

***Estorian i latte: A story of latte***

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**Abstract**—*Estorian i latte*, a narrative of the megaliths unique to the Mariana Islands in the western Pacific region, is an interdisciplinary endeavor undertaken by researchers in architecture and the humanities and social sciences. Historical written records dating back to the Spanish Era (16th-19th Centuries) substantiate the primary function of *latte* as house foundations. *Latte* can be viewed as part of the pile-built architectural tradition which is common among many Austronesian-speaking societies in Insular Southeast Asia and the western Pacific. Possible origins of *latte* are investigated utilizing recent findings of mtDNA research as well as relevant linguistic, archaeological, and socio-historical data. Within the rubric of inter-disciplinary studies, the *rati* stone of Sumba, the *rante* stone of Sulawesi, and the *bale* with *haligi* of the northern Philippines are examined as exhibiting possible links to *latte* of the Marianas. The authors suggest that *latte* may be

interpreted as a hybrid of architectural concepts originating from various parts of Insular Southeast Asia. From the perspectives of the researchers, the *latte* represents a direct adaptive response to the tropical climate of the Marianas, as well as the archipelago's seismic activity, geography, and environment, with some local socio-cultural variations in manifestations. To conclude this study, attempts are made to reconstruct a virtual latte house based on pertinent historical data, utilizing computer generated 3D graphics.

### **Introduction**

The anthropology of vernacular architecture is a research topic that is of continuing interest to scholars and many others in the Pacific-Asia region. In the course of an extensive review of living houses, particularly in Insular Southeast Asia, it is clear that architecture embodies a wealth of anthropological information pertaining to origins of people, migration, technology, symbolism, kinship, social structure, and various other cultural practices (Waterson 1993, 1997). In addition, architecture can reflect cultural adaptations to local environments and, in the case of monumental architecture, it can manifest itself as part of enduring elements of prior landscapes (Rodning 2010: 186). The present paper, which combines contributions by architects and social scientists who study and conduct scholarly research in the Pacific Asia region (Figure 1), examines the megaliths of the Mariana Islands in the western Pacific region, commonly known as *latte*, from the perspectives of architecture, archaeology, cultural anthropology, history, and sociology. This paper's goal is to gain hitherto undiscovered insights into various aspects of the *latte*. The present co-authors suggest that an inter-disciplinary inquiry can be an especially useful methodology within which new knowledge might be gleaned with regard to the origin and use of the megaliths of the Mariana Islands.

The present paper is comprised of several sections that include 1) general discussions regarding *latte*, 2) major historical accounts concerning *latte*, 3) review of previous and contemporary attempts to reconstruct *latte* houses, 4) possible origins and relationships of *latte* with Insular Southeast Asia, 5) concept of *latte* as a fusion of several optimizing factors, 6) reconstructing a virtual *latte* set based on a stone panel at Borobudur, Central Java, Indonesia with the application of 3D computer graphics, and 7) synthesis and conclusions. The present paper is structured so as to embrace a broad range of perspectives regarding the *latte* of the Mariana Islands.

### **The *Latte* of the Mariana Islands**

The Chamorros, the indigenous people of the Mariana Islands, were prolific builders of megaliths, known locally as *latte* stones. Archaeological records

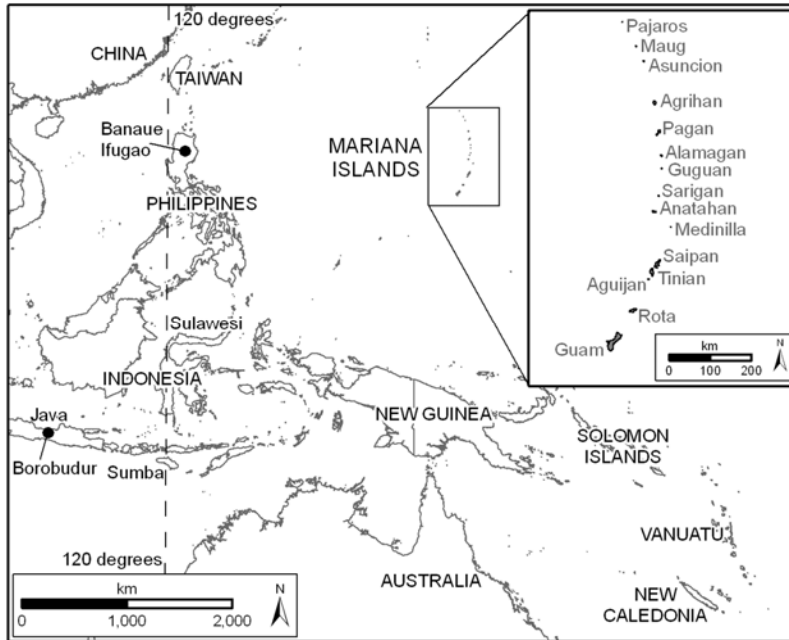


Figure 1. Map of Southeast Asia and Western Pacific Region.

indicate that *latte* stones were constructed during the latter part of the Marianas' prehistory, commonly designated as the *latte* phase, which was originally defined by Alexander Spoehr in his seminal work in the southern Mariana Islands (1957). The geographic distribution of *latte* stones coincides with the geographic range of islands within the Marianas, extending from Guam in the south to Maug in the north (Ueki 1978; Yawata 1943).

With regard to *latte* architecture, a *latte* set can be defined as a double row of stone columns which generally consist of two structural elements, each column having a semi-spherical capstone, known as *tasa* in the Chamorro language (n.b., in the discipline of architecture, identified as a "capital"), that was carefully positioned on top of a stone shaft, *haligi* in Chamorro. Extremely rare exceptions to the classic model exist, that include a *latte* column carved as a single piece, having its capstone connected seamlessly to its shaft, on the island of Rota (Brian Butler, personal communication); and a *latte* set at Mochong on Rota that has a series of wide limestone slabs forming a wall on one side, instead of stone shafts. At the Mochong latte site, the capstones were situated atop the narrow empty space between the wide slabs (Morgan 1988: 141, 144; Takayama and Egami 1971; Yawata 1945: 418-424).

Mariana Islands' *latte* sets may be comprised of 4, 6, 8, 10, 12, or 14 columns (Hornbostel n.d.; Graves 1986), most commonly oriented having their

long axis parallel to shoreline, river, or other natural features (Morgan 1988; Reinman 1977). Such clusters of *latte* sets reflect aspects of the settlement patterns of the indigenous Chamorros during the *latte* phase and provide an important basis for attempting to understand the use of space and the adaptation to prevailing landscapes within the context of historic geography and island ecology. The spatial density of *latte* sites has been found to be particularly high along the Holocene landscape of sandy coastal littoral on the islands in the southern Marianas (Carson 2008; Hornbostel n.d.; Kurashina 1991; Morgan 1988; Reinman 1977; Thompson 193).

The *latte* stones of the Marianas symbolize a singular megalithic architectural style that was present for many centuries, beginning around the 9th century A.D. and existing until after the initial arrival of European explorers and missionaries in the Western Pacific region in the 16th-17th Centuries (Kurashina et al. 1999). Writing in the early 1900s, Safford (2009:97) referred to “these stone or masonry pillars still standing arranged in double rows” as “*latde*.” The builders among the indigenous Chamorros left behind their silent legacies immortally carved in *latte* stones, yet the original exterior appearance of a *latte* set complete with its superstructure above the columns has not been well understood up to the present time. Although a wide variety of Spanish-era historical accounts, as well as speculative interpretations, artistic drawings, and replicas of *latte* stones exist, modern 21st century architects, archaeologists, and anthropologists have not fully met the challenges of logically or methodically reconstructing a *latte* house. The present paper entitled “*Estorian i latte*” will attempt to bridge this gap by providing a compendium of data concerning *latte* stones of the Marianas from a variety of perspectives, including architecture, archaeology, anthropology, sociology, and history.

### **Historical Accounts of *Latte* Structures**

Early historical accounts dating as far back as the mid A.D. 1500s corroborate the widely understood function of *latte* stones as raised house foundations. One of the oldest existing written accounts was recorded in the course of the Legaspi Expedition that made a visit to Guam in 1565, describing architectural variation with regard to the buildings on the island. Some 44 years after the initial contact by Ferdinand Magellan in 1521 in the Marianas, a member of the Legaspi Expedition wrote in his diary that there existed locally three types of structures: a) high houses, b) low houses, and c) boat houses. The vivid observation of the writer concerning the high houses was recorded as follows:

The houses are high, well kept and well made. [They] stand the height of a man off the ground, atop large stone pillars, upon which they lay

the flooring. [There] they have the living room, [with] rooms and quarters on either side of the living room. Their sleeping areas [are] matted like outdoor mattresses. Their sleeping platforms are high; there they put their trappings [sic] or clothing. There are little windows in the room ... (in Plaza 1973: 6-7).

From the written account recorded by the Legaspi Expedition, a number of important observed architectural features can be enumerated:

1. In 1565, at least three types of structures were observed – a) high houses, b) low houses, and c) boat houses or canoe houses. The high houses were supported by large stone pillars.
2. Boat houses or canoe houses were differentiated from both high houses and low houses.
3. High houses were residential buildings.
4. The construction of the high houses was of notable quality and the high houses appeared well maintained.
5. The height of the stone pillars was equivalent of the height of a man.
6. Inside the house, the house was partitioned to include a) the living room at the center, b) a room/a quarter on one side of the living room, and c) another room/another quarter on the other side of the living room.
7. Mats were laid on the floor in sleeping areas.
8. Sleeping platforms were high.
9. Trappings or clothing were kept in the sleeping platforms.
10. Little windows were present.

