**Hukay** is a Tagalog term that can either be the verb “to dig” or a noun, “a hole in the ground as a result of digging”. It also means “an excavation” among archaeology practitioners in the Philippines. Published twice a year, **Hukay** is the refereed journal of the University of the Philippines - Archaeological Studies Program. We accept articles on the archaeology, ethnoarchaeology, palaeoenvironmental studies, and heritage of the Asia and Pacific regions.

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**On the cover:**  
A bottle of Chamberlain’s Pain Balm from Melodina Sy Cruz’s Article on p. 34.
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BOOK REVIEWS

Review by Joan Tara Reyes

Review by Joan Tara Reyes

Review by Michael Armand P. Canilao
Of the seven articles in this issue, four discuss the outcome of the excavations of the ruins of two stone houses in San Juan, Batangas, Philippines. These two adjoining sites were excavated during the University of the Philippines-Archaeological Studies Program’s annual field school from 2009 to 2011. Ena Angelica C. Luga discusses the construction methods of the second structure known as Structure B. The construction methods of Structure A written by Angelus Maria P. Sales was published in *Hukay* Volume 18. Melodina Sy Cruz analyses the glass shards from Structure B. Her study is a pioneering work on glass bottles from a historical period site. Cruz’s paper can be used as a reference for bottles found in same period sites. An important contribution made by Cruz’s paper is the identification of bottles based on the lips and seams. Andrea Natasha E. Kintanar investigates scratch marks on porcelain sherds recovered from Structure A. Same as Cruz’s paper on glass shards, Kintanar’s work is the first of its kind in the Philippines. She expands research on porcelains found in the Philippines by studying usewear, an area which earlier ceramicists overlooked. Kintanar’s article is significant because it looks at activities which involved porcelains that may help us understand past lifestyles. Pauline A. Basilia’s work on buttons recovered from Structure A is another interesting article. Using Energy Dispersive X-ray, Basilia identified the buttons and concluded that some were sourced from France. Cruz’s and Basilia’s works can be used to understand trade and distribution of imported items during the late colonial period.

Rhayan G. Melendres who participated in the Porac, Pampanga field school in 2002, writes on the significance of tradeware ceramics recovered from the site as time markers. He correlated the radiocarbon dates of the site with the dates of the foreign ceramics and found out that the latter are as good as the former in dating sites. Melendres’ study illustrates that Chinese and Southeast Asian ceramics from secured contexts in well-documented excavations can provide good dates.

Rafael Dy-Liacco’s article on boat-shaped burial markers in Batanes and Catanauan demonstrates his interest in archaeoastronomy. Dy-Liacco interprets the boat-shaped burial markers as representations of
an earlier world view shared by the Austronesians when the Milky Way was an integral part of that consciousness.

Maria Sagrario R. Simbulan tackles a sensitive issue in her article on managing archaeological databases. She tries to reconcile the need for the public to access relevant data on archaeological sites and the same time the need for archaeologists to protect sites by concealing information.

All seven articles are groundbreaking because they investigate good research topics and open new avenues for archaeological investigations such as new approaches and methods in artefact analyses. The topics discussed in this volume have not yet been studied before in the Philippine context. This shows the ingenuity of the writers, all graduate students, by looking at Philippine archaeology with fresh perspectives.

Lastly, we thank the National University of Singapore for providing the two books reviewed in this volume.

Grace Barretto-Tesoro

Hukay Editor
Building in 19th Century Philippines

Ena Angelica C. Luga¹

Abstract

Prominent structures in Philippine history include those constructed during the Spanish colonial period such as churches, fortifications, and “stone houses” or bahay na bato associated with the elite. The archaeological investigations of these structures have increased with the annual Field School of the University of the Philippines-Archaeological Studies Program (UP-ASP). This paper is an outcome of one such Field School conducted in 2011. The UP-ASP Field School 2011 conducted an archaeological investigation of a structure recorded as Structure B located in Barangay Pinagbayanan, San Juan, Batangas. This paper investigates the methods and materials used for the construction of Structure B and compares it with Structure A, an adjacent site previously excavated. Both structures were found to be bahay na bato. This paper sheds light on how building construction went about in 19th century Philippines based on archaeological evidence. It presents the different factors that influenced building construction, the peculiarities found in the construction of these structures, the challenges posed on the construction of a bahay na bato, and the mechanisms used to cope with these challenges in the 1800s.

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Introduction

The archaeological excavations of Spanish colonial structures such as domestic structures, fortifications, and churches in the Philippines have been increasing in frequency especially with the annual Field School by the University of the Philippines-Archaeological Studies Program (UP-ASP). In 2011, the UP-ASP Field School excavated ruins of a structure in Barangay Pinagbayanan, San Juan, Batangas (Figure 1). This structure, recorded as Structure B, was the second structure to be excavated in the area and was eventually identified as a *bahay na bato* based on archaeological evidences and local accounts. Structure A was previously excavated in 2009 and 2010 and found around 40m north of Structure B (Barretto-Tesoro *et al.* 2009; Sales 2013; UP-ASP 2010).

During the excavation, several questions were raised regarding the structure, one of which was regarding the technology and methods used in its construction. The main objective of this research endeavour is to answer this particular question: what were the methods and technology used in the construction of Structure B?
To answer the aforementioned question, this study’s aims are:

1. To identify construction materials found in Structure B;
2. To identify the technology and methods of construction employed in Structure B; and
3. To compare the construction materials and methods in Structure B with Structure A.

With increasing archaeological investigations of structures in the Philippines, this study will contribute to the literature on construction methods employed during the Spanish colonial period and aid in the understanding of colonial structures. It will particularly help in understanding Structure B as well as provide information on building practices employed during the time of its construction. Furthermore, this study may provide a relative date for when Structure B was constructed based on the technology and methods used, and help identify the relationship between Structure A and Structure B. This study will only undertake the investigation of the construction technology and methods used in Structure B. It will not investigate artefacts recovered from the site but will instead make use of archaeological data related to construction gathered from the excavation of Structure B. The entire structure, therefore, will be treated as the artefact. Furthermore, this study will focus on exploring the relationship between Structure A and Structure B, excluding other archaeologically investigated structures. This study will make use of archaeological findings from the excavation of Structure B as primary data. These findings will then be checked against local accounts on Structure B as well as archival research data regarding construction methods and technology used during the Spanish colonial period. For the comparison of Structure A and Structure B, the initial findings of this study and data from previous excavations on Structure A will be investigated.

The bahay na bato

The bahay na bato was actually a Spanish adaptation of the indigenous bahay kubo (i.e. nipa hut) (Huetz de Lemps 1998; Lico 2008; Perez 1989; Valera-Turalba 2005; Zialcita and Tinio Jr. 2002). It followed the post and beam structural system that the bahay kubo employs as well as the practice of using only the second floor as the living area (Alarcon 1991; Sales 2010; Yu 1996; Zialcita and Tinio Jr. 2002). The adaptation of
the bahay kubo did not come about as a single event, though. The bahay na bato, as we know it now, resulted not only from the fusion of Spanish and indigenous architectural styles but is also a product of various events exclusive to the context of the Philippines (Huetz de Lemps 1998; Lico 2008; Manahan 1994; Ordonez 1998; Perez 1989; Sales 2013; Valera-Turalba 2005; Zialcita and Tinio Jr. 2002).

After a series of calamities, like earthquakes and fires that devastated the metropolitan areas of the time, changes to the methods and materials of construction were implemented. In 1583, the city of Manila – with houses and churches made of wood, bamboo, and nipa – were devoured by flames in a matter of hours. This resulted into changes in construction with the city being rebuilt with stone, bricks, and clay roof tiles. By 1645, the walled city of Manila had 600 stone houses (Zialcita and Tinio Jr. 2002). However, a series of earthquakes devastated Manila in 1647, 1658, and 1677, reducing it to rubble. This caused further changes to the design and construction of buildings. Houses were then limited to two storeys with only the first landing of the main stairway made of stone. The second flight of stairs and the second floor were made of wood. Wooden posts were also found to be better adaptive to the shaking ground compared to stone pillars (Lico 2008; Manahan 1994; Ordonez 1998; Perez 1989; Sales 2010; Valera-Turalba 2005; Zialcita and Tinio Jr. 2002). Radical changes in the construction of walls and columns as well as in the roofing material used were primarily brought about by the Earthquake Ordinance passed in 1880 by the then Consultative Council of Public Works. Among the prescribed regulations of the 1880 ordinance were: 1. the use of thinner wood posts; 2. the use of light roofing materials such as corrugated galvanised iron sheets; and 3. the thickness of a wall to be made at least a fifth of its height. Also after the implementation of the Earthquake Ordinance of 1880, foundations were built shallower, running to only about a meter deep (Huetz de Lemps 1998; Yu 1996; Zialcita and Tinio Jr. 2002).

Structure B

The materials used for construction were relatively uniform throughout the structure. Consistent with what is known to be “bahay na bato” or “stone house”, Structure B was primarily made of volcanic tuff blocks locally referred to as adobe. These adobe blocks usually refer to quarried tuff, a pyroclastic igneous rock, commonly used as construction
Building in 19th Century Philippines

material in the Philippines since the Spanish colonial period (Alarcon 1991; Valera-Turalba 2005). These adobe blocks are often seen in Spanish-era houses, churches, and fortifications. However, from an architectural standpoint, adobe refers to a material which may be used as plaster or bricks, made of “a heavy soil, composed largely of clay and silt in sufficient quantities to form a matrix in which sand particles are firmly imbedded,” (Harris 2006: 13) to which “water is [then] added, and straw, manure, and fragments of tile are sometimes combined with this mixture to provide increased mechanical strength and cohesion when it dries” (Harris 2006: 13). These sun-dried mud blocks could be traced as far back as 8000 B.C. and has been commonly used for construction in Latin America, Africa, some parts of Asia, and Southern Europe (Blondet and Garcia n.d.). Such a conception of adobe is very far from the local understanding of the term. Furthermore, during the course of the excavation of Structure B, conglomerate, along with tuff blocks were found to have been utilised. Local residents referred to both types of stone blocks as adobe, referring to the conglomerate blocks as “mahunang adobe” or “weak adobe”. The use of the term adobe to refer exclusively to tuff stone blocks is then questionable. It may be that the use of the term adobe in the Philippines refers to any stone block. Hence, to avoid confusion, adobe will be used in this paper to refer generally to stone blocks. For the construction of Structure B, two types of stone blocks were used. As mentioned earlier, these blocks were either made of tuff or were of conglomerate material.

These stone blocks varied in size. The stone blocks used in the eastern portion of the structure were slightly larger than those on the western side. The sizes of the stone blocks in the western portion, based on what was exposed, ranged from 23 cm to 26 cm x 54 cm to 62 cm x 16 cm while those used in the eastern half ranged from 17 cm to 20 cm x 60 cm to 64 cm x 27 cm. These stone blocks were bound by and plastered with lime mortar and cement for some parts of the structure (Figure 2). Lime mortar and cement were also used as fill for the structure’s pillars (Figure 3). Mortar requires aggregates to increase its strength (Figure 4). In the case of Structure B, several types of aggregates were used. Tisa or clay roof tile fragments were the most common aggregate in the structure (Figure 5a). Baldoza or clay floor tiles were also used, as well as shells, ceramic sherds, and scoria (Figures 5b and 5c).
Figure 2: A pillar base made of tuff stone blocks bound by lime mortar and exhibiting evidence of lime mortar finishing for what used to be a pillar in the southwest corner of Structure B.

Figure 3: Lime mortar fill of a pillar within the eastern half of Structure B. (Photo by K. Tantuico).
Figure 4: Roof tile fragments used as aggregates for a pillar grout. (Photo by K. Tantuico).

Figure 5a: Tisa fragments with evidence of being used as aggregates.

Figure 5b: Scoria collected from Structure B.

Figure 5c: Earthenware sherd with evidence of being used as an aggregate.
Tuff and conglomerate stone blocks, lime mortar, and cement along with various aggregates comprised the structure’s foundations, walls, and pillars. Along with these masonry materials, though, locals accounted for wooden posts which they identified as *mulawin* or commonly known as molave (*Vitex parviflora*). These wooden posts were supposedly taken during the destruction of the structure, explaining why the only archaeological evidence found were post holes, post bases, and their foundations. There were six post holes unearthed and one more that could have possibly been a post hole but was no longer explored. These, however, accounted only for the structure’s ground floor. According to interviews with local residents, the structure had a second floor made of thick wooden slabs or *tabla*. These, too, were supposedly made of hardwood. Furthermore, according to one account, the second floor was wrapped in *capiz* windows. Consistent with archaeological evidence, worked *capiz* shells were retrieved from the site (Figure 6).

![Figure 6: Capiz shells used in windows (Photo by M. Reyes).](image)

The structure’s roofing was corrugated galvanised iron (G.I.) sheets. This is supported by a sizeable G.I. sheet fragment recovered from Trench 4 (UP-ASP 2011) (Figure 7) further supported by archival records. According to Mayo (2010), the old town of San Juan, identified as the current Barangay Pinagbayanan, had six families who owned stone houses with metal roofs. With regard to the structure’s entryway, local accounts vary. Some said the structure had one entryway on the west facing the current main road. A few said there were two entryways. Archaeological evidence supports that at one point there could have been two entryways.
Figure 7: Corrugated galvanised iron sheet fragment (Photo by H. Valerio).

The south face of the northwest corner had a smooth finishing suggesting that it was the end of the feature and not a result of the structure’s destruction. There was also a mortar bed with stone block impressions connecting the northwest corner to the west wall, and leading up to this area from the west are stone block pavers (Figures 8a and 8b). According to local accounts, the entryway was big enough to fit a horse carriage. The distance between the south face of the northwest corner to the edge of the west wall was approximately 165 cm, a reasonable width which may have been wide enough for a horse carriage. Another entryway was directly across the west entryway to the east also with pavers leading up to it. This was smaller though, with a width of 140 cm, and had evidence of being closed off. The door to the main entryway was said to have been made of hardwood. Again, no evidence of this wooden door was found except for metal hinges that are decidedly thicker and bigger than those currently used in houses (Figures 9a and 9b).

With regard to the structure’s flooring, there was unanimous account that the second floor was made of wooden slabs consistent with a traditional *bahay na bato*. Regarding the ground floor, however, accounts varied greatly. Some said it had cement flooring; others, a dirt floor; and yet a few said it was made of *baldoza* tiles. A few *baldoza* tile fragments were found during the excavation. However, none of these were *in situ*. What looked to be cement flooring was also exposed in a portion west of the northwest interior pillar. This did not, however, extend throughout the area. The material used for the flooring of Structure B was, therefore, not established.
Figure 8a: West view of the northwest corner.

Figure 8b: South view of the northwest corner with attached pavers.
Figure 9a: A corroded metal butterfly hinge (Photo by H. Valerio).

Figure 9b: Half of a metal hinge.
Construction Methods and Techniques observed in Structure B

There were three construction methods used for the building of Structure B: 1. Grout masonry, 2. Solid masonry, and 3. Dry masonry.

1. Grout masonry is a “multi-unit construction in which the space between masonry units is solidly filled with grout” (Harris 2006: 480). Grout refers to mortar mixed with enough water to make it viscous enough, allowing it to be poured (Harris 2006). This kind of masonry was used for the construction of Structure B’s pillars, post bases, and double walls. For the pillars, stone blocks were laid out in a manner forming a square that is hollow in the middle. These blocks were bound by lime mortar, and every few layers, grout is poured into the hollow (Figure 13). A similar method was used for the construction of post bases. However, before the grout was poured, the wooden posts were probably first hoisted up and held in place. The grout, along with stone blocks, helped stabilise the wooden posts. For the double walls, stone blocks were laid side by side with a space in between. Again, these stone blocks are bound by lime mortar, and grout is poured after a few layers of stone blocks (Figure 10).

2. Solid masonry is a method used when masonry units (i.e. stone blocks) are placed directly adjacent to each other to form a solid load-bearing wall system (Ching 1991). It was used for the construction of a single wall in the northwest portion of the structure (Figure 11). Stone blocks were simply laid atop each other in a running bond pattern and bound by lime mortar.

3. Dry masonry is simply “masonry laid without mortar” (Harris 2006: 342). It does not make use of any kind of binding agent and depends largely on the fit of masonry units for its stability. This technique was seen utilised for the foundation of a post base along the northeast wall (Figure 11). The utilisation of rubble for one layer was noticeable in this post base foundation. This was also observed in the pillar foundation in Structure B’s southwest corner. Although lime mortar and cement were used to bind the stone blocks of most of the southwest pillar foundation’s layers, the penultimate layer was made of irregularly shaped stones with no visible binding agent. Dry masonry was also employed for the pavers on both the west and east sides. Stone blocks were laid directly on the sediment in a running bond pattern with no binding agent or mortar bed. The west and east pavers, however, were oriented differently. The pavers on the east
were oriented north-south while those on the west had an east-west orientation (Figure 15).

**Figure 10:** This is the eastern half of Structure B where remains (i.e. grout filling) of interior stone pillars and double walls are found.

**Figure 11:** A portion of the north wall showing a post hole and post base and its foundation which used dry masonry; the only single wall in Structure B constructed through solid masonry. (Photo by M. Sy Cruz).
Inconsistencies in Structure B

Structure B had noticeable inconsistencies in its construction. Just along the south wall found in Trench 3, the double wall east of the exposed post base was 93 cm wide while the double wall directly west of it was only 55 cm (Figure 12). Further to the west closer to the southwest corner of the structure, the wall once again thickens to 62 cm at its widest. Such a drastic change in wall width was also observable along the north walls in Trench 2 (Figure 15).

![Figure 12: A portion of the structure’s south wall found in Trench 3 exhibiting pronounced differences in wall construction.](image)

Also, the foundation along the south wall was explored. It was found that the wall foundation east of the post hole, referred to earlier, was made of three layers of stone blocks with an elevation of -125 cm DP while that on the west of the post base was made of only two stone block layers with an elevation of -105 cm DP.

Moreover, foundations of two post bases were looked into and it was found that they were constructed differently. The post base foundation along the south wall was constructed in the same way that the wall foundations were built (Figure 12).

The post base foundation along the north wall, however, was constructed similar to the southwest pillar foundation except that the post base foundation did not make use of any binding agent (Figures 13 and 14).

Also noticeable was that pillars within the structure were present only on the eastern half (Figure 15). The only pillar present in the western half was located along the perimeter walls, specifically at the structure’s southwest corner (Figure 15).
Figure 13: A post base foundation found along the structure’s North wall in Trench 2.

Figure 14: Ruins of a pillar, its base, and its foundation located in the structure’s South-west corner in Trench 1.
It was also observed that the number of post bases increased in the structure’s western half. Such observations may be indicative of two things:

1. There were two phases of construction with the first being the construction of the eastern half of the structure. The first construction phase probably began prior to the Earthquake Ordinance of 1880 when structures generally depended on deeper foundations, stone pillars, and thick walls. This was a time before thinner wooden posts were prescribed and foundations became shallower.

2. The second floor of Structure B was only on the eastern portion supported by the four inner stone pillars. This would be consistent with local accounts that the second floor did not cover the entire area of the ground floor. This would also explain the enclosures and wall-like features within the structure. They could be what were left of the main staircase with two landing platforms beginning parallel to the north wall, directly in front of the entryway, and then turning right going southwards. This would be consistent with local accounts as well.
Another noticeable inconsistency is in the method employed in the building of walls during the second phase of construction. All of Structure B’s walls were double walls except for a portion of the wall in the northwest found in Trench 2. A stretch of the north wall connected to the northwest corner was a single wall (Figure 15).

These inconsistencies may be reflective of how building construction was undertaken in 19th century Philippines. During those times, there were no trained architects, engineers, foremen, or carpenters. The first Filipino architect, Felix Roxas, Sr., left the Philippines in 1840 and came back in 1854 after studying and practicing architecture in England and Spain. He then held several positions such as interim head of the Public Works Office in 1866 and eventually as architect for the Manila Government (Zialcita and Tinio Jr. 2002).

It is thus understandable that, if the construction of Structure B began before the Earthquake Ordinance of 1880, there were not that many trained architects and engineers in the Philippines, and those who were schooled were employed by the government and focused on public works. House builders, then, were not formally trained and only had their practical experience to bank on. As Zialcita and Tinio Jr. (2002:33) put it, “they [builders] often guessed their way through”. This may be a reason behind the inconsistencies in the construction of Structure B such as in the case of the corner pillars of the south wall. These builders, however, are not to be belittled. Although oftentimes illiterate and without formal training, maestros were recognised for their skills (Yu 1996; Zialcita and Tinio Jr. 2002). A maestro was often employed in the countryside from the big towns and cities. He directed the project from start to finish and was his own architect, engineer, and foreman. The typical maestro, however, “did not know how to calculate, in advance, the precise dimensions of the building as a whole and in its minute parts. As a result, he has no way of computing the quantity of materials to get” (Zialcita and Tinio Jr. 2002:39). He, therefore, only ordered the materials as work progressed. This made house-building extremely challenging since getting materials to the construction site was already not without great difficulty (Valera-Turalba 2005; Zialcita and Tinio Jr. 2002).

The circumstances of 19th century Philippines – with the difficulty of acquiring and transporting construction materials as well as a maestro’s lack of knowledge on standard cost estimating procedures – undoubtedly had its effects on the construction of Structure B. The aforementioned
conditions are the most probable explanations to Structure B’s phases of construction and inconsistencies.

It may be that materials procured when the construction began were insufficient for the entire structure. Construction, hence, had to come to a stop for a while, resulting to the eastern half of Structure B. The rest of the materials probably came during or after the pronouncement of the Earthquake Ordinance of 1880. Hence, the walls were thinner, the foundations with fewer layers of stone blocks were, thus, shallower, and wooden posts were used in the western half.

Such difficulty in accessing materials may also explain why a portion of the northern wall was a single wall as opposed to the double walls of the rest of Structure B. It is tempting to think that the house builders, illiterate and without formal training, were inept. At first glance, this anomalous single wall seems to be a product of such incompetency. However, upon thoughtful inspection, Structure B’s single wall actually exhibits the cleverness of its house builders.

As mentioned earlier, Structure B’s single wall was located along the northern perimeter. This side of the structure faces Structure A – also a bahay na bato previously investigated archaeologically – and is hidden from public view. If the anomalous single wall was located in the west, it would have been facing the main Barangay Road. If it were along the southern or eastern perimeter, it would have been facing an old road now known as kalsadang putol and would thus have been open to public view and scrutiny. The single wall’s location, therefore, could not have been just coincidental or a product of thoughtless endeavour. Its location was carefully decided upon, hiding it from public view, keeping the structure’s grandeur and establishing the owner’s status in the community. The only probable reason, then, for why a portion of the wall was constructed differently than the rest of the structure is that materials could have once again run out, and the owners could no longer delay the completion of the structure.

Comparing Structure A and Structure B

Structure A was a bahay na bato located north of Structure B. It was archaeologically investigated for two years prior to the excavation of the latter (Barretto-Tesoro et al. 2009; UP-ASP 2010). Like Structure B, it was found to be a bahay na bato built in the late 1800’s (Sales 2013). According
to local accounts, both structures were taken apart. Structure A’s stone blocks were recycled by the locals and used to build fishponds as well as tungko or outdoor stoves starting in the 1950s (Sales 2010). Structure B, on the other hand, was also said to be taken down in the 1950s. According to local accounts, the materials were recycled in the construction of a house in a nearby town.

Structure A was constructed in a similar manner to Structure B. They both utilised the double wall system, although a portion of Structure B had a single wall. They basically used the same materials, although more conglomerate blocks were observed in Structure B whereas Structure A predominantly used tuff blocks. Both structures had stone pillars as well as hardwood posts. However, Structure A utilised stone pillars as the main structural support of the house whereas Structure B primarily utilised wooden posts.

They both used lime mortar with tisa aggregates as binding agent, although it was observed that Structure B also used other materials as mentioned above. There was also evidence that, like Structure B, Structure A had capiz windows.

Unlike Structure B, however, Structure A had decorative mouldings along the base of its exterior walls. It also had pilasters on its exterior of which none was found in Structure B. Moreover, Structure A had arches whereas no evidence of such was found in Structure B.

Also, Structure B had no sufficient evidence to establish the flooring material whereas Structure A had several flooring materials in situ such as baldoza tiles and tuff stone blocks. Baldoza tile impressions on mortar flooring were also exposed as well as compact dirt floor of dark reddish colour. These changes in flooring material helped in the analysis of the use as well as the hierarchy of space in Structure A which, unfortunately, could not be established in Structure B. Furthermore, unlike Structure B which used corrugated galvanised iron sheets as roofing material, Sales (2013) would argue that Structure A made use of tisa or clay roof tiles. However, archival records do not mention any house in Pinagbayanan having clay roof tiles for roofing. Instead, six stone houses with metal roofing were recorded (Mayo 2010). Another major difference is in the method of construction used for the foundations. Structure A made use of wooden planks as formworks, indicated by plank impressions on excavated foundations, while there was no such evidence anywhere in Structure B. Based on these evidences, the owner of
Structure A seems to have had more means to get good quality construction materials such as tuff stone blocks and clay tile flooring. Structure A was also more decorative with its arches, mouldings, and pilasters. This indicates that the owner of Structure A may have been wealthier than the owner of Structure B. On the other hand, these differences may simply be indicative of changing times. Based on the predominance of stone pillars in Structure A and of wooden posts in Structure B, Structure A may have been constructed at an earlier time than Structure B.

Conclusion

Structure B is a *bahay na bato* constructed in 19th century Spanish colonial Philippines. An analysis of its construction shows the challenges of house building in the 1800s. Its construction methods and materials say quite a lot about its social milieu. Its phases of construction show that, consistent with archival records:

1. *Maestros* or master builders of the time relied only on previous construction experiences and did not have sufficient knowledge for estimating, in advance, the amount of materials needed for the construction of the entire structure; and that

2. Raw materials for construction were difficult to come by. From the procurement to the transportation, house builders faced numerous challenges to accessing construction materials; and such difficulties left uncertainties as to how long it would take for completion.

On the other hand, Structure B also exhibits the craftsmanship of house builders of the time. Although without formal training, house builders – or at the least *maestros* – were skilled and experienced. They may have guessed their way through but they worked with careful thoughtfulness.

Although both structures have been archaeologically established as stone houses, there were quite significant differences in their construction. One is in the materials used. Tuff stone blocks are known to be more durable than conglomerate blocks and were more commonly found in Structure A than in Structure B. Furthermore, the predominance of stone pillars as opposed to wooden posts as well as the supposed use of clay roof tiles rather than corrugated galvanised iron sheets for roofing
may be indicative that Structure A was completed prior to the Earthquake Ordinance of 1880 and before the completion of Structure B. Also, the construction of Structures A and B were probably undertaken by different maestros as seen in the differences in construction method and design.

**Recommendations**

The preliminary analysis of the construction methods and technology used in Structure B and its comparison with the Structure A shed some light on how construction of stone houses were undertaken in 19th century Philippines. It also, however, raised several questions.

It is recommended, then, that for further studies, the following may be explored:

1. The peculiar form as well as the use of rubble or irregularly shaped masonry in the construction of the column (i.e. stone pillar and wooden post) foundations;
2. Sourcing of construction materials such as lime, hardwood, capiz windows, and roofing materials;
3. The utilisation of various types of aggregates such as ceramic sherds, roof and floor clay tiles, and volcanic rocks; and their effects on the durability and strength of the mortar produced; and
4. The variability in design of stone houses and its possible correlation with the status of the owners.

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References


Looking Through the Glass: Analysis of Glass Vessel Shards from Pinagbayanan Site, San Juan, Batangas, Philippines

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Abstract

This paper studies glass artefacts recovered during the excavation of Structure B, San Juan, Batangas, Philippines in 2011. Whole glass artefacts, as well as glass shards with diagnostic traits are studied in order to infer their form and function. Dating of select glass shards were also attempted based on diagnostic features especially with regards to lips and seams. Invaluable information was also gleaned from embossed letters or words as these words were used as key words to research more about the glass artefacts.

Introduction

Artefacts preferred for analyses in Philippine archaeology include stone tools and ceramics. Glass vessels seem to have been largely ignored as evidenced by the lack of detailed study. This may be due to the different kinds of research required to fully understand glass artefacts and the site they belonged to. For instance, there is great difficulty in tracing the source since double research should be undertaken- one regarding bottle manufacture and the other, regarding product manufacture. Both require exhaustive archival research together with analysis of the physical features of the artefacts.

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The excavation held in April to May of 2011 in Pinagbayanan, San Juan, Batangas (Figure 1), has yielded 328 glass shard artefacts, which provide ample specimens to be studied. A great bulk of these was recovered from midden contexts. Echoing James Deetz’s (1977) call for the study of “small things” as significant materials in the understanding of history, I decided to study these glass shards. Structure B, with site code IV-2009-G, is interpreted as a residential building constructed in the latter half of the 19th century, in particular a bahay na bato, based on the lay-out and the artefacts associated with it (UP-ASP 2011). The significance of this study lies in the insights on the quotidian life of the 19th century to be gained from glass artefacts as source material in addition to historical documents. The many uses of glass such as windows, containers, decorations, and lighting offer a wealth of knowledge waiting to be disclosed, and which may not be available to scholars if only written documents are studied.

Figure 1: Map of the Philippines showing the location of San Juan, Batangas. Inset photo shows where the excavated site is located.
This paper has a number of objectives, first and foremost being the identification of glassware types and functions found in Structure B. In the process, analyses of the glass shard parts are inevitable, which can provide us with approximate dates of manufacture which in turn shall help date the site (Horn 2005). This paper also attempts to investigate where the glasswares were manufactured based on existing labels in the form of embossed designs, if any. With the knowledge of the place of manufacture, we can tell if the glassware was imported or produced locally. This may have a bearing in the interpretation of the site as it gleans information on the social status of the residents of the bahay na bato.

Short history of glass making techniques

Glass is an amorphous non-crystalline solid mainly composed of Silica (SiO$_2$), Sodium oxide (Na$_2$O), and Calcium oxide (CaO) (http://www.glassonweb.com/articles/article/41/). Contrary to popular beliefs that glass is a modern invention, glass has been around for millennia. Grossman (2002) places glass manufacture to as early as the 3rd millennium BC in Egypt. So far, nobody knows where and when it was invented but sources like Pliny’s (A.D. 23-79) accounts tell of the accidental discovery of glass by the Phoenician traders who noticed the forming of a clear liquid when the nitrate blocks on which they placed their cooking pots melted and mixed with beach sand. Archaeology was able to recover Assyrian stone tablets dated to about 650 B.C. containing information on how to make glass. Around 2000 years ago, the Syrians used the glassblowing technique to produce glass, a technique adopted by the Romans who became agents of savoir-faire dissemination as they conquered nations and established the Roman Empire (Macfarlane and Martin 2004).

There were three major techniques of glass manufacture (Polak 2005) though some would say nine (Stelle 2011). For the purpose of giving a brief overview of the evolution of glass manufacture, the three major ones will be discussed as taken from Polak (2005) since he provided a comprehensive study of bottles for beginners and discussed other techniques which he subsumed under the three major ones. The free-blowing technique had been common for thousands of years until 1860 (Polak 2005, 2007) and was the most common method used (Lorrain 1968). A long hollow metal rod was employed which was dipped in molten glass to gather a glob on the end. The glassmaker then would huff and
puff into the rod until a big bubble is formed and was further shaped into the desired form.

