Interim report on the joint Australian–Philippines Butuan boat project, October 1992

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Introduction

The 1992 Butuan boat recording project is the second joint Philippine–Australian maritime archaeological project (for the first, in 1988, see Clark *et al*., 1989). The present project is funded by an Australian Research Council (ARC) grant held by two of the authors (Clark and Green). The subject of the ARC project is the study of the development of ships and shipbuilding technology in the pre-modern period. The research utilizes maritime, historical, reconstruction, experimental and ethno-archaeological techniques, together with archival research and computer-based methods, to study aspects of ships within the Indian Ocean, Southeast Asian and East Asian regions and the associated aspects of European shipbuilding technology.

This research has implications for our understanding of the history of Asian technology, and the processes of maritime trade which were central to cultural diffusion and adaptation throughout the Asian littoral, the Indian Ocean and Oceania. The expansion and technology of maritime trade is also closely related to the economic history of Asian societies and a better knowledge of maritime technological evolution in the area is one of the keys to a better understanding of the mechanics of Asian economic and cultural history.

The Butuan Boats represent an important part of the understanding of Southeast Asian shipbuilding technology. The lashed lugs have parallels in other parts of Southeast Asia, particularly in archaeological finds in Malaysia and Sumatra (Evans, 1927; Gibson-Hill, 1952 and Manguin, 1985). The technique is still found in the Moluccan and Solar Archipelago and the Solomon Islands (Burningham, personal communication and Horridge, 1982) and also has parallels in Europe (Hornell, 1946). Vedstigial lugs are also found in South Sualwesi (Burningham, personal communication), the Maldives (Millar, 1993) and other areas. Previous work on the Butuan 2 boat (Clark, *et al.,* 1992) has resulted in a better understanding of the construction proces of this type of boat. Since there are two other extant Butuan boats, not investigated in 1988, located in museums in Butuan and Libertad on the island of Mindinao, it was considered important to record these two vessels in detail in order to complete the investigations. In consultation with Wilfredo Ronquillo and the National Museum, a visit Butuan to record the Butuan 1 and 5 boats was made in September 1992. Prior to visiting Butuan, Clark, Santiago and Vosmer spent a short period in Tawi Tawi, southern Sulu, recording local boat construction (Fig. 2). After completing the field work in Butuan, a Bajau (Bajao or Badjao) *lepa* or ‘houseboat’ in the anthropology and ethnography collection of the National Museum in Manila was also recorded. This paper summarizes the initial findings of this work; it is anticipated that a more detailed report will be published later.

