THESIS

on

The Design and Construction of a Yacht.

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The generic name "ship" was derived from the word "skap" meaning scoop. It is an invention contrived by man to convey himself and his belongings from place to place by water. The earliest form of vessels was the raft and was merely a number of tree trunks bound together by vines. From it developed the canoe or dugout made from the trunk of a single tree.

Finally "built-up" boats were produced, the inner frame and outer shell being constructed separately.

The first vessel of which history gives any account was the Ark built by Noah. The details of its construction are not of much interest, however, as it was not intended to be propelled through the water and was provided with neither sails nor rudder. The earliest authority on Egyptian boats dates back to 3000 B.C. The Hebrews used ships during King Solomon's time to convey material for the construction of the temple. The Phoenicians were the most able mariners of their day and Herodatus tells us that they circumnavigated Africa in 604 B.C. The Greeks and Egyptians were also able seamen but the development of the ship and the art of navigation clearly belongs to the Phoenicians.

Water craft, like every other useful contrivance, have been improved and developed to meet the demands of the day and the boats of the present no more resemble the vessels of Columbus than does the modern mogul.
engine resemble Steven's first locomotive.

Of all the different types of sail boats used for pleasure on western inland waters the "skip-jack" seems to be the general favorite. This style of boat is known by many names such as "skip-jack", "lark" "skimming-dish", etc. and they are so called from the manner in which they ride the water. They are very light in weight and seldom draw more than one foot of water. Many of the "Class B" or 24 foot boats draw but 8 inches. The width of beam is quite large as compared to the length being usually from 7 to 8 feet for the 24 foot boats. This is necessary because of the lightness of the hull and the large amount of sail area. They are fast sailors in light winds but are not very good heavy weather boats.

The boat that I have built is of this type, 24 feet long and 7 feet beam. The frame is of 1 1/2 inch square oak, the sides and bottom are of 3/4 inch spruce and the deck is of 1/2 inch cedar.

A form was first made upon which the ribs were bent. They were then mortised, bolted together and braced as shown in Fig. 6. The frame was then set up and the ribs spaced 34 inches apart and braced as in Fig. 3. The depth amidships is 26 inches, at the bow 6 inches, and at the stern 5 1/2 inches. The cock-pit
is 3 feet wide, 8 feet long, and about 32 inches deep from the top of the combing to the floor strips.

Many of these boats are built with a center-board but lee-boards answer the purpose just as well and as they are placed one on each side it is not necessary to climb over the center-board box each time tacking takes place. This adds much to the comfort of the passengers.

The lee-boards of this boat are made of 3/16 inch tank steel and are 3 1/3 feet wide by 4 feet long. They are hinged and may be pulled up into the hull through the boxes as shown in Fig. 1 and 6. This is done when sailing with the wind and lessens the resistance to a considerable extent. The rudder is of 1/4 inch tank steel and is 11 by 31 inches in size. The rudder-stock is of 1 inch round iron. The opening through which the rudder-stock passes is made watertight by means of a 1 1/4 inch gas pipe which is held in place by bushings as in Fig. 5. The lee-board boxes are set at an angle of about 35 degrees with the perpendicular so that when the boat is healing over they are nearly perpendicular in the water. This is shown in Fig. 6.

All the ribs are bolted together with 3/8 inch bolts and the planking is fastened on by means of 1 1/2 inch screws. The spar is made of fir, 6 inches in diam-
eter, and gradually tapering to a diameter of 4 inches at the top. It is 18 feet 6 inches long and is held in place by four side-stays and one forward-stay. These stays are made of 5/16 inch galvanized wire rope and are kept taut by means of turn-buckles.

The boom and gaff are what is known as "built-up" being made of 1 1/2 inch strips of fir and bolted together as shown in Fig. 5. This gives the required strength with less weight than if they were made of solid timber.

The sails are of light duck and contain about 350 square feet, of which 85 square feet are in the jib and 265 square feet are in the main-sheet. To properly rig this boat four double blocks, six single blocks, and about 250 feet of Manila rope are required. The cracks were oaked with oaking cotton after which three coats of white lead and oil were applied, making the boat water-tight and also preventing decay of the wood.
Scale: 1" = 2'