From 1618 to 1866, pontil marks became a characteristic feature of the bases of bottles (Keane 2008; Polak 2005). These were formed when a long metal pontil rod was removed from a blown bottle. The pontil rod would first be attached to the bottom of a blown bottle to hold it after the blowpipe was removed. While pontil marks may be categorised into many types (Keane 2008), basically put, it is the “scar or roughage left on the base of a bottle” (http://www.sha.org/bottle/pontil_scars.htm) (see Figure 29). The invention of the snap case in 1850s replaced the pontil rod, which then marked the loss of the pontil marks and which enabled embossed designs to be placed at the bottom of the bottles (Polak 2005). The snap case was a five foot metal rod with pincers to hold the bottle while the neck was being finished. The second major technique was the use of moulds which dated to 1 A.D. up until 1900 (Polak 2005). This technique was used in combination with the free-blown process but because the moulds provided ready forms, lesser effort in blowing was necessary. The glassblower would blow into the blowpipe, which was placed in the mould, with molten glass on its end until the molten glass compressed itself against the sides of the mould. The moulds also made it possible to impress design patterns and letterings (Lorrain 1968).

Two types of moulds were used. One was an open type mould which formed only the body of the bottle sans the lip and the neck which were formed last. The other was a closed type wherein the lip and the neck were formed simultaneously with the body (Polak 2005, 2007). Features to be paid attention to are the seams which may indicate the method of manufacture. Later on, two types of moulds emerged. The first was the three-piece mould (1809-1880) in which a mould formed the lower half of a bottle while two moulds formed the upper half up until the shoulder. The important thing to look at is the presence of seams from the lower lip up until the shoulder and the presence of a seam encircling the bottle at the shoulder (Polak 2005, 2007). The other type was called turn mould or paste mould (1880-1900) in which wooden moulds were used. The wood was kept wet to prevent them from being burned from the heat emitted by the glass. The moulds were constantly turned, thus the term “turn mould”, so as to prevent the charring of the mould. In the process, it erased seams and mould marks and also gave the bottle high luster. The wooden moulds were later replaced by metal ones and to facilitate the sliding of the turning process, paste was added inside the
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mould, thus the term “paste mould” (Polak 2005, 2007). We see from the above that progress in glassmaking technique was very slow and basically almost uniform with very little change. In 1903, however, progress was speeded up with the invention of the automatic bottle making machine by Michael J. Owens (Keane 2008; Polak 2005). In 1909, improvements were made on the machine, making it possible to make small prescription bottles. Soon after, with the growing demand for glass bottles, bottles were manufactured by means of machine, a milestone in the glassmaking industry. As a general rule according to Polak (2005, 2007), therefore, the higher the reach of the seams from the bottom, the younger the bottle. For instance, prior to 1860, seams extend to just over the shoulder. From 1860 to 1880, seams extend up to the neck of the bottle. From 1880 to 1890, seams extend up to the lower part of the lip, and from the 1900 onwards, seams extend up to the orifice, or the top of the lip. Another important event in the history of glass bottles is the standardisation of threads in 1924 which made it possible to mass produce screw-topped bottles, which used to be confined to specialty bottles because of its complex production method (Polak 2005).

Methods

To study the glass artefacts from Structure B, Pinagbayanan, San Juan, there is a need to refit the glass shards to more or less be able to infer the type of glassware found in the site. To do this, sorting the recovered glass shards according to colour would be a great start. Next is to further sort the shards according to the context they were found. This is based on the assumption that a glassware is shattered into pieces in a certain context and therefore, shards found in a certain context can be most probably be refitted together. Sorting the shards based on context number also helps in determining the spatial and temporal distribution of glass in the site. A context number is simply an arbitrary number assigned to a specific context in a site. A context is a physical location, the formation of which is of utmost importance in archaeology as it indicates an event in relative time preserved in the archaeological record. A context may refer to sediments, features, or other locations where an artefact is found. To achieve the goal of identifying the function of the glass, field guide books to bottles were consulted (Digger Odell Publications 2001; Dust of the Bottle 2011; Grossmann 2002; Harris 2006; Historic Glass Bottle Identification and Information Website; Keane 2008; Lindsey 2010; Lorrain 1968; Macfarlane and Martin 2004; Polak 2005, 2007; Schroy 2007,
2008; The Bottle Guide; Wine Bottle). This is to familiarise myself with the possible forms of glassware and which particular forms correspond to functions. In this digital age where information is more accessible than ever regardless of geographical locations, the internet provided an invaluable source of information on the different kinds of bottles with embossed designs indicating the company that produced it and/or their content. The dates of manufacture were taken into consideration as these gave *terminus post quem* (the earliest possible) dates of some glass artefacts. Archival research was also employed, most especially regarding the local glass industry and trade with other countries. Documents at the National Archives of the Philippines were consulted. Last but not the least, a visit to the Bote’t Dyaryo Museum (Bottle and Newspaper Museum) at Escolta in Manila in 2011 served as a reference.

This study is limited to glass artefacts with diagnostic traits like seams and bases. All whole bottles recovered from Structure B are included in the study, as well as lip and neck shards, and body shards with features that may provide any information on the glass. The study of some glass artefacts will be limited to descriptions in the absence of more information, but these descriptions will at least provide a record of the said artefacts. Terminology used is based on Lindsey (2010) as he provides simple terms to name the basic parts of a bottle (Figure 2).

*Figure 2:* Basic parts of a glass bottle (Lindsey 2010).
My work on glass was initially confined only to form and function but during the process of data gathering, I discovered that dating can also be made possible, which greatly changed the trajectory of the paper. Datable features shall be analysed and this will fall mainly on the earliest possible date of manufacture of the bottles in question. This paper will not include the composition of the glasswares nor will it delve into microscopic details. Much as I would like to include information regarding the dates of import of glass bottles, as gathered from archival research, I would have to set a realistic goal of presenting whatever information has been gathered and shall leave for future papers the would-be results of archival research. This is mainly due to time restriction.

The Glass Bottles from Structure B

The 2011 excavation at Structure B in Pinagbayanan, San Juan, Batangas yielded a total of 328 glass artefacts, making up almost 8% of the sum total of the artefacts recovered. Categorisation of glass artefacts were made based on form, part, and inscriptions. Whole bottles automatically comprise one category. The same goes for flat glass. Shards with inscriptions are grouped together since one can look up the words on the Internet for any information regarding the bottle be it the bottle itself, or the liquid it used to contain.

A. Flat Glass

Of the total number of glass artefacts recovered only 19 were flat glass, with thicknesses ranging from less than 2-3 mm. These flat transparent glass shards could have been used for jalousie windows. The transparent, already patinated flat glass shards were found only in Trenches 2 and 4 (Figure 3), in contexts associated with post-destruction phases namely Contexts 317 and 346 (Trench 4 middens), and Contexts 105 (dark yellowish brown silty sand forming the matrix of the rubble Context 107) and 107 (rubble layer). This suggests that perhaps there was a shift from using Capiz shell windows to glass jalousies, but it could be worthwhile also to investigate the possibility that the two were used alongside each other simultaneously, given the paucity of flat glass shards. This is not explored further in this paper as the focus is more on glass vessels.
Figure 3: Flat glasses from Trench 2 (left) and Trench 4 (right).

B. Message on the Bottle:

A Van Hoboken & Co. Rotterdam Gin

This is a glass body shard with embossed letters “HOB” and under it, “TER” (Figure 4). The shard was initially believed to be part of the Hoskins Brothers Ales HOB Bitter manufactured in Leicester, England. On reviewing my notes made during the visit to the Bote’t Dyaryo Museum, though, I realised that most probably it is an A Van Hoboken & Co. Rotterdam Gin bottle (Figure 5). This case gin bottle is described as “produced in a two-piece cup-bottom mould, has a crudely applied "blob" finish, no evidence of air venting, and has a blob seal on the shoulder” (www.sha.org). So far, no information on the company that produced this bottle and gin can be found on the internet.

Figure 4: Shard from a A Van Hoboken & Co. Rotterdam Gin (IV-2009-G-2655) recovered from Structure B.
Figure 5: An intact bottle of A Van Hoboken & Co. Rotterdam Gin (Source: http://www.sha.org/bottle/liquor.htm).

Cerveza San Miguel

Ten shards, all from the midden (Context 317), were refitted to form this nearly whole bottle (Figure 6). It is dark olive green in colour, with circular base and body. It has a very slight insweep, which is not sloped upwards, unlike the kick-up in wine bottles. This may have been due to the pontil mark found at the bottom. It is curious to note, though, that the indentation was not as deep as commonly found in wine bottles. This must be due to the fact that wine is a more expensive commodity and the high kick-up eats up a big volume. (For more information on kick-ups, see section on bases below). The lip of this bottle is an applied double collar (1840-1870) and it is interesting to find a cerveza bottle which has yet to accommodate the crown cap or in popular local appellation, tansan. The Cerveza San Miguel was produced both in Spain and in Manila. So far, there is no information if this bottle was made in Spain or in the Philippines.
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**Figure 6:** Left: Refitted shards of a Cerveza San Miguel beer bottle (IV-2009-G-1393, 1803, 1806, 1807, 1816, 1862(2), 1864, 3336, 3372); Right: The seams of the Cerveza bottle extend a little over the shoulder, indicating that this could have been manufactured between 1860 and 1880 (illustrated by M. Cruz, retraced by H. Valerio).

**Chamberlain’s Pain Balm**

This light aqua rectangular bottle has the embossed words “CHAMBERLAIN’S PAIN-BALM” in the front and “CHAMBERLAIN’S MED. CO.” on the side (Figure 7). It has a tooled applied tapered lip which was common in the years between 1840 and 1870. The seams form a slanting line to the left and they extend until the neck (Figure 8), a common characteristic between 1860 and 1880. The Chamberlain Medical Company was established in Iowa by Lowell Chamberlain in 1872 ([www.chamberlainlotion.com](http://www.chamberlainlotion.com)). The pain balm is one of their many famous products as newspaper advertisements were made to promote it (Figure 9).
Figure 7: A bottle of Chamberlain’s Pain Balm (IV-2009-G-353, 354).

Figure 8: IV-2009-G-354 lip and neck of Chamberlain Pain Balm prior to refitting with IV-2009-G-353 (illustrated by M. Cruz, retraced by H. Valerio).
Figure 9: Advertisements of the Chamberlain Pain Balm (Sources: http://trove.nla.gov.au/ndp/del/article/35340265 and http://www.paperspast.natlib.govt.nz/cgi-bin/paperspast?a=d&d=BH19000209.2.27&e=-------10--1---0--).

**Hauthaway**

A piece of glass with the letters ‘AUTHAWAY’ was recovered from Structure B and interpreted as from a Hauthaway Shoe Polish bottle (Figure 10). The shoe polish was first concocted by Charles L. Hauthaway in 1852, in Bridgewater, Massachusetts. The Hauthaway & Sons Company still exists and has expanded their product line. Note that in the advertisement, the place of manufacture is in Boston, U.S.A (Figure 11).

Figure 10: Sherd of a Hauthaway Shoe Polish Bottle (IV-2009-G-3012).
Figure 11: On the left is an intact Hauthaway Shoe Polish bottle (Source: [http://www.museumoflondon.org.uk/ceramics/pages/largerimage.asp?obj_id=506571%20&img_id=45003](http://www.museumoflondon.org.uk/ceramics/pages/largerimage.asp?obj_id=506571%20&img_id=45003)) and on the right is its advertisement (Source: [http://www.promare.co.uk/ships/Finds/Fd_11A12Bottle.html](http://www.promare.co.uk/ships/Finds/Fd_11A12Bottle.html)).

Manuel Zamora’s Tiki-tiki

This is a clear glass base shard with visible letters “EL ZAMORA” and under them, “SALVACO” (Figure 12). The discovery of this type of bottle was purely by chance when I participated from September to October 2011 in an Archaeological Impact Assessment for the proposed museum of the archdiocese of Manila located at the back of Manila Cathedral. In this site, two empty whole bottles of Manuel Zamora’s tiki-tiki medicine were recovered. The bottles also indicate the address of Manuel Zamora’s pharmacy which was located at 928 Hidalgo St., Quiapo, Manila.

Manuel Zamora was born on March 29, 1870 in Sta. Cruz, Manila. Even as a student, he showed excellence in pharmacy, his chosen field, and earned his licentiate with distinction as sobresaliente (outstanding). In 1908, he established a small drugstore and laboratory at 928 Hidalgo St., Quiapo where he would invent a cure for beri-beri, the tiki-tiki in 1909 (NHI 1992). With this biographical information, the terminus post quem date we can give for the bottle is 1909.
Figure 12: Left: Shard of a Manuel Zamora’s Tiki-tiki bottle (IV-2009-G-1370); Right: An intact Tiki-tiki bottle (NCR-2011-Q-130) found at the back of the Manila Cathedral, Intramuros, Manila.

_Nanyang Company bottle (IV-2009-G-1387)_

This is a clear glass body shard with embossed Chinese characters which read “南洋公司” in vertical orientation (Figure 13). This translates to “Nanyang Company”. The function of this bottle is not clear, and no information can be found on the internet in relation to a Nanyang Company that produces glass or has products that necessitate glass containers.

Figure 13: Body shard with embossed Chinese characters (IV-2009-G-1387).
Palanca (IV-2009-G-3328)

The clear glass body shard has the embossed word “PALANCA” (Figure 14). Personal communication with Manny Encarnacion, a history and archaeology enthusiast, hints at the shard being part of a cuatro cantos bottle (literally meaning four corners which refers to a gin bottle), as the La Tondeña. On a visit to the Bote’t Dyaryo Museum at the suggestion of Mr. Encarnacion, I saw that indeed the clear glass body shard is part of the case gin bottle, with the words “LA TONDEÑA CARLOS PALANCA”. La Tondeña Distillers Inc. was established in 1902 by the Chinese-Filipino businessman and philanthropist Tan Quin Lay, more popularly known as Carlos Palanca after whom the famous award for Philippine literature was named.

![Figure 14: Left: Shard from a Palanca gin bottle (IV-2009-G-3328); Right: Cuatro cantos bottles with embossed “LA TONDEÑA CARLOS PALANCA” in Bote’t Dyaryo Museum, Manila.](image)

Soda water bottle

This is a light bluish green body shard with the embossed letters “ATER” which is most probably used as container for soda water since the colour is most commonly associated with soda water based on my observation of soda bottles (Polak 2005) (Figure 15).

![Figure 15: Shard from a soda water bottle (IV-2009-G-3282.2).](image)
Looking Through the Glass

Tarza Highes Poma

This is a clear glass body shard with embossed “TARZA HIGHERS POMA” and webbed designs (Figure 16). No information has been found regarding the glass shard. Web search words used were “Tarza highes poma”, “Tarzan highest pomade”, “Tarzan highest poma”, “highest pomade”.

Figure 16: Shard from a Tarzan Highest Pomade bottle (IV-2009-G-1372).

“Wine Manufactured in Japan”

This is a buish-green glass base shard with embossed Chinese characters (Figure 17). The Chinese characters are most probably the Kanji system used by the Japanese. The embossed words are “酒來本日標創” and are read from right to left. The word-for-word translation is “manufacture-brand/label-Japan-come-wine”, and the translation I give is “wine manufactured in Japan”. The base shard, with slight insweep, is a common characteristic of Japanese wine bottles (Ross n.d.)

Figure 17: Base of a wine bottle ‘manufactured in Japan’ (IV-2009-G-3282).
C. The Lippy Finish

Lips are important to look at for dates (Figure 18). When lips connected to necks were recovered, these offer further information based on seams. Of the bottles recovered in Structure B, majority have rolled or folded lips that date to 1840-1860 (Figure 18). These are IV-2009-G-3284 (Figure 19), IV-2009-G-1381(Figure 19), IV-2009-G-3808 (Figure 32), and IV-2009-G-1792 (Figure 34). Lips with applied square band (1840-1870) include IV-2009-G-1366 (Figure 20), IV-2009-G-3281, while tooled applied lip, as evidenced by horizontal striations encircling the lips, are present in IV-2009-G-3279 (Figure 20) and IV-2009-G-3531. IV-2009-G-1783, 1784, 1786 forming a lip, exhibit an applied bob lip. IV-2009-G-3531 on the other hand, exhibits a tooled tapered lip with collar (Figure 19).

![Figure 18: Different kinds of lips on bottles and their dates. (Source: www.bottlebooks.com/basics.htm).](image1)

![Figure 19: Examples of rolled and folded lips on bottles: (from left to right) rolled lip (IV-2009-G-1381); tooled applied tapered lip (IV-2009-G-3531); rolled lip (IV-2009-G-3284).](image2)
An interesting find is IV-2009-G-3814, a cobalt blue lip featuring a three-point closure and with seams up to the orifice top (Figure 21). According to www.bottlebooks.com, “Unlike most screw caps, the three point screw top had three lugs jutting out from the lip which were to engage a metal cap. This closure can be found on whisky and medicine bottles of the 1837-1940 period.” (Figure 22). The seams would indicate that the bottle was machine made. For the meantime, orifices shall be included in this category. Some clear glass orifice shards were recovered which could have been part of drinking glasses. These include IV-2009-G-1834, IV-2009-G-1836, and IV-2009-G-2836 (Figure 23).
D. Touching Base

Bases can provide information on the function of bottles. One feature to look at is the kick-up or the punt which is associated with wine bottles. Sometimes, the bases have embossed words or images that may help identify the product it the bottles used to contain or the manufacturer of the bottles, like the previously mentioned base shard (IV-2009-G-3282) (Figure 17). Kick-ups or punts refer to the deep indentation formed by pressing a wood or metal in the base of the mould while the glass is still hot and are commonly associated with wine bottles and calabash flasks (Polak 2005). There are many functions of the kick-up, but the most common and rational ones are as follows (http://en.wikipedia.org/wiki/Wine_bottle):

1. It contributes to the stability of the bottle by preventing the punt mark or the scar derived from the pontil rod from making an imperfection that might result in instability of the bottle. This is also to prevent the punt mark from scratching the table.

2. It facilitates the handling of bottles and accommodates the pourer’s thumb for ease of pouring. This may be in relation to the growing fondness of 19th century people for etiquette and finesse in manners, but this hypothesis remains to be tested.

3. The indentation impresses customers into thinking that a bottle holds a huge volume of whatever it contains, thus a form of cheating on the part of product manufacturers.

4. It facilitates the transport of bottles as bottles can be stacked on cargo holds on ships without rolling around and breaking. This is to prevent losses caused by breakages of bottles since these are fragile.
Four base shards with kick-ups were recovered (Figure 24). These are clearly wine bottles, as can be observed through the colour. For instance, IV-2009-G-327 is dark greenish which is most appropriate for wine as it prevents wine from being exposed to sunlight which might alter the taste and quality. IV-2009-G-3171 is light green in colour and could have been used to store wine that is not sensitive to sunlight exposure. IV-2009-G-2254, on the other hand, may look like crockery or stoneware but the cross section reveals that it is actually glass painted to produce a semblance to crockery. This could have contained ginger ale according to Anna Pineda (personal communication, 5 September 2011), a graduate student at the UP-ASP. It might indicate a transition from the use of stoneware to the use of glass in storing beverages. IV-2009-G-3290 forms a rose-coulored round base with rounded kick-up. I have not yet encountered any bottle of similar type and colour thus will have to suspend judgment. Another shard (IV-2009-G-3172) is fragmented but it is clear that there used to be a kick-up attached to it as the interior part slopes upward which could have been a slight insweep.

Figure 24: Base shards with kick-ups (from left to right, top to bottom: IV-2009-G-327, IV-2009-G-3171, IV-2009-G-2254, IV-2009-G-3290).
One base shard (Figure 25) has a French square shape and thick emerald green glass was used. No information can be obtained from this aside from that it looks relatively younger due to its lack of patination and still polished look. IV-2009-G-163 is a glass base shard of probably a fluted shot glass (Figure 26). IV-2009-G-649 is made of clear plain frosted glass with no kick-up (Figure 27). IV-2009-G-650 is made of dark glass and has no kick-up nor insweep (Figure 28). IV-2009-G-1822 has a slight insweep and is made of dark amber-coloured glass. IV-2009-G-3812 is unique in that it ribbed or ringed (Figure 29). It was initially thought to be a lid because the ribs were first thought to be threads but on closer look, the features are not threads but rings atop each other. This could have been part of a preserved fruit bottle based on its light aqua colour based on my observations of fruit jars (Polak 2005). The base of the Cerveza San Miguel (IV-2009-G-1803) has a pontil mark (Figure 30) and it is curious to note that it does not have a kick-up.

![Figure 25: Base shard with a French square shape](IV-2009-G-1802).

![Figure 26: A base shard which could have been a fluted shot glass](IV-2009-G-163).
Figure 27: A base shard of a plain frosted glass (IV-2009-G-649).

Figure 28: A dark glass with no kick-up or insweep (IV-2009-G-650).

Figure 29: Ringed base shard (IV-2009-G-3812).
E. Whole Bottles

Five whole bottles were recovered from the site and all of these were found in Context 317, which is the midden located at the back section of the Structure B). One nearly intact brown bottle, also from Context 317, will be included in this category.

Brown Bottle

This brown bottle (IV-2009-G-1978) was recovered in four pieces which were glued together (Figure 31). It has a threaded lip, with seams extending all the way to the orifice, suggesting that it was machine-made. The absence of patination suggests that it is a relatively young bottle compared with the other bottles found in Context 317. This bottle could have functioned as a medicine bottle, based on observations on contemporary medicine bottles which are more often than not, brown in colour.

Figure 30: Base of the same Cerveza San Miguel bottle with a pontil mark (same bottle shown in Figure 6).

Figure 31: Brown bottle which was probably a medicine bottle (IV-2009-G-1978). Right: Illustrated by M. Cruz, retraced by H. Valerio.
Clear Bottles

Two intact clear bottles were recovered from the site. Bottle A (IV-2009-G-3308) has a base diameter of 4cm. It has a threaded lip and the body has bubbles in it. The seams extend up to the lower part of the lip (Figure 32). Bottle B (IV-2009-G-2872) is of the same size and shape as Bottle A (IV-2009-G-3308), and also has a threaded lip. There is, however, a marked difference between the two. For one, it is clearly observable that Bottle A has a dull appearance compared to the polished look of Bottle B. Two, Bottle B lacks bubbles. Three, the seams of Bottle B extend all the way to the orifice. Four, Bottle B has an embossed trademark design at the bottom. The differences suggest that Bottle B is younger, with evidences of it being manufactured by a machine.

Figure 32: Top: Clear glass bottles: IV-2009-2872 (left) in contrast to IV-2009-G-3308 (right). Below: illustrations of the same clear glass bottles (illustrated by M. Cruz, retraced by H. Valerio).
Magsimpra Ink Bottle

This is a bluish-green circular bottle with small bubbles which indicate that it was made when glassmaking techniques were not that yet developed. The base is embossed with “MAGSIMPRA INK”. The seams extend until the lower part of the lip which was rolled or folded, suggesting that it is made between 1840 and 1860 (Figure 33). (www.bottlebooks.com).

Scott’s Emulsion Cod Liver Oil with Lime and Soda

One of the most interesting glass artefact recovered was the patinated whole empty bottle of Scott’s Emulsion Cod Liver Oil with Lime and Soda. Scott’s Emulsion was manufactured by Scott & Bowne in New York by the cousins Alfred Scott Bowne and Samuel Bowne. According to “Digger” of www.bottlebooks.com, the brand hit the market at around 1878. The company first used the image of a man with a fish on his back in 1884 and six years later, it became the trademark. The seams of the bottle extend all the way up to the orifice and the lip is threaded.
This suggests that the bottle was machine made and this would mean that it was manufactured in 1903 at the earliest. 1903 is the year when Michael J. Owens invented the first bottle-making machine. It should be noted also that between 1909 and 1917, a number of other automatic bottle-making machines were invented and since then, bottles around the world were machine-made (Figure 34). (Polak 2005).

Unidentified Distorted Bottle

This clear glass bottle is unique in that it is distorted. The neck was bent and a little crack on top was formed due to the bending. Its bottom was embossed with the number “20”, which may be an indication of the volume in milliliters that it can hold. The visible seam extends up to the lower end of the lip which is folded or rolled. It is not clear whether the bending was the result of anthropogenic forces or caused by other forces such as taphonomic processes. It is, however, to be noted that to be able to change the form of glass, a very high temperature is required. If the distortion is caused by high temperature taphonomically, then why are the other glasses not affected? With this in mind, the researcher believes that the bottle was distorted intentionally, the purpose of which remains to be a mystery (Figure 35).
Discussion

Different glassware types are present in Structure B which include wine bottles, medicine bottles, an ink bottle, and flat glass. Based on the embossed letters on some glass bottles and body shards, we know that most of these bottles functioned as vessels of imported contents like medicine, pomade, and shoe polish. Most bottles contained foreign products, with the exception of the locally produced wines like the Palanca liquor. The presence of these bottles indicates the affluence of the occupants of Structure B who had access to these imported items.

Based on the dates gathered from the glass shards with common manufacture date of 1870, we can be certain that Structure B was occupied in the latter half of the 19th century. Aided by archival and historical research, we arrive at the conclusion that Structure B was built after 1881, when the old church was built (UP-ASP 2011). This is based on the assumption that the people strictly followed the Law of the Indies which stated that the residential buildings should be constructed in reference to the church which should be at the centre of the town.

Moreover, the presence of different medicine bottles might suggest that preventive measures were undertaken to counter diseases which were prevalent during the late 19th century. It should be noted that
Pinagbayanan suffered from episodes of flooding and the floods bring about many diseases:

“pidiendo la traslación de la población al barrio de Calit-Calit, fundándose para ello en la situación que ocupa el pueblo próximo al mar y a ríos que en tiempo de aguas inunda la población convirtiéndola a una verdadera isla, produciendo las aguas estancadas enfermedades perniciosas.” (Errección de Pueblo: Batangas Hojas 269-270)

“requesting for the transfer of the town to Calit-Calit as justified by the proximity of the town to the sea and to rivers which inundate the town during the rainy season, which makes the town a real island and with the stagnant waters causing pernicious diseases.” (author’s translation)

The presence of depression glass (IV-2009-G-3268) (Figure 36), so called because it became the “it” thing in the 1920s when America was plunged into a financial crisis during the Great Depression and it was also the time when America was on the cusp of the Industrial Revolution (Schroy 2007, 2008), also says a lot about the status of the original residents of Structure B. Depression glass became the first mass-produced glassware in the 1920’s but prior to that, only the rich could afford this luxury. The machines available made it possible to produce huge quantities of glasswares with different patterns and colours. However, as to which period it pertains to may be difficult to ascertain as it was found in a midden (Context 346).

Figure 36: Depression glass (IV-2009-G-3268).
Insights in studying glass vessels

The presence of four middens in Trench 4 of the site provides a challenge to the analyses of artefacts recovered from them. Most of the glass artefacts analysed in this paper were from Context 317 and 346 which were considered to be post-destruction middens. The consensus is that these middens contained artefacts from different phases which were accumulated through time. It is up to the researchers to determine which are to be associated with the original occupants of the bahay na bato.

A problem that needs to be resolved that I encountered was the lack of agreed terminology in relation to the study of glass. This may be attributed to the changes in technological processes. For example, prior to the invention of the bottle-making machine, the lip was the last one to be made, thus it is called the *finish*. With machine-made bottles however, the lip was formed first (Polak 2005). There is a need to fix the terminologies that will take into account these changes. At present, I am continuing my studies and working on modifying the terminologies as well as ways on how to describe glass, with the belief that these will prove useful in future studies as these will facilitate understanding and sharing of data.

Another problem in the study of glass bottles is that there is a distinction between the bottle manufacturer and the product manufacturer (Harris 2006). For instance, a product like soda water may have been around much earlier but which comes in a vessel of different material, with the glass bottle being in use much later. In this case, the pain balm antedates the bottle (IV-2009-G-353, 354) (Figure 7). This is based on the assumption that different products change containers. A very good example would have to be softdrinks which used to be sold in glass bottles but which now come in tin cans and plastic bottles.

In line with this is the difficulty of gaining company information with regards to which company associated with which glass company since a company’s brand may retain the same logo but let a new glass company manufacture glass vessels (Lockhart et al. 2007). We can also trace the technological evolution through time in rigid investigations of bottle manufacturers (Lockhart et al. 2007) Dates gathered from the period of production of a certain product can become *terminus ante quem* (latest possible) dates and may be used to give an approximate date range for the site.
There is also the problem of reuse which further complicates the study of glass (Busch n.d). Moreover, Horn (2005) points out that one must exercise caution in assigning a disposal date since glasswares may be used multiple times until unusable. Another is that earlier techniques of glass production may be used in later periods, thus contributing to the problems in dating glass bottles.

Regarding archival research so far, I have looked at the *Estadistica Mercantil* 1867, 1876, and 1878-80 (*Estadistica Mercantil del Comercio Exterior De Las Islas Filipinas* 1868, 1877, 1879, 1880, 1881) where lists of imported and exported items in the Philippines can be found during colonial times. The bundles of aforementioned dates were the only ones available. The main problem is that specific items were not provided and one can only see general items. For example, one can see *cervezas y sidras* (beers and ciders) on the list but as to the names of the brands, these are not provided. Checking other document bundles with lists of items consumed in the 19th century will be most recommended should time permits. Last but the not least, one shortcoming of this paper that I acknowledge is the exclusive categorising of glass shards into five major categories based on parts. The case is that there are overlapping characteristics like for example, the bases can also have embossed designs. Or for instance, the bases and lips of whole bottles were not tackled in the respective categories. But this is justified by the fact that this is just an initial study and as such, flaws are to be expected which were not rectified at the moment.

**Recommendations**

This paper presents information from a look at select glass shards with incomplete findings mainly attributed to lack of time, resources, and expertise at the time of writing the report. A second look, or to be more precise, an in-depth look would be necessary to complement this paper. In this section, I provide a list of recommendations for the study of glass, acknowledging my own limitations in the research itself.

One shortcoming of this paper is the non-inclusion of other base shards aside from those discussed above which are only wine bottles. Other bottle types were also found as can be inferred from the study of other base shards. Studies on stoppers, closures or caps should also greatly complement studies on glass.
Aside from glass bottles, glass artefacts recovered from the site also include Depression glass (IV-2009-G-3268). I have not done further research on this although I was able to acquire reference guides. Since Depression glass was associated with the rich, it would be nice to study them to identify the elites in archaeological sites.

More research regarding bottle manufacture and product manufacture should be undertaken. For instance, it would be recommended to have composition analyses done alongside the study of readily observable physical features. This is because while glass is essentially composed of silica (SiO$_2$), sodium oxide (Na$_2$O), calcium oxide (CaO), additives are sometimes mixed for example, to produce glass of varied colours. Moreover, compositional analysis will provide more insight on the technological aspect of glass study as it looks into the ratios of composition which may vary.

Studies on patination including the rate of patination of glass exposed to different environments would also prove useful in future studies. Composition analysis would be of particular importance to patination studies. Another important consideration is the study of sediment type where the glass was deposited since moisture, alkalinity and acidity are significant decaying factors (http://www.sha.org/research_resources/conservation_faqs/treatment.cfm#D1).

At the time of this writing, there was not much time to excavate the National Archives for documents pertaining to the date of import and/or availability of imported glass bottles, it is therefore highly recommended that archival research be undertaken. In particular, the bundles Comercio (trade) and Aduana (customs) may be of utmost importance. It would be wise to check the bundles Botica y Botiquines, too, as these may provide information on whether a specific locality or a particular pharmacist sold a particular medicine. Continuation of the review of Philippine archaeological sites yielding glass artefacts similar to the ones found in Pinagbayanan is also recommended for the understanding of the distribution of imported items on a larger scale.

