weather a preventer parrel and rolling-tackle should be put on before the men go on the yards. For a fourth reef the top-sail should be clewed up during the operation ; it will then be performed with less difficulty. The long reef-points in top-sails and courses have generally given place to the lighter and more expeditious method of having reef-lines on the sails, with beckets and toggles on the jackstay. The whole strain of the sail is thus thrown on the jackstay and small eyebolts, instead of the points being firmly tied round the yard itself. Also the slab of each reef is usually allowed to hang down and chafe at the fold ; but this can be pre­vented by fastening three or four small slab-lines on each side of each reef. Cunningham’s invention for reefing top-sails is very valuable in all weakly manned ships, but it requires to be kept square upon the yard while rolling up. If it becomes necessary to shift a top-sail during a gale, it should be made up on deck in the shape it would assume if furled on the yard, and stopped with spun-yarn, with the reef-earings and bowline bridles showing near the ends and the clews and bunt-line toggles near the centre, where it would be slung by a slip strop. When the two earings are taken into the centre it will form four parts, and the weather top-mast studding-sail halyards being bent round it will cause it to look like a large bale. In that state it is hoisted into the top by the sail tackle, at the same time being steadied by the studding-sail hal­yards ; there all the ropes are bent, clew-lines and bunt-lines hauled up, reef-tackles hauled out, and the sail bent to the yard before the stops are slipped or cut ; then it is reefed as desired before the weather sheet is hauled home. A fore-sail or main-sail is bent in a similar manner, except that the various ropes employed on a course are bent on deck, by which ropes and the burtons it is swayed up. Studding-sails are very useful in long voyages ; their disuse on the main-mast is to be regretted, especially in long ships. A top-mast or top-gallant studding-sail is shifted “before all,” by a man on the yard gathering in the sail as it is lowered to him and holding the outer leech till it cants the right way.

During a coasting voyage the vessel must be within a moderate distance of the shore, therefore the person in charge should con­stantly be ready to run for shelter when necessary, and have the moral courage to do it in time. In yachting voyages, however dis­tant, there is a natural desire to see the land and all that is worth seeing, and, being well provided with charts, such vessels can enter any harbour, when perhaps a pilot is not able to get out. A ship starting on a foreign voyage should seek “blue water” as soon as possible, and keep a safe distance from all land which is liable to become a lee shore, and not be tempted to edge in because a certain tack is much nearer to the desired course than the other. For the choice of track and for trade winds, see Navigation.

To heave to for the purpose of stopping is done in a cutter by easing off the jib-sheet, hauling over the weather fore-sheet, and tricing up the tack of the main-sail. A schooner is treated simi­larly : the top-sail (if she has one) is backed and the gaff-fore-sail is taken in. A ship has her courses hauled up, head-sheets eased off, and either the main or fore yard squared. Upon the latter point opinions differ. If two ships are close together, the one to wind­ward had better back the main-top-sail and the ship to leeward the fore-top-sail ; they should always preserve a little headway. Boats invariably board ships on the lee side ; small vessels, when drifting fast, on the weather side. A ship at anchor in a tide-way will always present a lee side during some period ; but a ‘ ‘ weather tide ” causes a dangerous sea for boats. A boat’s oars should never be tossed up or forward when there is danger of their fouling, for fear of staving the boat or injuring some one in the after part.

When in the vicinity of a lee beach and landing by means of a boat is determined on, the oars should be manned to the utmost and the waves watched (as they always vary), and the boat forced in on the top of the third large wave, care being taken to keep her exactly end on to the sea. At the instant of touching the ground every man should jump out and begin to haul up the boat, if she is of reasonable weight ; the next wave will probably put them all out of danger. By holding on to the boat they give and receive mutual support, and avoid being sucked back by the receding water or crushed by the boat.

The term " hove to ” as applied to a vessel in a gale of wind is derived from the desire to turn her bow up towards the wind and sea ; this under all circumstances of sail should be the point aimed at, since then the seas strike the side obliquely and also the bow, which is the strongest part. The best sails to keep on a ship during a violent gale are the close-reefed main-top-sail, main- and mizzen- try-sails, and fore-stay-sail. The fore-try-sail also may do good, and is far preferable to a main-stay-sail. The pressure of the main­top-sail tends greatly to mitigate the violent motion ; also by heeling the ship she presents a higher side to keep the sea out and a sloping deck to aid the water in running off. The helm should be about one turn “a-lee,” never hard down. When north of the equator ships should heave to on the starboard tack, and the reverse in southern latitudes. More sail should be made as soon as the gale moderates, to steady the ship. The violent rolling motion may sometimes be diminished by altering course, so that the period be­

tween the waves reaching the vessel may be made to disagree with her own period of oscillation, or when running before the wind by bracing the yards up in opposite directions. Steamers at a reduced speed can scarcely be considered as hove to ; their masts and sails are too weak to be of any use in a gale and too small in moderate winds ; they make the rudder do all the work. The best sail to scud under is close-reefed main-top-sail, reefed fore-sail, and fore­top-mast stay-sail.

