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Electronic version

URL: <https://journals.openedition.org/tc/280>

DOI: 10.4000/tc.280

ISSN: 1952-420X

Publisher

Éditions de l'EHESS

Printed version

Date of publication: 1 January 2001

Number of pages: 85-120

ISSN: 0248-6016

Electronic reference

Hans Kumar and Lotika Varadarajan, "Ap, The Canoe of Chowra Island", *Techniques & Culture* [Online], 35-36 | 2001, Online since 07 September 2012, connection on 29 September 2022. URL: <http://journals.openedition.org/tc/280> ; DOI: <https://doi.org/10.4000/tc.280>

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Hans Kumar and Lotika Varadarajan

- 1 The Andaman and Nicobar group of islands collectively comprise 300 named and unnamed islands and over 260 named and unnamed rocks³. The coastline stretches over an extent of about 1962 kms. The Nicobar group contains 23 islands, extending over 1841 sq. kms. Twelve of these are inhabited (Sankaran 1995 : 7-8). The islands are divided into three groups : Car Nicobar to the north, Central Nicobar in the mid-section, with Little Nicobar, Pilo Milo Kondul and Great Nicobar constituting the southern unit. Chowra island is a part of the Central Nicobar group and is located 60 kms. south of Car Nicobar (fig. 1). This paper deals with *ap*, the canoe of Chowra island (photo 1).
- 2 The natural resources of Chowra are restricted and the islanders had necessarily to sail to the other islands to garner the required resources for survival. Perhaps, in an effort to conserve the limited forest resources of the island, a taboo developed on the felling of trees in Chowra. On the other islands, however the rich tropical rain forest engendered the growth of trees with a singularly long, branch-free trunk, the canopy of which developed only at the higher reaches where direct sunlight could be accessed (Sarkar 1990 : 3). Such trees were nature's own gift to the canoe makers of the islands. The carpenters of Chowra earned renown not only for their skill in making canoes, but also in that of constructing the typical Nicobari hut. The distribution of resources between the different islands of the Nicobar group also encouraged inter-island traffic⁴.
- 3 From Great Nicobar came the best cane, *Calamus andamanicus*, Kurz, which was not only a superior binding and tying material in canoe construction but which also served as a coconut grater. The mastication of betel nut and betel leaf was widespread. Lime, which was an essential ingredient, could, however best be procured from the Nancowry group of islands. The source was two kinds of bi-valves, the smaller, *Anadara antiquate*, Linn., and the larger, *Polymesoda (Geloina) errosa*, (Solander).

- 4 All items were bartered against a complex system of kinship ties and those based on amity. This greatly facilitated mutual exchange of commodities in a non-monetised economy, best articulated in Chowra and Car Nicobar.

FIGURE 1. MAP (NOT TO SCALE) OF CENTRAL NICOBAR WITH INSET CHOWRA ISLAND

Photo 1. Ap. Elevation. Port

- 5 The inhabitants of Chowra were distributed among the five villages of Raihiun, Kihtasuk, Alhait, Chonckamong and Tahaila (fig. 1)⁵. Property was divided among extended families called *chanong uver*. Each *chanong uver* was headed by the *köviö chanong uver*⁶. The *chanong uver* could be further connected through a common ancestor

leading to further inter-relationships in joint property holdings. The head of these larger units was called *köviö hakngôk*. The term *löh* or *kuniyo* was used to designate a kinship relationship existing in the past cutting through the barriers of contemporary disparities in *chanong uver*. Marriage was prohibited among members of the same *chanong uver* and *kuniyo*. The term *hulông* was used to denote families of other villages or islands such as Car Nicobar with whom there were customary bonds of friendship hospitality, presentation and barter. Marriages were permitted with *hulông* (informants : Micha, Chonckamong village, Edmond, Tahaila village, Chowra⁷). While there were social inter-relations governing economic exchange between Car Nicobar and the Central Nicobars, the products of the southern group were brought by the southern Nicobarese to the Nancowry group for further redistribution. There were no marriage ties with the southern group and the Chowra *ap* did not sail south of Kamorta and Nancowry.

Calendrical System

- 6 These seafaring activities, given the unpredictable meteorology of the Bay of Bengal (Tikedar et al 1986 : 8,13-17, 20-21), had necessarily to be based upon a deep knowledge of seasonal and quotidian variations in meteorological conditions. This information is found enshrined in the lunar calendrical system of Chowra. The corpus was implicit rather than explicit. Indeed, in traditional knowledge systems, based as they are on a continuous mode of implicit cross-referencing, codification can be self-defeating. Experts in weather conditions and seasonal change were called *tamol sahiöh*. This functionary set the date for all seasonal festivals and his advice was taken for all important seagoing activities.

Phases of the moon, tidal movements and related activities

- 7 The day before, *iliuö si*, moonless night, (Hindu *amavasya*), was called *engngö hing*. On this day a small moon was visible in the east. The first sickle moon in its waxing phase after *iliuö si*, visible about 3' above the water in the west, was called *kanat*. The water would be still for two days and this was a good period for fishing. Counting started from day 4, *hiong*, after *iliuö si*. Between day 2 and day 6 the current would increase. The next unit, from day 1 to day 6, was called *samioplo saneuiyö öngliöng*.
- 8 Days 7, 8, 9 were collectively called *manuchö öngliöng*. The sea would now be calm and there would be no current. It was a favorable period for fishing but not for sailing. Day 8 was called *ranön*. Day 9, the first day of the full moon, was called *raneh han sohö*. Day 10, the second day of the full moon was called *annöyö hansohö*. Days 10 and 11, when the moon entered its waning phase, were called *hanniöng si ken* and *anne si kën* respectively, while days 13 and 14 were known as *hanniöng si hanyal* and *senanne si hangal*. Between days 10 to 14, the current would increase the unit being called *saneuiyö öngliöng àlhinöt allimot*. However, on day 14 the current would begin to decrease in strength. On days 15 and 16 there would be no current. This was associated with the half moon called *alhinot*. Days 16 and 17 were called *manuchö öngliöng*, day 17 being marked by the beginnings of a resurgent current. After day 18, the current would progressively strengthen as was noticeable in the earlier cycle from *iliuö si* to day 6 in the period of the waxing moon.

