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Traditional island Southeast Asian watercraft in Philippine archaeological sites

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Abstract

The seas of island South East Asia have long been an aid rather than a hindrance to movements within the region and among close neighbours. Many shared cultural traits show evidence of maritime connections within the region. As has been revealed by archaeology, historical accounts and ethnography, a boatbuilding tradition likewise emerged out of island Southeast Asia. At least three examples of such watercraft have been identified in Philippine archaeological sites, all of which predate Spanish colonization. While the remains of these sites were documented and recorded, little comprehensive research has so far been done from these sites to form a cohesive study on the ancient maritime culture in the Philippines and interactions with its Southeast Asian neighbours. This paper seeks to present the known examples of Southeast Asian boats in the archaeological record, ethnographic and regional parallels, and discuss the potential of future inquiries into revealing more of the Philippines' maritime past.

Introduction

The seas of island South East Asia have long been an aid rather than a hindrance to movements within the region and among close neighbours. Archaeologists have revealed ample evidence of the active maritime networks in the region that existed from at least 5,000 years ago, at the beginning of the Austronesian migration that spread throughout all of insular Southeast Asia and most of the Pacific (Bellwood 1985; Bellwood 1991; Bellwood 1995; Bellwood and Dizon 2005; Horridge 1995; Reid 1988; Ronquillo 1998; Scott 1994; Solheim 1988; Solheim 2006). As pointed out by linguists, archaeologists, and anthropologists, shared cultural traits such as language, agriculture, animal husbandry, and pottery-making are evidence of the Austronesian maritime connection. Likewise a boatbuilding tradition emerged out of island Southeast Asia but scarcely addressed in archaeology and history subjects.

Based on a 17th account by a Spanish priest in the Philippines, Alcisco Alcina (1668 translated by Horridge 1982), boatbuilding at the time was shown to favour the shell-first technique of joining planks edge-to-edge using wooden dowels and lashed lugs. Similar construction techniques are in evidence from regional neighbours, such as southern Taiwan (Hornell 1920; Horridge 1982), Indonesia (Horridge 1982), and Malaysia (Evans 1927; Manguin 1993). In some parts of Indonesia the tradition still persists despite the presence of modern influences (Horridge 1982). In the Philippines at least three sites have been discovered which confirm the historical information and show that this technique was used in the archipelago hundreds of years prior to the European contact in the 16th century Common Era (CE).

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This paper seeks to present the known examples of Southeast Asian boats in the regional parallels of the archaeological and ethnographic record, as well as discuss the potential of future inquiries into revealing more of the Philippines' maritime past.

Traditional island Southeast Asian Watercraft

Studies have shown that active trading networks within island Southeast Asia began during the Neolithic period at least 5,000 years ago (Bellwood 1985; Bellwood 1991; Bellwood 1995; Bellwood and Dizon 2005; Horridge 1995; Reid 1988; Ronquillo 1998; Scott 1994; Solheim 1988; Solheim 2006). Long distance sailing technology in the region must have appeared much earlier, with the peopling of Australia through Southeast Asia some 40,000 years ago (Green 2006). Early insular Southeast Asian vessels were built shell first (Manguin 1993). Their construction used the lash-lugged technique to fasten ribs to planks. The planks were joined to each other by either sewing or edge pegging with wooden dowels. Pierre-Yves Manguin (1993) has posited that plank sewing was an earlier technology that was eventually replaced by dowel edge pegging. A decade earlier, Adrian Horridge (1982:56-57) argued the need for metal tools to drill the holes needed for edge pegging with dowels while the sewing technique did not. Doweling was thus a later development. We see however, that in several instances plank sewing still persisted at the time the practice of doweling had been established. Metal was not used for joinery in traditional Southeast Asian boats (Horridge 1982; Manguin 1993; Scott 1981).

Historical accounts

Very few historical accounts have been found to exist describing the boats in the Southeast Asian region, much less the techniques utilized in their construction. An 8th century Chinese text by a Chinese monk described a large sailing *kunlun bo* (Southeast Asian ship) more than fifty meters long and carrying more than 1,000 people (Manguin 1993:262). The *kunlun bo* used several layers of planks and coconut bark fibres to bind its parts together (Manguin 1993:262). A 14th century CE Chinese document written by Wang Ta-yuan observed boats in Madura that used split rattan to fasten the wood together and cotton wadding to plug seams (Scott 1981:6).