Although the original account concerning the high houses was a single paragraph in length, a wealth of information was set forth concerning various architectural and functional attributes of *latte* houses in the year 1565. Legaspi's account substantiates the function of the *latte* house as a residential unit, providing a place where residents could sleep, and a portion of the house was used for storing goods such as trappings (perhaps subsistence related equipment?) or clothing.

In the above-noted 1565 description, no mention was made regarding the actual dimension of the *latte* house other than the relative height of the stone pillars in relationship to the height of a man. Architectural details, viz. the roof, walls, construction methods, entrance to the house, and actual raw materials used, are also silent. In addition, the possible significance of the *latte* houses with reference to social ranking, social organization, or religious associations was silent. However, Dunham (2009) and others emphasize the all-encompassing importance of these concepts in Indonesia, as is the case with Petersen (2009) and others regarding Micronesia.

Thirty-seven years later, in 1602, Fray Juan Pobre wrote a detailed account of daily life in the Marianas. He described the houses as being built on stone pillars. Fray Juan Pobre noted that the houses were built by all the relatives and neighbors in the village (Driver 1993:17-18). Although the use of stone pillars had long disappeared by the early 20th Century, historic photographs archived at the Micronesian Area Research Center on the campus of the University of Guam depict the cooperative work pattern of constructing thatched roof houses in more recent times in the Marianas. According to Driver's translation of Fray Juan Pobre's historical account, the deceased were buried in front of the houses of their respected relatives (Driver 1993:24).

A rare document written originally in Latin by a Belgian Jesuit, Fr. Peter Coomans, attests to the fact that houses built on stone pillars existed well into the latter part of the 1600s in the Marianas. Writing of the period 1667-1673, Fr. Peter Coomans (1997:12) described houses built on stone pillars:

They keep their belongings in another [house] built high upon pillar-like stones. Here are found all their riches, such as some tortoise shells, for they value them more than gold, [and] in some earthen pots, a [single-edge] or double-edge axe, discolored glass beads, and some castanets.

Fr. Francisco Garcia, S.J., described events that occurred during the period 1668–1681 in the Mariana Islands (McDonough 2004). Details concerning some aspects of the houses are found in Garcia's writings, as follows:

The houses are the cleanest that have yet been found among *Indios*. They build them of the wood of the coconut and *palo maria* (*Calophyllum inophyllum*: daok). The walls and roofs, made in the form of a vault, are curiously woven of coconut leaves. They have four rooms with doors or curtains made of the same matting. One serves as a sleeping room, another for storing produce, another as a kitchen, and a fourth is large enough to hold and store boats (in McDonough 2004: 168).

In the latter part of the 17th Century, as described by Garcia, valuable information concerning the houses can be summarized in the following manner:

1. The houses are noted as being the cleanest yet found.
2. The construction material used for the house included wood, coconut, *palo maria*, and woven coconut leaves.
3. The roofs formed a vault and the houses were built with walls.
4. There were four rooms with doors and curtains made of woven coconut leaves. Each room had its own functional use: sleeping, storing produce, food preparation, and storing watercraft.
5. The houses evidently served as residential units.

The descriptions given by Garcia offer further details regarding house construction with regard to construction materials and the form of the roofs, at the time when Father San Vitores devoted his time to the Christianization of the Chamorro people in the Marianas until his death in 1672. From the description of the houses given by Garcia, the size of the houses appeared to have been rather substantial, as they could accommodate four rooms including a space for storing watercraft in one of the rooms. In a written history of Guam, Robert Rogers provides an account of Guam several years after the martyrdom of Father San Vitores (Rogers 1995:62):

The remainder of 1678 into 1679 saw the Spaniards mount scorched-earth sweeps into hostile areas throughout Guam, tearing down big *latte* houses, burning food stores, killing any hostiles they caught, and carrying off children to be baptized.

It appears that the *latte* structures ceased to be actively utilized rather quickly in the course of the burning of many villages by the Spaniards. The Spanish Conquest of the Marianas in 1668-1698 has been linked to the destruction and disuse of the *latte* megalithic structures (Rogers 1995:35; Petersen 2009:193). From the literature review, it appears that the close of the *latte* phase in the Marianas gradually occurred from the time of arrival of the Europeans and onward. The process of Christianization led to cultural conflicts and profound socio-cultural changes for the Chamorro people.

Prior to the drastic changes brought about by the arrival of Europeans in the Marianas, it appears that the cultural rules that governed *latte* house construction seemed to have been conservative across an extensive span of time. Overall, *latte* houses did not appear to undergo significant changes or transformations from the middle 1500s through the late 1600s in the Marianas. If any changes occurred, such changes might have been in the number of rooms within the living house, to accommodate demographic changes. Until the depopulation of the Marianas occurred owing to factors including warfare and diseases that came with the Europeans, the population size of the Marianas has been estimated to be quite substantial, with various estimated figures ranging from approximately 20,000 to more than 70,000 (Coomans 1997; Driver 1993: 21; Hezel and Driver 1988; Rogers 1995: 47, 70-71; Russell 1998; Underwood 1976).

The intra-site similarity of *latte* could well have been linked to the cooperative work pattern of construction as mentioned by Juan Pobre. The basis for the cooperative work pattern could have been through kinship or bounded groups based on some common thread. Such communal groups possessed not only the necessary technical skills for house construction, but also architectural design trajectories as part of their inherent intellectual and cultural property. Extra tools necessary for subsistence economy required space for storage within the *latte* house.

The size of the floor space inside the *latte* house must have been closely correlated with the number of stone pillars that had to be set in the ground. The inter-site variability in *latte* stone morphology was most likely influenced, in part, by the variability in design trajectories and the mental template of *latte* among different communal groups. Other factors such as the availability and variety of raw materials may have influenced the sympatric variability in *latte* stone morphology. The chronological age of *latte* must also be considered in interpreting the variability of *latte* stones across a span of time.

By the middle 18th Century, the utilization of *latte* structures appears to have completely ceased. In 1742, no wooden super-structures above stone pillars could be seen on the island of Tinian, when Lord George Anson and his ship *Centurion* and the crew spent two months on the island. An officer aboard the *Centurion* illustrated a set of 12 tall *latte* pillars, all standing and each having its capstone in place on top of the corresponding upright. The illustration most likely depicts the well known House of Taga *latte* site on Tinian when all *latte* stones were still standing. The illustration also depicts a watering hole, a breadfruit tree with several fruits hanging from the tree branches, and a number of tall coconut trees in the surrounding areas. The scene depicted is quiet and devoid of local people, as the island of Tinian had been depopulated some 50 years prior to the arrival of the *Centurion* in 1742 (Russell 1998; Walter 1974). During his tenure as a German Colonial District Officer, Georg Fritz wrote that, in 1855, nine of the 12 *latte* columns at the House of Taga on Tinian stood upright (Fritz 1989).

By the time the corvette *l'Uranie*, which was commanded by Louis Claude de Freycinet, made an extended stay in the Marianas in 1819, the original integrity of the traditional *latte* architecture seemed to have been reduced to mere memory. Laura Thompson (1940:461) wrote that "... since Freycinet visited Guam 150 years after the advent of the missionaries, it is unlikely that correct information concerning technical details was available."

In Freycinet's account, the ruins of *latte* were termed "casas de los antiguas", meaning the "houses of the ancients" (Freycinet 2003:114). In a sense, the remnants of the *latte* were transformed to become a silent link to the ancestors. The expression by Coulaud (1982) may be applicable to the remains of *latte* houses, i.e., that they represent the intersection of "the visible and the invisible worlds."

At a very tall *latte* stone ruin, presumably the House of Taga site on Tinian, seven of the columns remained standing (Freycinet 2003: 113). A sketch of a *latte* appearing in Plate 81 in Freycinet's account resembles an A-frame house. Also illustrated in Plate 81 are contemporary buildings, the early 19th Century vernacular architecture of the Marianas. These buildings had embraced new architectural designs introduced or influenced by the Spanish Colonial powers. Freycinet (2003: 115) wrote: "Houses of this kind, as one sees, are supported by neither pillars of masonry nor piles ...." Though the "modern" house was



described as an “imitation of a European house,” it is plausible that certain architectural design concepts of the pre-European *latte* houses might have persisted.

Freycinet’s description of the “modern house” is given as follows (Freycinet 2003:114):

As in the dwellings already discussed, its floor is raised above ground level, but only by two or three feet. In shape, the structure is rectangular, 18 feet long and 10 feet across, and divided into two unequal parts of areas. One of these, which is half the size of the other, constitutes the sleeping quarters of the heads of the family. It is next to the principal room, to which a door leads in. Two little windows permit the entry of air and light. This room is, at once, a sitting room, a dining room and a bedroom for children. It receives daylight through two side doors or exits, both provided with ladders or steps, built of wood like the rest of the structure. The roof is covered with palm leaves, placed tightly enough together to prevent any water from entering. Even today, the kitchen is outside and a little removed from the dwelling itself. The native hearth consists of a few stones on which pots may conveniently be set, and all is covered by a light roof, held up by a few poles in the ground.

Such features as the raised floor directly above ground, rectangular house shape, small windows, the use of ladder, and a detached cooking area with hearth stones appear to be some possible pre-European architectural design concepts that were carried over to the modern living Chamorro houses of the Spanish Period in the early 19th Century. Historical continuity is one of the important factors that determines architectural form, and “continuity can be surprisingly strong and must be significant in any attempt to explain house forms in the Austronesian world” (Waterson 1997:73). Perhaps within the framework of conservatism and newly introduced foreign ideas, the Spanish colonial power continued to play a major role in transforming the local architectural styles until the demise of the Spanish colonial rule at the end of the 19th Century. Houses that featured *bodega* (a cool cellar under the house floor) and buildings made of *manposteria* (coral masonry) gained popularity during the 19th Century. Some of these structures have survived into the present century in the Marianas.

