

Sampan, Belangs, and Junkos

The Pearl-Boats of the Aru Islands

The authors of this article had questions to ask about Indonesian boats and boatbuilding. Ian Crawford was interested in early Indonesian contact with Australia, and in traditional Indonesian craft. Graeme Henderson was following the development of the Australian pearling lugger as a boatbuilding form and wanted to know about

any Indonesian influence on design developments in the Australian industry. The hospitality of Brian and Karin Simpson was enjoyed for the 450-mile journey from Darwin to Dobo on the yacht Najat.

1
A junko in the harbor at Dobo.

GRAEME HENDERSON
and IAN CRAWFORD

Introduction

The slimy tidal flats at Dobo are prime real estate for the boat owners of the Aru Islands in eastern Indonesia (Fig. 2). A congested row of long narrow thatch-roofed wooden houses on stilts fringes the shoreline, reaching out from the land over the shallows. Hundreds of boats of assorted shapes, sizes, and colors are

thickly clustered between the houses.

Most conspicuous are the *junkos* (Fig. 1)—10- to 20-meter-long motorized vessels, many of which resemble the Australian pearling luggers. About 50 of these hog the access to the best work platforms around the houses. Tucked in between these and lying on the foreshore away from the busiest area are smaller vessels called *belangs* and *sampans*. The *belangs*, open planked boats with upswept ends, are generally around 8 meters long; usually there is a whole family on board. The *sampans*, large dugouts

3 to 6 meters long that generally lack outriggers, are scattered in profusion and often appear abandoned. It is late September. The sharp clattering of the shipwrights' hammers and axes echoes across the harbor water from sunup to sundown and beyond, as the men complete the outfitting of the pearling fleet for the coming season.

Pearling in Indonesia

Pearling has been carried out in Indonesian waters from very early times, with local



2
Map showing location of Aru Islands.

divers collecting the shell. Some of the Indonesian divers went a considerable distance in search of shell. As Europeans extended their presence in the north of Australia, they saw Indonesians collecting pearls in Australian waters.

The Aru Islands have been, and still are, one of the principal pearl-shell grounds in Indonesia. Although quite off the track of all European trade, these islands had by the early 19th century become the eastern terminus for the annual fleet of Bugis prahus from Makassar. (The Buginese are traders and seaborne colonists from south Sulawesi; see map, Fig. 2.) They were a source not only of pearls and mother-of-pearl, but of such exotics as birds of paradise, tortoiseshell, *trepang* or sea-slug, and edible birds' nests. The British naturalist Alfred Wallace did the 1000-mile journey to the remote islands in a Bugis prahu in the 1850s (Fig. 4) and considered it quite an achievement. "Even by the Makassar people themselves the voyage to the Aru Islands is looked upon as a rather wild and romantic expedition, full of novel sights and strange adventures. He who has made it is looked up to as an authority, and it remains with many the unachieved



3
Map of the Aru Islands.

"The Aru Islands have been, and still are, one of the principal pearl-shell grounds in Indonesia."

Glossary

bowsprit—a spar projecting forward from the stern of a sailing vessel to extend the head sail and support the foremast

breasthook—inside timber or iron fitting bent to a V shape and fastened at the fore end of the ship to unite the bows and strengthen the forepart of the structure

carvel built—a system of planking in which the outside planking is flush, the edges meeting and giving the shell a smooth surface

counter—the part of the stern that projects aft of the rudder post on some vessels

grown frames—natural crooked pieces of wood used for framing

hanging knees—wooden knees having one leg fastened against the under side of a beam and the other leg against the ship's side

keelson—a fore-and-aft center line beam extending from stem to sternpost, located above the ribs, giving longitudinal strength

ketch—a fore-and-aft rig with two masts, the larger mast standing foremost

molds—patterns made of thin boards to conform exactly to the shape of frames, by the aid of which the frames can be bent or fashioned to the required form

outrigger—a counterpoising log of wood or float thrust out to windward of a sailing canoe to prevent its capsizing

prahu (or proa)—a generic term referring generally to several types of swift Indonesian boats, some undecked, that are propelled by sails, oars, or paddles. On some prahus both stem and stern are sharp and upcurved, allowed the vessel to sail equally well in either direction. Junkos, belangs, and sampans are all prahus.

ribs—frames

schooner—a fore-and-aft rigged vessel with two or more masts, common in coasting and fishing trades

strakes—planks abutting against each other and extending the whole length of a vessel

stringers—fore-and-aft strength members

taffrail—the railing about a ship's stern

ambition of their lives. I myself had hoped rather than expected ever to reach this "Ultima Thule" of the East. . . ." (Wallace 1869:309).

The pace of life at Dobo, the principal town of the Aru Islands, increased during Wallace's stay. Chinese merchants arrived and established temporary bases from which they purchased marine produce brought in by traders from the distant shores of southern New Guinea and northern Australia. "The Arru Islands," wrote Earl in 1937, "are the commercial emporium . . . of the part of the archipelago in which they are placed" (Reece 1982:16).

Pearling in Australia

The Australian pearling industry started in the 1860s, preceding substantial settlement in the north. From an early stage the larger European boat owners saw the advantage of moving their fleets every now and then from one fishing ground to another, crossing state and national boundaries in search of more plentiful shell and less government control. Their movements encouraged trends toward standardization by the highly capitalized operators in the industry, among whom new technology was diffused relatively rapidly. By 1901 such companies had 'mother' schooners that could supply their pearling luggers at sea for months at a time.