Getting to know bottle collectors in the Philippines may be of immense help. So far, Douglas Wong, who sometimes help in detecting metals in archaeological impact assessments, has offered to help. He has a friend who collects bottles but the problem is that the collection is in Bacolod, which is outside of Manila. Should time and resources permit, I would like to see the collection and to take pictures as well as notes for
future reference. In the process of studying glass artefacts, I came to realise how valuable a partnership between antique collectors and archaeologists can be, as echoed by Lindsey (in Keane 2008). There is much to do in the study of glass artefacts in the Philippines. While the difficulties in doing so, as outlined in this paper, are many, this paper has in one way or another proven that it is not entirely impossible. Hopefully, glass artefacts from other Philippine sites will be studied so we can have a view of glass consumption and/or manufacture on a larger scale.

Acknowledgements

I am immensely grateful to many people for making this paper possible. My most sincere thanks go to Manny Encarnacion for referring me to the Bote’t Dyaryo Museum at Escolta, and also for lending me a book on ancient glass. I also thank Cynthia Valdes for suggesting various literature on glass, and Rose of Bote’t Dyaryo Museum for giving me special permission to enter the museum. My most express gratitude goes out to Eleanor Lim for lending me a guide book on Depression glass and to Anna Carla Pineda who imparted whatever knowledge she has on glass while we accessioned artefacts during our fieldschool days.

I also thank Harpy Valerio, co-fieldschooler for her thoughtfulness on taking pictures of glasswares on the visits to old stone houses in Taal, Batangas, a fieldtrip which I was not able to participate in. Harpy was also the one who digitised the illustrations in this paper. I would also like to thank Dr. Grace Barretto-Tesoro for the constructive criticisms without which this paper would never be polished. My profound gratitude goes to Dr. Victor Paz who permitted me to join the Manila Cathedral excavation where I was able to see more glass artefacts. He was also generous enough to let me use pictures of artefacts found in that site for this paper. His helpful insights regarding the interpretation of my data are indispensable. I also thank Douglas Wong for his offer to help which may be useful in my future research on glass. My most heartfelt thanks also go out to the wonderful people at the National Archives who were of immense help to me in archival research: Aurea Silva, Naomi Alejo, and Ramil Abao, but most especially to Rose Marie Mendoza who has been a mentor and a friend. Last but not least, I am most grateful to my batchmates, friends, and staff of UP-ASP for the encouragement and inspiration which provided me with the strength to carry on with this research and the determination to finish this paper.
References:


Looking Through the Glass


### Appendix A: Refitted Glass Shards

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Of Scrapes and Scratches: A Preliminary Study on the Use-wear of Porcelain Sherds from Structure A, Pinagbayanan, San Juan, Batangas, Philippines

Andrea Natasha E. Kintanar

Abstract

Research conducted by the University of the Philippines–Archaeological Studies Program in San Juan, Batangas began with a survey in 2008. This led to a systematic archaeological excavation of a stone house in Barangay Pinagbayanan, San Juan, Batangas in 2009. Subsequent excavations were conducted from 2010 in the same stone house, in 2011 of a second stone house and in 2012 of the old church ruins. Use-wear or use-alteration analysis was performed on the porcelain sherds recovered from the 2010 excavation.

Specifically, scratches and abrasions probably left by utensils were identified and examined. Porcelains recovered from the site were Chinese, European, and some American white ware. Since ceramics also have non-utilitarian purposes, some preliminary assumptions are offered as to whether these sherds were from a utilitarian or decorative piece.

Use-wear analysis helps in inferring activity patterns within and between different areas of a site (Griffiths 1978). In the Philippines, this is the first use-wear experiment done on porcelain sherds from a historical site. The results show that the specimens investigated were possibly porcelains used for both decorative and dining purposes.

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Introduction

The town of San Juan is located on the southeastern tip of the province of Batangas (Figure 1). The history of this town stretches out even before the colonisation of Spain; this is due to the discovery of burial jars in Calubcub II dating to 100 AD to 400 AD, in Batangas by the National Museum (Barretto-Tesoro et al. 2009). A research group from the Archaeological Studies Program of the University of the Philippines conducted a survey in 2008 in Pinagbayanan, San Juan, Batangas which later led to systematic archaeological excavations of stone houses or bahay na bato (Barretto-Tesoro et al. 2009; Sales 2013; UP-ASP 2010, 2011). The porcelain sherds included in this study were recovered from the 2010 excavation of a stone house officially recorded as Structure A, Site 1.

Figure 1: Map of the Philippines with zoomed in map of Batangas and San Juan. (Source: maps.google.com).

The excavation of Structure A was divided into two field seasons owing to time constraints and issue of ownership. The southern section was excavated in 2009 and the northern section in 2010. The 2009 team found mouldings, walls, pillars, water well, and even exposed some of the walls and pillar’s foundations. One of the objectives of the 2010 field season was to excavate the northern part of the structure to determine the extent of Structure A. At the end of the 2010 excavation, 12 trenches were opened. The 2010 excavation yielded artefacts similar to those recovered
in 2009 such as square and round nails, metals fragments, glass shards, and ceramic fragments. The 2009 excavation of Structure A yielded 304 porcelain sherds (Barretto-Tesoro et al. 2009). The 2010 excavation team retrieved 87 foreign ceramic sherds. The discrepancy is most probably due to the fact that the 2009 team most likely excavated a part of the kitchen whereas the 2010 team excavated the storerooms and patio. The objective of this research is to infer utility of the porcelain sherds through use-wear analysis. Is it possible to infer vessel function through use-wear analysis on porcelain sherds recovered from Pinagbayanan, San Juan, Batangas?

Use-wear analysis was applied to check for scratches and abrasions left by utensils such as spoons, forks and knives. The utilisation of utensils was hypothesised since the site dates to the late 1800s when cutlery was already available and the former owner of the bahay na bato has been interpreted to be a principales or local elite of the town (Barretto-Tesoro et al. 2009). Ethnographic reports from the 2010 excavation team also stated that most of the residents of Pinagbayanan believed that Structure A was a large house and a wealthy family lived there (Fuentes and Kintanar 2010). The kinds of porcelain recovered from the site were Chinese and European, as well as some American white ware. A second hypothesis is that these sherds were from a decorative piece. Use-wear analysis helps in inferring activity patterns within and between different areas of a site (Griffiths 1978). This study hopes to understand the function of these porcelain sherds in the late 1800s within a settlement context.

This research is relevant in Philippine archaeology since it is the first use-wear analysis on porcelain sherds in any site in the Philippines. Use-wear is often used on tradeware ceramics that are more or less whole and not on sherds (Griffiths 1978). Studies have been made regarding the identification of vessel form and function, but few are done on marks made by utensils on porcelain or tradeware, given that use-wear analysis is usually done on stone tools (Adams 1988; Renfrew and Bahn 2008; Shea 1988). Earthenware and stoneware pottery, on the other hand, are usually examined for their function, but only seldom is porcelain studied with a use-wear analysis approach (Schiffer 1989).

Structure A is a historical site dated to be from the late 1800s. The ceramics include Chinese porcelain from the Qing dynasty (1644-1912) and European wares such as English Flow blue wares that were produced
around the 1820s to 1940s. Since the sherds recovered are relatively small, it must be noted that the identification of what piece the sherd came from is not absolute. It was difficult to interpret the use and form of the original pieces where the sherds came from. “The smaller the portion of a vessel under consideration, the less that can confidently be stated about the object of which it once formed a part,” (Griffiths 1978: 28). It must be noted that the analysis of use of a sherd will not offer us the identification of what part it was from, nor will it guarantee us the identification of form, but it will only tell us if the sherd came from a utilitarian or decorative piece.

This is preliminary work deals with the possibility of a wider practice of use-wear analysis on historical ceramics, since it centres on the use of utensils including serving spoons and forks. Residue analysis will not be part of the analysis since the ceramics had already been pot-washed while in the field. The measurements of the depth of the scratches were not recorded and studied thoroughly since the microscope for that purpose was not available in the laboratory at the time of analysis.

The Archaeological Specimen Inventory Record from both the 2009 and 2010 excavations were the primary documents used for the accession numbers and preliminary descriptions of the sherds. Also, the location or trenches where the sherds were found are written there. The 2009 site report of the excavation of Structure A (Barretto-Tesoro et al. 2009) ostensibly served as a staple resource material for the excavation results of the southern section. In the 2009 report, considerable information on foreign ceramics can be found, as well as their photographs and their accession numbers (Barretto-Tesoro et al. 2009).

Related Literature

Dorothy Griffiths’ article (1978) entitled “Use marks on historic ceramics: A preliminary study” is the most relevant reference for this paper. It is an experiment done on ceramics from the historical period with regards to marks left by utensils. Other research done on the subject of use-wear focuses more on prehistoric pottery e.g. Bray’s 1982 article on use-wear analysis on Mimbres Black-on-white wares (A.D. 1000-1130 in the American Southwest); while Hally (1982) focused on the study of surface alteration which were results of use of pottery vessels from the 12th-13th centuries in the American Southwest. Both articles studied use-wear in terms of soot and oxidation due to heating practices. The study of
use-wear on ceramics conducted on American southwest pottery was meant to provide a clear understanding of how a vessel was used and with that, socioeconomic and ideological inferences are made (Skibo 1992). Through use-wear or use alteration research, anthropologists and archaeologists were able to reconstruct prehistoric social organisation in the region (Skibo 1992).

For the identification of sherds, publications on blue-and-white ceramics were consulted (Carswell 2000; Gotuaco et al. 1997). Gotuaco et al. (1997) discussed the variety of Chinese and even Vietnamese wares found in the Philippines, where Batangas was mentioned as an area where blue-and-white porcelain were found. Another Chinese porcelain book that helped in this research is He Li’s The Chinese Ceramics: The New Standard Guide.

The Process

The ceramics were classified, identified, and compared with ceramics from the 2009 excavation as information on provenance and decoration were taken from the 2009 reports and results. Since use-wear was to be analysed, old scratches and abrasions were distinguished from the new scratches on 25 sherds that include body, mouth, and foot rim sherds. All the 25 sherds were preliminarily identified as Chinese porcelain. Only 25 were studied since, admittedly, the usage of the microscope was only for a limited time.

Also a distinction was made between knife cuts and spoon and fork scratches by differentiating the intensity of the cut. Stirring marks from spoons will come out as very light scratches compared to cut marks from a knife. This is important because the scratches will tell us if the sherd belonged to a ware used for dining, serving, storing, or as a decoration.

The samples taken were mostly foot rims and mouth rims since they are more diagnostic (Griffiths 1978). The foot rims were studied for the possibility of it being a decorative piece, since being in storage or ‘sitting’ for a long time on a shelf leaves abrasions at the bottom. Mouth rims may show us spoon marks from stirring, and even from the act of scraping the food from the plate or bowl.

Some body sherds were also analysed just to see if there were any marks. A portable microscope, which was plugged to the researcher’s
laptop via USB with a 50-60x magnification was used to locate scratches and abrasions. A scratch is a mark or incision which is made on the surface, it is more linear than an abrasion which refers to a place where the surface is rubbed off or worn off due to friction. A cut, on the other hand, is an opening or a cleft, a deeper incision which was made by an edged or sharp instrument, in this case, a knife.

Photographs were taken to illustrate the marks on the sherds. Pictures found in Griffiths’ 1978 article that show scratches and abrasions were compared with the sample from Structure A to be able to identify similar marks. Photographs of ceramics from published materials (Carswell 2000; Gotuaco et al. 1997) were used to identify the form of sherds recovered from Structure A. Data is presented using charts, tables, and photographs.

Types and Parts of the Porcelain Sherds found in Structure A

Blue-and-white porcelain which originated from China, is, to this day the best known type of Asian ceramic, where blue cobalt oxide is painted on white clay to come up with a beautiful underglaze design (Carswell 2000; Gotuaco et al. 1997). In 1603 the Dutch East Indie Company sent Chinese porcelain to Amsterdam and from there the Europeans tried to copy Chinese porcelain art (Moore 1908).

Since then, new types of blue-and-white porcelain emerged such as the European Flow Blue and transfer print (Carswell 2000; Moore 1908). The difference between Chinese and European porcelain are quite easy to differentiate based on the shade of blue and design.

Besides Chinese and European porcelain, American white ware and sherds from modern ceramics were also collected from the site. American white ware came into circulation in the early 20th century (Wilby 2004). This is easily distinguishable from Chinese white ware since the glaze of American white ware does not have a jade-like texture resulting from the clear glaze that also contains small amounts of iron (Miller and Miller 2000; Wilby, 2004).

The majority of the porcelain sherds from the 2010 excavation were Chinese blue-and-white porcelain, proposed to be from the late Qing dynasty; and this is not surprising to know considering the popularity and prestige of the ware.
There were also some sherds from modern pieces and this was easily identified due to the engraved initials ‘S.C.D.’ which was later found out to be Susana Castillo Dimayuga (the wife of the property owner) (UP-ASP 2010). The modern sherd resembles the bowls and plates seen and used today, even as prizes in annual town fairs or perya. Anghel and Susana Dimayuga, owners of the lot where Structure A stands had been married since 1960.

The engraved initials can be a good dating material for the different phases of the structure. The other modern ceramics are distinguishable since the fabric and designs are technologically different from that of the 19th and early 20th century wares. Figure 2 is a graph showing the types of sherds from the 2010 excavation.

![Figure 2: Types of sherds from the 2010 excavation of Structure A.](image)

For the analysis, only eight body sherds were studied under the microscope for two reasons: a.) due to time constraints; and b.) these sherds had the most practical dimensions for use-wear analysis. While the researcher was doing use-wear analysis, it was discovered that ideally the material being studied is whole, but if sherds should be analysed, these should not be smaller than 8-10 cm.

The reason being, scratches and abrasions are more visible and analysable on bigger surfaces. Although Griffiths (1978) stated that foot rims show evidence of abrasions and mouth rims show evidence of stirring or scraping, the researcher still included body sherds in the analysis so that marks from there can be compared with those found in
mouth rims. Another reason is that it is more probable to find knife cuts in body sherds.

Eight mouth rims and seven foot rims were studied under the microscope. Figure 3 illustrates sherd parts from the whole excavation. Provenance was not recorded at the time of classifying sherd parts, but information on the types and provenance of all the sherds may be seen in Figure 2.

**Figure 3:** Types of sherds from the 2010 excavation, provenance not stipulated.

### Horizontal and vertical distribution of sherds in the site

In all trenches excavated in 2010, tradeware ceramic sherds were found, although Trenches 9 and 10 only had relatively few pieces. Trench 6 yielded the most sherds, which is very significant since this trench is located near the excavation site in 2009, an excavation wherein more sherds were collected (Barretto-Tesoro et al. 2009).

It was mentioned that the 2009 excavation included the kitchen area of the structure and perhaps the amount of sherds found in Trench 6 may lead us to identifying the function of this part of the structure.

Since Trench 6 is found nearest the proposed kitchen area excavated in 2009, this could explain the abundance of sherds collected from that trench. However, since sherds were distributed in all trenches, this alone cannot be used to infer the definite functions of the proposed rooms.
This may be said because Trenches 8 and 10 are located outside the structure. Also Trench 11, known as the Test Pit trench, yielded nine sherds, more than the four sherds found in Trench 9, which was an interior trench. See Figure 4 for the table of the distribution of sherds per trench.

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Figure 4: Distribution of sherds in trenches (2010 excavation).

**Distinguishing Scratches and Marks**

Even before looking for knife cuts and utensil marks, it was imperative to first identify “new cuts” or marks made recently by troweling, by the soil, or by bagging the artefact. The difference of new and old marks is quite easy to see. Figures 5 and 6 show the new and old scratches on the sherds.

In Figure 5, the scratches on the left are new scratches simply because the cut is fresh and shallow, while the scratch on the centre can be easily seen as old because the mark is deeper and possible soil deposits have already been localised. This is evidenced by the discolouration inside the cut which resembles the colour of soil or the sediment.

Figure 7 also shows two kinds of scratches with measurements. Measurements were made so that it may be diagnosed if the cut was made by a knife. The difference between cuts, scratches, and abrasions was explained above.
Figure 5: Pointing out a new mark (57.5x magnification). Exterior part of a Chinese porcelain sherd.

Figure 6: New and old scratches, (57.5x magnification). Interior part of a Chinese porcelain sherd.
Porcelain uses and marks

In her article, Griffiths (1978) identified distinct marks on her samples which indicated the different functions of each ware. She mentioned that in dinner plates, there are two varieties of use-marks. Knife cuts are usually longer and deeper than spoon and fork marks that might illustrate scraping. In soup plates, one can only find spoon and fork marks.

Knife cuts are the heaviest as they cut most deeply into the glaze and they tend to have distinct little tears along the edges of the cut where flakes of glaze have been chipped off by the knife blade. These cuts usually form fairly straight lines of various lengths, depths, and widths, occasionally ending in a tiny hook. Generally, says Griffiths, they are scattered all over the plate centre. On the other hand, the fork or spoon scratches are much lighter than the typical knife cut and, more often than not, they cover the plate centre often extending on the plate sides, with a haze of short random lines. On some occasions, the marks curve in longer, sweeping lines over and around the plate centre and short zigzag lines are also common.
Comparing photos from Griffiths’ article with results from the microscopic analyses of 25 samples made it possible to identify some marks. The researcher took a sample from a base sherd (or foot rim) from the 2010 excavation, and interestingly, the sample yielded the marks described by Griffiths. Figure 8 is a photograph taken from Griffith’s article, placed here for reference. Figure 9 depicts “deep cuts,” or knife cuts seen in IV-2009-F-2050 (the sherd that bears the engraved initials of S.C.D.). The term “deep” is used to refer to the force that the user employed when cutting the food. Although Figure 9 is a modern sherd, the abundance of marks should not be disregarded. Other sherds depicted lighter marks which corresponded to spoon and fork marks. Figure 10 is a photograph of IV-2009-F-2200 retrieved from Trench 11. It is a Chinese blue-and-white foot rim sherd with light marks. The knife marks found on these sherds may tell us the kind of food that was eaten by the household or owners of the structure. Normally and traditionally (in western perspective) knives are used for meat. By identifying this kind of mark, there is an opportunity for archaeologists to deduce economic status, kitchen practices, as well as the variety of food. Meat consumption is connected to power and dominance, or higher social status (Fiddes 1991, 1994). If knife marks were manifestations of the consumption of meat, this is additional data that can support that the people who resided in Structure A were elites.

Figure 8: Centre of a soup plate showing heavy use, evidenced by spoon scratches and some knife-cuts on a 20th century white earthenware (Griffiths 1978: Figure 7).
Figure 9: Interior of porcelain sherd (IV-2009-F-2050) with knife marks (60x magnification). Modern sherd, with ‘S.C.D.’ engravings on the opposite side.

Figure 10: Interior of a Chinese porcelain sherd (IV-2009-F-2200) with old but light scratches (60x magnification).
Marks on foot rims

Griffiths also mentioned that foot rims have veritable marks to yield. Use-marks on the foot rim take the form of simple abrasions, dulling the brilliance of the glaze or scratching it with short, haphazard, criss-cross lines (Griffiths 1978). As a general observation, the use-marks on the centre of the plate should agree with the foot rim to indicate use. The abrasions found on the foot rim indicate storage or being placed on the dining table. There are some cases wherein plates with few or no cutlery marks do not normally exhibit worn foot rims. But, in the event that they do not match, it may indicate one or several types of use or storage.

Some of the proposed reasons why the foot rim might exhibit more usage than manifested by the plate centre are: “a.) the use of cutlery that was not hard enough, or sharp enough; b.) the plate or bowl could have been a serving dish, cake plate, pie dish among others; and c.) the manner of storage could have been in stacks without the use of a buffer material” (Griffiths 1978: 74). When examining plates and bowls, it is important to compare the foot rim with the mouth rim and centre of the same piece.

This is done so that it can be deduced if the ceramic was heavily used for dining, or not. Griffiths showed a photograph of a worn foot rim, and it is included in this paper, for comparison with sherds from Structure A. Figure 11 is a photo taken from Griffiths’ article exhibiting a worn out foot rim with heavy abrasion marks. A foot rim sherd taken from Trench 8 exhibits one that has already lost the luster of the glaze. Figure 12 is a photograph of IV-2009-F-1532, an undecorated modern white ware. The magnification used was higher than those for the scratches, i.e. 65x. Significantly, this would mean that the piece could have been stacked without a buffer or the table where this was used did not have a table cloth.

Another foot rim that seemed very much worn out would be IV-2009-F-1845, a Chinese porcelain foot rim sherd retrieved from the top soil of Trench 5 (Figures 13-14). The foot exhibits signs of discoloration. When the interior base of the same piece was examined, heavy marks indicating the cut of a knife were seen. It can then be proposed that IV-2009-F-1845 (or this particular sherd) might have come from a utilitarian piece or a dining plate. IV-2009-F-1845 is highly possible to be a utilitarian material and not a decorative plate or bowl.
Figure 11: Worn out foot rim (Griffiths 1978: Figure 12).

Figure 12: Worn out foot rim of a white ware (IV-2009-F-1532).
Figure 13: Chinese porcelain foot rim sherd (IV-2009-F-1845) with abrasions and discolouration (60x magnification).

Figure 14: Knife marks found on the same porcelain as in Figure 13 (IV-2009-F-1845), matching worn out foot rim.
Also significantly included in foot rim examination is, if in the event that a plate or bowl is whole and only one side of the foot rim has abrasions, then the plate or bowl could have been decorative. Even nowadays, there are households that place ceramics in an upright position wherein the surface of one side of the foot rim is parallel to the wall and the one side of the mouth rim is perpendicular to the base or shelf. This will of course happen if and when the plate has a precise drawing or adornment. “A distinctive pattern of uneven abrasion will result if the picture or design on the plate-centre is displayed upright,” (Griffiths 1978: 74). In the same article, a photograph was shown to illustrate a decorative pattern familiar even today (Figure 15).

Figure 15: Illustration of a plate display explained in Griffiths (1978: Figure 8).
Naturally, some sherds did not exhibit heavy use or abrasions. It should not be readily assumed that these wares were not used at all. A plate stand is another probable or alternative manner of decorating plates or bowl. Although the history or origin of plate stands is currently not yet available, perhaps further research can be done in the future. Nonetheless, below are examples of the use of the plate stand for decorative purposes (Figures 16a-16b). The researcher had this possibility in mind, and upon encountering sherds that did not exhibit heavy abrasions, a guesstimate can be made that the owners could have used plate stands similar to the decorative pattern which Griffiths proposed. In fact, a certain European foot rim sherd (IV-2009-F-2022) showed that it was not heavily weathered or “abraded” (Figure 17).

Conclusion

Use-wear analysis on the sherds from Batangas is not entirely conclusive, but can however give veritable information, as object function can still be identified. It could be inferred or estimated that the sherd could have come from a dinner plate/bowl, soup plate/bowl, serving plate or decorative plate. Also significant is that the “level” of use can also be determined. But of course, caution must be taken when analysing, for the reason that most of the sherds collected from 2010 are too small, and it must be noted that it was once part of a larger object, where most probably the marks or scratches can be found on its other pieces.

In addition to indicating the possible “level” or kind of use which past users employed on the ceramics, decorative practices or styles can also be determined. This analysis has rendered helpful results for the benefit of archaeological studies in the Philippines as it opens the doors to archaeologists studying economic status, household or kitchen practices, as well as the kinds of food consumed of the group of people being studied.
Recommendations

Use-wear analysis is not all about scratches and marks. In Griffiths’ article, she mentioned the possibility of studying cracking of the fabric and/or crazing of the glaze of vessel resulting from localised contact with heat or intense thermal shock. Also, a very interesting and promising approach could be investigating the spalling of the surface of the vessel (usually the interior), possibly resulting from the “crystallization of salt impurities carried into the fabric of a vessel by various liquids and left behind, to form crystals, when the liquid medium evaporates” (Griffiths, 1978: 80).

Since scratches and scrapes are not entirely conclusive, any archaeologist or researcher should bear in mind that residue analysis will also help. Thus, sherds and ceramics alike should not be washed after being collected from a site, especially if your objective is use-wear analysis. Other ways of analysing is checking for etching which happens to the glaze when it is attacked by various acidic liquids stored in the vessel. Griffiths also mentioned that deposits (such as wood stains) on the fabric and/or glaze could be seen resulting from long storage, insufficient cleaning, or high temperature cooking of contents. For further studies, the researcher looks forward to conducting an experiment to determine characteristics of use marks produced by different utensils and other tools. Perhaps on a different research and different site, the researcher will want to investigate on chopstick marks, as this may shed more light on kitchen and dining practices, the owner of the house, as well as social class and ethnicity.

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References


Buttons of San Juan: Preliminary Analysis of Buttons Recovered from San Juan, Batangas 2009 Field Season

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Abstract

The 14 buttons recovered from the 2009 excavation of Structure A, Barangay Pinagbayanan, San Juan, Batangas were morphologically and chemically analysed using Energy Dispersive X-ray (EDS). The objective of the analysis is to determine the raw material of the buttons for classification. Optical microscopy reveals breakage pattern, patina, and manufacturing traces indicative of glass buttons. After EDS analysis, five button types were identified: porcelain or prosser buttons, glass type 1, 2 and 3 buttons, glass shanked button, and a bone button. Based on the known button manufacturing lifetimes, it is suggested that all inorganic buttons were European imports with prosser buttons possibly from a Bapterosses factory in France.

Introduction

Structure A, Site 1 (Edgardo De villa Salud Property) Barangay Pinagbayanan, San Juan, Batangas (IV-2009-F) is a late 19th century two-story household dwelling locally called “Bahay na Bato” (stone-based

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Buttons of San Juan

house). It is part of a cluster of abandoned stone ruins that was assumed to have been constructed in the late 1800s. Batangas (Figure 1) is archaeologically rich, with excavations concentrated on the western coastline with various sites such as Kay Tomas and Pulong Bakaw south of Calatagan (Dela Torre 2008; Fox 1959; Ronquillo and Ogawa 1996), Balayan (Santiago 1961), and Lian (Dela Torre 1994). The province is also the location of the underwater archaeological site of San Diego (Desroches et al. 1996) and an excavation at Verde Island (Legaspi 1964). San Juan figured in archaeological literature via the National Museum’s excavations at the jar burial site of Calubcub II dated to 500 AD and 10th to 15th century (Salcedo 1979).

Figure 1: Map of Batangas Province showing areas with archaeological field work.

The Municipality of San Juan, 42 km from the provincial capital of Batangas, is bounded by Quezon Province to the north; Rosario, Taysan and Lobo to the west, and Tayabas Bay to the south and east. According to archival records, Barangay Pinagbayanan was the site of the old town of San Juan politically under the town of Rosario. It was established by the Recollects under P. Fr. Toribio Mateo in 1881, naming the town after San Juan Nepomuceno. The earliest settlers include families from within Batangas and nearby provinces (Garcia 1968). The proximity of the town to the coast resulted to constant flooding (Sastron 1895). In 1886, the town was relocated to Calit-calit, 7 kms away. The town elites disapproved of the relocation. Their investment towards the old town, evidenced by the quality of the material of their houses, was substantial and they refused to abandon their residence (Erecciones de los pueblos: Batangas, 1767-1896).
However, the relocation proceeded in 1891. The old San Juan was named Barangay Pinagbayanan which translates to “former town” (Barretto-Tesoro et al. 2009).

In 2009, the University of the Philippines- Archaeological Studies Program (UP-ASP) excavated the southern portion of Structure A for that year’s annual Field School (Barretto-Tesoro et al. 2009). The northern portion was excavated the following year. One of the primary objectives was to carefully examine activity areas of the house through stratigraphy and artefact analysis. The location of the trenches was influenced by the positive structures, i.e. walls, a stone well, and several pillars. Structure A is part of the settlement around the town plaza, which indicates that the house belonged to one of the principales of the town (Villegas 1998). Excavation in Trench 1 revealed that it was an enclosed area with large windows facing the modern street. Extensions in Trench 1 recovered the doorway leading into the vicinity (Figure 2). Trench 2 surrounded the stone well (koloong) while Trench 3 investigated the tuff stone pillars, which revealed remnants of a stone arch. Both trenches were under what would have been the second floor kitchen. Trench 4 revealed part of the storage area (kamalig) based on the raised tuff blocks flooring.

**Figure 2:** Map of San Juan with highlighted Barangay Pinagbayanan. Inset: Site Map of the southern portion of Structure A (Barretto-Tesoro et al. 2009).
Recovery of buttons strengthens the assumption that Structure A had a domestic function at one or more stages of occupation. Buttons were recovered from all trenches in various layers of construction, occupation and even through to the modern times. This study presents the morphological and chemical analysis through Energy Dispersive X-ray (EDS) of the 14 buttons recovered from Structure A. It is supplemented by available patent records and button cards published in the same era to identify the types of button present in the assemblage.

The analysis aims to describe the different button types manufactured and/or used in the late 19th century Pinagbayanan, San Juan. This study is a preliminary analysis of buttons and focuses raw material identification and form description. The buttons are also described according to its production process and possible use based on the layers where it was recovered. A basic classification is presented but the results should be treated as a case study. The importance of the study lies on the preliminary exploration of button artefacts and its contribution to a holistic picture of historic Philippines as represented by Structure A.

**Buttons in Archaeology**

In Philippine archaeology, attention towards buttons as one of the many types of artefacts recovered from historical sites has not been intensive. There is only one other Philippine historic site where buttons played an active role at site interpretation.

In the excavations at Lumang Bayan Site in Sta. Teresita buttons were used as time-markers. Burials associated with plastic buttons were assumed to be modern, while burials with organic (bone/shell) buttons were early 20th century (Paz 2003).

This is the first study to fully analyse buttons recovered in a Philippine archaeological context to demonstrate that morphological and technological analysis of buttons contribute to its archaeological potential. One of the most important contributions of buttons towards archaeology is its ability to be time-markers. Buttons had been one of the artefact types ubiquitously recovered in rescue archaeology (Venovcevs 2013).

Production process and the time period in which the buttons were made, used, and discarded contributes to the fuller understanding of the button’s life history as connected with the possible uses of site.
Furthermore, buttons had been associated with social status and various activities based on their style and manufacture (Lindbergh 1999). Button size and style are closely correlated with its intended function. Smaller buttons of 8 mm to 15 mm are used for underclothing, shirts and waistcoats (Linbergh 1999). The smallest buttons of this range are also associated with dolls or baby’s clothing (Sprague 2002). Medium buttons of 16 to 21 mm are used to fasten larger items of clothing, such as coats, jackets, and pants (Lindbergh 1999). However, this is not followed strictly, especially since buttons are kept after the garment has been discarded. Archival data on Philippine button manufacture has not been fully investigated. Data on buttons are usually gleaned from button cards that are with collectors. This limits the study in placing the buttons in the Philippine context. It is assumed that buttons were not manufactured in the Philippines. Instead, they are imported into the country as part of the European or American trade system. However, this makes buttons important indicators of trade and access of goods in the historical period.

**Button Manufacturing in the Industrial Age**

Buttons are considered as clothing-related items, generally, to fasten garments together. However, buttons were originally worn primarily as decorations on clothing without any utilitarian value. It was only in the sixteenth century when buttons gained utilitarian use and, until the nineteenth century, only to fasten men’s undergarments (Orser 2002). Men were originally the market for buttons (Lindbergh 1999) but in the 1890s, women’s clothing such as shirt waists already used buttons.

