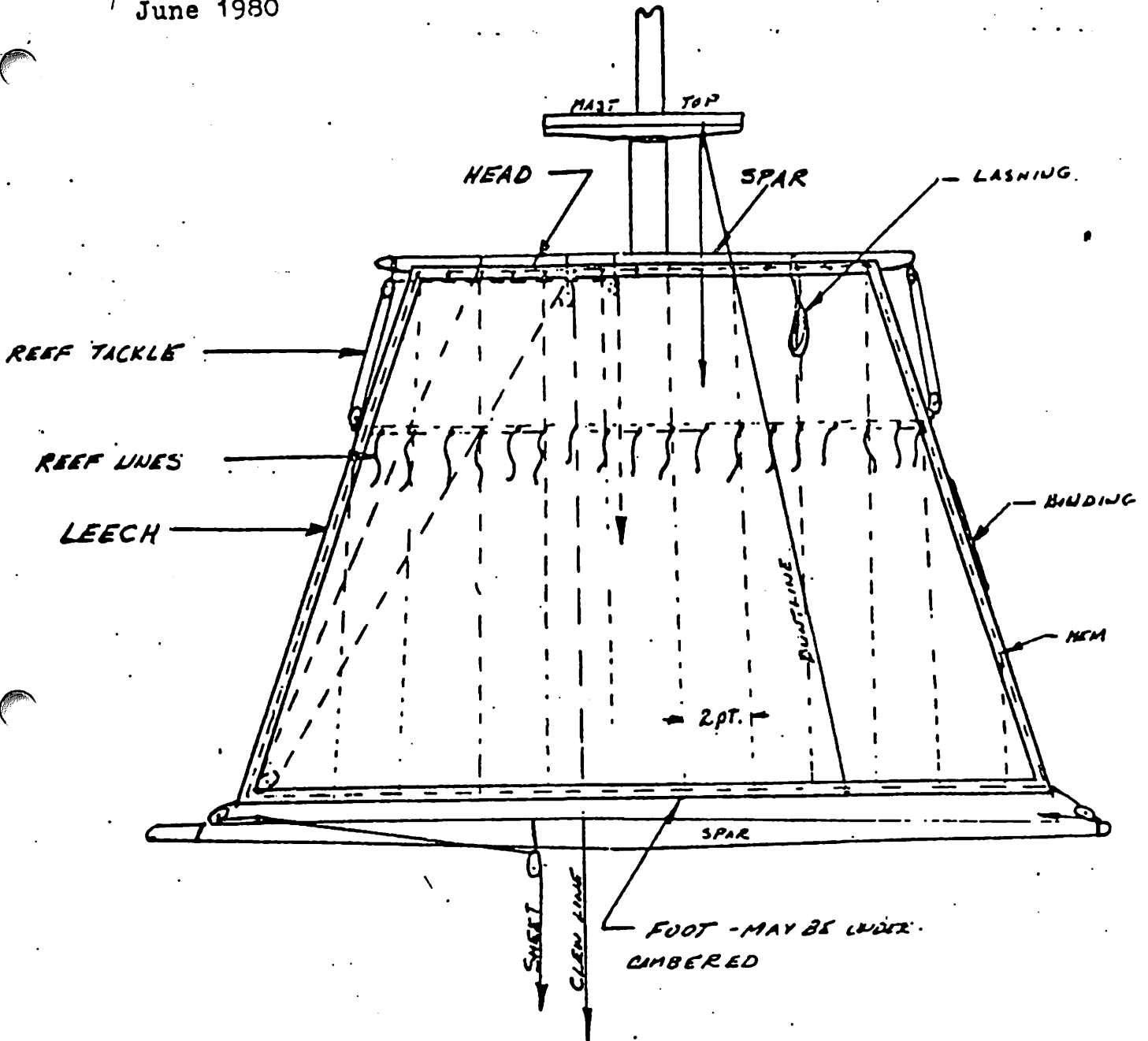


June 1980

# SAIL MAKING

55



TYPICAL SQUARE SAIL RIG  
(ALL LINES SHOWN ONE SIDE ONLY)

If you have decided to make sails, prepare yourself! Many excellent references are available which describe and illustrate the structure, appearance and rigging of sails. Most of the rigging will be new to you and will not necessarily be on models or model plans of ships you have already completed. References I have used are "The Lore of Ships", "Model Ship Builders Assistant", "Modeling the Brig Irene" and countless paintings, drawings and photographs which not only give the technical details of sail construction but also show the general appearance of ships under canvas. After some study you will realize that each type of sail is rigged the same with minor variations evident for the different periods of sail. Generally speaking, after completion of the hull, spars and appointments the addition of sails will nearly double the effort of rigging the ship. There will be much repetitious work and at times you

will be ready to chuck the sails and rig as before. Don't stop! The results will be worth the effort.