Smaller, less influential boat owners were inadequately prepared for getting across or around the barriers of geography, advancing technology, and government regulations. The naked divers from the Makassar prahus could not successfully compete with apparatus divers seeking pearl shell on the north coast of Australia. The smaller Broome (on the northwest coast of Australia) pearl luggers had diving apparatus on their boats, but many failed to survive in the industry during a period of declining prices after 1910.

Contact

One of the largest fleets operating off the north coast of Australia belonged



4 Alfred Wallace's view of Dobo, 1856: prahu under construction at right.

to James Clarke, a Queenslander (Bain 1982:195-196). Clarke began pearling in the 1870s in Torres Strait but soon gained experience working in Indonesia and West Australian waters. He returned to the Aru Islands pearl grounds in about 1906 and operated his fleet with a mother schooner, keeping outside the three-mile limit of territorial waters. At Dobo he formed the Celebes Trading Company, which gave him greater independence. Previously the pearls of this area had been bought from the local Indonesians by Chinese and Arabs who took them to Makassar, whence they were sent on to Singapore and then to London, Paris, and Amsterdam. Now the Netherlands Indian Government was giving concessions to British firms so that shell could be shipped directly to London.

By 1914 the shell beds of the Aru Islands were worked out, and Clarke obtained from the Australian Commonwealth Government permission to bring some 30 luggers and their crews to Broome. The Broome pearl luggers, facing decreasing prices for their shell and the effects of increased regulation of the industry, saw the arrival of Clarke's boats as an unwarranted invasion by a foreign company with foreign boats and foreign labor.

Today it is a commonly held belief among Broome residents that

Clarke's Aru Islands Fleet of 1915 had a very substantial influence on the subsequent design of the Broome boats. These 'Aru' boats were said to have had an almost yachtlike appearance, with low freeboard aft, round counter sterns, and an open taffrail, features that were quickly adopted by local builders.

Description of Aru

The Aru Islands consist of six main islands separated by narrow channels, which in the absence of a road network are the highways of Aru. Shipping is also protected by a line of small islands and reefs along the eastern shores, and one can travel in sheltered waters. Only on the western shores are the villages exposed to the oceanic swells, and for part of the year these are suppressed by the southeast trade winds. The main commercial center is Dobo, on the west coast, with a population of 5500. The principal shell beds lie on the east coast back country (*blakang-tanah*).

The Boats of the Arus

When the pearling season commences on the Aru Islands, each of the three major boat types—sampan, belangs and junkos—are involved

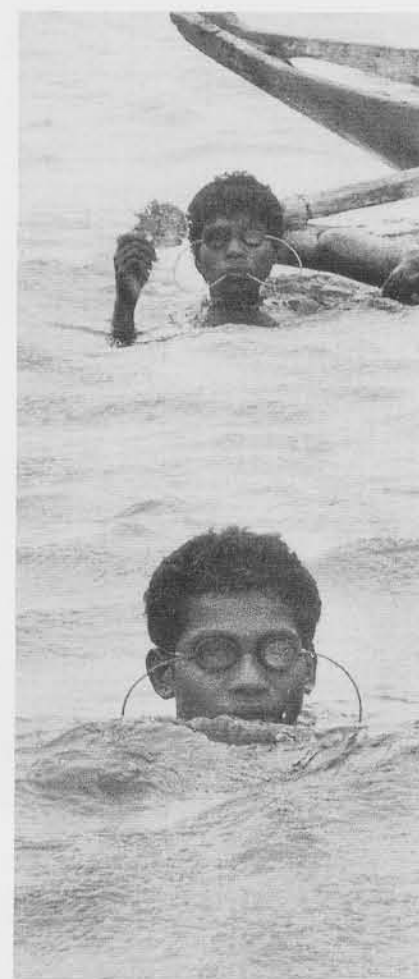
in collecting and transporting shell. When we arrived on the east coast at the beginning of October 1982, we saw sampans collecting shell and then the first of the junkos arriving for the season. We were told that the belangs were used in like manner to the sampans for shell collecting.

Sampans: The sampans, dugouts of 3 to 6 meters that sometimes carried outriggers and a sail (and in Dobo even an outboard motor), are a multi-purpose inshore craft. They are employed in fishing, general transport, and pearl shell gathering. Many people could make sampans, and one could be constructed at short notice anywhere on the Aru Islands.

We observed one sampan collecting shell less than a mile from the small island of Aduar. The sampan was equipped with a double outrigger and crewed by five divers who appeared to be in their teens (Fig. 5). In the water the divers wore nothing but a pair of swimming trunks and goggles (Fig. 6). The goggles consisted of two circular pieces of clear plastic (about 3 cm in diameter) set into wood or tortoiseshell sockets to fit around the eyes. The two sockets were held together with wire, and a leather or rubber strap fitted them to the diver's head. Plastic tubes of about 1 millimeter internal diameter pierced the sockets, and led to the diver's mouth. As the diver descended he would blow gently into the tube to ease the pressure of the sockets on his eyes.

Two methods of diving were employed. Most times the divers took

" . . . at present we are looking at a technology that has not changed in the last 400 years."



5 Sampan divers wearing goggles.



6 Sampan and divers.

a breath while treading water, sank in an upright position with their hands above their heads, spun around while wriggling their hands (reputedly to help equalize the pressure), and then dived down to the seabed. An alternative method was to kick down from the bottom of the sampan. Graeme Henderson swam with them (wearing mask, snorkel, and fins) in about six meters of dirty water for about 20 minutes, during which time they collected about six shells. The shell was small, and was probably destined for the nearby Japanese cultured pearl farm.

