

**BAJAU LEPA AND SOPE:  
A "SEVEN-PART CANOE" BUILDING TRADITION IN INDONESIA.**

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ABSTRACT

Built up dugout canoes and planked boats, constructed with their bows and stern formed by conjoined port and starboard pieces, but lacking a true stem or stern post, are described as a distinct class of boat in Southeast Asian waters. Many of these craft have the hull form of an opened out dugout and they are often associated with the Bajau people. It is suggested that the design has been spread from mainland Southeast Asia to island Southeast Asia by the expansion of the Bajau into that region.

KEYWORDS: Indonesia, Bajau, perahu, maritime archaeology, boat building.

INTRODUCTION

Throughout the maritime traditions of the diverse Austronesian peoples the simplest traditional watercraft, aside from occasional rafts, are the dugout canoes fashioned from single tree trunks without the addition of any planks. However, the majority of the small craft throughout the region are dugouts which have been built up by the addition of planks. These built up dugouts range in sophistication from simple dugouts with a single wash-strake on each side, to large planked vessels with only a vestigial dugout as the keel. The different outrigger structures that are used in conjunction with many of these craft have been the subject of considerable research, and are well recorded, but the various constructions of the built up dugout canoes themselves have received relatively little attention. Doran (1981:24) probably goes too far when he states that "no one has ever studied them". The literature includes the detailed works of Hornell (1920), Nootboom (1932) and Haddon and Hornell (1936, 1937, 1938), but relatively little detail about the structures of the various canoes is provided, particularly in the works of Hornell (1920) and Nootboom (1932), which deal with the Indonesian region. The structures of the canoes of Bali and Madura are covered in much greater detail in Horridge (1987).

A basic structure of many built up dugout canoe designs has been classified as the "five-part canoe" (Haddon and Hornell 1938:5). The five-part canoe is further defined and discussed in Horridge (1987:29). In the five-part canoe design, a single strake, which is added to the dugout, is formed by long, nearly straight, wash-strakes on each side through the long midbody of the vessel and by pieces in the bow and stern. The pieces in the bow and stern are shaped forked pieces in the typical five-part canoe (Fig. 1a) but they can also be simple flat bulkheads (Fig. 1b).

The five-part structure is employed in the construction of vessels with more than one strake, and in the construction of vessels that have strakes made up of several planks; if forked end pieces are used the vessel can be described as having a five-part canoe structure although it is made from more than five parts.

The five-part canoe design is very widely spread throughout the huge area populated by the maritime expansion of the diverse speakers of the Austronesian phylum of languages. It is, therefore, an ancient and highly significant tradition of boat building.

The five-part canoe design is not ubiquitous. There are other canoe designs which do not have the forked end pieces or bulkheads of the five-part canoe. Some have a median stem or sternpost like most western planked boats. Others have

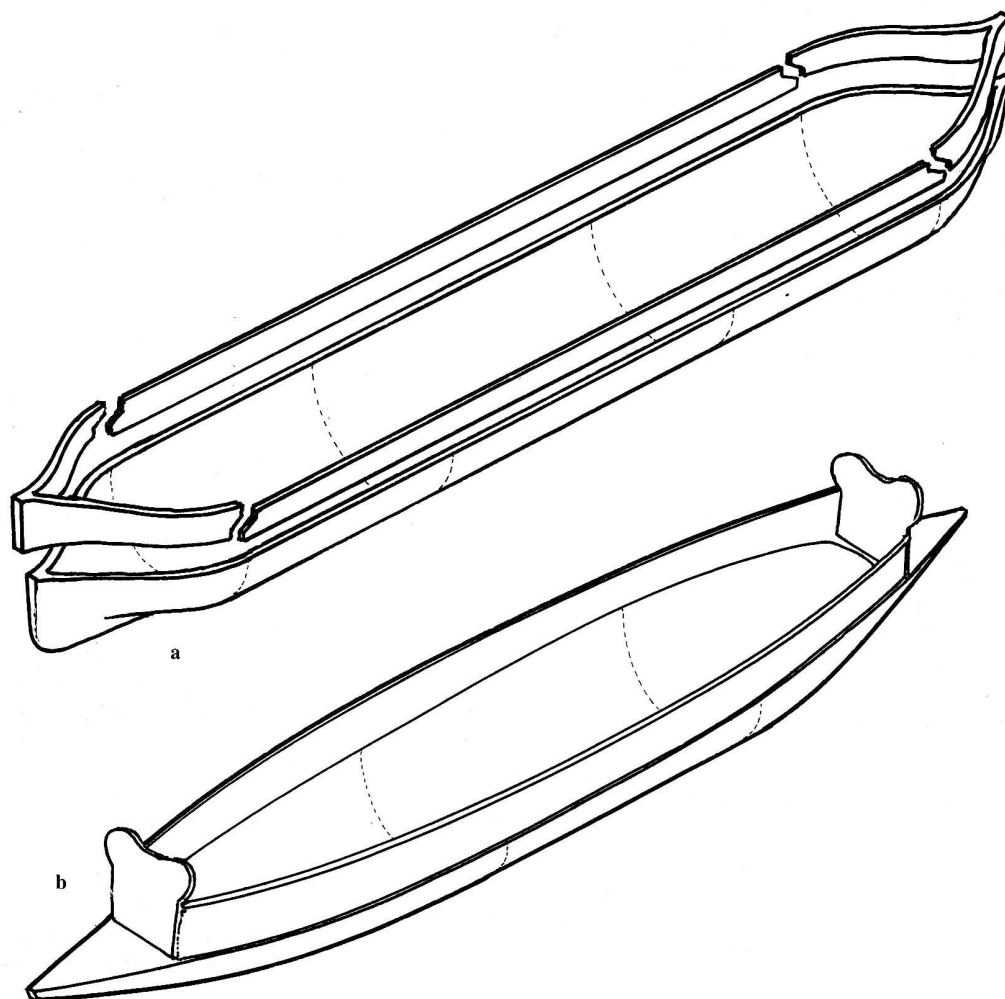


Fig. 1a,b. Five-part canoe structures.

stemless ends that are formed by shaped conjoined pieces (Fig. 2). This stemless structure was identified and briefly described in Horridge (1981:56-57), and it is vessels with this structure that are the subject of this paper.

This stemless structure could be called the seven-part canoe. It is a less elegant design than the five-part canoe, and might have originated as a pragmatic response to a lack of suitable forked timber for the construction of five-part canoes. There are, however, reasons to suggest that the seven-part canoe developed in Southeast Asia as a separate tradition and technology. A hypothetical evolution of the seven-part canoe is presented

in the text. In the islands of Southeast Asia the seven-part structure has been developed to a high degree of sophistication. Spread over a wide region, examples of canoes and planked boats with seven-part structures show a uniformity of distinctive stylistic and structural features which suggests that they represent an important and long established tradition, rather than just a decadent five-part canoe tradition. Many examples of vessels that belong to this proposed seven-part tradition are associated with the remarkable and widely spread people known by various names including Bajau, Bajau Laut, Bajo, Samalan, Samal, Sama and "Sea Gypsies"

who speak a language which they call *Bahasa Sama*. Other examples are associated with the Bugis and Makassar people of South Sulawesi and isolated examples also occur in Java and probably in other localities unknown to the author.

The history and social organisation of the *Bahasa Sama* speaking Bajau people is beyond the scope of this paper but a superficial description of their traditional life-style may help to explain certain characteristics of their watercraft. For a detailed description of the various "Sea Nomad" peoples of Southeast Asia, including the *Sama* speaking Bajau, see Sopher (1965). The social organisation of the Sulu Sea Bajau is described in Nimmo (1972).

Some *Sama* speakers, particularly the Bajau of the southern Sulu region, live most of their lives aboard small boats. They may be conceived, born, and finally carried to their graves aboard canoes called *lipa-lipa* in which, during their lives, they wander the coast and offshore reefs and islets, and at other times, congregate in "moorages" that are located in protected bays and estuaries, to take part in social processes.

Aside from the boat dwelling Bajau, many more of the *Sama* speakers now reside in villages which are comprised of houses built on piles over the water in the intertidal zone or in shallow water. Many of the village dwelling Bajau still live a peripatetic, or ambilocal, existence, spending periods of time in different communities and regarding themselves as residents of the wider Bajau community rather than any particular village. In the most established villages many of the houses are connected by causeways and bridges, but this is a very recent development. In many other villages the only way to move around the village is by canoe. Nearly all the people living in these villages have a life intimately connected with the sea and the use of small boats. Both male and female learn to handle small craft with extraordinary ease and skill in early childhood. For this reason, vessels that would be regarded as having insufficient stability or freeboard by almost any other boat users, are valued for lightness and ease of propulsion by the Bajau.

#### COLLECTION OF DATA

Much of the data presented here is derived from personal field observation. This has been gathered on numerous trips to Indonesia between

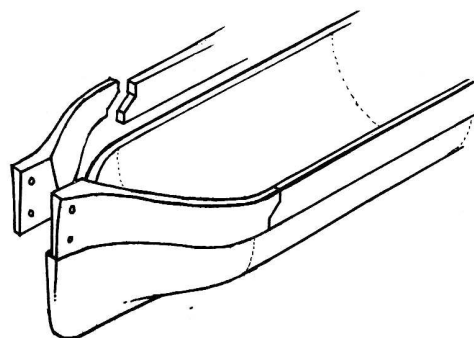


Fig. 2. Seven-part canoe structure.

1975 and 1991. All the Indonesian locations mentioned in the text have been visited by the author except for the Kangean Islands and Kabaena (Fig. 3). All other locations except Rote and Lombok have been visited or revisited during the last three years.

#### ORTHOGRAPHY

The spelling of local boat names and nautical terms has been either supplied by local informants or recorded from documents such as registration papers wherever possible, as in a previous paper on the stemless boats of Ende Bay (Burningham 1990). Thus, related boat types from different localities appear as *sope*, *soppe*, *sopek*, *sopet* and *sapit*. In the case of the Sabah *lipa-lipa*, the spelling *lipa-lipa* appeared on documents connected with the acquisition of one of these vessels by the Museums and Art Galleries of the Northern Territory and also in Gibson-Hill (1968). However, the spelling *lepa-lepa* or just *lepa* has appeared elsewhere in the literature referring to the same vessels (Sather 1985, Warren 1980).

The pronunciation of the various names follows standard Indonesian phonetic spelling rules with the *e* in *sope* and *soppe* pronounced as a long *e*: thus the pronunciation is approximately "so-pay".

The *Sama* speaking, maritime oriented people are commonly known as Bajau in the Sulu region and as Bajo in Eastern Indonesia. Both names are used in this paper according to location; to have used only the more accepted form, Bajau, would have produced inconsistencies such as having Bajau as the population of the coastal community of Labuan Bajo, or giving rise to the boat name *sope bajo*.

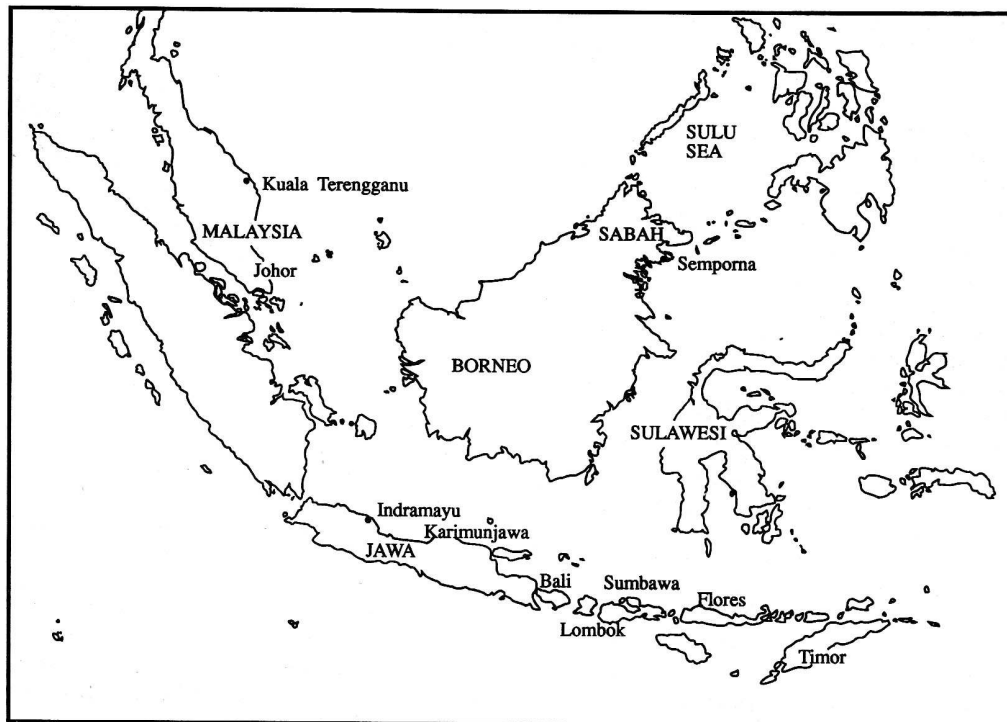


Fig. 3a. Map of Southeast Asia showing places mentioned in the text.

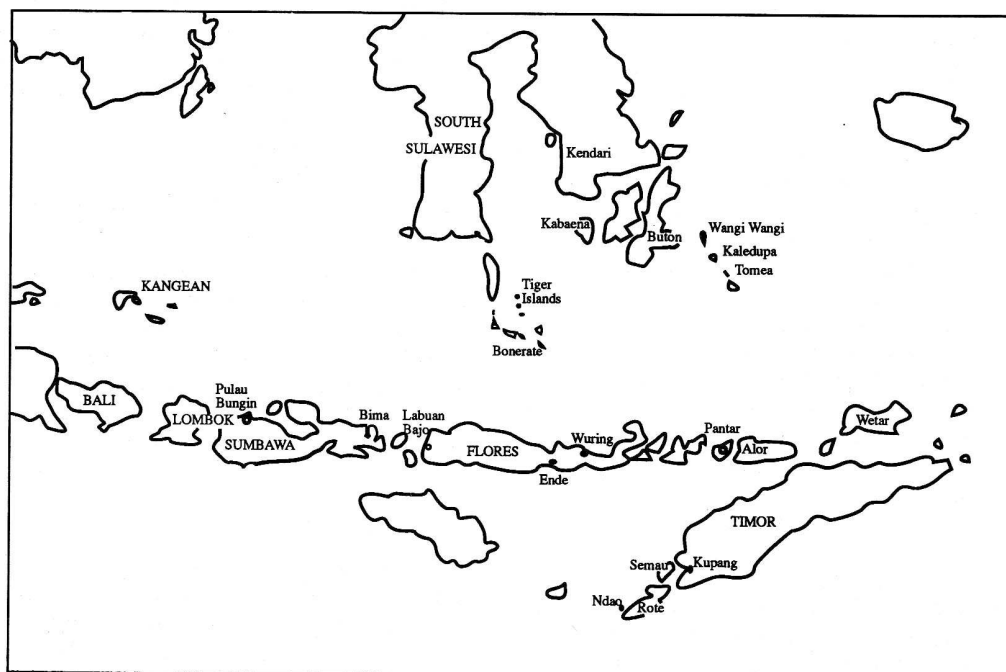


Fig. 3b. Map of the Lesser Sunda Islands and Southern Sulawesi showing places mentioned in the text.