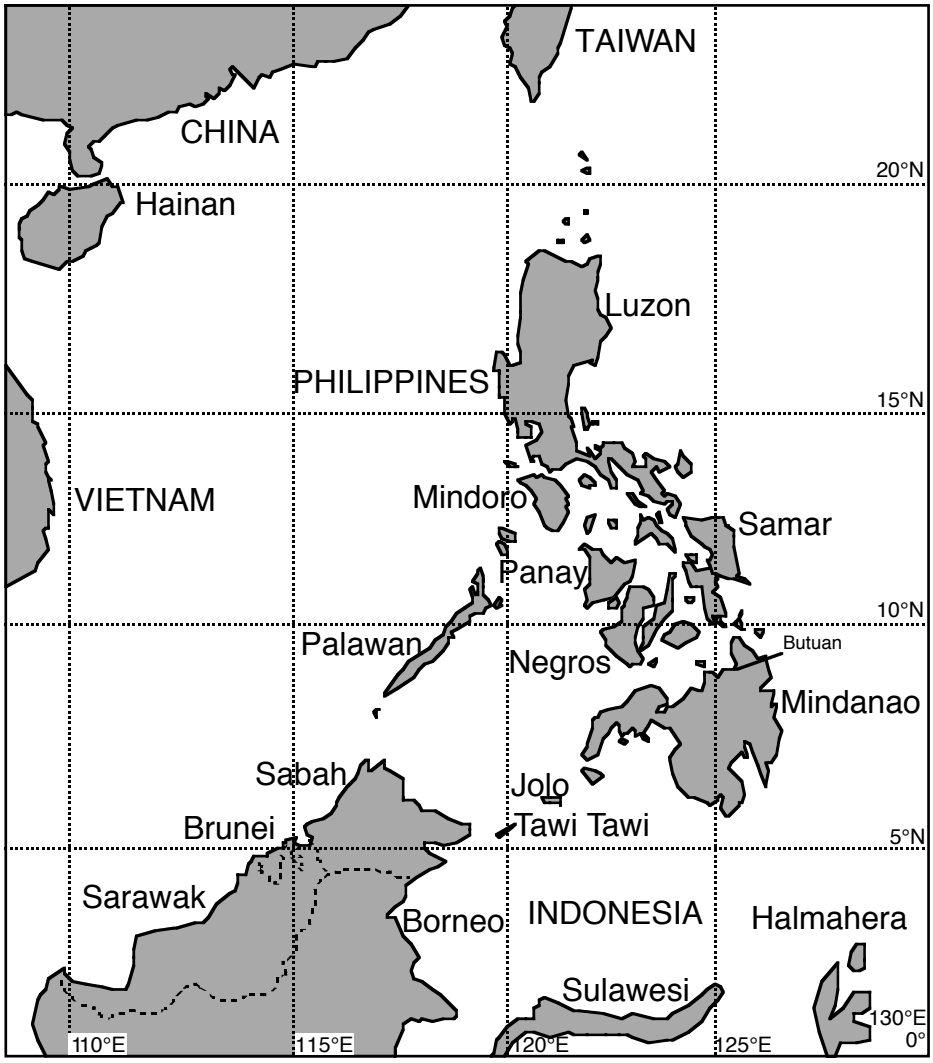

Figure 1. Map of the Philippines showing the main sites.

Tawi Tawi survey

Originally it had been planned that Clark, Vosmer and Santiago would spend 5 days carrying out a preliminary ethnographic survey to investigate the contemporary boat building in the Tawi Tawi region. However, with the unexpected closure of the Tawi Tawi airport, Clark and Vosmer's arrival was delayed and the opportunity for field work was reduced to two days. During this short time, it was possible to visit only two boat building sites. The first of these was a small Bajau community located at Tungkalang, Sanga Sanga. The second was at Talisay, a Samal village on the island of Sibutu. It should be noted that the difference (if any) betweel Samal and Bajau needs some explanation: the names are usually synonymous, if any differentiation occurs, generally sedentry fishermen are refered to as Samal and semi-nomadic fishing societies are refered to as Bajau (Burningham personal communication).