More detailed accounts were produced with the coming of the Europeans in the 16th and 17th centuries CE. Portuguese 16th century CE accounts described Sumatran trading ships, referred to as *jong* (or *jonque*) as being larger than their own and able to carry 1,000 passengers (Manguin 1993). The planks and frames of the *jong* were fastened exclusively by wooden dowels. The ship's hulls were sheathed, had multiple masts and used quarter rudders (Manguin 1993). Antonio Pigafetta, who chronicled Ferdinand Magellan's voyage to Southeast Asia, wrote in 1521 of outrigger boats using wooden dowels (Pigafetta MS 1522 in Blair and Robertson vol 33:225; Scott 1981:6). In 1526, Andres de Urdaneta described rowers positioned over the outriggers that extended over the sides of the vessels (Scott 1981:6, 16-17).

The most comprehensive account of boatbuilding techniques of the time was by Alcina, who in his 1668 writings described the step by step shell-first construction of a large plank boat in the Visayas, Philippines (Alcina 1668 in Horridge 1982:5-29; Scott 1981:11-17). After preparing a keel connected by mortise to the stem and stern posts,

carved planks with protruding lugs were attached edge to edge by wooden dowels. The shape of the garboard strakes determined the size and form of the boat. When several strakes were attached the partial boat was allowed to dry completely for one to two months. After this period, the boat was dismantled and refitted tightly. Flexible ribs were lashed to drilled holes in the lugs and to thwarts which were added to strengthen the boat crosswise. Alcina described plank boats that used bamboo outriggers, at least one tripod mast and quarter rudders. During that period Alcina noted that the use of double outriggers was seen only in the Philippines though single outriggers were used with canoes of the Pacific islands (Horridge 1982:22, 56-57).

The Alcina manuscript is a valuable resource for the thorough descriptions of boat construction methods, boat types, tools, and terminologies used in 17th century Philippines.

Archaeology

The oldest example of a Southeast Asian boat in the archaeological record was discovered in Pontian in the Malay Peninsula and dated to 260-430 CE. The Pontian boat is characterized as being sewn-planked and lash-lugged (Manguin 1993:256). Wooden dowels were also used, presumably to keep the strakes from sliding. Manguin (1993) considers the combined Pontian boatbuilding techniques of sewn planks, dowelling and lashed lugs to be of a transitional boatbuilding tradition between the earlier tradition of sewn planks and lashed lugs and the later tradition of edge pegging and lashed lugs.

Other examples of sewn plank boats were found in Indonesia, particularly in Medan, North Sumatra and Sambirejo and Kolam Pinisi in South Sumatra (Manguin 1993:). Recovered from the sites were badly degraded planks. The boat in Medan was dated to the 12th-14th centuries CE based on associated ceramics (Manguin 1993). The Sambirejo timber was radiocarbon dated to 610-775 CE. Wood remains at Kolam Pinisi were radiocarbon dated to 434-631 CE (Manguin 1993).

Numerous types of boats have been noted throughout the islands of the Philippines since the historical period (see Orillaneda and Ronquillo this volume). Boat and ship remains found and studied in Philippine archaeological sites however have predominantly been of South China or European origin. Only a few remains have been found to display characteristics of island Southeast Asian design.

Butuan boats

In the mid-1970s, the so-called Butuan Boats were discovered under flood deposits in Butuan City, southern Philippines (Peralta 1976). According to reports and articles over the years, a total of nine Butuan boats were found accidentally during infrastructure works or by the probing rods of pot hunters in search of wooden coffins containing valuable grave goods (Clark *et al.* 1993; Green *et al.* 1995; Ronquillo 1987; Ronquillo 1997; Salcedo 1998; Scott 1981). An additional two boats may have since been found (Cembrano 1998) though this has yet to be confirmed.



Figure 1. The remains of Butuan Boat 1 on display at the Balangay Shrine in Butuan City (photo by author).

