EARLY CHESAPEAKE SINGLE-LOG CANOES:

A Brief History
and
Introduction to Building Techniques

by
Alexander Lavish and George Surgent
Patuxent Small Craft Guild

CALVERT MARINE MUSEUM
SOLOMONS, MARYLAND
Preface

The Calvert Marine Museum Press is pleased to add another publication to its series of topics pertaining to the themes of the museum. The roots of this article grew from a grant awarded by the National Trust for Historic Preservation, Maritime Division in August of 1980. A natural outgrowth was the Patuxent Small Craft Guild, one of five educational clubs sponsored by the Calvert Marine Museum.

The purpose of this booklet is to relate how single-log Chesapeake canoes were and can be built. This publication is based on the experience gained by the Guild during construction of an Indian dugout and a colonial punt. Both craft are on exhibit at the museum’s small-craft exhibit shed and are used by the Guild to demonstrate boat-building techniques, and small craft handling.
Introduction

The Chesapeake Bay and its many tributaries provided a food source for early human inhabitants living along those waterways, and offered a solution to their transportation problems. Explorer records tell of the dugout canoe used by the Indians and how their simple construction technique was adapted by colonists to meet their specialized needs for gathering seafood, moving cargo and transporting people.

William Strachey, Secretary of State of the Virginia colony and author of “The Historie of Travaile into Virginia Britannia,” provides a very descriptive picture of the methods of log canoe building by the Indians around Jamestown in 1610.

“They make them with one tree, by burning and scraping away coals with stones and shells till they have made them in the form of a trough. Some of them are an ell deep and forty or fifty foot in length and some will transport forty men, but the most ordinary are smaller and will ferry ten or twenty, with some luggage, over the broadest rivers. Instead of oars, they use paddles and sticks, with which they will row faster than we in our barges.”

Similar North Carolina Indian methods are mentioned by Hakluyt in his “The Principal Navigations, Voyages, Traffiques and Discoveries of The English Nation,” Vol. XIII, Part VI.

“The manner of making their boates is thus: they burne downe some great tree, or take such as are winde fallen, and putting gumme and rosen uppon one side thereof, they set fire into it, and when it hath burnt it hollow, they cut out the coale with their shels, and euer where they would burne it deeper or wider they lay on gumes, which burne away the timber, and by this meanes they fashion very fine boates, and such as will transport twentie men. Their oares are like scoopes, and many times they set with long poles, as the depth serueth.”
To provide an exhibit of these early and now rare vessels, in 1980 the Patuxent Small Craft guild of the Calvert Marine Museum undertook a project to produce reproductions of an Indian style dugout and a colonial canoe. The purpose of the present publication is to document the techniques and skills learned and used in this project so that others may build and pass on the techniques of building these historic craft.

**Selecting the Log**

In addition to tulip poplar, both Indians and settlers considered yellow pine, bald cypress, and even sassafras trees for canoe construction. These woods are all lightweight, easy to work, resist cracking, are fairly rot resistant (bald cypress, most resistant) and were, at the time, plentiful, although not all types were available in each area. Unfortunately, large diameter trees without knots and other deficiencies, such as stress cracks, are not readily available today. When the idea of building a pair of canoes was originally discussed with the Calvert County forester, John Markovich, he indicated that only a few trees existed within the county that would meet the 36-inch minimum diameter requirement. It was through his efforts that a tulip poplar with 34 feet of branch-free trunk was located in Dunkirk, Maryland. The tree had been topped by lightning and was destined for firewood when the project director, George Sargent, convinced Edwin Ward, the property owner, to donate this tree to the museum. With the help of volunteers the tree was felled, cut into two 17 foot lengths, and transported by a front-end loader and low-boy trailer to the museum grounds in March of 1980. At least one Bay boat builder, William M. Rollins of Poquoson, Virginia, states that a tree should be cut on a full moon because there are less mildew problems that way.

**INDIAN METHOD OF MAKING A DUGOUT CANOE**

The size and type of tree needed is determined by experience and the canoe’s future use. The body size of the builder and the anticipated use of the canoe are used as a scale of measure, i.e., “Will my butt fit?” and “How much and what will I carry in the canoe?” The location of the tree to be used is also critical: The Indians were unable to move a log of considerable size great distances, so the canoe was built or shaped where it fell—the closer to the water the better. Fortunately, prior to the mid-nineteenth century, the shoreline had abundant trees of the right size. Brewington in his book *Chesapeake Log Canoes and Bugeyes* gives a rough scale of beam times seven or eight equals length.