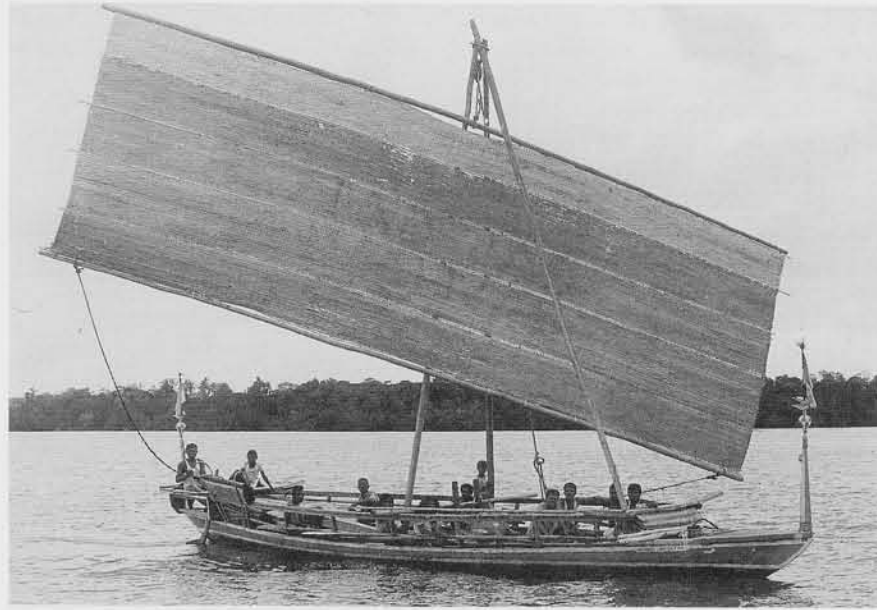
Belangs: The belangs seen on the foreshore at Dobo come in from villages, bringing pearl shell or copra (dried coconut) for sale. Usually there is a whole family on board (Fig. 8). After a stay of a few days, they return home. When the afternoon breeze sets in at Dobo, these vessels spring to life—up go masts and sails and away they go. To the European eye belangs have a strange appearance. The mast is a tripod (Fig. 7). Suspended from the apex is a large rectangular sail that often as not has one end pointing up towards the sky. With the breeze behind them, they travel comfortably at four or five knots, so although they may look unusual they are not inefficient sailing downwind. With a thorough knowledge of tides and winds, people can travel from Dobo to the remotest part of the island in three to four days. Faced with a headwind, the crew will lower the sail and row the propel their vessels with poles (Fig.

8). These small prahus would be dangerous in the open sea, but are ideally suited to the sheltered waters of the Aru Islands.

Two features make the belangs of particular interest to western observers: the rig and the method of construction. Both features recall earlier vessels of Indonesia and are, in a typological sense, archaic, but as the belangs suit the local conditions so well, there can have been little or no advantage in changing. In the long term the future of the belangs may not be good, for modern technology in the form of aluminium or fiber glass boats and outboard motors will probably displace the belangs when the islanders become more affluent, but at present we are looking at a technology that has not changed in the last 400 years. If we could document the remoter past, we might find little change over the last thousand years.

The use of rectangular sails suspended from tripod masts was once common in Indonesia (Fig. 9). Perhaps the most famous type of vessel so rigged was the *paduwakang* of the Bugis, a large vessel of up to 300 tons that carried two tripods, each with several sails. The *paduwakang* was one of the types of vessel that used to sail to the Australian coasts in the 18th and 19th centuries. It has been replaced by the *pinisi*, in which some features of the *paduwakang* hull have been retained, but a fore and aft rig has replaced the old rig. According to Haddon and Hornell (Haddon 1920:101–103, 134), it is possible that the vessels depicted in the sculptures at Borobudur (Java), dating from the 9th century A.D., have tripod masts, but they thought it more likely that the masts were bipedal; the lack of definition in the sculptures precluded a definitive conclusion on this point. When Haddon and Hornell carried out their surveys, the bipod and tripod masts had been displaced in Java and Sumatra but were still common in eastern Indonesia and were to be found in adjacent northwest Irian Jaya at Waigla and more remotely at Waki Island and the Louisiade Archipelago and Maasim area (see illustrations in Paris 1841).

The method of construction used



7
Belang prahu with tripod mast under sail.



8
Belang prahu at anchor, Dobo.



9
Rectangular sail on a belang prahu, here used with single mast.



10
Building a belang prahu, Feruni.

pean terminology is called a cleat. in making belangs (Fig. 10) is an interesting one. As is the common practice in the building of prahus, the hull is built up without the support of ribs. The hull timbers are held together with wooden dowels, and to a large degree, the timbers of the hull are cut so that they fit the curvature of the hull. It is also true that the timbers are bent over fires and to some extent forced into place before they are dowelled. But the crucial feature is this: in the European shipbuilding tradition the shipwright starts by building a frame of ribs and then fixes the planks of the hull to these ribs, while in Indonesia shipbuilding the hull is built first and the ribs added later. The builders of belangs follow the traditional method, but when the hull planks or strakes are carved, the builder leaves a series of wooden lugs on the inside of each strake. When the strakes are in correct position, these lugs form a line running up the inside of the hull. A hole is drilled vertically through each lug, which in Euro-

The builder then inserts a frame of flexible timber which he ties to the cleats. At this stage, the vessel has a tied frame but no ribs. The hull is ready for sale.

