

change and preservation of the coat has been effected by an internal arrangement of wood-work, as holdfasts and strengtheners, so that all the outer hoops and iron-works are dispensed with; yet, such is the dread of innovation in the sage and mature mind of maritime authority, that it took the little interval of seventeen years to get this improvement brought into general adoption. But buoys, made entirely of wrought iron, have subsequently been introduced among the fleet of wood, and are found to have advantages in certain localities. The last improvement proposed by the Superintendent, and adopted by the Board, is the construction of a larger-sized buoy of wrought-iron, as a three-decker—or having three compartments, each air-tight, so that in the event of a ship dashing against it, and bursting in one compartment, the buoys would still float by means of the air in the other compartments. These buoys are of the enormous size of seventeen feet in height, and one of them is twenty feet. We should not omit to state that a buoy is made to retain its upright position by means of a lower division, or cell, which has a hole in it below to admit the water, with an air-hole above; by means of which water-weight at the lower end, the buoy is ballasted. This lower division, whether in wood or iron, is called the ballast-bag. By similar means a buoy is made to float horizontally or afloat, as may be most suitable to circumstances. A buoy is kept in its place by a large chain affixed to a ring at the bottom, which descends the requisite number of fathoms, when it is fastened to a large flat iron slab, called a "sinker," as well it may be, for it weighs twelve hundred weight; and sometimes, where the situation is exposed to the violence of winds and tides, as much as two tons. There are occasions, also, when a mushroom anchor is employed, which weighs nearly this amount, having besides a holding property, that would render it impossible to be dragged by any amount of force which the buoy could experience, or his chain endure.

The importance of the chain being of an ascertained and reliable strength for a given purpose is obvious, and we should not omit to mention the means that Captain Poulier adopts for testing and proving every chain used for a buoy, or supplied to any of the light-ships in the service. The required amount of strength being known, he causes the chain to be tried, by appending weight to it far greater. If the force required, for instance, amount to a strain equal to eight or ten tons, he applies a weight of twenty tons. In general, he tries each chain up to sustaining a weight of thirty tons,—eighty tons being known as their fair breaking point. If a chain has undergone the ordeal of thirty tons unharmed, he then examines every fathom, link by link, and selects any one link that appears, in the least degree, to suggest an imperfection, or to be, in the least degree less strong than the rest. The chain is then taken to an anvil, and this particular link being singed out, two blacksmiths with massive hammers continue to strike it, cold, in successive blows. It may be beaten into triangles, squares, octagons, ovals, and finally flattened, and cut away from the chain; but it must not break, split or show a flaw. If it does "finch" in any respect, the whole chain is condemned, and returned to the severely tried contractor. It would be well for the public service if all government contracts (so long as the odious and mischievous system exists of proposing to men to under-bid each other, instead of offering a fair sum to the best man) were tested with the same severity. A record of all these chain-tests is kept, and of a most substantial kind; the link in question being preserved, ticketed, and bunched up, and a book kept; so that reference can be made directly, if any chain, furnished by the Trinity, Buoy Wharf, is reported to have "parted," when it ought to have held fast.

Attached to this establishment is a blacksmith's shop, and a whitesmith's, for the repair, testing, and so forth, of all iron-work, and for the manufacture of any small articles needed, for the buoys of the light-boats—the latter being supplied and

fitted out with every thing necessary at this Wharf. A room is set apart as a butcher's shop where the masters of the light-boats cut up and salt all their store of meat; and by the side of it is another small room, which contains the pump-works of an Artesian well, of two hundred and forty-five feet in depth, where all the supply of fresh water for their tanks is obtained.

Let us proceed to look at the general store-rooms for supplying the light-houses, light-boats, and beacons along the coast—not forgetting any little additional matter that may add to the comfort and safety of the buoys.

We pass through store-rooms—clean, as only naval officers seem to know how to keep a place clean (for certainly the sight of a morsel of rag, a fallen button, or a pin, would "stand out" as an effect upon the surface); and in side offices and closets we discover shelves full of lamp-glasses of different sizes; cupboard full of reflectors; drawers full of lamp-wicks, like rolls of linen; shelves crowded with light copper oil-measures; nooks and corners filled with bales of lamp-leathers, cloths, and whitening, and soap, and other cleaning and polishing materials; while overhead are hanging groves of mops, hand-brushes, and brooms. All this light-horse chandlery on the left side; on the right are stowed, like a dead wall rising up to the ceiling, a battery of black round-headed oil-cans, each fixed firmly in a circular black basket, so as to be protected from injury when carried up cliffs, or sent up by the side of rocks or light-house stone-work from boats below, or other rough-and-ready-work, on emergencies.

