the operation can be performed much quicker. The second method is to lash the two cables together above the turns with a piece of old rope, which acts as the slip and is cut when done with. In rough weather when a boat cannot lie under the bows the lashing must be passed by a man on the cable (if it is not high enough, heave it up), after which both cables are hove into the same hawse-pipe, whence they are easily cleared inboard ; if there are many turns a small lashing will suffice in moderately deep water.

One of the objections made to slack mooring is that turns are formed below water where they are not visible. To meet this objection a piece of paper representing a ship stuck to the glass cover of a compass, with two differently coloured threads attached to paper anchors or inserted into cuts at the edge of the card, in the directions the anchors actually bear from each other, will represent all the turns which the ship makes with the cables.

There are various ways of putting on a mooring-swivel, but doing it inboard appears to be the safest and easiest. First place it in the riding-cable by shackling the two short legs of the swivel ; leave the two linked ends for the second cable, the end of which being hauled out of the hawse by the bowline is hauled into the other pipe by a hook-rope and shackled to the outer long leg ; the stopper just inside the hawse (which had been holding the weight outboard of the lee cable) is then slipped and that hawse-pipe is left clear for hauling out the inner end of the lee cable, which is hauled in the other side and shackled to the inner (upper) long leg of the swivel ; it then becomes a bridle. There are thus three parts of cable in that hawse-pipe ; the last, having no weight, should be stopped here and there to the others so as to be carried out as the swivel is veered towards the water’s edge and the bridle hove up square. Ships constructed as rams take in both bridles on the same side. A mooring-swivel should always be taken off by first heaving it inboard. If moored very slack, turns may form below the swivel during a calm with still water, but they will disappear with a cross strain ; and if the ship is about to get under way the swivel and turns may be hove in together. If it becomes desirable to put on a mooring-swivel when turns are in the cables, let it be put on over them ; they will soon shake out. One of the bridles is sometimes taken off the swivel for the sake of clearing that side of the deck ; the error is obvious on considering that the strength of the remaining part is not equal to the strain which may come upon the span, and the nip in the hawse-pipe is always the part most severely tried. The importance of frequently white-leading and greasing all cable shackles and swivels is obvious, but, being troublesome, it is much neglected. The bow of a cable shackle should always be forward ; if the reverse is the case, the shoulder may strike the side of the hawse-pipe or get jammed under the compressor. The shape of a shackle bolt should be such as to pre­vent it entering the wrong way ; they often go half way in and jam.

It is desirable that every vessel should carry anchors as large as she can stow and work conveniently, and cables to correspond. A wooden-stocked anchor is lighter when under water than an iron- stocked one of similar holding power, and the wooden stock is less liable to foul when let go ; but the durability of iron has nearly rendered the wooden stock obsolete. The old-fashioned anchor with long shank, fluke, and stock had greater holding power and certainty of grip than the more compact dumpy anchor now in common use. Backing large anchors by smaller ones is now seldom practised, except when vessels are on shore and the anchor is laid out on a sandy bottom ; it is generally better that each anchor should have its own cable and proportionate strain. Float­ing anchors were formerly used to keep ships’ bows up in a gale ; they were made of iron crossbars and three or four thicknesses of strong canvas, or a spar with a heavily weighted sail, spanned with a stout hawser ; such a contrivance might frequently be im­provised and used to prevent a boat or small vessel from foundering.

Should an anchor be lost in sand or soft mud after having borne a heavy strain, it may be buried entirely, when it can only be recovered by grappling the chain, if that is of sufficient length. This is best done by a small anchor with a bar of iron to assist the stock and dragged by a long scope of chain. If the anchor is on ordinary ground and only sunk as far as the shank or a little more, as shown in fig. 38, it is easily recovered whether there is any cable on it or not. The full

length of a hawser strong enough to weigh the anchor should be used as a sweep, with a boat at each end pulling very slowly or drop­ping with the tide, in the reverse direction to the strain when it parted, so as to catch the fluke as a hook. Towing a hawser against the tide is generally waste of time, and a chain forms too narrow a bight, unless the anchor is buoyed. When the anchor is felt both boats should close together and their crews pull with all their strength for a minute or two. Then, while one boat remains stationary, keeping her part of the hawser steady, the other should cross her bows with a slack hawser, which thus passes

under the tauter part ; this second boat, by continuing in a circle round the anchor and returning to the side of the stationary one, will cause a turn to be formed round the fluke, as represented in the figure. Both crews should again pull hard to tighten the turn round the fluke, after which, both parts being held in one boat and made equally taut, an anchor shackle (buoyed) is placed round them and shaken down by a veer-and-haul pull on both parts by the crew of one boat, while the other tows ahead to keep a strain on the hawser till it is nearly vertical, when the anchor is secured. The ship can then take in the two parts of the hawser and weigh it.