One of the oldest extant photographic plates made in the Marianas is by French naturalist Antoine-Alfred Marche at Astaga [As Taga, i.e., The House of Taga] in 1888. The photograph shows at least five *latte* columns standing (Marche 1982). Georg Fritz recorded that, in 1900, five of the 12 *latte* columns at the House of Taga remained upright (Fritz 1989: 21–22). When Hans Hornbostel carried out extensive archaeological investigations of the southern Mariana Islands under sponsorship of the Bernice B. Bishop Museum in

Honolulu, Hawaii, in the 1920s, only two of the 12 *latte* columns were standing. At the present time, just one of the 12 *latte* columns at the House of Taga remains in its original upright position. The capstone of the single standing *latte* column at the House of Taga is only partially intact.

Contemporary thinking suggests that many of the *latte* stones appear to have toppled over from natural causes, especially earthquakes. Perhaps when house structures deteriorated and were not replaced on top of the *latte*, the loss of the central weight of the raised house made the *latte* below more vulnerable to earthquake damage. As time elapsed since the end of the *latte* phase in the Mariana Islands, the number of standing *latte* columns at the House of Taga gradually decreased. This might be construed as a measurable quantitative indicator of *latte* site deterioration (Figure 2), accompanied by the gradual loss of memory and knowledge concerning ancient *latte* structures. Figures 3 and 4 illustrate the remains of *latte* stones at the House of Taga Site on Tinian.

### **Previous and Recent Attempts in *Latte* Reconstruction**

Some concerted attempts to reconstruct the appearance of the *latte* structure merit careful consideration. Noteworthy among the serious attempts to graphically reconstruct a *latte* structure include detailed line drawings by American architect William Morgan (1988); a line drawing by Chamorro artist Noel Quitigua (in Russell 1998); and an illustration used as cover art in a popular local education book (Cunningham 1992).

The most elaborate graphic reconstruction of *latte* structure is a set of architecturally plausible models prepared and presented by American architect William Morgan (1988). Based upon his empirical knowledge of traditional architecture of Micronesia through his direct field observations, archival records (Kubary 1889, 1895), archaeological considerations (Spoehr 1957; Thompson 1932, 1940) and creative imagination of his own, Morgan proposed several possible types of *latte* structures: a) the Pyramidal Model, b) the A-frame Model, c) the Perimeter Extensions Model, and d) the Traditional Meetinghouse Model.

Among these proposed models, Morgan suggested that the “Traditional Meetinghouse Model” best approximated the ancient *latte* structure. Morgan’s Traditional Meetinghouse Model incorporates the 12-column *latte* set at the famous House of Taga site on Tinian as foundations for a wooden superstructure with a raised house floor, some 16 feet above ground. According to Morgan’s model, the wood-framed superstructure is protected by a steep thatched roof; supported by transverse wooden beams sitting on top of pairs of *latte* capstones; reinforced by walls made of plaited split bamboos; and equipped with wall portals to permit the flow of air for ventilation. Morgan (1988: 133) made an estimation of the floor measurement to be approximately 21 by 64.3 feet or 1,350 square feet. The roof gable projects outward at both ends, simulating distinctive

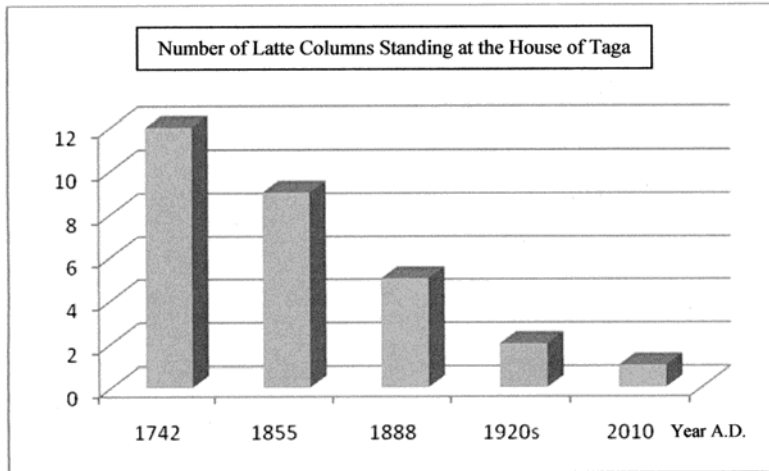


Figure 2. Diagram showing the decreasing number of standing *latte* columns at the House of Taga Site on Tinian, Commonwealth of the Northern Mariana Islands.

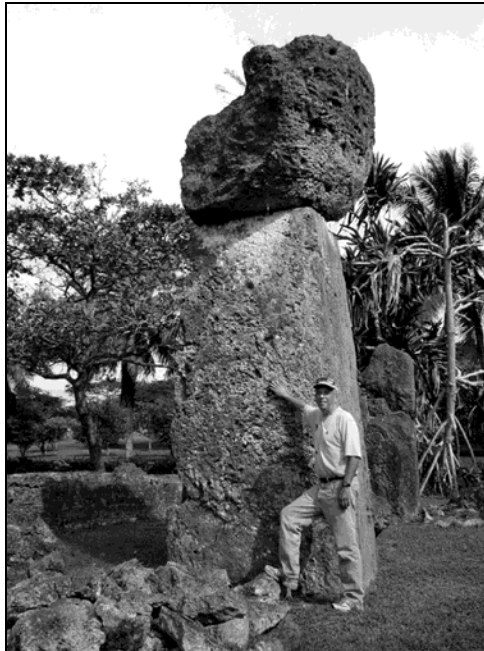


Figure 3. The Single Standing Latte Stone at the House of Taga Site, Tinian, Commonwealth of the Northern Mariana Islands (photographed by Hiro Kurashina).



Figure 4. Panoramic View of the House of Taga Site, Tinian, Commonwealth of the Northern Mariana Islands (photographed by Hiro Kurashina).

traditional roof designs as seen in western Micronesia (Kubary 1895) and some parts of Indonesia such as Sulawesi and Sumatra (Dawson and Gillow 1994). Morgan described the function of the main beams of the wood platform as stabilizers for the capstones which were positioned on top of stone shafts. Morgan estimated the weight of each shaft to be approximately 14 tons based on a coral density of 130 pounds per cubic foot (Morgan 1988: 134).

According to a Chamorro legend, Chief Taga buried his daughter in the rectangular cavity intentionally carved into the top of one of the large capstones at the House of Taga site (Russell 1998:22). The presence of human remains inside the cavity was recorded by Spanish Governor Felipe de la Corte who examined the cavity upon his visit to Tinian in 1855 (de la Corte 1970).

An artistic depiction of a ten-column latte house illustrated by Noel Quitigua (in Russell 1998:98) represents a straight-on view of a *latte* house. The wooden superstructure has a high pitched roof. Wooden tree trunks in their natural shape define the basic structural framework of the superstructure. Wooden poles are placed across on top of the capstones and they provide the base for the superstructure. Floor beams span from capstone to capstone. A window is present which has three horizontal bars. Lashings, presumably made of coconut fiber, are extensively utilized to hold together beams, poles, and other structural elements. The entrance to the *latte* house appears to be through the bottom floor of the superstructure via a ladder.

The line drawing of a *latte* house on the cover of Cunningham's (1992) book is credited to Noe Pegarido and shows a 12-column *latte* house with a superstructure having a high pitched roof. Using William Morgan's typological system, it would be considered to be a traditional meeting house. A column and beam frame structure sits atop the house enclosure with rafters and purlins. A series of horizontal wooden pieces are situated across the capstones, serving as the base of the superstructure. The oblique view of the house depicts two entrances along the long side and one entrance at one of the end walls. Wooden poles with notches which serve as steps are shown as ladders for the entrances.

Over the years, various *latte* replicas based on the artistic license of modern builders have been constructed at a variety of locations on Guam and in the Commonwealth of the Northern Mariana Islands (CNMI). On a small scale, a detailed *latte* reconstruction model that was created by Noel Quitigua is on display at the CNMI Museum of History and Culture on Saipan. It represents an 8-column *latte* structure with the super-structure yet to be built. The scale model, work on which is still in progress, is meticulously made and displays possible activities that might have taken place in the vicinity of a *latte* house. A canoe, *lusong* (stone mortars), pottery vessels, fishing implements, and the like are found in the spaces between reproduced *latte* stones.

Among the latest *latte* replicas being constructed is a canoe house, known as “Guma’ i Latte Sakman,” at Ypao Beach in Tumon Bay, Guam (Matthews 2009). The house is an A-frame structure with 10 reproduced *latte* columns. Each *latte* column will measure 12 feet in height. The structure which will be 39 feet high is designed to house a *proa* (canoe) named the *Saina Sakman*. The blessing of the site for the proposed canoe house took place on 18 October 2009 in conjunction with the 22nd Guam Micronesia Island Fair held at Ypao Beach Park. Project Manager Ron Acfalle and Luta (Rota) Mayor Joseph Inos led the blessing of the site together with performers of the Chamorro dance troop “Pa’a Taotao Tano.”