Three contingencies should always be anticipated by the captain and officer of the watch, and in some degree by every man in the crew, so that the alarm should lose half its dread and be met by prompt action,—a man falling overboard, fire, and collision. A boat’s crew should be appointed in each watch, who on going on deck should see the boat ready and the plug in. If the ship be on a wind and capable of tacking, on the cry “A man overboard !” the helm should be put down and the ship steered round on the other tack, with either the fore or main yards left square and the courses up ; she will then drift down towards the man, while the boat, which was at first on the weather side, is being lowered to pick him up. If the ship is running free the case is worse ; she must be brought to the wind instantly with the head-yards square. Various plans have been devised for lowering boats, many of them very good when executed by trustworthy men ; the same may be said of the old system with plain blocks and tackles ; practice and cool­ness will render either successful.

With regard to fire, prevention is better than cure ; lights in the hold should never be without a protecting lantern, and passengers’ sleeping-cabins should be lighted by lamps fixed in the bulkhead, inaccessible from the inside. Pumps and engines for extinguishing fire should be on the upper deck, for fear of being cut off by the first outbreak. Fire stations and exercise should be frequent even with the smallest crew. On the first alarm all ports and ventilators should be closed, wind-sails hauled up, hatchways closed as much as practicable, awnings and all lower sails taken in, and the ship kept before the wind, unless the fire is in the after-part, in which case the boats should be lowered at once. Many other things will present themselves to a cool head ; perhaps the first order should be “ Silence ! ”

Collisions may be reckoned among those dangers against which no man can guard himself, be he ever so wise and experienced ; it avails not that one ship should do what is right, unless they both do so. The laws upon the subject appear to be all that can be desired (see “ Rules of the Road,” under Navigation, vol. xvii. p. 277) ; but the mode of enforcing obedience is very lax and lenient. A purely nautical tribunal is greatly needed, and every unjustifiable deviation should be severely punished, whether followed by an acci­dent or not. It is admitted that in most cases of collision the evi­dence is so conflicting that a judge must be puzzled where to find the truth. The great increase of speed diminishes the time of approach ; the increased length of vessels demands a larger circle to turn in ; the want of sail at the extremities diminishes the power of turning, throwing all the work on the rudder, which is proportionately much smaller than it was. The perpendicular stem gives a deadly blow at the flat side, instead of first cutting down the upper works by the sloping cut-water, and probably coming to a state of rest before reaching the water’s edge. Sufficient care is not taken to keep all lights from the upper deck and all places where they may disable the eyes of the officer in charge or the look­out men. Even holes have been made at the back of the bow-light box to enable the officer of the watch to see them burning ; of course his eyes are thereby rendered unserviceable for seeing distant objects. Officers in the merchant service are invariably in two watches, which does not allow them sufficient time for sleep, especi­ally in windy weather. If immediate action is not taken the instant a sail or a light is reported, the officer in charge should take bearings by the compass, by which he will soon know if the other vessel is inclined to pass ahead or astern. If it remains stationary by the compass, they must both be converging on the same spot.

If a ship should spring a leak at sea which may be attributable to straining and is sufficiently serious, she should be run before the wind and sea under small sail. If the pumps then clear out the water, she may run for a port or resume her voyage when the gale ceases. If the leak does not abate, though the motion of the ship is easy, it will be evident that a butt (end of a plank) has started if it is a wooden ship, or that a plate has given way if an iron ship. In that case, two stout hauling-lines should be placed under the bowsprit and head-gear, and the end of one secured to the head-earing, the other to the clew of a spare top-sail or course, also two similar ropes to the other side, each of the four ropes being marked at 10 and 15 fathoms from the sail. Half a hundredweight of iron (shot or furnace bars) should be attached to each clew, the ship’s progress completely stopped, the sail thrown overboard and drawn square across the bows ; the hauling-lines on the clews being carried aft and kept square by the marks, while the ropes on the head of the sail are veered, the sail is placed like a large patch over the place desired. Should the position of the leak not be dis­covered, it might be well to place the sail under the main-mast ;