# AN HYPOTHETICAL EVOLUTION OF AN INDONESIAN SEVEN-PART CANOE STRUCTURE

Many of the traditional craft with the seven-part structure exhibit hull form and other features which suggest that they have evolved from an opened out, or expanded, dugout canoe. There are also seven-part canoes which are clearly neither opened out dugouts nor related to opened out dugouts in design. This paper examines the possibility that the seven-part structure initially evolved from the opened out dugout and, therefore, the seven-part canoes which do not have the form of opened out dugouts are a later development and only related stylistically to the original seven-part canoe.

The traditional built up dugout canoes of eastern Indonesia are typically double outrigger canoes with deep and very narrow hulls. The hulls would not be stable without the outriggers but, developed in combination with well designed outriggers, they produce sleek craft with enough lateral resistance to sail to windward efficiently (the same can be said about virtually all the seagoing, built up canoes of Oceania except that they are single outrigger or double canoe designs). Boatbuilders of this tradition do not normally use heat, steam or even simple mechanical force to bend planks to shape. Instead the planks, and other component parts of the hull, are always carved to shape; wherever possible they are grown timbers with natural curves. Similarly, there is never any attempt to use timber bending techniques to open out a dugout canoe and increase its beam although the technique is standard practice in many other regions including western Indonesia. This technical limitation has constrained the development of the hull forms of the dugout canoes and built up dugouts because the beam of a vessel is limited by the diameter of the tree trunk that is used to make the dugout base (Fig. 4). As stated above, this is not an impediment to the development of capable seagoing sailing vessels if outriggers (or double canoes) are used, but it might be seen as a technology unlikely to lead to the development of larger mono-hulled, dead-weight capacity vessels.

In contrast to the technology of Eastern Indonesia, outrigger canoes are almost entirely absent in Western Indonesia (Haddon 1920:97,115) and completely absent on the mainland coast of Southeast Asia (Sopher 1965:194). The use of opened out dugouts appears to be standard in this region where dugouts are still in use. The dugout

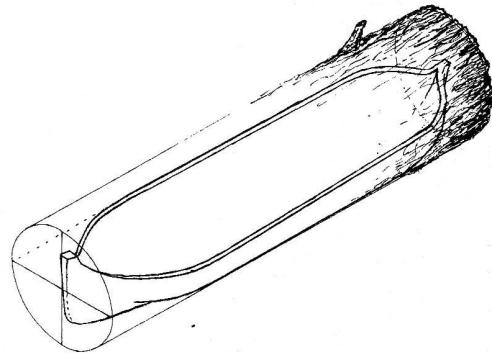


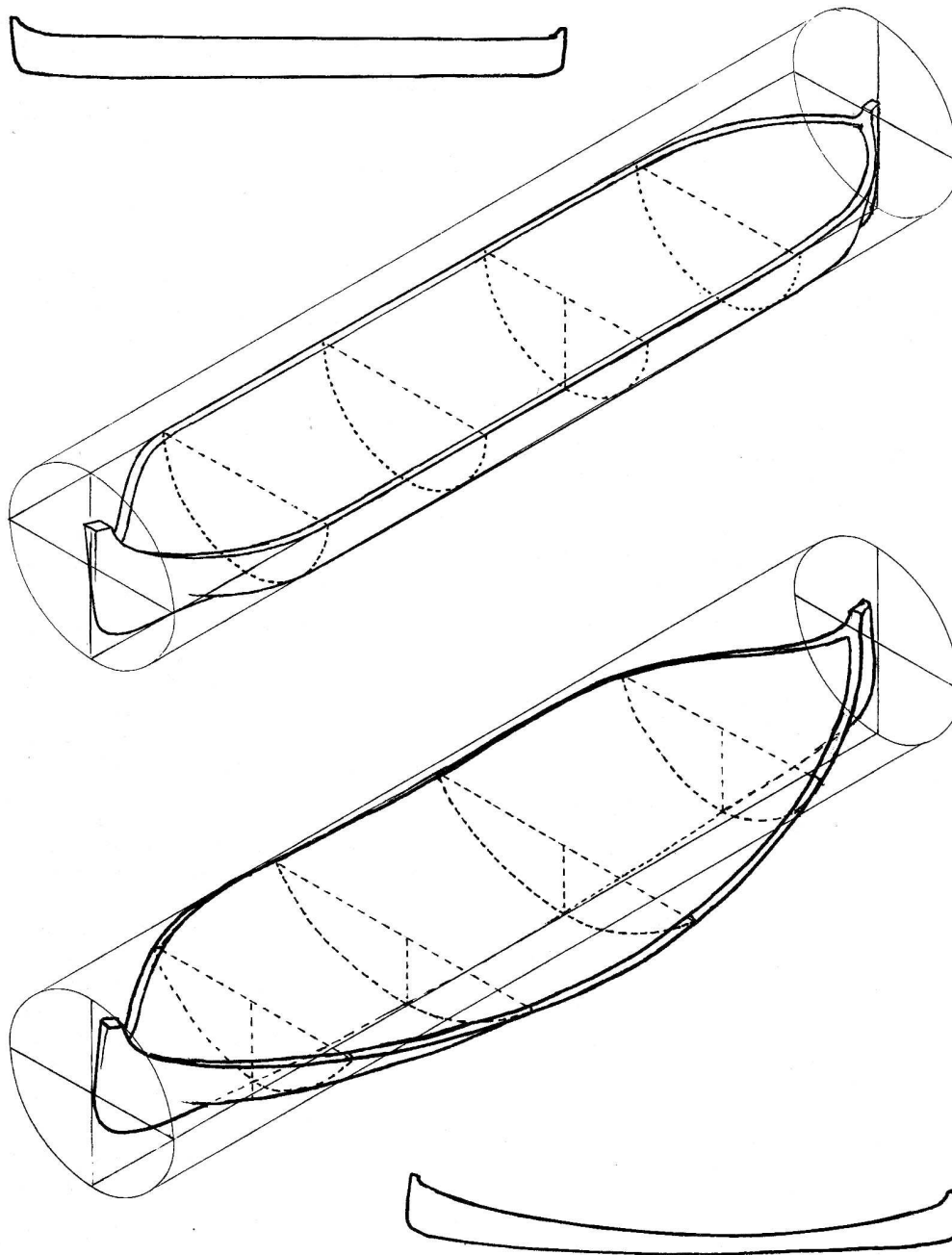
Fig. 4. The beam and depth of a simple dugout is limited by the dimensions of the log.

canoes of North Borneo and Sulu are always opened out. This is done using a slow fire of coconut husks or damp wood chips (Gibson-Hill 1968:194). An opened out dugout can have considerably more beam relative to its depth, and the hull form is less constrained, though it does have certain limiting characteristics. Figure 5 shows how the shape of a canoe, such as the canoe in Figure 4, is distorted in the process of opening it. The midsection changes from a near semi-circular section, which is derived from the cross section of the tree trunk, to a shallow, slack bilged "V" section. While the beam is increased, the freeboard and depth of the hull is greatly reduced in the midsection, but in the bow and stern freeboard is actually increased. The ends curl upwards and, as a result, the stem and stern profiles become more vertical or, if already vertical, develop reverse rake.

Gibson-Hill (1968:194) described the basic Bajau dugout canoe of North Borneo which is opened out in this way and has no added planks:

*Bugor-Bugor.* This is the Bajau dugout... It is usually a relatively small affair, 8-12ft. long, beamy, of shallow draught and (as befits the Bajau) with little freeboard. In profile the upper and lower surfaces are almost parallel, both turning up slightly at the ends, following the expansion of the middle section. The general shape bears a close resemblance to that of the dug out base of a *Lipa-Lipa*, with which it is no doubt associated.

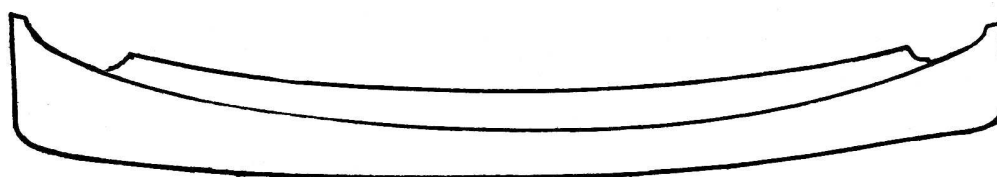
A vessel such as the canoe in Figure 5 or the *Bugor-Bugor* requires the addition of wash-strakes to increase the freeboard through the midbody (except in the hands of the Bajau) but no pieces need be fitted in the bow and stern. Figure 6 shows the addition of wash-strakes in



**Fig. 5.** Distortion of the dugout which occurs when it is opened out.

the midbody. To simplify construction, the wash-strakes are not tapered out in the bow and stern where the bend in the strake would be greatest. Instead they simply terminate, creating a slight step or break in the sheer of the hull. This design

is, in effect, a "three-part canoe". Alternatively, small, shaped pieces could be used to run the wash-strake smoothly into the prow of the dug-out base; this design is in fact quite common on canoes in the Buton area of Sulawesi, and in a



**Fig. 6.** Addition of wash-strakes in the midbody.

slightly different form, on canoes from central Sumbawa (Figs 7b, c).

For the builders of such three-part canoes either to build larger vessels, or to build vessels in which the dugout base was a relatively smaller part of the structure, it would eventually have been necessary to increase the freeboard in the bow and stern. This could have been done using a five-part structure, but, in the absence of a tradition of using forked end pieces or of running the strakes right to the ends of the vessel, it was done using carved blocks to form the two sides of the bow and stern. This structure allowed the retention of the sophisticated hydrodynamic shape of the original dugout's ends and avoided the problem of running the strakes through to the ends where the curvature would be much greater and difficult bending of the planks would be necessary. The resultant structure is that described here as the seven-part canoe structure.

For structural reasons, canoes or planked vessels which evolved in this way, from an opened out dugout, will tend to exhibit a number of particular design features which are summarised below:

1. A slack bilged, V-section midbody with very flared topsides in the transverse section;
2. A rockered keel or bottom - the bottom curves up towards the ends in the longitudinal section;
3. Vertical, or even inward raking, profile to the bow and stern;
4. A break or step in the sheer formed by the termination of the sheer strake near the bow and stern;
5. 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.

The first three design features are simply characteristics of the opened out dugout, the fourth and fifth result from a particular system of building and an evolutionary sequence such as that outlined above. That sequence was suggested by the structure and hull form of a number

of traditional canoes and planked boats from Sabah, Sulu and Indonesia which exhibit all, or most, of the five features.

#### EXAMPLES OF VESSELS WITH THE SEVEN-PART STRUCTURE

Throughout the Sulu region and further west in Sarawak, the use of an opened out dugout base for traditional building of vessels, even large cargo carriers, was standard. This construction was described by Richards (1967:162):

Malay boats have a dug-out keel. A tree is felled and a suitable length of trunk cut: from this nearly a quarter is removed with the axe to make a flat side. The baulk is set up on rough trestles ... with the flat side uppermost. The flat side is then attacked with the axe and hollowed out. The hollowed log is spread out wider by putting water into it, or letting the rain fill it, and heating it with fires beneath it. Spreader thwarts are forced in to keep the shape as the spreading and hollowing out proceeds...

The resulting keel will be twice as wide as the original diameter of the log; 2-3 in. thick in the middle, tapering to about 1 1/2 in. at the edges... The spreading of the timber has the effect of bending the ends upwards... It also simplifies the making and fitting of the strakes. The keel-piece is really the keel and garboard strakes made in one piece.

Traditional boatbuilding has nearly disappeared in the Sulu/Borneo region and the literature describing the traditional craft is scant and unsatisfactory. Gibson-Hill (1968:191) remarked on this lack of data and observed that the best available work on Philippine watercraft (Galang 1941) "is little more than an uncritical catalogue". The situation is hardly improved today and it will be a great pity if the remaining watercraft and boat building traditions of the region are not properly recorded before they completely disappear.

Most of the examples of seven-part construction vessels given in this paper are not from Sulu/Borneo but from Eastern Indonesia, an area with which I am more familiar and for which the literature is a little more helpful. In most of the examples described below, some of the five design features ascribed to this seven-part structure appear to have been retained as stylistic elements in designs that have evolved beyond the basic seven-part canoe.

The Bajau *lipa-lipa* mentioned above in Gibson-Hill (1968:194) is a fine example of this seven-part structure which exemplifies all five of the design features in the most exaggerated form. There are, or were, other craft from the Sulu region and Borneo built by people other than the Bajau which would probably provide excellent examples of the seven-part structure, but I have neither had the opportunity to study them, nor been able to gather sufficient data about their construction from the literature. As mentioned below, some traditional Thai watercraft have stylistic features and technical details which suggest a connection with the vessels described below, but that connection is beyond the experience of the author and the scope of this paper.

#### The Bajau *Lipa-Lipa* of the Sulu Region.

The *lipa-lipa* is the vessel used as the home of family groups of the traditional boat-dwelling Bajau from the Semporna region of Sabah and the Sulu Archipelago of the South Philippines. The boat dwelling Bajau life style is now fast disappearing and in 1991 only a few *lipa-lipa* were still used as dwellings in the Semporna area (pers. comm. Paul Clark:1991). *Lipa-lipa* were recently still in use as fishing boats in situations where a shallow draught and easily driven form is advantageous.

