 300 years of abandonment and post-Contact reuse of the land (Dixon 2000, 2005), making the “Pompei Premise” (Ascher 1961, Connah 2003) of in situ preservation of surface remains tenuous. Nevertheless, “the working assumption is that cultural processes at work during the last phase of occupation are primarily responsible for the general patterns of distribution now observed...” (Craib 1986:149).

A recent archaeological survey for the U.S. Navy on the Micronesian island of Tinian in the CNMI (Figure 1) provided an opportunity for the International Archaeological Research Institute Inc. (IARII) to assess the utility of systematic shovel testing and limited excavation for the identification of Latte Period (A.D. 800-1600) domestic activities recorded by previous archaeological investigations and ethnohistoric accounts.

## Methods

Six newly recorded prehistoric sites were selected for this study (Dixon et al. 2000) and each site was situated at the back of the first major terrace on the west side of the island within the Voice of America Area B (location not shown for the sites’ protection). Site TN-1-591 contained three *latte* sets, site TN-1-598 contained one *latte* set, site TN-1-654 contained one *latte* set, site TN-1-656 contained one *latte* set, site TN-1-658 contained two *latte* sets, and site TN-1-660 contained one *latte* set.

Each site was separated by at least 100 meters (m), but they all shared a common topographical setting, had arable soils in between each other, and all their *latte* sets were oriented roughly north south. Shallow subsurface features exposed at the base of *haligi* (or upright columns) during larger excavations at these sites yielded the charred remains of two plant species indigenous to the Mariana Islands, *Tournefortia argenta* (Heliotrope tree) and *Hibiscus tiliaceus* (Hibiscus tree or *Pago* in Chamorro), plus the charred nut shells of one cultigen presumably introduced by Pre-Latte (1500 B.C.–A.D. 800) settlers, *Cocos nucifera* (Coconut or *Niyok* in Chamorro). These charred remains were submitted to the Radiocarbon Dating Laboratory at the University of Waikato in New Zealand yielding standard 2 sigma assays at 95.4% probability (Stuiver & Reimer 1993) between A.D. 1300 and 1670 for features at sites TN-1-591, TN-1-654, and TN-1-656. Charred coconut shell from one subsurface feature perhaps predating the use of site TN-1-588 yielded an assay between A.D. 600 and 800. While not all these sites were

contemporaneously occupied, they appear to represent a traditional multi-family community separated by topography and considerable distance from other archaeologically identified clusters of habitation sites on the west side of the island (Craib 1995, 1999, Eble et al. 1997, Franklin & Haun 1995, Haun 1988, Henry et al. 1996, Jimenez et al. 1996, Moore et al. 1986, Moore et al. 1999, Putzi et al. 1997, Welch 1994, Welch & Tuggle 1998).

Shovel tests were placed along a metric grid at 5 m intervals, parallel to the long axis of all nine *latte* sets at the six Latte Period sites. Shovel test units were always extended to a distance of at least 15 m beyond the nearest *haligi*, and some transects were extended much further to link with larger excavations placed adjacent to *lusong* and in rock shelters, or other *latte* sets farther away. This distance was always sufficient to detect a noticeable drop in ceramic density by about 15 m beyond the *latte* set, although it was rare to reach areas with no subsurface remains whatsoever, especially given the disturbances of pre-World War II Japanese agriculture nearby (Dixon 2005). Shovel tests of 35 square centimeters (sq cm) in size might arguably be a poor reflection of stratigraphic complexity where present, but their depth rarely exceeded 30 cm, indicating the relatively shallow nature of subsurface deposits beneath the dense underbrush of “wait-a-minute” weeds. Test units measuring 50 by 50 sq cm were also excavated adjacent to upright *haligi* within each *latte* set for stratigraphic control associated with radiocarbon dated features.

## Results and Discussion

Data from only one site TN-1-658 are presented here in schematic form for the sake of brevity, although these data will be compared to the other five tested sites later. Site TN-1-658 (Figure 2) is located inland of a steep cliff access to a small bay on the west coast of the island and south of a larger *latte* site TN-1-591. Two sets of *haligi* at Site TN-1-658 ranged in height from approximately .55 m at the North *latte* set to approximately .63 m tall at the South *latte* set (see Figure 3 for a comparison to a *latte* set measuring 1.11 m tall at site TN-1-591, Feature 3). Three larger *haligi* and a larger *tasa* as yet unerected near the South *latte* set suggest it may have been in the process of being modified at the time of its abandonment. One small utilized rockshelter was located in the bedrock escarpment to the east and a possible quarry area for some of the *haligi* was found in the escarpment to the south. Late Pre-Latte pottery found in testing of the rockshelter indicates the area was repeatedly utilized centuries before its selection as a Latte Period habitation site, as three radiocarbon dated strata and one subsurface ash pit spanning the period from 380 B.C.–A.D. 1420 indicate (Dixon et al. 2000:155).