Once a tree was chosen, it was downed by burning around its base. The fire may have been controlled by using mud and water, minimizing damage to the trunk. After it was downed, the tree was burned to the proper length and probably was rolled upon two log cross pieces where it could be more easily shaped.

The technique of burning and scraping was used to hollow the log. A fire was started on top of or against the log and allowed to burn. Again the area to be burned could have been controlled with mud and water applications. The burned area was then scraped clean using oyster shells or stone tools. This process was repeated up and down the length of the log until the desired shape was achieved.
CONTEMPORARY PATUXENT SMALL CRAFT GUILD METHOD OF MAKING AN INDIAN DUGOUT

INDIAN DUGOUT

FIG. 1

To save time, modern methods were used to crudely shape the canoe, and burning and scraping techniques were used only in the final shaping. The first step in shaping was to mark the top edge of the canoe with a chalk line on each side of the log (Fig. 1). This line is approximately three inches higher than the center of the log. A chain saw was then used to make cuts called kerfs across the log every 18 inches and down to the chalk line along the entire length of the log. The wood between the kerfs was then removed using splitting wedges, mauls and an axe. With the top of the log now flattened, the inside or hollowed portion of the canoe was drawn, leaving about 2 inches of wood on the sides and 6 inches at the ends out side of the line. The wood inside this line was then removed using the same technique as mentioned above (Fig. 2). This process leaves a very rough finish. A hollow adze and a lipped adze were used to smooth and further shape the inside, top edge and ends. At this point the ancient Indian technique of burning and scraping was used to give the dugout canoe its proper finish. The bottom of the canoe is the natural shape of the log. When finished the canoe measured 14.8 feet long, 2.2 feet wide and weighs approximately 500 pounds, dry.
**COLONIAL CANOE**

Although the first settlers on the Bay (Virginia settlers especially) did not include shipwrights knowledge in building watercraft, they observed the adaptiveness of the Indian dugout to the region, and chose similar boats. With that knowledge and the tools at hand, the colonists succeeded in copying the Indian canoe while making improvements in both the building technique and the tools used in construction (Fig. 3). By using iron tools instead of fire, construction time could be cut considerably; by shaping the bow and stern, the performance of the craft could be improved.

The Patuxents Small Craft Guild decided to replicate a colonial type canoe or punt using only hand tools similar to those the settlers had, a task that proved to be both more physically demanding and time-consuming than anticipated.

![Two-man Log Saw](Image)

**Setting Up the Log**

In order to properly mark the log for cutting, it was first necessary to remove the bark and to support it on two timbers resting on reasonably level ground. Next, the ends were trimmed by cutting them perpendicular to the longitudinal axis of the log with a two-man saw. This resulted in a working length of about 15½ feet. Upon closer examination, it was noted that the log was slightly elliptical in cross section and had a longitudinal twist. The log was then rolled several times to determine which surface would serve as the bottom of the canoe. Final positioning placed the log bottom side up, and the maximum width was allowed for both sides of the planned canoe. Wooden wedges were inserted under the log to secure its position, and vertical lines were then scribed down the center of each end. Next, a section view of the canoe was drawn freehand on paper to form a template. This tem-

![Shipwright's Adze](Image)

![Hollow Adze](Image)

![Lipped Adze](Image)

![Drawknife](Image)

![Spar and Car Plane with interchangeable irons and matching soles](Image)

**Fig. 3.**
plate was used to approximate the canoe location as viewed from the log ends. From this process it was decided that the canoe at its mid-section would have a beam (width) of about 27 inches and a height of 18 inches. Additionally, the template served to locate the horizontal lines which were scribed on each end to represent the canoe bottom. The ends of these lines were connected along the upper surface by snapping a chalk line. These lines enclosed the wood to be removed first. Figure 4 shows the completed layout.

A great deal of personal judgment and individual preference contribute to determining the general shape and size of the canoe. In colonial times canoes varied in depth and width depending on their intended use. Generally, canoe width was one-seventh to one-eighth of the length and the depth was about two-thirds to one-half of the width. Dugouts too short for their width sacrificed speed and capacity; dugouts too long sacrificed maneuverability and stability.