- 9 The term *panlechö*, covered a period of high tide with the current flowing east to west. This easterly current was called *lon panlechö*. *Kantuko* denoted a period when there was a strong current flowing west to east. This westerly current was called *lon kantuko*. A current of lesser intensity flowing in the same direction was named *lon chöch* (informants : Father Sylvanus Wilfred, Hillary, Leslie, Chowra). The directional terms were *kapea*, north, *lohngo*, south, *ful*, east and *sumhav*, west. It was dangerous to sail when *lon panlechö* coincided with high tide and *lon kantuko* with low tide. Sailings would be attempted only in the presence of a favourable wind when the intensity of these currents had declined. It is to be noted that while some winds indicated direction, others were named after the relevant seasonal festival. Seasonal activities as defined by the calendrical system are summarized as follows :

Winds	Activities
<i>Kukapea</i> , East Wind	January to April: routine activities
<i>Sumhav</i> , West Wind	May to August: gardening planting. May to July was the season of rough seas when putting out to sea would be avoided. Canoes were repaired in August.
<i>Ól iluoi</i> , East Wind	September to mid-November. The festival of <i>Ól iluoi</i> is held and <i>ki-chut</i> , inter-island sailing take place. Whereas during the season of <i>sumhav</i> only two sails would be put up, after the festival of <i>ól iluoi</i> , canoes would sail under three sails.
<i>Offul</i> , Strong East Wind	Mid-November to December. Named after the pig festival, <i>offul</i> or <i>panu hanot</i> , which occurs during these months. The strong wind which blows during the month of November made it difficult to go to sea.

- 10 Sailing practices were based on stellar reckoning. Night sailings were preferred as the heat of the day could be avoided. Three stars, positioned in a segment, 25° to 30° above the horizon, were associated with the location of Chowra. These stars were called *kui raihiun* (after the village of this name). *Kui raihiun* remained stationary between 7 pm and 4 am. The Southern Cross was named *kalitpicho*. Another group of eight stars, *tha ok euh*, Coconut Tree, was associated with the direction of Chowra. Moving east to west, it was clearly visible at 3 am. The star indicator for Car Nicobar was a bright star to the northeast, called *kui tha rulu*. In sailing from Chowra to Car Nicobar, between 2 am and 3 am, the course would be set following the lower straight line of the Great Bear, *ngeung nga*, keeping the morning star to the rear (informant : Raphael Job, Chukchucha village, Car Nicobar). When approaching Chowra, the morning star would be to the left of the canoe (informants : Frederick, Chowra ; John Smith, Kimus village, Car Nicobar). An additional guide was the location of the island of Bathi Maly, mid-way between Car Nicobar and Chowra, from where both islands could be glimpsed.

Rituals and beliefs

- 11 Although other islands also developed their own calendrical systems based on the rhythm of the seasons, Chowraites were renowned for their accuracy in weather forecasting. At the same time the *kamasuön*, shaman of Chowra, was attributed with awe-inspiring powers. There was a belief that if canoes from other islands were brought to Chowra, specific taboos determining the fate of the watercraft could be

negated exclusively by the Chowra *kamasuön* through the performance of the necessary ritual (Dagar 1986 : 174).

- 12 The *ap* has always been central to the activities of the Chowraites. It is considered a living force and canoe burial has been practiced within living memory. Canoe races have ritual underpinnings which may be disguised under the prevailing Christian culture (photo 2). A canoe race takes place after the festival of *Tanolo/Tanol Sahiöh*, meaning time of seasonal change. This festival is celebrated during the *sumhav* season (May to August). A pig is cut and offered to each canoe at this time. Prior to proceeding to the sea, betel leaf, betel nut, a small green coconut and a cheroot are offered to the *ap* (photo 3). Canoe races are also held during the festival of *Ól iluoi* between September and October. The next major racing event takes place after the pig festival, *panu hanot*, between mid November to December. In pre-Christian times this heralded the ossuary feast when the bones of the dead were ritually brought together and cleansed. Pigs' blood would be smeared on the *ap* and songs would also be sung to the canoe.
- 13 Apart from internal demand there was also an external one as the superiority of the Chowra built canoe was widely acknowledged. There were ingenious ways of securing the wood necessary for canoe manufacture. The Chowra canoe builder would go to the other timber rich islands such as Teressa, Katchal and Nancowry. The preferred trees in canoe construction were *kanya* (*Amoora wallichii*), King, or *pamiyôm*. He would offer his services to build dwelling places, tend to coconut trees and other edible plants in return for permission to cut a tree of his choice for canoe construction. The services of a *kamasuön* from Chowra would be required at the important stages of construction when rituals had to be performed. An illustrative example is the occasion when the canoe was to be shifted from the jungle to the shore. Two green coconuts, *kammeó*, would be scooped out. Grated coconut mixed with chicken blood would be placed inside each green coconut, which would be further embellished with the stem and green leaves of the banana tree. One of these would be placed on the stump the tree, which had been cut. The second would be placed inside the canoe. The powerful negative spirit, *iviöi*, would be diverted by the offering at the tree and would not notice that the canoe was being carried away. The second coconut would be placed inside the canoe and was also accorded protective powers.

Photo 2. Canoe race at Car Nicobar. The Chowra team is to the left. One paddler is balanced between the boom and the hull

PHOTO 3. OFFERING OF BETEL NUT IN RACING CANOE

Building technology

- ¹⁴ The Chowra *ap* even in its present form, exemplifies a great tradition in terms of woodwork and application of the principles of naval architecture to the construction of

watercraft. *Ap*, extending in length from 2 ms. to between 20 ms. and 25 ms. can still be found. The basic canoe building technology remains unchanged irrespective of size but variations may be introduced because of the exigencies of available resources and the intended end use. The unit of measurement used in canoe construction is the *pam*, equal to the distance, middle finger tip to middle finger tip, between two out stretched arms, a little less than 2 ms. The *ap* can be divided into following categories based on length.