### **Possible Origins and Relationships of *Latte* with Insular South East Asia**

From the ongoing discussions of the *latte* of the Marianas, it is becoming clear that some of the architectural design elements possess intrinsic concepts that can give clues as to their origins. In the following sections of this paper, the relationships between the Marianas and Insular Southeast Asia are explored, aided by some early historical accounts and the latest human biological data involving mtDNA genetic research. Academic contributions within sociology are also incorporated.

Regarding the origins of the Chamorro people, Garcia wrote as far back as the 17th Century that “... They preserve their history in their memories, if you can call this mixture of fables history in their memories, and this contains the belief that they came from the south and west. The similarity of their skins and language, their color, the custom of blackening their teeth, and their mode of governing, or the lack of it, suggest that they have the same origin as the Visayas and the Tagalogs...” (McDonough 2004: 167).

During recent communications with genetic anthropologist Koji Lum of Binghamton University (SUNY), he graciously shared his unpublished updated research information regarding the origins of the Chamorros, as follows (personal communications with Mike Carson and Rebecca Stephenson 2009):

So in summary, we have known for a while that 89% of Chamorros were unlike other Pacific Islanders and these we now link specifically to

the Sulawesi/Sumba/Philippines and we now know that the 11% of Chamorros that we used to think were identical to other Micronesians are also distinct and unique to the Marianas. Thus, in terms of their mtDNA, Chamorros are almost completely unlike any other Pacific population suggesting an independent origin directly from ISEA followed by minimal gene flow from other archipelagoes except in Saipan where we see a pattern consistent with historical resettlement and admixture with Carolinians. I think the emerging genetic pattern is consistent with similar patterns of linguistic and material culture distinctiveness.

According to the most recent genetic research data based on mtDNA studies, Koji Lum has narrowed the geographic homelands of the Chamorros to three geographic areas in Insular Southeast Asia, namely, from the north to the south, the Philippines, the islands of Sulawesi, and Sumba in Indonesia. Looking at the map presented in Figure 1, these three geographic areas are aligned near 120 degrees East Longitude, forming a north-south axis. In some ways, these geographic areas represent an almost ready gateway to the Pacific. Lawrence Cunningham (personal communication 2010) indicates navigation would have been relatively easy on board classic ocean-going canoes with sails, utilizing winds from east-northeast. In the following sections of this paper, the extant traditions of pile structures and megaliths are examined as found among three cultural groups, namely, Ifugao in Banaue, Philippines; Sumba in Indonesia; and Sulawesi in Indonesia, within the ethno-historic contexts of each group.

### **Pile Structures and Ifugao Houses (*Bale*) in Northern Luzon, Philippines**

In the preceding sections of this paper, various attempts were described to reconstruct *latte* houses on a visual basis, primarily guided by educated hypotheses, and highlighted by imaginative artistic license. Ethnographic aspects of Ifugao architecture that have been carefully recorded by Yale anthropologist Harold Conklin merit clear consideration (also cf. H. Otley Beyer 1887). Although the famous Ifugao rice terraces with stone facings represent an expression of megalithic tradition in and of themselves, a closer examination seems appropriate of Ifugao houses built on wooden pillars resulting in a design similar to *latte* stones. This is undertaken in light of recent DNA research conducted by Koji Lum of Binghamton University (SUNY) regarding the genetic origins of the Chamorro people of the Marianas.

The most representative architecture, besides the famous rice terraces (Villalon 2008) in Ifugao in the Cordillera Administrative Region of northern Luzon, is the *bale*, which provides a fusion of storage and living space. The *bale* is a wooden house with a raised floor supported by four distinct wooden posts

(Conklin 1980: 5). The wooden posts that are called *haligi* are shaped rather like the *latte* of the Marianas. The upper portion of the *haligi* is a circular wooden disc. The disc and the shaft may be hewn from a single log. The disc might be quite thick in appearance, as seen in Plate 54 and Plate 61 in Harold Conklin's monograph (1980:12–13). These typically serve as rat-guards to protect the grain stored inside the *bale*. The *bale* supported by robust wooden posts in Ifugao may be large in size, and the space under the raised floor can comfortably accommodate as many as 15 adults, as in Conklin's Plate 54. The wooden disc may in some cases appear thin, and it can wrap around the shaft as a separate piece, as in the *bale* photographed in 2007 in Banaue (Figure 5). The height of the *haligi* in Figure 5 is approximately 150 cm. The roof is thatched. In reference to the word *haligi*, it appears to be linguistically linked to the Proto-Malayo-Polynesian word for the house post, “\*hudiRi” which is akin to the Proto-Austronesian word for the house post, “\*SudiRi”, as described by Pawley (2007: 28). As previously mentioned, the Chamorro word for the stone shaft that supports the capstone is *haligi*. It might be interpreted that Chamorro and other languages using *haligi* are incorporating Proto-Malayo-Polynesian cognates shared in a broad region of Proto-Malayo-Polynesian language communities.

Conklin described the *bale* as a dwelling and storage place (i.e., granary) for a nuclear family. As expected from the presence of the extraordinary rice terraces in Ifugao, rice is the main staple food item. Pounding of rice using a stone mortar and wooden pestle can take place under the overhang of the roof of the *bale*, as in Conklin's Plate 48. Rice, as well as sweet potatoes, taro, maize, millet, yams, and manioc, are consumed as starch staples. A variety of side dishes are consumed, including shellfish, chicken, pork, carabao, fish, ducks, birds, and a number of plant food items. As containers, earthenware vessels are made by specialists in pottery making, using local clay.

The social and economic standing of individuals is determined by the quantity and type of animals sacrificed at rituals and for prestige feasting. Rituals are linked to calendric rites associated with rice cultivation and consumption, and non-calendric rites such as death. The venue for religious rituals is usually inside the house or under the house or granary. The duration of rituals can vary from a few hours to many days. Funeral observances and the sacrifice of animals take place during religious rituals around the *bale*, as portrayed in Plates 54 and 61.

Figure 6 shows an architectural sketch of a wooden post (*haligi*) of an Ifugao *bale*, illustrating various components of the wooden column (*haligi*) which supports the house floor and its beam. No metal nails are used in the construction of the traditional Ifugao *bale*.

Earthquakes of considerable magnitude occur in this region of the Philippines. For example, one of the most recent earthquakes occurred in 1990. The earthquake was so severe that some of the stone-lined rice terraces in Ifugao sustained major damage. According to Augusto Villalon (2008), the severe 1990

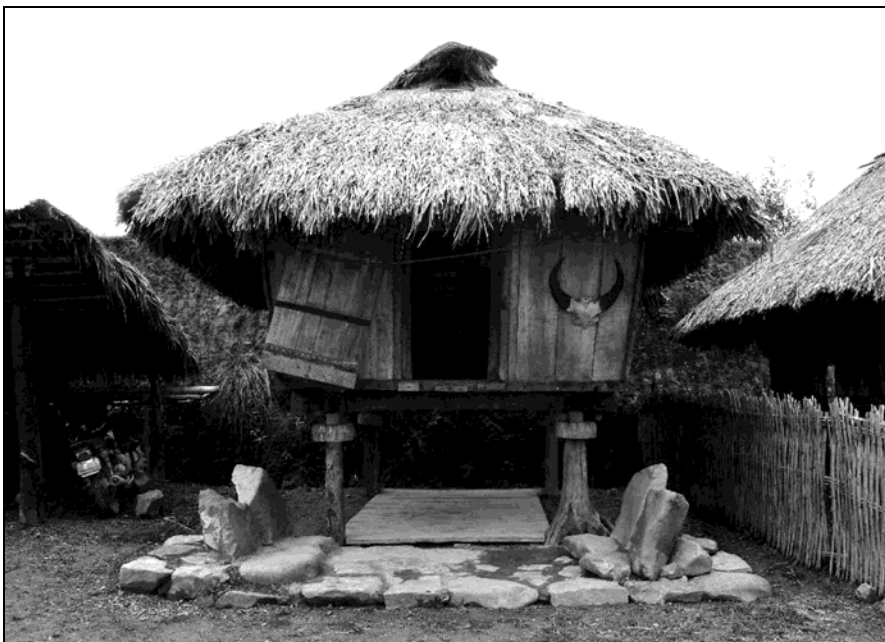


Figure 5. Ifugao *bale* (house) in Banaue, Northern Philippines, 2007 (photographed by Hiro Kurashina).

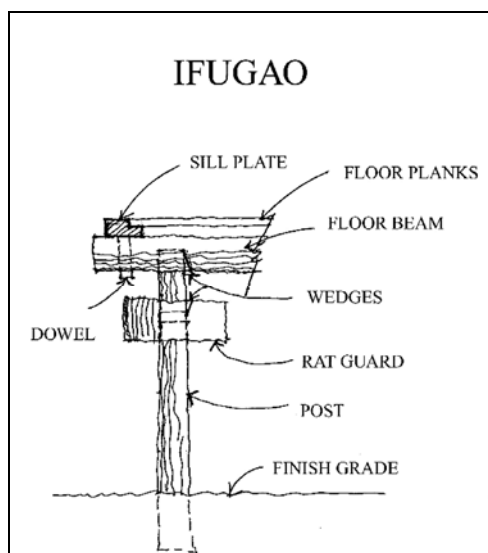


Figure 6. Ifugao *bale* column and beam structure (illustrated by Andrew Laguana, AIA).



earthquake yielded no recorded damage to traditional wooden houses. Villalon explained that the traditional Ifugao *bale* are designed to be sympathetic to earthquakes. He further stated that non-traditional concrete structures showed signs of damage.