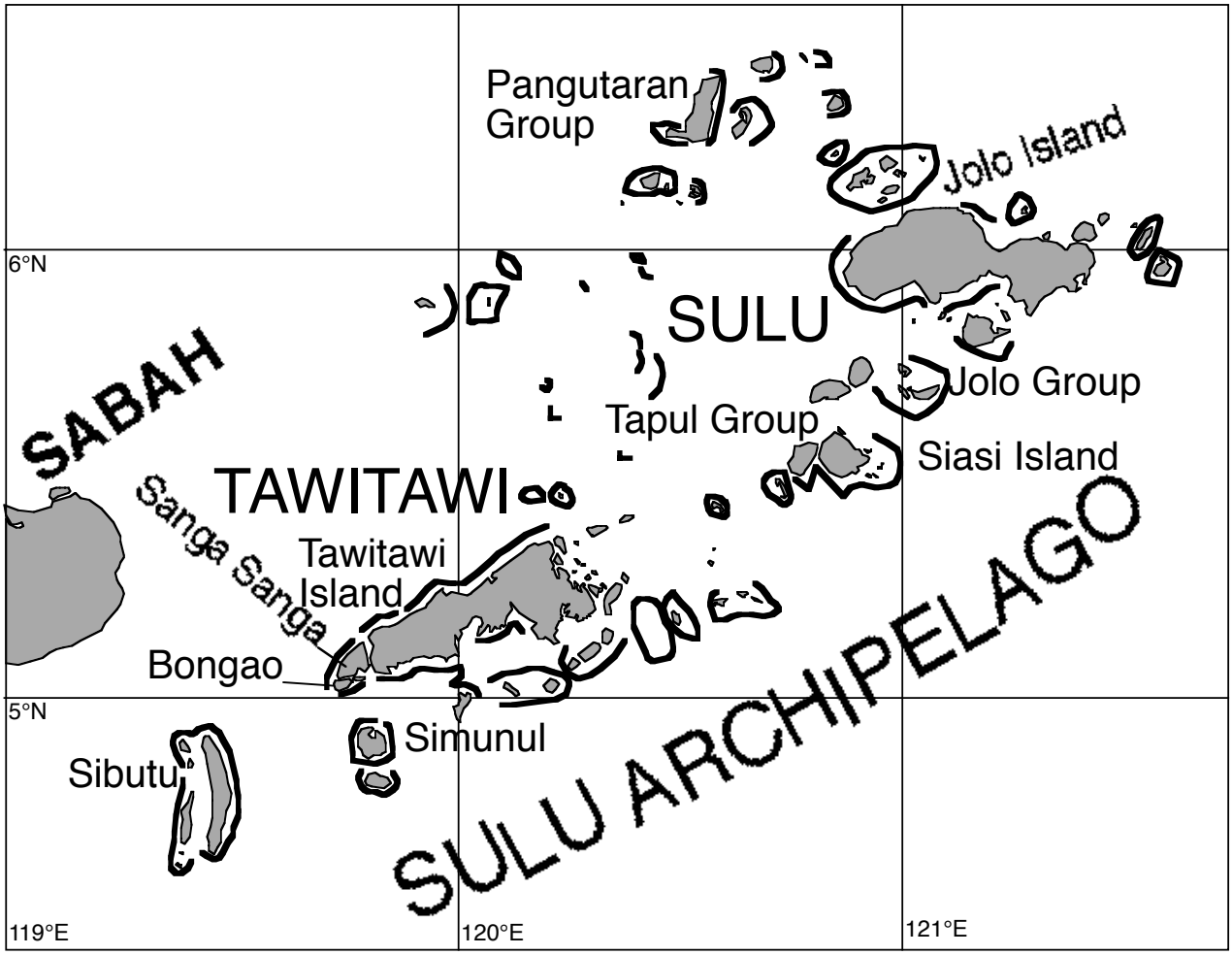

Figure 2. Map of the Tawi Tawi region in the Sulu Archipelago.

TUNGKALANG

Tungkalang, which means 'sand dune or sand point' (Pacita Paa, pers. comm.) is located on a sandspit in the Bongao channel on the western side of the causeway or bridge that joins the islands of Bongao and Sanga Sanga. Living in a cluster of stilt houses and at least one 'house boat', the community is a single clan of Bajau people made up of eleven families (Inglesani Hadjulani, pers. comm.). With the aid of Pacita Paa, a student at Mindano State University (MSU) who acted as translator, Clark and Vosmer spent approximately eight hours interviewing Inglesani Hadjulani (a 28 year old, third generation Tungkalang boat builder).

The community derives its income ostensibly from small boat building and subsistence fishing. The ratio of boat building to fishing, according to Hadjulani, was dependent on the availability of raw materials and the number of orders for vessels to be built. At that the time of the field work, four *kumpits* (motor launch) ranging in size from approximately 12–14 metres were being built, as well as a number of canoes and dugouts. The *kumpits* , which can take about two months to build if all the materials are available and there are no delays, cost approximately 150,000 Philippine *piso* (this price may have be inflated since the informant was quoting a price for a foreigner and not a local Philippino). For comparison the informant was asked whether he could build a 'traditional' *lepa* (*lipa lipa*) similar to a derelict *lepa*, about 10 m long, abandoned on the eastern edge of the village. Hadjulani quoted a price of 60,000 *piso*, but said although he could build one, it would be difficult since they were not built any more. The knowledge and skill required to build a vessel of this type apparently still exists in the community, presumably amongst

the older members, but since the current generation is not being taught the method of building *lepa*, it is only a matter of time before the ability is lost.

In additional to gathering general information on the community's boat building activities, time was also spent studying the community's canoe construction techniques. Two types of canoe were seen being built: a simple dugout, one-part canoe; and a more complex, seven-part type. The simple dugout variety was characterised by a chine at the bow and stern, which blended and disappeared into the rounded midsection of the vessel. The seven-part canoe (see Fig. 3) was built without chines and comprised a dugout base with two wash strakes and four end pieces. The wash strakes, called *tapi*, were edge-joined to the top edge of the dugout by means of wooden dowels. These strakes build up the sides of the canoe and give the vessel more freeboard. The end pieces called *sugbat*, two of which comprise the bow and the remaining two the stern, are essentially mirror images of one and other. The bow pieces are slightly longer than the stern and have vestigial decorative elements incorporated in their form. They both, however, function in the same manner as the wash strakes, to raise the freeboard of the vessel. The end pieces were scarf joined to the wash strakes and edge joined to the dugout base with dowels. At the bow and stern, where the end pieces meet, they are 'side joined' with dowels. All seams were luted with *golum* , the bark of a tree (paper bark species).

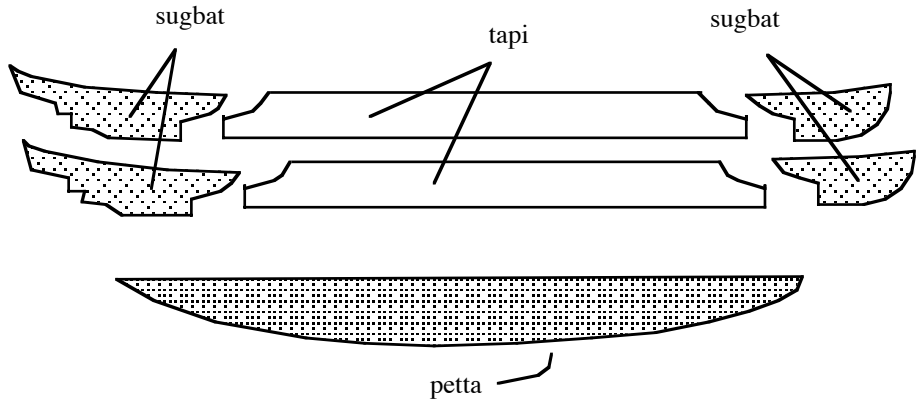

Figure 3. The seven-part canoe construction.