The lines and construction of a *lipa-lipa*, built at Kampung Tundun near Semporna by Haji Penghulu Hindi bin Basarani for the Museums and Art Galleries of the Northern Territory in 1983, are shown in Figures 8-10. In this example of a *lipa-lipa*, the dug out base is not very much more than a keel, but it is shaped and dug out, particularly towards the ends and it has the distinctive shape of an opened out dugout. It is called the *tadas* (or *teddas* - Sather 1985:192) meaning the bottom of a dugout, rather than *dalamat*, the name for a more complete dugout base used in smaller built up canoes. At the very ends where the two sides converge, the *tadas* is low and cut away - this is probably because the ends of an opened out dugout are prone to be split open by the forces used to open the midbody. In

fact all dugouts show a tendency to split in the ends, where radial splitting of the tree trunk from its core easily occurs. It might have been consideration of this problem that brought about the use of conjoined end pieces in the evolution of the canoe. The ends of the reduced *tadas* project at the bow and stern of the *lipa-lipa* to give an unusual bow profile with a ram-like projection (*torok*) slightly reminiscent of a classical galley or a *Dreadnought* type battleship. Midships and through the midbody there are four broad strakes. The section is shallow with very slack bilges and very flared topsides. All the strakes except the top strake terminate on steps on the shaped bow and stern pieces. The top strake is a wash-strake which terminates well before reaching the bow to create a distinctive step down in the sheer; aft there is a similar step in the sheer although the strake is extended as a kind of rail, clear of the hull. The conjoined end pieces (*tujjah*) of the *lipa-lipa*'s seven-part canoe structure are large pieces with complex shape. They give a very exaggerated reverse rake to the bow profile and a less exaggerated reverse rake in the stern. The bow pieces also form a prow finial of distinctive flaring shape and aft there is a similar, but smaller, finial formed by the stern pieces. The bow finial referred to here is not the forward projection formed by the *lingayat* and *jungal* in Figure 9, but the upper projection of the *tujjah* itself.

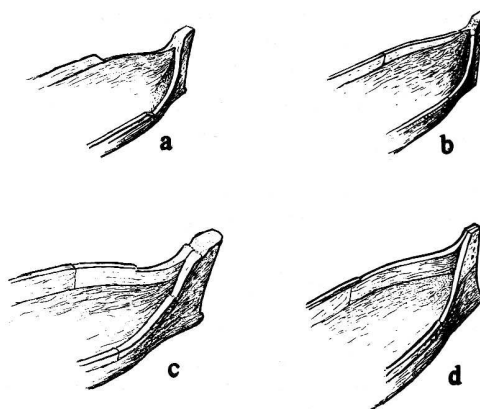


Fig. 7. Canoe bows illustrating possible steps in the development of the seven-part canoe: **a**, dugout with wash-strakes: Gulf of Bone, Sulawesi. **b**, built up dugout with seven-part structure, the wash-strake extensions do not meet in the bow: Mola, Buton area. **c**, built up dugout with wash-strake extensions that meet behind the prow: Saleh Bay, Sumbawa. **d**, built up dugout with wash-strake extensions that meet in the bow and form the prow: Pulau Bungin, Sumbawa.

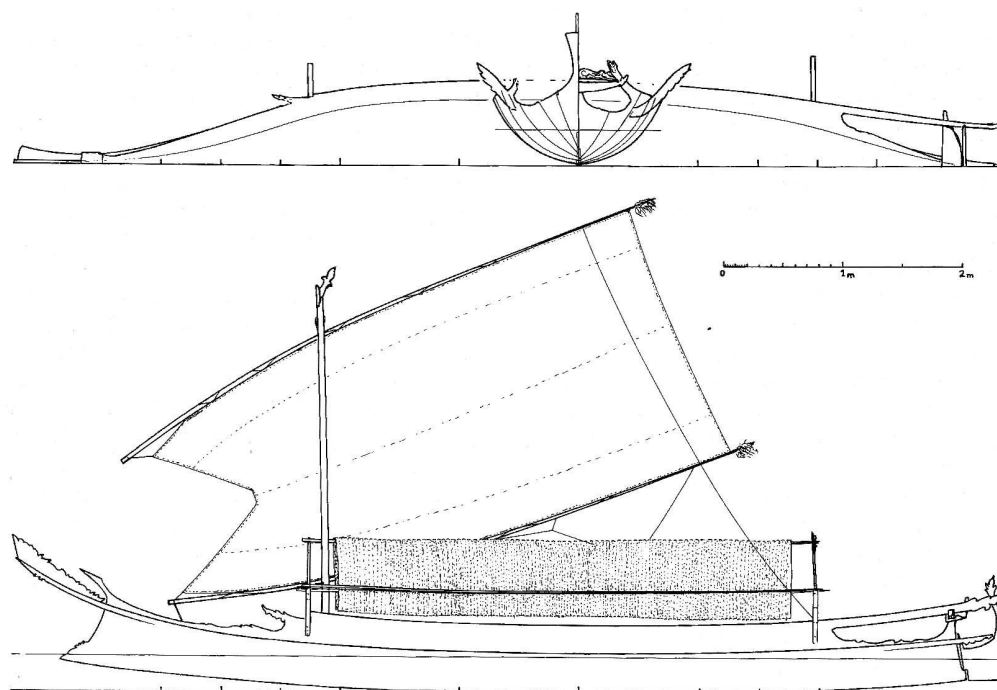


Fig. 8. The Bajau *lipa-lipa*.

The Sabah *lipa-lipa* is steered with a rudder mounted at the stern on the longitudinal centre line of the vessel. This centre or median rudder is presumably an example of western influence, because the traditional craft of the region are mostly steered with quarter mounted rudders. The tiller or yoke is fitted thwartships and is controlled by lanyards. This system of steering is fairly widely spread among Bajau communities and is also found on certain small craft in Malaysia and Sumatra. The styling of the *lipa-lipa*'s rudder, with the decorative spur on the top of the blade, is also widely spread in a less exaggerated form.

The rig is a single, tilted, rectangular sail usually called *lama so'do* or *lama tanja* in *Bahasa Sama*, the language of the Bajau.

The name *lipa-lipa* is obviously cognate with *lepa lepa*, the name used for stylistically similar canoes in South Sulawesi and used as a general word for canoe by some Bajo, but the origin of the name is not clear. It is, presumably, also cognate with *lipi lipi* which is the name of the wash-strake that does not reach the bow or stern on the traditional built up dugout canoes of the Maranao people of Mindanao (Saber 1977:3) and, perhaps, this is the feature originally indi-

cated by the name. Another example of this usage is found at Terengganu on the east coast of Malaysia where a vestigial or decorative wash-strake, found on several types of traditional boat, is called *lepa*.

The antiquity of the design of the *lipa-lipa* is not known. It is perhaps not the original boat of the Sulu Bajaus, but the same construction is found in the other Bajau craft of the region, including the larger seagoing *sapit* which is a deeper, more capacious, cargo carrying vessel. Formerly, *sapit* were used for long voyages to Java and eastern Indonesia; and there is a story of a *kumpit* (a large fully decked *sapit*) sailed as far as the Maldives, and was thwarted in an attempt to reach Arabia for the Haj by the Second World War (Kuris 1974:103, 124).

**Bajo Craft and related vessels of Eastern Indonesia.** There are Bajo communities in a number of places in eastern Indonesia, most of them on small remote islands or in isolated bays and creeks. Today, the two largest communities are Mola on Wangi Wangi and Pulau Bungin off the coast of western Sumbawa, but both are said to be recently established. Linguistic and cultural evidence suggest that the Bajo or Bajau came to eastern Indonesia from their home in the

Sulu region in the relatively recent past (Fox 1977). The earliest historical reference to their appearance in Eastern Indonesia is from 1725 (Fox 1977:259). In that year, seven Bajau fishing vessels with a total of 91 men, women and children were taken captive from Bernusa on

Alor, according to a letter from the chief officer in Kupang to the Governor General in Batavia. Bernusa on Alor is probably the village now called Baranusa, actually on the north coast of Pantar which lies to the west of Alor. Today at Baranusa there is a lively and very traditional

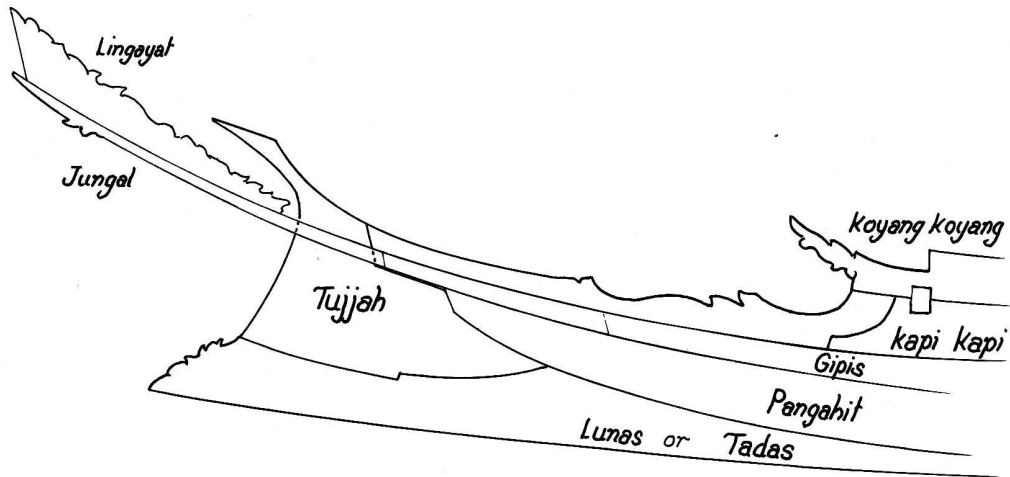


Fig. 9. Plank pattern of *lipa-lipa*'s bow.

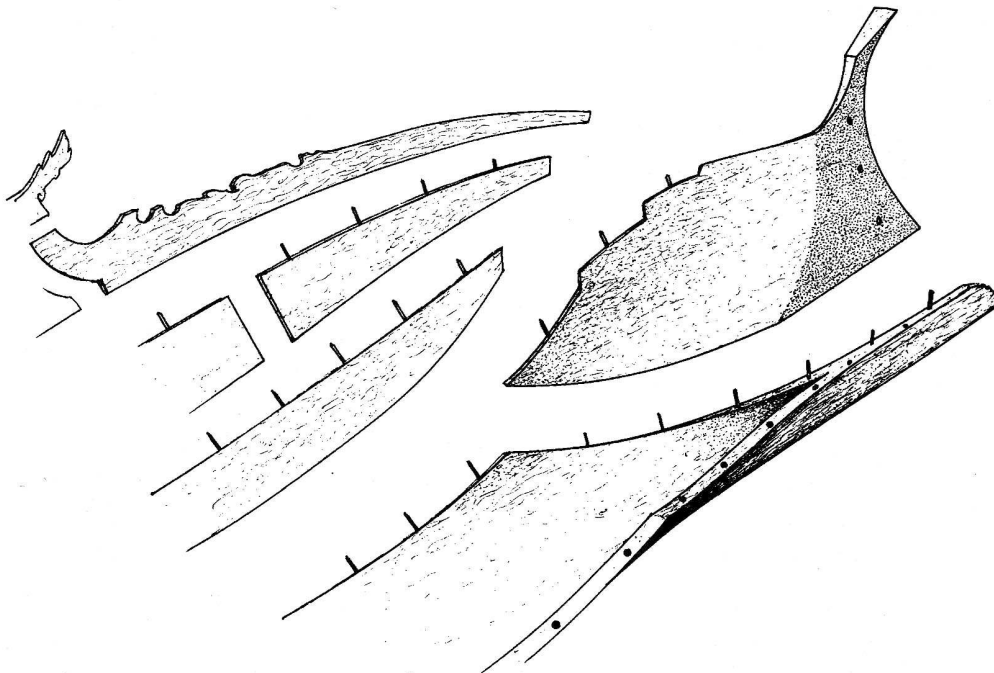


Fig. 10. Construction of *lipa-lipa*'s bow, planking shown on one side only.

maritime community which builds and sails beautiful and swift open boats called *sope* or *tena*. These vessels retain all of the style of the traditional Bajo *sope* described below, and they still carry the large, powerful, tilted rectangular sail that has virtually disappeared elsewhere because it requires great skill and exertion to handle safely. The tilted rectangular sail used at Baranusa is particularly interesting because it is cut with its foot longer than the head. This cutting of the sail and the whole sail plan is typical of the Sulu Bajau vessels and is significantly different from the cut employed by the Makassar and Bugis people of South Sulawesi (Fig. 11). Doran (1981:Fig. 16) illustrates an almost identical sail plan carried by a Sulu *vinta*.

There are, however, no *Sama* speakers at Baranusa. The people of Baranusa speak a local language and use their own nautical terms, very few of which are related to the Bajo terms.

I have not had the opportunity to visit Baranusa itself, but information about Baranusa and the data on the boats of Baranusa was collected from the crew of a Baranusa *tena* and measurements taken on the *tena* at Kupang, Timor, in April, 1991. The *tena* and men were returning from a fishing and collecting voyage to Scott Reef: the vessel was so typically a Bajo vessel that local Bajo of my acquaintance, who saw the *tena*, had difficulty accepting that she was not from a Bajo community.

On the evidence of the distribution of Bajo boat types and technology, there seem to have been Bajo communities in eastern Indonesia which have now integrated with local populations and adopted the local languages whilst retaining aspects of the Bajo maritime oriented life-style. The same process has occurred with other "Sea Nomad" groups in Southeast Asia (Sopher 1965:183) and it can be the cause of debate as to who is properly considered to be Bajo or Bajau. Some aspects of this problem of Bajo ethnicity are discussed in an article entitled "Badjo atau bukan Badjo, itu Soalnya" (Bajo or not Bajo, that is the question (Zacot 1979)). The historical background of the enigma of Bajau ethnicity is highlighted in "Who Were the Balangingi Samal? Slave Raiding and Ethnogenesis in Nineteenth-Century Sulu" (Warren 1978).

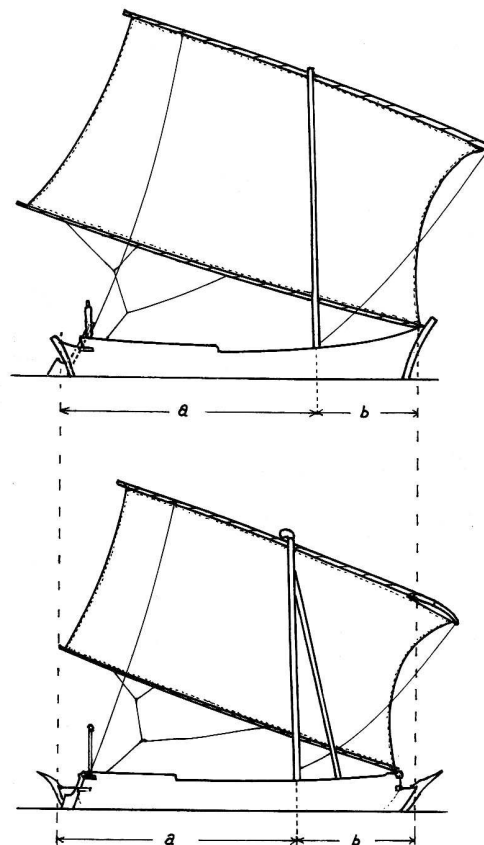
**The *lelepa sope* of Pulau Bungin.** Pulau Bungin is a tiny half-tide islet off the coast of Alas, Western Sumbawa. It is protected from all directions by larger islands and the mainland coast. The entire islet is covered by houses built on piles and has been built up with coral rubble

and sand; it is a very traditional Bajo village where lontar texts relating Bajo history are held.