Despite the earthquake-resistant design, the traditional wooden *bale* with *haligi* of Ifugao began gradually to be replaced by non-traditional concrete houses in the 1970s, and the trend has escalated in recent years. In addition to deforestation that has caused a shortage of natural wood construction materials, there is a “local perception that traditional houses are a symbol of poverty and ‘new’ concrete houses are a symbol of modern prosperity” (Villalon, personal communication with Rebecca Stephenson and Hiro Kurashina 2010).

Regarding the antiquity of the famous rice terraces of Ifugao, the present authors are aware of the wide range of age estimates. The radiocarbon dates being obtained at present for that location promise to shed new lights on the temporal framework, according to one of the co-authors of this paper, John Peterson (see Peterson, this volume).

Morphological variations of wooden *haligi* certainly exist among the extant Ifugao *bale*. With the exception of a few historically photographed wooden *haligi* of Ifugao *bale* (e.g. Conklin’s Plates 54 and 61), the wooden *haligi* of Ifugao *bale* complete with associated wooden rat guards tend to be less robust in appearance in comparison with the megalithic *latte* of the Marianas. Some of the rat-guards are thin circular wooden discs which wrap around the top portion of the wooden post, exposing the protruding top end of the post as in Conklin’s Plate 25. With some of the *haligi*, no protrusion is present at the top of the rat-guards as Conklin’s Plate 61.

Pile-built structures similar in architectural design to the Ifugao *bale* exist in the southwestern islands of Japan, including the Ryukyu (Okinawa) Islands, in the form of granaries, *takakura*, (Sato 1991; Hiro Kurashina, personal observation, June, 2010). Okinawa is situated approximately 900 miles north-north-east of Luzon in the Philippines. The architectural designs of the granaries found in Okinawa are quite similar to the general structural design of the *bale* among the Ifugao of the Philippines in several respects. The common architectural features include: a) wooden posts as foundation pillars, b) rat-guards placed at the top of the wooden pillars, c) raised storage area above the rat guards, d) thatched near-pyramidal roof, e) upwardly widening side walls, f) lack of windows, g) entry via a wooden ladder to the raised entrance with the door at the front of the structure. It is interesting to note that the rat-guards observed in the Okinawan granaries are square wooden plates. In Southeast Asia, the rat-guards are frequently shaped as circular discs.

Figures 7 and 8 show a six-pillar granary and a nine-pillar granary as standing in June 2010 at the Native Okinawan Village inside the Ocean Expo Park in Motobu Town situated northwest of Nago City in Okinawa. Hiro

Kurashina visited this display and studied its details. The six-pillar granary is modeled after a granary that still stands in the village of Ogimi. The other nine-pillar example is a reproduction of a granary in the City of Nago in Okinawa.

### **Megaliths (*Rati or Rate*) in Sumba, Indonesia**

A literature review concerning the culture and history of Insular Southeast Asia has revealed insights that provide corroborative information concerning the relationship between the Mariana Islands and Insular Southeast Asia, including Sumba. Sumba is one of the Lesser Sunda Islands in the southern Nusa Tenggara Timur province of eastern Indonesia. The island of Sumba is situated across the Sumba Strait from Flores, which is to the west of Timor across the Savu Sea. Sumba has a land area of approximately 4300 square miles with a population of some 600,000. The highest peak of the island reaches 4000 feet above sea level.

Although the prehistory of the East Timor region extends to the upper Pleistocene around approximately 35,000 B.P. (O'Connor et al. 2002) and similar antiquity has been reported on Flores (Morwood et al. 2004), no Pleistocene sites have yet been discovered on Sumba itself to date. Wet rice cultivation is practiced utilizing river-fed irrigation systems. Dry rice is also cultivated in some parts of Sumba. Rice is the traditional food item used for feasting (Adams 2007: 59). In Sumba, the tradition of building megalithic stone tombs continues today and it has been carried out for a considerable time depth.

A recent ethno-archaeological study conducted by Ron L. Adams focused on the megalithic tradition of West Sumba in Indonesia. Adams (2007:iii) stated: "The construction of megalithic tombs has occurred for hundreds of years on the island of Sumba." Though the precise date for the initial construction of megalithic tombs on Sumba is unknown, Adams (2007:51) proposes that the appearance of megalithic tombs on Sumba overlaps in time with the megalithic tombs of Java and Sumatra during the latter half of the first millennium (see Bellwood 1997:287-290). In his dissertation, Adams (2007:136) states that "only individuals of the noble class could be interred in stone tombs."

Several types of stone tombs exist in Sumba. One type of stone tomb consists of a capstone which is supported by 4 or 6 or 8 stone columns (Adams 2007:139, 163). The columns which are referred to as legs by Adams (2007:139) are about 1 m in height and 50 cm in width. The capstone in the form of a stone slab is said to be as large as 2-3 m long and 1-2 m wide. The type of stone used for the megalithic tombs in Sumba is limestone. According to anthropologist Webb Keane (1995), stone tombs known as *rati* in the local dialect are found where he conducted his field research in Sumba.

Two of the co-authors of the present paper (Harya Putra and Hiro Kurashina) traveled to West Sumba in May 2010 to visit some of the traditional villages, to obtain information regarding the megalithic tombs. The villages they



Figure 7. Six-pillar Okinawan granary (photographed by Hiro Kurashina).



Figure 8. Nine-pillar Okinawan Granary (photographed by Hiro Kurashina). Square wooden plates atop the wooden pillars serve as rat-guards.

visited included Tarung in Waikabubak, and Anakalang in the interior region of West Sumba. In addition, a brief visit was made to the village of Wannu Karedi near Waikabula, near the northwestern coast of West Sumba.

According to local informants, Tarung in Waikabubak is the highest ranking village in West Sumba. More than 100 megalithic tombs exist at Tarung, including at least 11 megalithic tombs with capstones supported by stone columns. In the local dialect of Tarung, the stone columns are known as “*parii*” or “*watu parii*” (stone = *watu*) column (*parii*).

While stone tombs in Anakalang are known as “*rati*” in the local dialect as reported by Keene (1995), Putra and Kurashina learned through oral interviews with local informants at Tarung that an equivalent word in the local dialect of Tarung in Waikabubak is “*rate*”. The informants in Tarung explained that “*rate*” is an old word that refers to “a space or a place where the dead are buried” or a “place for the dead person” (“*rate ata mate*” = a place for the dead person).

In some parts of the Pacific-Asia region, the differentiation of the sound of “r” and “l”, of which the former is a liquid sound in linguistic terms, is often obscure. Given the intrinsic phonological ambiguity between “r” and “l”, the terms “*rati*” and “*rate*” in Sumba are phonetically quite similar to that of *latte* in the Marianas. The meanings of “*rati*” and “*rate*” in two dialects in Sumba, “stone tombs,” or “a space or a place where the dead is buried” are of considerable interest to the present authors from the perspectives of Mariana Islands archaeology.

In addition to historic documentation (Driver 1963), field archaeological excavations carried out in the Marianas have revealed that the ancient Chamorros buried their dead under or near the *latte* houses, typically in between the *latte* columns or in front of the *latte* houses. The spatial association of *latte* with human burials in archaeological contexts was reported as early as the 1920s in the Marianas (Hornbostel n.d.; Thompson 1932).

In Sumba, the ancestral house, which is a pile structure, is called *uma* (Adams 2007:81). In the Chamorro language of the Marianas, the word for house is *guma*. One can readily appreciate the apparent linguistic similarity between the two words. Could the Chamorro word *guma* have a socio-cultural connotation as being an ancestral house, as with the *uma* of Sumba?

In terms of linguistics, *uma* and *guma* appear to be intimately related to the Proto-Malayo-Polynesian word for house, \**Rumaq*, which coincides with the Proto-Austronesian word for house, \**Rumaq*, according to Pawley (2007:28). The word \**Rumaq* differs from the Proto-Malayo-Polynesian words, \**balay*, meaning “open-sided house and, \**udug*, meaning “temporary hut”. Perhaps the Chamorro “*guma*” and Sumbanese “*uma*” are cognates of Proto-Austronesian and Proto-Malayo-Polynesian \**Rumaq*, referring to “house (with walls)”. Various Austronesian words that relate to house are discussed in more detail by Fox (1993).



Figure 9. Megalithic tombs (*rate stones*) in front of high-peaked traditional houses at Tarung, Waikabubak, West Sumba, Indonesia (photographed by Hiro Kurashina in May, 2010).

With regard to the spatial positioning of megalithic tombs in Sumba, Waterson (1997:210) indicated that “graves occupy prominent positions in front of the houses, suggestive of the close relations that exist, in the traditional world view, between the dead and the living.” The digital image of megalithic tombs recorded by Kurashina (Figure 9) illustrates the megalithic tombs in relationship to the traditional thatched-roof houses in the village of Tarung in Waikabubak.

According to local informants who were interviewed by Harya Putra, one or more individuals may be buried in a megalithic tomb, for example, husband and wife. Usually, the dead people are buried wrapped in a piece of locally woven *ikat*. The body is buried in a fetal position. The traditional burial goods consisted of prestigious ornaments such as gold, and other metal necklaces and bracelets. Offerings to the occupants of the megalithic tombs typically include betel nuts.

Many local people in Sumba chew betel nuts, both dry and fresh, mixed with lime and pepper. Sliced dry betel nuts were seen for sale in substantial quantities at a Saturday morning market in Waikabula. It is interesting to note that the custom of chewing dry betel nuts rather than fresh ones is a culturally preferred practice common among the Chamorros of the Marianas.

The high-peaked traditional houses in Sumba are visually quite impressive. The space within these houses is divided into 3 levels: a) the highest portion,

reserved for the animistic local religion and storing of food (e.g., rice and corn), b) the middle portion, the space for humans for cooking food, sleeping, and other household activities, and c) the pen under the living space utilized for keeping animals, such as pigs and chickens.