The new owner will want to fit the vessel out to meet his own requirements. Most belangs have a deck consisting of strips of bamboo over a horizontal frame, and they also have an external frame running down each side of the vessel outside the hull. The mast fittings are attached to the deck frame. The horizontal frame, which has several components, is lashed to the frame inside the hull. In some cases, the original hull frame as supplied by the builder is retained. In other cases, the owner removes some or all the hull frame components and replaces them with solid timber ribs which are usually then dowelled to the hull.

Horridge has recently argued that the use of an internal frame lashed to cleats was once common in the southern Moluccas (1981:51–54). He is undoubtedly correct. Antonio Galvao, a Portuguese ex-

plorer who visited the Moluccas in 1544, left this remarkable description:

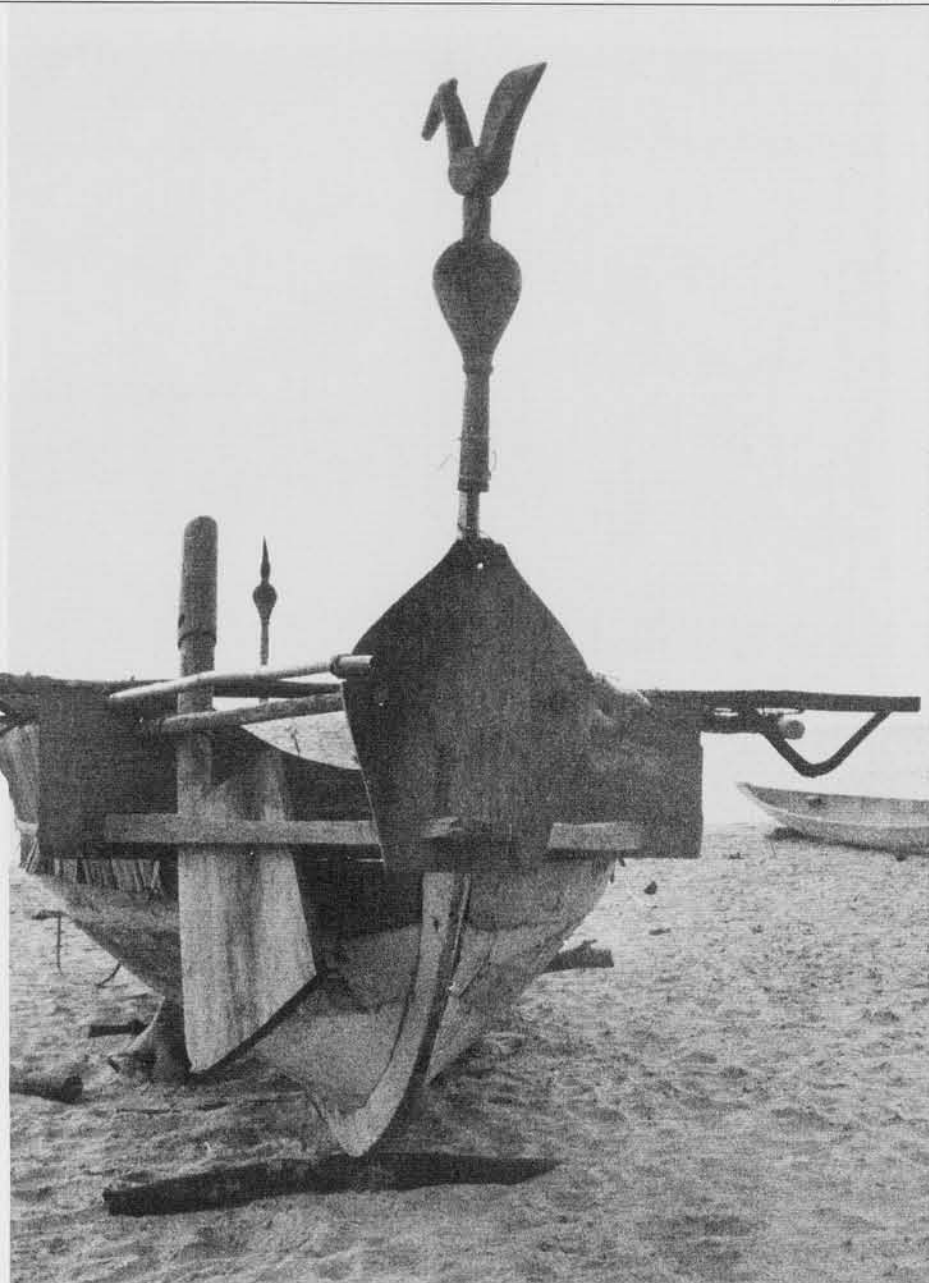
Their boats are made in this fashion: in the middle they are egg-shaped and at both ends slope upwards. So they can sail forwards as well as backwards. They are neither nailed nor caulked. The keel, the ribs and the fore and aft timbers having been adjusted, they firmly fasten all of them with cords of gamuto [sago palm fiber] through holes made in certain places. They leave some handles or grips on the inside of the boards. Through these they tie them together [so that] nothing can be seen from outside. In order to join the planks, they make pegs . . . and in others at regular intervals they bore holes into which the pegs fit. (1971:157)