- 15 *Inter-island transport craft with sails.* These wide-bodied and strongly built canoes can attain a length of between 15 ms. to 20 ms. They carry a crew of between 3 to 5 persons and possess a load bearing capacity of between 100 kgs. to 200 kgs. With a favourable wind these can attain a speed of 4-5 knots.
- 16 *Fishing craft.* These are used in calm coastal waters. A one-man craft is used for shallow shoreline fishing while a larger one carrying between two to four persons can be used further out at sea.
- 17 *The racing canoe (mahsol ap).* These are long, sleek outriggers, richly decorated with customary ornamentation (photo 4). They have a higher length to breadth and smaller breadth to depth ratio. The medium size ones at present extend between 10 ms. to 15 ms. while the large one range between 15 ms. to 25 ms.
- 18 *The general purpose canoe.* The size of the canoe varies according to its intended use. These cater to ship-to-shore traffic as also that of transport of passengers and cargo from one part of the island to another (photo 5).

Photo 4. *Mahsol ap*, the racing canoe

Photo 5. *Ap*, ship to shore. The central spar arrangement is tied by the *hinuötcha* to the *sinkiva* and *tanleal* at the *kuilo* to keep it in place

Materials and Tools

- 19 The traditional materials have comprised cane and wood. The size, density grain and texture of the wood have determined its placement in the outrigger. Cane is used for tying different elements together. Saps and tars derived from local trees are used as fillers, joiners and as waterproofing material. The canoes are painted in vegetable colour and decorated with floral and leaf elements as well as with textiles. However, resulting from the constant interaction with mainland-India in recent times, non-organic materials such as iron nails, polymer ropes, plastic sheets, synthetic colours and adhesives have also secured a niche. Newer tools like steel knives, axes, saws, chisels, planes, hammers and hand drilling machines are also a part of the repertoire. The local canoe builders have accepted these because their own traditional tools and materials have proved far more labour intensive. However, the introduction of new materials and tools has necessarily led to some departures from traditional norms in work practice.

Procedures

- 20 Canoe construction is bound by seasonal constraints and is closely interwoven with ritual. The method and sequence followed as also the requirements in terms of time are determined by these considerations as also those pertaining to the availability of raw material and manpower, both skilled and unskilled. At times the operations can spread over several months or a few years while at others it can be completed without interruption within a single season. A racing canoe, which requires meticulous work procedure, may take a several years while a small fishing canoe may be completed within one season. Another important feature of Chowra canoe construction is the

distribution of activities between the site where the tree is felled and the final finishing of the craft at the dwelling of the owner. After search the tree is usually identified on some other island within the Nicobars. In present times the search is extended to the tropical rain forest area in Hut Bay, Little Andamans. Canoe construction can, in essence, be divided into three stages. In the first stage it is crudely completed at the jungle site. At stage two, the canoe is carried to a second and more accessible site where it is brought to a level at which it can undertake the voyage to the owner in Chowra. The final touches are imparted during stage three at Chowra.

- 21 With the introduction of mechanised crafts and inter-island shipping schedules in recent years, the activity of canoe construction has declined drastically. The details of construction being provided below relate to a three masted canoe, about 18 ms. in length, with a maximum hull width of about 1 m. and a maximum depth of about 0.9 m. The description is essentially based on oral information provided by the expert canoe maker, Vice-Captain Gabriel of Alhait village, Chowra.

Stage one

The team

- 22 A team comprises both skilled as well as unskilled men headed by the *yiö chak*, the master canoe builder. The master carpenter is also the chief planner of the canoe. Skilled manpower is required for felling the tree, shaping the hull, burning for shaping and expanding the capacity of the hull, and for the transfer of the tree trunk. Unskilled persons can clean the workspace and perform other menial jobs. A typical team may comprise about 5 or 6 skilled men and 3 or 4 unskilled ones at any given time. For a large canoe as many as 20-25 men may be required to carry the unfinished canoe out of the forest in slings.

Selection of tree

- 23 The master carpenter journeys to the islands where the search is to be made for the tree. Once the choice is made, the terms and conditions under which the owner will allow the tree to be felled have to be determined. The trunk selected has to be free of branches along the required length, while it has to be sufficiently wide in girth to provide for the desired width. A 60 to 80 year old tree with a straight trunk or one having a slight incline to one side is preferred. Considerations to be taken into account include determinants such as that the length of the finished canoe has to be 12 times that of its width while the length of the undressed tree trunk has to be 15 times this width. These would involve a search for a tree the height of which would be about 20 to 30 times the basic width desired.

Felling of the tree

- 24 Once the tree is selected preparations are made for felling the tree. An area around the tree is cleared keeping in mind the direction of its intended fall. Two to three persons cut the tree by axe. Incisions are made from three sides so that it falls freely in the pre-determined direction without the help of ropes or any other ancillaries. This operation takes about 1 or 2 days. Once the tree has fallen, the branches are cleared. The big, straight branches are kept aside while the smaller ones are stacked for miscellaneous

uses during the first phase of the construction when the team is working in the jungle. A rope is used to mark the length of the hull on the tree. A margin of 1 to 1,5 *pams* is left at either end. The remaining parts of the tree are cleared from the work site. This operation takes another day.

Dressing of the log

- 25 The tree trunk is now turned so that the concave length rests on the ground. It is supported and kept in position by logs and stones. The lower section of the tree is selected for the aft end as it is of wider girth than the forward area. Markings are now made with the help of a rope and *dav* (curved metal blade) leaving a margin of 0,5 *pam* for the fore end and 0,75 *pam* for the aft end. The intervening area is levelled off by axe and *dav* to a width of about 1/3 the diameter of the log. This will equal about half the width of the finished canoe. Two men work simultaneously from either end, advancing towards mid-point. The fore and aft ends are left untouched. A centre line is now marked on the flattened portion with the use of rope and charcoal. An edge of between 9 to 10 cms. is also defined.
- 26 Three to four persons now cut out the central area thus defined by axe to a depth equal to about half that of the diameter of the tree. The cutting is done from the points of termination towards the centre, working inwards from the outer peripheries. The scooping continues until a hull thickness of about 10 cms. is achieved. The bark from the outside of the log is next chipped away by axe or *dav* to about the same depth as the inner scooping. The surface is planed (photo 6).