The highest portion of the high-peaked traditional houses thus serves a dual purpose, accommodating a sacred religious space for the *marapu* ancestral god as well as the granary. Four massive wooden pillars (*parii*) can be seen inside the tri-level house. Along the parameter of the roof, relatively thin wooden posts with rat-guards are present in some, but not all, of the houses.

The rat-guards are in the form of circular wooden discs positioned near the top of the posts, which support the house beam just below the roof (Figure 10). Rat-guards protect the food items kept inside the food storage area. Since the food storage area or a granary is situated above the living space, the positioning of the rat-guards near the top of the posts which support the roof appears logical.

As an expression of displaying the sign of prestige, water buffalo horns decorate the exterior wall around the main entrance to the high-ranking houses. The cultural emphasis placed on water buffalo horns is also evident in other parts of Insular Southeast Asia, including the Tana Toraja of Sulawesi.

### **Megaliths (*Rante*) in Tana Toraja, Sulawesi, Indonesia**

According to Ron L. Adams (2007), megaliths are found in central Tana Toraja, which represents one of the most productive paddy rice cultivations areas in the region. Adams (2007:250) describes the megalithic stone monuments of Tana Toraja as follows:

Standing monolithic stone funerary monuments (*simbuang batu*), which generally stand between about one and five meters above ground, were traditionally (and on rare occasions are still) erected as a part of these large funeral feasts. In most parts of central Tana Toraja, erecting megaliths requires the slaughter of at least 24 water buffaloes. The desired shape of *simbuang batu* megaliths is that of a menhir [in architecture, a single standing stone monolith, rough and squared, tapering toward the top] with the top narrower than the base. Some examples of these stones are quite rough and appear to have been shaped very little or not at all, while others are cut into an almost prismatic shape.

For funeral feasting, there must be a minimum of five megalithic monuments which can be erected in a circular pattern, in a linear formation, or without any regular formational pattern. Although these megalithic monuments are not directly built where the burial is, the monuments are erected at the



Figure 10. Rat-guards in the form of thin circular wooden discs near the top of carved wooden posts that support the horizontal beam below the roof at a traditional house in Anakalang, West Sumba, Indonesia (photographed by Hiro Kurashina in May, 2010). The thatched roofs are replaced by corrugated tin roofs in some of the modern houses observed.

feasting plaza, ordinarily situated in the outskirts of the hamlet where the deceased lived (Adams 2007:253). What is significant is the association of megalithic columns with funerary rites in Tana Toraja.

In the traditional structures of the Tana Toraja, the open platform space beneath the floor of the impressive pile building is used for relaxing, social activities, or the performance of various tasks (Figure 11). The open platform space serves as a sitting place for privileged or high-ranking guests at times of rituals. High-status houses acquire prestige from myths linked to founding ancestors, as well as the sacred power of family treasures that include beadwork and other precious artifacts (Waterson 1997:56, 165).

Sociologists Todd and Ann Ames conducted field research in Tana Toraja in 1994 and in 2000. According to T. Ames, in Tana Toraja, the term *rante* traditionally refers to the site of the megalithic stones that are raised in connection with *aluk to dolo* (traditions of the ancestors) funerals. *Rante* stones are large, rough-hewn stone monoliths which are erected as memorials to the

deceased (Figure 12). However, Torayan Christians now also use the term *rante* to refer to the central courtyard at their funeral *pestas* (feasts). Ames shares the following narrative concerning *rante* in Tana Toraja, based primarily on his doctoral dissertation (Ames 1998):

While observing a traditional *aluk to dolo* funeral one morning, a procession began to bring the *rante* stone to the *rante* field. The *rante* stone is a hewn or rough stone of varying dimensions. In Tana Toraja, stones might measure as much as a metre and a half across at the base and rising out of the ground for five or six metres. While in a general sense *rante* serves as a memorial, it also may be inhabited by the spirit of the dead, which is the reason why it is said that only the followers of *aluk to dolo* still raised them.

When Ames first arrived in Tana Toraja, he had heard several tourists referring to the *rante* stones as being phallic symbols. At one point he even heard a non-Torayan guide telling a group of international tourists that was what *rante* stones intentionally represented. In all his time in Tana Toraja, and out of the dozens of times he asked this question of local Toraya, all insisted that “no, the *rante* stones were definitely not a phallic symbol.” Like Harry Wilcox (1949:75), who asked the same question over fifty years earlier and received the same answer, there appears to be no support for the idea that the stones are phallic symbols, according to Ames.

Ames noted that bringing in the *rante* stone was a major effort. Forty men pulled on three bamboo poles attached to the stone. The stone was about four meters long and two-thirds of a meter across. While the men struggled to drag the stone over the dry *sawah* (harvested and currently unused rice field) below the hillside of the *rante* site, a number of men including several elderly men broke out in spontaneous *sisemba'* (kickboxing matches). *Sisemba'* is considered to be an important indicator of high-status funerals. This *sisemba'* was much more good-natured and less serious than many others may be. Breaking off the *sisemba'*, the men made a massive effort and dragged the stone another 30 meters before they all stopped to chant and dance again. Ames continues:

By mid-day, the men had reached the small hill bordering the *rante* field and proceeded to drag the *rante* stone up the incline. One old *nene* (elderly person, gender unspecified) squatting nearby explained that this part of the ritual is called *mangrui' batu* which literally means bringing the stone to the *rante*. In the *rante* field, a small buffalo was waiting to be killed. It had a rattan weaving around its neck as a special *aluk to dolo* decoration.

Another *nene* explained that in former times, to bring the *rante* stone up to the field, only slave people brought the stone, not *to makaka* or *to*





Figure 11. Traditional granary of Tana Toraja in Sulawesi, Indonesia (photographed by Todd Ames).



Figure 12. *Rante* stones of Tana Toraja, Sulawesi, Indonesia (photographed by Todd Ames).

*parengnge'* (the higher-class people). Today all of the social classes work together to transport a *rante* stone.

When asked who was allowed to have a *rante* stone, a relative replied that in order to be able to bring a stone to the *rante* field, the family must be able to kill at least 14 buffalo, and the deceased must be a *to parengnge'*, *to makaka*, or *to biasa*. Even if they had 14 buffalo to offer, people of slave status do not even try to have a stone in the *rante* field because they know this is not allowed and people would be angry with them. Before people make a *pesta* (feast), they know what their social status is and what they are allowed to do and not to do. If a person is of slave status and tried to do something above his class at a *pesta*, that person would be publicly denounced. These responses indicate the continued importance of class status distinctions still existing within *aluk to dolo*.

On the fourth day, at mid-morning, the *to parengnge'* and others had made the *tau tau*, the effigy of the dead man. The *to parengnge'* must hold all the common people to their various activities, as their obligation and special responsibility. After the *to parengnge'* and the *ambe* (royalty) finished the *tau tau*, the *rante* stone was placed upright with one end in the ground, and they built the *bala'kaan* (wooden tower or raised platform from which meat is ritually distributed at a funeral).

Another elderly person at a different funeral stated that the *rante* stone held the memories and impression of the dead person for the family. It was stated that this was an important aspect of the old traditions.

In 2000, according to Ames, there were several instances of people constructing wooden forms that they then filled with concrete mix. After the forms were removed, the faces were chiselled to make them look like traditional natural *rante* stones. This was not undertaken for some new traditional reason. Rather, local people said ... “It [is] just easier to pour concrete mix than it [is] to drag a stone to the site.” Apparently, the new method of making *rante* stones does not alter the ritual or the supernatural functions associated with the natural *rante* stones.

### **Discussion: Concept of *Latte* as a Fusion of Several Optimizing Factors**

Variations of what are generally called “pile buildings” exist in the tropical environment of the Pacific Asia region, including Micronesia and Melanesia (Waterson 1993), and the three Southeast Asian geographic areas discussed above are known for having distinct styles of pile buildings. The *latte* of the Mariana Islands can be understood to be a form of pile building used primarily as

residential units where a number of household activities took place (Dixon et al. 2006; Thompson 1940).

Architecture, in most instances, derives its origins as a direct adaptive response to climate, geography, seismic activity, and environment. In the tropics, in particular, in the locations described in this paper where *latte* stones and similar pile structures exist, the most common characteristic elements are heavy rainfall, frequent seismic activity, high winds such as tropical storms and typhoons, high temperatures, and high humidity. All, if not most, of these elements have become the basic criteria for consideration by contemporary architects in designing structures. The authors suggest that the builders in the *latte* period could well have had in mind the same or similar criteria in trial-and-error fashion for designing and constructing living houses and other related structures (Bayman et al., this volume).

Of particular note, frequent earthquakes and volcanic eruptions occur in the basin of the Pacific Ocean and Insular Southeast Asia, which includes the Marianas Islands, the Philippines, and Indonesia, along with islands such as Sumatra, Java, Bali, Sulawesi, Flores, and Timor. These islands are part of a seismic belt where earthquakes of considerable magnitude have been historically known and recorded, as well as their occurrences in modern times.

The present authors suggest that the concept of the *latte* structure in the Marianas might be viewed as a fusion or hybrid of architectural concepts originating from various parts of Insular Southeast Asia. More specifically, the possible areas that served as sources of influence include Philippines/Sumba/Sulawesi, which have been identified by mtDNA biological studies as having close human genetic relationships with the Chamorros of the Marianas.