Haddon and Hornell recorded the use of this technological feature in boats called *orembai* in Ternate (1938:66–67), and Wallace described the method of construction in use on the boats from the Kai [also Kei; now Ewab] Islands (1869:321–322). Outside this area,

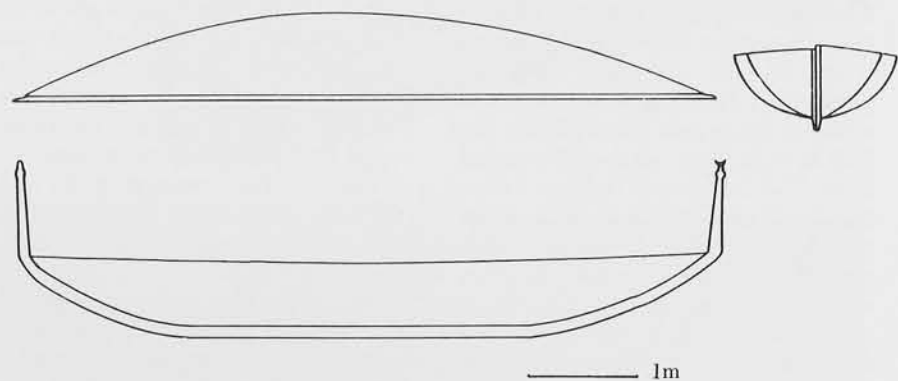
the vessels called *Mon* in the Bougainville Islands and parts of the Solomon Islands also had a lashed frame although here the strakes were sewn together, not dowelled as in the *belang*.

Most *belangs* are built at Feruni (Fig. 11) and on the west coast of Tarangan Island, although we saw three under construction at Aduar on the east coast, and it is likely that they are built in small numbers throughout the group of islands. Feruni, which we visited, clearly was a major center for *belangs*. Approximately 50 vessels were under construction in a village of 600 people. We were told that there were two types of *belang* at Feruni—those built for sale and those built for local use—but we did not have the time to ask about the differences.

Construction commences with the positioning in the ground of posts which will support the keel. The keel extends to include the bow and stern posts (Fig. 12). The strakes are then added symmetrically, and are held in position with dowels. Large wooden hammers are used to drive the planks together, but the planks are not fixed together quickly. As the planks near each other, they are held by bindings that are tied through the eye cleats. Throughout the process, the old planks are used as models for the new timbers, and old ribs may be tied in to ensure the proper shape to the hull. On completion of the hull it is taken apart again, and when it is reassembled, paperbark is inserted between the planks and the old form-giving ribs are left out. Instead, flexible sticks are lashed in their places, and the hull is then ready for sale. Buyers come to Feruni and Koba-Koba, and they order or build for themselves the superstructure that includes the deck, mast fittings, and frames for holding spars and cabin. All of these additional fittings are held in place by a framework that is tied back to the ribs, and therefore a person buying a *belang* is likely to take out the temporary frames with which it is supplied, and replace them with ribs. Sometimes these ribs are simply tied to the eyed



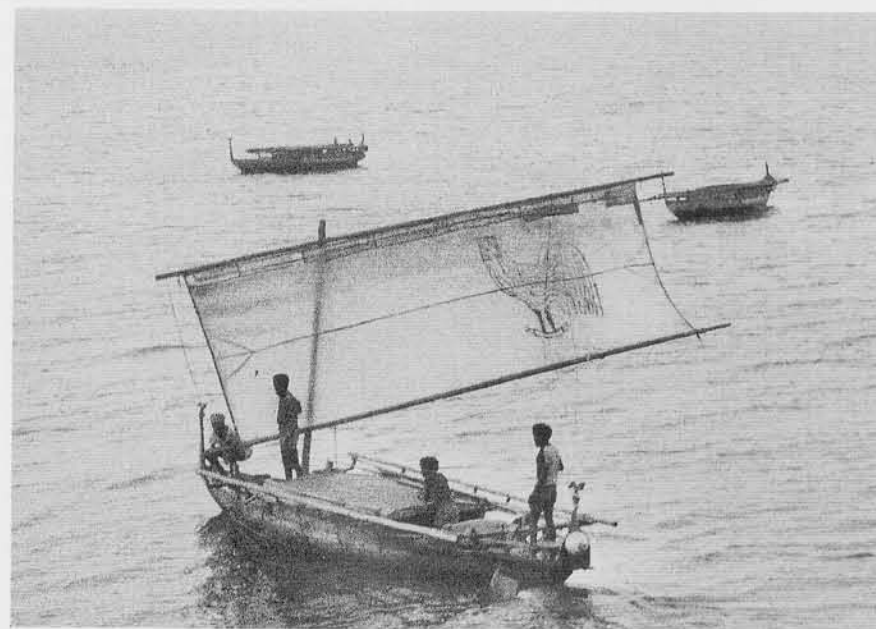
11
View of stern of *belang prahu*, Feruni.



12
Lines of a *belang prahu* at Dobo drawn by Graeme Henderson.



13
Three girls poling a *belang prahu*, Aduar.



14
Belang prahu using single mast under sail, Aduar.

cleats, and sometimes they are pegged with dowels.

Purchases are not made entirely with money, for the buyer is expected to provide a feast for the people who drag the boat from the place of construction to the sea, and to give a prescribed number of goods including plates, fabrics and iron goods, as well as making a cash payment. We did not witness a sale and launching, but one imagines it as a high point in the lives of the inhabitants. Prices fluctuate: just before and during the pearling season they are relatively high, but after the pearling season they decline. If there are too many vessels for sale, the price may be de-

pressed and the builder may be forced to take the boat to other villages in order to sell it. Once a person has purchased a *belang* and had it fitted out to his own requirements, he is usually reluctant to sell it.