PHOTO 6. SCOOPING. AFT SEGMENT

Shaping of the *kanliul ap* and scooping operations

- 27 The log is now overturned and placed 10 cms. to 15 cms. above the ground on a support base constituted by 5 to 6 equally spaced transversally positioned wooden logs. The remaining bark is removed. Keeping the centring of the scooped section in mind, a corresponding centre line is carefully marked on the outer surface of the log. The entire surface of the log is planed. The centre line is redrawn. The planing is now undertaken by highly skilled workers in such a manner that a recognizable centre line, the *kanliul ap*, is brought into being, running continuously from fore to aft end. The hull circumference is now shaped into the form of an inverted slightly flattened V shape. Towards the fore end, shaping is done in such a manner that the keel line slopes downwards at an angle of about 50° to 60°. The thickness of extreme fore end is about 10 cms. at this stage. All the extra wood is removed and planed. The only exception is the extreme fore end which will be worked upon at the second stage.
- 28 The aft is also shaped in a similar manner the curve here being gentler, the angle varying between 30° to 40°. A solid block of wood, extending 1 m. beyond the hollowed out area, is left at the aft end. This is about 10 cms. thick at the hull end while at the other, it is about 20 cms. This will be prepared later to receive the aft end fittings. The log is now reversed for the second time. The support logs, 3 to 4 in number, are now of lesser girth. Four to five skilled persons, working with utmost care, continue the scooping operations by axe and *kanlue*, adze. The work proceeds until the thickness of the shell is between 10 cms. to 12 cms., about twice that of the final thickness. The bottom portion is thicker, being 15 cms. to 20 cms. All measurements are taken by simple means such as the hand span, rope or slivers of wood. The scooping is planned in a manner such that the slope towards the aft end is a little gentler than that at the fore quarter. As the scooping progresses, small logs are lightly hammered into position, crisscrossing their way along the length of the hull. These help to maintain the shape of the hollowed out section. During the time taken to perform these operations the wood has a chance to dry out thus reducing the weight of the hull. It is at this point that preparations are made to shift to the second site. The date and time of the shift are determined by the *kamasuön*. On the set day, slings are placed at either end of the hull (photo 7), which is then carefully carried out of the forest by 25 to 30 men.

Stage two

- 29 The final shift to the new site is accomplished over the next few days. The hull is now placed upright on two logs about 30 cms. in diameter. Side supports are also provided. The main focus of attention at this stage is towards perfecting the hull prior to the placement of ancillary parts. If additional wood is required this is again secured from the forest.

Defining the thickness of the hull

- 30 An extremely ingenious method is used to ensure uniformity in wall thickness without damaging the hull. This is achieved by the use of a stick gauge, the *kauleuh*. The end portion of the *kauleuh*, which is stepped, has a diameter of about 5 mms. to 6 mms. The length is equal to that of the desired thickness of the unfinished hull of the canoe, which is 2mms. to 3 mms. more than that of the finished hull. Using thin fibre marking

ropes, the carved-out length is divided and marked into 10 to 12 sections defined along the circumference. These divisions are then lightly etched into the surface of the main body of the hull (photo 8). These lines are further demarcated along each segment of the circumference by three points. There are now four constituent parts upwards from the *kanliul ap*. However, towards the upward sloping stem and stern ends two points are demarcated. Small holes having a diameter of about 6 mms. are hand-drilled into each point from the outer skin inwards. The depths of the holes are designed to provide for a thicker wall along the *kanliul ap* as also the uppermost segment of the hull which constitutes the junction line between the hull and the *sinkiva*. The *kauleuh* is inserted.

- 31 The scooping process continues until the hull thickness, as guided by the *kauleuh*, has been achieved. At the forward end the thickness is less by about 1mm. to 2 mms. The internal surfaces are now smooth and symmetrically streamlined at both ends. The fore end rises sharply and is narrower than the aft end. The upper free end section of the hull faces inboard. During the scooping operations, two factors ensure that there is a widening in the hull cavity. The first is the scooping process itself while the second is that the initial wall thickness of 9 cms.-10 cms. has now been reduced to 4 cms.-5 cms. At this stage the hollow space is about 25 cms.-30 cms. wide at midship. Special care is taken during the scooping of the free ends of this space as these will be used for securing the hull fittings along the upper plane.

PHOTO 7. ATTACHMENT OF SLING AROUND HULL PRIOR TO LIFTING

Photo 8. Markings on the vertical axis of the hull for insertion of *kauleuh*. The etching on the horizontal axis is stated to be inscribed to break the shock of wave impact running along the grain

Fashioning of fore end

- 32 Because of the nature of the wood here the carpentry has to be executed with a great deal of care and delicacy. A minor crack can result in the tearing of the bow at sea. At the same time the area has to be strong enough to bear the whipping of the waves and hazards of collision against rocks and boulders in course of sailing. The following features are, therefore imparted at this section : a) the wall thickness is 7 cms.-8 cms. as against that of 4 cms. to 5 cms. elsewhere ; b) the stem comprises a solid block of wood over a length of about 20 cms. to 25 cms. and has a thickness of about 3 cms. to 4 cms. at the free end ; c) the stem is covered by the attached fore end fittings. These act as a protective shell.
- 33 The fore-end is shaped to a symmetrical v-shape by gentle strokes of the hand-axe, the excess wood being removed in the same manner. The grooves for the joints on both sides of the stem are then carefully engraved. At a distance of about 2 cms. from the stem, the first set of grooves, having a depth of 1 cm., is engraved from bottom to top. A second set of grooves is now made on top. This is transversely incised on the outer skin of the hull. It is 70 cms. – 80 cms. in length, about 1 cm. in depth and about 4 cms.-5 cms. in height. The *kuilo* is positioned along these two sets of grooves. These three dimensional grooves prevent ingress of water thus effectively increasing free board (figs. 2 and 3).

