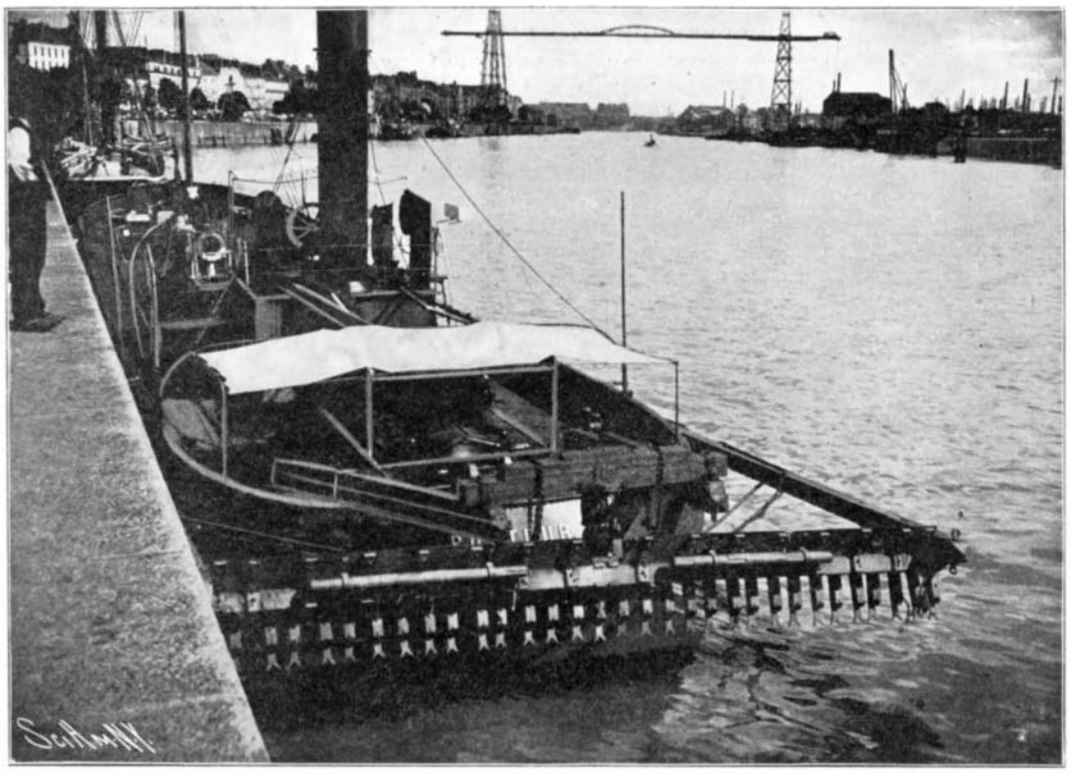
RIVER RAKE FOR CHANNEL DEEPENING.

BY J. PELTIER.

The river Loire is a somewhat capricious stream and by no means favorable for navigation. Its banks are formed of easily displaced and shifting sands, that during winter freshets threaten to fill the channel by the formation of shoals and bars. Engineering skill, however, has succeeded, by the building of suitable works and by continuous and intelligently-applied dredging, and also by the construction of a 10-mile canal around the most difficult portion of the river, in keeping the channel open. Ships drawing about 18 feet of water can reach Nantes at any time of the year, or any condition of the tides. Vessels drawing 20 feet can reach the city during spring tides, and occasionally, during thé highest tides, vessels drawing as high as 23 feet of water have been able to deliver cargoes at Nantes.

During the present winter, after a season which witnessed the highest floods of the Loire of the present century, the river has fallen to an elevation as low as that in the year 1822, and the tides, flowing with rapidity up a comparatively shallow channel, carry a large amount of mud in suspension which, at slack water, settles to the bottom in the upper reaches of the Loire, where the water is rendered slack by the shallower portions of the river, which as yet have not been dredged. In order to prevent tnis accumulation, the Public Works have transformed a steam mud barge into what might be called a steam-rake barge. The barge is 131 feet in length, 23 feet in breadth and has a tonnage of 292 tons. The rake, which is adjusted across the stern, is 36 feet in length and weighs 2 tons. During ebb tide the barge, which has engines of 300 horse-power, takes up a position in the middle of the river and then lets go the rake until it rests on the bottom. The barge then steams from Nantes to the canal and back to Nantes, and continues to rake the muddy bottom until the next time of high water. Steam is delivered to the tines and the upper part of the rake and the agitation serves to loosen up the mud, which is carried in suspension by the ebb tide to sea. The method has proved highly successful.