To create *latte*, it is highly plausible that several optimizing technological factors were ingeniously merged, infused, or integrated, embracing the use of stone as durable and long lasting raw material, having two-part construction of *latte* (capstone and shaft) to absorb shocks caused by seismic activity, the use of piles or columns for raising the floor to prevent water intrusion in case of high waves, incorporating the capstone that could serve as a rat guard, creating a well shaded and ventilated work area under the raised floor, and so on. The capstone facilitated a wider platform to support the superstructure that rested above. The area below the house floor and between the *latte* columns provided ample space for various activities. Better air ventilation created by the raised house floor was desirable for lowering humidity inside the living house. The area under the house floor was well shaded and also provided a shelter in case of rain. Besides facilitating space for various activities, the area could have been used for storage purposes.

Synthesizing the diverse information presented in the preceding sections of this paper, the concise rubric in Table 1 may be of relevance for analytical consideration.

Table 1. Rubric of optimizing factors of *latte*.

Attribute	Possible Connections
Two-part construction absorbing shocks	Sumba
Use of stone for durability/permanency	Sumba, Sulawesi
General shape of column	Ifugao
Raised floor	Ifugao, Sumba, Sulawesi, and probably others
Rat-guards	Ifugao and possibly others
Burial association	Sumba

It is of great interest that a linguistic similarity is also found for the Chamorro word *haligi* (pillar) within many dialects spoken in the Philippines. The Chamorro word for house, *guma*, is similar to the Sumba word for ancestral house, *uma*. The word in Sulawesi for the effigy of a dead person, *tau tau*, is similar to the Chamorro word *taotaomo'na* which literally means “people of before” (Cunningham 1992:100). Keane (1997:218–219) makes the point that house structures serve as locales where the spirits of departed ancestors maintain identity, meaning and purpose across time and space. House structures, thus, are essentially required most of all because of their links to the past. Further comparative linguistic studies would likely reveal additional insights to the relationships between the Marianas and the three specific geographic areas in Insular Southeast Asia that have been identified by Koji Lum as exhibiting close genetic relationships with the Chamorros of the Marianas.

### **Basis for Reconstructing a Virtual *Latte* Set: Borobudur, Central Java**

In light of the above discussion, linkages between the *latte* of the Marianas and Insular Southeast Asia can be established via several parameters, including human genetics, linguistics, and architecture. Early historical accounts in various languages concerning *latte* houses in the Marianas provide an important basis for reconstructing a *latte* set. Another informative aid is a rare recorded image of a pile-built structure depicted in one of some 1460 stone panels (bas reliefs) at Borobudur in Java, Indonesia (Figures 13 and 14).

Borobudur is the largest megalithic Buddhist temple located in Java, Indonesia. It was constructed during the 8th and 9th Centuries at the time of the Sailendra Dynasty (Lubis 1990; Morton 1983; Soekmono 1976). Poortenaar (2009:54) says Borobudur is the largest Buddhist structure on the planet.



Figure 13. Stone Panel I.b86 at Borobudur, Central Java, Indonesia (photographed by Hiro Kurashina).



Figure 14. A detail view of a pile-built structure in Stone Panel I.b86 Borobudur, Central Java, Indonesia (photographed by Hiro Kurashina).

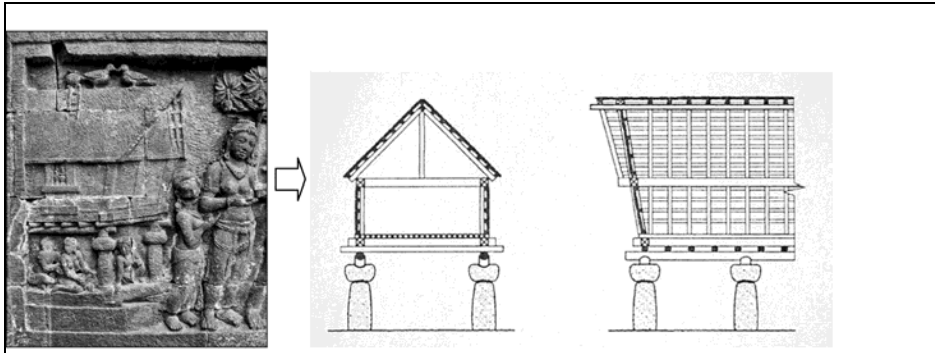


Figure 15. *Latte* architectural model (right) based on Borobudur Panel (left) as interpreted by architect Andrew Laguana, AIA.

The stone panel at Borobudur (Panel Number I.b86) that is of considerable interest to the present authors is situated on the main wall of the First Gallery. It is positioned within the general thematic context of the Avadana (“Heroic Deeds”) series (Miksic 1996). The stone panel (Panel Number I.b86) measures 264 cm in width and 76 cm in height. It depicts a pile-built structure which might represent an ancient *latte* house of the Mariana Islands with robust columns that support the wooden superstructure. A close-up view of the pile-built structure depicted in the stone panel is shown in Figure 14 of the present paper. The house foundation pillars appear rather massive and include thick capstone-like components. Immediately on top of each capstone-like component is a short post-like structure that supports girders spanning presumably to the next pair of pillars. Spanning the girders are equally spaced horizontal crossbeams or floor joists. It appears that the superstructure is a wood frame house and the girders and beams are made of straight log timbers. The roof gable is distinctly angled and projects outward. The inner side of the protruding roof gable partially shows what appears to be the framework of the roof. The roof was most likely thatched. A window is present on the main exterior wall of the wooden superstructure. Adjacent to the pile-built structure, nine people can be seen, as well as a big ocean-going watercraft equipped with masts, large sails, and an outrigger.

With a working hypothesis in mind that the Borobudur panel might be viewed as a pictorial documentation of ancient Indonesian seafarers’ observations during their journey(s) along the Pacific Rim, the present authors applied the image at Borobudur along with other actual *latte* stones still in existence today as a model for reconstructing the virtual *latte* house (Figure 15). Although the number of columns is not fully apparent in the Borobudur panel, the present authors chose to depict an 8-column *latte* structure with characteristics that are described in the historical accounts. The size and shape of the virtual *latte* set are designed to approximate examples of *latte* found in the Marianas.

A detailed examination of the pile-built structure in the panel at Borobudur reveals that decorative motifs such as gable finials appear to be absent. The roof does not appear to be saddle-backed, which is common in Southeast Asia, such as in Tana Toraja. The wooden super-structure is assumed to be assembled using various techniques of joining, mortising, pegging, and lashing without any metal nails. In reference to jointed wooden buildings, Waterson (1997: 78) suggests that such buildings are well adapted to withstand earthquakes. It can be assumed that working on wood was technologically highly advanced, as the indigenous Chamorro people were capable of building sophisticated watercraft. The locally available raw materials must have included a variety of plants, e.g., large trees and their byproducts, such as fibers that could be prepared as cordage.

For the creation of the virtual *latte* house showcased in this paper, a number of architectural and engineering computer programs were used, including AutoCad by AutoDesk to construct the structural framework of the house, AccuRender by Robert McNeel and Associates rendering tools for the material finishes as well as textures and landscape elements, and SmoothMove PanViewer by Informer Technologies, Inc., to pan and engage the various views in and around the structure. Various 3D computer graphics showing the virtual *latte* house from a variety of perspectives are illustrated in Figures 16 through 22.

### Conclusions

In the present paper, the anthropology of *latte*, as a form of vernacular architecture in the Mariana Islands, has been examined by a team of interdisciplinary researchers. Various aspects of *latte* have been explored from the perspectives of architecture, archaeology, cultural anthropology, history and sociology. The present research has revealed a number of findings that provide new insights into the understanding of the *latte*, a unique architectural style which is correlated in geographic distribution with the indigenous Chamorro people of the Marianas Archipelago in the western Pacific region.

As historically recorded in documents as far back as the beginning of the Spanish Era in the 16th Century in the Marianas, the *latte* were described as stone foundations that supported a wooden superstructure placed above the capstones. Documents by multiple observers and writers through the latter part of the 17th Century corroborated that the apparent function of the *latte* was for raising the wooden residential house off the ground. The construction of *latte* stones in the Marianas ceased as a result of warfare and newly introduced diseases that led to substantial depopulation and disruptions within indigenous Chamorro communities during the post Contact period. By the beginning of the 19th Century, the original architectural integrity of the *latte* seems to have disappeared or been reduced to mere memory among the indigenous inhabitants. Up until the

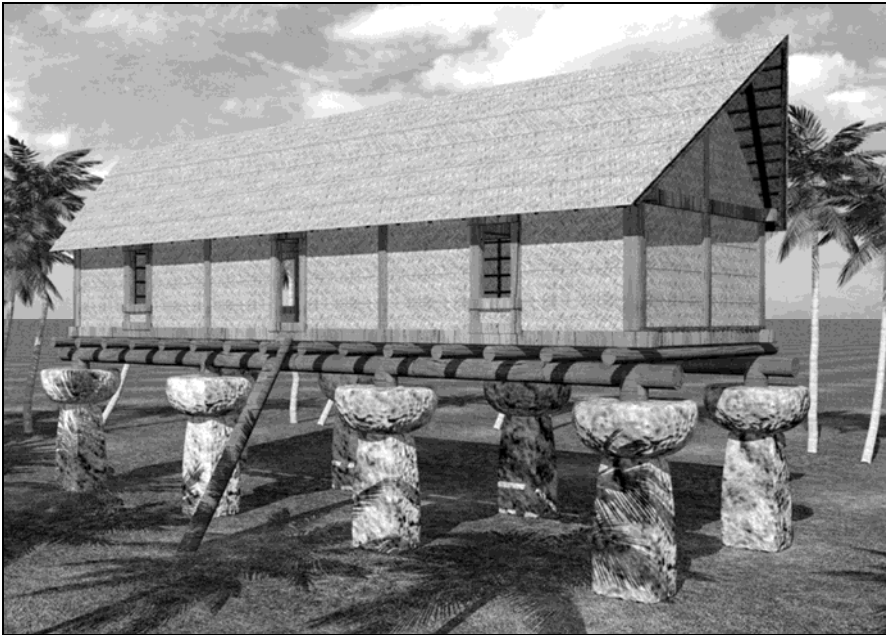


Figure 16. 3D computer graphic image of a reconstructed *latte* house based on architect Andrew Laguana's *latte* architectural model (Figures 16-22 by John Aguon and Andrew Laguana, AIA).