The canoes from Pulau Bungin are highly regarded and used over a large area. These canoes are called *lelepa sope* by the Pulau Bungin Bajo, *lelepa* means canoe and *sope* refers to the style. Larger vessels of the same style are simply called *sope*. *Lelepa sope* are built on a dugout base.

The smaller *lelepa* are formed almost entirely from a single log with only low wash-strakes added through the long midbody. They are not normally opened out and have the typical near semi-circular midsection of a dugout canoe.

Larger *lelepa sope* are built on an opened out dugout base and they are probably the only examples of this technology in eastern Indonesia. The dugout base is traditionally made from



**Fig. 11.** Sail plan of a Baranusa *sope* (a), compared with a South Sulawesi *pajala* (b). The ratio a:b which indicates mast position is 5:2 for the *sope* and 2:1 for the *pajala*. The *sope* has the foot of the sail longer than the head; the *pajala* has the foot equal to the head or slightly shorter. The clew of the *sope*'s sail is aft of the sternpost: the clew of the *pajala*'s sail is forward of the sternpost. The *sope*'s sail is deeper and greater in area.

a log of a tree known as *pohon tambora*. This species of tree, it is said, grows only on the slopes of Gunung Tambora, the huge flat-topped volcano that straddles central Sumbawa. The timber is light, durable and resists splitting; it is acclaimed as uniquely suitable for dugout canoe making. Today, *kayu tambora* is very difficult to acquire and another timber, locally known as *kayu soren* is most commonly used.

Once the canoe has been carved to shape and dug out, in order to open it out, the canoe is shored up off the ground or on beams over the water between the houses, supported only near the ends. It is then filled with sand and water to about a hand span below the rail. Heat is gradually applied from below using torches made from coconut fronds, or by slow fires of coconut husks and shells. The desired expansion and beam is predetermined for five stations along the hull's length and beams are prepared with notches cut to fit over the rail at each station when the desired expansion is achieved (Fig. 12). This allows fairly precise control of the shape so that the finished craft can be given the long midbody of a canoe or the more rounded boat shape with greater beam midships of the *sope*.

The bow of a medium sized *lelepa sope* with typical traditional styling and plank pattern is illustrated in Figure 13. The shape is markedly different from the Sulu *lipa-lipa* but it has the same structure and the same stylistic elements including the ram-like projection.

The name given to the dugout base, *batangan*, is apparently cognate with the Indonesian *badang* meaning body rather than *batang* which means stick or batten. The name for the strakes which

build up the sides of the canoe - *timbau* - is fairly widely used. It is presumably cognate with the Indonesian *timbul*, meaning to rise or to float to the surface, however, in Terengganu, Malaysia, the term *timbal* is used, and this word, in normal usage, means "balancing", or "on both sides". Either word would be appropriate in meaning.

The construction of the Pulau Bungin *lelepa* is very finely executed. A little luting fibre is placed between the planks during construction, but the planks are so carefully shaped and fitted that no caulking is required to make them water tight. The planks are bent to shape using heat, and oil to prevent charring (my informant, Jailani, was of the opinion that this use of oil was a recently introduced technique). The planks are edge dowelled together with dowels at four finger widths (i.e. about 75mm). Most other boats in the region have the dowels at one hand span (200mm). In traditional construction of a *lelepa sope*, no floors or frames are fitted in the dugout base but top pieces (*taju*) are fitted to strengthen the upper planking.

In recent years there have been a number of changes in the construction of boats at Pulau Bungin, especially in the case of the larger *sope*. Many now have an external stem post stepped on to the top of the bow projection. This gives the impression that the projection was originally intended to take the base of a stem, but that is not the case. The *salureh* structure is still used behind the stem, but in some cases the bow is given considerable forward rake to conform with modern fashion in boat building. Often the dugout base is reduced to a very small part of the hull or an ordinary keel is used, in which case floors and

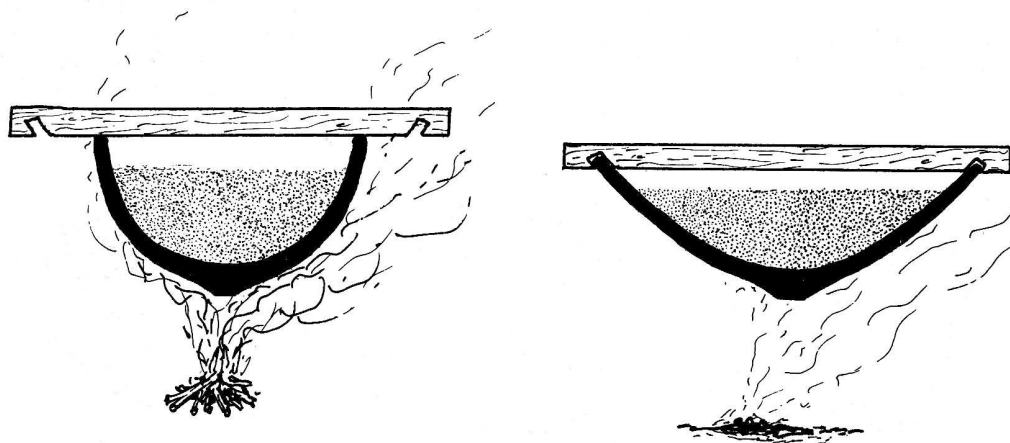


Fig. 12. The dugout is expanded over a slow fire until it reaches the required beam.

full frames are fitted to strengthen and tie the hull together. The keel or vestigial dugout is not made from *kayu tambora* but from *kayu bungur* (*Lagerstroemia speciosa*) which is considerably harder.

When I visited Bungin in 1991, no *lelepa sope* had been built there for some years and it seemed unlikely that any more would be built. Even the smaller *lelepa* were disappearing in favour of outrigger canoes of similar structure. The styling and construction of the last Pulau Bungin *sope* had changed to the point that it could not be distinguished from that of other small planked craft of the region. This has occurred with Bajo *sope* from other islands, but the hull form of the *sope* usually remains a distinguishing characteristic even when *sope* are built with a conventional plank and frame structure. The mid section of the Pulau Bungin *sope*, and other *sope*, is much like that of the *lipa-lipa* with slack bilges and very flared topsides. Although *sope* have more beam and depth relative to their length, the mid section, in conjunction with sharp ends, gives a hull that is lively and easily driven but does not have great stability.

In detail, the styling, hull form, and gear of the traditional Pulau Bungin *sope* is much the same as that of the Ende *sope bajo* which is described and illustrated in greater detail below.

It will be noted that there is no similarity between the terms for the various parts of the canoes used at Bungin and Semporna, Sabah. The terms shown in Figure 13 were those which were represented as most original (*asli*) at Bungin, but on a visit in 1991 I was provided with a variety of alternative terms. The dugout base could alternatively be called *belakah*, the wash-strake called *guguntoh*, and the *salureh* could be called *samboh* or *sambohi* (cognate with Indonesian *sambung*) meaning extension, particularly where it was relatively simple in shape because

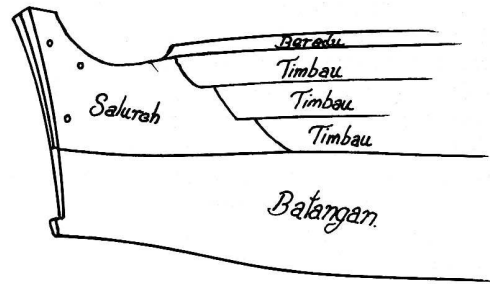


Fig. 13. *Lelepa sope* plank pattern and plank names.

the canoe was not given traditional styling.

**The sapa, sope bajo and juko of Ende, Flores.** The various stemless boats found in the region of Ende Bay, Flores, are perhaps the finest craft of their type and certainly the most traditional still built in Indonesia. They are built in three styles called *sope bajo*, *juko* and *sapa* or *sapa sangge*, but they are always built with the same basic structure. The small craft of all three styles are simply called *sapa*. Above a certain undefined length, about 6 metres, the different types have different names: the type with the most similarity to the Bajau craft of the Sulu region and the *sope* of Pulau Bungin is called the *sope bajo*. The people who build and operate these *sope bajo* are not Bajo people: they speak the local Endenese language and regard themselves as Endenese (*Orang Ende*). But these coastal, maritime oriented Endenese acknowledge that they have a different ancestry from the predominantly Melanesian-featured people who make up the bulk of the population. They believe themselves to be descendants of mercenaries who came to fight against the *Raja* of Ende in the 19th century. It seems most likely that their forebears were pirates and slave raiders from the Sulu Sea, many of whom were Bajau. In the early

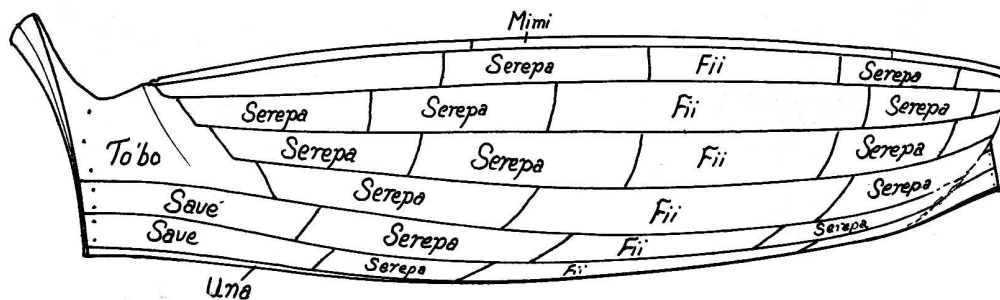


Fig. 14. *Sope bajo* plank pattern and plank names.

19th century, Ende was an important haven for the Sulu pirates who made annual voyages down through eastern Indonesia, pirating and slaving. In 1839 the Dutch colonial authorities compelled the *Rajas* of Ende to sign a treaty "by which they engaged to repress all piracy, and not to permit any intercourse between their subjects and pirates, whether in the way of protection, or by assisting them in the sale or exchange of their booty" (Anon 1850: 626). Perhaps an effect of this treaty was the isolation of a community of Bajau and other Sulu people who had set up at Ende.

The traditional vessels of Ende Bay are mostly planked boats built on a shallow, slightly rockered keel, but some are built on a wider dugout base. It is said that the dugout base was formerly more common and it is reasonable to suppose that it was once standard. Both keels and dugout bases are called *una*.

The plank shell construction of a small *sapa* of the *sope bajo* style with the Endenese names of the planks and timbers is shown in Figure 14.

This vessel is built on a keel but the form of the opened out dugout is accurately replicated by the first two strakes which end with conjoined planks called *save*. Above these are the large bow and stern pieces called *to'bo* which are stepped to take the ends of the strakes. As with the *lipa-lipa*, there are at least three strakes which terminate on the bow and stern pieces; this arrangement is standard and found even on the largest and the smallest of the Ende *sope* and *juko*. The *to'bo* (bow and stern pieces) form a prow finial which is similar to the *tujjah* of the *lipa-lipa* but more vertical. The break in the sheer formed by the termination of the wash-strake is reduced to a very small step right in the bow and stern: both the break in the sheer and the wash-strake itself have been reduced to purely stylistic elements of the design. The whole bow is stylistically related to that of the *lipa-lipa* but much less exaggerated and it lacks all the carved decoration. The *to'bo* are styled to form a bow that does not curve smoothly; there is a distinct hard angle in the topsides. This stylistic element is not found in the

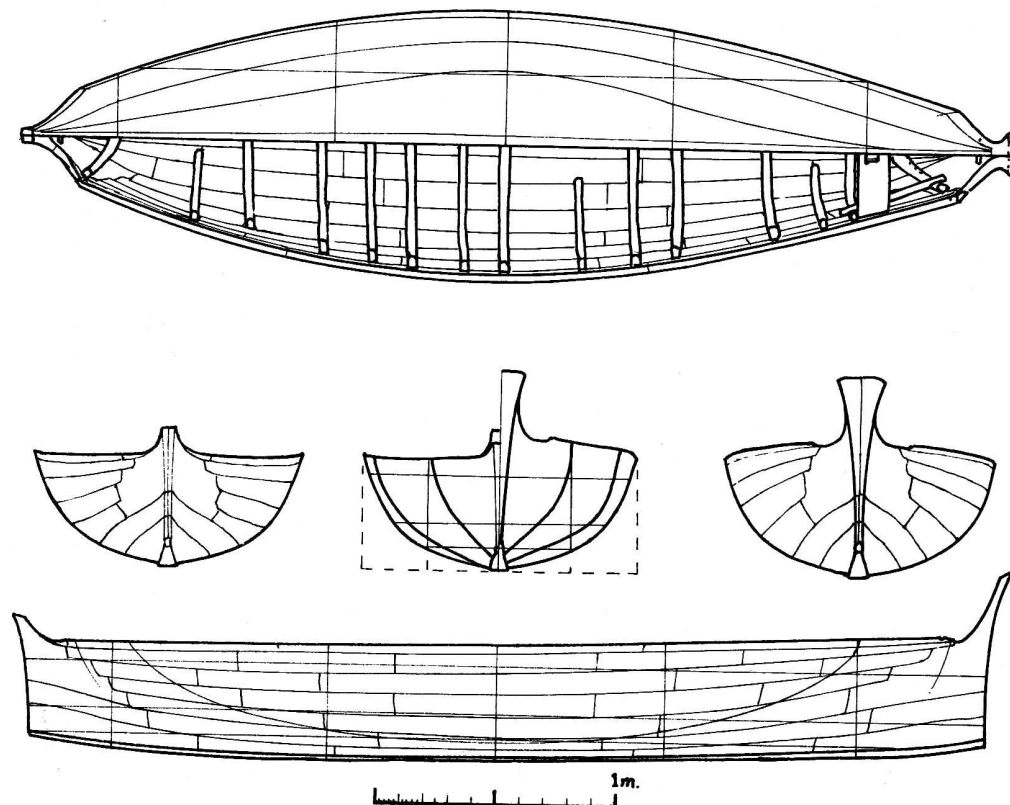


Fig. 15. Lines of a *sope bajo*.