The manufacture of buttons in the beginning of the Industrial Age primarily used metal, e.g. pewter, silver, copper, and brass, until the 18th century. These metal buttons were used in the military both as a decoration, embossed with the army’s insignia, and as a functional clothing fastener, usually undecorated. New developments in the Industrial Age made it possible to manufacture buttons using different kinds of raw materials. Cheap glass, ceramic and shell buttons were made available for the utilitarian use of non-elites.

There are two main types of buttons, namely, the sew-through buttons and the shank buttons. The sew-through buttons are considered as utilitarian with one through five perforations to enable the thread to attach the buttons to the garment. On the other hand, shank buttons have no perforations. Instead, it has a loop at the back of the button for
attachment to the garment. The earlier shank buttons have a loop made of metal and button base could me made of any material.

Bone Buttons

The oldest known buttons are made of animal bones. Before the industrial age, bone buttons were produced domestically. Introduction of lathe use made production easier and more precise. The lathe is used to cut a circular tube from the bone. Individual buttons are cut from this bone tube and fashioned into buttons. Bone buttons were cheap to make and were used for men’s underwear and pants fasteners (Ferris 1986). Women also used bone buttons for shawls and cloaks. By the 1700s, bone button style had evolved to a single holed button base that accommodates fabric-covering (Lindbergh 1999). These buttons are called Dorsets or Cartwheels and went out of fashion by 1830s (Venovcevs 2013). Some bone buttons had one perforation or had a pinshank attachment made of metal. In 1832, horn buttons saw a manufacturing revolution with the introduction of a new technique by T. W. Ingram. This new process involved boiling the horn or bone raw material to a viscous consistency and press moulded into the final button form. Further improvements occurred in 1837 with the introduction of coloured dies to create colourful bone buttons. The most common pressed horn buttons were black and red. By 1850s, only horns or vegetable ivory were used for the pressed horn technique. Bone buttons went out of fashion by this time, except for ornately carved and inlaid button types.

Ceramic Buttons

The main development of 1840 is the introduction of the Prosser Method. This fully industrialised process allowed for the production of buttons using dust clay, instead of wet clay. The powder is pressed on to a cast-iron mould under 400 tons of pressure. Then, they were fired in a muffle furnace over very high temperature. The process and resulting white ceramic buttons bore similarities with porcelain wares that they were sometimes called small china buttons. In button cards, they are commonly called agate buttons (Prosser 1881). Another term suggested for these buttons is “prosser buttons” (Sprague 2002: 113), which is the term used by this paper. This Industrial Age innovation allowed for the production of ceramic buttons in very large quantities. Hence, they are the most common button types recovered in archaeological sites dated to the late nineteenth-century (Venovcevs 2013).
Documentary evidence for the beginning of the prosser method is mainly based on the English patent record No. 8548, issued on June 17, 1840 to Mr. Richard Prosser (Albert and Adams 1970). It contains the original dust clay method of manufacture. In the same year, prosser buttons were produced by English factories such as Minton Company at Stoke-on-Trent, Maw, Turley and J.M. Blashfield, and W. Chaberlain and Co. at Worcester, as well as some Birmingham companies” (Sprague 2002). A version of the prosser method was passed in the United States on 30 June 1841 (Patent No. 2199) filed by Thomas Prosser, Richard’s brother. The patent was for a similar technique but had some few additions. This included the use of a fly screw-press or similar machines to put pressure on the dies. Prosser button production started at least by 1844 by Charles Cartlidge & Co. of Greenpoint, Long Island, New York (Ketchum 1987). The factory had closed by 1856.

By 1851, English button factories were driven out of the market by the French manufacturers, such as those managed by Jean-Felix Bapterosses (Godden 1982). Bapterosses’ patent was approved by the 4th of November, 1844. A law suit by Prosser documented that Bapterosses was able to learn the technique in England when he worked at the Minton factory and brought the technology to France. Bapterosses continuously improved the prosser method over the years with the introduction of a new furnace design in 1847, and the introduction of milk as a lubricant by 1855. Bapterosses opened his factory in 1845 and eventually settled in Briare in 1851. By 1848, the French factories were producing prosser buttons in different colours such as pink, ochre, grey, blue and black (Sprague 2002). With the button’s better appearance, the improved techniques for faster manufacture and cheap labour, the French factories were able to sell their buttons at a cheaper price compared with the British buttons. By 1850s, the French manufacturers had completely dominated the European market. The prosser buttons were called agate buttons in the button cards, which the salesman used to introduce his wares. However, the prosser button manufacture had reached its end by the 1950s and 1960s with the introduction of plastic buttons.

Glass Buttons

Manufacture of glass buttons was developed before the prosser method was in place. Mass-production of glass buttons started in the 18th and 19th century (Orser 2002). Production had started in the 1830s where glass was pressed on to a metal frame (Venovcevs 2013). One of the main
concerns for the production of glass buttons was the weakness of glass shanks, which easily broke under stress. The solution of glass button manufacturers was to replace the glass shanks with metal shanks instead. Another option was to fashion the shank with a frame where the glass face could be attached. The earliest date for metal shanks on glass buttons are based on the U.S. patent awarded on 28 December 1880 to John A. Deknatel entitled “Glass Button and Mold for Manufacturing the Same”. The patent came from developments made by Deknatel’s assistant, A. Hamann.

Although glass buttons were able to provide more options for decorations and had the ability to copy precious stones, the glass button shanks became a problem for the non-elite consumers who were concerned with durability. They were also over looked over prosser buttons, which had the advantage of having no sharp edges to affect threading (Sprague 2002). Their limited demand contributed to the rarity of glass buttons in archaeological contexts (Ferris 1986). Glass buttons came in a wide range of colours. Black buttons became very popular at the second half of the nineteenth century, after the death of Prince Albert in 1861. Queen Victoria’s mourning attire included jet buttons, which the black buttons imitated for the masses (Lindbergh 1999). An analysis of the button industrial production process makes button invaluable chronological markers for post-industrial sites. Each button type prospered and faded as production closely followed what is fashionable. An graphic representation of each button type’s terminus post quem (Figure 3) demonstrates the ability of button artefacts, once properly identified, to aid in building a more holistic site interpretation.

Figure 3 : Button lifetimes per Button Type.
Methods

Sample Preparation

The buttons were catalogued using National Museum accession numbers on site. Buttons with the same accession number were given an arbitrary number for analysis. Initial button sorting was conducted into organic and inorganic buttons. All inorganic buttons were cleaned in the Archaeological Studies Program laboratory using tap water then allowed to dry.

Morphological Analysis

The button dimension was taken according to maximum diameter (MD), maximum thickness (ML) and maximum perforation diameter for at least one perforation. The measurements were taken using a digital calliper (Mitutoyo, Japan). Apart from button dimensions, other concerns were button form, opacity and colour. A hand-held lens of 10x magnification was used for initial surface examination to determine the possible button raw material. The aim of the morphological analysis was to characterise the buttons and develop a working classification for further stages of the analysis. One of the more interesting questions is whether porcelain buttons are present in the assemblage. Sprague (2002) noted a propensity in misidentification of porcelain buttons due to its similarity with the surface features of glass button types.

Optical Microscopy

All buttons underwent optical microscopy using a NIKON SMZ-745E stereo microscopy at the Plants and Sediments Laboratory at the UP-ASP. A camera attachment, NIKON D-5000, was used to take the images. The objective of optical microscopy was to identify physical features on button surfaces that provide clues on the raw material. This study focuses on the following:

*Seams* are an important indicator of using moulds. The presence of moulds indicates a highly industrialised process. This is true not only for buttons but also for other historical artefacts, e.g. bricks, nails, etc. For buttons, seams are a feature of both glass and ceramic buttons. Both button production processes used moulds to be able to manufacture a great number of buttons for every firing.

*Orange peel surface* on the back of a button suggests that a button is porcelain. This feature is not present on glass or any other button
type. This feature could have been produced through two methods (Sprague 2002): when the clay is removed from the mould; or it is an impression from the mould while the button was waiting to be fired.

Breakage observed, if any, also contributes to the evidence towards porcelain or glass raw material.

Patina is caused by the decay of a glass material. It appears to be a translucent film that had developed on the surface of glass. Only glass materials are able to develop patina.

Other surface features, such as traces of manufacture, are also documented.

Elemental Analysis

To supplement the morphological analysis and optical microscopy, the study used elemental analysis to contribute towards the identification of the raw material of the buttons. A representative sample of each inorganic type, based on morphological analysis, was randomly selected for Energy Dispersive X-ray (EDS) analysis. The non-destructive EDS analysis was conducted at PhiLab, Makati under their own laboratory protocols. No treatment was performed on button the surface.

Results

Morphological Analysis

Analysis of the 14 buttons (Table 1) reveals that all but one button are classified as sew-through buttons with two to four perforations. One button is described as shanked. Nearly all buttons are inorganic, with one organic button. The most common sew-through buttons are ones with three perforations. Only one button has a single perforation in the centre, while there are four buttons with two perforations and two buttons have four perforations. For sizes, nearly all buttons are small, with two buttons being medium sized. There are 11 buttons that are described as white or off-white. Two buttons are coloured, a black sew-through and a blue decorated shank button. The organic button appears plain or unpainted. All inorganic buttons are opaque, except for the shanked button, which is translucent. Overall, most buttons are in good condition, except for the shanked button with an incomplete shank.
Table 1: All buttons collected from Structure A with Maximum Diameter (MD), Maximum Length (ML), and Maximum Perforation (MP), comments pertaining to size, colour and opacity.

<table>
<thead>
<tr>
<th>Accession #</th>
<th># of Perforations</th>
<th>MD</th>
<th>ML</th>
<th>MP</th>
<th>Comments</th>
<th>Colour</th>
<th>Opacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV-2009-F-1023</td>
<td>3</td>
<td>7.59</td>
<td>2.29</td>
<td>1.01</td>
<td>small</td>
<td>white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1310</td>
<td>2</td>
<td>12.8</td>
<td>3.38</td>
<td>2.06</td>
<td>small</td>
<td>off-white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1021</td>
<td>1</td>
<td>16.11</td>
<td>4.97</td>
<td>3.17</td>
<td>medium</td>
<td>white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1298</td>
<td>3</td>
<td>7.01</td>
<td>2.77</td>
<td>1.7</td>
<td>small</td>
<td>white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1298</td>
<td>3</td>
<td>7.55</td>
<td>2.16</td>
<td>1.04</td>
<td>small</td>
<td>white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1296</td>
<td>2</td>
<td>12.27</td>
<td>2.92</td>
<td>1.44</td>
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<td>off-white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1296</td>
<td>3</td>
<td>6.09</td>
<td>2.15</td>
<td>0.98</td>
<td>small</td>
<td>white</td>
<td>opaque</td>
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<td>IV-2009-F-1022</td>
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<td>13.56</td>
<td>3.66</td>
<td>2.32</td>
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<td>off-white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1309</td>
<td>3</td>
<td>6.13</td>
<td>1.83</td>
<td>0.96</td>
<td>small</td>
<td>off-white</td>
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<tr>
<td>IV-2009-F-1390</td>
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<td>6.93</td>
<td>2.54</td>
<td>1.04</td>
<td>small</td>
<td>white</td>
<td>opaque</td>
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<td>1.25</td>
<td>small</td>
<td>black</td>
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<td>3.05</td>
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<td>off-white</td>
<td>opaque</td>
</tr>
<tr>
<td>IV-2009-F-1191</td>
<td>4</td>
<td>16.28</td>
<td>2.47</td>
<td>1.81</td>
<td>medium</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IV-2009-F-1392</td>
<td>Shank</td>
<td>12.1</td>
<td>2.78</td>
<td>0</td>
<td>small</td>
<td>blue</td>
<td>translucent</td>
</tr>
</tbody>
</table>

Optical Microscopy

Seams are present only for the small sew-through buttons (Figure 4a) with three perforations and on the sew-through buttons with two perforations (Figure 4b). It is absent on all other button types, including the one-holed sew-through button (Figure 4c).

Orange peel surfaces are difficult to determine with no reference photo. The surface on the back of buttons has pock marks gathered towards the area of the perforations (Figure 5). However, this could also be usewear. Only one button shows a possible orange peel surface (Figure 6).

Breakage is observed on three buttons. The one-holed sew through and the shanked button (Figure 7a and 7b) both have similar concave break wave markings. This type of breakage, with concave/convex pattern is a characteristic of glass. On the other hand, the three-holed sew-through button does not exhibit this wave pattern (Figure 7c). Instead, it appears to be amorphous.
**Figure 4:** Optical microscopy of buttons investigating SEAMS on (a) IV-2009-F-1390, (b) IV-2009-F-1022, and (c) IV-2009-F-1021.

**Figure 5:** Optical microscopy of buttons investigating Orange Peel Surface on several button types.

**Figure 6:** Optical microscopy of button investigating Orange Peel Surface on IV-2009-F-1298.

**Figure 7:** Optical Microscopy of buttons investigating breakage patterns on (a) IV-2009-F-1021, (b) IV-2009-F-1398, and (c) IV-2009-F-1390.
Patina is observed only on the surface of the shanked button (Figure 8). The patina has developed around the decoration but it does not cover the button entirely. Only glass buttons would be able to develop a patina.

![Figure 8: Optical microscopy of button investigating patina on IV-2009-F-1392.](image)

Only one other feature is observed. It is the only manufacturing trace on the buttons. A piece of material can be seen protruding from the top of one of the buttons (Figure 9). It is possible that this happened when the material was still in its liquid state. A piece of material had overflowed from the mould. It is possible that the raw material used had a viscous to liquid state when placed in the mould suggesting that glass was used.

![Figure 9: Optical Microscopy of buttons investigating manufacturing traces on IV-2009-F-1298.](image)

Elemental Analysis

The following buttons were sent for EDX analysis: IV-2009-F-1390, IV-2009-F-1022, IV-2009-F-1021, IV-2009-F-1392, IV-2009-F-1394 (Figure 10). Elemental analysis reveals that button IV-2009-F-1390 has no evidence of silica (Si). Instead, it has traces of iron (Fe) and nitrogen (Ni). This suggests that this type of button is made of porcelain. Three buttons, IV-2009-F-1021, IV-2009-F-1022, and IV-2009-F-1394, have varying degrees
silica (Si) ranging from 13% to 18%. Button IV-2009-F-1392 also has no silica but retains similar chemical characteristics as other glass buttons. It is believed that the patina and the limitations of the machine have affected the results. Nonetheless, this button type is considered as glass.

Figure 10: Results of EDS analysis.

Discussion

The 14 buttons retrieved from the excavation can be classified into three (3) main types according to material, namely, porcelain, glass, and bone. Glass buttons have the highest quantity with 50% of the collection, followed by porcelain buttons at 43%, and bone buttons at 7% (Figure 11). Of the three types, only glass buttons showed variation in form, colour, shape and decoration. They are divided into four types, namely, Glass Type 1, Glass Type 2, Glass Type 3 and Shanked.

Figure 11: Types of glass buttons and quantity recovered.
Porcelain Buttons

All porcelain (P) buttons are all sew-through buttons with three perforations (Figure 12a). It shows unique physical characteristics in terms of breakage pattern and the distinctive orange peel surface at the back of the button. All factors combined suggest that these buttons are prosser buttons. Compared with data from button collectors, they are examples of the dish-type buttons, where the surface is bevelled and the under-side curves outward. These buttons are distinctively minute. It is suggested that these buttons may have been used for baby or doll’s clothing (Sprague 2002).

Figure 12: Button Types recovered from Structure A.
The four main types of glass buttons are arbitrarily labelled as Glass Type 1, Glass Type 2, Glass Type 3 and Shank. The glass buttons come in four different colours, with two different ways of attachment onto a garment. None of the glass buttons are considered flat discs, which seems to be a characteristic of modern buttons, a change in form for advances in sewing equipments.

Glass Type 1 (G1) is collared with a central dip where the two perforations are located (Figure 12b). The consistency of the dimensions of the glass buttons indicates that they were moulded. It is a technique where glass, in its plastic form, was poured into dies. This type of button is considered as a single piece, wherein the buttons were made as a single object, without any attachments of the same or another material. Two holed buttons were used for fastening work shirts and pants and described as “trouser” or “suspender” buttons (Lindbergh 1999).

A single button represents Glass Type 2 (G2). It is the only button with a single perforation, or one “eye”, located in the centre dip (Figure 12c). This type of button requires a self-shank sewing technique, where the button serves as a lock for the garment. This type of attachment might have also accounted for its size as the biggest button in the assemblage. It bears the collar decoration also found in Glass Type 1 buttons. The brown to red stains on the surface of the button seems to be damage resulting from high temperatures, e.g. burning, and not a part of the production process. The button is not completely flat, resembling the concave-convex morphology of the glass and porcelain buttons. This is the largest inorganic button in the collection and may have been used to fasten coats, jackets or other larger outer garments.

Glass Type 3 (G3) is one of the two coloured buttons in the assemblage (Figure 12d). Also of moulded glass, Glass Type 3 had four perforations or eyes which are located in the central dip. The morphology is similar to the ceramic buttons, except for the size and the number of perforations.

Only one shanked type of button was recovered from the excavation (Figure 12e). It is a single piece moulded glass button. The shank is incomplete with only a small portion protruding from the back making it difficult to determine the type of shank it used to have. There was no indication of a missing metal shank attachment. The decoration
seems to be a flower motif with a leafed bottom surrounded by a criss-crossed design, for texture, embossed onto the face of the button. Glass buttons with a metal shank is rare. In 1870s, glass buttons were mounted on sturdier metal shanks (Venovcevs 2013).

**Bone Button**

Only one organic button was recovered from site. It is hewn from bone with four complete perforations with a faux perforation in the middle (Figure 12f). Unlike the other perforations, middle perforation did not go through to the other side and, thus, was not functional for attachment. Instances of faux perforations on organic materials is usually the result of manual perforations wherein the faux perforation serves as a guide for the placement of the functional perforations (Lindbergh 1999). This type of perforation is usually hidden and not located on the exposed surface, suggesting that the face of the button was hidden from view, maybe by textile attachments. Another evidence for having a textile attachment on the face of the button is its flat morphology. It is the only true flat button recovered. Furthermore, the face of the button has no other signs of decoration, e.g. varnish.

**Site Distribution**

Buttons are well represented in that they were recovered from all of the trenches and in various layers, from the layer associated with modern times to the layer contemporary with the construction of the old stone house (Table 1).

The “modern” layer still yielded modern materials, such as plastic wrappers. The layer below the topsoil, as with Trench 1, is associated with the destruction of the house. The layers under it reveal several occupational phases suggesting improvements and repair. A midden deposit, where the storage area should have been, above the primary occupational layers suggests the house’s evolving purpose. Non-living layers also yielded buttons of similar type to the living layers.

The oldest buttons are Glass Type 1 and Shank. According to historical data, especially patents, single piece shank buttons were produced as early as the mid-1700s and ceased production after the late 1800s, when they were replaced with metal shanks creating 2-piece buttons. Associated with the shank button are Glass Type 1 buttons. The two oldest buttons were part of the fill used for construction indicating
that they were discards. The custom of saving buttons may or may not have been in place by the time of construction or buttons were not regarded as important enough to be saved.

The oldest buttons associated with a living floor are prosser buttons. However, prosser buttons appear on most levels, suggesting that at the time of construction, use and destruction, prosser buttons were readily available, at least more than glass buttons or organic buttons.

The single organic button and glass type 2 were recovered in the same depth, but of different contexts. The wooden button was recovered from what is believed as flood deposits. Associated with this layer are sorted ceramics, glass, and metal of various weight and size.

Glass type 2 is the only button recovered from the midden deposit that was truncated by a natural destruction layer. The midden is composed of marine shells, and a wealth of metal artefacts. There might have been burning in the area of the midden causing the stains on this unique button type.

The natural destruction layer, which lies below the final destruction layer, is only found in Trench 4. This depicts a possible period of abandonment prior to the final destruction of the kamalig area. Prosser buttons are ubiquitous in this layer, with a lone Glass Type 1. The buttons may have been unintentional discards that has not been collected because people did not use the space as frequently.

The layers before and after the final destruction rubbles yielded only Glass Type 1 and the singular black Glass Type 3. There’s a great difference between the two buttons in terms of morphology and period of production. Glass Type 1 is recovered from older layers, while Glass Type 3 was only recovered from the layer after the destruction. Furthermore, black buttons gained popularity only at the late 1800s while glass buttons started production as early as the late 1700s. The black button, together with the associated artefacts, such as the bone toothbrush, may indicate a period of high European or western influence just after the final destruction layer.

The modern layer still had a prosser button. It is possible that prosser buttons were deposited in other areas outside the excavation but were transferred there due to flooding or other taphonomic processes.
Conclusion

Although there are no archival data on the presence of buttons in historical Philippines, it is assumed that buttons were a European or American import. At the end of the 18th century, the Spanish involvement in commerce had significantly declined. The players in Philippine commerce were the British and Americans (Skowronek 1998), followed by the Spanish. Even style had been influenced by the economy. As early as 1792, Spanish creoles and peninsulares sported the European style. British and American entrepreneurs had started to invest in the economy, even migrating to the Philippines seeking to influence the cultural and commercial realm.

By 1899-1908, the Philippines had a marked increase in commercial dependency towards the U.S. (Jenkins 1945). In 1909, this was supported by the Payne-Aldrich Act of 1909 enabling free trade. Some of the industries established include the production of pearl buttons. There was no mention of local Philippine production of inorganic buttons.

With this in mind, the possible origin of the prosser buttons is the Bapterosses factory in France. It could also be traded in from British trade or part of fasteners on European clothing. Glass had been continually produced in various areas and it is difficult to determine its production origin. This is the same with bone buttons. It seems that the 1800s-1900s residents of Pinagbayanan belong to the more opulent class, having access to European style clothing.

The study demonstrated the importance of buttons for relative dating, and for interpretations. Morphological analysis was able to give clues into the raw material of the buttons. Breakage pattern, patina, and manufacturing traces were able to give vital evidence towards the possible button raw material. On the other hand, seams and orange peel surfaces were inconclusive. For this study, chemical analysis was invaluable for determining the button raw material.

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Museum of the Philippines.


How old is the Babo Balukbuk Site?
The Use of Tradeware Ceramics and Radiocarbon Dating in Identifying the Age of Porac, Pampanga, Philippines

Rhayan G. Melendres¹,²

Abstract

Central to the process of doing archaeology is the necessity for understanding the chronological sequencing of archaeological entities and past events and understanding the method that was used in doing so. Without a firm grasp of this sequencing, archaeologists would not be able to deal with issues of behavioural process and evolution. For this reason, dating the past has been one of the most crucial methodological problems facing archaeologists. Two sources of dating were used in identifying the age of Babo Balukbuk, Porac, Pampanga, Philippines namely: tradeware ceramics dating and radiocarbon dating. The system that I developed that was published earlier will be employed in identifying and documenting the tradeware ceramics found in the site. Also, the radiocarbon dates will be used to validate and cross-check the dates of the ceramics. Then, this paper will discuss the results of these dating techniques and their implications and significance in understanding better the pre-Spanish people of Pampanga, Philippines.

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Introduction

One of archaeologists’ traditional objectives in excavating sites is to date them (Rice 1987; Wiseman 1994). Central to the process of doing archaeology is the necessity for understanding the chronological sequencing of archaeological entities and past events, and understanding the method that was used in doing so. Without a firm grasp of this sequencing, archaeologists would not be able to deal with issues of behavioural process and evolution (Michaels 1989). For this reason, dating the past has been one of the most crucial methodological problems facing archaeologists (Renfrew and Bahn 2000; Sinopoli 1991; Thomas and Kelly 2006).

Pottery has long been a significant tool in chronological building in archaeology (Rice 1987). Rice articulated that the abundance of ceramics at archaeological sites throughout the world, just like in the Philippines, make them very sensitive and insightful instrument for delineating stylistic changes through time and for tracing cultural identity and relations. Ceramics, because of its many utilitarian and socio-cultural functions, easy transportability, durability, and numerous shapes, styles and decorations, make them very significant in dating and understanding a particular site (Melendres 2008, 2012).

In the Philippines, the use of tradeware ceramics as basis for dating a particular site is a common practice. Sites such as burials, habitations, and shipwrecks in the Philippines that are dated using tradeware ceramics include Butuan, (Peralta 1980; Scott 1982; Watt 1981), Santa Ana (Fox and Legaspi 1977; Locsin and Locsin 1967), Bolinao (Legaspi 1974), Calatagan (Barretto-Tesoro 2007; Fox 1959; Janse 1941); Bais (Tanjay Region), (Junker 2000), Cebu (Hutterer 1973; Nishimura 1992), Hatcher Shipwreck (Curtis 1985), Santa Cruz Shipwreck (Orillaneda 2008), Lena Shoal Shipwreck (Goddio et al. 2002), and Pandanan Shipwreck (Diem 2001; Loviny 1996).

For this research, two sources of dating were used in identifying the age of Babo Balukbuk, Porac, Pampanga, Philippines namely tradeware ceramics and radiocarbon dating. The system that I developed (Melendres 2008, 2012) will be employed in identifying and documenting the tradeware ceramics found in the site. Also, the radiocarbon dates will be used to validate and cross-check the dates of the ceramics. A background about the site will be discussed. Then, this paper will discuss the results of these dating techniques and the implications in understanding the pre-Spanish history and culture of Pampanga, Philippines.
The Archaeology of Babo Balukbuk, Porac, Pampanga

The excavation area is officially named Dizon 1 and situated in Babo Balukbuk in Hacienda Dolores, Porac, Pampanga, Central Luzon, Philippines (Figure 1). The area is a sugar plantation owned by Mr. Nestor Dizon. A Global Positioning System (GPS) reading locates it at 15° 05’ 27” north altitude and 120° 31’ 26’ east longitude and has an approximate elevation of 150 metres above mean sea level (Dela Torre 1999).

Figure 1: Map of the Philippines showing the Province of Pampanga.

The earliest archaeological exploration and excavation in Porac was from 1935-1936 which was carried out by G.M. Goodall and two Filipino assistants (Beyer 1947). Then in 1959 and 1960, Robert Fox excavated in Balukbuk and Gubat (Fox 1960a, 1960b, 1960c). The next exploration of the area was done in 1993 when some people from the National Museum conducted an archaeological impact assessment in Porac (Bautista et al. 1993). Afterwards, three excavation seasons followed in 1999, 2001, and 2002 were conducted in the sugarcane plantation of Mr. Nestor Dizon in Sitio Babo Balukbuk (Dela Torre 1999; Dizon 2002; Paz 2003).
How old is the Babo Balukbuk Site?

Working on the results of previous excavations (Dela Torre 1999; Dizon 2002) and several surface surveys, the excavation team was able to confirm that the general land area contained substantial quantities of material culture. For the 2002 excavation, “the site was mapped based on the reference points of the previous excavations. The same datum point was used to extend the grid map. For mapping consistency in the area, a 4m X 4m grid with a north-south orientation was adopted across the site” (Paz 2003: 8). The site was excavated utilising an open area excavation procedure which was done by following the natural stratigraphic layers on a larger scale without maintaining baulk walls along opened grid squares of the excavation area. An area of 28m X 24m was opened by the end of the excavation season (Figure 2).

Figure 2: Excavation grid of the site (after Paz 2003).
Melendres

Stratigraphy and the Archaeological Materials and Features found in the Site

Stratigraphic units and features were labelled as “context.” The different natural layers in the site may be described as follows (Figure 3) (after Paz 2003).

![Figure 3: Stratigraphy of the site where the number means depth in centimeters (after Paz 2003).](image)

Context 1 (Layer 1) is the top soil of the area which is mainly composed of volcanic sand from the 1991 eruption of Mount Pinatubo. Through field walking, the vegetation, soil characteristics, surface features, and artefacts were noted. Most of the artefacts found were broken pieces of earthenware and tradeware. Below Context 1 is Context 3 (Layer 2). It is composed of loose volcanic sand which is dark brownish in colour with a lot of organic materials such as roots of cassava and sugar cane. Broken pieces of artefacts, mostly earthenware and tradeware, were also found in this layer. Context 14 is the interface between Context 2 and the next context which is Context 5. It is a mottled layer of sand with distinct features of plough marks. Also, one burial and multiple globular earthenware pots were found in this layer. Context 5 (Layer 3) is composed of loose light yellowish brown sand with extensive in situ deposits and features such as burials, pit-middens, hearths, plough marks, and post holes. Layer 4 is made up of Contexts 38, 65, and 212. It is a sterile layer of sand.
since no cultural materials were recovered here. However, at the depth of 3.5 meters below the datum point, three pieces of angular earthenware sherds were found in the deep trench.

Almost 85% of the materials recovered in Babo Balukbuk were earthenware sherds. In contexts 14 and 3 however, large pieces were mostly recovered —globular type earthenware vessels (Figure 4). Earthenware rims, bodies, bases, handles, spouts, and covers were recovered in different stratigraphic layers in the site. There were some sherds that had soot or carbon traces in their exterior and interior surface. This suggests that they were used for cooking. Some sherds were decorated using different techniques such as carving, combing, incising, impressing and a combination of these. The most common design element in Babu Balukbuk earthenware assemblage is incising the pots with lines below the rim or neck area. Also, Paz (2003) reported that some of the earthenware sherds have rice impressions of both the grain and the husk. This may suggest that rice was used as a temper.

![Figure 4: A globular pot found in the habitation area of Context 5 (after Paz 2003).](image)

Barretto (2003) classified the metal implements found in the site into two. The first of the two types are the metal implements (Figure 5) that were recovered from burial contexts (7 pieces) and the second category are those that were recovered from non-burial setting (13 pieces).

Due to the acidity of the matrix of the site, there was a mark absence of skeletal materials, thus, identification of graves is a bit complicated. Only the presence of teeth enamel, arm bones inside a bangle and the associated grave goods or furniture like tradewares, bangles or bracelets and beads provided evidence that they were indeed burials.
Thirteen bangles of varied sizes were recovered from eight burials in the site (Figure 6) (Barettto 2003). The bangles were later on analysed through Energy Dispersive X-Ray (EDX) connected to a scanning electron microscope (SEM) to determine their chemical composition (Carlos 2007). Based from the analysis, the bangles were brass as they were mainly composed of copper and zinc.

Aside from earthenwares, tradewares, metal implements and brass bangles, other artefacts and ecofacts were recovered in Babu Balukbuk. Mortars, spindle whorls, pestles, and polished pumice stones were found in the site (Melendres 2008; Paz 2003). In addition, 50 pieces of Chinese beads strung into a bracelet and used as a burial accessory were also found. The beads were associated with one bangle and one brown stoneware jarlet. *Oryza sativa* L. (rice), as well as some nuts and other plant remains and wood fragments, were also recovered through wet flotation method (Paz 2003). Animal bones and teeth were also found in the site. Moreover, archaeological features such as postholes, hearths, middens (Figure 7), and plough marks (Figure 8) were also documented.
Types and Associated Dating of Tradeware Tradeware Ceramics from Babo Balukbuk

Using the system I proposed (See Melendres 2008, 2012), the tradeware tradeware ceramics of Babo Balukbuk were identified, analysed and documented.

