THE NEW PROPELLER "NIPHON."

This is a beautiful vessel of 475 tuns, designed for the China trade; she might, however, be adapted for a gunboat, being capable of carrying a moderate armament, and of sailing fast. She is 157 feet 6 inches long over all, about 154 feet between perpendiculars, has 25 feet 6 inches extreme breadth of beam and 9 feet 6 inches depth of hold, and has a deck above this 6 feet 6 inches high, making her whole depth 16 feet, which brings her under the rule of measurement as a double-decked vessel. Her ends are long and sharp, with slightly concave lines; the stem is nearly upright and handsomely curved in the wake of the forefoot, and her stern is semi-elliptical, and well proportioned. Viewed broadside on, she presents a lively sheer graduated her whole length, and as great care has been bestowed in the regularity of her planking, she looks finely. She has 10 inches dead rise at half floor, and to strengthen her bilges and aid her in holding on by the wind, and prevent her from rolling when going free, she has bilge-strakes 60 feet long, which project outside of the planking 6½ inches, in all 10 inches thick, and are tapered toward the ends to blend with the hull. Her model and style of workmanship reflect great credit on all who have been employed upon her. The following details of her materials and the style of her construction will be interesting to all who are engaged in shipbuilding:—Her partner-beams are 15 feet by 10, boiler-hatch beams 10 feet by 7, and all others in the lower deck frame are 7 feet by 7—they are about 3 feet apart—of hackmetack. The deck is white pine, 3 inches thick. The upper deck frame is also hackmetack, the hatchbeams, mastbeams and forecastle beams are 8 inches by 4½—the rest 5 inches by 4½ and 2 feet apart. The deck is of white pine, 2½ inches thick. The lower deck water-way is 12 inches by 10, ceiling in between-decks 1¾ inches, spirketing 6 inches high, and plankshear 4½ inches, pine; the top of plankshear 17 or 18 inches above deck. The top timbers are of hackmetack, except in wake of 3 ports on each side, only one on each side being pierced for cargo ports. Top timbers 8 inches by 5, tapering to 8 inches by 4½, and 8 inches apart. The outer plankings or bulwarks, from the plankshear to the upper deck, are two-inch pine, excepting on the round of the stern and on the bow, where they are oak. The stem, sided 12 inches, and stern posts, 13 inches, are of oak, also the knightheads—the keel of rock maple one length, and two of white oak, 12½ inches and 12, with lock scarphs 10 feet and 3 inches shoe. The frame or ribs are of Pembroke angle iron 3½ inches by 2½, and ½ inch thick, extending all in one piece from the keel to gunwale. They are only 16 inches from center to center. The cross floors consist of reversed angle iron, and $\frac{5}{16}$ths-inch plate in wake of boiler and engine, on every frame, and elsewhere plate with angle iron on every alternate frame. There is a water-tight iron bulkhead, ¼ inch thick, stiffened by 9 vertical angle irons at the mainmast, to which the boiler and coal bunkers of iron extend. Another similar bulkhead about 16 feet from the stem, and one abaft the engines, 10 or 12 feet forward of stern post, dividing the vessel into four water-tight compartments. The main keelson, riveted to every floor, consists of two angle irons, 3 feet by 3 feet 6 inches, and running through the main bulkhead to the engine floors, which are four feet high above the keel. Instead of ceiling there is a system of bracings of 3 inches by ⅝ bar iron, crossing each other diagonally, and about three feet apart. This strapping, or diagonal bracing, is securely fastened to a heavy stringer plate, 6 inches wide by ¾ thick, running fore-and-aft at the lower part of the plate-iron knees which are attached to the beams by screw bolts and nuts; the lower ends of the strapping are firmly riveted to a bar keelson 4½ by ⅝, attached to the cross-floor heads by double rivets. The planking of the vessel is of the best white oak, the garboard strake 5 inches thick, bolted edgewise to the keel at the distance of four feet. The second strake is 4 inches, and all the rest to plank-shear 3½ inches. This planking is fastened to the angle-iron ribs, by galvanized iron bolts with round heads, having a square shoulder ¾ of an inch from the head toward the screw ends; these bolts are driven from the outside through the ribs, and finally set up by galvanized nuts on the inside of the angle-iron ribs. Between the oak plank and the frames there are strips of tarred felt, and elsewhere wherever oak and iron come in contact.