There are strong oral traditions that the Aru Islanders learnt to make *belang prahus* from the Kai Islanders (see map, Fig. 2). At Tual in the Kai Islands, Ian Crawford was told in 1971 that *belangs* were ceremonial *prahus*, built as long as 20 meters. These *prahus* were paddled by 20 to 30 men and would have had a cabin and carried a flag on an elaborately carved stem post. These vessels were constructed at

the villages of Mun and Uwat on Kai Besar Island.

Alfred Wallace visited the Kai Islands in 1857 on his way to the Aru Islands. The captain of the vessel on which he was traveling stayed several days in Kai to arrange the purchase of two *prahus* for resale in Aru. At this period Kai produced *prahus* for adjacent islands including Seram and Goram. Their *prahus*, wrote Wallace, "are all made by that wonderful race of boat-builders, the Ké Islanders, who annually turn out some hundreds of boats, large and small, which can hardly be surpassed for beauty of form and goodness of workmanship" (1869:284).

He continued: "These vessels . . . will make long voyages with perfect safety traversing the whole Archipelago from New Guinea to Singapore. . . ." (1869:321). It is possible that Kai-built *prahus* manned by Goram Islanders ventured to the northern coasts of Australia in the 18th century. Moderate-sized *prahus*, such as those purchased by the captain of Wallace's vessel, were used for trade among the islands of Aru. Even canoes were constructed of planks. Later in his book, Wallace gave a detailed description of the construction of a Kai *prahu* (1869:321–322), and the method is exactly that used on Aru at the present day.

The term *belang* which we are using to designate a particular type of *prahu* is used more closely on the Aru Islands to categorize any small non-oceangoing *prahu* which is bigger than a sampan and smaller than a junko (Figs. 13, 14). For instance, at Dobo a small *prahu* of a type known elsewhere as *lambo* was referred to as a *belang*. It is possible that the term used for a boat also reflects the ethnic origins of its owner, for in the Aru Islands junkos are owned by Chinese merchants, while *belangs* are owned by the indigenous people. The term *pelang*, of which *belang* is a variant, apparently has a wide distribution which includes northern Sulawesi and the Moluccas. Haddon and Hornell (1938:72) also traced derivatives in the Philippines (*belangay*), Timor (*belo* and *bero*), Banks Island (*wel-wel*), and Fiji (*velo-velo*).

They used this evidence to support notions of a dispersal of prahu forms from Indonesia to Oceania. While prehistoric dispersals of peoples and technologies from Indonesia to Oceania are well established, this linguistic evidence must be treated with caution. If the term *belang* can embrace boats of different design at Dobo, it would be rash to conclude that the word was ever restricted to a single type in the past.

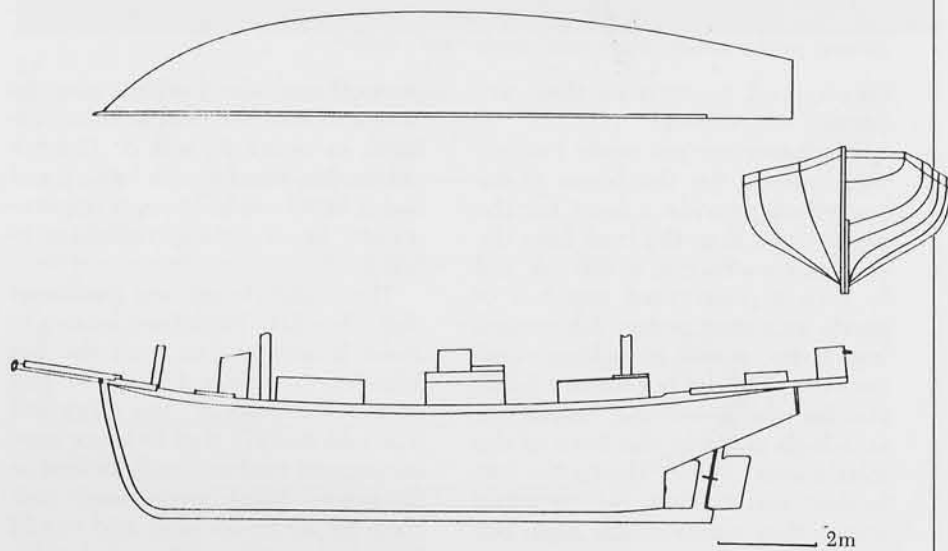
The Aru Islands *belang* is thus the survivor of a major boat form that was once dominant in the Moluccas. Vessels of this type sailed the whole of the Archipelago and New Guinea coasts, possibly reaching Australia. With the introduction of luggerlike vessels, the old design has been largely abandoned in the Moluccas, except in the Aru Islands and possibly in other relatively remote areas.