Past excavations in Porac especially those conducted by Robert Fox in 1950s dated the lowest layer of Babo Balukbuk as belonging to the Tang period (Fox 1960a, 1960b, 1960c). This dating is mainly based on the lead glazed wares found in the site (Addis 1969). In 2002, four sherds from lead glaze wares were found in the site. A sherd from a small pouring vessel with moulded petal design with green lead glaze, a sherd of a broken spout from a green lead glazed kendi and two sherds from a body of an unknown vessel were unearthed (Figure 9). Addis (1969) believes that these lead glaze pieces were not from the Tang period (618-906 AD); instead they represent the continuation of a Tang tradition into later times. The dating of these ceramics is 13th to 14th century current era (C.E.), significantly younger than previously thought using a less system-
atic identification of the ceramics. Other sites were dated to the Tang dynasty due to the presence of these lead glazed ceramics such as Hacienda Ramona Site in Porac, Pampanga, Tabon Site in Vallehermosa, Negros Oriental, and Cagayan Site in Sulu Province (See Beyer 1947). Moreover, Chin (1988) said that lead glaze wares found all over Southeast Asia (mainly produced in Fujian in the 13th-14th centuries C.E.) show a buff or grey body with green and amber or brown glazes which have a tendency to flake. These attributes can be seen with the lead wares found in Babo Balukbuk.

Additional support of this dating is that these wares were found in a stratigraphic layer where Longquan celadon (Figures 10-11), Dehua whiteware (Figure 12), and Chinese stoneware (Figures 13-14) were used as grave goods in some of the burials. Examples of Longquan celadons that were found in the site are twin fish dish, fluted dish, bowls with petal designs and jarlets. As for Dehua whiteware, simple and coarse dishes and fluted dishes were found in the site.

Figure 9: Chinese green lead glaze ware sherds (III-1999-N-115662-63) found in the habitation area in Context 5 (13th–14th centuries).

Figure 10: Longquan celadon twin fish dish (III-1999-N-21005) found in a burial in Context 5 (Height: 4cm; Diameter: 13cm; 13th – 14th centuries).
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Figure 11: Longquan celadon jarlet (III-1999-N-21006) found in a burial in Context 5 (Height: 6cm; 13th – 14th centuries).

Figure 12: Dehua whiteware fluted bowl (III-1999-N-21004) found in a burial in Context 5 (Height: 3cm; Diameter: 11cm; 13th – 14th centuries).

Figure 14: Chinese light brown stoneware jarlet (III-1999-N-21002) found in a burial in Context 5 (Height: 10cm; 13th – 14th centuries).
With the establishment of the Ming dynasty in AD 1368, Emperor Hongwu restored the tributary system and prohibited the Chinese from participating in private Southeast Asian overseas trading (Hall 1968; Moorhead 1965; Tan 1997). The decree was issued to abate the attacks of Japanese and local pirates on regions along the coasts in South China. Thus, foreign trade was promulgated as a government monopoly. The new policy was so restrictive that even the construction of private ships for long distance voyage was prohibited (See Tan 2007). It was only at the end of the 16th century that the trade ban was revoked by Emperor Wanli (Guy 1980; Tan 2007).

Because of this trade ban, few early Ming blue and white ceramics can be found in the Philippines compared to the Middle and Late Ming blue and white ceramics which Tan (1997) referred to as “Interregnum Period.” Even if there is an existing trade ban in China, this did not stop the Chinese from undertaking illicit trading and smuggling of Chinese products to mainland and island Southeast Asia specially of trade ceramics (Tsao 1962). Chinese blue and white and celadon were still available during the late 15th and early 16th century C.E. in the Philippines such as those found in Lena Shoal (Goddio et al. 2002), Pandanan (Loviny 1996), and Santa Cruz (Orillaneda 2008) shipwrecks. In fact, Babo Balukbuk contained blue-and-white dishes from Jingdezhen (Figure 15) plus Guangdong (Figure 16) and Longquan celadons from this period which suggests that smuggling of Chinese products during the early Ming dynasty was so prevalent in the Philippines that even the polities that are not located near the coastlines can even acquire these objects.

**Figure 15:** Jingdezhen blue-and-white sherds (III-1999-N-12179-82) found in a midden in Context 14 (Late 15th-16th century).
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During this Chinese trade ban, many Southeast Asian ceramics notably those from Si Satchanalai and Mae Nam Noi, Thailand and Binh Dinh, Central Vietnam filled the vacuum left by the Ming period ceramics (Diem 2001; Loviny 1996). Tradeware tradeware ceramics excavated from Babo Balukbuk reveal a remarkable assemblage from different kiln complexes within China and Southeast Asia. Many celadons from Si Satchanalai, Thailand were found in the site (Figure 17).

They usually have some scars from firing supports on their bases and black speckles on their body. These wares were mainly dishes, bowls and jars dating between 14th to 16th centuries C.E.. But for Dizon 1 site, these Thai celadons most likely date to the 15th to 16th centuries C.E. due to the fact that no 14th century C.E. Chinese wares, blue-and-white in particular, were found in the site. Diem, an Asian Studies graduate of Murdoch University who specialises on Vietnamese and other Southeast Asian ceramics, (personal communication, June 2002) agreed and suggested that one sherd from a stoneware jar was probably made from Mae Nam Noi kiln in Central Thailand in the 15th to 16th centuries C.E. (Figure 18).

Figure 16: Guandong celadon bowl (III-1999-N-21009) found in a burial in Context 14 (Height: 5cm; Diameter: 14.3cm; Late 15th-16th century).

Figure 17: Thai celadon bowl sherds (III-1999-N-20649-56) found in the habitation area in Context 14 (14th-16th centuries).
Babo Balukbuk is quite rich in tradeware ceramics not only from China and Thailand but also from Vietnam and Burma. Some of the large celadon dishes found in the site (Figure 19) were similar to those found in the Twante district in Burma (Myo and Rooney 2001). These ceramics share the characteristics of celadon found in Twante kilns such as having a glassy and crazed olive green glaze that is flaking and pooling in some areas of the ceramic.

They are also thickly potted. The dating for these ceramics is late 15th to 16th century. These large celadons were similar to those found in the Santa Cruz shipwreck (Orillaneda 2008). If not for the cross referencing, these big celadon plates would most likely be associated with Kalong wares from Thailand which are dated to 15th to 16th centuries (Brown 1988; Myo and Rooney 2001).

This discovery added a new dimension to the history of tradeware ceramics in Southeast Asia that were excavated in the Philippines. This is due to the fact that aside from Babo Balukbuk, the only archaeologically excavated site with reported Burmese celadons in the Philippines was the Santa Cruz shipwreck (See Orillaneda 2008). That is why a re-examination of the unidentified celadon and supposed Kalong celadons in the Philippines is a must.
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Moreover, ceramics manufactured in Binh Dinh, Central Vietnam were recovered from the site. In the 15th century, this region was known as Vijaya, the capital of Champa whose people spoke an Austronesian language (Diem 2001). Example of Binh Dinh potteries found in Babo Balukbuk includes a sherds from stoneware jars with the remains of a single handle with pressed ends with caramel brown glaze (Figure 20) and a sherd of a dish with opaque greenish grey glaze and sign of stacking ring in the middle (Figure 21). Similar types of these ceramics were excavated from the Pandanan shipwreck (Diem 2001). The dating of these ceramics is 15th century because Diem (2001) believes that the ceramic production ceased in Binh Dinh in 1471 when Viet forces conquered Vijaya and annexed the region as part of the Dai Viet Kingdom.

Figure 19: Sherd of a Burmese celadon plate (III-1999-N-11377) found in the habitation area in Context 14 (Late 15th – 16th century).

Figure 20: Vietnamese stoneware jar sherd (III-1999-N-14503) found in the habitation area in Context 14) (15th century).
In Babo Balukbuk, “Swatow” type (Zhangzhou) porcelains (Figure 22) were also recovered. Five sherds of underglaze blue-and white porcelain from a bowl, dish, and plate were found in the site. Unfortunately, due to the agricultural activity in the site, they were found in different contexts from Layer 1 to Layer 3. Thus, inferring about their context of usage is a bit complicated. “Swatow” ware derived its name from Shantou in China (Swatow in Dutch records), an old junk port along the southern coast of Guangdong near Fujian (Adhyatman 1999; Tan 2007). However, Chinese scholars prefer to use the name Zhangzhou instead of Swatow because they are really being manufactured in Zhangzhou and are just being exported from the port of Swatow (Tan 2007). These ceramics were dated to 16th-17th centuries C.E. (Adhyatman 1999; Tan 2007). However, with the presence of the Zhangzhou ware, we can conclude that the Babo Balukbuk site was still being used by people until the early part of the Spanish contact.
Cultural Layers of the Tradeware Ceramics of Babo Balukbuk

There are two pre-Spanish contact layers in the site. The cultural layers (Contexts 14 and 5) were dated using the tradeware ceramics that were used as grave goods in burials found in the site. The trade ceramics showed that they are from different time periods.

The first and older cultural layer (Context 5 [Layer 3]) is dated to 13th-14th centuries. The date was from the Longquan celadons (Figures 10-11), Dehua whitewares (Figure 12) and the Chinese stoneware jars (Figures 13-14) that were used as grave furniture. Aside from burial contexts, the same types of trade ceramics were found in the habitation area of the site as well as in pit-midden contexts (Melendres 2008). Examples of Longquan celadons that were also found in the site are twin fish dish, fluted dish, bowls with petals designs and jarlets.

As for Dehua whitewares, simple and coarse dishes and fluted dishes were found in the site. Moreover, a Chinese brown stoneware jarlet (Figures 13-14), a dark caramel glazed jarlet, and a black jarlet were recovered in the site in both burial and non-burial settings. This suggests that these materials were not just funerary and ritual objects but are also used for utilitarian purposes such as for food and water containment.

On the other hand, the second and younger cultural layer of the site (Context 14) is dated to late 15th-16th centuries. In this layer, a burial with two trade ceramics were found. A Guangdong celadon dish of Longquan prototype (Figure 16) with thickly applied sea-green glaze and light grey body seen on the broken section of the mouth rim was excavated together with a whiteware jarlet (Figure 23). There is no available reference for the whiteware jarlet however the celadon dish is similar to the celadons found in the Santa Cruz shipwreck which were dated to late 15th-16th centuries (Orillaneda 2008).

Thus, this cultural layer is dated to late 15th century to 16th century C.E.. Aside from these grave goods, this cultural layer is associated with Southeast Asian ceramics like Vietnamese stoneware dishes and jars (Figures 20-21), Burmese celadon plates (Figure 19), Thai stoneware jars (Figure 18), Thai celadon dishes (Figure 17) as well as Chinese blue and white dishes (Figure 15) and plate and celadons dishes and bowls which are dated 15th-16th centuries.
Radiocarbon Dates of Babo Balukbuk and Mount Pinatubo Eruption

After the 1991 eruption of Mount Pinatubo, a multi-disciplinary study of Mount Pinatubo’s previous eruption was undertaken (Newhall et al. 1996; Gaillard et al. 2004; Gailliard et al. 2007). Geological data and satellite images were used to reconstruct how the landscape of Central Luzon was modified by the cyclical eruptions of Mt. Pinatubo. In the study, archaeological data, historical and archival record and oral accounts were also gathered to give an insight into how the eruption of the volcano and its aftermath affected the people on and around Mt. Pinatubo (Gailliard et al. 2007).

Newhall et al. (1996) have named the most recent pre-1991 eruption of Mt. Pinatubo, “Buag,” after a village in San Marcelino, Zambales located near the Marella River. Radiocarbon data from charcoal and wood, lahar and fluvial deposits from Marella River (397 ± 70 B.P.; 560 ± 60 B.P.; 600 ± 60 B.P.; 635 ± 80 B.P.; 760 ± 60 B.P.), O’Donnell (400 ± 80 B.P.), Abacan (410 ± 55 B.P.; 470 ± 50 B.P.; 570 ± 70 B.P.), Upper Sacobia (460 ± 30 B.P.), Pasig-Potrero (630 ± 70 B.P.; 950 ± 70 B.P.), Bamban (660 ± 80 B.P.), Bucao (730 ± 80 B.P.) and Guagua-Pasac (1730 ± 40 B.P.; 1800 ± 40 B.P.) were collated and presented in the study of Gaillard et al. (2007: 228-230). However, most of these dates are from materials that are not in situ but are from dated lahar, fluvial, and lake deposits that occur in the O’Donnell, Sacobia, Abacan, Pasig-Potrero, Marella and Bucao River valleys (Newhall et al. 1996). Included in the study were the two radiocarbon dates from Babo Balukbuk (See Table 1). Radiocarbon dating of charcoal
samples recovered in Babo Balukbuk inside a buried hearth in Context 14 yielded ages of $455 \pm 40 \text{ B.P.}$ and $415 \pm 40 \text{ B.P.}$ (Paz 2003). Using OxCal v3.10, the radiocarbon dates from Babo Balukbuk were calibrated and converted to Before Present (B.P.) and Current Era (C.E.) dates. The calibrated ages of the charcoal found in a hearth in Babo Balukbuk are 1420-1530 C.E. and 1400-1520 C.E..

**Table 1:** Radiocarbon Dates of Babo Balukbuk (modified from Paz 2003; Gaillard *et al.* 2004; Gaillard *et al.* 2007). $^{14}$C age was defined by the use of the Libby half life of 5568 years. Calibration ages have been computed through the calibration curves of Stuiver and Reimer (1993) and using OxCal v3.10. The calibrated ages are the statistically-most-likely equivalent in calendar years before 1950 (B.P.) using 2-sigma range.

<table>
<thead>
<tr>
<th>Lab. Number</th>
<th>Material</th>
<th>Occurrence</th>
<th>$^{14}$C Age (B.P.)</th>
<th>Calibrated Age (B.P.)</th>
<th>Calibrated Age (C.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WW – 4684</td>
<td>Charcoal</td>
<td>Cultural Layer (Context 14)</td>
<td>$415 \pm 40$</td>
<td>$530 - 420$</td>
<td>$1420 - 1530$ C.E.</td>
</tr>
<tr>
<td>WW – 4683</td>
<td>Charcoal</td>
<td>Cultural Layer (Context 14)</td>
<td>$455 \pm 40$</td>
<td>$550 - 430$</td>
<td>$1400 - 1520$ C.E.</td>
</tr>
</tbody>
</table>

From the previous publications (Newhall *et al.* 1996; Paz 2003; Gaillard *et al.* 2004; Gaillard *et al.* 2007), there are only five dated materials that are recovered from *in situ* context or from primary deposits. These includes the charcoal from a pumiceous pyroclastic-flow deposit in Upper Sacobia-Abacan River, charcoal from Buag, Kakilingan, San Marcelino, Zambales, uncharred root of a tree growing on the bank or floor of Pasig-Portrero River and two charcoal samples from a buried hearth in Context 14 in Babo Balukbuk.

These are presented in Table 2 where it shows the comparison of the radiocarbon dates from the date of the manufacture of the trade ceramics. Data presented includes the source and nature of the material, the dating technique that was used in analysing the material, the date of the material in current era and the reference/s for the identification and date of the material being analysed.
Table 2: Comparison of Radiocarbon Dates and Dates of Trade Ceramics from Babo Balukbuk

<table>
<thead>
<tr>
<th>Source and Nature of the Material</th>
<th>Dating Technique</th>
<th>Date in Current Era (C.E.)</th>
<th>Reference/s for the Identification and Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charcoal from a pumiceous pyroclastic-flow deposit in Upper Sacobia-Abacan River</td>
<td>C14 Dating</td>
<td>1460 - 1520</td>
<td>Newhall et al. (1996)</td>
</tr>
<tr>
<td>Charcoal from Buag, Kakilingan, San Marcelino, Zambales</td>
<td>C14 Dating</td>
<td>1400 - 1500</td>
<td>Newhall et al. (1996)</td>
</tr>
<tr>
<td>Uncharred root of a tree growing on the bank or floor of Pasig-Portrero River</td>
<td>C14 Dating</td>
<td>1320 - 1460</td>
<td>Newhall et al. (1996)</td>
</tr>
<tr>
<td>Charcoal in a buried hearth in Context 14 in Babo Balukbuk</td>
<td>C14 Dating</td>
<td>1420 – 1530</td>
<td>Paz (2003); Gaillard et al. (2004); Gaillard et al. (2007)</td>
</tr>
<tr>
<td>Charcoal in a buried hearth in Context 14 in Babo Balukbuk</td>
<td>C14 Dating</td>
<td>1400 – 1520</td>
<td>Paz (2003); Gaillard et al. (2004); Gaillard et al. (2007)</td>
</tr>
<tr>
<td>Chinese green lead glazed dish found in the habitation area of Context 5 (Figure 9)</td>
<td>Date of Manufacture</td>
<td>1279 - 1368</td>
<td>Adhyatman (1990:161); Chin (1988:56)</td>
</tr>
<tr>
<td>Longguan celadon twin fish dish found in a burial in Context 5 (Figure 10)</td>
<td>Date of Manufacture</td>
<td>1279 - 1368</td>
<td>SACS (1979: 176-183); Zhu (1998: 236-237); Wang (2002: 90)</td>
</tr>
<tr>
<td>Longguan celadon jarlet found in a burial in Context 5 (Figure 11)</td>
<td>Date of Manufacture</td>
<td>1279 - 1368</td>
<td>SACS (1979: 172-173); Zhu (1998: 189-199)</td>
</tr>
<tr>
<td>Dehua whiteware fluted bowl found in a burial in Context 5 (Figure 12)</td>
<td>Date of Manufacture</td>
<td>1279 - 1368</td>
<td>Tan (1993: 11); Li (1993:21); Peng (1998:32)</td>
</tr>
<tr>
<td>Chinese dark brown stoneware jarlet found in a burial in Context 5 (Figure 13)</td>
<td>Date of Manufacture</td>
<td>1279 - 1368</td>
<td>(Guy 1986: 81)</td>
</tr>
<tr>
<td>Chinese light brown stoneware jarlet found in a burial in Context 5 (Figure 14)</td>
<td>Date of Manufacture</td>
<td>1279 – 1368</td>
<td>(Guy 1986: 81)</td>
</tr>
<tr>
<td>Sherds of Jingdezhen blue and white dish found in a midden in Context 14 (Figure 15)</td>
<td>Date of Manufacture</td>
<td>1488 – 1505</td>
<td>Gotuaco et al (1997: 134); Peng et al. (2002: 48)</td>
</tr>
<tr>
<td>Guandong celadon bowl found in a burial in Context 14 (Figure 16)</td>
<td>Date of Manufacture</td>
<td>1488 – 1505</td>
<td>Crick (2001); Orillaneda (2008:55)</td>
</tr>
<tr>
<td>Thai celadon bowl found in the habitation area in Context 14 (Figure 17)</td>
<td>Date of Manufacture</td>
<td>1400 - 1500</td>
<td>Brown (1988); Dofflemyer (1989: 48-51); Adhyatman (1990: 312-317); OCSP (1991: 62-86)</td>
</tr>
<tr>
<td>Thai stoneware jar from Mae Nam Noi found in a midden in Context 14 (Figure 18)</td>
<td>Date of Manufacture</td>
<td>1400 - 1500</td>
<td>Diem (personal communication, 2002.)</td>
</tr>
<tr>
<td>Burmese celadon plate found in the habitation area in Context 14 (Figure 19)</td>
<td>Date of Manufacture</td>
<td>1488 – 1505</td>
<td>OCSP (1991:86); Myo and Rooney (2001); Crick (2001); Orillaneda (2008)</td>
</tr>
<tr>
<td>Vietnamese stoneware jar with caramel glaze found in the habitation area in Context 14 (Figure 20)</td>
<td>Date of Manufacture</td>
<td>1400 - 1471</td>
<td>Diem (1996: 100-101); Diem (2001: 33)</td>
</tr>
<tr>
<td>Vietnamese stoneware dish found in the habitation area in Context 14 (Figure 21)</td>
<td>Date of Manufacture</td>
<td>1400 - 1471</td>
<td>Diem (2001: 28-36)</td>
</tr>
<tr>
<td>“Swatow” Zhangzhou plate found in the habitation area of Context 14 (Figure 22)</td>
<td>Date of Manufacture</td>
<td>1573 - 1619</td>
<td>Adhyatman (1999); Tan (2007)</td>
</tr>
</tbody>
</table>
Mt. Pinatubo erupted around 500 B.P. to 600 B.P. or 1350 to 1450 C.E. (Newhall et al. 1996; Paz 2003; Gaillard et al. 2004; Gaillard et al. 2007). Based on the dates of manufacture of trade ceramics found in Babo Balukbuk and the radiocarbon dates from charcoal samples of a buried hearth found in the site, the locality was already being used by people before and during the Buag (latest pre-1991) eruption of the Mt. Pinatubo and was continually used even after the eruption, thus, it was never abandoned. Furthermore, Newhall et al. (1996) concluded that the pre-1991 eruption of Mount Pinatubo is of the same size and magnitude as that of the 1991 eruption of the volcano. Thus, it is quite possible that the people of Babo Balukbuk just rebuilt their settlement after the eruption and continued their way of life in the site. This can be proven by the cultural evidences found in the site such as a burial, postholes for houses, hearths, plough marks, earthenware vessels, and trade ceramics that are dated post 500-600 B.P.. Examples of trade ceramics that are manufactured after the Buag eruption of Mt. Pinatubo that are found in Context 14 (interphase layer of Layer 3 and Layer 2) and Context 3 (Layer 2) in Babo Balukbuk includes Jingdezhen blue and white (Figure 15), Guandong celadons (Figure 16), celadons from Si Satchanalai (Figure 17), Thai stoneware jar (Figure 18), celadons from Twante district in Burma (Figure 19), Vietnamese stoneware jar and dishes (Figure 20 - 21) and Zhangzhou porcelain (Figure 22).

Tradeware Ceramics as Heirloom Pieces

Guy (1986) characterised the “heirloom problem” in analysing tradeware ceramics temporality. This means that some of the potteries found in a site are much older compared to the other ceramics found in that same stratigraphic layer. The database (Melendres 2008) developed for this study is helpful in identifying the sequence and contemporaneity of the ceramics dates. The database is a system of determination where relevant information about a particular ceramic are noted and recorded such as the artefact number, condition of the ceramics, ceramic type, artefact form, part of the ceramic, description of the ceramic, archaeological context where the ceramic was found in the site, provenance and dating. Also, references that pertain to the ceramic being analysed are also listed as well as the level of confidence of the identification. This means that the database gives a clear picture of the entire ceramic assemblage of the site as well as the prevalence of a particular type of tradeware ceramic in the site.
In Babo Balukbuk, a whiteware box with qingbai glaze that has a shape like a gourd or melon with lines radiating from the exterior bottom was found in the habitation area of Context 5 (Layer 3) in the site. It was manufactured in Fujian, China in the 12th-13th centuries C.E. or during the Sung dynasty in China. This means that it is older than the other ceramics in Layer 3 which are all dated to 13th-14th centuries C.E.. It is one of a kind in the ceramic assemblage. This may suggest that it was an heirloom piece.

Significance of Tradeware Ceramics for the People of Babo Balukbuk

The determination - identification and dating - of the tradeware ceramics from Babo Balukbuk revealed that the site was used from 13th century C.E. up to the early Spanish contact around 16th century. Aside from dating the site, ceramics are indications of some of the behaviour and cultural practices of the people of Babo Balukbuk.

People of Porac seem to have elaborate funerary practices just like the other pre-Spanish people in the Philippines. In Babo Balukbuk, especially between 13th to 14th centuries, they buried the dead near their houses and near their agricultural lands or even probably under their houses (Paz 2003; Melendres 2008). This is indicated by several types of habitation evidences such as postholes, plough marks, hearths, and middens near the graves (Paz 2003; Melendres 2008). They also practiced inhumation wherein the dead body was covered with textile first before burying them (Barretto 2003). This was asserted by Barretto (2003) when she found cloth impressions and patterns on some of the metal implements used as grave goods. In Porac, aside from metal implements, beads and bronze bangles, tradeware ceramics were placed in the grave. Most were white-ware dishes with qingbai glaze, celadon dishes, jarlets and some stoneware jars. Ethnographic records signify several reasons for the committal of materials with the dead. According to Barretto (2000:108), these grave furniture could be used as “gifts for the ancestors and gods”, “implement for the journey to the afterlife” and as a “protection to drive away evil spirits”. Thus, funerary goods or items must therefore be of immense value for the dead especially in the afterlife (Barretto 2003). The practice of burying the dead with grave accompaniment continued up to the late 15th -16th centuries. This was established when a burial with a whiteware jarlet (Figure 23) and a Guangdong celadon dish (Figure 16) as grave goods were found in Context 14 in the site.
How old is the Babo Balukbuk Site?

The presence of tradeware ceramics in Babo Balukbuk indicates a vibrant trade or exchange relations between the locals of Babo Balukbuk and nearby polities in what is now Pampanga from 13th to 16th centuries. Early Spanish accounts reported that Pampangans or Kapampangans as keen traders and had trading relations with China, Moluccas, Malacca, Aceh, Brunei, and other Kingdoms in Southeast Asia (Blair and Robertson 1903-1909 as cited in Larkin 1993). Vlekke (1965) even avows that Pampangans went to Batavia (Indonesia) as late as the first half of the 17th century which is even after the subjugation of Pampanga by the Spaniards. In Babo Balukbuk, however, the people were not directly involved in trade with foreigners since the site is far from the coastline. Instead, most likely they dealt with local traders from Pampanga. Porac from 1571 (the year of Spanish conquest of Pampanga) up to the present time was largely a forested area (Larkin 1993). This suggests that forest products were possibly their main products for exchange. Some examples of forest products that are of utmost important for the Chinese and other foreign traders, which are very much available in Porac, includes beeswax, timbers and wood, fur and skin of forest animals and feathers of birds (See Scott 1994).

Concluding Remarks

Ceramics has long used in archaeology as a tool in chronology building (Orton et al. 1993; Rice 1987). Dating the site using the date of manufacture of the trade ceramics is reliable if certain conditions are met. Firstly, the site should be properly excavated and recorded. The layer in the stratigraphy of the site where the trade ceramics were excavated should be properly recorded. Also, the context of use of the trade ceramics in the site should be noted and recorded i.e. burial or non-burial contexts. Moreover, cross referencing is important in identifying and dating trade ceramics specially those that were manufactured in China and Southeast Asia. Cross referencing means that you check the literature for the latest bibliographic sources i.e. kiln site reports, archaeological site reports, catalogue of exhibitions and other ceramic publications, which pertain to the ceramic form and type that you found in the site. The more cross-referencing you do the higher the reliability of your identification and dating.

In Babo Balukbuk, a complete database of all the trade ceramics found in the site was created and developed (Melendres 2012). For each
cereal type and form found in the site, data about its identification, dating and references were researched and recorded including the location where the ceramic was found in relation to the stratigraphy of the site as well as its archaeological context or usage. The results showed that there were different kinds of tradeware ceramics that were used by the people of Babo Balukbuk. There were Chinese celadons, white wares, blue-and-white wares, and stonewares. There were also some Southeast Asian ceramics such as wares from Si Satchanalai and possibly from Mae Nam Noi, Thailand, ceramics from Binh Dinh Central Vietnam, and celadons from Twante District from Burma. The system that was employed to identify, evaluate, and document the tradeware ceramics in the site also supported the analysis that there were two cultural layers as demonstrated by the ceramics that were used as grave goods. The first cultural layer (Context 5) is dated to 13th-14th centuries C.E. and the second layer (Context 14 and 3) is dated to mid to late 15th-16th centuries C.E.

The radiocarbon dates were used to validate the dating of the site based on the date of the trade ceramics found in the same layer. Radiocarbon dating of charcoal samples recovered in Babo Balukbuk inside a buried hearth yielded ages of 455 ± 40 B.P. and 415 ± 40 B.P. (Gaillard et al. 2004; Gaillard et al. 2007; Paz 2003). The data shows that the radiocarbon dates from Babo Balukbuk and the trade ceramics from the same layer are consistent with one another (Table 2). The radiocarbon dates ranges from 1400-1530 C.E. while the manufacture dates of trade ceramics ranges from 1400-1505 C.E.. Also, comparing radiocarbon dates from geologic samples around Mt. Pinatubo, the charcoal found in a buried hearth in Babo Balukbuk and the date of manufacture of trade ceramics found in the site, we can conclude that the site was continually used by the people.

Finally, dating the site using the manufacture dates of the trade ceramics is as effective as radiocarbon dating as long as the conditions that were listed above were met. It is as effective yet inexpensive way of dating a particular site.

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How old is the Babo Balukbuk Site?


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The Last Voyage of the Dead: 
The Milky Way and the Boat-Shaped Burial Markers of the Philippines Archipelago

Rafael Dy-Liacco¹

Abstract

The boat-shaped burial markers of the Philippines archipelago and their original astronomical orientation towards the Milky Way concretely manifest the purpose and concern of monumental architecture and the archipelago’s indigenous world view. In the archaeological record of Malayo-Polynesian Philippines, monumental remembrance is not materialised in structures that either defy the earth, like the tower form, or that identify with nature and the cosmos, like the mound. Instead, boat-shaped burial markers laid out low to the ground in stones or coral slabs appear to flow and disappear into the farther landscape. The fickle and frequently powerful and destructive natural environment defines the cosmological, which can only be highlighted or pointed out, not mastered or made a home of. Initial findings seem to show that the boat-shaped burial markers pointed towards the place where the Milky Way appeared to rise up from the horizon in the first hours of the evening, at the start of the short dry season. In the case of the Catanauan burials, this orientation seems to have determined the choice of Tuhian cove itself where the markers are found; the cove opened to a magnificent view of the Milky Way precisely at that time of year. The Annales concept of the longue

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duree and some ethnoastronomical parallels help clarify these peculiarities of the monumental architecture of the various Malayo-Polynesian peoples of the Philippines archipelago, who shared in the region-wide Austronesian ethnic and linguistic heritage, but who more peculiarly shared in their archipelago’s distinctively stormy weather.

Introduction

The archaeological record of the pre-Spanish era in the Philippines archipelago presents an enigma. Unlike the records of the wider Austronesian region, where megalithic structures in a variety of distinctive shapes but following basic architectural forms seem to abound according to Victor Paz, an archaeologist at the University of the Philippines-Archaeological Studies Program (personal communication, 2011; see also Figure 5 in this article), no megalithic structures of such forms have been discovered in the Philippines as of this writing. What the record shows instead are the boat-shaped burial markers of two otherwise not immediately related cultures – one in Catanauan and the other in Batanes (Figure 1).

Figure 1: The locations of Catanauan and Batanes in the Philippines archipelago (map obtained from http://en.wikipedia.org/wiki/File:Ph_physical_map.png; accessed 27 January 2014).
The older of these two cultures appears to be the one in Catanauan, dating to 1300–1000 BP (Paz et al. 2011). This dating places both sets of burial markers within the same broad time frame as the megalithic practices of the Austronesian cultures that appeared by the time that the Austronesian expansion had reached its broadest extent, stretching from Madagascar to Easter Island. Thus to the degree that the burial markers in the Philippines and the megalithic structures in the wider Austronesian region manifested forms of monumental architecture, we are looking at chronologically parallel monumental practices within different societies in different places that otherwise shared an ancient ethno-linguistic heritage. So the question at hand becomes more acute: Why did monumental practices in the Philippines archipelago take such an oddly different form? Insight towards the answer, I believe, is obtained by examining the geohistorical forces in the archipelago and their long-term effect on its peoples’ collective world view, as seen in the linguistic parallels and differences between the Philippines archipelago and the rest of the Austronesian region.