Each period of sail will, as mentioned, require particular details for authenticity. Figure 1 illustrates the general requirements of the square rigged sail. Each such sail will require these details to be repeated. Other sails (jib, stay and gaff) are similar to the square sail and are well illustrated in reference books. I will describe the making, mounting and rigging of the square sail for a ship of the late 18th or early 19th century.

The following materials and tools will be required:

1. White balloon cloth (lightest weight possible)
2. Min-Wax Driftwood and Dark Walnut
3. Fine buff colored cotton mercerized thread
4. Sobo glue
5. A soft No. 2 pencil
6. Steam iron
7. Sewing maching with stitch length adjustment
8. Tan button thread
9. No. 871 white hard linen line

The ship model should have all standing rigging up and all spar rigging with the exception of the braces. If sails are to be furled, the spars should be in their lowered position as you would rig without sails. Unfurled sails require the spars to be at their highest position. Rig your lifts accordingly. All tackle and foot ropes should not be on the spars until sails are mounted.

We will not proceed with the actual making of sails. The following techniques are intended as a guide to help you other builders avoid the many pitfalls I have run into. Hopefully, many improvements in method will result as other builders make sails.

The first chore is the laying out of the sails on the balloon cloth. If your plans show the sails, the cloth may be layed over the plan and the outline drawn on the cloth with the soft pencil - (DO NOT USE A BALL POINT PEN). If no sails are shown, you will have to establish sail size by the spar length and spacing. Normally the top of the square sail will be nearly the length of the spar to which it is lashed and the bottom is as wide as the spar below. Merchant and coastal vessels would show more space between sails, while warships and clippers did not allow the inefficiency of this spacing. The undercamber of the sail was evident only in the merchants. The lower square sail had parrallel sides on most ships. Remember when laying out the sail to allow approximately 3/32" for the outer hem. Straight sides should be drawn on the cloth using a straight edge and the curved edges may be drawn free hand. Exactness in size and shape is not critical since the finished sail is a very flexible member of the ship. Care should be used to stay within 1/16" of the finished size you want.

With the sails drawn on the cloth you are ready to cut. Use a very sharp sewing shear of large size. Be sure all cuts are smooth with no saw toothed edges. This cutting takes some practice and if you do get saw notches, smooth them out by trimming with a smaller pair of shears. Don't worry about any ravel at this time.

X June 1980

## SAIL MAKING

(57)

The cut sail should now be stained. To avoid a reddish look, (unless you want it) I have found the heavily pigmented driftwood stain will do a very nice job of giving the white balloon cloth an old canvas look. If a more watery stain is used, the sail will look like colored balloon cloth. A pigmented stain is required to fill some of the cloth grain and weave. A fairly clean, water marked sail can be had by using the top portion of the driftwood stain in the can unstirred. If a dirtier sail is wanted stir the stain well and don't worry about the cloth hitting the bottom of the can where the heavy pigment will be. Fold each cut sail and dip into the 1/2 pint can and remove to a towel. Lay the sail out flat and blot with another towel. In areas of heavy pigment pick-up, rub the sail to streak out the pigment. Move each sail to a clean area on the lower towel to prevent pick-up of unwanted coloring from the previous sail. Don't try to make a deliberate stain or dirt pattern; the natural position of darkened areas or water marks will turn out fine and, with all sails on the boat, will be more than satisfactory. Hang each sail flat (do not lay on a surface) and allow to dry for 24 hours. When dry trim all ravels.

The sails when dry should be pressed flat with a steam iron and all outside hems folded and pressed. To avoid trouble at home, use a cover for the ironing board since some of the coloring will be deposited on the iron and ironing board - clean the iron when your through. All hems should be kept as close to 1/16" wide as possible. Slight variations or unevenness in hem size will not be noticeable. Some corners with accurate angles will require trimming but not at this time.