Fashioning of aft end

- 34 The profile and shape of the aft end is quite distinct from that of the fore end (figs 4 and 5). Since the canoe is beached from the aft end, it is provided with the following features : a) the sheer is gentle as compared to the fore end making an angle of about 40° from the horizontal plane. This facilitates a closet shoreline approach ; b) the solid extension of the hull is more attenuated as compared to the fore end. This imparts

additional protection in case of collision ashore ; c) it beats a lap joint for accommodating the aft end fittings, the *ritlo*.

Aft carpentry for attachment of ritlo

- 35 Two sets of marking are made along the upper face of the rim at the aft end of the hull. The first is of a length of 25 cms.-27 cms. while that of the second of about 42 cms. to 45 cms. Two depth measurements of about 14 cms.-15 cms. and 18 cms.-20 cms. are marked on the sides of the first length. Two widths of about 12 cms.-13 cms. and 15 cms.-16 cms. are marked at the interface between the two lengths. At the end of second length, a width of about 8 cms.-9 cms. and depth of about 10 cms.-11 cms. are marked. The marked areas are then incised. A lap joint is made on the second length to join the *ritlo*.
- 36 The depth of the joint is about 4 cms. and the length about 27 cms. The width at forward end is about 13 cms. and about 8 cms. at the free end aft. The cut has an aft-ward slope vertically at a depth of 4 cms. and has a forward slope longitudinally. To avoid transverse slippage in the joint, another cut is made for a dovetail joint at the forward end of this lap joint. This is about 3 cms. wide and 4 cms. long with a depth of about 4 cms. The remaining portion of the second length is now shaped. The forward end of this portion is about 15 cms., wide and 18 cms. deep. The free end is about 8 cms. wide and 6 cms. deep excluding the 4 cms. cut for the lap joint. Both of these surfaces are cut with an aft-ward slant. All excess wood is removed and surfaces are made smooth.
- 37 With regard to the first length of about 25 cms. to 27 cms., side cuts are made at the interface plane of both lengths so that the portion of the second length is connected by a span of only about 12 cms. in width and 14 cms. in depth. The cuts at both sides at the interface plane have an aft-ward slant. The remaining portion of the first length is shaped to match the hull profile (figs. 1, 3, 4).
- 38 By this time both the inner as well as the outer skin of the hull is smooth and streamlined. The hull is now ready to receive fittings after widening. While this work on the hull is in progress, some logs in criss cross alignment, port to starboard, are placed inside. These are lightly hammered into position (photo 9). The aim is : a) to protect the hull from buckling while additional work is in progress ; b) to further open up the top section of the hollow to a small extent. These logs are monitored everyday to assess their loosening. They are hammered back in such a manner that the middle and aft portions open-up to a greater extent than the front portion.

Widening of hull

- 39 The process of widening the canoe by controlled heating of the dugout section demonstrates a meticulous understanding of the properties of wood. This process doubles or trebles the opening in the mid-ship section resulting both in improvement in buoyancy as well as enhancing the hull capacity.

Figure 2. Assembled parts of the *ap* Figure 3. Layout of the *ap*

Figure 4. Parts of the *ap* Figure 5. Parts of the *ap*

- 40 Women grate between 60 to 100 coconuts very finely. About 50 torches, between 2 ms. to 3 ms. in length, are made from the dry coconut leaves (photo 9). Some of the other leaves are cut into about 200 smaller pieces, each of about 60 cms. to 70 cms. in length. The area near the canoe is cleared as the flames can rise by as much as 1 to 2 m. above the canoe. The grated coconut, *chul*, is tubbed vigorously into both the inner as well as the outer surface of the hull to soften the wood by oiling. When there is a change in the colour of the wood the process is discontinued. The hull is now tilted to one side being placed about 30 cms. above the ground on support logs at both ends. However, this tilting operation is absent in the construction of long length racing canoes.

PHOTO 9. SPOT BURNING OF SIDE. NOTE COCONUT LEAF TORCH

Burning of the hull log

- 41 The small pieces of coconut leaves are placed longitudinally inside the hollowed out section. The lower surface is evenly covered from end to end in two layers. Leaf segments with a thick stem are placed on the upper layer. This layering ensures slow and even combustion while the weight of the stems holds down the burning leaves. This process of firing is usually undertaken in the evening when there is an absence of strong wind. Two rows of between 5 to 6 men per row take up their positions facing the dugout section. Each individual is responsible for a specific length of the canoe. A fire is lit in a corner, this post being manned by 2 to 3 men. Others present would also participate in case of emergency. The master craftsman directs whole operation from a position of vantage. Some water is also kept at hand.
- 42 The fire spreads on the layers of leaf but is sectionally controlled. Each person burns his division starting from the middle. The aim is provide for an even spread in firing and consequent heating of the desired portion of the hull. Simultaneously the outer surface of the log is also heated. This is done by hand held torches. Both surfaces of the log are thus evenly heated in a controlled manner. This process takes about 10-20 minutes. The master carpenter inspects the blackened surface, scratching this with his fingernails or by means of a thin metal rod. Charring of wood should be even and the impression of the fingernail or rod should remain visible. The tilting is now reversed and the process is repeated in the second segment of the circumference. The canoe is now turned to a horizontal position. The bottom sector is now torched. This operation takes a slightly longer time. The surface is again inspected and spot burning and heating is locally performed to treat inadequately burnt parts.
- 43 By the end of the operations, the charred surfaces are 2 mms. or 3 mms. deep and the dugout is very hot. All activities are performed in quick succession without allowing any intermediary cooling to take place. Once the master carpenter is satisfied at the

efficacy of the operations the surfaces are dusted. 6 to 8 persons vigorously repeat the rubbing with grated coconut for 30 or 40 minutes. This is a difficult operation as the surface is still very hot. The application of grated coconut cools down the canoe and allows close inspection of every part of the surface. It neutralizes overheated spots and areas where burning may be continuing, hidden under the surface formation of charcoal. The pressure exerted by the hand strokes, mid-height hull upwards, also directs the free edge to widen and face upwards rather than inwards. The hull cavity has now almost doubled its original size. These operations, however, involve a high degree of skill.