Some words about the preceding methodology are in order. Two considerations came into play in choosing the approach taken here. The first consideration was that the earliest recorded Filipino ethnoastronomical lore—or mythological lore of any kind for that matter—went as far back only to Spanish times. That means records go back no further than 500 BP. Moreover, there is good reason to doubt the antiquity or genuinely indigenous provenance of anything recorded after that. But the Catanauan boat burials are between 1300 and 1000 BP, and their culture appears to have disappeared after 1000 BP. Any ethnoastronomical support for the burial practice postulated here would have to come from parallels in the wider Austronesian region, if any.

The second consideration came out of my first investigations into that very question. As suggested by an anonymous reviewer, a more ethnoastronomical approach is to be expected. I shall take up the wider ethnoastronomical picture, as also suggested by the same reviewer, in the concluding discussion. However, do any particular parallels exist between the cosmology suggested by the orientation of the boats in Batanes and Catanauan to the Milky Way, and the ethnoastronomy in the rest of the Austronesian region? Indeed, already taking the first explained consideration into account, I had initially approached the problem in this manner. As it turned out, the short answer to the question was: No – at least none that I found, beyond the fact of the widespread concepts of the
soul boat and of the sky containing souls. There were intriguing possible parallel cosmological notions scattered here and there, such as the Milky Way as a river in the sky, but nothing that came together decisively. The closest parallel that I came across was from Arnhem Land, northern Australia, just across the water from Papua New Guinea. The anonymous reviewer had in fact offered the same parallel, in view of the wider ethnoastronomical picture. It is a striking parallel and I will bring it up in the closing discussion.

Aboriginal Australia, however, is not routinely associated with research into the Austronesians. Thus I was stumped by the lack of sure comparisons. I set the entire thesis aside for several months. Though it was intriguing, it seemed good only for speculation, something to add as an anthropological side note to world-wide lore about the Milky Way, but without further solid basis for argumentation. My investigation into the ethnolinguistics of the situation had until this time left me with the notion that any ancient indigenous reference to the Milky Way in the Philippines archipelago—if such a reference ever existed—had been forgotten and lost to history. Since skies over the archipelago are clouded over most of the year, I began leaning to the view that perhaps there never was cosmological interest in the Milky Way in the archipelago at all. Then one day, on being urged by Victor Paz to take up the problem again, I was perusing Blust’s Austronesian dictionaries and his Austronesian linguistic tree and a map of Austronesia, and it struck me: The Austronesian way of referencing the Milky Way was very ancient; perhaps it was not the case that the Philippines archipelago had never taken an interest in the Milky Way, but that its way of referencing it had changed. What the Milky Way was called by the boat-shaped burial culture in Catanauan and then by the one in Batanes we shall perhaps never know. But that a change away from the ancient Austronesian way had occurred seemed uniform across the archipelago. This insight was accompanied by another. Colleagues from the Archaeological Studies Program at the University of the Philippines and I had routinely been making a formal distinction between the boat-shaped burials of the archipelago and the various megaliths found in the rest of Austronesia.

The boat-shaped burials were not megaliths. However, I now realised, from an architectural point of view, both were monuments. I had been of the intuition that the “lack of megaliths” in the archipelago had to do with our stormy weather. But I needed something more explanatory than the banal “megaliths get blown over”. The preceding two insights
plus this intuition were enough to pick up the investigation again, although now on a different tack.

Monumental Architecture

Five kinds of architecture can be identified in the human structural record: folk, vernacular, monumental, spiritual, and utilitarian (Allsop 1977). Bruce Allsop describes these types as being “emotionally and originally different” (Allsop 1977: 41). This kind of description indicates the role of architectural form in human culture. Allsop says: “Architecture is not only an expression of what men are: it reflects back upon men and conditions what is possible for them to be and to become” (Allsop 1977: 9). Or as Timothy R. Pauketat and Susan M. Alt put it: “Cultures may seem to reside in the head, but they are made in the physical world” (Pauketat and Alt 2005: 214). The architectural types of interest for this article are the monumental, the spiritual, and the utilitarian. Allsop succinctly defines the monumental type:

Monumental architecture is, by definition, committed to remembrance and so to the appearance of permanence. The simple repose of massive earth-borne structures and of trilithonic openings are preferred to enigmatic balances and controlled thrusts. Symmetry of plan goes with the stable symmetry of structure (Allsop 1977:9).

The mind for architectural monumentality is ancient and has universal spread. Peter M. Barnett is worth quoting at length on this point. Discussing his approach to teaching architecture to beginners, Barnett explains the necessity of understanding that the tower and the mound are basic cross-cultural monumental forms: The tower form, he says, “is the most universal indication of the specialness of a place, and particularly of the axis mundi, or centre of the world. [...] it is the symbol of man himself, walking upright among the beasts of the earth” (Barnett 1977: 12). Of the mound or earth/mountain form, he says:

Equally universal among early civilisations is the earth/mountain form, an expression not only of the natural landscape, but also of the cosmos which it reflects. Examples include the pyramids of Egypt and Mesopotamia, Aztec temples and Indian stupas, and end with the great stupa at Borobudur in Java, with its elaborate cosmic iconography (Barnett 1977: 12).

Here it is pertinent to note that monumental and spiritual architecture are often found merged. Allsop observes: “Death and religion being closely associated in the minds of men, the distinction between monumental and spiritual architecture is often blurred” (Allsop 1977: 7).
What differentiates the two types is their primary cognitive purpose and social function: “Spiritual architecture is related to noncorporeal things, monumental architecture to people [...]” (Allsop 1977: 7). The attempt to distinguish finely between different instances of monumentality and their degree of merger with spirituality will not be made here.

Also to be noted is what Cecil D. Elliott calls “the monumental non-monument” (Elliott 1964: 52). He gives as an example “the building that is not monumental in function but adopts certain characteristics of monuments” (Elliott 1964: 52). Thus: “It may be dignified in manner, permanent in construction, static in form, geometric in shape, and grandiose in scale—but it is an office building, a school or even a family residence” (Elliott 1964: 52). This kind of building is not a monument but fits into the category of utilitarian architecture. Allsop defines utilitarian architecture as being “dedicated to utility” and as expressing “a non-spiritual objective” (Allsop 1977: 9). In what follows, Austronesian structures that exemplify the truly monumental along with varying degrees of spirituality, and the utilitarian non-monument but with monumental qualities, will be encountered.

The Austronesian Expansion

The Austronesian linguistic family comprises nearly 1200 distinct but close-knit languages (Bellwood et al. 1995). Originating from a pre-Austronesian homeland in the southern Chinese mainland, the first Proto-Austronesian speakers were in Taiwan (Formosa) before 3500 BCE (Bellwood 1995). After the initial colonisation of the Philippines from Formosa about 3000 BCE (Bellwood 1995), the Austronesian expansion followed migration routes that fanned out southwards from the Philippines archipelago (Figure 2). Expanding west and east, by the millennium after 1 CE the Austronesian linguistic region included Madagascar in the west and the far-flung islands and regions in the east (Bellwood 1995). Thus by roughly 1000 CE Austronesian native speakers extended across a large roughly triangular region of the globe, with Taiwan at the apex, Madagascar at the farthest point to the west, and Easter Island at the farthest point to the east (Bellwood 1995).

The base of this triangle covered the chain of islands running from Sumatra, in the west, to the coastal regions of Papua New Guinea and the islands of Melanesia, north of Australia, through to Polynesia in the eastern Pacific; Hawaii and New Zealand too were part of this
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Austronesian region (Bellwood 1995). The Philippines archipelago, thus, lay at the chronological and geographical centre of the expansion. It was the radiating point from which the expansion across the rest of the region took place.

This expansion resulted in the ramification of Proto-Austronesian into five linguistic subgroups: the various Formosan languages (namely Atayalic, Tsouic, and Paiwanic), Western Malayo-Polynesian (WMP), Central Malayo-Polynesian (CMP), South Halmahera-West New Guinea (SHWNG), and Oceanic (Oc) (Tryon 1995). Robert Blust’s diagram of the Austronesian linguistic tree (Figure 3a) roughly corresponds to the fan-shaped geographical expansion of the linguistic family (Figure 3b). I highlight this graphical correspondence because it helps emphasise some oddities—one linguistic and two archaeological—that I shall point out about the Philippines archipelago as the radiating point in the Austronesian expansion.

The first oddity about the Philippines archipelago as the radiating point in the Austronesian expansion is the disassociation of the word for “path” from also meaning the Milky Way in the languages of the archipelago, but the persistence of the association in the languages that came out of the archipelago. According to Blust’s dictionaries, the association of the word for “path” with the Milky Way is found in WMP languages just south of the Philippines, in northern and southern

Figure 2: Austronesian Migration Routes (adapted from Cagé 2008).
Sulawesi, and in various Oc languages from Micronesia eastwards (see Blust and Trussel 2010).

This distribution is shown below in Figure 4. These parallel occurrences across different linguistic subgroups were likely not coincidental developments. Rather, the first node in the family tree shared by the subgroups—in this case PMP—must have contained an original word that carried these same meanings. Thus in Blust’s reconstruction,
The PMP word *zalan meant “path” and also meant the Milky Way (Blust and Trussel 2010).

1. WMP Tontemboan (N. Sulawesi): lalan (path / Milky Way).
2. WMP Muna (S. Sulawesi): sala (path); sala waghua (Milky Way).
4. Oc Lau (Solomon Islands): tala (path / Milky Way).
5. Oc Fijian (Fiji): sala (path); sala ni caŋi (Milky Way). (See Blust and Trussel 2010)

![Map](image)

**Figure 4:** Map of Austronesian languages that associate the word for “path” with the Milky Way (map adapted from Tryon 1995:21, Map 1).

However, as the reconstruction of the migration routes of the Austronesian expansion implies, the association of the word for “path” with the Milky Way must have passed through the Philippines archipelago. Yet Blust’s dictionaries show that the WMP languages of the archipelago no longer carry the association (see Blust and Trussel 2010). In other words, at some point after the expansion of the Austronesians through the archipelago and into the regions south, words for “path” in the Philippines archipelago ceased being associated with the Milky Way. Presumably, if the Austronesians had lingered any longer in the Philippines before further colonising southwards, this disassociation might have become a permanent feature of all subsequent Austronesian
languages outside of Formosa. However, compared to the initial length of time it took between the Austronesian arrival in Formosa and their migration to northern Philippines, their spread through the Philippines and into Micronesia was rather rapid (Gray et al. 2009).

The second oddity about the Philippines archipelago as the radiating point in the Austronesian expansion is the absence from the archaeological record of indigenous monumental structures that take either of the two basic forms of the tower or the earth/mountain. As seen in the preceding section, Barnett called these two forms universal to monumentality. Taking after them would be structures such as large burial mounds, whether earthen or stone-filled, stone temples, megalithic blocks and structures, and monoliths.

This absence in the Philippines is not due to any lack of architectural capability, as the rice terraces in the highlands of Luzon testify, and as do the fortress-like idiangs that are found situated on prominent overlooks in Batanes. Yet, whatever practices may have accrued around the rice terraces and the idiangs, their architecture, though sharing in monumental qualities, is basically utilitarian. They are examples of what Elliott calls the monumental non-monument. What makes this architectural absence all the more curious is the presence of monumental structures that take after either of the two basic forms not only in Austronesian Formosa, from which expansion into the Philippines first took place, but also in Austronesian regions colonised after the migration out of the Philippines (Figure 5).

Much about the original cultural purpose and later cultural use of these monumental structures remains unknown; similarly, much remains on the level of hypothesis (e.g., on the purpose and function of the megalithic structures of Woodlark Island see Damon 1979, and Bickler and Ivuyo 2002; on the Easter Island structures see Belmonte and Edwards 2007).

I note, however, that general socio-political observations about monumentality—for example, the observation that monumental structures effect “a continuing commitment to particular places, and to a social and ecological transformation of the landscape” (Sherratt 1990: 149)—are as true on the whole for the rice terraces of Luzon as they are for the moai of Easter Island.
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Figure 5: Map of Austronesian monumental structures of basic form (map adapted from Tryon 1995: 21, Map 1).

2. Western and central Borneo: various megalithic types (Metcalf 1976).
5. West Sumba: monolithic gravestones (Hoskins 1986); Central Flores: monolithic gravestones (Schröter 1998).
10. Tonga: earthen or stone-filled burial mounds (Kirch 1990).
13. Easter Island: ahus (platforms) and moai (statues); (Belmonte and Edwards 2007).

That is, they are as true for monumental non-monuments as they are for genuine monuments. Thus, as valuable as this kind of socio-political framework of analysis is for understanding the archaeological record, more relevant for this article is the exploration of the cognitive dimension of culture. What is needed is an analytical framework that accounts for that dimension. Given that utility is not the primary factor in the original choice for a genuinely monumental form, the point remains
that some form is chosen and not another. The question remains why and with what meaning? Pauketat and Alt point out:

   [...] physical constructions make manifest our subjectivities and dispositions and those of other people involved, at least as these exist in specific moments of construction. Indeed, the various moments of construction are also “intersubjective” experiences that shape the ways we think about others, objects, and the spaces of experience (Pauketat and Alt 2005: 214).

In the Philippine archipelago, rather than the kind of monumentality characteristic of the wider Austronesian region, we encounter instead another oddity: boat-shaped burial markers laid out low to the ground in stones or coral slabs. The concept of the soul-boat itself is not peculiar; it was widespread throughout the Austronesian and adjacent regions. However, these kinds of burial markers are peculiar to the archipelago.

Though clearly monumental in purpose, they take after neither of the basic monumental forms of tower or earth/mountain. They are neither “raised against the horizontal of the earth”, like the tower (Barnett 1977: 12), nor are they “an expression not only of the natural landscape, but also of the cosmos”, like the earth/mountain (Barnett 1977: 12). Instead, as shall be seen, they seem to flow and disappear into the farther landscape.

The Longue Durée and Cosmology

The Annales paradigm analyses history on three levels of space-time: (1) The longue durée, or the long term; (2) Conjonctures, or the middle term; and (3) Evenements, or the short term (Bintliff 1991: 6). Occurring contemporaneously within these levels are, in the words of John Bintliff, “groups of processes moulding the visible development of human societies” (Bintliff 1991: 6). Within the short term are grouped political events and individual actions (Bintliff 1991: 6). Within the middle term are grouped socio-economic and demographic trends, and ideologies (Bintliff 1991: 6). Within the longue durée are grouped geohistory, stable technologies, and world views (Bintliff 1991: 6).

Of interest to this study is the influence within the longue durée of the natural forces of geohistory (in this case, weather patterns and tectonic activity) on world views. Annales thought recognises that such influence occurs. The geohistorical processes within the longue durée have been described as “the permanent forces that operate upon the human will and
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weigh upon it without its knowledge, guiding it along certain paths” (Febvre 1949: 37, cited in Bintliff 1991: 7).

In this picture, patterns that recur within the collective will or mind over the long term belong to the long-term world view. These world views in turn affect the shape of social institutions in the middle term: “One could not pretend to explain an institution if one did not link it to the great intellectual, emotional, mystical currents of the contemporaneous mentalities [viz., “world view”]” (Bloch 1939/40, cited in Burguière 1982: 430, cited in Bintliff 1991: 11). In this case, the social institution of interest is the practice of the boat-shaped burial markers.

**The Longue Duree in the Philippine Archipelago**

The first point of geohistorical interest to note is the location of the Philippines archipelago on what is known as the “Rim of Fire”. Bankoff (2004: 93) describes it as “the string of volcanoes extending along a tectonic fault line that runs from Aceh in northern Sumatra to Japan.” Geologically coupled to it is what is called the “Belt of Pain.” Bankoff (2004: 93) describes it as “an area of extreme seismic activity stretching from just below Hong Kong to north of Malaysia and Singapore”. This geological coupling is apparent in Figure 6, which plots on a global scale both tectonic fault lines, in yellow, and epicentres of strong earthquakes (magnitude > 5), in red. Note that the Philippines archipelago lies on yellow and is saturated in red.

What is also notable in Figure 6, however, is that much of the previously described Austronesian triangle similarly lies on tectonic fault lines and thus likewise experiences extreme seismic activity. However, asides from possessing a concentration of active volcanoes and being periodically shaken by earthquakes, what distinguishes the Philippines archipelago geohistorically not only on a global level but from the rest of the Austronesian region is the second point of note: the sheer number of typhoons (hurricanes) that can be relied upon to hit its islands each year. Bankoff (2004: 93) observes that the archipelago lies on “Typhoon Alley,” which he describes as “the path usually taken by storms generated in the western North Pacific”.

Beginning as low-pressure areas over the ocean, these weather disturbances develop into typhoons, and after passing through or by the Philippines archipelago, may veer northwards towards Japan, or go into
the Chinese mainland, or travel into Southeast Asia (Figure 7). But they all affect the Philippines first. As a result of being in the path of storms, large-scale storm-related disasters, consequent not only upon strong winds but especially upon massive flooding due to torrential rains, occur frequently in the archipelago (see Bankoff 2006). Some 20 storms hit each year (Bankoff 2004). Bankoff notes that three typhoons that caused major disasters hit in 1995 alone (Bankoff 2004).

He has connected over half of floods from 1691 to 1911 as recorded in archives of the Manila Observatory directly to typhoons, and the rest to monsoon rains (Bankoff 2006). In the Philippines, when monsoon rains are at torrential levels, it is usually because they are being exacerbated by offshore typhoons. Moreover, local chronicles from the Spanish era tell of frequent disasters due to flooding (Bankoff 2006). Though Indonesia is also prone to major disasters related to its underlying tectonics, this kind of frequent almost annual and multiple disastrous flooding is not part of the Indonesian picture.

Volcano-related events can also cause ruin on a large scale, as was the case for the eruption of Mt. Pinatubo in 1991 and the subsequent flows of lahar (volcanic ash mixed with water) when it rained (Bankoff 2004). Similar large-scale destruction can occur with earthquakes as well, as in the case of the Baguio earthquake of 1990 (Bankoff 2004). Today, strong off-shore earthquakes are always accompanied by tsunami warnings. However, disasters and possible disasters such as these, despite the high seismic activity of the archipelago, do not in fact occur on as regular a basis as those connected to typhoons. Rather, they only punctuate the yearly picture of storm and flood.

**Figure 6:** Seismic activity (National Geophysical Data Centre, cited in “Plate Tectonics”).
Figure 7: World storm paths and intensities from 1995 to 2011. (The author compiled the image above by overlaying one image on top of the other of the set of images of worldwide tracks for each of the years from 1995 to 2011, available at www.solar.ifa.hawaii.edu/Tropical/summary.html). Note that during this time period no other region on earth experienced the frequency of storms (including strong storms) quite like the Philippines archipelago, which is under the cloud of storm paths at the upper right of the map above. Note also the stark difference with the rest of the Austronesian region, in particular with the region just to the south of the Philippines (i.e. Indonesia), where much is common otherwise in the way of terrain, climate, and seismic activity. Online maps purporting to show the tracks and intensities of all storms beginning from a point in the 19th century show a similar pattern of frequencies e.g. see AccuWeather.com 2010; also see Rohde 2006, for another such map and for a statement of the problem on using storm track data from before the satellite era).

A final point of geohistorical interest about the Philippines archipelago is exacerbation of its weather to meteorological extremes by the ENSO phenomenon. The ENSO phenomenon kicked up to the level of activity with which we know it today at about 4500 BP (see Wanner et al. 2008). That is, between 3000 and 2000 BCE. At that period in time, Austronesian colonisation of the Philippines was still ongoing, but the Austronesian expansion southwards and out of the Philippines had not yet begun (see the dates in Bellwood 1995). Before the ENSO upkick, climate was wetter in the general Austral-Asian region (Wanner et al. 2008).

With regard to wetness, however, climate in the Philippines archipelago itself apparently was much the same then as it is in the present (see Wanner et al. 2008). The difference must have simply been less variability before the upkick (see Wanner et al. 2008). For the Philippines, ENSO variability means greatly increased rainfall during the portion of the cycle known as La Niña, but greatly decreased rainfall
during the portion known as El Niño (“The ENSO Cycle”). El Niño is the likely culprit behind the second half of the local comment about Philippines climate reported by Bankoff (Asia Magazine 1990: 10, cited in Bankoff 2004: 93) “when it rains, it floods; when it doesn’t, there are droughts”.

Monumental Architecture in the Philippines Archipelago Collective
World View

The preceding geohistorical processes that involve the Philippines archipelago have occasioned the rise among the indigenous peoples of the archipelago of what Bankoff (2004: 111) calls a “culture of disaster”. Bankoff (2004: 111) observes that “In some societies, natural hazards occur with such historical frequency that the constant threat of them has been integrated into the schema of both daily life and attitude”. Citing F. Landa Jocano (1999), Bankoff identifies the core cultural attitude of bahala na and the core cultural value of pakikipagkapwa as the primary coping practices in the Philippines culture of disaster (Bankoff 2004). Bankoff sees the overall configuration of these practices, rather than the elements of the practices themselves, as being distinctive about the Philippines setting (Bankoff 2004). The attitude of bahala na involves both the notion that life is a series of calculated risks, and the notion that fate ultimately lies outside of human hands (Bankoff 2004). The value of pakikipagkapwa involves a cluster of traits that operationally express group empathy, unity, and support, especially during times of disaster (Bankoff 2004). This cultural picture is essentially one of human solidarity and cooperation in the face of hazardous and unpredictable, but not unexpected, natural forces of cosmic magnitude.

Behind this picture, Bankoff sees an indigenous cosmology: divine forces are ultimately fickle, and they express themselves routinely in the great disasters of nature (Bankoff 2004). If his analysis is correct, then one can begin to see reason for the previously mentioned linguistic oddity of the Philippines archipelago, concerning words for “path” and the Milky Way. Though the Milky Way changes in shape, orientation, and brightness in the course of a single night, it is visible any time of year that the night sky is visible. Thus it shares in the permanency of the sky. Not surprisingly then, it has a place in folk cosmologies in cultures around the world. It even plays a role in the cosmology of the Manus of the Admiralty Islands archipelago, where on two of the islands of the
archipelago, the word for the Milky Way, *pwanchal*, also still means “the way” (Hoeppe 2000: 29–30).

However, Blust’s reconstructed PMP word *zalan* not only means “path,” but more specifically, “path, made by a human as opposed to an animal” (Blust 2010). Anyone who lives in the Philippines for any substantial length of time comes to know that because of the heavy rains and recurrent floods and landslides, permanency is not a feature one associates with human-made paths, ways, or even modern roads. Indeed, Bankoff observes that because of the frequency of natural disasters in the Philippines, “most engineering accomplishments are viewed as futile and of inconsequential purpose” (Bankoff 2004: 92). One can begin to see why in Malayo-Polynesian Philippines, words for “path” ultimately became disassociated from meaning the Milky Way.

In a similar manner, within cultures of the cosmological view that Bankoff describes for the Philippines archipelago, there is no meaningful place for anthropological structures that are “committed [...] to the appearance of permanence” as exemplified in form by “[t]he simple repose of massive earth-borne structures” and by “stable symmetry of structure” – which is what normally describes monumental architecture (Allsop 1977: 9). Within cultures with a cosmology such as Bankoff describes, structures with such forms neither exemplify the view of the cosmos, as supposedly the permanency of the earth/mountain does, nor exemplify the human person in relation to the earth, as supposedly the ascendancy of the tower does (see Barnett 1977). Perhaps the best example of this negation of presumptive cosmic symbolism is the half-buried Spanish-era church that lies seemingly a safe distance beyond the foot of Mayon volcano. One can begin to see why among pre-Spanish peoples of the Philippines, human-made monuments in the basic forms of the earth/mountain and of the tower never took cultural hold.

Thus, in the Philippine archipelago, human-made fixed points were routinely subject to swift natural burial or destruction, which as a well-known phenomenon negated any symbolic claims that might have been made for them vis-à-vis cosmic ascendancy or permanency. The only fixed points to which such claims could sensibly be imputed were natural ones in the ancient landscape, such as the sacred mountain, and the mountain’s natural grotto. Moreover, no path or way made out by humans was guaranteed as permanent or safe, not even a sea journey; yet these paths and ways had to be travelled in the simple business of
everyday life (see the examples in Bankoff 2004). Cosmologically, one’s deepest concern was not with one’s ultimate destination, but with one’s journey (see Bankoff 2004 discussing Alfredo Lagmay; see also the discussion on anxiety on pp. 98–100).

Yet in purpose, monumental architecture is “committed to remembrance” and “is concerned primarily with the dead” (Allsop 1977: 9). In what permanent way were the dead to be remembered by the living, if one’s deepest concern was not the destination but the journey? I believe that the indigenous cosmology of the Philippines archipelago and the purpose and concern of monumental architecture came together in the boat-shaped burial markers of Batanes and Catanauan.

Archaeological field work is still an ongoing affair at Catanauan. Much more work has to be done before enough hard data has been accumulated to enable even the principal investigators to begin constructing a specific picture of the culture that produced the boat-shaped burial markers there. Similarly, more work is still needed on the Batanes boat-shaped markers. In the minds of the principal investigators, the Batanes markers especially still have some vexing fundamental questions attached to them, including whether or not they were all originally meant as burial markers, as skeletal remains cannot be found in some (Dizon et al. 2007–2008); although in the view of Armand Mijares (personal communication, 2012), an archaeologist who excavated in Batanes, they were all indeed meant as burial markers.

Here I shall deal only with basic facts and what is incontrovertible: the shape and composition of the markers in Catanauan and Batanes, their layout and orientation in the landscape, the number of burials per marker, and the fact that at least two Batanes markers contained burials. The dating of the Batanes markers is another vexing question, but in the view of the principal investigators, they are not as old as the Catanauan markers, and the latter can reliably be dated to about 1300–1000 BP according to Victor Paz, (personal communication, 2012) the Catanauan Site Director. The picture that I shall construct from these points, therefore, will be equally broad and basic.

**The Batanes and Catanauan Boat-Shaped Markers**

Two major sites for the boat-shaped markers in the Batanes group of islands are Chuhangin on Ivuhos Island, and Nakamaya on Batan
Island. Eusebio Dizon, an archaeologist from the National Museum of the Philippines, explored the Chuhangin site in 1994 and described it as follows: “...down on the rolling plain, there were boat shaped stone grave markers in regular patterns. The stones were arranged [to present the] current traditional boat or *tataya*, where the bow or prow and stern appear prominently” (Dizon and Santiago 1995, cited in Dizon and Mijares 1999: 5). With that picture in mind, an inspection of the principal investigators’ maps of the Chuhangin and Nakamaya sites reveals boat markers similarly sprawled across the landscape; these maps also reveal that the markers are generally oriented along Northwest-Southeast axes, as are the flotilla of markers as a whole at each site (for Chuhangin see Dizon *et al.* 1995–1997: 44, Figure 6; for Nakamaya see Dizon and Cayron 1997: 21, Figure 1).

Principal investigators originally noted that the boats apparently pointed prow-forwards towards the sea (Armand Mijares, personal communication, 2012), although there is no way to actually tell prow from stern (Armand Mijares, personal communication, 2014). However, this orientation also generally aligns with the appearance of the Milky Way at the area where its band touches the far horizon, in January when the annual battery of storms ceases.

The northerly latitude of the Batanes Island group ensures that rains still occur in the months before the storms begin again in June. What is important to note is that the stormy portion of the year brings with it a nearly constant cloud cover over the entire archipelago, rendering the night sky unobservable most of the time, whether or not rain is actually falling. Excavation of a burial marker at the Chuhangin site was conducted in 1995 and of another marker at the same site in 1996 (Dizon and Mijares 1999).

The stones of the first marker were of an andesite and limestone composition (Dizon and Mijares 1999), while the stones of the second marker were coralline limestone (Dizon and Mijares 1999: 7, Figure 4). The markers contained a single burial each (Dizon and Mijares 1999). The second boat-shaped marker is about 4.5 metres in length and 2.0 metres wide (Dizon and Mijares 1999: 7, Figure 4). In comparison, the dimensions of two boats excavated at the Pamayugan 2 site in 2006 were 3.5 metres long by 2.0 metres wide, and 2.4 metres long by 1.3 metres wide (Dizon *et al.* 2007-2008). Thus the dimensions of the boat marker at the Chuhangin
site may be seen as falling within the variance of dimensions of boat markers found elsewhere on Batanes.

Over 1500 kilometres from Batanes, in Catanauan on the Quezon Peninsula, some 80 metres from the shoreline of Tuhian beach, scarcely above sea level, are the boat-shaped markers of archaeological Localities 1 and 4. They likewise (as the principal investigators view it) point prow-forwards towards the sea (Victor Paz personal communication, 2012; see also the discussion on the boat shaped burial markers as intentional forms in Paz et al. 2011). As with the Batanes markers, they also are oriented along Northwest-Southeast axes (the principal investigator confirmed that this orientation was the case even for the perturbed markers; Victor Paz, personal communication, 2012).

This detail of orientation can be seen in the map in Figure 8. The dimensions of the largest marker, seen in the upper left of the map, at nearly 4 metres long and 2 metres wide, falls within the variance of the Batanes boat marker dimensions, seen earlier. The Catanauan markers differ from the Batanes markers in composition, being composed of coral slabs. Moreover, each contains not a single burial, but multiple burials. This last detail is also seen in Figure 8.

**Figure 8**: Map of archaeological site at Locality 1, Catanauan (image courtesy of Victor Paz).
The markers date, as previously noted, from 1300–1000 BP. The extended burial seen in the upper left of the map belongs to a later culture that likewise used the site as a burial ground (Victor Paz, personal communication, 2012; see also Paz et al. 2011). Relatively recent use of heavy farming equipment had perturbed the site, as is highly evident in the markers at the right and bottom of the map (Victor Paz, personal communication, 2012; see also Paz et al. 2010, 2011).

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From Tuhian beach itself one obtains a spectacular perspective on the night sky. One stands on the rim of a smoothly arcing cove whose symmetric mouth opens almost directly South-East (Figure 9). Thus the cove perfectly frames one’s first view of the Milky Way at the beginning of the dry season, when in the hours after nightfall it is seen as a pale white band that arcs upward from the far horizon, at the centre of one’s field of view.

Within the Milky Way and on its border one sees Sirius and Canopus, the two brightest stars in the night sky seen from this region at this time of year (Figure 11). In the centuries 1300–1000 BP, the Milky Way rose up almost vertically, compared to the angle at which it appears today (e.g., compare the image in Figure 11 to that in Figure 10). At that time period, at the beginning of the dry season (say about 15 January), at 8:00 p.m., the largest boat-shaped marker at Locality 1 (i.e. L1SM1) was oriented to a point on the horizon near directly below Canopus, while the orientations of markers L4-1 and L4-2 at Locality 4 almost perfectly bracketed a point on the horizon directly below Sirius (Figure 11). This near alignment occurred each night, moving about 30 minutes earlier each week. By mid-February the sky was already too bright with light from the just-set sun for the Milky Way and the stars of the alignment to be visible. This brief two-week yearly window of visible alignment suggests that an annual ritual may have occurred at this time at Tuhian, at the beginning of the dry season, vis-à-vis the dead at the burial markers.

It also suggests that, beyond reasons of proximity, ethnoastronomical considerations went into the choice of Tuhian cove itself for the opportune location of the boat-shaped burial markers. At present, no remains of associated habitations have been found near the boat-shaped markers, and the author would not be surprised if these are in fact found at some distance away, near the shores of another larger
The cove of Tuhian beach opens South-East, perfectly framing the first view of the Milky Way at the start of the dry season. Shown in the figure are the azimuth orientations of the boat-shaped burial markers L1SM1 (az = 160°) at Locality 1, and L4-1 (az = 131°) and L4-2 (az = 136°) at Locality 4. Investigator Emil Robles (personal communication, 2013) believes that the other markers at these localities are too perturbed to yield specific azimuth orientations. (From an original image courtesy of Emil Robles; this image was obtained from the original by enhancing colour and luminosity levels.)