Junkos: On arriving at Dobo we counted 46 boats that appeared to fit into the category of junko. The typical junko is a 10- to 20-meter-long plank on frame carvel-built vessel, with a counter stern, ketch rig and diesel engine (Fig. 16). Some appeared quite similar to pearling luggers seen at Thursday Island, having three low deck houses with green trim, a foot-operated tiller, the galley in a box on deck, and minimal sleeping accommodations. Only one junko was being built, at Lamerang across the harbor. It was a 24-meter craft (larger than any of the completed junkos in Dobo at that time) and had been under construction for two years. The owner was the richest Chinese merchant in Dobo and was reputed to hold a monopoly over the sale of pearls. He intended using the vessel for trading to Surabaya (Java) and for pearling. This craft was being built on western principles, the bolted frame having preceded the planking. The fastenings seen were of iron. It was being built with the aid of plans (from Makassar) and molds. Planks were bent using tension and oil over an open fire, but the boatbuilders had access to modern electrical appliances—we saw a belt sander being used.

The 24-meter vessel had a cut-



15
Australian pearling lugger, early 20th century.



16
Lines of a junko at Dobo drawn by Graeme Henderson.

off counter stern. The top-sides were made of iron-wood. Inside it was heavily built: there were 13 by 5 centimeter stringers every 35 centimeters, the frames were all grown, and the floors extended 2 meters each side of the keelson. However, the keelson was quite light (10 cm by 20 cm), and there were no breasthooks in the stem. The exterior was being fiber glassed. One of the shipwrights said that fiber glass had been introduced to Ambon (see map, Fig. 2) by the Japanese some years ago, but it had only been used in Dobo for about a year. The shipwright had learnt from his father, and made seven or so *belangs* before starting on larger boats in 1969. He had helped build about three larger boats since then.

The other Dobo shipwrights were maintaining boats rather than building new ones when we visited. After building, a junko does not need a refit for five years. Then they need broken parts replaced each year.

The majority of the Dobo shipwrights do not normally use plans, relying on molds and building by tradition. When we enquired about molds in a boat-building yard, we were shown dozens of them. The 61-year-old shipwright in charge of the 24-meter junko uses plans, and has built a number of the Dobo junkos in this manner. He also has sets of molds which he keeps for building other boats, but he only uses three molds per boat, whereas the Japanese used to keep molds for the full length of the boat. This shipwright was born on the Aru Islands, but his family originally came from Banda Island. He learnt boat-building at Dobo before World War Two while working for an English firm, which was managed by a Dane named C. A. Monstead, and which employed Japanese master shipwrights. The Japanese had built boats in Dobo using plans. They also looked at pearling boats coming from Australia (Fig. 15) and built similar ones. He explained that Captain Monstead took over the control in Dobo of the Celebes Trading Company, which had previously built some boats in Dobo for pearling.

A 72-year-old Dobo man told us he had joined the Celebes Trading Company in 1932, and had worked for them in Darwin and on the Aru Islands. They had taught him to dive for pearl shell using underwater breathing apparatus. The Company would commence diving in Australian waters in August, but in the Aru Islands they waited until October. The diver said that the Celebes Trading Company had built some boats at their Aru Islands base on Canaria Island, but most of their boats were built in Australia and just repaired on the Aru Islands. The Australian-built boats had a deeper keel than those built in the Aru Islands.

“The majority of the Dobo shipwrights do not normally use plans, relying on molds and building by tradition.”

We took advantage of the low tide each day to measure some of the junkos. The first boat selected was the 13.6-meter *Sinar Dobo* (“Radiance of Dobo”), built in Dobo by a shipwright who had come from Makassar. It is said to be the second oldest boat in Dobo, having been built in the early 1950s. It is of plank-on-frame carvel construction, with a cut-off counter and a straight stem. The main-mast and mizzen-mast carried gaff and boom. Its diesel engine had not yet been refitted for the coming season. The three deck houses surmounted a front hold with some accommodations, an engine room, and an after hold. The galley was on the deck forward, and the toilet was mounted on a platform built back over the water behind the extremity of the counter. Boards had been laid athwart the bowsprit to form an extra forward platform. Shade was provided between the masts by a flat planked roof some six feet above the deck.

The *Sinar Dobo* had grown

frames 13 by 12 centimeters, and three stringers 16 by 4 centimeters per side. The keelson was not continuous. It ran beneath the masts to act as mast steps, but for the rest of the length of the vessel the frames were just bolted down to the keel. Iron fastenings were used throughout. There were no breasthooks, and no hanging knees. The ceiling planking was very light.

The second boat measured was the 17.8-meter *Flamingo*, a junko built at Dobo eight years previously. It carried stringers every half meter up each side, and there was a gap of about half a meter between each of the grown frames. The *Flamingo* had a sharper stem and longer counter, giving it a more pleasing appearance than the *Sinar Dobo*. The owner said he had journeyed from Dobo to Surabaya, Java—1300 to 1400 miles—in 20 days, using sail only. When we saw it, the *Flamingo* had a three-cylinder Yanmar diesel of 50-horsepower. He estimated the *Flamingo*'s value at three million rupees (\$AU4800, at that time about \$US2600).

The *Flamingo* carries five crew and five divers. Two men looked after the engine, three acted as tender when divers were below, four were deck hands, one was cook, and one was helmsman. The *Flamingo* seeks pearls along the whole east coast of the Aru Islands, including Karang Island. It can carry three tons of pearl shell and has bulkheads for wet storage of shell. The owner is not interested in the small shell, which are used for the Japanese cultured pearl farms. He is interested in large shell, which he sells in Makassar for export to America, Germany, and Korea.

The house of the *Flamingo*'s owner contained an eight-year-old Japanese compressor for helmet diving. The compressor had a capacity of 10 kilograms per square centimeter. It has a large reserve tank with three outlets. The owner said his divers work up to 25 fathoms. They stayed down one hour and then spent one hour on top after a five-minute ascent. If a diver gets sick he goes down again. None of his divers were sick last

season, however. He did not know of any recompression chamber on the Aru Islands.