- 44 The log is now secured properly by providing additional supports from below as also at the two points of termination. The stems of coconut leaves, which have been previously prepared, are placed along the sides of the hull. These are hammered into position according to the degree of widening desired at specific points. The master carpenter finally examines each batten and determines the final placement. The dugout is left to cool for the night.
- 45 Apart from its role in widening the burning process also performs other functions. Entophytic organisms are killed while the sap is dried and moisture removed. The pores on the surface of the wood are sealed thus providing protection against seepage. The thickness of the shell has shrunk by 3 mms. to 4 mms. and the dugout is now ready for its penultimate finishing and assembly.

Placement of *sinkivas*

- 46 About 40 planks, 1 m. in length and varying in diameter between 12 cms to 13cms. have been already hewn by means of axe or adze. These are now cut to size for specific placement in the hull. Three sets of these serve to house the three masts. Slightly aft of mid-ship, two *sinkivas* of wider dimensions are placed with a spacing of 3 cms. to 4 cms. The main mast is positioned here (figs. 4 and 5, photo 10). Viewed from the forward end, the forward and aft masts are positioned respectively at points located about one quartet and three-quartets along the length of the hollowed rim. The *sinkivas* are of similar dimensions and spacing as was the case for the main mast. These *sinkivas* are positioned at distances of 2 ms. from each mast to accommodate the related rigging. The booms are placed one-third and two-thirds the distance along the walls of the dugout. There are no *sinkivas* here. Free space is provided at the forward and aft ends. Bearing the constraints of this layout, the remaining *sinkiva* are placed with a spacing of between 20 cms to 40 cms. (figs. 3, 4).

Making of assorted parts

- 47 *Tanleal*, stringers. They are made from a soft wood with a diameter of between 10 cms. to 12 cms. The length is slightly larger than that of the scooped section.

Photo 10. Mid mast and rigging arrangement. Note *nyi-alpanam* at the rear. Shoring at this location shows ritual ranking accorded to the *ap*

- 48 *Leningh-ens*. Two strong flexible poles are chosen. The diameter is between 7 cms. and 9 cms. and the length is approximately half that of the hull.
- 49 *Hantaha*. The wood is light but has to be sufficiently strong to withstand the pressure of the waves. The initial log has a diameter of between 30 cms. to 35 cms. and a length of 15 ms. At one-third the distance from each end, positions are marked for the spars, *tamnoeke*. The forward end is profiled to penetrate the water. The aft end is also profiled, the lower part being slanted upwards with a pointed end. The design responds extremely well to local hydrological conditions.
- 50 *Tamnoekes*. These are made of a hard wood. There are a total of 18 sticks forming two sets of 9 sticks (photo 11).
- 51 *Hanrah* and *Tanu*. These are roughly formed and given final shape at the time of assembly.
- 52 *Ritlo* and *Chonko*. The making of these forward fittings is an extremely intricate operation. The only way these can be distinguished from the hull after fitting is by their distinct contrast in colour (photo 12).
- 53 The lower arm of the *kuilo* is V-shaped in cross section 5 cms. to 6 cms. in length and between 1 cm. to 2 cms. in thickness. The dimensions are such that it fits into the grooves of the hull coveting the stem completely at the fore end. The top fork shaped end sits on the hull for a mating length of between 60 cms. to 70 cms., fitting internally onto the lap joint of the hull. The aft end of the forked arms is cut with a forward slant, 15 cms. to 20 cms. in height, the thickness, at 6 cms. to 7cms., matching that of the hull. At the free ends a longitudinal groove, about 2 cms. in depth and 10 cms. in length is cut along the inner face aft. The bottom surface is flat to mate with the hull. The two lower segments of the *kuilo* join the main body. The main body extends forward by

another 1 m. to 2 ms. This then tapers to become a batten, rectangular in cross-section being 6 cms. in width and 2 cms. in depth. The free end is cut, 2 cms. in depth and 6 cms. in length to accommodate the lap joint with the *chonko* which will be fitted from above. A metal sleeve, about 1 5cms. length is also inserted here on the *kuilo* to hold the grooved joint between *kuilo* and *chonko*.

- 54 The *chonko* is about 1 m. in length. The free ends are forked and serve to identify the fore end of the canoe. Starting at a distance of about 15 cms. from its mating end, the *chonko* is profiled in concave contour along the greater part of its length. It has holes and is also fitted with hooks to hold pendants, *inlöi kuilo* (figs. 2 and 3). The third part, aft of the *kuilo*, is a pair of wedge shaped members (photo 12). In forward profile, thickness and incised grooving, it mirrors the forked ends of the *kuilo*. The aft end tapers to merge with slope of the hull having the same thickness. At the time of the assembly of the canoe these parts are tied to the hull through holes having a diameter of about 5 mms. to 6 mms. This fore end joinery effectively increases the freeboard of the canoe while strengthening and protecting the stem.
- 55 *Ritlo*. The carpentry here is simpler than that at the fore end. In a large canoe the *ritlo* is divided into three parts, comprising a total length of about 2 ms. The first part, about 65 cms. to 75 cms. in length, sits on the hull through a lap joint, about 30 cms. in distance end to end. At the aft extremity, the second part, about 55 cms. to 60 cms. in length, is mated by a similar lap joint. The third part, about 10 cms. to 12 cms. in length, is fitted to the second in the same manner. The aft most part is indented with hooks and holes for fixing pendants, *inlöi ritla*. Metal sleeves are provided in the second and third parts in the same way as has been described for the fore end fittings. The free end of the third part is disc shaped and serves to identify the aft end (see photo 1). All the free mating edges have an upward slant towards the aft while the lap joint surfaces have a lengthwise slope towards forward, opposite in orientation to those existing in the fore end fittings. The fixtures are profiled to concave shape as at the fore end. When assembled, the overall height is slightly lower than that of the fore end (figs. 2 and 3).
- 56 *Chamkayas* and Mast Fittings. The poles used for the masts are made of hard strong wood, usually obtained from the same tree as the log used for the hull. The length of the forward and aft masts is between 3.5 ms. to 3.7 ms. while the diameter is between 12 cms. to 14 cms. tapering down slightly towards the bottom. The middle mast is longer by about 20 cms. to 30 cms. The top ends of the masts are intricately worked. The pendants are functional as they serve to provide an indication of wind direction and strength. There two sets of holes on the masts, 6 cms. to 8 cms. in diameter, called *chukhi-nana*. These are used for securing sails to the masts. In the larger canoes the masts rest directly on the *sinkivas*. In smaller ones, a mast step can be carved into the hull floor itself. In a few cases the masts may be rectangular in cross-section. Each mast is held in position by a set of transverse and longitudinal ropes, the *hinuata*.