Only three of the boats have been studied archaeologically and recovered: boat no. 1 (figure 1), currently on display in the Balangay Shrine in Butuan City which is adjacent to where it was recovered; boat no. 2, which has been partially reconstructed and is on exhibit at the National Museum in Manila; and boat no. 5, which is currently undergoing restoration and conservation treatment at the Balangay Shrine. A few timbers and broken planks of boat no. 4, which were recovered by pot hunters, are also stored at the Shrine. Most of boat no.4 however remains *in situ*. The three archaeologically excavated boats were radiocarbon dated to 320 CE, 1250 CE, and 1215 CE, respectively (Ronquillo 1987). While the 900 year disparity of boat no.1 with

boats no.2 and no.5 has been cause of some uncertainty. The Butuan boats are undoubtedly the oldest water craft in Philippine archaeology (Cuevas, *et al.* n.d.; Ronquillo 1987; Salcedo 1998).

Though the remains of the vessels are incomplete, they are calculated to average fifteen to twenty meters in length, three to five meters in beam, and exhibit several of the building techniques described by Alcina with edge joined planks and lashed lugs (Alcina in Horridge:9-14; Scott:13-14). Planks of the Butuan boats were cut and carved from a single piece of timber and attached by scarfed joints to winged stem or stern pieces (Clark *et al.* 1993; Cuevas *et al.* n.d.). Though round or flat bottomed and using a center plank, they are frequently referred to as *balangay* (or *balanghai*), which use a true keel or dug-out keel (Scott 1981).

Gujangan wreck

The heavily looted Gujangan wreck was found in the waters off Gujangan Island, Sulu province, southern Philippines (Cuevas, *et al.* n.d.). The wreck, dated to the 15th-16th century CE based on its ceramic cargo, was only briefly inspected by archaeologists in 1998 (Cuevas, *et al.* n.d.). Plank remains show drilled holes along its sides and bored lugs, indicating the edge pegging and lashed-lug construction technique. They are remarkably similar to the Butuan boat planks (figure 2).The Gujangan hull was left *in situ*, though several pieces of timber were recovered for sampling.



Figure 2. Gujangan wreck plank showing a drilled lug and holes for dowels (Photo by author).

San Isidro wreck

In 1996, in the waters of San Isidro, Zambales province in the northwest Philippines, a vessel approximately 15 metres long carrying Ming Dynasty Chinese ceramics (circa 16th century CE) was discovered. It was postulated that the San Isidro acted as transport service for larger vessels that were unable to moor closer to shore. Though much of the hull was obscured by cargo and concretions, small pins were observed (Cuevas *et al.* n.d.). The San Isidro plank remains (figure 3) indicate that it may have

been clinker built with dowels and sewing (Santiago 1996). This, however, needs to be verified by additional site inspections.