Indeed, even after the passing of the boat-shaped marker culture at Catanauan, the sense that the landscape at Tuhian beach was in some way uniquely special for the burial of the dead may have persisted among inhabitants of the area for some time. It may help explain why a subsequent and apparently quite different burial culture continued to use at least one of the localities for its own burials, as was indicated by the extended burial in the preceding Figure 8. These hypotheses can only help enhance the larger interpreted picture that eventually emerges from further work on the archaeological remains. It is in this enhancement where the validity and usefulness of these hypotheses ultimately lie.
Figure 10: The Milky Way, Sirius, and Canopus; about 8:47 p.m., looking southeast from Tuhian beach, Catanauan, on 18 January 2012. Today the band of the Milky Way is slightly more angled to the horizon than it was at 1100 BP, when it was more vertical. In the photo, Sirius shines brightly near the top; Canopus shines brightly at the middle right. The visual difference in brightness between these two stars and the other stars within the field of view is more apparent in this image than in the computer-generated sky chart contained in Figure 11. On the horizon glow the electrical lights of fishing boats. Reflections of stars streak the bay. (This pseudo-HDR image was obtained by the author from his original photo. The original photo was added to itself once then once again using PaintStar. The resulting three images were then processed for an HDR-like image using Picturenaut. The result brings out the colours and contrasts in the underexposed areas of the original image, without overexposing the rest of the image. The human eye and brain appear to perform an essentially similar task. This technique helps compensate for limitations in photographic equipment and for modern-day light pollution, to create an image closer to what the human eye might have seen on a clear and dark night.)
Figure 11: Chart of the night sky at 8:00 p.m., looking directly South-East (viz. straight out to sea) from Tuhian beach on 15 January 899 CE (image created by the author using Stellarium). The Milky Way arcs upward at the center of one’s view. Red lines running from the celestial zenith to the horizon indicate the points on the horizon to which the Catanauan boat-shaped burial markers L4-2, L4-1, and L1SM1 were aligned. The points are near directly below the stars Sirius (α Canis Major) and Canopus (α Carina), the two brightest stars seen in the sky at that time of year.

Discussion

The Milky Way as a celestial path travelled by souls of the dead is a worldwide mythic motif. Variants of it occurred across the native peoples of America (Gibbon 1972) and among Indic groups of the Old World (Gibbon 1972). In China it was a great celestial river (Schafer 1974). This river connected on both sides of the celestial dome to the oceans of the earth, allowing voyage between sea and sky (Schafer 1974). The celestial river is also a Polynesian myth (e.g. see Driessen 1982). The motif of the celestial river is also found among the aboriginal peoples of northern Australia (Ridley 1873). For the Yolngu in Arnhem Land, across the water from New Guinea, stars in Orion also form a celestial canoe, named “Julpan” (Norris 2007). Asides from Julpan, the Yolngu also have the lore of a boat of the dead, or spirit boat, called “Larrpan” (Norris 2007), that takes its passenger souls to the Milky Way:

When Yolngu people die, they are taken by a mystical canoe, Larrpan, to the spirit-land (Baralku) in the sky, where you can see their camp-fires burning along the edge of the great river of the Milky Way. The canoe is sent back to earth as a shooting star, letting their family on Earth know that they have arrived safely in the spirit-land (Norris 2007).
This Yolngu lore suggests an explanation of the cosmology behind the boat-shaped burial markers of Catanauan and Batanes. However, even if the Yolngu myth does fit the archaeological picture at these sites, Gibbon would argue that there is no reason to assume anything but independent origin for seeming parallels such as these unless further evidence of common origins is available (see Gibbon 1972). What can be concluded from Gibbon (1972) is that such independent parallels are not uncommon and occurred worldwide.

We have no oral or written records otherwise of the cosmologies attendant at Catanauan and Batanes. Principal investigators of the Batanes burials are not even certain that the boat-shaped markers belonged to the native Ivatan culture (Dizon and Mijares 1999). We do know, however, from a Spanish missionary report in 1787, that the Ivatans of Batanes believed that in death the souls of their elite went to the sky to become stars (Hornedo 1994). Within this broad context, the conclusions reached in this article make anthropological sense. In terms of ancient cosmology, beliefs that held in some form or other rather commonly among different peoples around the world are being proposed as holding here as well. Moreover, given the not infrequent occurrence of the various components of this picture in other parts of the world—the Milky Way as a path or river for the souls of the dead, the soul boat, the boat-shaped burial marker (i.e. also in northern Europe)—it is not surprising that at one point in the human story that these components should come together as they did in Catanauan and Batanes.

I do believe that in line with the ideas presented here, a useful investigation may be made of the practice of boat-shaped burial markers in northern Europe and their attendant cultural world view. The *longue durée* of northern Europe may help explain both cultural parallels and cultural differences.

I do not expect that outright astronomical parallels are to be found, since the year-round observational picture is quite different between northern Europe and cloud-covered, storm-racked Philippines near the equator. Filipinos, indeed, are a people of the storm, and as the preceding Figure 7 indicates, there really is no place on earth with weather quite like that in the Philippines archipelago. Moreover, the skies of northern Europe and the behaviour of day and night, near the polar extremes of the globe, are not quite like the skies and the behaviour of day and night in more equatorial latitudes. Elsewhere around the world,
looking at how memorialisation occurs in other cultures of disaster may be another fruitful avenue for investigation.

Laid out in the landscape and composed, in the case of Batanes, of stones, or in the case of Catanauan, of coral slabs, the boat-shaped burial markers of the Philippines archipelago were given the quality of persistence. Yet, laid out low to the ground, they did not emphasise human mastery and defiance of the earth. Moreover, laid out in boat shapes, they did not emphasise a micro cosmos tamed and made home by human beings. Rather, pointed prow-forwards towards the sea, and in either being gathered together like a flotilla of boats on a common journey, as in Batanes, or in having the dead gathered together within one boat, as in Catanauan, they functioned as mute reminders of the people’s shared journey into the world of cosmic forces, of which death was the final journey.

Yet, even until now, perhaps the glimmer of a permanent destination for these ancient peoples breaks through. Aimed along Northwest-Southeast axes, as apparently are all the markers uncovered in Catanauan, and as are most of the markers discovered in Batanes, when the storms cease by mid-January, after eight months of consistently cloud-covered skies, in the first clear nights, the boats point not only towards the sea, but in the darkness after sunset towards the region on the far horizon where the broad band of the Milky Way—which is now no longer an impermanent path made by human hands, but is an eternal path in the heavens in which shine the brightest stars of the night—rises from the edge of the world into the sky.

References


The Challenge of Managing Archaeological Databases: Some Issues and Concerns

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Abstract

Archaeological databases contain information about archaeological sites – geographical information, type of archaeological operation, the site director, date(s) of the excavations, information about the structures or stratigraphic units in which the artefact, feature, human, animal or plant remains were found, their description, cultural, historical, and date-related information. The purpose of maintaining an archaeological database is threefold. Primarily, archaeological databases allow archaeological institutions to perform their roles as guardians and custodians by providing a repository for the long-term, archival storage of information about the country’s archaeological heritage. Secondly, archaeological databases serve as research tools to help archaeologists and researchers in related disciplines such as anthropology, and history. Thirdly, archaeological databases provide the general public access to archaeological information and provide teaching support to teachers and students interested in their country’s archaeological heritage.

This paper attempts to focus attention on concerns related to the management of archaeological databases as well as on issues relating to

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archaeological research data residing in these databases. These concerns involve data quality, data access controls, data security, deployment channels, collaboration and continuity. Two important issues will be discussed: How can an archaeological institution balance the need to serve the public, honouring its right to know, with the need to protect archaeological sites and associated artefacts from individuals who seek information for the purpose of stealing our archaeological heritage? A second issue has to do with honouring the intellectual property rights of archaeologists and researchers vis-à-vis the rights of the public to access information generated as a result of publicly-funded research.

Introduction

What is heritage? According to Shanks (2005:166), “heritage can include just about anything—from landscapes to collections, buildings and institutions, living traditions, even impressions and orientations... The important thing about heritage is that it is about relationships with the past. Heritage is what the present values in the past, and the value of the past lies in its contribution to contemporary senses of worth and identity.” The term ‘heritage’ has been used synonymously with ‘cultural heritage’ or ‘national heritage’ – a situation that does not sit well with some heritage experts who contend that national heritage as a concept is something totally different and has a meaning of its own. UNESCO (2008) defines heritage as:

“the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations. Cultural heritage includes tangible culture (buildings, monuments, landscapes, books, works of art, and artefacts), intangible culture (folklore, traditions, language, and knowledge), and natural heritage (including culturally significant landscapes, and biodiversity).”

All remains and objects and other traces of humankind from past times are elements of the tangible archaeological heritage. The notion of archaeological heritage includes artefacts, remains, structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water (ICOMOS 2010; UNESCO 2007). As such, this makes our archaeological heritage a finite non-renewable physical and material resource and every effort must be made to accurately document it for scientific study and to serve the needs of future generations.
Background

Archaeological databases contain information about archaeological heritage sites – geographical information, type of archaeological operation, date(s) of the excavations, information about the stratigraphic units in which the artefact, feature, human, animal or plant remains were found, their description, cultural, historical, and date-related information.

It is critical for archaeologists and researchers to manage data effectively as the quantity of data collected on surveys and excavations continues to grow. Dr. Nick Ryan (2004) succinctly described the nature of archaeological data thus:

“Archaeologists …have to deal with a remarkable variety of different types of information. Archaeology is above all a multi-disciplinary subject drawing on a wide range of skills and specializations, from the arts and humanities through to the biological and physical sciences. From a computer scientist’s perspective, archaeological applications provide some significant challenges, one of which is to develop information systems that can cope with this variety. In the processes of research, excavation, analysis and publication, each of the many specializations generates vast quantities of data, much of it of widely differing types, and the challenge is to provide ways in which this can be presented to and used by all who need it.”

Given the ever-increasing amounts of information generated by archaeological projects, there is definitely a need to manage the data, to organise data for easy retrieval, and to allow information to be shared and used for publication. It is for these reasons that institutions engaged in archaeological research need to establish and maintain archaeological databases.

The purpose of maintaining archaeological databases is threefold. Primarily, archaeological databases allow archaeological institutions to perform their roles as guardians and custodians by providing a repository for the long-term, archival storage of information about the country’s archaeological heritage. Secondly, these databases serve as research tools to help archaeologists and researchers in related disciplines such as anthropology and history. Thirdly, these databases provide the general public access to archaeological information, and provide teaching support to teachers and students interested in their country’s archaeological heritage.
Brief overview of databases

A database is simply an organised, structured body of information. A database is not necessarily computerised though. A three-ring binder full of field forms is a database — but one that is cumbersome and difficult to query (Anderson et al. 2011). Banning (2000:62) defines an archaeological database as “a collection of interrelated data, stored with controlled redundancy to serve applications independent of programs that use the data”. Users can query, add or modify data, and add or modify the database structure itself. The output consists of responses (onscreen or printed) to user queries, transaction logs (records of database changes), or updated data, and an updated database.

In a short introduction to database structure, Banning (2000:63) states that databases “can be as simple, flat-file databanks, similar to index card files and spreadsheets, or these can be complex, relational databases.” A relational database consists of several tables, each of which has a number of fields and contain a number of records, and structured to recognise relationships between stored items of information. Banning also characterised a database field as containing “information on a particular attribute or characteristic of a particular item” while a record in an archaeological database “is analogous to a single file card in a card catalogue: it describes a single site, artefact or context by displaying several related fields”.

It is crucial that archaeological research materials – artefacts, environmental and dating samples, field and laboratory documentation, records, notes, catalogues, photographs, drawings, historical documents, and reports – essentially all the data associated with an archaeological investigation, be stored appropriately and remain accessible to researchers and to future generations and be archived in a manner that ensures quick access.

Examples of archaeological databases

The following are four examples of archaeological databases that are accessible free of charge on the internet (all website information quoted below were obtained from the URLs cited):

A. Celtic Inscribed Stones Project

The Celtic Inscribed Stones Project (CISP) is based in the Institute of Archaeology, University College London. CISP’s aim is to
undertake a collaborative, interdisciplinary study of Early Medieval Celtic inscriptions, with the objective of compiling a comprehensive and authoritative database of all known inscriptions from Britain, Ireland, and Brittany. The goal is to turn what is a largely untapped resource into usable material. The database can be accessed at http://www.ucl.ac.uk/archaeology/cisp/database/.

The CISP database includes every non-Runic inscription raised on a stone monument within Celtic-speaking areas (Ireland, Scotland, Wales, Dumnonia, Brittany, and the Isle of Man) in the early middle ages (AD 400-1000). There are over 1,200 such inscriptions in the database. Information on the stones has been stored in three main databases:

- **Site**: Includes information on the physical character and/or history of the site.
- **Stone**: Includes information on discovery, location, condition, size, form, and decoration.
- **Inscription**: Includes information on legibility, position, script, linguistics, and readings.

Within each of these databases you can find bibliographic references while links to images of many of the stones can be found within the Inscription pages. CISP has given each site, stone, and inscription a 'unique identifier' to aid searching.

The inscriptions are faithfully recorded, whether these are written in the Celtic vernacular or in Latin, using the Roman alphabet or in Ogham script. Information for the database is drawn from published and unpublished works and internet resources. The databases incorporate the details of present and former locations, physical characteristics, readings, previous work, bibliographic info and, if available, images. The digital format has allowed researchers and scholars to periodically update the database as new researches on inscribed stones are published or more current field data becomes available. The CISP database has three subsystems: the Core, the Bibliography, and the Image subsystems. The Core subsystem is composed of five primary tables (Site, Stone, Inscript, Reading, and Translat), secondary tables, and look-up tables. All in all, the CISP database consists of more than 40 interrelated tables.
B. Arachne

Arachne is the central object-database of the German Archaeological Institute (DAI) and the Research Archive for Ancient Sculpture at the University of Cologne. Arachne (http://arachne.uni-koeln.de) is intended to provide archaeologists and Classicists with a free internet research tool for searching hundreds of thousands of records on objects and their attributes. This combines an ongoing process of digitising traditional documentation (stored on media which are both threatened by decay and largely unexplored) with the production of new digital object and graphic data. In addition to extensive digital image archives integrated with detailed textual information and bibliographic databases, among the collections in the Arachne database are the following:

- The complete catalogue of sculptures in the **Antikensammlung der Staatlichen Museen zu Berlin** (Antiquities Collection of the Berlin State Museums). This database contains photos, descriptions and high quality scans of approximately 2600 Greek, Cypriot, Etruscan, and Roman sculptures in stone, as well as several large bronzes (including extant objects and those now lost).

- The **Foundation of Rhine-Westphalia Economy Archive of Cologne** (RWWA) has a collection of about 15,000 digitised glass plate negatives from the late 19th until the middle of the 20th century. These glass negatives show people at their workplace, production methods, machines, products as well as architectural or industrial plants – research materials important to industrial archaeology.

- The image database of the **Cast Collection of Ancient Sculpture** shows every plaster cast in Berlin representing an ancient object. In addition to data like provenance, state of preservation, and relevant bibliography, extant photographs were digitised.

- The **Hellespont Project** integrates Arachne with the Perseus digital collection at Tufts University, combining the digital collections of classical studies of both institutions into one of the most comprehensive and free online collections of Greek and Roman antiquity available for public and scientific use.
C. International Dunhuang Project: The Silk Road Online

The International Dunhuang Project (IDP) is a ground-breaking international collaboration to make information and images of manuscripts, paintings, textiles, and artefacts from Dunhuang and archaeological sites of the Eastern Silk Road freely available on the WWW ([http://idp.bl.uk](http://idp.bl.uk)) and to encourage their use through educational and research programs.

While much of IDP’s early work focused on conservation and cataloguing, these have been supplemented with digitisation, education, and research. IDP started digitising the manuscripts in 1997 with the aim of bringing together the collections in virtual space. As of September 23, 2013, the IDP holds 413,832 high-quality images of the manuscripts and other material, integrated with cataloguing and contextual information in its database.

The largest collections of material from the Silk Road town of Dunhuang and the surrounding region are held in libraries, museums, and research institutes in London, Beijing, Paris, St. Petersburg, and Berlin, with important holdings in Japan and smaller collections throughout the world. The geographical diversity of the collections is due to their having been removed from Central Asia by a succession of archaeological expeditions from different countries. These expeditions, which began in the late 19th century, uncovered and explored the ruined temples and settlements in the deserts of Central Asia.

The collections consist largely of items, dating from about 100 BC to AD 1200, including paintings, murals, artefacts, coins and manuscripts, the last in over twenty different languages and scripts. The size and scope of the collections, as well as their fragility and limited access, has meant that, while they constitute a primary research resource for the history and literature of the region, many of the manuscripts have yet to be studied in detail.

These first three examples of online archaeological databases offer datasets of a secondary nature (previously published research data) as opposed to the fourth example (see discussion on Lerna below) which offers primary datasets containing raw findings from actual excavations or field observations. CISP, Arachne, and Dunhuang feature easy-to-use, user-friendly interfaces, open access, and the presence of search tools that help users quickly locate or at least narrow their search for information.
The websites offer downloadable content such as database manuals (CISP), PDFs of journal articles and grey literature (Dunhuang, Arachne), and links to other sources. Multimedia content like maps, images, sound tracks, videos are available (Dunhuang) while user-selected database records and related content can be downloaded from Arachne. Only the Arachne webpage requires a user to login; new users need to apply for access to the site and wait for confirmation that access was granted. Both the Dunhuang and Arachne webpages offer a limited selection of content in other languages; Arachne allows the user to select different language versions of content shown using the various interfaces on its website. While all three webpages are expected to present updated content, the Dunhuang and Arachne webpages seem to offer newer, more contemporary content. Finally, all three online databases do not charge any fees for access to information. The fourth example discussed below, the Lerna pottery database, is also online but does not have a web-based user interface. Instead, the fourteen tables that make up the Lerna database can be downloaded free of charge in several file formats.

D. LERNA

The Lerna material is an example of a database comprised of a set of related tables that is downloadable from the archives of the Center for the Study of Architecture (CSA). The database can be downloaded in four formats: MS Access, Claris Filemaker Pro, ASCII, dBASE 5 from (http://www.csanet.org/archive/adap/greece/lernpot/lernameta.html#Download). While no online user interface is available, the database is freely downloadable and can be used by researchers without any charge.

Lerna, a type site for the pre-Mycenaean periods in southern Greece, was excavated from 1949 to 1959. The database contains information on 365 vessels belonging to the Early Helladic period that were found in Phase I, Level IV.

Fourteen data tables make up the Lerna IV pottery database. Each is a separate file in FileMaker, and each has its own ASCII file. In Access, however, all tables are included in the single Access file. Each table is also related to one or more other tables, and the relationships are crucial to the functioning of the whole. The fourteen data tables in the database are:

- The **Catalog1** table contains data such as the Catalogue number,
Class, dimensions of the item (height, rim diameter, base foot), Form Shape, Form Type, descriptions of decorative aspects, Munsell numbers, and descriptions of the interior and exterior surfaces of each vessel.

- The **Classes** table contains data on decorative treatment, fabric, surface treatment and colour.

- The **Context** table contains basic information about site contexts - the phase(s) to which they belong and their relationships to other contexts and the site itself.

- The **FitchAnalysis** table contains results from neutron activation and atomic absorption spectrometry analysis performed by the Fitch Laboratory.

- The **LernaInvNo** table contains inventory numbers assigned to the vessels during the excavations.

- The **Morphology** table contains data describing the range of vessel forms and types current during the Early Helladic III period at Lerna, and illustrations of the vessel forms and types.

- The **Pattern** table contains descriptors of painted decorations along with some illustrations.

- The **PlanElevation** table contains all plans and elevations of Lerna IV Phase I.

- The **PotContext** table contains data on the find spots of the vessels.

- The **PrevPub** table contains references to publications which mention specific vessels.

- The **ProfileTerminology** table contains links to illustrations of Morphology profile descriptors.

- The **Sherds** table contains descriptions of existing sherd types from each catalogue entry.

- The **Syntax** table contains standard decorative schema used in Lerna pottery.

- The **ThinSection** table contains images of thin section petrography done at Temple University.

The preceding four examples of online archaeological databases
serve to highlight the diversity of archaeological heritage material that can be stored in databases. This diversity and the significance of such heritage resources make managing these databases a significant challenge to archaeological institutions.

Managing Archaeological Databases

The focus of this paper, an eighteen-year old archaeological institution, is considering the use of digital databases across sub-disciplines within the organisation. Previously, spreadsheets, paper-based filing systems, and early versions of database software (Dbase and Access) have been used to store data generated during the different stages of its archaeological projects. However, no common file format or data storage system has ever been adopted by the institution. Essentially, this means that there are probably as many data storage methods in use as there are archaeological research teams.

The current effort to transition to the use of database software like FileMaker Pro offers the institution a chance to consolidate its research findings and field data into searchable archaeological databases that would include data from the sub-disciplines represented within the institution such as lithics, human osteology, botanical and faunal remains, pottery, and metal studies. However, with 18 years’ worth of data, photo, illustrations, and reports to organise and digitise, the institution faces a huge challenge.

Taking steps to institutionalise the use of databases to store information relating to archaeological projects can contribute significantly toward protecting an archaeological institution’s body of research. Since it is usual for sites to be excavated over several seasons in the very least, with especially rich archaeological sites exceeding 150 seasons (see Chersonesus, Ukraine), the ability to ensure the long-term accessibility and preservation of archaeological research data is a critical responsibility of archaeological institutions since the very same fieldwork that is the source of artefacts and associated field data also destroys the archaeological site and with it all traces of human activity and settlement (Niven and Thompson 2011). Simply put, you cannot dig a site twice.

Managing access to these databases, instituting procedural controls to protect these databases from malware and viruses, and taking steps to ensure data quality will serve to increase the value of this
institutional asset over time; putting in place the technological infrastructure and support mechanisms will set the stage for the long-term curation of the research data, indefinitely extending the useful life of the archaeological data and allowing new generations of researchers and archaeologists to exploit the databases and to validate the data to further their own research agenda. Making these databases available as part of the institution’s public archaeology initiatives also ensures that the nation will continue to benefit from the wealth of information found in these databases long into the future.

Dealing with the concerns

Managing archaeological databases is definitely not a walk in the park. There are many concerns that should be addressed by archaeological institutions that want to deploy these databases in a manner that ensures maximum exposure to the public and other academic research institutions, at the same time protecting the databases from unauthorised access or misuse.

Especially at risk are archaeological research databases that contain primary data sets and raw information derived from field observations and analysis. Discussed in this paper are concerns involving data quality, data access controls, data security, deployment channels, collaboration, and continuity. This paper will not cover archaeological database design and data conversion concerns; these topics deserve to be discussed more extensively in a future publication.

Maintaining Data Quality

Data quality has three facets: data accuracy, completeness, and consistency. These facets impact the data’s usefulness which in turn determines the quality of the decisions based on that data. Below are some examples of basic questions that need to be answered to ensure that only high quality data are stored in the archaeological databases: Are the field measurements accurate? How precise should your data be? Have all measurements been recorded using the same system of measure? Have all stratigraphic data and data on artefacts been recorded?

Institutions should set up data entry protocols to protect the integrity of their databases. Field forms are the primary sources of inputs to archaeological databases. Great care should be taken to ensure that data points on the forms are completely and accurately filled up by the field investigators. This will facilitate the data entry process by reducing
errors and eliminating the occurrence of incomplete database records.

Ensuring completeness is difficult, especially in large and long-running projects. Beyond data entry, post-field processing activities like collecting and organising digital photographs as well as digitising charts, diagrams, and illustrations generate digital files that will be part of a project’s databases. Incomplete data will hamper the efforts of the researchers to make sense of the material gathered and will endanger the long-term success of the project. Involving team members who understand the importance of complete documentation will go a long way towards successful project completion and ensuring continued funding for future archaeological projects.

Selecting the Appropriate Information Channels

How should the institution’s archaeological databases be deployed? The channels to be used to provide access to archaeological databases have implications on the technology infrastructure the institution needs to invest in and on the budgetary resources it needs (initially and on a continuing basis) to support the maintenance and updating of these databases. The institution can provide access to its archaeological databases either offline (within the premises of the institution or library) or online via the Worldwide Web (WWW). There are significant advantages and disadvantages to using either access channel. Offline access offers greater security and control over the institution’s archaeological databases but is available to a limited audience only; online or web-based access offers access to a much wider audience but with much less control over the database and how it is used.

Opting to deploy the databases in-house via its research units offers the institution the best chance of protecting the data assets but severely limits public access to the information, significantly reducing the number of people who can benefit from the information. Permitting access to the archaeological databases via the institution’s library facilities may offer a middle ground – using the library’s built-in custodial procedures to monitor and control access while affording a bigger audience a better chance to view the contents of these databases.

A better appreciation of the work that the archaeological institution and its researchers have put in to populate these databases is a definite upside to this. Using the institution’s library facilities to provide public access to these databases will also send a strong signal that the
databases are primarily academic in nature, to serve academic research purposes (Lock 2003).

Interest in catering to an even broader audience brings up a related concern: Is the institution ready to use the WWW as an information channel and make the data in these databases available worldwide?

The question is deceptively simple; being ‘ready’ involves significant investments in networking technology and security software to safely deploy the databases in an online environment that will afford the institution complete control over the integrity of these archaeological databases and its content while presenting an easy-to-use interface that allow researchers and scholars to explore the databases.

While there are other national organisations tasked with protecting the national heritage and the repositories of information about this heritage, an online presence provides an important contact point between the research institutions maintaining archaeological databases and its public – this is particularly important when incidental finds or archaeological rescue situations need to be reported, or if unaccessioned, personal collections are to be repatriated, surrendered or deposited for safekeeping with the institution.

Persons reporting unauthorised excavations or looting might want to remain anonymous. This should be considered when developing the database’s user interface. The user interface should provide the names of the institution’s contact persons and their email addresses. Finally, feedback and ideas from viewers are important sources of inputs to improve the databases and access.

Implementing Data Access Controls

To help ensure data quality and to protect data integrity, two different sets of data access rights levels have to be established by the institution’s database administrator. The first set involves access permissions for members of the institution (internal users) and the second set involves access permissions for the general public and to interested parties who are not associated with the institution (external users). A possible third set of access permissions might include research collaborators and funding institutions that have a stake in or are currently involved with research projects.
For internal users three levels of control would be ideal. Level 1 rights would grant a data entry operator the right to add new records and to input data into these new records but withhold the right to edit existing records. Level 2 rights would allow a supervisor to authorise staff with Level 1 rights to revise existing records. Level 2 rights holders can execute database backup and restore procedures to and from external data storage devices (see discussion of database protection concerns), extract subsets of databases, and delete database records. Ideally, a user with Level 3 rights can perform all the functions of Level 1 and Level 2 users. In addition, a Level 3 user defines the data access level to be granted to an authorised user.

Regardless of the access channels the institution chooses to use to disseminate the results of its archaeological research projects, being ready to cater to requests from internal and external users means setting up security protocols that establish the identity of the viewer (example: viewer can be Admin, Researcher, or Visitor) and on the basis of this identification, create a list of the viewer’s rights vis-à-vis the databases, and enforcing these limitations to what the viewer can or cannot do. For example, as an Admin user, the viewer is permitted to update (Add, Revise, and Delete records) the database in addition to the Query and Browse rights that a Visitor is limited to.

A user identified as a Researcher will not have the right to update the database but is granted the right to view additional sensitive or proprietary information that is not normally shown on the standard browser interface shown to Visitors. Additionally, a running log of the database users/viewers and their activities (additions, revisions, deletions, and queries) will need to be maintained to track all changes to the database.

Protecting Archaeological Databases

The vulnerability of information systems increases as institutions move into a more networked world. Protecting the institution’s archaeological databases and digital research materials from both unintentional (human error, environmental hazards, system failures) and intentional threats is essential. Applying Turban et al.’s (2008) description of intentional threats to the research setting, this type of threat can include theft of data (particularly researchers’ primary data sets), inappropriate use of data, theft of data storage equipment, deliberate manipulation of data and programs, and destruction from viruses and malware.
Beyond controlling access to archaeological databases, it is important to establish procedures to physically protect the information assets of the institution. For institutions that choose to deploy the databases within their premises or in libraries, an important protective measure is to disable USB ports and CD/DVD drives. This will ensure that no unauthorised copying of databases occurs. This measure also prevents users from introducing viruses and malware into the system. Disabling internet access from the computers designated as data access kiosks will prevent unscrupulous users from sending copies of the databases to themselves or other recipients; this will also minimise the possibility that viruses and malware will get into the system. Choosing to use the Internet as an access channel may offer greater access to a wider audience but also increases the risk of exposure to internet-borne viruses, malware and unauthorised intrusions.

Additional ways that an archaeological institution can protect its information assets involve establishing policies that will govern data backup cycles and procedures, installing and regularly updating antivirus software on all devices connected to the institution’s network and putting in place disaster recovery and continuity plans. Creating data backups should be a regularly scheduled activity to protect an institution’s information assets. With the continuing drop in external hard disk prices and increasing drive capacities, the institution should not find it difficult to implement an institution-wide data backup policy to create copies of the databases and other related research materials stored in digital format. These backups should be stored in secure locations; ideally, copies of the data backups should be stored in multiple locations in different geographic regions or, if this is not possible, in different buildings in the same geographic region. Internet-based data repositories offer an alternative to the actual physical storage of backups in other locations. The Archaeology Data Service (ADS, http://ads.ahds.ac.uk/), the Digital Archaeological Record (tDAR, http://www.tdar.org/), and Open Context (http://www.opencontext.org/) are some examples of archaeological data repositories. A list of research data repositories is available from Databib (http://databib.org/), a searchable catalogue of online data repositories.

Insisting on the installation, use, and regular updating of antivirus software for all computers and devices that connect to the institution’s network is the simplest way to avoid virus and malware infections that could render systems unusable and the storage devices connected to these compromised computers unreadable. A disaster is a situation where an
institutions are unable to access their information technology and systems resources as a result of fire, water, or other hazards or because of the catastrophic failure of its information systems (IS) due to equipment malfunctions, malicious 'exploits' or through virus attacks.

According to Turban et al. (2008:647), a disaster recovery and continuity plan (DRCP) “outlines the process by which an institution could recover from a major disaster”. Developing a DRCP emphasises the willingness of the institution to be proactive about protecting its information and IT assets. DRCPs are essential to any data security system. While this paper will not discuss the DRCP in detail, answers to the sample questions below should give the reader a clear picture of what DRCP guidelines would show:

- What do you need to begin running in event of a computer outage?
- Who will do the data recovery work?
- How does the institution verify that data recovery worked?
- Who needs to be notified?
- What are priorities for recovery operations?

In the event that the institution’s databases are destroyed or compromised by virus or malware attacks, the most recent database backup can be restored to provide a starting point for recovering the rest of the data affected by the attack. This is the best argument for instituting a regular backup schedule for all types of digital data, not just databases.