Sails

- 57 Three lugsails are used. All three sails are of almost the same dimensions. The length on the longest side is almost 1.5 times the height of the mast. Loosening or tightening the tack or the clew can change the angle of the sail on the mast (photo 13).

Assembly of the canoe

- 58 The site is cleared and all parts are set out close to the hull. The cross-sticks are removed from inside the hull which is rubbed with grated coconut. Holes are drilled for securing the *sinkiva* and the *kuilo*. The *kuilo* is carefully set into place and tied to the hull. The third section of the *kuilo*, the wedge shaped pieces, are also tied. The *sinkiva*, connected at this stage, project slightly outwards from the hull. The lengths are reduced at the final stage in Chowra.

Photo 11. Assembly of *hantaha*, *tamnoeke* and *leningh-en*

Photo 12. Note *kuilo*, *chonko*, *tanu* and forward mast rigging. *Hanrap*, the short batten at the mating edge between the *kuilo* and the hull and the third wedge shaped member constituting a part of the *kuilo* are also visible

Photo 13. Three masted inter-inland transport *ap* under sail. Note positioning of sail on mast and rigging

Fixing of *tanleals*

- 59 Securing of the *tanleals* is a complex task as these, positioned above the *sinkivas*, have to shape themselves to the curve of the hull. This is accomplished with pole and rope through a clamping movement. The *tanleal*, aligned in this way, are left in position

overnight and are bound the following day. The absence of nailing during assembly is to be noted. The first part of the *ritlo*, and the two *leningh-ens* are attached. The *hantaha* is kept on the ground parallel to the hull, the forward end reaching slightly to the fore of the point at which the *kanliul ap* turns upwards at the stem. It is hand lifted and the points of upward junction with the *hantahas* are marked on it. Two 8 holes sets are now drilled and dents are made for the *hantam*. The central holes of each set are in line with *leningh-en*. The *tamnoekes* are positioned here. The float is again lifted and is now cushioned on chocks to reach the height of the loaded water line. The water line at this stage is assessed at about 10 cms. to 15 cms. above the *kanliul ap*.

The *Hantaha* assembly

- 60 The *tamnoekes* on the *hantaha* are secured to the *leningh-ens* by intricate rope work.

Filling of holes

- 61 The holes made by *kauleuh* are plugged watertight. The remaining holes, which had been made to secure the *sinkiva* and other parts to the hull, are also plugged. However, because of the uneven gaps left by the tope work these are permeable.

Fastening of *tanu*

- 62 While the work on the float was on hand, other members of the team have worked on fixing of the *tanus*. Two or three of these battens may be joined by a lap joint in such a manner that the *tanus* extend from their starting positions aft of *kuilo* to the last *sinkivas*. The *tanus* are bent to the hull profile and secured in this position on both sides by another set of thin ropes. The whole assembly is thus strengthened from all sides and transformed into one rigid body. Separate battens, of lesser width than the *tanu*, are placed over the mating surfaces between the *kuilo* and wedge pieces aft of it. These also cover the holes.

Balancing the canoe

- 63 On the date set by the *kamasuön*, 20 to 30 men carry the canoe to the shore (see photo 6). The canoe is positioned at sufficient depth to allow it to float. This should be performed on an even keel. If it fails to do this, immediate corrective actions are taken while at sea. This may include shifting the *leningh-en* or adding a small degree of dead weight at specific points within the canoe. The canoe is then brought ashore for necessary adjustment and again assessed at sea. The process is repeated if necessary. Finally it is loaded to capacity and the water line is appraised. There are no markings but this is estimated at between 10 cms. to 15 cms. below the lowest *tanu*.
- 64 In sailing, the float should run parallel to the water level at load line. Even after this, the testing continues. The dugout is left anchored, freely floating at sea, for a day or two for continued evaluation. Trial sailings under mast and sails are also undertaken. After all these tests, the canoe is finally ready to sail for Chowra. The site is cleaned. All rejected parts are either burnt or buried while all useful items are loaded. The canoe embarks on its maiden voyage at dawn or in the early hours of the morning.

Stage Three -at Chowra

- 65 In the meantime at Chowra the necessary materials for finishing the canoe are assembled and the canoe is welcomed on arrival. The craft is rendered lighter by the dismantling of the masts, sails, *leningh-en* assembly and *hantaha*. It is now carried ashore by between 20 to 30 persons and placed on three chocks. The canoe is now meticulously taken apart, inclusive of plugs and fillings. Each item is kept in accordance with its position and is inspected by the master craftsman. A day is selected for commencing the next phase of work. It is also time for festivities and rest, a homecoming after prolonged absence.