The upper deck is flush fore and aft, and on it is a companion-way to cabin, towing bits, engine and fire-room hatches, main deck and fore hatches. The wheel-house is forward of the foremast, there is also a patent Manton windlass; the chains come in through water-tight pipes from the hawse holes, so as to exclude the water from the between-decks, Abaft the mainmast is a house, 14 feet by 12, for officers' lodging and mess room, and around the quarter deck are seats attached to a light open rail, supported by turned stanchions; these seats have tin water-tight cylinders attached to them, removable with the seats to serve for life-preservers. There are also ample accommodations for the captain and engineers, and a long dining saloon upon the deck. In addition the ship is fitted with a galley, donkey boiler, pump, and a distilling and steam apparatus for cooking for a large number of passengers or the crew. All the mattresses are filled with cork and other material, so as to adapt them for life-preservers, and all the doors and the chairs have water-tight tin cases attached to them for the same humane end. We believe Capt. R. B. Forbes, the designer of the vessel, calls these the *Monitor* life-preservers.

In case of her being required for a gunboat or an armed-despatch vessel, it will only be necessary to cut and fit the ports, where guns, from heavy 32-pounders to 42-pounders, can be safely mounted, and on the upper deck several light Parrot rifles can be easily made useful.

The rig is peculiar, and may be called a "barkentine," but it differs from the usual rig so-called, inasmuch as the square sails are on the mainmast, the fore and mizen being fore-and-aft rig with boom sails and gaff topsails; the fore stay-sail or main jib sets on a stay setting up to the knight-heads, the bowsprit is really nothing more than a jibboom, on which sets a sail the stay of which goes to the mast-head, close up to the fore cap, and to the topmast there sets a jib topsail. The dimensions of the spars are as follows:—Foremast above deck, 60 feet; head, 10; diameter, 19; rake, 1 inch to the foot; distance from outer part of the stem, 34 feet; topmast, 42; pole, 8; foreboom, 41; gaff, 29. Mainmast, 45 feet from the foremast; 51 feet 6 inches above deck; rake, 1 inch to the foot; head, 12 feet 6 inches; diameter, 20; topmast, 25 feet 6 inches; topgallant, 15; royal, 11; and pole, 5. Total, 56 feet 6 inches—all in one stick. Main yard, 52 feet; topsail yard, 39; topgallant, 29; royal, 20 feet 6 inches. On this mast there is no square mainsail, only a small storm spencer, fitted to brail to the mast. The mizen is 45 feet 6 inches from the mainmast, and is 60 feet above deck, with 8 feet head, and a topmast on which sets a flying gaff-topsail and a stay-sail. The topmast is 32 feet; mizen boom, 41 feet; gaff, 23 feet. As the smoke pipe comes up in the center of the space between the main and mizenmasts, this is the only way by which sufficient canvas can be safely carried on the mainmast. The rig is certainly novel and unique, and will doubtless propel as well and work as well as the regular barkentine.

The draft of the *Niphon*, when in her best light cargo trim, will be 10 feet aft and 7 forward; and when deeply laden, 11 feet or 11 feet 6 inches aft and 8 feet 6 inches forward.

The motive power, got up by the Atlantic Works, consists of two vertical cylinders, 26 inches diameter by 26 stroke, directly acting on the shaft, which is 32 feet long by 8 inches diameter, moving a four-bladed screw 9 feet in diameter. The engines are condensing, with all the usual appliances of pumps, blower, &c. The boiler is 25 feet long by 10 feet shell, with 64 feet grate and 1,600 feet fire surface, and of the kind generally known as the double-return flue boiler. It is expected that she will make, under steam alone, under favorable circumstances, 11 statute miles an hour, and consume 12 or 14 tuns of coal per day of 24 hours, carrying 30 lbs. of steam, and making 75 revolutions, and under steam and sails, with a side wind, she ought to compete with any vessel of her size. As the fastenings of the bottom plank are of galvanized iron, countersunk, three-fourths of an inch, and well plugged, when the bottom is well covered by felt laid on "half-stuff," the composition metal will wear as well as on any purely wooden ship and insure a clean bottom.