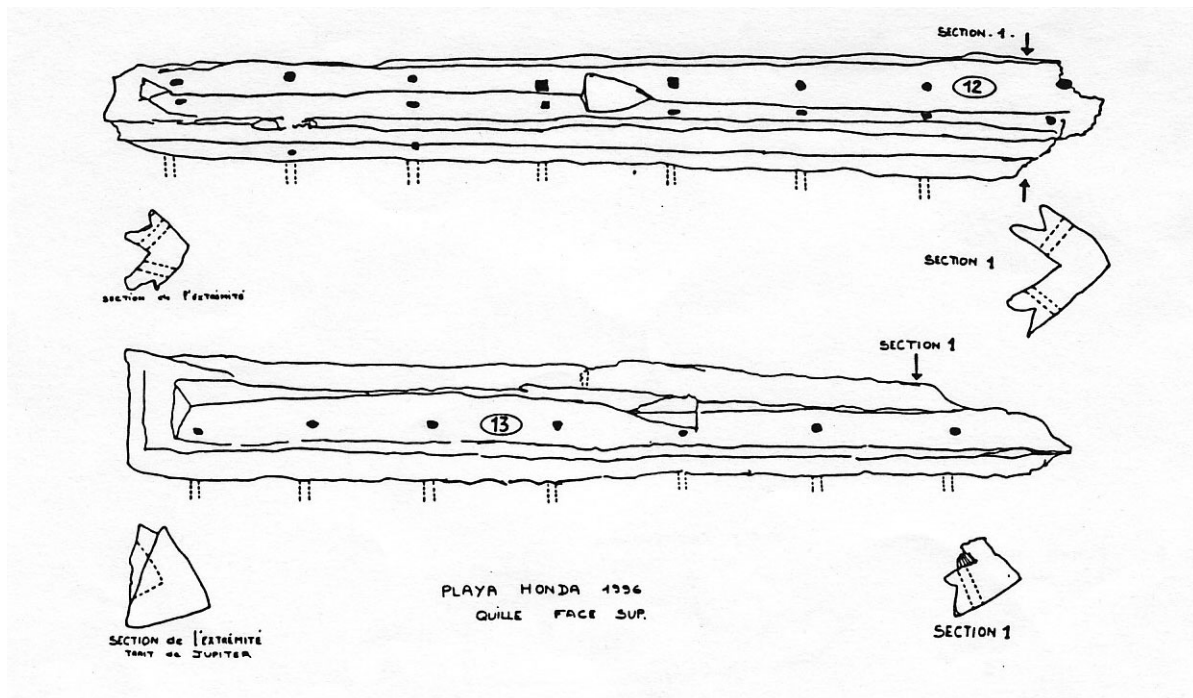


Figure 3. Drawing of San Isidro plank remains (Goddio 1996).

The San Isidro keel and planks were recovered for documentation, but returned to the site and reburied due to the difficulty of waterlogged wood conservation (F. Goddio pers. comm. 2011; Rey Santiago pers. comm. 2010).

Other sites

Preliminary studies are underway for the remains of a round bottomed boat recently exposed by erosion in Caoayan, Ilocos Sur in the Northern Philippines (see Faylona *et al.* this volume). Interviews with the local community indicate that the boat is a *biray* (or *viray*), a traditional sewn-plank boat of northern Luzon estimated to be around 100 years old (Pamela Faylona pers. comm.; Germelina Goulart pers. Comm. 2011).

At least two other underwater sites in Mindoro and Marinduque in southern Luzon are reported to be balangays (Brian Homan pers comm 2010), but have not been fully examined.

Contemporary examples

A few island Southeast Asian boat builders have continued practicing traditional techniques long after the introduction of western-boat and shipbuilding practices (Horridge 1982). It has been through the study of contemporary Indonesian boat builders (Horridge 1982: 49-55), for example, that numerous clues were taken to help interpret the fragmented and deteriorated timber found in archaeological sites (Horridge 1982; Manguin 1993; Scott 1981).

In Batanes, the northernmost Philippine province, the *tataya* is built shell first. Ricardo Galang (1941) described it as carvel built without the use of any iron nails. It is edge pegged and fastened by lugs to frames with rattan lashing. The *tataya* is remarkable in contemporary Philippine boats because it does not make use of outriggers. Austronesian speakers of southern Taiwan make use of the same boat technology, demonstrating the continuing cultural ties between the two locations (Cuevas *et al* n.d.; Galang 1941; Horridge 1982).

Recently, in a project called *Voyage of the Balangay*, a group of Filipino adventurers sailed replica balangays modelled partially after the Butuan boat remains and built by traditional Sama-Badjao boat builders of the southern Philippines (Voyage of the Balanghai 2010). The first replica, named the *Diwata ng Lahi*, was completed in less than two months in mid-2009 using traditional tools with the exception of electric powered drills. The *Diwata ng Lahi* travelled from Manila to Mindanao sailing along the country's western coast. Two more balangays were built, and the three vessels, sailing without outriggers, travelled throughout the southern Philippines, before sailing to the rest of Southeast Asia and back. The entire voyage was completed in early 2011. The *Diwata ng Lahi* is currently on display at the National Museum in Manila.

The balangays were built using dowels to fasten planks together. However, unlike the Butuan boats which used one piece of wood for each plank, the balangays used several scarfed timbers to form the strakes. This was due to the scarcity of suitable hardwoods (Rey Santiago pers. comm. 2011). Consequently, dowels or metal fastenings, rather than lashings were needed to directly join the frames to the planks to increase strength. Unlike the Butuan boats, the balangays were built with keels and used stem- and sternposts rather than winged ends. During the voyage, when repairs were needed and wooden dowels were unavailable, iron fastenings were used.