The distribution of various types of artifacts recovered during shovel testing is graphically displayed using segment diagrams (i.e. Wansleebein & Verhart 1998:5.3), with one diagram per shovel test unit plotted at 5 m intervals (Figures 4 and 5). Each segment conforms to a type of artifact recovered (abrader, bone tool, burned daub, lithic debitage, faunal bone, unworked marine shell, stone/shell

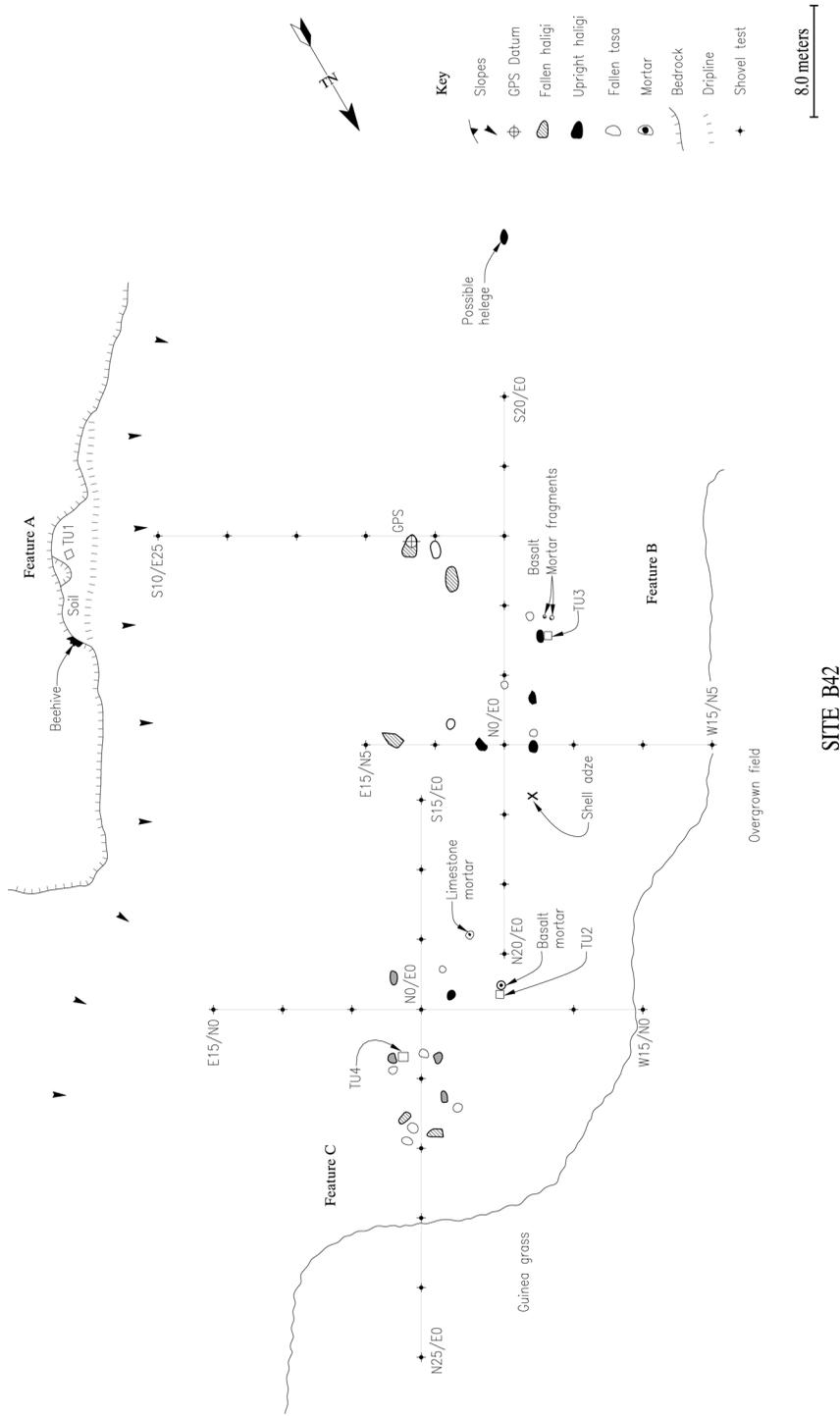


Figure 2. Site TN-1-658, showing location of *latte* sets and shovel tests.