STEAM BARGE WITH HEAVY RAKE AT THE STERN FOR DEEPENING THE CHANNEL OF THE LOIRE.

SKELETON MODELS OF WARSHIPS.

The costly, complicated, naval constructions of the present age are such intricate structures that the ordinary drawings are exceedingly difficult for the practical seaman to comprehend, and models that will show all details of the interior economy are necessary for the personnel on board to handle and fight a modern battleship most efficiently.

The drawings and blue prints that are furnished in the outfit of all vessels are technical productions, which cannot be readily understood by the men and which require even for officers considerable time to study. These plans are usually kept by the captain, executive, and officer in charge of the department of steam engineering. One is almost invariably obliged to go below into the compartment in question to get a correct idea of the situation, the relative space occupied by pipes, valves, etc., in a compartment and its relation to neighboring compartments. Detail drawings generally fail to show the environment of valves, etc., and inspection of the drawings is rarely satisfactory. Even after going below into store rooms the watertight bulkheads prevent direct access there to neighboring compartments, and an exact idea of surroundings cannot readily be obtained even by personal inspection unless one devotes a great deal of time and care to study those features. This is what must be done by those who are specially detailed to carry out the regulations for the care and preservation of our ships, the executive, hull board, etc., but for the other officers and men skeleton models are necessary if they are to know the ship thoroughly. Having seen the skeleton models on board vessels of the German navy, Commander W. H. Beehler, U. S. N., called attention to them while naval attaché and explained the use which the German navy made of these models for instructing the officers and men about the ships in which they were serving. These skeleton models are made of tin and usually on a scale of one quarter of an inch to a foot; they cost, according to the size of the ship, from 2,000 to 10,000 marks, $500 to $2,500, and this money is well invested by an economical administration.

The Bureau of Construction was anxious to have such models, but did not have the money to construct them. But even this sum and ten times that amount would be much more wisely expended for skeleton models than for the ornate models that have been made of all our ships for exhibition in the great expositions at Chicago, Paris, St. Louis, etc., and which only show the exterior appearance of the ships without giving any view of the interior details. How cheaply useful skeleton models can be made has been instructively told by Commander Beehler in the Proceedings of the U. S. Naval Institute, from which publication we abstract the information presented in this article.

Upon his return from duty as naval attaché at Berlin, Vienna, and Rome, Commander Beehler was ordered to the Asiatic Station and took command of the U. S. S. "Monterey" at Canton, China. Shortly after taking command he proceeded with the "Monterey" to Hong Kong, where upon inquiry he soon found a Chinese carpenter whom he engaged to construct a model of the "Monterey" out of wires, paper, and wood. This Chinaman had two assistants who, by taking the blue prints, constructed a complete working skeleton model on the same scale as the plans, one quarter of an inch to a foot. They did all the work on board, as the plans were not allowed to leave the ship. They simply bent a large wire to represent the keel and stem and stern posts, after which they bent wires to shape according to the plans of each frame and secured these wires representing the separate frames to the keel wire and attached the longitudinals in their proper positions. These wires formed the skeleton of the ship. A narrow batten was then secured inside to represent the keelson of a width corresponding to the scale of the depth of the double bottom. The inner bottom was made of cardboard in sections of the interior watertight compartments. The outer skin plating was left off and the spaces along frames were filled in the double-bottom with cardboard representing the bulkheads of the double-bottom compartments. In this manner all the details of the interior of the

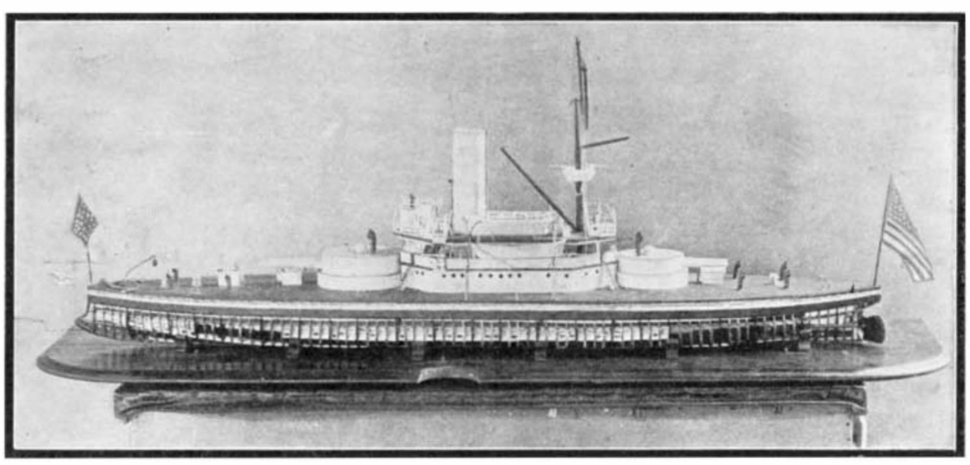


Fig. 1.—The Model Complete.

