reſiſtance of the water which depends on it will be very feeble: but as the ſhip increaſes her motion, the force of the wind on the ſails will be diminiſhed; whereas, on the contrary, the reſiſtance of the water on the bow will accumulate in proportion to the velocity with which the veſſel advances. Thus the repetition of the degrees of force, which the action of the ſails adds to the motion of the ſhip, is perpetually decreaſing; whilſt, on the contrary, the new degrees added to the effort of reſiſtance on the bow are always augmenting. The velocity is then accelerated in pro­portion as the quantity added is greater than that which is ſubtracted; but when the two powers become equal; when the impreſſion of the wind on the ſails has loſt ſo much of its force, as only to act in proportion to the oppoſite impulſe of reſiſtance on the bow, the ſhip will then acquire no additional velocity, but continue to ſail with a conſtant uniform motion. The great weight of the ſhip may indeed prevent her from acquiring her greateſt velocity; but when ſhe has attained it, ſhe will advance by her own intrinſic motion, without gaining any new degree of velocity, or leſſening what ſhe has acquired. She moves then by her own proper force *in vacuo,* without being afterwards ſubject either to the effort of the wind on the ſails, or to the reſiſtance of the water on the bow. If at any time the impulſion of the water on the bow ſhould deſtroy any part of the ve­locity, the effort of the wind on the ſails will revive it, ſo that the motion will continue the fame. It muſt, however, be obſerved, that this ſtate will only ſubſiſt when theſe two powers act upon each other in direct oppoſition; otherwiſe they will mutually deſtroy one another. The whole theory of working ſhips depends on this counter action, and the perfect equality which ſhould ſubſiſt between the effort of the wind and the impulſion of the water.

The effect of failing is produced by a judicious ar­rangement of the ſails to the direction of the wind. Accordingly the various modes of Failing are derived from the different degrees and ſituations of the wind with regard to the courſe of the veſſel. See Seaman-ship.

To illuſtrate this obſervation by examples, the plan of a number of ſhips proceeding on various courles are repreſented by fig. 3. which exhibits the 32 points of the compaſs, of which C is the centre; the direction of the wind, which is northerly, being expreſſed by the arrow.

It has been obſerved in the article *CLOSE-Hauled,* that a ſhip in that ſituation will ſail nearly within fix points of the wind. Thus the ſhips B and *y* are cloſe- hauled; the former being on the larboard-tack, ſteer- ing E. N. E. and the latter on the ſtarboard tack, ſailing W. N. W. with their yards *a b* braced obliquely, as ſuitable to that manner of ſailing. The line of battle on the larboard tack would accordingly be expreſſed by CB, and on the ſtarboard by C*y*.

When a ſhip is neither cloſe-hauled, nor ſteering afore the wind, ſhe is in general ſaid to be ſailing large. The relation of the wind to her courſe is preciſely de­termined by the number of points between the latter and the courſe cloſe-hauled. Thus the ſhips *c* and x have the wind one point large, the former ſteering E. *b* N. and the latter W. *b* N. The yards remain almoſt in the ſame poſitton as in B and *y*; the bowlines and ſheets of the ſails being only a little ſlackened.

The ſhips *d* and *u* have the wind two points large, the one ſteering eaſt and the other well. In this man­ner of ſailing, however, the wind is more particularly ſaid to be upon the beam, as being at right angles with the keel, and coinciding with the poſition of the ſhip’s beams. The yards are now more acroſs the ſhip, the bowlines are caſt off, and the ſheets more relaxed; ſo that the effort of the wind being applied nearer to the line of the ſhip’s courſe, her velocity is greatly augmented.

In *e* and *t* the ſhips have the wind three points large, or one point abaft the beam, the courſe of the former being E. *b* S. and that of the latter W. *b* S. The ſheets are ſtill more flowing, the angle which the yards make with the keel further diminiſhed, and the courſe accele­rated in proportion.

The ſhips *f* and *ſ,* the firſt of which ſteers E. S. E. and the ſecond W. S. W. have the wind four points large, or two points abaft the beam. In *g* and *r* the wind is five points large, or three points abaft the beam, the former ſailing S. E. *b* E. and the latter S. W*. b* W. In both theſe ſituations the ſheets are ſtill farther ſlackened, and the yards laid yet more athwart the ſhip’s length, in proportion as the wind approaches the quarter.

The ſhips *h* and. *q,* ſteering S. E and S. W. have the wind fix points large, or more properly on the quar­ter; which is conſidered as the moſt favourable manner of ſailing, becauſe all the ſails co-operate to increaſe the ſhip’s velocity: whereas, when the wind is right aft, as in the ſhip *m,* it is evident that the wind in its paſſage to the foremoſt ſails will be intercepted by thoſe which are farther aft. When the wind is on the quarter, the fore-tack is brought to the cat-head; and the main-tack being caſt off, the weather-clue of the main-ſail is hoiſted up to the yard, in order to let the wind paſs freely to the fore-ſail; and the yards are diſpoſed ſo as to make an angle of about two points, or nearly 22°

, with the keel.

The ſhips *i* and *p,* of which the former ſails S. E. *b* S. and the latter S. W. *b* S. are ſaid to have the wind three points on the larboard or ſtarboard quarter: and thoſe expreſſed by *k* and *o,* two points; as ſteering S. S. E. and S.S.W. in both which poſitions the yards make nearly an angle of 16°, or about a point and an half, with the ſhip’s length.

When the wind is one point on the quarter, as in the ſhips *l* and *n*, whoſe courſes are S. *b* E. and S. *b* W. the ſituation of the yards and fails is very little diffe­rent from the laſt mentioned; the angle which they make with the keel being ſomewhat leſs than a point, and the ſtay-ſails being rendered of very little ſervice. The ſhip *m* ſails right afore the wind, or with the wind right aft. In this poſition the yards are laid at right angles with the ſhip’s length: the ſtay-ſails being en­tirely uſeleſs, are hauled down; and the main-ſail ia drawn up in the brails, that the fore-ſail may operate; a meaſure which conſiderably facilitates the lteerage, or effort of the helm. As the wind is then intercepted by the main-top-ſail and main-top-gallant-fail, in its paſſage to the fore-top-ſail and fore-top-gallant-ſail, theſe latter are by conſequence entirely becalmed; and