Figure 3. Tim Rieth next to a *latte* stone at Site TN-1-591.

tool and pottery), with the length of each segment reflecting the quantity of material found as a percentage of the largest assemblage of the type. Black dots on the charts represent the position of individual *haligi*, while the circle with X represents the location of stone mortars. Only marine shell was measured by weight, while all other artifact categories were measured by count. It should be cautioned when interpreting these segment diagrams, that the linear distribution of materials is very likely a function of the linear placement of test units within only four cardinal directions. For a more accurate reflection of overall disposal patterns at a *latte* site, shovel tests would have to blanket an entire habitation area.

Overlap between the remains of certain activities could be expected, such as the use of *Tridacna*, *Turbo*, *Isogonum*, and *Spondylus* marine shells for food and as raw materials for tool manufacture. It can also be assumed that some movement of materials occurred within each 5 m grid as a result of traditional cleaning tasks and post-abandonment disturbances, with larger items more likely representing primary loci of deposition. Skeletal remains were immediately reburied after identification as human and are not noted on Figures 4 and 5 out of cultural sensitivity.

Classes of domestic refuse disposed within the larger Latte Period community of six sites can be further grouped for interpretation by five shared functions or related activities in Tables 1–5. Table 1 includes evidence of *lusong* used dur-

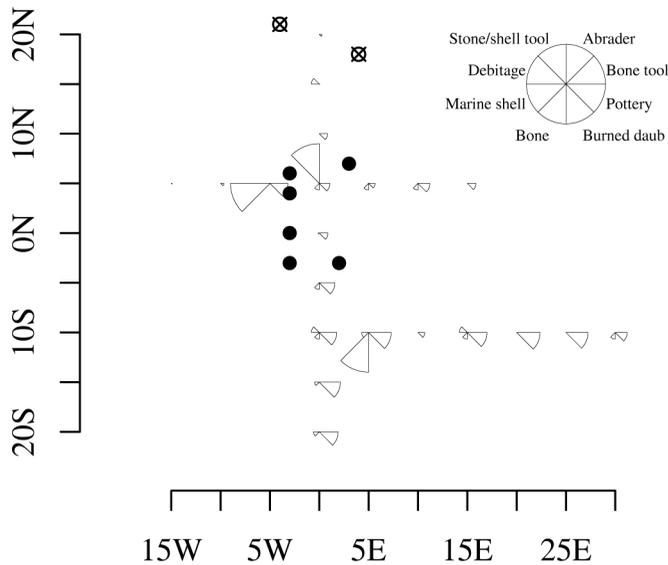


Figure 4. Site TN-1-658, south *latte* set artifact distribution.

ing food preparation. Table 2 includes evidence of cooking and food or water serving and storage (including broken pottery and burned clay daub). Table 3 includes nonperishable evidence of eating (including unworked fragments of marine shell and faunal bone of fish, birds, and animals). Table 4 includes evidence of tool use and manufacture (including worked stone, shell, and bone tools plus their associated debitage). Table 5 includes evidence of human burial and the retrieval of certain skeletal remains for post-interment tool making and ritual behavior. Each X on Tables 1–5 represents the presence of a given activity at a specific *latte* set within one of six sites in the community. Additional information is also provided in these tables to document the approximate date of *latte* set use if known from excavations, the number of pairs of shafts, the mean height above ground surface of *haligi* for each *latte* set in meters, and the overall length of the *latte* set in meters.

Emerging social status differences have sometimes been equated with structure size in the Mariana Islands (Graves 1986, 1991), the presumption being that by European Contact individuals and families of higher standing in an indigenous community lived on larger *latte* sets in structures supported by higher and more numerous pairs of *haligi*. Early Spanish accounts do indicate that “Those of low station were not permitted to eat or drink in the houses of nobles, or even go near them” (Garcia 1985:27), but there is little indication that higher status families had differential access to particular foods or luxury items (Cordy 1983). Within the community under examination in this study, site TN-1-654 was noticeably larger than its neighbors with 5 pair of *haligi* standing 1.7 m tall, in comparison to an average height of .75 m for the remaining eight structures mostly having 3 or 4 pair

Table 1: Evidence of Food Preparation Activities around Lusong at Six Prehistoric Sites on Tinian

Activity	Site	Latte Set	C14 Date	Shaft Pair	Length	Height	Front	Back	Sides	Under
Lusong	TN-1-588		AD 600-880	4	13	0.8				
Lusong	TN-1-591	Fea. 1	AD 1480-1950	4	11	1.1			X	
Lusong	TN-1-591	Fea. 2	AD 1470-1670	3	9.2	0.4	X			
Lusong	TN-1-591	Fea. 3	AD 1420-1640	5	15.5	1.1				
Lusong	TN-1-654		AD 1640-1960	5	13	1.7			X	
Lusong	TN-1-656		AD 1300-1620	4	16	0.5				
Lusong	TN-6-658	North	None	4	10	0.5	X		X	
Lusong	TN-6-658	South	None	3	9	0.6			X	
Lusong	TN-6-660		None	3	11	1.1	X			