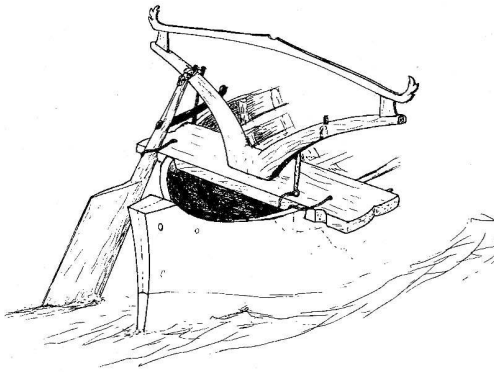


Fig. 16. Rudder mounting of a *sope bajo*.

*lipa-lipa* but it is common in South Sulawesi on Bugis and Makassar designs.

The lines of this type of small vessel (Fig. 15) show great similarity to the *lipa-lipa* in the mid-section. In fact, the ratios of beam to depth and the shape of the sections are virtually identical. Not all of the boats from Ende have exactly this midsection but the example in Figure 15 was chosen for taking the lines off because it was judged typical of the smaller boats (and also because it was in the shade of a large tree).

The Ende boats have a great deal more beam and depth relative to their length than the *lipa-lipa*. They are very much boat shaped rather than canoe shaped and in this respect are more closely related to the *sapit* or *sope* than the *lipa-lipa*.

While the plank pattern, the edge joining of the planks and the use of large conjoined bow and stern pieces are similar to the construction of a *lipa-lipa* or a traditional Pulau Bungin *sope*, the actual method of building is, in an important way, different. The *lipa-lipa* is built using relatively thin, straight planks which are bent into shape. However, the Ende boat builders, like other boatbuilders in eastern Indonesia do not bend planks or any other timbers. The timber of choice for boatbuilding in their region (*Vitex* sp.) is extremely hard and dense and would probably be very difficult to bend. Their planks are carved to shape and so they tend to be made short to avoid wastage of timber. This is reflected in the plank terminology which has separate names for the relatively straight planks in the mid-body (*fii*) and the planks which curve in towards the ends (*serepa*).

Both the Ende *sope* and the *lipa-lipa* are shell constructed; the plank shell is edge dowelled together. The *lipa-lipa* does not have ribs or bulkheads to increase the hull's rigidity and tie

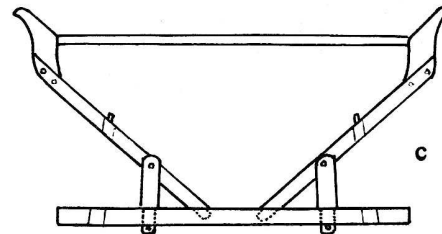
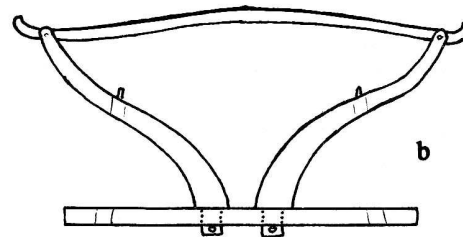
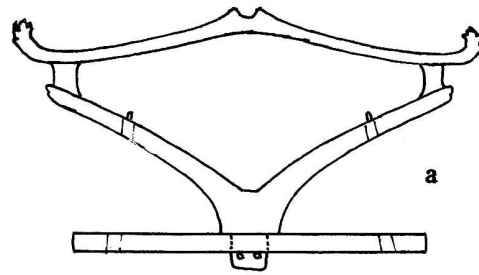


Fig. 17. Three types of rudder mounting: **a** and **b** are traditional while **c** is a modern adaptation to the use of sawn timber.

the plank shell together - it is a light and flexible construction. The Ende vessels, on the other hand, have thicker planking of much stiffer timber and they have plenty of frames to further increase the rigidity of the structure.

Turning from the structure to the rig and the steering gear: Ende vessels are steered with quarter mounted rudders. The mounting of the rudders is shown in Figure 16. The upper part of the mounting serves as a crutch for lowered spars. This particular style of rudder mounting is peculiar to Bajo vessels and some South Sulawesi craft (although the general design is widely

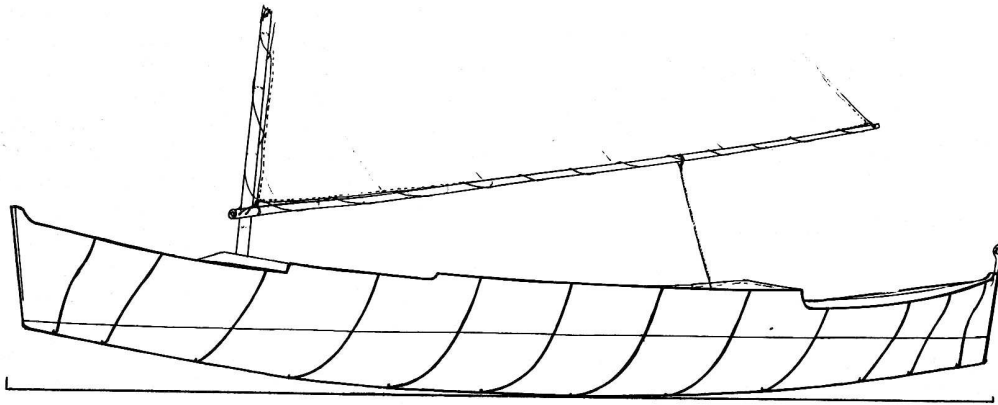


Fig. 18. Lines of a *lepa kaloko*.

distributed). In some cases the structure is made with a forked piece of timber and in others the two diagonally projecting arms are separate timbers. Three different structures (Fig. 17a-c) are illustrated: a and b are widely distributed and traditional while c is a modern version adapted for construction from mill sawn timber. Another variant of type a, observed at Ende, is illustrated in Horridge (1986:Fig. 19).

All but the largest of the traditional Ende boats carry a sprit sail which is called *raja sipa'*, or *zaja*

*sipa'* (*zaja* pronounced something like "zvraja" and meaning sail) in Endenese. It is called *lama tongka* by the Bajo of eastern Indonesia.

The various stemless construction vessels of Ende Bay are described in greater detail in Burningham (1990). Data for that paper was gathered by the author at Ende in 1989.

**The *lepa* and *soppe* of Mola.** Mola is a large Bajo community on the island of Wangi Wangi in the Tukang Besi Islands which lie southeast of Buton and Sulawesi. There are a number of Bajo

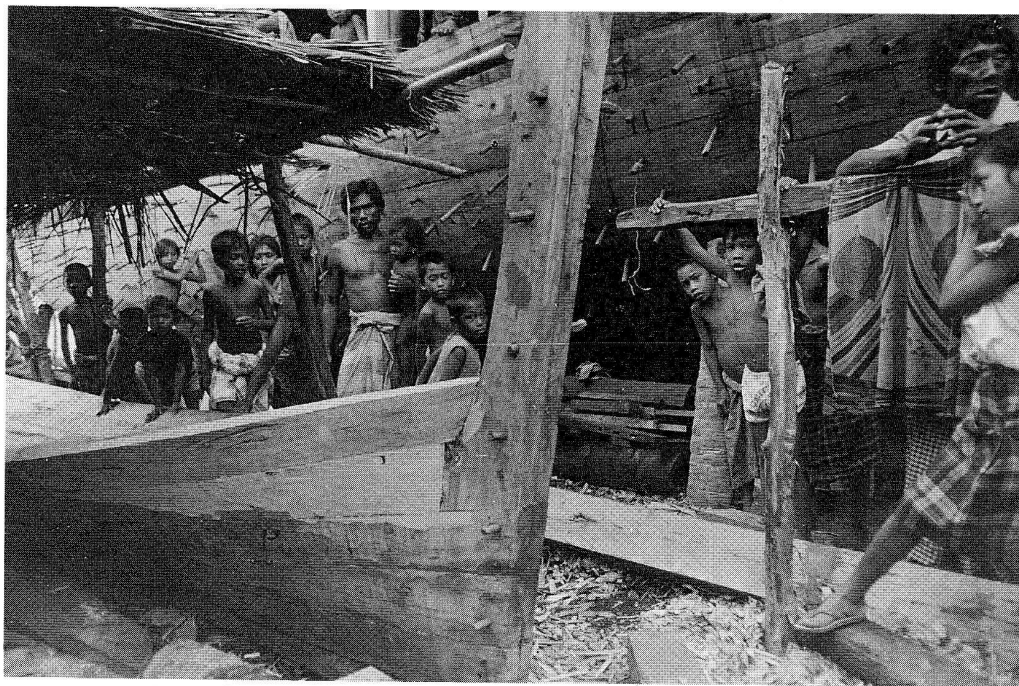


Fig. 19. Construction of a *soppe* at Mola (photo by Kurt Stenross).

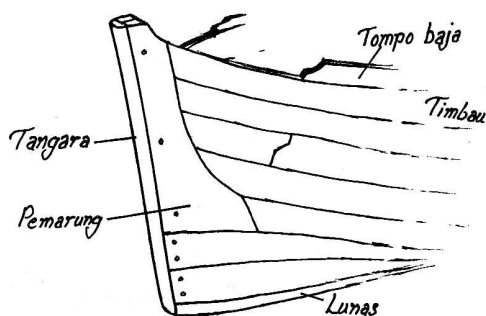


Fig. 20. Sketch of a Mola *soppe*'s bow showing plank pattern and the names of certain planks and timbers.

communities in the Tukang Besi Islands and formerly there were several other large Bajo communities that have disappeared. The circumstances of the Bajo arrival in the region are not recorded but the town of Wanji, which is adjacent to Mola, was one of the foremost havens of the Sulu pirates in the nineteenth century. Naval cannon can still be seen there, used as kerb stones and bollards. More recently, the Bajo played an important role in the Kahar Muzakkar rebellion and the associated piracy between 1951 and 1965. Following the suppression of the rebellion, Bajos who were threatened with retribution from their less piratically inclined neighbours abandoned some settlements in the Tukang Besi Islands (including their largest settlement, Montegola on Kaledupa) and consolidated in new communities such as Mola on Wangi Wangi and Wuring on Flores. Other Bajos in the Tukang Besi Islands, who were less compromised by their activities during the rebellion, merged with the local communities and adopted their local Tukang Besi Island dialects of the Butonese language.

A variety of small craft are used by the Bajos at Mola. Because most of the houses are built on piles over the water, or in the inter-tidal zone, virtually everyone in the community has frequent need to use some sort of water craft. There are two types of dugout canoe: one is the standard dugout of the Buton region. It is not an opened out dugout; but the lines are full in the ends to give maximum capacity and it is usually built up by a single strake in either three-part or seven-part construction.

The other type of dugout, called *lepa kaloko*, is used mainly for fishing for tuna. These one-man canoes are very light, extremely sharp, and designed to be fast and easily propelled either by paddle or sail. They are slightly opened out but

are very round bottomed and narrow beamed. Having no outriggers, they are extremely unstable (the name *kaloko* means crank or unstable). In fact, they are too unstable even for some Bajo, and yet the experienced Mola Bajos handle them under sail in the open sea with great facility. They are equipped with a simple trapeze, but the trapeze is only used to its full extent in racing and recreational sailing. To sail regularly in such a manner, risking capsize with fishing gear on board, would be a reckless lapse of professional competence.

The lines of one of these canoes are projected in Figure 18. They are not normally seven part canoes, being fashioned almost entirely from a single log with addition of a low wash-strake and coamings. They are carved to be very thin (between 10 and 20mm all over) and so are very light.

Outrigger canoes appear to be entirely absent in the Tukang Besi Islands. Larger seagoing outrigger canoes are replaced by sharp-lined planked boats called *soppe*.

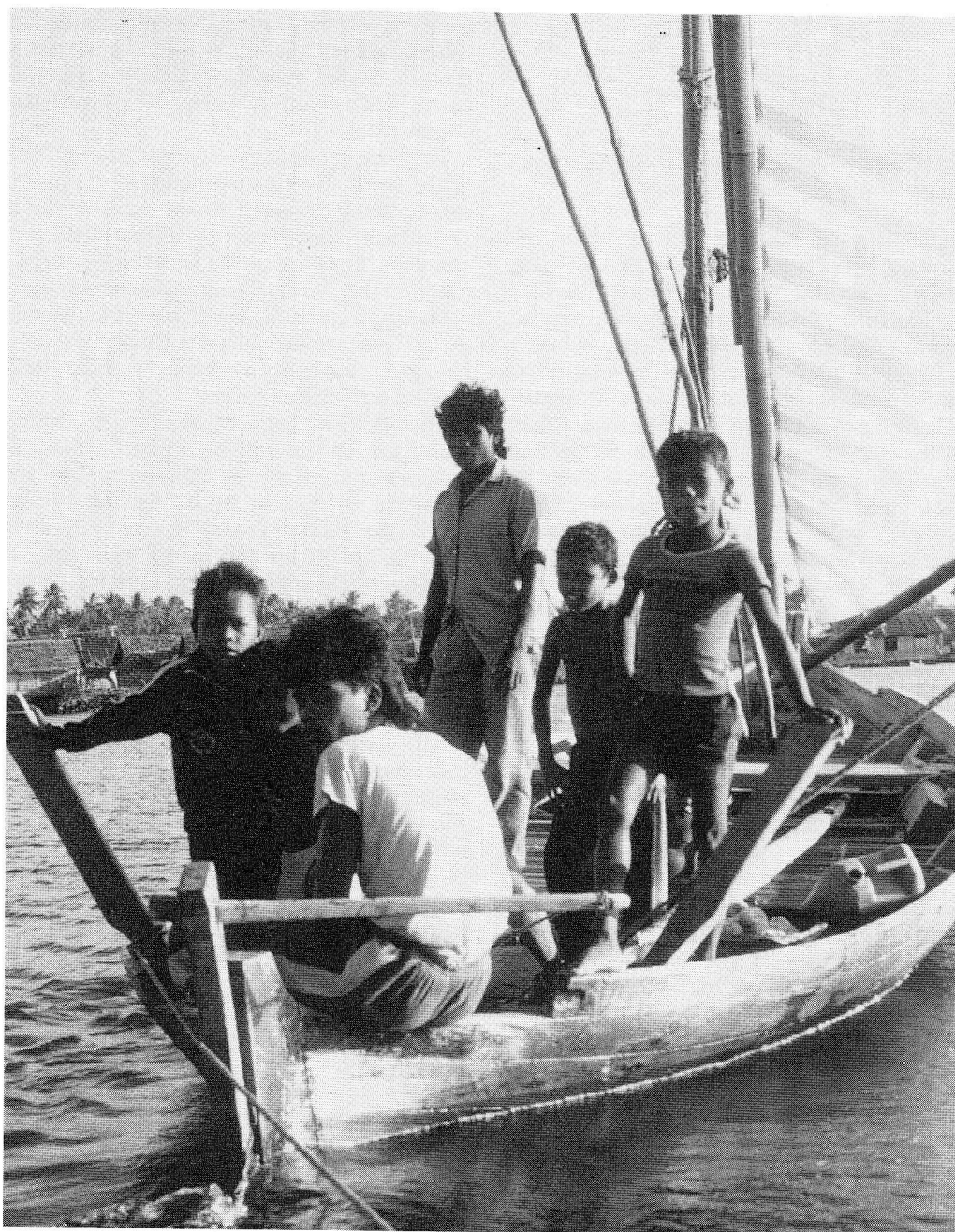
The plank built *soppe* of Mola are larger than the dugout canoes and have greater capacity, though they are also very sharp lined. They are somewhat different in shape from the *soppe* of Ende: the midsection shows considerable deadrise, almost no turn to the bilge and, in consequence, extremely flared topsides. In recent years, the conjoined bow and stern pieces have been reduced so that they have become little more than a bipartite stem and sternpost. As with the Ende vessels, the lower strakes which replicate the shape of the opened out dugout simply meet in the bow and stern. A Mola *soppe* under construction with the conjoined bow pieces is illustrated (Fig. 19). This vessel was later given an external stem which had no structural function but made her look more modern. Figure 20 is a sketch of the bow of a similar *soppe* with the Mola names for certain planks and timbers. It will be seen that none of the terms is cognate with those used by the Semporna Bajau and that only the term *timbang* is common to Mola and Pulau Bungin. Most Mola *soppe* have little or no rocker in the keel, though the keel is in some cases dugout, but they retain the flared midsection, the break in the sheer, the prow finial and the conjoined bow and stern structure of the seven-part canoe.

