into account, to say nothing of the resistance of the lower masts and top-masts, and the yards, however sharply braced to the wind, we shall be satisfied that the resistance aloft is many fold greater than that which the hull alone offers to the wind. Accordingly, the prodigious additional security which is imparted to a ship on a lee shore by cutting away the masts, is well known to practical seamen. This con­viction, resting on the ever energetic mind of Nelson, though within a few minutes of his last breath, was the true source of the last order he ever gave, “ Hardy, anchor the fleet.”

Whilst speaking of the comparative merits of steam ves­sels and ordinary ships under a stress of weather, it may be mentioned, that as steamers are furnished with very reduced masts and yards, they are in the most favourable position for making sail in a gale of wind, should sailing then he possible. In other words, a sea-going steamer, though comparatively much undermasted, is enabled, in a storm, to spread quite as much canvas as could be carried with advantage, in a sailing ship of her size, at that particular moment. It must be remembered, that the sailing vessel, in order to be able to make way in fine weather, is obliged at all times to carry with her, and to expose permanently aloft, an extent of masts and yards which is very detrimental to her progress in bad weather; whilst, on the other hand, the steamer stows away her fine weather power under hatches in her coal boxes, till the time returns when it can be used with advantage.

To return to the improvements introduced into the art of seamanship by the skill and science of late years, we may begin by adverting to the remarkable advantages which have been gained by the extensive use of iron on board ship.

In the year 1808, Captain Brown of the navy proposed the use of iron cables and rigging ; but it was not till 1811 that the cables were fairly tried. They have since been used universally, and no greater boon was ever bestowed upon the sea service. The original cost of a chain cable is not much more than that of a hempen one, whilst its dura­bility is greater, in a ratio which cannot be stated in figures. The security afforded by it is vastly greater ; for it is exposed to none of the deteriorating causes which render a hempen cable, after much use, comparatively so little trust-worthy. The alternate wetting and drying, which saps the strength of a hempen cable, has no effect on one of iron. The friction against rocks, especially against coral, is often fatal to a hemp cable in a few minutes ; but the same friction, after weeks of hard use,only slightly polishes a few links of the chain. Intro- pical countries, therefore, the introduction of chain cables has increased the security of ships at anchor tenfold; but in every climate their advantage is immense. Nor does this advan­tage consist solely in their strength and durability, for they are managed with much more facility, occupy far less space, and are coiled away with little, or it may be said, no trouble at all ; for as they are hove in, they fall quietly into, and adjust themselves, in a box or case near the hatchway, from which they are drawn up when wanted with comparatively small labour. To those who remember the toil and trouble of “ forming a bend” in the cable tier, the wet and the dirt, and the noise made by the numbers of men required to coil it away, these advantages will not be considered as small ones.

Several adaptations have been found necessary in conse­quence of the use of chain cables. The hawse holes require to be filled with strong cases, or tubes of iron ; and a most ingenious and powerful stopper has been contrived by the late great and good Sir Thomas Hardy, (the ablest seaman we probably ever had in this country of seamen), by which the cable can at any time be prevented from running out, whatever be the strain upon it. This stopper consists of a large swan-necked bar of tough iron, which embraces the cable as it comes up the hatchway, having one of the ends of the curve fixed to the beams of the lower deck, by means of a powerful bolt, whilst to the other end is attached a tackle, also worked on the lower deck, by which

this curved stopper can be drawn tight, and the chain press­ed so firmly in its embrace, against the angle of the hatch­way, that however quickly it may have been running out, or whatever strain may be brought on it, the cable is ar­rested almost immediately.

Iron cables require a peculiar but easily-learned de­scription of management. They cannot, for example, be used in deep water, without some modification ; for their weight, added to that of the anchor, is so great, that the la­bour of heaving up becomes prodigious. To remedy this evil, and yet to profit by the security which belongs to ren­dering invulnerable that part of the cable most exposed to friction by rocks, a device was suggested by admiral the Honourable George Elliot, which having been found to answer the purpose, is now generally adopted. An eye, with a thimble in it, is formed at the end of a hempen cable, and to this is shackled, in the usual way, one of the lengths of the chain. The outer end of this length of chain being then shackled to the anchor, the cable may be used in any depth of water, with nearly as much security as if it were made of iron from end to end, and with only the inconve­nience arising from the additional weight of one length of chain. Another device has lately been introduced, which many seamen prefer. This consists of three-tapered tails of small chain, shackled to the main one, by which it can be spliced with ease and security to the hempen cable, with the strands of which it is “ married” in the usual way. One advantage of chain cables is, that a ship may often lie at single anchor, without risk of fouling the anchor. If the scope of chain be too short, the tides strong, and the ground either of sand or of smooth and hard materials, there will be nearly the same risk of fouling the anchor as with a hempen cable ; but if the scope be long, the tides not very impetuous, and, above all, if the ground consist of mud, there is scarcely any chance of this troublesome and dangerous accident happening. It may be proper to explain, that “ fouling the anchor” means the entanglement of the cable with its flukes, or other parts, by which its power of holding the ground is destroyed, or so materially lessened, that when a strain is brought on it, the anchor slides along the bottom, and consequently the ship is no longer held firmly.

Any one who looks at an anchor will perceive that it con­sists of three principal parts, lying at right angles to one an­other. 1st, The arms or *flukes,* which form a sort of half­moon, from the *crown* or middle point of which springs ; 2d, the *shank,* a long, straight, and very strong bar of iron, firmly welded to the crown at one end ; whilst the other is passed through, and is firmly, grasped by the 3d part, viz., a stout beam of wood, called the *stock.* The end of the shank, which projects several inches beyond the stock, is fitted with a strong shackle, (formerly with a ring, when hemp only was used), to which the chain is attached. As long as the cable pulls the anchor by means of this shackle at the end of the shank, the anchor does its duty, and resists the effort to move it along the ground ; and if the bottom be soft, the strain of the cable has even the effect of mak­ing the bill, or point of the lower fluke bury itself more and more deeply. The purpose of the stock, or long wooden beam which crosses the shank, is to force the anchor to assume its proper position, or that best adapt­ed to its digging one of its flukes into the ground. This important purpose is effected by the tendency which the stock has to lie flat, that is, horizontally on the ground; a position, it will be observed, necessarily implying that one of the flukes is up, and the other buried beneath the surface of the bottom ; so that if, by accident, the anchor, when first let go from the ship’s bows, should rest on the ground with one end of the stock sticking up, and the other down, which would bring the flukes flat, or horizontally on the bottom, a position in which they would have no hold whatever, a slight strain on the cable puts all to rights, by tumbling the