Table 2: Evidence of Cooking Activities (pottery/burned clay daub) at Six Prehistoric Sites on Tinian

Activity	Site	Latte Set	C14 Date	Shaft Pair	Length	Height	Front	Back	Sides	Under
Cooking	TN-1-588		AD 600-880	4	13	0.8		X	X	
Cooking	TN-1-591	Fea. 1	AD 1480-1950	4	11	1.1		X	X	
Cooking	TN-1-591	Fea. 2	AD 1470-1670	3	9.2	0.4	X			
Cooking	TN-1-591	Fea. 3	AD 1420-1640	5	15.5	1.1		X	X	
Cooking	TN-1-654		AD 1640-1960	5	13	1.7	X	X	X	X
Cooking	TN-1-656		AD 1300-1620	4	16	0.5	X	X	X	X
Cooking	TN-6-658	North	None	4	10	0.5			X	
Cooking	TN-6-658	South	None	3	9	0.6		X	X	
Cooking	TN-6-660		None	3	11	1.1	X	X	X	X

Table 3: Evidence of Eating Activities (unworked shell/faunal bone) at Six Prehistoric Sites on Tinian

Activity	Site	Latte Set	C14 Date	Shaft Pair	Length	Height	Front	Back	Sides	Under
Eating	TN-1-588		AD 600-880	4	13	0.8			X	
Eating	TN-1-591	Fea. 1	AD 1480-1950	4	11	1.1	X			
Eating	TN-1-591	Fea. 2	AD 1470-1670	3	9.2	0.4				
Eating	TN-1-591	Fea. 3	AD 1420-1640	5	15.5	1.1				X
Eating	TN-1-654		AD 1640-1960	5	13	1.7	X		X	
Eating	TN-1-656		AD 1300-1620	4	16	0.5				
Eating	TN-6-658	North	None	4	10	0.5	X		X	
Eating	TN-6-658	South	None	3	9	0.6	X	X	X	X
Eating	TN-6-660		None	3	11	1.1		X	X	X

Table 4: Evidence of Tool Making (stone/shell/bone) and Use at Six Prehistoric Sites on Tinian

Activity	Site	Latte Set	C14 Date	Shaft Pair	Length	Height	Front	Back	Sides	Under
Tool Use	TN-1-588		AD 600-880	4	13	0.8	X		X	X
Tool Use	TN-1-591	Fea. 1	AD 1480-1950	4	11	1.1	X			X
Tool Use	TN-1-591	Fea. 2	AD 1470-1670	3	9.2	0.4		X		
Tool Use	TN-1-591	Fea. 3	AD 1420-1640	5	15.5	1.1			X	X
Tool Use	TN-1-654		AD 1640-1960	5	13	1.7			X	X
Tool Use	TN-1-656		AD 1300-1620	4	16	0.5			X	
Tool Use	TN-6-658	North	None	4	10	0.5	X		X	X
Tool Use	TN-6-658	South	None	3	9	0.6				X
Tool Use	TN-6-660		None	3	11	1.1		X	X	X

Table 5: Evidence of Human Burials at Six Prehistoric Sites on Tinian

Activity	Site	Latte Set	C14 Date	Shaft Pair	Length	Height	Front	Back	Sides	Under
Burial	TN-1-588		AD 600-880	4	13	0.8	X		X	
Burial	TN-1-591	Fea. 1	AD 1480-1950	4	11	1.1				
Burial	TN-1-591	Fea. 2	AD 1470-1670	3	9.2	0.4				
Burial	TN-1-591	Fea. 3	AD 1420-1640	5	15.5	1.1				X
Burial	TN-1-654		AD 1640-1960	5	13	1.7				
Burial	TN-1-656		AD 1300-1620	4	16	0.5		X		
Burial	TN-6-658	North	None	4	10	0.5			X	X
Burial	TN-6-658	South	None	3	9	0.6				X
Burial	TN-6-660		None	3	11	1.1				

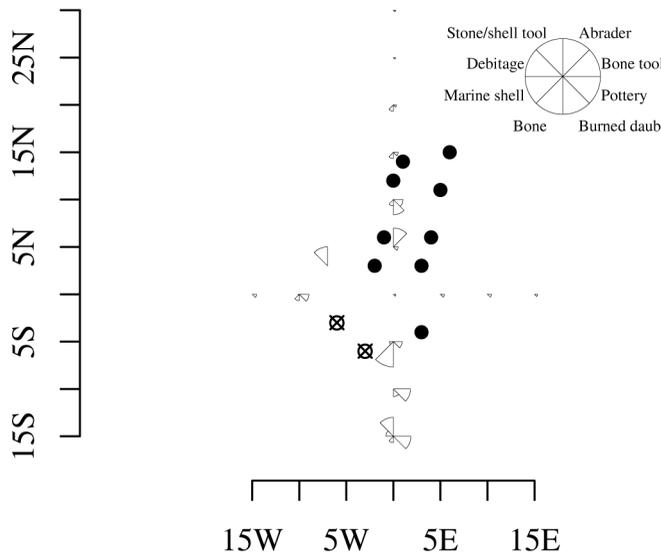


Figure 5. Site TN-1-658, north *latte* set artifact distribution.