Both types, according to Hadjulani, could be used either with or without outriggers and varied in length from 4–9 m. At the time the data was collected Hadjulani was just completing a seven-part *petta* designed to carry four people. The LOA of the canoe was 5.28 m, the maximum beam was 0.74 m at 1.9 m from the bow and the average depth was approximately 0.4 m. The 'tool kit' used to build the canoe, comprised of a *batuk* (adze or axe), *barina* (drill) and *tusukan* (chisel). The vessel had been completed in eight days, although he said that it could have been completed in five if he had worked on it continually. The vessel was sold for 2500 *piso*.

The seven-part canoe seen at Tungkalang and described in this paper is very different from the vessels depicted and described as '*vinta*' by Spoehr (1977). Spoehr's '*vinta*' from the Zamboanga and Sulu area appear to be five-part canoes, as defined by Haddon and Hornell (1975). Various authors have written on the five-part canoe building tradition, outlining the construction techniques. Haddon and Hornell (1975) and more recently Horridge (1987), state that the five-part canoe is typical of Oceania and outrigger-canoes of Austronesian peoples, including those of Madagascar. Recently a seven-part canoe building tradition has been proposed by Burningham (1993) and he suggests this to be a Bajau tradition. Burningham lists five basic design features that identify the seven-part structure of Southeast Asia: a slack bilged, V-section midbody with flared topsides in the midsection; a rockered keel or bottom—the bottom curves up toward the the ends in the longitudinal section; vertical, or even inward raking, profile to bow or stern; a break or step in

the sheer formed by the termination of the sheer strake near the bow and stern and; the entire bow and stern above the dugout base or keel formed from large shaped, conjoined pieces on which all or most of the strakes terminate (Burningham, 1993:199). These features, it is argued, are the result of the opening out of a simple dugout. However, there are seven-part canoes built in the region that are not opened out (presumably because the builders do not have the techniology of heating to bend timber) and there are outrigger canoes built as a typical unopened canoe, but using the seven-part structure. This is a highly complex area beyond the scope of this report, however, the field observations of Bajau *lepa* at Tawi Tawi supports the Bajau origin of the seven-part opened out canoe construction.

Nomenclature of terms for tools, vessels and parts of vessels

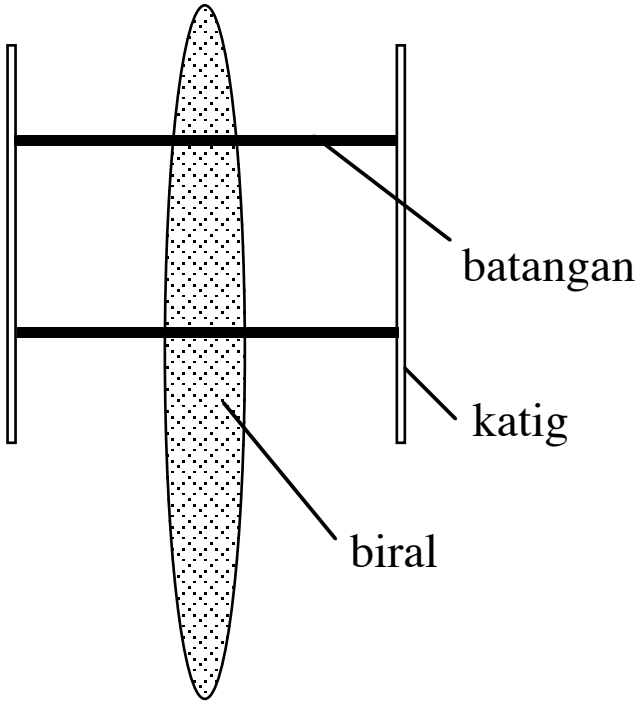

Figure 4. Principle elements of a *biral* (small double outrigger canoe).

Terms for vessels and parts of vessels

bangka	general term for boat throughout the Philippines
biral	simple dug out (with or with out outriggers)
sikayan	five-part canoe (Sulu region)
pelang	five-part called *vinta* by Spoehr (1971)
petta	built up canoe (can have seven or more parts)
tempel (*temper*)	motor launch, planked and edge joined with transom stern, usually less than 10–12 m in length.
kumpit	motor launch, planked and edge joined with transom stern, 12–20 m
Lepa	'traditional' Bajau house boat, 8–12 m
basnig (*basnik*)	large double outrigger with numerous wires coming down to support the outriggers from the mast (Ilongeos people).
golum (*gollom*)	caulking (*golum*, *gelam*, *gelang*, etc are all names for paper bark *Melaleuca leucadendron*) in the Indo-Malay region
pasok	dowels