Some Mola *soppe* have a median rudder used with a peculiar Bajo tiller arrangement that is not found elsewhere in eastern Indonesia. The tiller projects thwartships from the rudder stock on the leeward side - when the vessel changes tack the

tiller is shifted to the new lee side. The helmsman controls the tiller with a lanyard; by pulling on the lanyard he can put the helm up to turn away from the wind. He cannot put the helm down to turn into the wind but the vessel is rigged to have so much weather helm that it will always turn

into the wind if the lanyard is let slack (Fig. 21). The form of the quarter rudder mounting is retained to serve as a spar crutch although the vessel is steered with a median rudder.

There are, in the Tukang Besi Islands, similar vessels also called *soppe* which are constructed



**Fig. 21.** The tiller is carried on the lee side of the rudder on a Mola *soppe*.

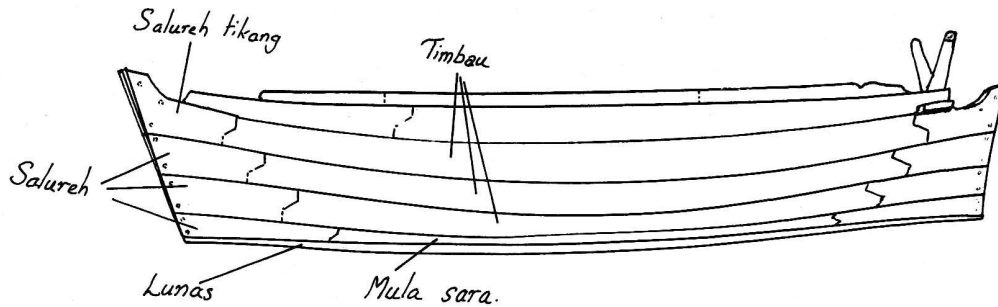


Fig. 22. Plank pattern and plank names of a Sulamu lepa.

with a conventional stem and sternpost; these are discussed below under a separate heading.

The *soppe* all carry the Indonesian lateen rig, usually known as *layar lete*, which has a boom laced to the foot of the sail as well as a spar on the luff. The heel of the spar is secured in the bow of the vessel so that the spar and the luff of the sail always remain aligned fore and aft even when running downwind. Formerly they carried tilted rectangular or quadrilateral sails called *lama sodo* by the Bajo.

Data was collected at Mola during a visit in August 1990 and information about Mola and the Tukang Besi Island Bajos was provided in separate personal communications with Daniel

Dwyer, Philippe Petinaud and Kurt Stenross, each of whom has made more than one visit to Mola and has extensive specialist knowledge of Indonesian watercraft.

**Lepa of Tanjung Sulamu.** There is a small Bajo community at Tanjung Sulamu on the northern side of Kupang Bay, West Timor. The Bajo population of Tanjung Sulamu is made up of Bajo who have come from other settlements in the area, particularly Oe Nggae on Rote; there is evidence that Bajo (Bajau) have been in the area since the 18th century (Fox 1977).

Formerly *soppe* were built at Sulamu or nearby Bajo settlements, but none remain. In 1986 two derelict *soppe* could be seen on the beach at the



Fig. 23. A Pulau Kangean sopet (photo by Kurt Stenross).

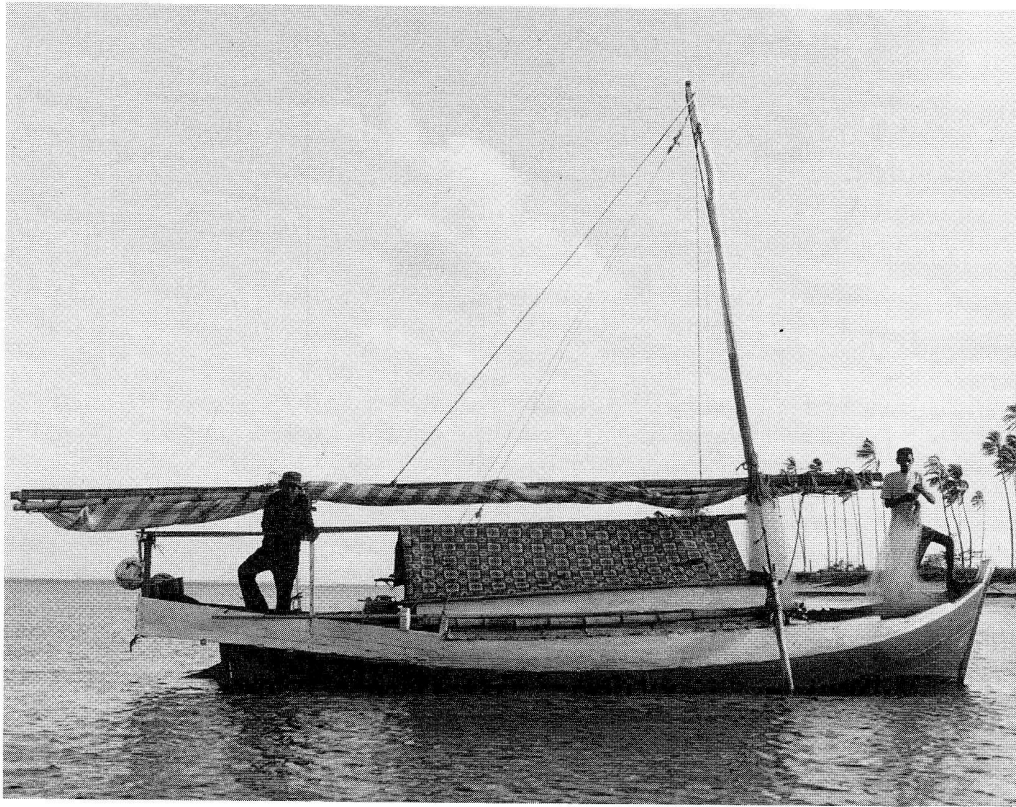


Fig. 24. A Tomea Bajo *soppe*.

northern end of Semaui Island, west of Kupang. Still in use are smaller boats called *lepa*, which are used for fishing. The *lepa* have a stemless structure and they are built on a small dugout base with slight rocker. The dugout is not actually opened out - it is too small and in most cases is really only a keel that has been carved to resemble a long thin opened out canoe. The midsection of the Sulamu *lepa* is the typical slack bilged V-section of Bajo craft. Some of the *lepa* have a break in the sheer at the bow and stern, others do not. Most are very roughly constructed from irregular shaped pieces of timber. Probably for this reason, the bow and stern pieces are relatively small with only one or two strakes terminating on them. A distinct angle between the midbody and the bow is carved into the shape of the top bow piece of the more carefully built *lepa*. The same stylistic element is found on the Ende *sope* and a variety of South Sulawesi craft.

The plank pattern of one of the better built Sulamu *lepa* with the local names of the planks is shown in Figure 22. If the *salureh* are regarded

as end pieces rather than planks, this example effectively has full length planks like the Sabah *lipa-lipa*. The basic terminology is the same as that used at Bungin.

Sulamu *lepa* are steered with quarter mounted rudders of the standard Bajo type, as illustrated above, but the rudder mounting is crude and the top part which serves as a spar crutch is often absent. Pins projecting from the forked part serve to hold the mast and spars when they are lowered. The rig is *layar lete* like that carried by the Mola *soppe*.

Data was collected during two visits to Sulamu in 1990.

**Sopet of Kangean.** There is a large Bajo population in the Kangean islands to the north of Bali. The stemless small craft of the Bajo communities is called the *sopet*. It is very similar to the Ende *sope bajo* and the Pulau Bungin *lelepa sope* in general appearance and hull form (Fig. 23). The prow is more flared and the forward end of the keel or dugout base projects as a spur, as it does on the Sabah *lipa-lipa*.

I have not had the opportunity to inspect the construction of a *sopet*. From photographs and

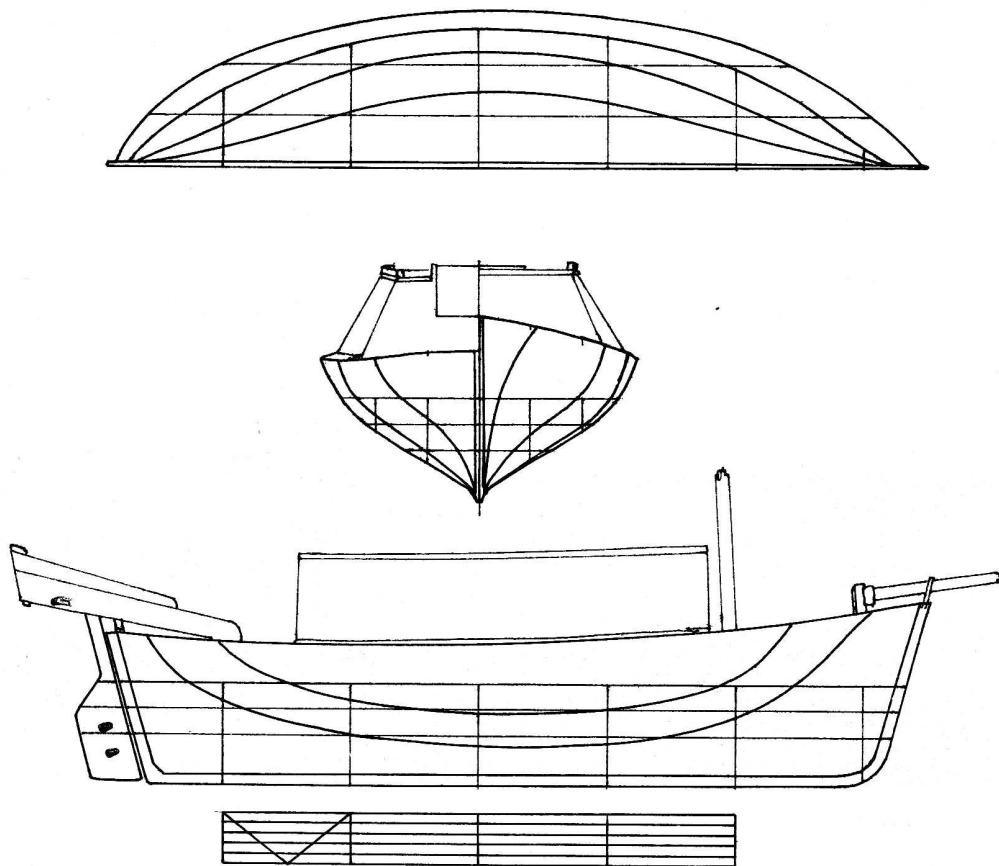


Fig. 25. The lines of *Sejarah Islam*, a small *lambo soppe* from Tomea.

description kindly provided by Kurt Stenross, it seems that the bow pieces are not as reduced in size as those of the Mola boats but not as large as those of Ende boats. There is no break in the sheer at the bow or stern.

The *sopet* have the standard Bajo quarter rudder mounting and the *layar lete* rig.

#### SOPE WITH STEM AND STERNPOST

Double-ended, open, *lete* rigged vessels built in the Tukang Besi Islands are generally called *soppe*. Some of them retain much of the style of stemless *soppe*, including the shape of the prow and the break in the sheer. A *soppe* built at a Bajo

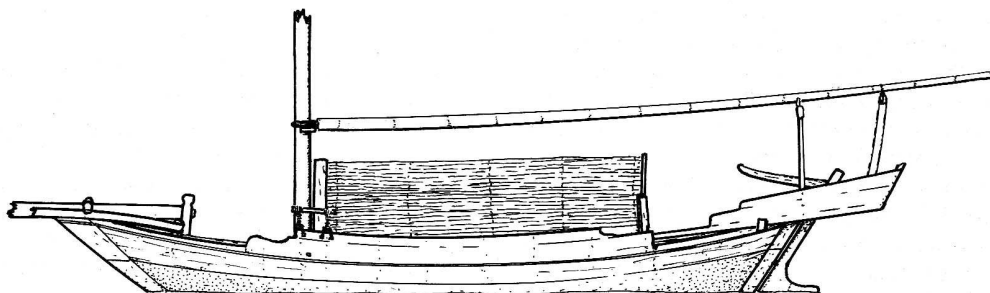


Fig. 26. A Kendari *lambo soppe*.

community on the island of Tomea is shown in Figure 24. She has a very marked break in the sheer forward and a close resemblance to the Sulu Bajau craft. Although she has a stem, the projecting top of the stem is built up with two timbers on the aft face to give the appearance of a stemless *soppe's* prow finial. Another Tomea built *soppe*, this one from a non-Bajo community, is shown in Figure 25. The lines are very much the typical lines of an eastern Indonesian Bajo *soppe*, but the styling has all been lost so that she is a plain double-ender. This *soppe* was originally rigged with the *lete* rig but later she was given a sloop rig which changed her from a *soppe* to a *lambo soppe*. For further details of this vessel, named *Sejarah Islam*, see Burningham (1989b).