**Shaping The Outside Surface**

Lines taken by M. V. Brewington from an actual log canoe built c. 1850, and illustrated in his book, "Chesapeake Log Canoes and Bugeyes" were used as a general guide in accomplishing the shaping and finishing work.

Before cutting commenced, the wedges securing the log were checked for proper positioning. This is an important precaution because the green wood log used weighed about 3800 pounds and would be dangerous if allowed to roll free.

Using a two-man saw, cuts were made every 6 inches along the log down to the canoe bottom reference plane as shown in Figure 4. The sectioned wood was removed with felling axe, maul and wedges. Of these tools, the wedges and sledge hammer technique worked most efficiently. The log was next rolled 90 degrees so that the bottom plane was in a vertical position. In this way the surface was easily made smooth and flat by using first the broadaxe and then the adze. After this operation was completed, the cut surface was coated with a mixture of 50% linseed oil and 50% turpentine to retard cracking; the log was then rolled over until it lay on the newly created flat face. (Note: Because work on this project was scheduled only on Saturday mornings, it was necessary to coat freshly cut wood with the oil and turpentine mixture to slow the drying rate. This would not be required if construction had progressed without appreciable delay.)

At this point, the upper log surface was marked (Fig. 5), and the vertical reference lines on the log ends were connected along the top with a chalk line. A second horizontal line was scribed at each end above the log center to represent the bow and stern location. A batten (a pliable narrow length of wood) was sprung along the side of the log connecting the horizontal line ends to form the sheer and was then tacked in place. The batten position was adjusted until the desired sweep and canoe height were attained. After the log was marked along the batten, measurements from the center line to the sheer line were transferred to the opposite side at selected stations located along the log length. The transferred measurements were furred in with a batten bent along the measured points so a curved line could be drawn to smoothly connect all measurements.

Again, a two-man saw was used to make cuts every 6 inches along the length of the log down to the sheer line and the wood was removed as described for the bottom.
The log was then rolled onto its side, secured in place, so that the canoe plan view could be marked on the top and bottom surfaces (Fig. 5).

Chalk center lines were again snapped along the top and bottom canoe surfaces. Two lines parallel to the reference lines were scribed on the ends to locate the bow and stern post positions. These parallel lines were in turn connected with a batten to outline the plan view of the canoe. Again the batten was adjusted until the desired curve was attained. Measurements from the centerline to the sheer were transferred to the opposite side to complete the canoe outline. These same measurements were transferred to the bottom to produce an identical canoe outline on the bottom surface.

With the layout completed, saw cuts were made down to the canoe outline and the excess wood was removed as before. In similar fashion the opposite side was cut to shape. The log, when completed, now had the appearance of an oversized wood block toy.

For the next step, the log was again positioned with the bottom side up so that it rested along the sheer line. Pads were first placed on the supporting timbers to protect the sheer from damage. With the log in this position, it was simply a matter of rounding the bottom and shaping the ends by removing the square corners with an adze. Hand planes, files and scrapers were used to produce the final shape. No templates were used. The completed symmetrical shape was achieved by sighting and comparing each side at different angles and by feeling the right and left sides—particularly the bow and stern—simultaneously with the right and left hands to locate high spots and irregularities. With a little practice a workman's sense of balance will tell when the contoured surfaces are identical. The final hull shape was complete when its appearance was pleasing to the eye.

**Shaping The Inside Surface**

With the canoe still upside down, a new center line was snapped along its length (Fig. 7). Stations were marked at two foot intervals along the line and extended around the hull. Along each station line, five evenly spaced \( \frac{1}{2} \) inch diameter holes were drilled to accept depth pegs. The length of the pegs corresponds to the thickness of hull desired at the point of location. The canoe sides are one
inch thick, the curve between the sides and bottom is 1 1/4 inch, and the bottom is 1 1/2 inch. After the pegs were driven into their respective holes the canoe was turned right side up and the interior wood removed down to the pegs. One of the more efficient techniques used was to cut "V" notches across the grain with an axe, and then to remove the wood sections with a foot adze. The resulting rough finish was later cleaned up with either the lip or hollow adze.