Tools

batuk	swivel head adze (can be used as an adze or axe). *Patok* is adze in Bahasa Sama
barina	drill
usukan	chisel (a long wooden handle to which the metal swivel head adze head is hafted)

Timbers

manakayan	wood used by Hadjulani to build the *petta*.
ligayan	wood used to make the dowels (*pasok*)

SIBUTU

The island of Sibutu, south west of Tawi Tawi (Fig. 2), takes four-hour to reach by ferry. In the town of Talisay eleven large vessels were under construction, in various stages. They ranged around 17 m overall. The largest had thirty strakes per side. Three smaller, narrow vessels, of 8–10 m length were nearing completion. Although the hull shapes are modern, the construction technique echoes earlier methods of edge-joined dowelled shell-first construction. Wooden dowels have been replaced by galvanised iron. These are cut at lengths of about 75 mm from 6 mm rod. They are spaced about 200 mm apart (Fig. 5).

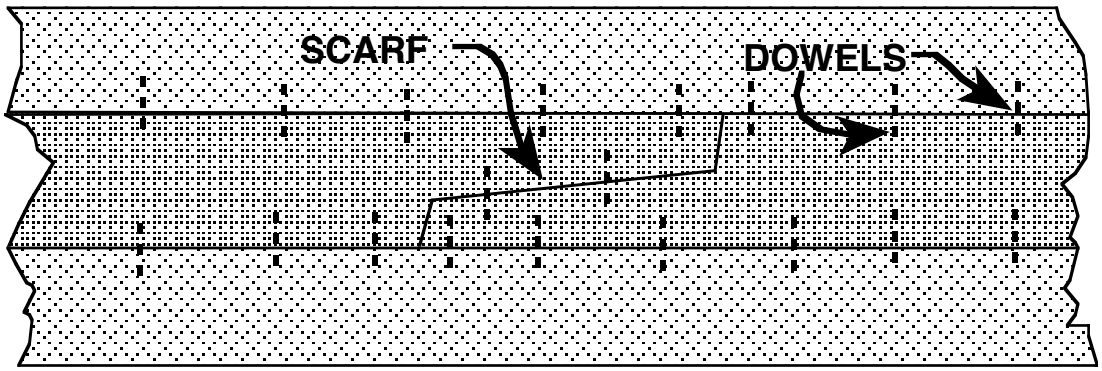

Figure 5. Detail of scarf joint and dowel placement in hull planking of *kumpits* under construction at Sibutu.

The keel is laid on blocks, a sternpost–horn timber is erected (possibly) tennoned to the keel and reinforced with a sternpost knee which is through-bolted using galvanised bolts (Fig. 6). A sharply raked apron is fitted, on which the forward ends of the planking terminate. After planking is completed a false stem is fitted to cover the hood ends of the planks.

The vessel is built shell-first, with floors, futtocks and top futtocks being fitted when enough planking is completed. Framing timbers are fastened from the outside with large, countersunk, galvanised nails. None of the nails are visible on the inside. The planks are fitted as matched pairs, port and starboard, and the shape of the vessel is controlled by the shape of the planks and their angle relative to the vertical centreline plane.

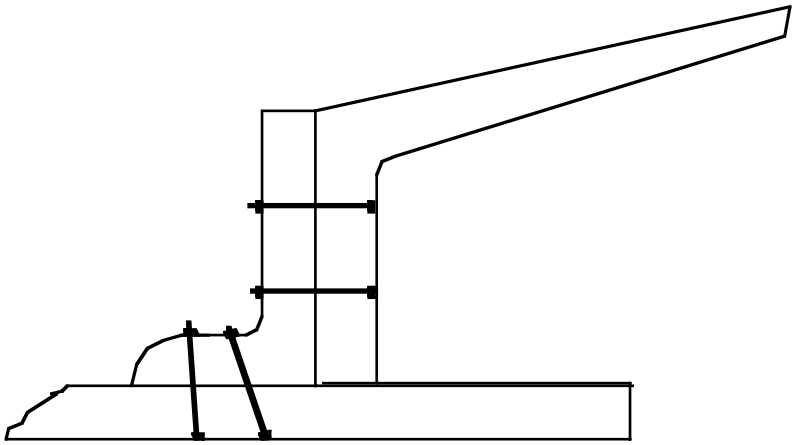

Figure 6. Stern post detail of a *kumpits* under construction at Sibutu

An interesting feature was noted where the planking was fastened in the tuck of the stern. Near the sternpost, the side of the vertical planking was nailed onto the edge of the next plank (Fig. 6). Gradually, the sharp tuck ran out to a smooth curve, where the edges of the planks were joined with dowels (Fig. ??). It was not clear at which point the transition took place, where the nails gave way to the dowels for fastening the planks.