Another sloop rigged *lambo soppe* is illustrated in Figure 26; this example is from a Bajo community on the mainland of Southeast Sulawesi near Kendari, an area of shallow water and winding tidal mangrove creeks. The Kendari *lambo soppe* has a much shallower hull form than the Tukang Besi Island version but has the same

stylistic elements in her design. The break in the sheer is very obvious and the topsides are very flared.

In the area of Kupang (southwestern Timor) and Rote, the *soppe* has almost ceased to exist. There remain a few *soppe* from Rote which have a stem, but the stem does not reach the keel. The lowest planks simply meet in the end just as the lowest planks do on the Ende *soppe* and the Mola *soppe*. These craft have rather crude heavy lines, but nevertheless, they exhibit the typical *soppe* midsection with very flared topsides. They are steered with quarter rudders which are otherwise uncommon in the area.

The island of Ndao, which lies off the southwest of Rote, has long had a part-Bajo population (Fox 1977:463). The *soppe* from Ndao tend to have better lines than those from the mainland of Rote, but in recent years, at least, they have been built with a full stem and stern post and they are steered with a large median rudder rather than quarter rudders. Similar *lete* rigged open boats, usually called *lete* or *ofa* (the Rotinese for boat), were until recently, owned and built at a number



Fig. 27. The rudder of a *lete* from Rote.

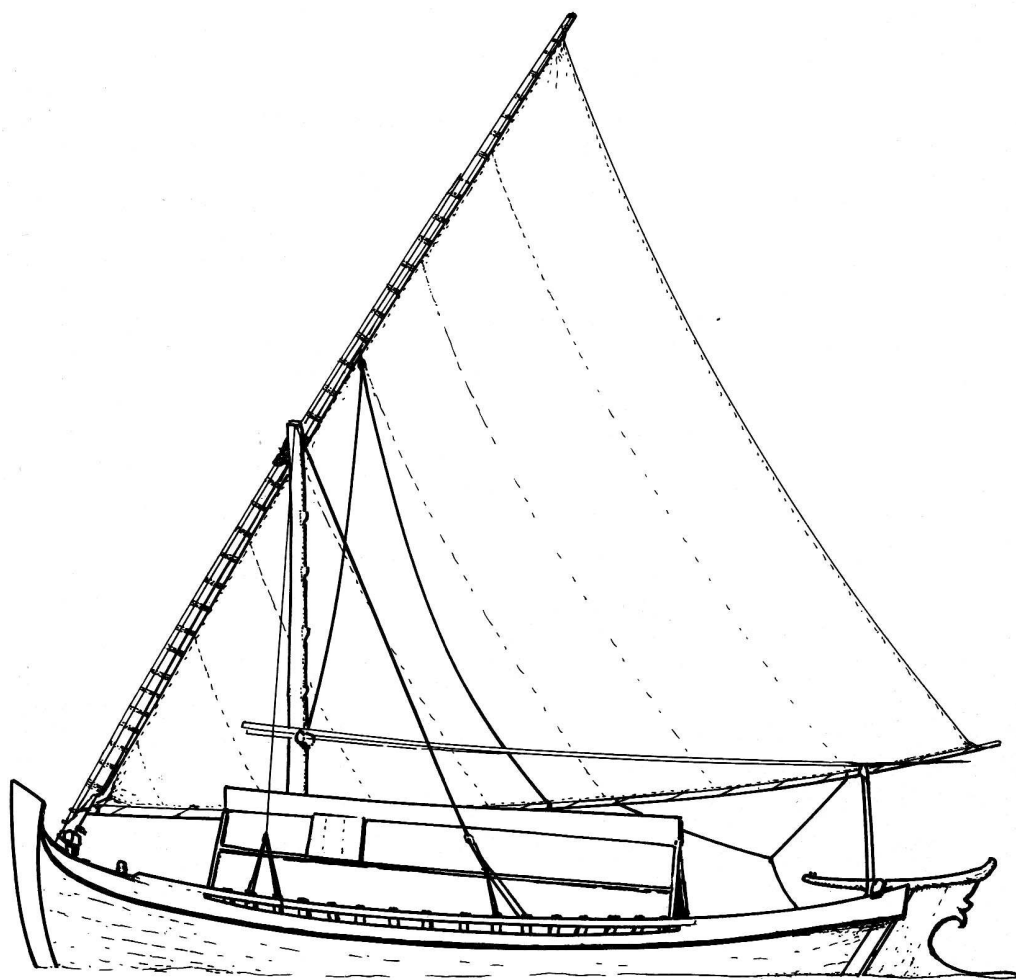


Fig. 28. A *bidoh* or *sekoci* from Kangean.

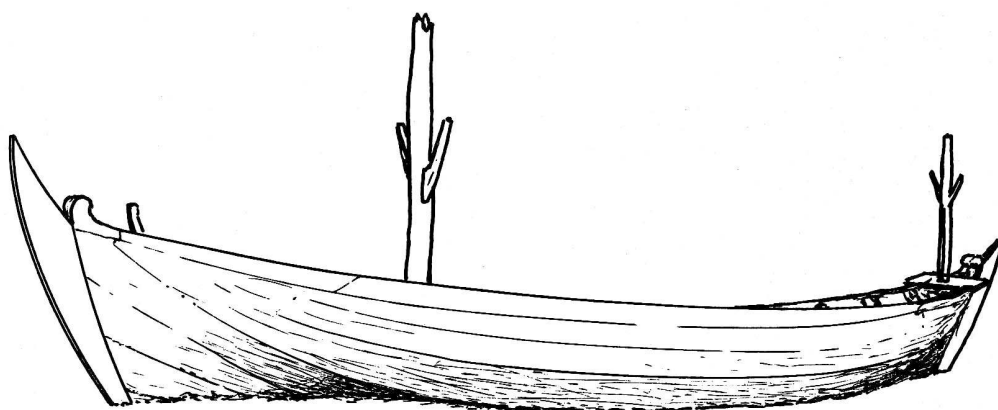


Fig. 29. Sketch of central Java *sopek* showing the plank pattern.

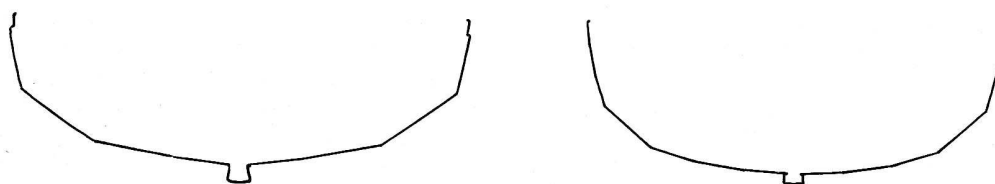


Fig. 30. *Mayang* and *sopek* mid-sections compared.

of villages on Rote and Semaui, the island to the west of Kupang. These vessels all had distinctive rudders: the top of the rudder blade and the rudder stock were decorated with carving like the rudders of Sulu *lipa-lipa* and *sapit* (Fig. 27). The only other examples of this type of rudder, to be found between Rote and Sulu, were carried on larger, fully enclosed, *lete* rigged vessels from Kangean that were called *sekoci* or *bidoh* - the Bajo word for boat (Fig. 28).

#### SOPE AND SEVEN-PART STRUCTURE IN JAVA

On the north coast of central Java the most common, locally built, planked boat is called the *sopek*. These vessels are discussed and illustrated in Burningham (1989). They are, in most respects, fairly typical Javanese vessels, sharing a number of design and construction features with the other vessels that can be broadly classified as *mayang*. Characteristically, *mayang* are constructed with broad flat planks producing distinct chines in the midsection. They have little or no deadrise, a long straight keel, and in most cases a large projecting stem and similar sternpost. None of these features is shared by the Bajo *sope* type vessel. However, the central Java *sopek* does have some features in common with the typical Bajo *sope*.

There is no break in the sheer of the Java *sopek* but the sheer strake is like that of the *sope* in that it does not run the full length of the hull. Instead of terminating with a break in the sheer, it tapers out in an unusual manner (Fig. 29). This may be the result of altering the sheer of a *sope* type design to conform to Javanese style without changing the plank pattern. The extra strake in the mid-body also gives a mid-section somewhat different from that of other *mayang*. The sections are compared in Figure 30. The *sopek* has a more rounded and less flat-bottomed section than other *mayang*.

The Java *sopek* has a fairly large projecting stem; it is certainly not a stemless, seven-part

construction. There is, however, the remnant of the seven-part bow immediately abaft the stem. This is a decorative piece with no real structural function but it is constructed of two conjoined pieces like the bow and stern pieces of a seven-part canoe.

Further west, in the Indramayu area of West Java, there are *mayang* type perahu, called *jegongan*, built entirely without stem or stern post. The modern examples of this type are fairly large vessels built from thin mill-sawn planks. In the bow and stern the planks simply meet as they do in the Sulamu *lepa*. There are no specially shaped bow and stern pieces like those found in vessels such as the Sabah *lipa-lipa* or the Ende *sope bajo* except small decorative prow finials rather like those on the central Java *sopek* (Fig. 31).

The large *jegongan* built of thin planks and with *mayang*-like lines seems to be a recent development. A survey of the Javanese sea fishing industry, published in the early part of this century (Van Kampen 1909), appears to be a comprehensive work. It records several large types of *mayang* that are virtually identical to those in use today, but nothing like the large modern *jegongan* appears to have existed at the time. Van Kampen (1909:33-34) illustrates a type of small fishing vessel from Indramayu, West Java, with similar style and profile to the modern *jegongan* and remarks that he had seen similar fishing vessels called *sope* at Makassar. The West Java vessels were known by a variety of names: at Indramayu they could be called *jukung*, or *juk jegong*, but further west along the coast towards Batavia they were called *jegong kapala jabing*, *jegong rancung* and *landrangan*. To the east on the Karimunjawa Islands, the same vessels, according to Van Kampen, with greater freeboard and beam, were called *sampan*, or *sope* in the case of the larger cargo carrying vessels. He noted that the Karimunjawa vessels were steered with two rudders - Javanese vessels are steered with single quarter rudders. It seems as if the Karimunjawa *sope* were typical Bajo *sope* while the Indramayu version represented the first step in merging with the *mayang* design to produce the modern Javanese *jegongan*.

#### OUTRIGGER CANOES WITH SEVEN-PART STRUCTURE

The vessels described above, with the exception of the *lepa kaloko*, all have a characteristic hull form with slack bilges and very flared topsides. They all have enough beam to be sailed without using outriggers to contribute to stability. There are other vessels in eastern Indonesia which have the seven-part canoe structure but do not have the *sope* type midsection. Most of these are outrigger canoes. Some are sailed by Bajo or by people living in places where Bajo descent is acknowledged. Others are sailed by Bugis and Makassar people.

***Jerangkat of South Sulawesi.*** There are numerous Bajo communities in the islands lying to the south of South Sulawesi. A few of the Bajo families still live aboard canoes for at least part of the year, collecting marine products such as trepang and clam meat among the extensive coral reefs and islets that make up the Tiger Islands. The canoes they use are outrigger canoes with deep narrow hulls more-or-less identical to

many of those used by other maritime South Sulawesi people. Such canoes are called *jerangkat* or *jerangka* by the Bajo and also by the Bugis of the Tiger Islands. However, some of the people of the Tiger Islands who say they are Bugis speak *Bahasa Sama* and, when questioned about this, say they are Bajo-Bugis.

There are no trees other than coconut palms on the sandy coral islets of the Tiger Islands, so the dugout bases for *jerangkat* are usually imported ready made from the Gulf of Bone to the north. The *jerangkat* are built up canoes with a seven-part structure but apart from this, their similarity to the Bajau *lipa-lipa* is purely stylistic. They have reverse rake to their bow and stern as do the *lipa-lipa* and they have a low version of the *lipa-lipa*'s prow finial. They also have a slight break in the sheer formed by the termination of the decorative wash-strake. The actual hull form is quite different from the *lipa-lipa* or any of the *sope* described above. The bottom of the dugout base turns up slightly at the ends but it has little or no rocker through the midbody. The beam is considerably less than the



Fig. 31. The bow of a Javanese *jegongan* showing the lack of a stem, the plank pattern and the prow finial.

depth of the hull and there is little flare to the topsides.

The rudder mountings are similar to those of the Ende *sopo* and the Kangean *sopet*.

Formerly, *jerangkat* carried tilted rectangular sails; these were replaced by *lete* sails. The *lete* rig is now often replaced by the *gantung* rig, which looks very similar but has its tack free and the halliard rove through the mast head with the fall coming down the forward side of the mast; it is handled as a type of standing lug sail and can be tacked through the wind. Tilted rectangular sails and *lete* sails which have the tack fixed and the halliard rove from the fore side of the mast down the aft side can only be tacked by turning away from the wind and inverting the sail in front of the mast like the lateen rig.

*Jerangkat* are also found at the Bajo communities of Wuring, near Maumere, Flores, and Labuan Bajo at the western end of Flores.

Very similar outrigger canoes are found in large numbers on the west coast of Lombok at certain villages. In other neighbouring villages, Balinese designs of outrigger canoe are used.

Some of the villagers who use the Balinese *jukung*-type outrigger canoes are Balinese speaking, others speak the Lombok language *Bahasa Sasak*. The fishermen who use the South Sulawesi *jerangkat*-type canoes are also *Sasak* speakers but they say that some of their forebears came from South Sulawesi or from "Bugis". There are no Bajo communities on the west coast of Lombok, as far as I can discover, but again there is reason to conjecture that some of the coastal villages might have some Bajo origins. Salt dried fish from these villages, which is sold in markets all over West Lombok, is commonly referred to as *Ikan Bajo* - Bajo fish.

Outrigger canoes, on the beach south of Ampenan, Lombok, are shown in Figure 32. The style of the bows is very similar to that of the Kangean *sopet*. These canoes are called *blandong* if they are used to carry cargo or passengers and simply called *sampan* or sometimes *jukung* (the Balinese name) if they are used for fishing.