of *haligi*. Site TN-1-654 also happens to be associated with the latest radiocarbon date in the community, while the shortest *latte* sets are associated with the earliest dates. For the purposes of this discussion, the “front” of these nine *latte* houses is defined as that long side facing the ocean (to the west), the “sides” of the house are located on both ends between the neighbors (north and south), the “back” is located between the house and the nearby cliffline which was always less than 50 m to the east, and “under” is between the *haligi*. It should be understood that access to tall *latte* structures above perhaps 1.5 m in height may have been through the floor, while lower structures likely had an entrance on one or both ends.

Table 1 demonstrates that food preparation activities centered on the use of *lusong* were generally located in front of or on the sides of the house, regardless of structure size or date of occupation. As can be seen in Table 2, the majority of daily cooking and serving activities involving pottery were conducted in the back or on the sides of most houses in this study, regardless of size or date of occupation. Figure 5 demonstrates that ceramics at site TN-1-658 were also found near outlying mortars suggesting that food under preparation was transported to and from *lusong* or ovens in ceramic vessels. The distribution of non-worked marine shell and faunal remains in Table 3 indicates that daily eating activities took place on the sides or in front of houses regardless of size or date of occupation, and only less frequently underneath or in back. Stone, bone, or shell tool making and using activities in Table 4 appear to have been generally conducted underneath the house or in small activity areas (of under 10 m in diameter in Figures 4 and 5) on the sides of the house regardless of size or date of occupation, although they sometimes occurred in front as well. As can be seen in Table 5, the few human burials that were encountered during larger excavations were generally placed

underneath or on the sides of the house regardless of size or date of occupation, less frequently being located in front or in back of the house.

Patterns of communal behavior and refuse disposal shared by these particular families on Tinian are immediately evident from a comparison of the shovel test data from all six *latte* sites presented in Tables 1–5. For instance, it appears that most everyone’s “front yard” was kept relatively free of domestic activities or perhaps was swept clean on a regular basis regardless of the size of the house or date of occupation, perhaps in anticipation of the kinds of communal events noted by the Spanish (Coomans 1997, Garcia 1985, Pobre de Zamora in Driver 1983). The “back yards” and sides of the house seemed most appropriate for individual household cooking activities, although most eating occurred in front or on the sides between houses, suggesting the daily sharing of food between families regardless of structure size or date of occupation. Shade underneath the higher *latte* sets seems to have been the preferred locale for some tool use and manufacture, while the sides of smaller houses and nearby *lusong* were favored by everyone else. Human burials were mostly found in the sides or underneath houses regardless of structure size or date of occupation, suggesting that important lifetime events and daily domestic activities were sometimes shared by more than one family.

As a possible analogy to such multi-family events, ritual feasts similar to those noted by the Spanish in the Mariana Islands were found to be critical events for the confirmation and replication of social values and perhaps political authority during the 9th and 10th centuries A.D. in the prehistoric archaeological record of the Philippines (Junker 2001; Peterson 2005), at roughly the same time as the beginnings of the Latte Period. This example is chosen because the Philippines are considered by many prehistorians to be the source of Pre-Latte Chamorro culture and language during the mid-second millennium B.C. (Bellwood et al. 1995, Kurashina & Clayshulte 1983), and the importance of *fiestas* in modern Chamorro society cannot be underestimated (Russell 1998, Stephenson 1994). Of special note in the late prehistoric Philippine social gatherings was the ritual use of rice (Junker 2001), a grain only grown by the prehistoric Chamorro within Oceania and also consumed primarily during ritual events (Hunter-Anderson et al. 1995), as noted by the Spanish. A prehistoric change from the production of small ceramic bowls used as griddles in the Pre-Latte Period toward much larger jars used for boiling in the Latte Period (Hunter-Anderson & Butler 1995, Moore & Hunter-Anderson 2000) may therefore denote in part the increased ritual consumption of rice in Chamorro society as such *fiestas* became more important through time.