Butuan Boats

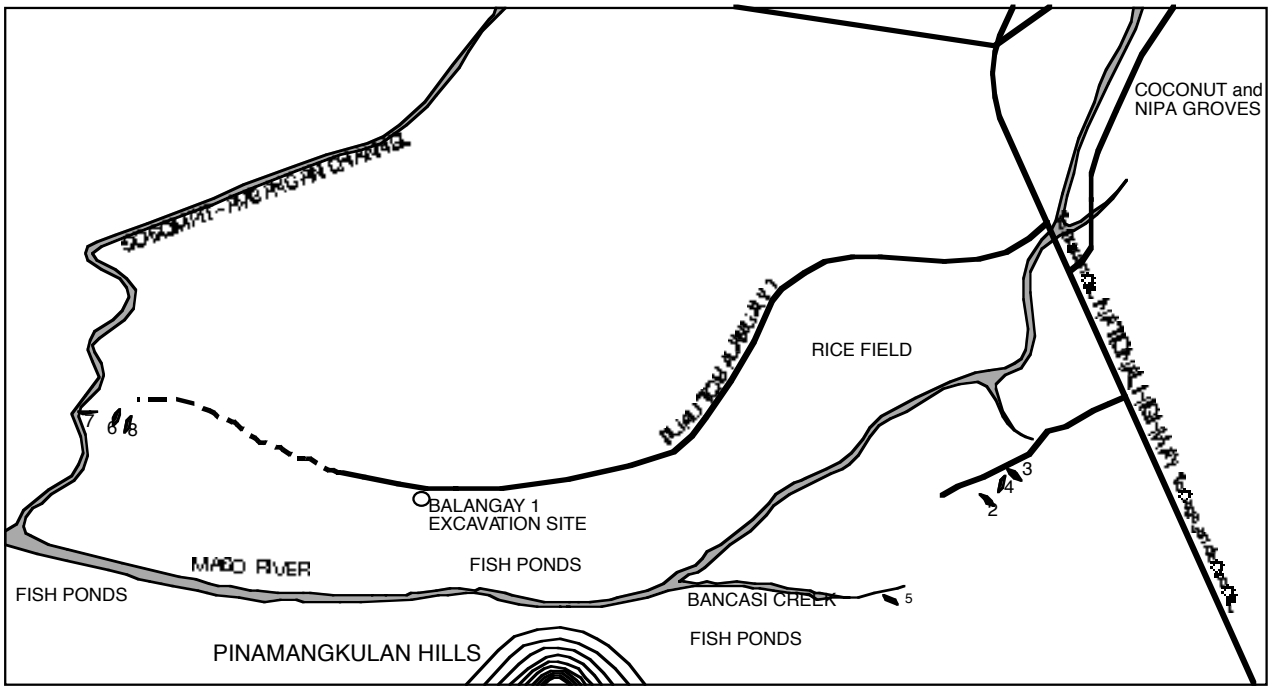

Figure 7. Map showing Butuan and Libertad Cities and the location of the Butuan Boats.

RECORDING METHODS

The Butuan 5 planking that was in fresh water tanks at the Butuan Regional Museum was first cleaned and the water in the tanks replaced. Each plank fragment was then carefully removed from

the tank and brought to a clear area at the front of the Museum. Here the planks were placed on a sheet of transparent Mylar film on a flat, level board. The Mylar sheets were 914 mm wide by 2440 mm long. A number of plank fragments were arranged on the board with adequate spacing so that the positions of the dowels could be marked on the Mylar using waterproof marker pens. Each sheet was numbered consecutively, the plank fragments were given arbitrary numbers and the sheets were marked with the date and Butuan 5. A camera, mounted on the roof of the museum porch, was adjusted so that the whole sheet containing the planks could be photographed in indirect sunlight. A mirror, placed on the board, was used to accurately level the camera and the board. A scale was placed on the board so that it lay in the same plane as the top of the planks. After the photograph was taken, a video coverage of the planks and the sheet was made for reference purposes. Tracings were then made around the plank fragments. The fragments were then transferred to a table where the Mylar sheet was placed over the top of the planks and details on the surface of the planks were transferred to the Mylar.

Essentially the same technique was used to record the Butuan 1 boat at the *Barangay* Shrine Museum at Libertad, but in this case, because the planks were much longer, photographs were taken from a tripod at 500 mm intervals along the length of the strakes. At each photographic station the camera was levelled relative to the surface of the plank using the mirror system.

OBSERVATIONS

The Butuan 5 boat

The Butuan 5 boat, the fifth of nine boat-sites discovered in the Butuan area, was excavated at Bancasi, Libertad, in 1986. It is the third vessel to be recovered from that area. The initial excavation was started by the municipal government of Butuan City and then taken over by staff of the National Museum, Manila. Since 1986, the timbers have been kept in fresh water at the Butuan Region X Museum in a concrete holding tank .

