leſs length and two cables; however, it is adviſable, as a preventive, when ſhips have not room to drive, and the night is dark, to let fall a ſecond anchor under foot, with a range of cable along the deck. If this is not thought neceſſary to be done, the deep-ſea lead ſhould be thrown overboard, and the line frequently handled by the watch, that they may be aſſured she rides faſt.

If at any time the anchor-watch, preſuming on their own knowledge, ſhould wind the ſhip, or ſuffer her to break her ſheer without calling the mate, he ſhould im­mediately, or the very firſt opportunity, oblige the crew to heave the anchor in fight ; which will prevent the commiſſion of the like fault again ; for beſides the ſhare of trouble the watch will have, the rest of the crew will blame them for neglecting their duty.

Prudent mates ſeldom lie a week in a road-ſtead without heaving their anchor in fight; even though they have not the leaſt ſuſpicion of its being foul. There are other reaſons why the anchor ſhould be looked at; ſometimes the cable receives damage by ſweeping wrecks or anchors that have been loſt, or from rocks or ſtones ; and it is often neceſſary to trip the anchor, in order to take a clearer birth, which ſhould be done as often as any ſhip brings up too near.

*Method for the ſafe removal of ſuch Ships as have been driven on ſhore.* For this purpoſe empty caſks are uſually employed to float off the veſſel, eſpecially if ſhe is ſmall, and at the fame time near the port to which it is propoſed to conduct her. In other cases, the following method adopted by Mr Barnard @@\* will anſwer.

"On January 1. 1779 (ſays Mr Barnard), in a moſt dreadful ſtorm, the York Eaſt Indiaman, of eight hun­dred tons, homeward bound, with a pepper cargo, part­ed her cables in Margate roads, and was driven on flrore, within one hundred feet of the head and thirty feet of the fide of Margate pier, then drawing twenty-two feet fix inches water, the flow of a good ſpring tide being only fourteen feet at that place.

“ On the third of the fame month I went down, as a ſhip-builder, to aſſiſt, as much as lay in my power, my worthy friend Sir Richard Hotham, to whom the ſhip belonged. I found her perfectly upright, and her ſhere for side appearance) the fame as when ſirſt built, but funk to the twelve feet water-mark fore and aft in a bed of chalk mixed with a ſtiff blue clay, exactly the ſhape of her body below that draft of water ; and from the rudder being torn from her as ſhe ſtruck coming on ſhore, and the violent agitation of the ſea after her be­ing there, her ſtern was ſo greatly injured as to admit free access thereto, which filled her for four days equal to the flow of the tide. Having fully informed myſelf of her ſituation and the flow of ſpring-tides, and being clearly of opinion ſhe might be again got off, I recom­mended, as the firſt neceſſary ſtep, the immediate diſ­charge of the cargo ; and, in the progreſs of that buſineſs, I found the tide always flowed to the fame height on the ſhip ; and when the cargo was half diſcharged, and I knew the remaining part ſhould not make her draw more than eighteen feet water, and while I was obſerving the water at twenty-two feet six inches by the ſhip’s marks, ſhe inſtantly lifted to ſeventeen feet eight inches ; the water and air being before excluded by her preffure on the clay, and the atmoſphere acting upon her upper part equal to fix hundred tons, which is the

weight of water diſplaced at the difference of theſe two drafts of water.

“ The moment the ſhip lifted, I diſcovered ſhe had received more damage than was at ſirſt apprehended, her leaks being ſuch as filled her from four to eighteen feet water in an hour and a half. As nothing effectual was to be expected from pumping, ſeveral ſcuttles or holes in the ſhip’s ſide were made, and valves fixed thereto, to draw off the water at the loweſt ebb of the tide, to facilitate the diſcharge oſ the remaining part of the car­go ; and, after many attempts, I ſucceeded in an exter­nal application of ſheep-ſkins ſewed on a fail and thruſt under the bottom, to ſtop the body of water from ruffl­ing ſo furiouſly into the ſhip. This buſineſs effected, moderate pumping enabled us to keep the ſhip to about fix feet water at low water, and by a vigorous effort we could bring the ſhip ſo light as (when the cargo ſhould be all diſcharged) to be eaſily removed into deeper water. But as the external application might be diſturbed by ſo doing, or totally removed by the agitation of the ſhip, it was abſolutely neceſſary to provide ſome per­manent ſecurity for the lives of thole who were to na­vigate her to the river Thames. I then recommended as the cheapeſt, quickeſt, and moſt effectual plan, to lay a deck in the hold, as low as the water could be pump­ed to, framed ſo ſolidly and ſecurely, and caulked ſo tight, as to ſwim the ſhip independent of her own leaky bottom.

“ Beams of ſir-timber twelve inches ſquare were pla­ced in the hold under every lower-deck beam in the ſhip, as low as the water would permit ; theſe were in two pieces, for the conveniency of getting them down, and alſo for the better fixing them of an exact length, and well bolted together when in their places. Over theſe were laid long Dantzic deals of two inches and an half thick, well nailed and caulked. Againſt the ſhip’s ſide, all fore and aft, was well nailed a piece of fir twelve inches broad and fix inches thick on the low­er and three inches on the upper edge, to prevent the deck from riſing at the fide. Over the deck, at every beam, was laid a croſs piece of fir timber fix inches deep and twelve inches broad, reaching from the pillar of the hold to the ſhip’s ſide, on which the ſhores were to be placed to reſiſt the preſſure of the water beneath. On each of theſe, and againſt the lower-deck beam, at equal diſtances from the ſide and middle oſ the ſhip, was placed an upright ſhore, fix inches by twelve, the lower end let two inches into the croſs piece. From the foot of this ſhore to the ship's ſide, under the end of every lower deck beam, was placed a diagonal ſhore fix inch­es by twelve, to eaſe the ſhip’s deck of part of the ſtrain by throwing it on the ſide. An upright ſhore of three inches by twelve was placed from the end of every croſs piece to the lower deck beams at the ſide, and one of three inches by twelve on the midſhip end of every croſs piece to the lower deck beam, and nailed to the pillars in the hold. Two firm tight bulkheads or partitions were made as near the extremes of the ſhip as poſſible. The ceiling or inſide plank of the ſhip was very ſecurely caulked up to the lower deck, and the whole formed a complete ſhip with a flat bottom within ſide, to ſwim the outside leaky one ; and that bottom being depreſſed six feet below the external water, reſiſted the ſhip’s weight above it equal to five hundred and eighty-one tons, and ſafely conveyed her to the dry-dock at Deptiord.”

@@@[m]\* Philosophical Transactions, vol. lxx. part 1.