## Conclusion

In conclusion, shovel test data and limited excavations seemed to be useful for locating and defining the nature and spatial extent of five kinds of outdoor activities associated with *latte* sets and their Latte Period occupants within one prehistoric community on the Micronesian island of Tinian. Artifact assemblages

and their spatial distribution at the household level appeared to indicate the sharing of food preparation, cooking and storage, eating, tool manufacture and use, and human burial between habitations regardless of structure size or date of occupation, suggesting the importance of communal daily activities and ritual events within the larger community of six sites. Similar activities and rituals also appear to reflect values of modern indigenous Chamorro society, since family sharing of food and labor is very similar to the spirit of *inafa'maolek* (interdependence within the kinship group), *chenchule'* (gift giving), and *ayuda* (giving assistance or help). The *fiestas*, *novenas*, and rosaries regularly attended in the Mariana Islands today may therefore have their roots in prehistoric traditions, where important communal events often took place in front of and around family homes as they do today.

### Acknowledgements

This study is based on information gathered on the island of Tinian by IARII in 1998 for the U.S. Navy within the former Voice of America Area B. The co-authors of this paper assisted the senior author as field crew and in the preparation of the technical report, and Tom Dye, David Welch, and Stephen Athens assisted with the analysis and interpretation of the results. Chris Evangelista and Justo Sanchez provided local labor and humor throughout the arduous fieldwork. Jeannette Simons, then of PACDIV and Jennings Bunn, then of COMNAVMIANAS are to be thanked for their cooperation during the project and permission to publish these data. Lon Bulgrin and Scott Russell, then of the CNMI Division of Historic Preservation, are also to be thanked for their information and enthusiasm, as is their Tinian island coordinator Carmen Sanchez for inviting us to become part of her family. The senior author would like to thank Linda Aguon and Annie Flores, then of the Guam Historic Resources Division of Parks and Recreation for their invitation to present an earlier version of this paper at the Guam Historic Preservation Symposium 2000 entitled *Prehistory of the Marianas: From the Pit, to the Page, to the Public*. An anonymous reviewer is thanked for constructive comments on an earlier version of this manuscript for another journal, as is Darlene Moore for her insightful comments on this manuscript.

### References

- Ascher, R. 1961. Analogy in Archaeological Interpretation. *Southwestern Journal of Anthropology* 17:317–325.
- Bellwood, P., J. Fox & D. Tryon. 1995. *The Austronesians Historical and Comparative Perspectives*. ANU Printing Services, Canberra.
- Bulgrin, L. 2000. "Fina'okso Antigo" Prehistoric Soil Mounds in the Interior of Rota. Paper presented at the Guam Historic Preservation Symposium 2000, *Prehistory of the Marianas: From the Pit, to the Page, to the Public*. Tamuning, Guam.

- Coomans, Fr. P. 1997. History of the Mission in the Mariana Islands: 1667–1673. Occasional Historical Papers Series No.4, Division of Historic Preservation, Saipan.
- Connah, G. 2003. Problem orientation in Australian historical archaeology. *Historical Archaeology* 37(1):146–158.
- Cordy, R. 1983. Social stratification in the Mariana Islands. *Oceania* 53:272–276.
- Cordy, R. 1995. Settlement patterns of complex societies in the Pacific. *New Zealand Journal of Archaeology* 7:159–182.
- Craib, J. 1986. Casas de los Antiguos: Social differentiation in protohistoric Chamorro society, Mariana Islands, Micronesia. Unpublished Ph.D. thesis, University of Sydney.
- Craib, J. 1990. Archaeological Investigations at Alaguan, Rota, Commonwealth of the Northern Mariana Islands. Report to the Historic Preservation Office, Saipan. Contract CNMI C41514-01.
- Craib, J. 1994. Archaeological Investigation of an Inland Latte Site (M221) at Manenggon Hills, Yona, Guam. *In* R. Hunter-Anderson (ed.), *Archaeology in Manenggon Hills, Yona, Guam, Volume 1*. Micronesian Archaeological Services.
- Craib, J. 1995. Archaeological Surveys in U.S. Military Lease Lands, Tinian, Commonwealth of the Northern Mariana Islands. Ogden Environmental and Energy Services Co., Inc., Honolulu.
- Craib, J. 1998. Archaeological Excavation in the Uyulan Region of Rota. Micronesian Archaeological Survey Report No. 33. The Micronesian Archaeological Survey, Division of Historic Preservation, Department of Community and Cultural Affairs, Saipan, MP.
- Craib, J. 1999. Archaeological Survey and Subsurface Testing of Selected Areas in the Military Lease Lands, Tinian, Commonwealth of the Northern Mariana Islands. Ogden Environmental and Energy Services Co., Inc., Honolulu.
- Dixon, B. 2000. West Tinian Airport Improvement Area, Commonwealth of the Northern Mariana Islands / Rota Highway 100, Commonwealth of the Northern Mariana Islands. *Society for Historical Archaeology Newsletter* 33(1): 30.
- Dixon, B. 2005. Pre-WWII rural Japanese plantation settlement patterns on the island of Tinian, Commonwealth of the Northern Mariana Islands. *International Journal of Historical Archaeology* 8:281–299.
- Dixon, B. & D. Welch. 2000. Archaeological Survey in Advance of the West Tinian Airport Improvement Area, Island of Tinian, Commonwealth of the Northern Mariana Islands. International Archaeological Research Institute Inc., Honolulu.
- Dixon, B., D. Welch, T. Dye & T. Mangieri. 2000. Phase II Archaeological Survey of the Military Lease Area (Former VOA Areas B and C), Island of Tinian, Commonwealth of the Northern Mariana Islands. International Archaeological Research Institute Inc., Honolulu.