We visited two other Chinese houses to look at diving equipment. In the first we saw diving helmets, a steel corselet, and an upper frock. The neck piece was marked 'Heinke.' There were 14- and 28-meter lengths of hose lying about. A second house contained dozens of aqualungs with Dakor demand valves, a Bauer high pressure compressor (for filling aqualungs) with Chinese engine, masks, and diving fins.

The third junko measured was the 20-meter *Banjir Mas*. It was said to be the oldest junko in Dobo, built in 1935. This vessel had a more rounded stem, and the sternpost was set at a greater angle because the vessel had been initially built without an engine.

It would appear that there are few significant aspects of the construction of the junkos whose origin is to be found in the Aru Islands, or the rest of Indonesia. The ownership, design, and supervision of construction has generally come from outsiders or from local people heavily influenced by outsiders.

Conclusion

When Wallace visited Dobo in the 1850s he left a vivid description of it as an entrepôt, with produce from the lands to the east, including Australia, transshipped and exported to the west. The link between Aru and Australia was provided by the Makassans then. Later, commercial connections were established by the Celebes Trading Company, and the interaction between the two countries was obviously close up to the Second World War.

In studying the shipbuilding traditions of the Aru islanders we see different influences at work. The indigenous traditions produce the sampans. The concept of the belang is locally acknowledged as originating in the Kai Islands. The junkos reflect the complex influences that went into the pearling industry. Today these traditions are being modified or abandoned. Boat

designs, especially in the junkos, are being altered to incorporate engines, and in Dobo, aluminum dinghies with outboards will probably soon provide an alternative to sailing. The Aru Islands are destined for change; for example, it was recently announced that 20 trawlers are to be built in Australia

for use in the area. Such developments should bring many benefits to the islanders, and older boat-building traditions may well be abandoned. Our survey was of necessity a brief one, and the complex traditions of the area deserve a more exhaustive study while this is still possible. **21**

Bibliography

- Bain, M. A.**
1982
Full Fathom Five. Perth.
- Collins, G. E. C.**
1937
Makassar Sailing.
London: Macmillan.
- Earl, G. W.**
1837
The Eastern Seas.
London: W. H. Allen &
Co. Reprint. Kuala
Lumpur: Oxford Univer-
sity Press, 1971.
- Galvao, Antonio**
1971
*A Treatise on the Mo-
luccas*. [c. 1544]. Sources
and Studies for the His-
tory of the Jesuits, vol. 3,
ed. and trans. Hubert
Th. M. Jacobs, S. J.
St. Louis University.
- Haddon, A. C.**
1920
"The Outriggers of In-
donesian Canoes."
*Journal of the Royal An-
thropological Institute of
Great Britain and Ire-
land* 50:69-134.

Acknowledgments

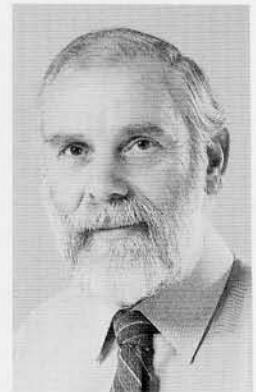
The expedition to the Aru Islands was funded by the Australian Research Grants Scheme and the Western Australian Museum. The authors are grateful for the assistance of Brian and Karin Simpson, Pastor A. Egging, Harbourmaster A. Z. Sipasulta (B.Sc.), Camat J. Persulesly (B.A.), A. Lapiam, Consul W. Meecham, and the staff of the Australian Embassy in Jakarta, particularly Gavin Bromilow.

- Haddon, A. C. and J. Hornell**
1936-1939
The Canoes of Oceania.
Special Publications of
the Bernice P. Bishop
Museum Nos. 27-29.
Honolulu: Bishop Mu-
seum Press.
- Hornell, J.**
1936
"Boat Construction in
Scandinavia and Oceania;
Another Parallel in Botel
Tobago." *Man* 200:145-
147.
- 1946
*Water Transport. Origins
and Early Evolution*.
Cambridge: Cambridge
University Press. Re-
print. David & Charles,
1970.

- Horridge, G. A.**
1981
*The Prahau. Traditional
Sailing Boat of Indo-
nesia*. New York: Oxford
University Press.
- Kerr, G. J.**
1974
*Australian and New Zea-
land Sail Traders*. Black-
wood, South Australia.
- Paris, F. E.**
[1841]
*Essai sur la construction
navale des peuples extra-
Européens*. Paris: A.
Bertrand.
- Reece, R. H. W.**
1982
"George Windsor Earl
and the Indian Archi-
pelago." *The Push from
the Bush* 12:6-40.
- Wallace, A. R.**
1869
The Malay Archipelago.
London: Macmillan. Re-
print. New York: Dover,
1942.



Graeme Henderson is a curator in the Western Australian Museum's Department of Maritime Archaeology, where he is responsible for a colonial period shipwreck management program, and for the curating of a collection of Australian boats. He received his M.A. in History from the University of Western Australia in 1976, specializing in later 19th century Australian ship-
ping.



Ian Crawford studied at Melbourne and London Universities; his doctoral thesis at the latter examined the impact of Indonesian contact on the Aboriginal culture of Kimberley, Western Australia. He is in charge of the Division of Human Studies at the Western Australian Museum.