General impressions

The existing timbers are fairly degraded, with only a few of the planks in good condition. Those frames that remain, fashioned from a different species of timber, are generally in better condition than the planking. The vessel seems to have originally been about 13 m in length, though the longest remaining portion, the keel, is about only 11.5 m. There are remains of eight planks on one side of the vessel and seven on the other.

Planking

The planks vary in thickness from 30–45 mm. The maximum thickness at the lugs is 80 mm, but is usually about 60–75 mm. The planking is edge-joined with dowels of approximately 12 mm diameter, spaced about 200 mm apart. Dowels extend more than half way through the width of the plank. The relative position of dowels on opposite sides of the plank strakes are staggered slightly (Fig. 8). Dowels on each side of the lugs are counter-pegged with hardwood locking pins, square in section and slightly tapered (Fig. 9). In the midships part of the boat where there is a large space between lugs, every third dowel is pegged. The planking wood is thought to be *kamagong* (Santiago, personal communication).

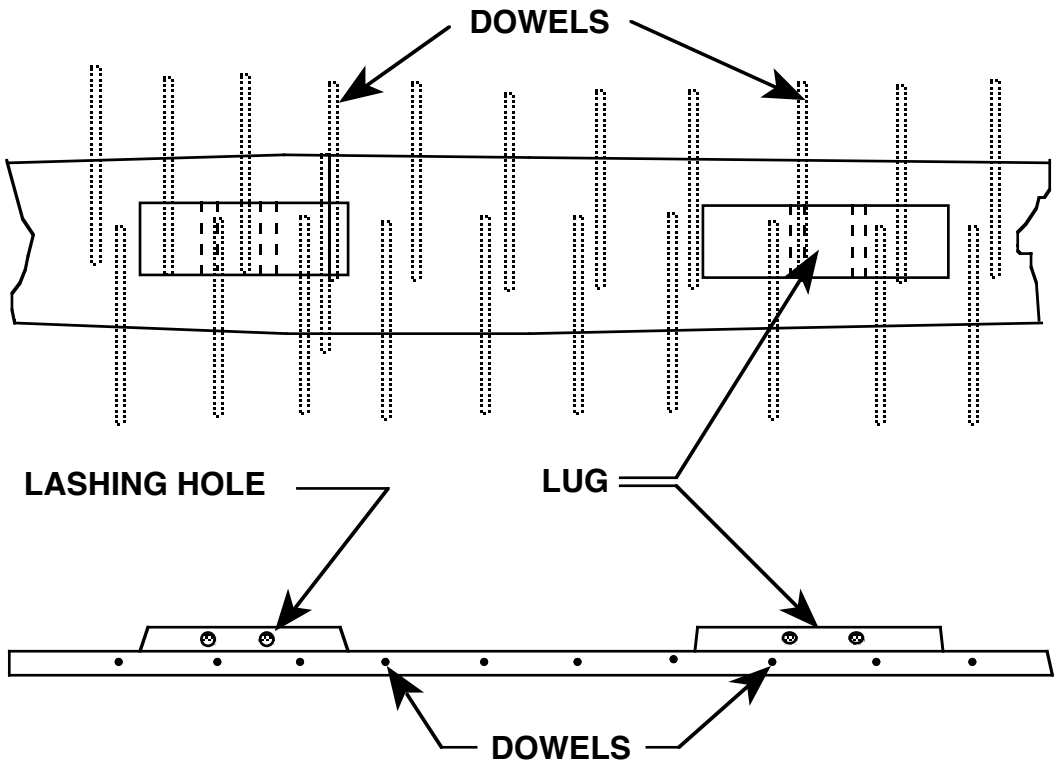

Figure 8. Plan showing the general arrangement of the dowels and lugs.

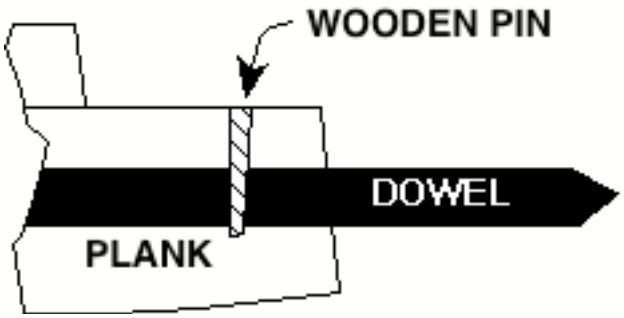

Figure 9. A cross-section of a plank showing the method of pinning the dowel.

On plank number 8, the lugs are different from the others, being carved in a triangular cross sectional shape (see Fig. 10). Unlike the other lugs, these triangular section lugs have no lashing holes. Though this was the last, or highest, strake remaining on the site, it should be noted that the presence of dowels on both edges of the plank indicates this was not the highest strake on the boat.