The sails are now ready for stitching. Baste all hems with black thread by hand. Use black or a color since the baste will be removed later and is easier to find. After the hems are held in place by basting, set up the sewing machine to stitch a straight hem with the stitches approximately 1/16" for a boat of 3/16" scale. Stitch all hems using the fine buff colored sewing thread. Be sure that the thread is cotton and mercerized. This will assure that the thread will "work" with the cloth over a period of time. After the hems are completed, the panels may be simulated by stitching vertically on the sail from top hem to bottom hem. The stitches should be reduced in length to about 2/3 of the hem stitch length. The panels are layed out on the sail with pencil and a straight edge. Center the panels on the sail width and make them approximately 2 scale feet wide. When all the stitching is completed trim all the loose thread ends and anchor all thread ends to the sail cloth with the sobo glue. The corners of the sails can now be trimmed square and glued. Remove the basting thread anytime after the hems are completed.

The sails are now ready to be bound with the No. 871 white linen line. This line should first be stained with dark walnut min wax. Stretch the line out between two pegs when staining to remove any set from the card wrap. Allow to dry a day before adding to the sails. A very thin bead of sobo glue should be layed on the sail edge one side at a time. Lay the sail flat on a piece of waxed paper and work the line onto the edge, making sure there are no gaps. Allow the glue to set and then bend the line for the corner and apply to the next side in the same manner. The joint of the line should be in the middle of the sail head edge. The sails should dry for a day and any gaps in the binding closed. The sails are now ready for installation on the boat. Working normally it will have required 4 to 6 weeks time for a suit of 15 sails to be brought to this stage.

The square-sails should be mounted first by lashing each sail to its spar. Be sure the sail is centered. Early boats had the sails lashed with a continuous looped line. I use tan button thread for this. Ships with jack stays should have the sail lashed to each jack stay eyebolt with individual loops of line. For either type of attachment the sail should be punctured with a darning needle which will make approximately a 1/32" dia hole through the head hem. The continuous loop lashing should have a hole at the center of each panel and one at each seam. Otherwise puncture the sail opposite each jack stay eyebolt. The sails should be rigged top to bottom.

With all the square sails in place, all spar and sail blocks should be added. Be sure to leave a long length of line on the sheet blocks at the corner of the sail to allow reaching the belaying point on the deck. The clew lines are now tied to the spar and rove through the proper blocks. The same should be done with the sheets. You will have two clew lines and two sheets per sail. These are fed down through the tops and are normally belayed at the bulwark pin rail. The sheets and clews for the lower sails can be tan button thread. The upper sail lines should be finer. For this I use white linen line stained dark walnut. All lines for running rigging should be stained. I prefer to do this staining on the boat as the line is less stiff for working before staining. The lower main, fore, and mizzen sail sheets and clews (these are clew garnets) are not dressed or belayed at this time.

The buntlines are not attached to the sails and rove through small blocks mounted under the fore part of the top. Single blocks should be used with the buntlines made of the same thread used in hemming the sails. Wax the cotton line before mounting and stain afterwards. The buntlines will pass through the tops and be belayed at the life rail.

With this much completed on the main sails you should now mount and rig any fore and aft sails required for your particular subject. You should always mount jib and fore stay sails and aft gaff sails since these were used to give the ship heading stability when "running" with the square rigged sails. However the amidship stay sails are not required for prototype accuracy. When added they do give the model a much more solid look. I prefer them if only to demonstrate prototype rigging practice.

The inside work will now be completed and the spar braces can be rigged. All spars may be turned slightly when sails are mounted. Since all spars are now joined by sails you will find the brace dressing will be less difficult.

When the sails and spars are dressed out the lower sail sheet can be rigged as required. You will find the addition of the tacks to appose the pulled of the sheets will help in setting these lower sails.

You now have the basic requirement for sails. If you still have the energy you can add bowlines, leech tackle, lashing, and a myriad of smaller details which will add to the appearance of the ship. With the rigging described, the sails may be set anywhere between furled and unfurled. The various lines should be used to pull the sail into the shape wanted to give a scale like appearance. Nearly furled sails will require additional poking pinching, and bending by hand since the material used for the sails is considerably heavier than scale.

I hope this brief discourse will be of help in starting you toward the making of sails. The description along with other references should eliminate many of the unknowns of this additional rigging.