The *Niphon* is intended for the China or Japan trade, and has first-rate accommodations for about twenty cabin and two hundred other passengers. She was built entirely after the plans and designs of Capt. R. B. Forbes, under his superintendence, by his executive foreman, Mr. Sylvanus Smith, at East Boston, and will very soon be ready for sea. Her rigging is fitted by Francis Low & Co., her sails made by John Lothrop, her joiner-work by Manson, Peterson & Co.; finally, her model and molds were made by J. J. Lawler, under Capt. Forbes's orders, and are intended for good speed and fair carrying capacity—say 300 tuns of dead weight, or 150 tuns of 40 cubic feet in light goods, and 200 tuns of dead weight.

The advantages of the mode of building as adopted in the *Niphon*, are a good combination of lightness and strength, greater durability, especially in hot climates than if the vessel was built wholly of wood, greater carrying capacity, better ventilation, and consequently more healthy than a wooden ship; ability to get at a leak, large or small, from the inside, when not full of cargo; no stowage for vermin; easily repaired. She has two important advantages over iron vessels; first, the absence of condensed vapor, which always takes place in iron vessels, making them cold in cold weather, and hot in warm weather; and secondly, the bottom being coppered will keep clean better. In short, there can be no doubt of the superiority of this mode of building over wood, and of its being, taking all things into consideration, as good as all iron. For light draught war-vessels it is very superior to all wood, as the amount of weight saved will enable them to be plated in wake of machinery sufficiently thick to keep out many of the lesser projectiles.

In regard to the mode of constructing vessels by a combination of wood and iron, as now adopted by Capt. Forbes, though not identical, it is on the same general principle as that used and patented by R. F. Loper, of Philadelphia, about fourteen years ago, the patent right for which has been lately renewed.

Accurate Machinery.

Newton's London Journal of Arts contains a paper read before the Institution of Mechanical Engineers, London, by Mr. John Anderson, the chief Government machinist at Woolwich, on the copying principle applied to the rifling of fire-arms. The principal object of the author is to set forth the benefits that result from the use of correctly operating machinery. He states that extreme accuracy may be more expensive at the outset, but it ultimately is the cheapest and most satisfactory. Many articles, after being turned and planed, have to undergo much hard filing before they are brought to a perfect fit; whereas, if this labor was spent in making a true fit in the lathe or planing machine, the greater expense of subsequent fitting would be avoided. In the Woolwich gun factory, certain metallic rings, one foot in diameter, had to be fitted to corresponding cylinders, and they were required to move easily yet without shake, as any looseness in the fit rendered them useless. Several good new lathes were tried in vain to make them fit, and they had, therefore, to be scraped and ground by skilled hand labor. Mr. Anderson was confident that the lathes could be perfectly arranged so as to obtain perfect roundness of the rings in them. Measures were therefore adopted to secure perfect roundness and steadiness of the lathe spindle, and with such success that at but a trifle more cost than the previous fitting of one of the rings by hand, the labor was reduced from three days' time to only one hour in fitting a ring. The lathe spindle became a true copy and the sliding rest a correct medium of transfer, and the combination of the two in operation resulted in perfect roundness in the rings. The lathe is a copying machine; and just as its bearing surfaces are, so is the work which is produced by it. In making the successive cylinders for building up an Armstrong gun, it is essential that perfect concentricity of the several parts should be obtained, in order to obtain a bearing of the whole surface.

THE deep-sea telegraph cable between France and Algiers has failed. It has been unavailable for three months, and all attempts made to repair it have proved abortive.