Establishing Ground Rules for Usage, Collaboration and Data Sharing

In an increasingly digital world where great value resides in information and information systems, it is important to be aware of the threats to these information resources. Institutions who choose to share data with the general public or with researchers in other institutions must establish ground rules for access to and usage of these information resources. One of the primary tools is the creation and adoption of an Acceptable Use Policy or AUP (also called Appropriate Use Policy) that any user who wishes to access the information resources of the institution must promise to abide by.

What is an AUP? The AUP is a formal or informal document that defines the intended use of the organisation’s computing facilities and information resources, unacceptable uses, and the consequences for non-
compliance. It is a document that outlines a set of rules to be followed by
users of computing resources, which could be a computer network, a
website, or information residing on a database. An AUP clearly states
what the user is and is not allowed to do with these resources
(Technopedia 2012). AUPs are created with three goals in mind: first, to
educate users about activities which may harm the institution; second, to
provide a legal notice of unacceptable behaviour and penalties for such
behaviour; and third, to protect the institution from liabilities arising from
the abuse or misuse of access facilities (Standler 2002). Putting in place
these usage policies is an important facet of the institution’s total
information security program and should be a priority of the database
administrator.

Security software should be deployed to periodically remind users
of the terms of the AUP as well as to monitor their activities while
accessing the information in the databases. A clear statement of access
limitations as well as copyright notices should be clearly visible on the
user interface. Collaboration and data sharing are also concerns that
archaeological institutions must address.

What policies are in place to govern research partnerships and
institutional linkages with regard to data sharing? What are the data
access rights of researchers from other institutions who collaborate on
archaeological research projects? A clear delineation of what is shareable
and what is not must be communicated to all members of the institution.
Beyond communicating data sharing policies, the institution should draw
attention to the benefits of data sharing (Wallis et al. 2013).

Wiseman (2013) argues that ‘data sharing’ or making data open, is
“building momentum to change the traditional approach to research
publishing and unlock new research possibilities.” While acknowledging
that many researchers remain dubious about sharing their research data
openly with the wider community, he maintains that doing so can actually bring them and their work wider recognition. He suggests that
“when researchers make the data behind their work open, it enables
others to use their datasets to enhance their own data, find new
information in it or even use it for comparisons against their own work.
This saves time, opens a world of opportunities and reduces inefficiencies
when basic experiments are repeated unnecessarily. Allowing access in
this way can also enable comparisons that have never been possible
before, enhancing opportunities for cross-disciplinary research.”
Ensuring Continuity

At the heart of this concern is the availability of long-term institutional support and stakeholder buy-in. Institutional support involves administrative support as well as long-term funding support for multi-year initiatives to hire and train technical staff, to setup the requisite technology infrastructure (facilities, hardware, software, and networks), and for the continuing maintenance of archaeological database systems.

Ensuring the continuity of programs to maximise the benefits derived from the institution’s archaeological databases depends on factors like adequate numbers of trained staff and archaeologists to use and populate the databases, the availability of database software training for research staff and archaeologists, the continued support of the institution’s administrators, the use of legally acquired software that will allow the institution to download updates and upgrades to keep the software current, and, possibly the most important factor, stakeholder buy-in.

Adequate funding will allow the recruitment and training for people who will operate and maintain the equipment on which the databases will reside, and for technical staff who will setup and maintain the databases and the information systems. Resources should be available to train archaeologists and research staff in the use of the databases. Ensuring that the institution’s people know how to use databases is the best way to maximise the returns on the institution’s investment. Funds should also be allocated for courses on data handling and database use for volunteers.

Stakeholder buy-in is critical because the best designed database systems are useless without people who will utilise the system for their research and who will populate the databases with their research data and findings. To help ensure researcher and staff buy-in, the institution must develop a data policy that reflects the institution’s mission statement. The scope, according to Jones (2009), should be clearly defined as to the “type of research outputs covered by the policy and the context in which the policy is to be applied, i.e. across an entire institution or just a single department or research project”.

Periodic reviews of the institution’s data policy will encourage researchers and archaeologists to contribute ideas and share experiences with an eye towards improving the data policy. Their involvement in the
implementation and review process exerts a subtle push towards acceptance and willingness to work within the bounds of the policy.

**Resolving the issues**

Shanks (2005:165) pointed out that “archaeologists have come to accept an obligation and professional responsibility to share their archaeological knowledge with the public as well as colleagues. And more—to carry out work for public as well as academic interests.” However, there are issues that need to be resolved to ensure that the support for the use and maintenance of archaeological databases within the institution is unwavering.

Ownership of data residing in archaeological databases remains a thorny issue, whether an archaeological project is externally funded or supported with an academic institution’s funds. Unresolved data ownership issues have resulted in the reluctance or even refusal of researchers to contribute research data to an institution’s archaeological databases. This can result in islands of information that are accessible only to the research project team members, discouraging collaboration and data sharing within the institution and with other research institutions.

The primary issue involves finding a balance between the intellectual property rights of the archaeologists or researchers who participate in archaeological research projects and the public’s expectation of access to the results of publicly funded research projects. How can the rights of researchers be protected while allowing them to fulfill their obligation to share the research results with the public?

Getting buy-in from researchers wanting to protect their primary datasets is a challenge. The problem lies in effecting a change in researcher attitudes towards data sharing and collaboration. This stems from the reluctance of researchers to share primary data without any assurance that their work (and their sharing of data) will be recognised in the same way that they do for publishing results in journals.

The following three points among several suggestions made by the Stellagroup (2012) seem to offer an equitable resolution to this challenge: First, “the creation of policies for reserving researchers’ rights to first publication on primary datasets they have submitted for inclusion in the institution’s databases.” Second, “that dataset publication / dataset deposition / dataset disclosure be considered a contribution to be weighed
in connection with tenure and promotion decisions.” Third, “using the preceding suggestion as a carrot for data openness and data sharing to encourage collaboration with other researchers.”

Changing this mindset carries with it the potential for creating ‘new’ knowledge from existing data. Some of the methods of new knowledge creation involve data re-use, data re-analysis, data mining, and combining datasets in innovative ways with research results obtained using new analytical tools and technologies.

An article by Costas, Meijer, Zahedi, and Wouters (2013) provides a perspective on “the current state of data sharing and explores how data publication can be encouraged, recognised, and simplified. The report recommends creating a reward system that will allow researchers to demonstrate the value of their work in an open/shared setting. Alongside this, it notes the need for data-citation standards so that usage of data can be tracked and recorded.

The report advises promoting the positive impacts of data sharing such as increased recognition, reduction in administrative costs, improved reputation, and ultimately the ability to attract the best new researchers.”

Taking a longer term view, the institution can adopt a policy requiring new research proposals to include research data management plans. This way, at the outset of any project, the research team agrees to work within the data management framework laid out in the institution’s data policy. This data management framework should clearly specify that the results of the research are to be made part of the institution’s databases.

The second issue also involves another balancing act – finding ways to enable the institution to fulfill its mandate to provide public access to and to protect the archaeological heritage of the country by establishing and maintaining a facility for long-term data storage and curation of archaeological heritage materials while limiting the access to this resource by entities who seek to take advantage of the detailed information in the databases to locate and steal archaeological materials for monetary or personal gain.
The following quote from George Nicholas (2012: 108-109) on intellectual property issues in archaeology accurately describes the tension between archaeologists, researchers, heritage protection advocates, indigenous peoples, and the public:

“The intersection of cultural knowledge, research practices, and the public domain produces many challenges for archaeologists and heritage stakeholders relating to intellectual property issues... How archaeologists and others respond to intellectual property issues has the potential to either positively transform research disciplines and their relations with stakeholders, or constrain the quest for equitable and productive research relationships and appropriate sharing of information. The challenges are enormous, and there is no single way to avoid or resolve intellectual property disputes that may arise within academia, the cultural heritage management, or descendant communities—or between any and all of these entities. However, a starting point is to recognize that intellectual property ... is an inherent part of all human societies, and that archaeologists working at the intersection of tangible and intangible heritages, are well positioned to provide a fuller understanding of the nature of cultural knowledge and rights and thus facilitate more equitable sharing of information derived from the past.”

Torsen and Andersen (2010) suggest that there are no clear cut ‘recipes’ for an archaeological institution to use to balance its mission to provide the broadest access to its archaeological databases through public archaeology initiatives, information dissemination and education while protecting the country’s archaeological heritage from those who would misuse it. The level of interest (or disinterest) of indigenous groups, political will, enforcement concerns, and legal issues relating to data ownership are factors that make this balancing act unique for every situation and every institution. Combining information dissemination efforts and education through public archaeology activities offer a good starting point.

Conclusion

The four online archaeological database exemplars presented (CISP, Arachne, Dunhuang, and Lerna) drew attention to qualities that an institution wanting to setup access to its archaeological databases should emulate. These are ease of use, a user-friendly interface, the simplicity of data access procedures, the absence of fee-based access controls, the presence of website-based search tools enabling users to quickly locate information, the ability to construct user-defined queries that allow users to isolate data subsets for downloading in a range of file formats, and the
availability of downloadable content such as scholarly papers and grey literature.

Beyond helping the institution fulfill its obligation to provide access to data in its archaeological databases (whether online or offline), developing a user interface that allows people to communicate with the institution directly provides a particularly important contact point, giving the concerned public a chance to provide feedback and suggestions, correct errors, and report illegal or unauthorised excavations and looting. This also opens the possibility of extending the functionality of the databases’ user interface by providing a hyperlink to a registry system that will allow people to notify the institution of incidental finds as well as the location of unaccessioned, illegally obtained artefacts and heritage objects.

Making information in archaeological databases accessible despite the attendant costs and potential risks is offset by the resulting greater public awareness and concern for the country’s archaeological heritage. This, in turn, will hopefully generate more interest and vigilance in heritage protection. Sustained interest from government agencies and pressure from indigenous groups and parties interested in protecting the country’s archaeological and cultural heritage should provide impetus for stricter legal measures and enforcement protocols that support heritage protection initiatives at the local and national levels.

References


Webpages Featured as Archaeological Database Examples


Webpages Cited as Archaeological Data Repositories


Webpage Offering a Searchable List of Research Data Repositories

BOOK REVIEWS

China as a Sea Power, 1127-1368: A Preliminary Survey of the Maritime Expansion and Naval Exploits of the Chinese People during the Southern Song and Yuan Periods

Lo Jung-pang, Edited by Bruce A. Elleman.

Expansion through Sea: China’s Maritime Story
Review by Joan Tara Reyes
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The world prides itself with stories of civilisations that grew through conquests. First, it was by land where armies marched and rode their horses. Then, navies conquered through sea with ships. The latter proved to cover more distance and introduced new found lands to conquer. Naval supremacy was THE next step for emerging imperialists at the dawn of the modern era. China as a Sea Power, 1127-1368: A Preliminary Survey of the Maritime Expansion and Naval Exploits of the Chinese People during the Southern Song and Yuan Periods book tells such a story. Lo Jung-pang wanted to narrate the emergence of China as a sea power. The manuscript for this book was finished in 1957. It was later edited by Bruce A. Elleman after Lo’s death. Such importance was given to Lo’s work that Elleman saw it to be published even after many years. Indeed, Elleman is right. Lo extensively researched ancient documents and other available sources during his time. Being Chinese and foreign-educated, Lo was exposed to different historical sources that he could utilise to write such a detailed and extensive research.

Book Parts

The book is made up of four parts divided into nine chapters.

The first part is about the different contexts and forces that enabled the emerging Chinese civilisation to be a maritime power. Lo laid down in detail how different polities started to create their own naval forces to subjugate the other. They have special naval forces with their own special fighting skills and armaments. These wars later resulted in political consolidation. As it happens, communities were concentrated in areas near ports. This changed their livelihoods as people became
merchants or naval engineers and shipbuilders, and seamen. They would later extend their power to Korea and Japan through maritime means and explore Southeast Asia. These activities resulted to the development of Chinese cartography. The second part discusses the Southern Song period that was constantly in danger of war with the North. This vulnerability propelled them to pool in resources for the development of their navy. Mass amount of wealth was poured in constructing war ships and producing armaments. Men with sea experience were drafted along with merchant ships to increase the number of sea crafts. The officials also encouraged maritime trade where they collect taxes to fund their navy. Luckily, the Chinese trade in Asia was very lucrative and established. Revenue came from Chinese settlements in Southeast Asia and other places.

The Song was not that successful as the Northerners invaded them that resulted to the Yuan period which is the focus of the third part of the book. The Northerners with some help from the South have built their own army and overtook the Middle kingdom. As a very successful conqueror the Yuans received tributes from their other vassals to fund their further expansion through land and sea. China then held influence in Korea where they launched their attacks on other kingdoms like Japan and Annam. According to Lo, as Korean and Chinese naval officers did not agree, the raiding party was sabotaged and failed eventually in Japan. On the other hand, they would gain some territory in Southeast Asia but did not go that far as they got entangled with local politics. Resisting them was easy for the locals. They expanded as far as Annam. Kingdoms especially in island Southeast Asia succeeded in repelling them. In the fourth part, Lo discussed his conclusions. As he reviews the past experiences of the Chinese sea empire, he recounts that the Chinese would reach great triumphs during the times of their solidarity and fail when they are weak and divided. When they have reached their maritime golden age during the Ming period, great explorations were led by Zheng He and sea trade flourished. As Lo pointed out, political instability would put this development on hold again as it had done before.

Some Comments

After reading the book, it is evident that Lo extensively researched for this book as seen on the amount of details that he supplied. He painted a picture of the different stages of what will become the Chinese empire. This book is very informative about those trying times as their
Reyes

maritime tradition began. He did impeccable research and maximised varied sources. This book is indeed a traditional and comprehensive historical work. The most interesting element of the book for me is the perspective of the author. As I look back, the book was finished during the start of the Cultural Revolution of China. Incidentally, Lo’s family was entangled with the founding of the Republic of China by Sun Yat Sen. His father was a diplomat under this government that is why he had a varied educational background as his family travelled around the world.

During the 1950s, Lo had been living in the United States after finishing his master’s and doctoral studies. Lo’s research is indeed very important during those times. As World War II ended, the Cold war started and the events in China gave the country much international interest. As they build their new country with a new identity and government, researchers from non-Communist Chinese such as Lo provided interesting perspectives especially as he gave much value on the country’s strong suit, its unity. Even though this book did not reach China during those times, it is still of importance. This book carries the life’s work of a man that had a different view of China during its pivotal moment. In the end, he still believed in its unity and greatness as he held on to the China’s illustrious past.

*The Portuguese and the Straits of Melaka, 1575-1619*

*Power, Trade and Diplomacy*

Paulo Jorge Pinto De Sousa, Translated by Roopanjali Roy.


**They Were Here First**

Review by Joan Tara Reyes

*Ph.D. Student, Department of History, University of the Philippines*

Most people forget that the Kingdom of Portugal was the first European country that sank its teeth on the lucrative trade available in Southeast Asia known to them as the Far East. Unlike the Spanish, Dutch, French and British, the Portuguese relatively started early and enjoyed trade monopoly for a relatively short period of time. The book of Paulo Jorge de Sousa Pinto tells this story of how state of the art navigation prevailed and how mismanagement brought this empire to its end. This book consists of five chapters with 336 pages of text. It includes some
The first chapter is about the workings of the Portuguese empire in SEA. It explains how the spices from Moluccas would be transported, stored and taxed in the different trade ports of Portugal namely Melaka in modern day Malaysia and Goa in India. In these ports, Portuguese officials act like despots instead of representatives of the crown. Even with this kind of mismanagement, the trade for spices, Chinese goods, and Indian silk was so lucrative that nobody minded the indiscretions. This did not last long as Javanese and Acehnese leaders started to trade with other European countries like the Dutch. The sultanate of Johor also started to trade spices creating great competition with Melaka. Even the Spanish became the Portuguese’s competitors as the former traded intensively for Japanese and Chinese goods in the port of Manila in the Philippines. As these European competitors gained more territory and turned highly militarised, especially the Dutch, the Portuguese-controlled ports became more and more isolated.

In the second chapter, de Sousa narrated how the Portuguese empire reacted to the presence of other Europeans. The empire tried to build fortresses on strategic areas first manned by qualified Portuguese soldiers. Then the time came when less and less skilled soldiers and officers were sent to their ports. As they weakened, the Spanish and Dutch particularly got stronger holds in their respective colonies and local allies. During the late 1500s, the Portuguese tried to imitate their colonial foes especially the successful Spanish but to no added advantage. Their lack of wealth for building forts, compensating soldiers and officers, and supplying arms and war ships prevented them from gaining territories and political presence in Southeast Asia.

The third chapter further discusses more problems for the Portuguese such as the changing political climate in the Southeast Asian region. As new sultans take over the sultanates, alliances continually changed, Melaka started to wane because of the formation of the Johor sultanate and the constant attacks from Aceh. Most Europeans waited for
the outcome of the instability but Portugal remained to protect its interest in Melaka. The empire also tried to connect with the Spanish as the Dutch and English militarily opposed their Latin rivals but it did not materialise. The Dutch was unstoppable and successful in controlling the seas. The VOC or the Dutch East Indies Company was officially formed and took roots in Batavia in 1619. The fourth chapter discusses the intricacies of the Malay sultanates that helped or destroyed further Portuguese attempts in gaining influence. Internal politics and economic interests, personal ambitions of sultans, and even aspects of Malay culture played on their standing in Southeast Asia. This showed how unstable the hold of the Portuguese and how volatile their political relations were. It seems that the Southeast Asian sultanates quickly adapted to the economic changes than the Portuguese. This made the local elite more active in the trade.

Such local intricacies were further discussed in the fifth chapter centred on the city of Melaka. This is the most special city for Portugal as the centre of their political power in Southeast Asia. Goans, Javanese, Chinese, and other Asian merchants lived in this city while the Malaccan-born Portuguese called *casados* led with their Iberian cousins. Political and religious positions control the city. All these relationships were connected like a web hanging on the promise of lucrative commercial ventures and the gain of military heroism. Some of the important Portuguese took centre stage in some parts of the chapter as the author narrated their stories of valour and enterprise. As de Sousa concluded his book, he reiterated the importance of the Portuguese documents and experience that could shed more light on the history of the Southeast Asian region. The Portuguese experience is a good story to be told and it should not be forgotten even though it was a short-lived imperial pursuit in Southeast Asia. After all, they were our first.

Some Comments

The author presented a traditional historical narrative based on archival documents of the Portuguese experience in the East. Most of all, he wrote about a topic that was previously overlooked. Most Southeast Asians would gravitate towards the language and documents of their most enduring colonisers. Most forget that Portuguese documents are among the oldest European-written documents about the “farthest” Asian region. Being the earliest and apparently weakest European imperialist, they reserve a very different point of view during those times. These
points of view can be read in de Sousa’s book. For Southeast Asian historians, these documents would present new sources of narratives. On the other hand, this book is clearly a continuation of European historical narrative set in the new lands. Here, they would set their new territories and gain political influences as they did in the Old World. European wars and alliances were also played in Southeast Asia. They would fight and align among themselves as easy as how they would do it in Europe within the distinct situations presented by the locals. The Portuguese clearly lost this fight but still it should be studied to understand the history of imperialism in Southeast Asia. Their experience highlights that imperialism is not something that a civilisation stumbles on as Portugal experienced. Imperialism is a stage a civilisation is ready for in order to endure. This was clearly shown by the Spanish empire.

Spain was the exact opposite of Portugal during the start of their imperialism. Unlike the savvy Portugal, Spain had no maritime technology nor experience as they were landlocked by the Moors. After the Reconquista, the Mediterranean promised a whole new world of commerce and wealth (Kamen 2004). Luckily, Spain already had set up certain institutions to control newly acquired kingdoms. Rules for organisations were laid. The veteran military was already in place. Then, maritime technology were outsourced from Portugal and the Italian states. It would only take a little time as Spain laid their plans outside Europe. They sailed to the Indies before the end of the 15th century and the rest was imperial history that lasted for more than three hundred years in four continents. Clearly, Spain was ready while Portugal was not. Spain’s institutions of control, and later the Netherlands’ and Britain’s commercial models (and military prowess) were evidently more effective. The Portuguese experience was a very good instrument in focusing on such models. Then again, the cultural aspect of imperialism is a different story altogether. As the last chapter discussed the city of Melaka, stories of the casados, catholicism, and even Goan influences were highlighted. One will comprehend that the empire left its indelible mark for the city will forever bear the marks of their Portuguese experience or should I say heritage? In this case, did the Portuguese really fail?

Reference
Mark Liechty’s *Suitably Modern: Making Middle-Class Culture in a New Consumer Society* (2003, New Jersey: Princeton University Press) is a valuable contribution to the theorisation of the emergence of the middle-class. It is an ethnographic work rich with narratives that has captured Nepal as it goes through cultural transformation in the later 20th century. It is hailed as a “welcome departure from the conventional mode of Nepalese ethnography,” which was limited to doing nothing more than studying “normative topics on kinship, religion, ritual, and shamanism” (Gellner 2004:101). This ethnography review will first lay out Liechty’s goals in the publication. The review will then attempt to track the theoretical gymnastics Liechty performs as he navigates his data wrought out of his urban ethnography of Kathmandu in the late 1980s. The review will primarily identify key theoretical approaches that he tapped as he shuffles through the pages of his interview transcripts. Another primary objective is to look into the methodology and research strategy that he employed in this urban ethnography. As a secondary objective this essay will assess future directions that this trailblazing work has opened up for further study.

Liechty’s main objective is to “conceptualize middle-class cultural practice” (p. 10) through an urban ethnography of middle-class life in Kathmandu. He summarises his aims and goals into three; namely, “1) to describe the cultural and historical context which was the spawning pool for middle-class culture in Kathmandu, 2) to narrate middle-classness as practiced in contemporary urban Kathmandu, and to 3) offer a new approach to conceptualizing middle-class culture” (p. 5). He attempts to grapple with the effects of modernity as it enters a nation-state that has (only recently) opened up to this tide of change after being ruled by the Rana Prime Ministers who exercised panoptic isolationist control over the Nepalese royalty and the Nepali citizens. He states that his study offers some insights on the “experience of modernity” in the third world.
periphery (p. xi). The study, however, avoids to perpetuate myths like “westernization, Americanization, and cultural homogenization” (p. 250); arguing that instead of a centre-periphery articulation there are an array of “local cultural narratives” that “flow in and around global narratives of progress, modernity and cultural fulfillment” (p. 250) as experienced by the Kathmandu middle-class. Liechty wants to capture the process of middle-class construction, its “practice, production, or performance” (p. 4), as it took place in the highland valley in the late 20th century.

Liechty deploys a barrage of theories that transcends temporality. He uses both the old and the new and that I believe this is a key strength of the work because it shows the reader that new theory needs not erase the old. On the one hand he uses classic social theory of Max Weber (1947) and Karl Marx (1973); on the other hand he also deploys an array of contemporary social theory using Raymond Williams (1977), Michel Foucault (1979, 1980), Pierre Bourdieu (1980), Arjun Appadurai (1996), Margaret Somers (1994a, 1994b), and Judith Butler (1990) to name a few. He uses a chimera of classic Marxian and Weberian traditions in tapping the formers “commitment to locate different forms of cultural practice in the context of unequal distributions of power and resources in society” (p. 12) and the latter’s “sensitivity to the powerful role of culture in social life” (p. 12). He carries out a Weberian mode of analysis of the Kathmandu middle-class ethos of “intra-class status competition” (p. 15) and emulation; yet he “constantly returns to [a] Marxian concern for the cultural politics of ‘ruling ideas,’ or how the middle-class disguise its class privileges behind seemingly noneconomic rhetorics of honor, achievement, and so on” (p. 15).

He states that the book looks at “ways of understanding the cultural processes of middle-class life in Kathmandu” (p. 25) rather than looking at cultural outcome or empirical condition. Here he uses Bourdieu’s practice theory (p. 21). He tries to answer the question of “what does class do rather than what is class” (pp. 264-265) - that is class as practice or project. He also taps on Foucault’s post-structuralist theory of power. His work embodies the spatial turn when he maps out the “spatial dynamics of class practice” (p. 249); more specifically how middle-classness takes place in space. He states that “Class is an inescapably locational idea: it necessarily implies a geography in which difference (however imagined, and/ or enforced) is mapped onto social space” (p. 255).
He then juxtaposes the above frames of reference to his thick ethnographic data which features the conjunction of performance and performativity as conceptualised by Butler (1990) and narrative and narrativity as conceptualised by Somers (1994a, 1994b, 1997). He claims that performance helps us understand “how people actively produce class culture in ways that with surprising regularity have overtly dramaturgical overtones” (p. 24). He argues that these performances (dramas) in socio-cultural life can best be understood through narratives and narrativity. In fact, he argues that “through cultural narratives people learn who they are, through cultural narrativity people learn who they should become” (p. 24). He tackles modernity and modern capitalism specifically consumerism and the role of mediascapes (print, radio, TV, theatres, VCR) in propagating modernity and how this gets allocated/imagined in the middle-class project. He tackles what Appadurai calls the “mass-mediated imaginary” as a hallmark of late capitalist modernity (p.32). Liechty takes on Appadurai’s challenge for anthropologists to map out the contours of “processes and [the] role of imagination in modern life” (p. 96). One all important process takes place when the middle-class’ arrayed relations to the capitalist market results to “consumer desire” being rapidly naturalised within their ranks (p. 19). He shows how this has led to internal and external contradictions in the lives of the Nepali middle-class. Interestingly, Sara Shneiderman (2006:645) describes this situation as a Durkheimian state of “anomie”. Thus in locating themselves outside (out here in Kathmandu) they also try to imagine possible lives (p. 238) inside modern cities- - like life in America (Hollywood). Liechty in fact touches on what Appadurai has called the “deterritorialization” of local experience through a barrage of imaginative resources. These resources Liechty fittingly calls the “prefab [ricated] imaginative structures” (p. 244). This life (inside the first world) is narrated through media and soon enough these narratives get embodied by the viewers as they adopt to fashion, language, and (consumer) behaviour and this sometimes lead to escapism as seen in the rise in cases of drug addiction among the middle-class youth in Kathmandu- - “consciously avoiding the future by living for each other in the present” (p. 241).

In terms of methodology Liechty spent sixteen months of fieldwork research from 1988 to 1991 with follow up visits in 1996 and 2001 (p. xii). He used participant observation, performing open-ended interviews and sometimes talking to informants in parks, stores, cafes, restaurants or street corners in Kathmandu. He amassed more than 200
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transcripts of informal interviews with three quarters recorded in audio
tapes (p. xii). He argues that the benefits of recording the semiformal
interviews “outweighed” the drawbacks to creating an “artificial
setting” (p. xiv). The audiotapes captured various linguistic elements like
code-switching, cadence, style, and grammatical construction which
allowed him to pay attention to language as not only as “what people said
but how they said it” (p. xiv). He tries to use language as a vista to how
modernity is experienced in Kathmandu. He admits that his ethnography
is “unusually voice-oriented” but argues that these stories gave him
access to how social meaning is produced and circulated in everyday life
(pp. xiv-xv). In fact, Chapter 9 revolves around the stories of Ramesh and
Suman whose stories are “like those of thousands of other young people
in the city” (p. 232).

An appeal to universality appears in several spaces in the book.
Indeed a superior contribution of Liechty’s work is in “chart[ing] a path
towards an anthropology of the middle-class culture in Nepal and
elsewhere” (p. 6). According to Liechty the emergent stratification by
status groups with its corresponding strict submission to fashion that was
seen in early 20th-century United States is a fitting processual analogy
(versus historical) to what was happening in the valley of Kathmandu in
the 1990s (p. 18). What he has witnessed in Kathmandu has “occurred-
in the broadest sense- elsewhere before, and continue to unfold around the
world” (pp. 19-20). He hedges; however, when he adds that “Nepal’s
cultural history should by no means be understood as the reliving of
someone else’s history or as the story of Nepal’s catching up with the
West” (p. 20). Interestingly, in one space of his work he also carries out a
semi-deductive enterprise when he seems to be predicting the likely
outcome of his study where he conveys his critical view of capitalist
modernity the “study is more likely to see evidence of market
interpellation and commercial objectification” (p. 34). Later in the work;
however, Liechty has explicitly stated that his work on class is not a
“theoretical tautology imposed on the data but [rather] a vivid
ethnographic fact, perpetually produced and reproduced in cultural
practice” (p. 265).

In his review of the book, David Gellner suggests that the
“informants do not appear in the round; one is not told anything of their
family background, schooling, social links, or religious
orientations” (2004:102). In defense, I believe Liechty does mention the
relevant background on the informants in the book (for examples,
Chapter 5 fashion informants, Chapter 8 Dianne and Gopal, Chapter 9 Ramesh and Suman). Anyway, we are also given the assurance that there are transcripts and records made of the interviews and their backgrounds (p. viii). In her review of the book, Sara Shneiderman suggests that in a span of a decade culture change has continued to take place in Kathmandu so much so that ten years after the ethnography was conducted the published book/ ethnography “feels somewhat dated already” (2006:646). I would argue; however, that this was precisely the reason for Liechty’s follow-ups conducted in 1996 and 2001. Furthermore, Liechty published another volume, Out Here in Kathmandu (2010), that is a companion to Suitably Modern where he says that “although the ethnographic realities documented here are now somewhat dated, my hope is that these essays remain relevant in terms of their topical foci, methodologies, and theoretical conceptualizations” (2010: x).

The book in many respects is charting new ground in terms of anthropological theory. For the most part the work fills up a void in our understanding of the middle-class and its role in the continued survival of late capitalism. I believe the work also opens up a world of possibilities in terms of future theoretical studies. Although Liechty explicitly states that he wants to study what class does rather than what class is (pp. 264-5), he may very well have also answered the latter question in his study. In order to identify his informants, he would have to come up with a working definition of the middle-class - defining markers or criteria of who the middle-class is (?). Although it can be argued that middle-classness is qualitative and relational (being in between those above and those below), we still need some quantitative markers to help us identify members of this class especially when we set out to study them. What is the annual or monthly income? What types of jobs? What is the highest educational attainment?

Interestingly, if we were to pursue case studies of middle-class transnationalism and diasporas in the future we would also have to be aware of cross-cultural incongruities between and among defining variables we use. For instance a middle-class Singaporean citizen could very well be an upper-class if he migrates to the Philippines given the cheaper standard of living there and the wide gap between the rich and the poor. This leads us to another aspect that future research can address - how does the gap between the rich and the poor relate to the space occupied by the middle-class. In the Philippines; for instance, the gap is so wide that subcategories begin to emerge like lower lower-class, middle
lower-class, upper lower-class, lower middle-class, middle middle-class, upper middle-class, and upper-class.

Finally, another important future direction is understanding risk-taking behaviour among the youth. Somon Gimbali, in writing the introduction of Arnold van Gennep’s *Rites of Passage* argues that the rites of passage performed by society function to “aid individuals negotiate major transitions in life [...] The problem for the industrial-urban civilization is that we are increasingly forced to accomplish these transitions alone and with private symbols” (1960: xvii-xviii). With society (at large) sentencing younger generations to life spent in educational (social) institutions, is peer life reflective of the individual’s attempt to go through the life transitions as a social group?

Liechty mentions that Kathmandu has “biting local critiques of modern youth as good for nothing teens” (p. 264). So it would be interesting to look deeper into peer dependence or peer group “conformity to group-dictated standards” (p. 241). In the case of Ramesh and addiction to drugs, he embodies “what could go wrong, a reference point that both peers and parents looked to in horror” (p. 236). Interestingly, this may bring us back once again to Max Weber and his disenchantment thesis of modernity (see Scaff 2000) - is drug addiction and its lure of hallucinations and trances a form of enchantment that the youth are attracted to?

**References**


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