Although the canoes in Figure 32 have a Balinese type of outrigger boom and connective, the majority of the outrigger canoes described

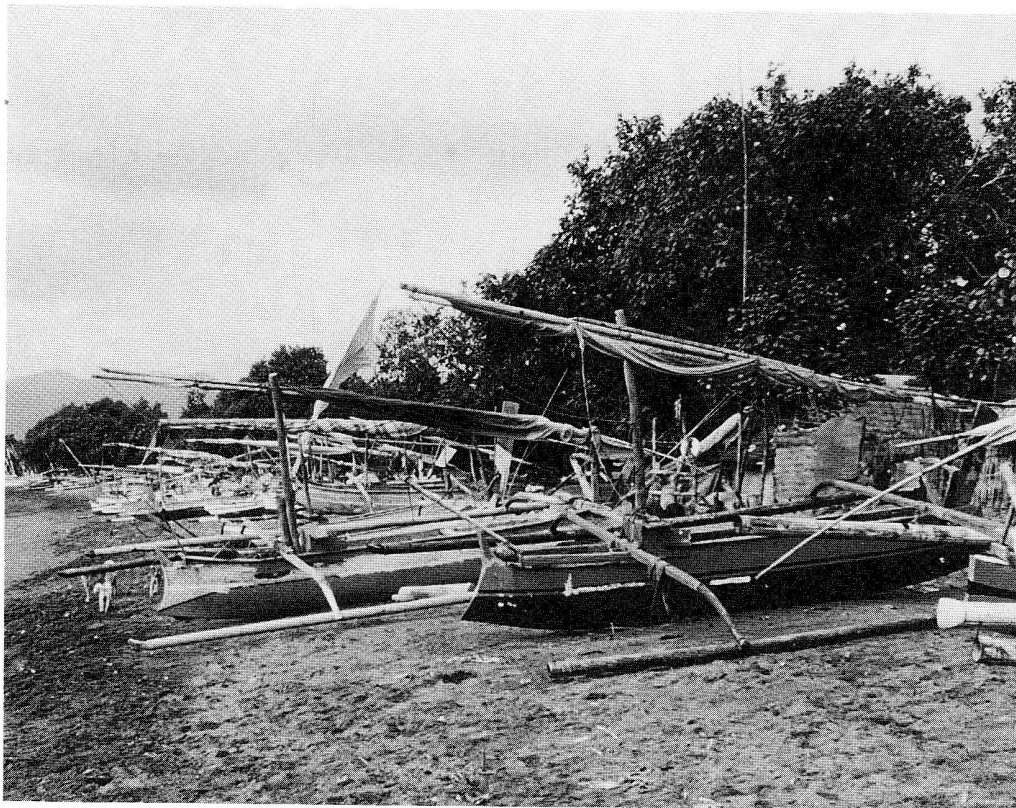


Fig. 32. Outrigger canoes on the beach near Ampenan, Lombok.

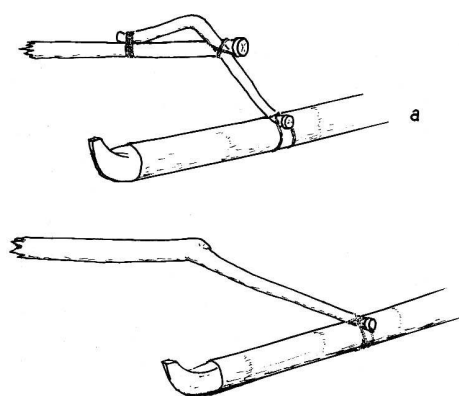


Fig. 33. Outrigger connectives: a, *tengko* type, b, sub-direct type.

above have the type of outrigger boom and connective shown in Figure 33a, and locally known as *tengko*. Indeed, the *tengko* type is common on the west coast of Lombok, even on Balinese *jukung*-type canoes. This distinctive type of connective is widely distributed throughout eastern Indonesia and Sulu; Hornell (1920) used the broad classification "East Indonesian type" for the various examples of this type. It is found in South Sulawesi and appears, now, to be the standard type there. Horridge (1981:Fig. 5) illustrates a model of a Makassarese canoe made in about 1900. This model has a similar but different type of outrigger connective; a type which Hornell (1920: Fig. 49) associated with Buton.

But if this type of double outrigger is standard in South Sulawesi, there are, or were in the past, significant exceptions. Hornell (1920:89) noted that amongst the smaller vessels - up to 20ft (6m) in length - "nearly all are single outriggers, a most exceptional design in Indonesia. The form of the attachment is also one not seen anywhere else in the archipelago". The attachment referred to was the type later classified as sub-direct (Fig. 33b) which is made from a selected grown timber and lacks any connective piece.

This sub-direct design, used with a single outrigger, is still common in some parts of South Sulawesi and is also found in certain off-lying islands. At Bonerate (the most notorious haven of the Sulu pirates in the 19th century) it is the standard design. In the Buton region, this type of single outrigger is found on canoes very similar to the Bonerate canoes. These vessels, called *jejolor*, originate from the five Bajo communi-

ties on small islands off the coast of Kabaena: Pulau Kokoi, Pulau Sekeli, Pulau Balo, Pulau Telaga and Pulau Segori. This single outrigger design is also increasingly popular at Pulau Bungin where it is replacing the outriggerless *lelepa*, and also at the Bajo community of Wuring where it is replacing the double outriggered *jerangkat*.

Neither the seven-part outrigger canoe with the *tengko* type double outriggers, nor that with the sub-direct single outrigger is anything like exclusive to Bajo communities although some of the finest of both types are built and owned by Bajos.

## DISCUSSION

The vessels described above, both with and without outriggers, exhibit various common features in their form and construction, and as stylistic elements of their design. The five basic design features listed earlier provide a key to identifying vessels belonging to a Southeast Asian boat building tradition here classified as the seven-part structure. It is suggested that these features have their origin in a development of the opened out dugout canoe and features of particular boat types that support this interpretation have been presented in the text. It is also suggested that the distribution of these vessels is connected with the spread of the *Sama* speaking Bajau into eastern Indonesia. There are, however, certain facts that point to a counter argument.

Most of the examples have the typical mid-section form of an opened out canoe, but they are not actually opened out canoes and they are built by people who do not use the technology of heating and bending timber which is required to open out a canoe. Furthermore, there are outrigger canoes with seven-part structure which do not have even the midsection form of an opened out dugout - they are typical unopened canoes in their hull form - yet they share the basic seven-part structure and the very distinctive style of longitudinal profile with the Sulu *lipa-lipa* and the *sope*. They also share the forked rudder mounting that is a feature of most *sope* and *lepa* from the Bajo tradition. It must, therefore, be acknowledged that the seven-part structure and the distinctive *sope* profile might actually have their origins in these unopened (outrigger) dug-out canoes of South Sulawesi. It is unlikely that either argument can ever be proved conclusively.

Against the priority of the non-opened out South Sulawesi canoe as the original seven-part canoe, it can be argued that the South Sulawesi *sope*-styled outrigger canoes are anomalous in certain respects, including their seven-part construction, when compared with other outrigger canoes of the region. It can also be argued that opened out canoes such as the Pulau Bungin *lelepa sope* and the Bajau *lipa-lipa* have a precise and particular structure with the strakes ending on a series of steps cut into the bow and stern pieces, while the Sulawesi outriggers have a relatively undistinguished version of the structure with the strakes simply butting on to the bow and stern pieces.

The seven-part structure outrigger canoes of South Sulawesi are anomalous in that they are effectively surrounded by five-part structure outrigger canoes. While the Bugis and the Makassar build seven-part outrigger canoes, the Mandar, who are the third most important maritime people of South Sulawesi, build very fine five-part canoes (Horridge 1981:Plates 7-9, Fig. 25c). The Mandar outrigger *sande* and *pangkur* have curved bows with cutaway forefoot: in this respect, and in their basic structure, they are similar to the highly developed outrigger canoes of the Madurese and the Balinese as well as the more primitive built up dugout canoes found further east in Indonesia. It is possible that the Bugis and Makassar formerly built outrigger canoes with a similar style of bow rather than the *sope*-style that they now favour. Certainly, their traditional planked boats and larger craft have curved and cutaway stems and sternposts rather than the angular style of the *sope*.

There is a little evidence to support this idea, and I have found no early illustrations of South Sulawesi canoes with the *sope* style of bow that would counter the argument. Thomas Baines, who was an excellent illustrator of 19th century sailing vessels, both European and eastern, unfortunately never visited South Sulawesi. However, he was twice in Kupang, Timor, which had a Makassar community, in 1856 and 1857. He painted the portrait of a native of Macassar (reproduced in Braddon 1986:140) leaning against a large dugout canoe on the beach. The canoe is clearly a five-part canoe with a curved forefoot, but one cannot be certain that the canoe had any connection with Macassar. Another drawing by Baines (reproduced in Braddon 1986:93) of the anchorage at Kupang, shows a small outrigger canoe with curved ends and the

*tengko* type of outrigger connectives found on the majority of South Sulawesi outrigger canoes.

Three 19th century illustrations of Macassan tripangers on the north coast of Australia, reproduced in Macknight (1976:Plates 9-11), show canoes or small boats drawn up on the beach and these all have rounded cutaway ends rather than the angular, reversed rake profile of the *sope*-style.

Aboriginal rock art on Groote Eylandt in the Gulf of Carpentaria includes several drawings of Macassan *perahu* which show an expert technical knowledge of the vessels on the part of the artist or artists (reproduced in Chaloupka, unpublished). In the same area there are numerous representations of canoes. There appear to be three distinct styles of canoe (Fig. 34a-c). The first, and most frequently depicted, has a very high prow. Some of this type were obviously very large; one is shown with thirty-five people on board. The only type of Indonesian vessel that now has such a prow is the East Javanese *pencoan* (Burningham 1989: Fig. 22) but the implications of that will not be pursued here. The second type has a *sope*-style profile. The third type has a rounded profile in the ends. This type is the only one shown with a sail, and some examples appear to be large.

The style of dugout canoe that was finally adopted by the Aborigines of North Australia, when they could no longer obtain canoes from the Macassans, has a straight bow profile and prow like that of the Sulamu *lepa* or the standard dugout of the Buton region.

Matthes (1859:Plates 16-17) illustrates models of a number of South Sulawesi canoes both with and without outriggers, which were collected in the period 1848-1858. The two outrigger canoes, called *bilolang* and *birowang*, are rather prosaic looking craft with plain, straight bows and stern. The *birowang* is constructed with a stem and sternpost. Neither looks anything like the traditional outrigger canoes that are now found in South Sulawesi. Two of the outriggerless canoes also have plain straight profiles to their ends while the other two have very rounded ends with large upswept finials, particularly at (what appear to be) the sterns.



Fig. 34. Three styles of canoe represented in aboriginal rock art from Groote Eylandt which show Macassan *perahu*.

They are more distinctive looking craft but again they look nothing like the characteristic South Sulawesi canoes of this century.

It seems quite possible that the *sope* styled canoes and outrigger canoes of South Sulawesi are a relatively recently developed style, and that they represent the seven-part *sope* style and structure imposed on canoes of a different tradition.

The forked rudder mounting carried by *sope* with quarter rudders and by many South Sulawesi outrigger canoes, which has been identified as South Sulawesi in origin (Horridge 1981:Fig. 6b, 1985:61), is actually much more widely distributed. For instance, traditional Thai sailing craft such as the *rua chalom* carried very similar quarter rudder mountings (Gibson-Hill 1952:120) and the majority of the rice barges serving Bangkok today still have the same type of quarter rudder mounting (pers. comm. Jeremy Green 1991). The variant type of rudder mounting with two separate arms is also widely distributed and, in a slightly different form, is found on relatively primitive craft such as the outrigger canoes of Timor and Wetar, further east.

Many South Sulawesi craft, including some outrigger canoes, carry their quarter rudders mounted on a different type of mounting with two parallel horizontal beams. This type of rudder mounting is peculiar to South Sulawesi but there is certainly not enough evidence to say that the forked rudder mounting has been introduced to South Sulawesi, replacing the original parallel rudder mountings. The only point that can be made is that the forked rudder mounting is found on nearly all seven-part structure vessels that have quarter mounted rudders, whereas it is by no means universal on South Sulawesi craft.

The origins of the seven-part structure tradition of boatbuilding remain a matter for conjecture, but the role of the *Sama* speaking people in spreading the *sope* style of seven-part structure boat through a large area of Eastern Indonesia is clear. The presence of these fine sailing craft in several coastal communities is evidence of Bajo populations that have been integrated into the local societies. This process of integration has been significant in introducing relatively advanced maritime technology and also in bringing some previously isolated communities into the wider and more cosmopolitan maritime oriented culture of the region.

If the presence of *sope*-type vessels, or vessels with some of the features of *sopellepa*-type is taken as evidence of influence from *Sama* speaking people, then the *Sama* speakers have had a

profound influence over a wide area of Indonesia. The significance of similar boatbuilding technology and style in other parts of Southeast Asia might be worth investigating. For instance, *kabang*, the large seagoing canoes from Ranon on the west coast of Thailand and southern Burma show obvious stylistic similarity to the Bajau *lipa-lipa*. These canoes are also used by "Sea Nomads", the Mawken, but the Mawken are not *Sama* speakers.

Sopher (1965), in his study of the various nomadic, boat dwelling people of Southeast Asia, concluded that the various "Sea Nomad" peoples of Southeast Asia were originally from a single culture but association with strand dwelling people in different localities had brought about loss of their common language. Nevertheless, in surveying the watercraft of the various Sea Nomads, by reference to the available literature, he conceded that the types of boats they used were strongly differentiated rather than showing evidence of a common original Sea Nomad boat type. This negative conclusion, based on the scant and misleading literature, failed to recognise that the *sope* or *soppe* of Eastern Indonesia and the Sulu *sapit* are the same type of vessel and, more importantly, that they are not simply planked boats but sophisticated built up dugouts of a very particular construction and style. As such they do form part of a homogeneous group with vessels such as the *lipa-lipa* and even the *kabang*.

#### ACKNOWLEDGEMENTS

I thank Kurt Stenross who provided information about Bajo vessels from the Kangean Islands and from Wangi Wangi, and also provided excellent photographs of these vessels; Philippe Petinaud who first pointed out to me the singular and significant nature of Bajo boat building and maritime activities in eastern Indonesia; Professor Adrian Horridge, whose valuable comments on a previous paper prompted the research on the seven-part canoe structure that is the subject of this paper, and Dr Campbell Macknight for generous and constructive referee comments. And thanks to the many Indonesian sailors and boatbuilders, with whom I have discussed boats, for their hospitality and politeness, for their helpful and interested attitude to my enquiries, and for the beautiful and functional traditional watercraft which they build and sail with pride and skill.

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Accepted 4 November 1991