Figure 17. Side view of a reconstructed virtual *latte* house.





Figure 18. Oblique view of a reconstructed virtual *latte* house.



Figure 19. Oblique view of a reconstructed virtual *latte* house.

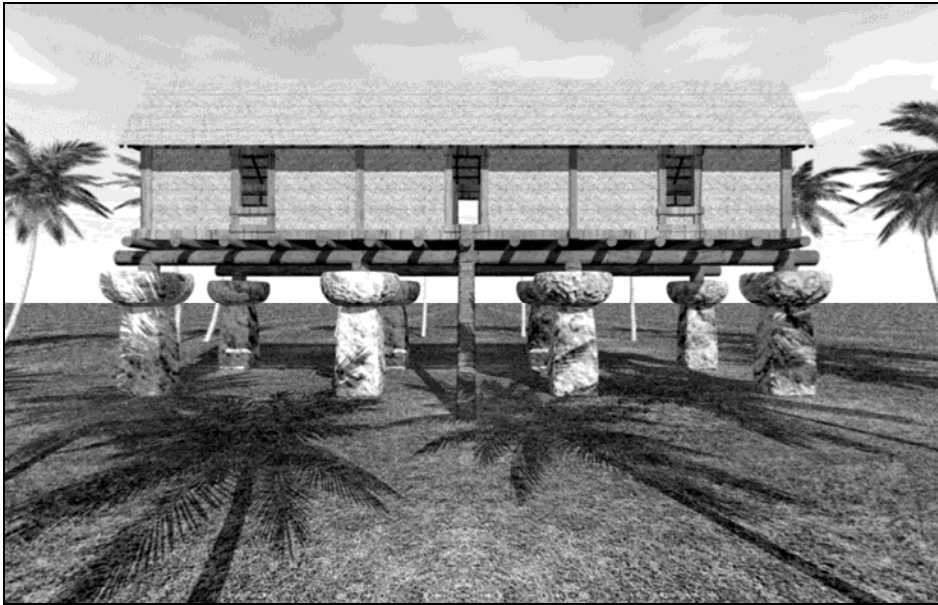


Figure 20. Frontal view of a reconstructed virtual *latte* house.

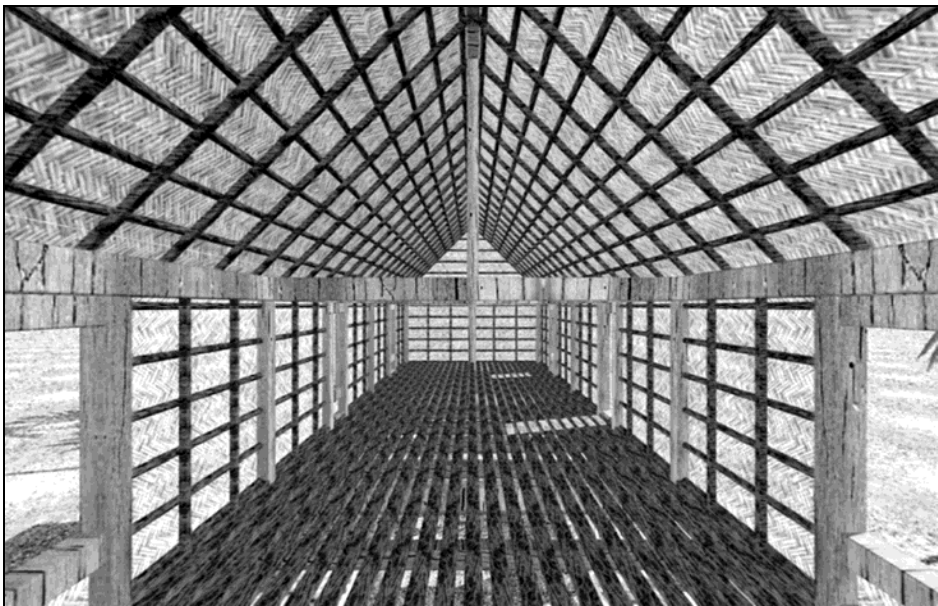


Figure 21. Inside view of a reconstructed virtual *latte* house.



Figure 22. The space under the house floor of a reconstructed virtual *latte* house.

present time, however, the remains of *latte* are perceived as a silent link with the ancient Chamorro ancestors.

Within the present-day context, an awareness of the *latte* as a viable link to the past has inspired artists, activists, preservationists and the like to reconstruct the ancient *latte* in various forms. Creative artistic license and imagination can be seen in some of these attempts in reconstructing the ancient *latte* architecture. The *latte* retains primary significance, in that the present authors support the point of view, in that vernacular architecture embodies anthropological information that may relate to origins of people, migration, technology, symbolism, kinship, social structure, adaptive responses to local environmental conditions, and other significant cultural practices.

In light of modern human genetic research, it appears that the Chamorros of the Marianas are closely related to Austronesian-speaking populations of certain parts of Insular Southeast Asia, including Sulawesi, Sumba, and the Philippines. These specific areas fall within the Ring of Fire where earthquakes of considerable magnitude have been well known to occur. Earthquakes can result in the destruction of houses and other structures. Landslides can occur in areas where topographic conditions are especially vulnerable. Seismic activity of great magnitude can cause significant tidal waves that can be quite damaging for people who inhabit coastal areas. Large-scale earthquakes also occur in the Marianas where the Pacific Plate and the Philippine Plate meet at the Marianas

Trench. Along with seismic activity, the Mariana Islands are also vulnerable to the effects of high winds, as the islands are situated along the typhoon belt.

Archival explorations, aided with field observations, strongly remind the present authors that living houses are commonly designed in adaptive response to prevailing climate, temperature, humidity, seismic activity, and other local environmental and/or sociocultural factors. The present authors suggest that the indigenous *latte* builders must have considered certain criteria in designing their structures in such a manner to respond adaptively to the prevailing tropical climate, seismic activities, and other adverse effects caused by nature, as well as cultural customs, e.g., ceremonial activities.

Working knowledge to date shared among the present co-authors favors the view that *latte* is a form of pile structure that is widespread not only in Insular Southeast Asia but also in Micronesia and Melanesia. In synthesizing the information available, pile-built structures have a number of adaptive advantages that can respond effectively to forces of nature as described within the main text of this paper.

The present co-authors also favor a new insight that the *latte* structure in the Mariana Islands may be analytically viewed as a hybrid of architectural concepts originating from a variety of places in Insular Southeast Asia. The hybridization of numerous ideas, concepts, and architectural design elements are believed to optimize adaptive responses to natural elements. For example, the two-part construction of *latte* may well be an adaptive civil engineering design to absorb shocks from earth tremors and earthquakes. The use of stone may be directly linked to a number of adaptive responses such as weight, durability, permanency, symbolic power, prestige, territorial marking, and aesthetics. The use of stone as a durable material was especially effective for mitigating the strong winds caused by tropical storms and tremors that occur in the course of seismic activities. The capstone was most likely effective for supporting the weight of the superstructure above, as well as guarding the entry of rodents via the pillars. The *latte* stones supported the raised house floors, thereby facilitating significant ventilation and furthermore creating shaded space under the house floor for a variety of activities.

In light of recent human genetic data, Sulawesi, Sumba, and the Philippines are considered to be some of the regional areas that have provided noticeable cultural influences for the Marianas. The presence of megaliths known as *rante* stones among the Tana Toraja of Sulawesi and *rati* or *rate* stones of Sumba are of much interest, as the linguistic terms used for the megaliths at these places appear closely related to the *latte* stones of the Mariana Islands. Both *rante* as well as *rati* or *rate* stones are associated with human burials in Sulawesi and Sumba, respectively. The presence of human burials in the close vicinity of *latte* stones in the Mariana Islands could well be linked to ancient mortuary practices associated with megalithic traditions of Insular Southeast Asia.

The local terminology of *haligi* (house post) in many parts of the Philippines, including the Ifugao of Banaue, may have a direct connection to the *haligi* (*latte* stone upright) of the Mariana Islands. Another linguistic similarity is *uma*, which refers to the ancestral pile house in Sumba. In the Marianas, *guma* is a Chamorro word for house.

In order to assist the narratives pertaining to the *latte* of the Mariana Islands, the present co-authors have incorporated 3D graphics into this paper, illustrating depictions of how a *latte* house might have appeared before the original integrity of the *latte* disappeared during the Spanish Era. This work will continue as new data and interpretations become available.

Although the original integrity of the *latte* has lapsed, the *latte* stones of the Marianas have left a long-lasting imprint, not only on the historic landscape, but also within the minds of the indigenous Chamorro people. The *latte* stones of the Marianas have captivated the curiosity and imagination of virtually all segments of society, including the general public, artists, archaeologists, school children, teachers, tourists, politicians, political activists, and historic preservationists, to name just a few.

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