In getting a ship under way there are a few precautions which should necessarily be observed. If the ship is moored, the first anchor to be weighed is that which it would be least convenient to sail from. At the time of unmooring the direction of the tide is very important in the case of sailing ships, and should not be dis­regarded by steamers. The hauling part of the cat-fall is always through the foremost sheave, to prevent the tackle from fouling owing to the ship’s motion through the water. The cable on the second anchor should always be hove short before making sail. Should there be plenty of room and the wind moderate, there is no caution necessary beyond placing leadsmen in the chains with newly marked lines, and putting the helm hard over each way to ensure its being clear. The after-yards should be braced up on one tack and the head-yards on the other, to pay her head off ; in cutters and schooners the stay-fore-sail is used for that purpose. If another vessel is at anchor too close astern to ensure gathering way while ahead of her, it should not be attempted ; but, by squaring the after-yards as soon as the anchor is tripped, the ship’s head will pay off till it becomes safe to fill all the sails and pass under the stern of the other vessel. The anchor should have been *catted* and perhaps *fished* also during the interval ; much way should never be on the ship till the anchor is secured, for fear of it slipping or of a man falling overboard. Should rocks or shallow water be incon­veniently close astern different means must be adopted. If the wind blows directly on shore, offering no choice of direction, and a current runs parallel to the shore, the ship’s head should be cast against the stream. The yards should be braced abox sharp up, with as much sail set over them as the force of the wind will allow, every means being taken to heave the anchor up quickly ; and, in a well-manned ship, as soon as it is out of the ground, haul on board the main-tack and aft with the sheet, set jib and spanker. The helm being alee, keep it so as long as is required, and brace round the head-yards quickly; the ship will soon spring ahead. Then, by keeping close to the wind, the rate of movement will be retarded till the anchor is secured ; then set the fore-sail.

The above is applicable in moderate weather when all or nearly all plain sail could be set. But, should there be a strong wind and a rough sea, it might not be possible to weigh the anchor or to prevent it staving the bows if it were hove up ; in that case it must be sacrificed for the safety of the ship by passing the strongest hawser from the after-port (padded with mats) to the cable, making it fast by a rolling-hitch, and hauling it taut ; an axe and block should be in readiness, also guys, to prevent the spring of the hawser breaking men’s legs. The courses should be reefed and all ready for setting ; the top-sails (double or treble reefed) should be set or sheeted home ready for setting ; and all the yards should be braced up on the tack it is intended to go off on. The first opportunity should be taken when the ship is commencing a yaw in the desired direction to slip the cable, set the fore-stay-sail and fore-top-mast stay-sail ; as soon as the top-sails fill, cut the spring, set the reefed courses, and the main- and mizzen-try-sails. To veer the cable previous to slipping would be more likely to break the hawser. The expedient of losing an anchor should only be resorted to when there is too much wind and sea to admit of weighing it and not too much to prevent the ship, of whatever description, from gaining something to windward under a press of sail. Otherwise her condition is made worse by the loss of the anchor ; it would be better to decide upon riding the gale out, letting go other anchors, veering all the cable available, striking the top-masts, and bracing the yards nearly fore-and-aft. The cutting away of the lower- masts, when necessary, must always be done with great care to avoid killing people or bilging the ship with the wreckage. The lanyards of the lower rigging on one side should be cut as the ship rolls in that direction, and a few notches made in the mast on both sides 3 or 4 feet above the deck, the men running aft out of the way when it is likely to fall, for which operations they would have from eight to fourteen seconds. As soon as the mast has fallen the lanyards of the stays should be cut and the most strenuous efforts made to cut and clear every rope which would still hold the mast to the ship.

"When weighing in rough weather with sufficient room to drift, it is better to have the anchor fully secured before making any sail ; or, if it is intended to run before the wind, the ship can be kept on her course by the jib only till the anchor is stowed. Steaming up to an anchor against strong wind or tide is objectionable, as it requires great attention and judgment to avoid jerks ; the same applies to steaming in a gale to ease the strain on the cable ; a con-