Many traditional boat builders of island Southeast Asia have begun to adapt modifications to their building techniques, as illustrated in the *Voyage of the Balangay* project, either out of necessity or to simplify work. Traditional boatbuilding in the region is thus rapidly declining. In the Philippines, it is interesting to note that where traditional boatbuilding has persisted are in the remote extreme northern and southern parts of the country (Abrera 2009; Cuevas, *et al.* n.d.).

Future research

Future research should involve the re-examination of traditional island Southeast Asian watercraft remains in Philippine archaeological sites. Specific goals should include the radiocarbon dating of the unexcavated Butuan boats, precise recording and documentation of the unexcavated Butuan boats and the hulls of the San Isidro and Gujangan wrecks; and to make a thorough comparative study of the remains.

Field research would entail, at least, partial excavation of the sites in order to expose portions of the hulls enough for documentation. There is however, the inclination by a number of groups, to recover at least one of the remaining Butuan boats for the purpose of exhibition and raising public awareness on the importance of the boats in the Philippines' maritime heritage. If this is the case, a tremendous amount of resources for the treatment and conservation of waterlogged wooden remains is required. Discussions with the Butuan branch museum staff suggested that boat no. 4 would be

the best option for excavation and recovery based on observations made when it had been partially exposed by pothunters (Lacsina 2011). The other boats may be test excavated to determine their condition and to assess whether more extensive excavation is merited. As the remaining sites are not monitored and within private land, boats no.7, no.8, and no.9 have likely been greatly damaged by pothunters or during fishpond construction, illustrating the dangers of leaving known boat sites unprotected.

A significant amount of knowledge can still be attained with the archaeological study of the remaining Butuan boats. Thorough documentation and recording of the hull remains would entail the excavation of the sites in order to expose portions of the hulls. Wood samples would have to be taken for dating purposes as this could confirm or refute the early 320 CE date of boat no.1.

The greatest challenge in archaeological excavation in the Butuan area is the high water table, which is less than 1 meter from the ground surface. In previous excavations, water pumps were utilized almost continuously.

There is also the considerable problem of determining the exact locations of the remaining boats. A recent site visit showed that exact and precise locations could not be confirmed as this was attempted by memory (see Stead and Dizon this volume). At least two of the boats, no.6 and no.8, were either inaccessible due to heavy vegetal growth or had been disturbed when fishponds were constructed in the area. The location of boat no. 9 is not marked on site maps and is likewise unknown to the present staff of the branch museum. The site of boat no.7 bore evidence of pot hunting activities, with a number of open excavation pits visible.

Probing the ground with the use of metal rods or *sonda*, as practiced by pothunters when the boats were first found in the 1970s and 1980s can be used to confirm the presence and extent of the sites in preparation for archaeological excavation. Remote sensing technology may also be utilized for more accurate results but at a much greater expense.

Neither the Gujangan nor San Isidro sites have been re-examined since the initial investigations more than ten years ago. At this point, their present conditions are unknown. The boat remains off the Mindoro and Marinduque islands must also be located and examined, as with other reported old boat sites. Surveys may be taken throughout the Philippines for finding other instances of traditional watercraft remains.

Discussion

Philippine maritime archaeology has thus far focused on international trade networks and ceramic studies, having put much emphasis on preserved cargo of which thousands of pieces have been found from single sites. The study of Philippine ship and boat technology from archaeological sites, however, is a topic that can benefit from more thorough studies. In spite of the presence of archaeological resources, very little research has been done with the aim of comprehensively investigating the traditional Southeast Asian boats in the Philippines. The existing research on the Butuan Boats, for example, was meant to be only preliminary in nature, pending more comprehensive studies in the future that have yet to occur. The San Isidro and Gujangan wrecks have likewise not been suitably utilised to enrich knowledge of Philippine maritime culture.

The data that will be generated from the research will add significant understanding to indigenous Philippine and island Southeast Asian boatbuilding techniques.

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