Extra wood was left in the bow and stern to add strength and reduce the risk of splitting. In spite of the precautions taken, two large cracks developed which threatened to separate the top and bottom. Even though the cracks were filled with oakum, wood slivers, and mineral pitch, it was still necessary to run a bolt vertically through both the bow and stern to stabilize the crack. Additionally, other deformities started to appear. The bottom bowed inward slightly and the length twisted so that the bow and stern were no longer vertically aligned. Probably none of these defects would have appeared if

the project had been completed in several weeks instead of over a year's time. Approximately 50 amateur man hours were required to complete the hull.

Decking and Finishing Touches

To complete construction, the canoe was fitted with yellow pine bow and stern posts, deck, coaming, and rub rail (Fig. 8). The posts were tapered to match the canoe lines, fastened with two galvanized nails and fitted with rope mooring loops. The decking was made up from six pieces of 3/4 inch planks and nailed directly to the canoe hull. Supporting deck knees were not required since the thick walls of the canoe provided adequate bearing surface. Pine strips of 1 inch x 3/4 inch were fitted to the deck to form the coaming and rub rail (Fig. 8). All exterior surfaces were scraped smooth and covered with two coats of oil base paint. The interior was rubbed with linseed oil to protect its natural wood appearance.
Observations and Lessons Learned

— Tulip poplar wood is a suitable material for a log canoe provided it is worked before it dries out.
— Handling the broadaxe and adze requires some experimentation for effective use. Techniques described in tool books had to be modified to suit individual purpose and comfortableness.
— Intuitive skills of eyeing and feeling matching curved surfaces were easily acquired and sharpened.
— The large amount of wood wasted made it easy to understand why plank boats were developed. This project was begun with a wet log weighing 3800 pounds and ended with a canoe weighing about 300 pounds.
— Working with hand tools is a labor-intensive process that makes one realize the value of power tools.
— Finally, Guild members came to appreciate the problems and achievements of the early settlers as they adjusted to the new world.

Canoe Performance

Both the Indian dugout and colonial canoe have been used for water demonstrations at the Calvert Marine Museum waterfront. During their initial voyages it was noted that the canoes performed differently.

The Indian dugout with its thick bottom and greater mass was stable but difficult to maneuver. Six people were able to stand on one side without it capsizing. In addition, it is very heavy and hard to launch and recover. On the other hand, the colonial canoe (punt) was easy to handle and fast, but not so stable. At best, the colonial design could accommodate only three people. Particular care must be exercised while getting in and out of the canoe.

Multi-log Canoes

It is easy to suppose how two colonial canoes were tied together, catamaran style, to give larger-holding capabilities and stability to these craft. By the Civil War, multi-logged canoes of two, three, five, and even nine logs, were being built by connecting logs or “chunks” together. From the Indian log canoe, the Bay’s most distinctive vessel, the bugeye, evolved. Calvert Marine Museum’s Wm. B. Tennison oyster buy-boat is an example of a nine-log canoe—the ultimate in multi-log construction.

Reference Books

Acknowledgments

This publication and the log canoe building project were made possible by a matching grant from the National Trust for Historic Preservation, Maritime Grants Division.

Special thanks are extended to Edwin Ward who provided the tree. George Surgent, Calvert Marine Museum shipwright was the leader of this project. Assisting in the construction were Robert Kelsey, Dennis Kund, LeRoy “Pepper” Langley, Alexander Lavish, Elgin Ferry, Robert Simmons, Charles Toler, Peter Vogt, and Benjamin Williams.

CALVERT MARINE MUSEUM
SPECIAL PUBLICATIONS

FLOTILLA: Battle for the Patuxent
by Donald G. Shomette $12.50

WAR ON THE PATUXENT, 1814: A Catalog of Artifacts
by Fred W. Hopkins, Jr. and Donald G. Shomette $2.00

SPECIAL PUBLICATION SERIES

A HISTORY OF DRUM POINT LIGHTHOUSE
by Ralph Eshelman $1.00

FOSSILS OF CALVERT CLIFFS
by Wallace L. Ashby $1.50

BROCHURES

WATERCRAFT COLLECTION $0.75

THE DRUM POINT LIGHTHOUSE $0.75

Copies may be purchased through the mail by writing Publications, Calvert Marine Museum, P.O. Box 97, Solomons, Maryland 20688. Please include 50 cents per order to cover mailing costs.