Sea-Going Rafts on the Pacific Ocean

By EDWARD K. BISHOP.

IF some ship-builder of old, with the lines of his primitive vessel in mind, could survey the oceans now, he would doubtless be as much amazed at some of the strange craft putting to sea from the Columbia river as at the modern warships or ocean greyhounds. In truth, many builders well acquainted with the present systems of marine architecture and engineering would view for the first time such craft, while the layman might hesitate before deciding whether to pronounce them monsters of the deep or some freak in ship-building. They can hardly be classified as ships, even though designed to go to sea, or as barges, though great freight-carriers; they are, in short, huge rafts of round timbers or lumber, bound by cables, chains and bolts in a scientific and ingenious manner, the method of construction having been evolved after many experiments in this little-tried field.

For several seasons past rafts of logs have been towed to San Francisco, Cal., and the journey has been completed in safety a sufficient number of times to demonstrate that the method of transportation is practicable as well as profitable. This year rafts composed wholly of lumber, and of totally different construction, have made their appearance, and every one interested in lumber or the carrying trade on the Pacific coast is watching the experiments with great interest, as the establishment of this method of transportation would revolutionize the coastwise carrying-trade, and, by its great saving in cost, drive the sailing vessels and steam schooners out of business, or force a large reduction in charges.

Both log and lumber rafts are still looked upon as objects of curiosity on the Pacific coast, and more or less the projects of men who will take great risks. The former operates in a comparatively restricted field, and will probably never change existing conditions to any great extent, as many think the lumber raft is destined to do; but it has already stood the test of several seasons, and the methods of its construction will be treated first.

A CRADLE IN PROCESS OF CONSTRUCTION, BEFORE LAUNCHING.

Ten years ago considerable attention was directed to the first raft of logs ever built for an ocean trip. It was towed from the Bay of Fundy to New York city. Since then a number have entered that harbor, but at the present time the centre of activity in this line is on the Pacific coast of North America, where a company has been incorporated for the express purpose of transporting the timber of Oregon and Washington to San Francisco by means of rafts. The problem of incorporating material as unpromising as round logs into a vessel sufficiently stanch to make an ocean trip of 650 miles is a peculiar one, and few have seen the actual work of construction.

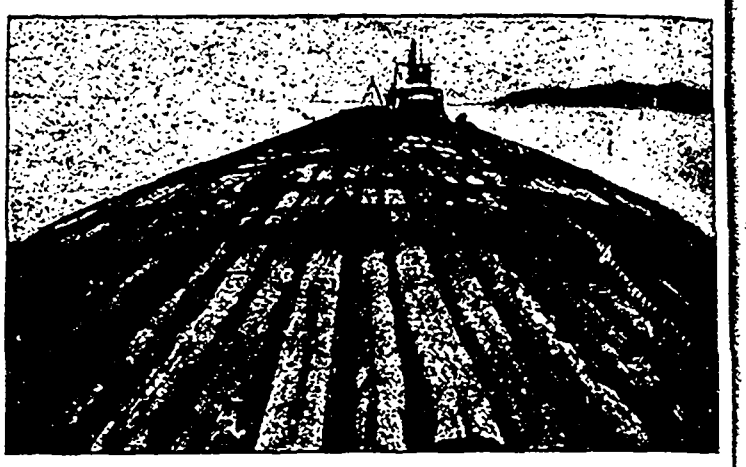
In contrast to ordinary boat-building, the cradle for this unique vessel is constructed on land and launched, leaving the work on the raft itself to take place in the water. The usual process of launching a completed vessel is replaced by drawing certain pins, causing the entire cradle to separate into two parts and allowing the raft to float freely in the river. At a short distance it then closely resembles one of the modern whalebacks, without any upper works, though a little closer inspection reveals the corrugated surface formed by the logs and the huge chains encompassing the whole. The timber composing it is of fir, and is chiefly for piling purposes and spars. No sticks shorter than 30 feet are used, and many measure 110 feet.