We pass on to the oil-store. This is a great square room, paved with large slabs of slate, so clean and clear from the slightest crumb to catch the eye, that the entire surface looks like one enormous slate. On the right-hand side is ranged a compact set of oil-tanks and cisterns, all painted in Venetian red, and fixed close against the wall. At the opposite end stands a row of smaller tanks containing olive oil, for engines, also painted red. Each has a large brass tap, with a copper mouth-piece hung beneath it, to catch any dripping, together with a copper trough on the floor below, to prevent waste or untidiness. Copper oil-measures of all sizes are ranged on shelves. These tanks and cisterns contain the enormous quantity of one hundred and thirteen tons of oil. All the light-houses, light-boats, and beacons on the coast are supplied from this source.

Passing out through other store-rooms, the floors of which are half-covered with small kegs of whitelead for painting purposes, and with ranges of small red windlasses, or cranes, for heaving up lanterns to the mast-heads of light-boats, we arrive at the chain-cable tiers of the buoys, all ranged according to their several sizes and lengths, and all painted black, and shining in their dark massive repose. A little railway, or tram-road, is constructed from the level of the store-rooms, which runs straight down to the end of the wharf, so that trucks laden and empty can go and return from the stores to the boats, without delay, or effort, and a cargo of all sorts of things is thus "trundled out" in a surprisingly short space of time. Certainly no practical operations, requiring strength, precision, and celerity, are carried out with such undeviating accuracy, as when they are under the direction of an active and intelligent naval officer of experience.

A light-ship (we call them all light-boats) is a creature of peculiar construction; all its fittings-up are peculiar; its crew is peculiar, and all their duties are peculiar. Imagine a three-masted vessel of the size of a small steam-boat, but with bulwark—of great strength, and, in short, presenting all the features of strength and compactness, and the whole frame-work painted a dull Venetian red. All its fittings-up and apparatus on deck are painted red also. Every piece of machinery that is on deck is either painted red, or protected by a red water-proof canvas cover. There is a lantern for each mast-head, but not visible during the day. Each one is lowered and sleeps in a locker, or case, at the foot of the mast

—or rather, where the mast joins the deck. The lantern is a circular frame-work of metal, with glass windows all round, and varying from three to four feet in diameter. They are hoisted up to their position at the mast-head every night, by means of a small crane, called from its shape an A crane. Some of these lights in the light-ships are revolving, for which there is a clock-work apparatus on the deck, with a communication up the sides of the mast. During the day time, a signal to vessels is given by means of a tele-mast, on the summit of which is placed a large globe made of wooden hoops, and having somewhat the appearance of a globular bird-cage. To get this up to such a position, as no shrouds run so high, and the globe could only be fixed there by a manual operation (to leave it swinging would be out of the question, as it would soon be knocked to atoms) was found to be a work of so much difficulty, that Captain Poulier at length devised an alteration in the construction of the globe, by which it should be taken up one half at a time, and then fixed on the top of the topmast. The man who first performed this experiment, found that he could not fix the globe without standing in the inside of one half while he fastened up the other. This being successfully done, it then occurred to him, and to all those on deck who were looking on, that there had been no provision for his getting out! There stood the man in the globe-cage at the tip-top of the topmast, in a situation at once painful and ludicrous—so excellently had he fastened himself in this novel prison. After a time, he was enabled to break out and come down, and the globe has now a little trap-door underneath. These hoop-globes are of great use, being visible from a great distance at sea. A flag is not visible far off, as it straightens in the direction of the wind. Many of the buoys display a hoop-globe of similar construction on the top of an iron rod sticking out of their heads.

In the exposed and stormy position where most of the light-ships are destined to be moored, they are continually exposed to towing seas, and to waves running completely over the decks—and this for days together. Every precaution is taken to keep out the sea from the interior of the vessel, where men are destined to live under such tempestuous circumstances, cut off from all the rest of the world. The decks are saturated all over with a mixture of resin and turpentine, so as to render them impervious to wet, and not only is each hatchway carefully defended, but, even the apertures through which the mooring-cables pass up from below, are protected by iron hoods, like helmets of a primitive form.

The crew of the light-ship is composed of eleven men, with a mate and captain. They are all picked men, as to character; and to provide against illness, as well as to break the monotony of the life, seven only remain on board at a time, and four ashore, always ready to attend a summons. Here then, in some position of the most dangerous kind, on the most dangerous part of our dangerous coast, does the light-ship ride—or rather toes, roll, heave, and plunge—at anchor: battered by the raging seas, howled round by the raging winds, threatened at all times by wreck upon the lee of those very sands or rocks she is placed to warn others to avoid, and remaining fixed at her post in "thunder, lightning, or in rain," even while the "hurly-burly" of the elements seems determined at every moment to drive her to utter destruction. Great care, however, is taken to provide for her safety, as far as practicable. She is always moored by the mushroom anchor, and anchors of a ton weight.

The fitting-up of the interior is of the most careful and ingenious description. The berths, the mess-table, and seats (all fixtures), the lockers, the oil-room, with its tanks, each with a copper trough under its nose, to prevent the least waste or uncleanness; the copper oil-measures; "all of a row," the spare hoop-globes for the topmast, made to collapse, so as to present a flat surface, and thus occupy much less space; Captain Poulier's iron invention for securing any link of