Fine tuning of hull and canoe assemblage

- 66 On a pre-decided day the full team reassembles. The hull is reshaped, if required, by a repetition of the burning procedure. This procedure, *otfooto*, is usually undertaken in the evening. The *sinkivas* are now trimmed to final size. In order to prevent any movement or slippage of the *tanleals*, a longitudinal groove, 3 mms. to 4 mms. in depth, is incised on both mating surfaces with the *tanleals* on the top face of the hull. Each component is cleaned. If required these are further refined or remade. Grooves are sharpened and made smooth. The craft is re-plugged and the balance is once again reassessed. The canoe is then polished and repainted. Sails are retouched for stitching and are trimmed to final shape and size. The *ap*, now a living entity, is ready to perform its functions and becomes fully integrated with the rhythm of local life.
- 67 The earlier leadership role, which Chowra had assumed, overcoming its paucity in natural resources including wood, is reflected in the disciplined and systematic approach to work even today. The previous pattern of interdependence between Car Nicobar, Chowra and the islands of Katchal, Nancowry and Kamorta has persisted into modern times at the level of social relationships, and, to a lesser extent, economic exchange. While at one level the adoption of the Christian faith has led to the atrophy of many of the mores associated with a hunter-gatherer mode, at another, ancient beliefs and social customs have persisted within the changed context of the Christian faith. Despite the introduction of mechanization, traditional methods of construction continue as is demonstrated by the material which we have been able to access.

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NOTES

3. This work forms part of a larger project on « Boat Building and Fishing Communities – Bengal and the Andamans ». The project has been funded by the Department of Ocean Development, Government of India, and carried out at the National Institute of Science Technology And Development Studies, CSIR, New Delhi. Facilities provided by Director, NISTADS, are gratefully acknowledged. We also thank A. Kumar, for the preparation of the CAD Charts. Data has been collected during repeated field trips over a period of three years. The Department of Tribal Affairs, A&N Islands provided the necessary support for fieldwork including the services of interpreters.

4. Whereas canoes were made in all the islands, Chowra alone possessed expertise in pottery. Chowra pots were used by all the Nicobarese groups for boiling pandanus, *Pandanus lerum*, Jones and that most prized of festive fare, the flesh of pig, *Sus scrofa andamanensis*, Blyth. Chowra pots, therefore, constituted an essential item in trade (Varadarajan, in press) Three Chowra pots could be traded in Nancowry against one bundle of cane from Great Nicobar (informant : Jurra, Great Nicobar). Between February and April each year Chowraites would sail to Car Nicobar and the Nancowry-Kamorta group of islands to sell their pots. Very often the canoe itself would also be bartered. In return coconuts, lime, cane pigs would be brought back from the Nancowry-Kamorta group of islands. These expeditions were known as *ki-chut*. The products of Car Nicobar comprised pigs, cloth, saws, *fél*, *dau* and *haniong*, axes.

5. The Nicobar group of islands is peopled by groups of Mongoloid origin. According to Bright, the language of the Nicobars is a branch of the Mon-Khmer group of languages ; Merritt Ruhlen places the Mon-Khmer group within the Austroasiatic family of languages. The Nicobari language is given a separate identity within this group. Parkin classifies the languages spoken on the 12 inhabited islands in the Nicobar group as a separate sub-family within the Austroasiatic phylum. The 12 islands are : Car Nicobar, Chowra, Teresa, Bampuka, Nancowry, Kamorta, Trinket, Katchall, Pulo Milo, Kondul, Little Nicobar, Great Nicobar. The inhabitants are most likely to have originated on the Pegu-Tenasserim coast of Burma, homeland of the Mon. The Car Nicobarese have a tradition of having fled a violent rebellion in Tenasserim, and Hutton writes of a long-standing association with Moulmein in Burma which, taken with the Nicobarese language, may argue a Talaing (Mon) connection. Since then, probably no other Austroasiatic group has been so isolated, nor for so long, as the Nicobarese. In 1971 there were 17,971 Nicobarese speakers in the Nicobar group. Among the villages of Car Nicobar, the language of Kimios village, which is the most south-westerly one, is closest to the language of Chowra.

6. I am dealing with primary source material and I am very wary of too stringent a classification. I have explained each term in the text, but are refrained from hazarding English language equivalents.

7. I have given the names of the relevant informants in the text next to the material supplied by them. In a society in which there is little hierarchy and in which functions change it is difficult to give details relating to status -nor is there any system of an address in the modern sense of the term.

ABSTRACTS

Chowra is part of the islands of the Nicobar group in the Union Territory of the Andaman and Nicobar islands located in the Bay of Bengal. While the single outrigger canoe is indigenous to these islands, within the Nicobats canoe typology falls within the four sub-sets of: a) Chowra Teressa, Car Nicobar, b) Katchal, Nancowry c) Kamorta, d) Kondul, Little Nicobar, Great Nicobar. The subject of this article is the *Ap* of Chowra. Although Chowra has a paucity of natural resources including wood, this island had assumed a lead position in the past. Not only were the Chowraites the most skilled canoe builders but the shamans of this island inspired much respect and fear among the other indigenous groups. Notice is also taken of the calendrical and navigational systems but the main emphasis is on constructional procedures and practices.

Chowra fait partie des îles Nicobar au sein de l'Union territoriale des îles Nicobar et Andamans, situées dans la baie du Bengale. La simple pirogue de course est locale, elle s'intègre pourtant dans les sous-catégories nicobar. Cet article traite principalement de la construction de la pirogue *ap* de Chowra. Chowra possède des ressources limitées —dont le bois—, mais cette île a néanmoins occupé une position importante par le passé. Ses habitants étaient en effet considérés comme des experts dans le domaine de la construction des pirogues ; en outre, leurs chamanes inspiraient crainte et respect parmi les autres groupes locaux. Nous évoquerons aussi le système calendaire et le système de navigation.

Chowra forma parte de las islas Nicobar en el marco de la Unión territorial de las islas Nicobar y Andaman, localizada en la bahía de Bengala. La simple piragua de bordos es local. Sin embargo, es integrada en las subcategorías nicobar. El artículo enfoca principalmente la construcción de la piragua *ap* de Chowra. Chowra posee recursos limitados, entre los cuales cuenta la madera. Pero en el pasado, esta isla detuvo una posición importante, ya que sus habitantes eran considerados expertos en el campo de la construcción de piraguas. Además, sus chamanes provocaban temor y respeto entre los otros grupos locales. También evocaremos el sistema de calendario y de navegación.

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Mots-clés: Calendrier, charpentiers navals, Chowra, chamane, pirogue de course, Nicobar

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