The cradle is composed of forty-three inverted bents, twelve feet apart, and the logs extend twelve feet over at each end, making the completed length 528 feet. The posts of the bents are 8 x 10 timbers; with caps, 10 x 20. The desired contour for the bottom of the raft is secured at each bent by 30° and 60° bearers, supplemented by gluts designed to produce a form as nearly circular as possible. The various bents are joined together longitudinally by a series of 12 x 12 timbers, or waling - 6 altogether, 4 being at the bottom and 1 on each side.

As already stated, the construction allows the final separation of the cradle into two parts, the line of cleavage corresponding closely to that of the keel of a boat. The division is rendered possible by the manner of joining the posts at each bent. One post is bolted to the 10 x 20, mentioned above, which extends the entire width at the point considered, while the other is fastened at right angles to an 8 x 10 and a 3 x 10, strapped together, with sufficient space left to allow the 8 x 20 to slide between, and long enough to reach half the distance between the posts. Thus it will be seen that the two sides of the cradle are entirely distinct, the connection being made by sliding one timber into the channel formed by the other two, and can be made into a rigid whole only by fastening the sliding member so that no motion is possible. This is done by pinning the three pieces together by a two-inch iron rod, so arranged that, when the raft is completed, power can be applied to withdraw each pin. Upon such withdrawal the cradle slides apart, releasing its burden.

When the cradle has been built and launched, it is towed to the desired location, which in the Columbia has been in fifty feet of water near the mouth of a slough, and is fastened in its place by a row of piling on one side, each pile passing through a tie box, connected with a bent, which allows the cradle to rise and fall with the tide and also to sink deeper as the load increases. When completed, the raft draws about twenty feet of water.

In order to bind the raft together, the constituent piling must be very carefully selected. No swell butts or crooked sticks are accepted. The minimum length of a pile is thirty feet, and the butt must not be less than twelve inches or more than 15 inches in diameter. Even with such timber, it is a source of wonder that a raft can be built to stand the ordinary swell of the ocean, not to mention the heavy seas frequently encountered, until it is noted with what care each piece is fitted into place, and the whole chained so that the pull on the towline actually binds it



A RAFT UNDER TOWAGE.

more firmly together. The logs are brought beside the cradle, where two large steam derricks, built on scows, are placed to hoist them into position inside. The raft grows, piece by piece, till the cradle is completely filled, when it is ready for the chain work which is to bind the whole together.

In form the raft closely resembles a cigar with each end cut off. It is designed that a section taken at any point should be a circle, but in practice most of the upper face is somewhat flattened. Each end is a perfect circle, twelve feet in diameter, and the size gradually increases till the width is fifty feet. After the raft leaves the cradle, its shape is maintained by chains, made of 1¼-inch iron, encircling the raft at intervals of twelve feet, and by wire cables running both longitudinally and transversely. The termination at each end is a stout bulkhead of four-inch plank, spiked to the ends of the logs. Outside of the plank are two upright round timbers, and the double cable, extending the entire length of the raft, joins the corresponding timbers together. The transverse cables connect the encircling chains a little below the water line, thus preventing the raft from spreading.

The method of connecting the towline to the raft is ingenious and effective. Through the exact centre extends a heavy chain of 1¾-inch iron, with a series of smaller chains attached at regular intervals and connected by shackles to those encompassing the raft. Near the middle these chains extend at right angles to the centre line, alternately on one side and the other, except in the case of the last five at each end, where the circumference of the raft is rapidly diminishing, these being arranged in even pairs and slanting sharply toward the bulkheads at the ends, in a regular herring-bone plan, before joining the outside bands. Thus, when a pull is exerted on the towline, it is transmitted to every chain encircling the raft, and the heaviest strain will come on the rear end, which can better stand it. The logs cannot escape, as they are bound by the circles of chain and the increasing diameter of the raft exactly as are the staves of a barrel when a