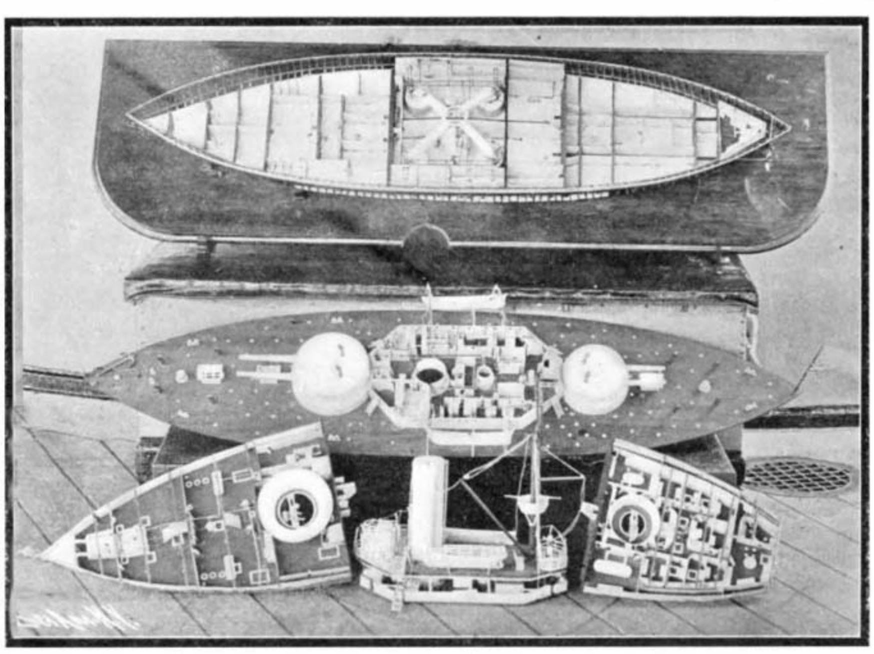


Fig. 2.—Model Dismantled to Show Interior Details.

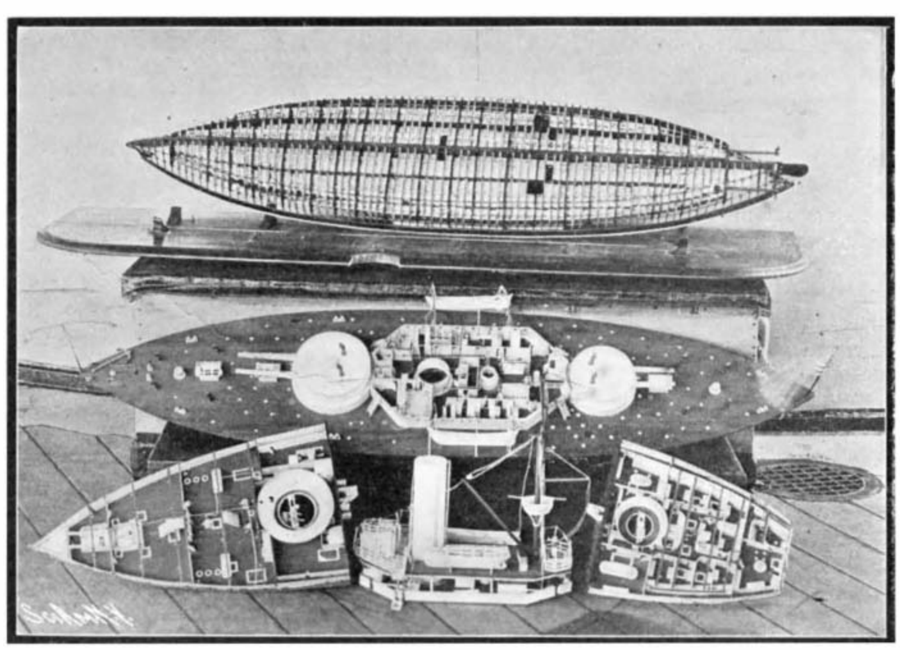


Fig. 3.—A View Showing Double Compartments.

SKELETON MODEL OF THE MONITOR "MONTEREY."