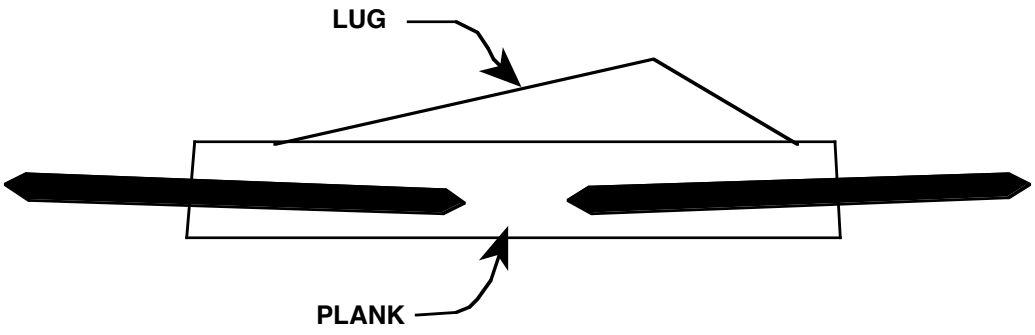

Figure 10. A section through plank number eight.

Lugs

The lugs are spaced about mm apart, centre to centre. Each is pierced by two holes in the athwartships plane, 30–35 mm in diameter. These holes were used for the lashing rope that held the frame to the planks. Most lugs show slight compression of the timber at the frame lashing positions. In some lugs, a slightly raised ridge running across the lug about midway between the lashing holes was noted.

Remains of another unusual plank, thought to be number 7, were also noted. This strake has a continuous raised portion, similar to the keel, but off centre, and lugs pierced with lashing holes. The strake also has a series of notches cut in it between the lugs, perhaps to hold beams or uprights. The continuous raised portion certainly could have functioned as a wale, but may have been a beam shelf (see Fig. 11).

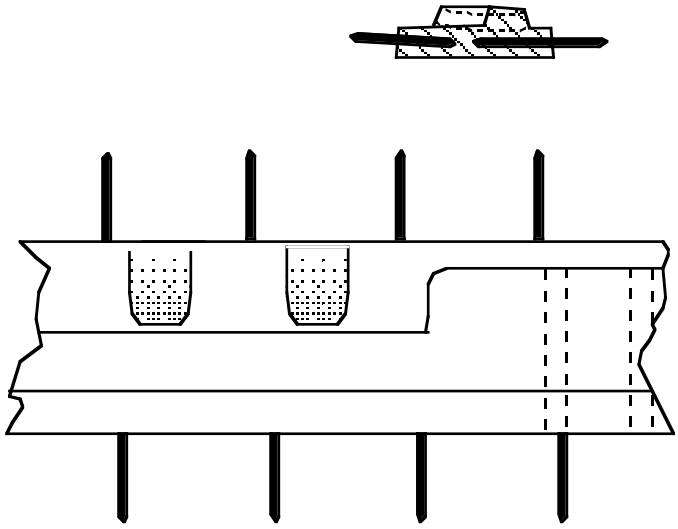

Figure 11. Plank 7, section and plan.

Keel

This is a narrow plank with a raised lug running its full length (see Fig. 12). This carinate or ridged keel is different from keel planks found on the other excavated Butuan boats, numbers 1 and 2. Presumably this continuous raised lug not only serves as a frame lashing structure, but also—and primarily—increases the stiffness of the keel and decreases any tendency for the vessel to hog.

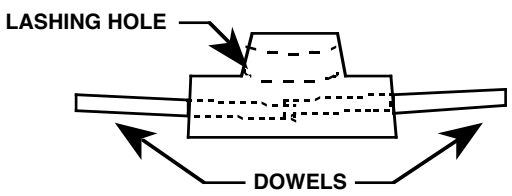

Figure 12. Section through keel

Butuan 1 Boat

The remains of this boat comprises a keel, a wing stem, two strakes on one side, one strake on the other and some fragments. The dowels are counter-pegged at every alternate dowel, except at the wing stem where they pegged at every dowel. The strakes are broad at the centre and the overall length of the remains is about 13 m. The keel plank is interesting because, except at the narrow end, it has lugs in sets (tranversly) in threes, the outer two have been drilled to take the lashings, the middle one apparently to act as a support. All the other strakes have single lugs. There are three lashing holes on nearly all of the lugs, two of the holes are equidistant from the ends of the lug, the third hole (possibly having been drilled later) is spaced at an equal distance to the separation of the symmetrically placed holes.

Lepa

The National Museum has in its ethnographic collection a Bajau *lepa* from Sitangkai. We were kindly given permission by Dr. Jesus Peralta, senior Curator of Anthropology and Ethnology to measure and photograph this vessel. The vessel, which is almost ten metres long consists of a keel and five strakes. It is edge-joined with dowels, and though there are lugs on the keel and the inside of two of the five strakes on each side, they are not used to lash the vessel together. A preliminary lines plan, showing sections and waterlines, is shown in Figure 13.

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