- Dixon, B., D. Welch & C. Magnusson. 2001. Archaeological Data Recovery of Site TN-1-691, West Tinian Airport Improvement Area, Island of Tinian. International Archaeological Research Institute Inc., Honolulu.
- Driver, M. 1983. Fray Juan Pobre De Zamora and his account of the Mariana Islands. *Journal of Pacific History* 18:198–216.
- Eble, F., M. Swift & J. Panataleo. 1997. Final Report of Archaeological Reconnaissance Conducted at the Three Proposed Alternative Voice of America Relay Station Sites, Island of Tinian, Commonwealth of the Northern Mariana Islands. Garcia and Associates, Honolulu.
- Franklin, L. & A. Haun. 1995. Archaeological Survey in Conjunction with FY95 Tandem Thrust Training, Island of Tinian. Paul H. Rosendahl Ph.D. Inc., Hilo.
- Garcia, F. 1985. The Life and Martyrdom of the Venerable Father Diego Luis De Sanvitores. Partial translation by Margaret Higgins, published in 31 parts under the title *First History of Guam*, Guam Recorder, 1936–1939. Unpublished manuscript on file at Micronesian Area Research Center, University of Guam, Mangilao, Guam.
- Graves, M. 1986. Organization and differentiation within Late Prehistoric ranked social units, Mariana Islands, Western Pacific. *Journal of Field Archaeology* 13:139–154, Boston.
- Graves, M. 1991. Architectural and mortuary diversity in Late Prehistoric settlements at Tumon Bay, Guam. *Micronesica* 2:169–194.
- Haun, A. 1988. Archaeological Reconnaissance Survey and Field Inspection of Relocatable Over-the-Horizon Radar Sites on Tinian. Paul H. Rosendahl Ph.D. Inc., Hilo.
- Henry, J., A. Haun, M. Kirkendall & D. DeFant. 1996. Archaeological Inventory Survey in Conjunction with the EIS for Training Exercises on Tinian Island, Commonwealth of the Northern Mariana Islands. Paul H. Rosendahl Ph.D. Inc., Hilo.
- Hornbostel, H. 1924–1925. Unpublished field notes and artifact catalogs on file at Bernice Pauahi Bishop Museum Library, Honolulu.
- Hunter-Anderson, R., J. Amesbury & D. Moore. 1994a. The Manenggon Hills Project. *In* R.L. Hunter-Anderson (ed.), *Archaeology in Manenggon Hills, Yona, Guam, Volume 1*. Micronesian Archaeological Services.
- Hunter-Anderson, R., J. Amesbury & D. Moore. 1994b. Site Discovery and Data Recovery in Manenggon Hills. *In* R. Hunter-Anderson (ed.), *Archaeology in Manenggon Hills, Yona, Guam, Volume 1*. Micronesian Archaeological Services.
- Hunter-Anderson, R., J. Amesbury & D. Moore. 1994c. Summary and Synthesis. *In* R. L. Hunter-Anderson (ed.), *Archaeology in Manenggon Hills, Yona, Guam, Volume IV*. Micronesian Archaeological Services.
- Hunter-Anderson, R. & B. Butler. 1995. An Overview of Northern Marianas Prehistory. Micronesian Archaeological Survey Report Number 31, CNMI Division of Historic Preservation, Saipan.

- Hunter-Anderson, R., G. Thompson & D. Moore. 1995. Rice as a prehistoric valuable in the Mariana Islands, Micronesia. *Asian Perspectives* 34: 69–89.
- Jimenez, J., A. Haun, M. Kirkendall & S. Goodfellow. 1996. Prefinal Report: Archaeological Investigations at Unai Chulu, Island of Tinian, Commonwealth of the Northern Mariana Islands. Paul H. Rosendahl Ph.D. Inc., Hilo.
- Junker, L. 2001. The Evolution of Ritual Feasting Systems in Prehispanic Philippine Chiefdoms. *In* M. Dietler & B. Hayden (eds), *Feasts Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, pp. 267–310, Smithsonian Institution Press, Washington D.C.
- Kurashina, H. & R. Clayshulte. 1983. Site formation processes and cultural sequence at Tarague, Guam. *Bulletin of Indo-Pacific Prehistory Association* 4:114–122.
- Levesque, R. 1992. *History of Micronesia. A Collection of Source Documents. Volume 1—European Discovery 1521–1560*. Levesque Publications, Quebec.
- Moore, D. 2005. Archaeological evidence of a prehistoric farming technique on Guam. *Micronesica* 38: 93–120.
- Moore, D., M. McNerney & R. Hunter-Anderson. 1986. An Archaeological Survey of Portions of Tinian Island, Commonwealth of the Northern Mariana Islands. American Resources Group, Ltd., Carbondale.
- Moore, D., R. Hunter-Anderson, E. Wells & J. Amesbury. 1999. Archaeological Data Recovery and Construction Monitoring for the Proposed Voice of America (VOA) Mariana Radio Relay Station, Island of Tinian, Commonwealth of the Northern Mariana Islands. Micronesian Archaeological Research Services, Guam.
- Moore, D. & R. Hunter-Anderson. 2000. Pots and pans in the intermediate Pre-Latte (2500–1600 bp) Mariana Islands, Micronesia. *In* J.-C. Galipaud & I. Lilley (eds), *The Pacific from 5000 to 2000 BP, Colonization and Transformations*, pp. 487–503. IRD Editions, Paris.
- Pantaleo, J., A. Sinoto & K. Kautz. 1996. Inland Latte Villages of Eastern Rota: Archaeological Investigations of the Dugi/Gampapa and E-Chenchon/As Nieves Agricultural Homestead Divisions, Island of Rota, CNMI. Prepared for the Department of Lands and Natural Resources, Saipan. AB Business Management and Consulting Services, Saipan.
- Peterson, J. 2005. Liminal objects, sacral places: epistemological and archaeological investigations at the Aleonar Site in Cebu, Philippines. *Philippine Quarterly of Culture and Society*, 33 (3-4): 218–270.
- Putzi, J., F. Eble, D. Moore, J. Amesbury & R. Hunter-Anderson. 1997. Final Report Phase II Archaeological Survey and Testing at the Proposed Voice of America Relay Station Site within Area A, Tinian Island, Commonwealth of the Northern Mariana Islands. Garcia and Associates, Honolulu.
- Reinman, F. 1977. An Archaeological Survey and Preliminary Test Excavations on the Island of Guam, Mariana Islands, 1965–1966. Miscellaneous Publication, Number 1. Micronesian Area Research Center, Mangilao, Guam.

- Russell, S. 1998. *Tiempon I Manomofona: Ancient Chamorro Culture and History of the Northern Marianas Islands*. Micronesian Archaeological Survey Report, 32. Division of Historic Preservation, Saipan, CNMI.
- Spoehr, A. 1957. *Marianas Prehistory: Archaeological Survey and Excavations on Saipan, Tinian, and Rota*. *Fieldiana: Anthropology*, 48. Field Museum of Natural History, Chicago.
- Stephenson, R. 1994. On Technology and Culture Change. *In* R. Stephenson (ed.), *Traditional Technological Structures and Cultures of the Pacific: Five Papers*, pp. 1–6. University of Guam, Mangilao.
- Stuiver, M., and P. Reimer. 1993. Extended <sup>14</sup>C database and revised CALIB radiocarbon calibration program. *Radiocarbon* 35: 215–230.
- Thompson, L. 1932. *Archaeology of the Mariana Islands*. Bernice Pauahi Bishop Museum Bulletin, 100. Bernice Pauahi Bishop Museum, Honolulu.
- Thompson, L. 1945. *The Native Culture of the Marianas Islands*. Bernice Pauahi Bishop Museum Bulletin, 185. Bernice Pauahi Bishop Museum, Honolulu.
- Wansleeban, M. & L.B.M. Verhart. 1998. Graphical analysis of regional archaeological data. The use of site typology to explore the Dutch Neolithization process. *Internet Archaeology* 4. [http://intarch.ac.uk/journal/issue4/wansleeben\\_toc.html](http://intarch.ac.uk/journal/issue4/wansleeben_toc.html)
- Welch, D. 1994. *Archaeological Assessment of Historic Sites in Conjunction with the Tinian Tandem Thrust '95 Military Exercises, Tinian, CNMI*. International Archaeological Research Institute, Honolulu.
- Welch, D. & D. Tuggle. 1998. *Military Exercises and Historic Sites in the Military Retention Area of the Island of Tinian, CNMI: An Archaeological Assessment*. International Archaeological Research Institute, Honolulu.