throw himself with a superior force on the van or rear, and cut either of these off before it can be properly supported by the other squadrons. Viscount de Grenier, who was, we believe, one of the first to notice these defects, proposed to remedy them by introducing a new order of battle.

The leading principles of De Grenier’s tactics are founded on the following considerations. It is evident that each ship of a fleet must at all times occupy the centre of a cer­tain horizon. This horizon De Grenier divides into two unequal parts, calling the greater the *direct and graduated space,* and the less thc *indirect, crossed, and ungraduated space.* The reason of these appellations is, that on the greater segment of the horizontal circle there are twenty dif­ferent points, which may be marked by degrees from one of the close-hauled lines to the other, and to which a ship may sail from the centre by so many direct courses without tacking ; whereas from the other twelve points, including that from which the wind blows, she cannot arrive but by steering cross courses, which must necessarily delay her progress. Suppose now a fleet to leeward, so disposed that only a part of it can fight with another equally numerous, and ranged to windward in a single line, and let the lee fleet be ranged on three sides of a lozenge *a b, c d, e f.*

The squadron *a b,* which is most to windward, being drawn up in line of battle, cannot be fought but by an equal num­ber AB, CD, EF. All the rest of that fleet therefore must remain inactive, unless the ships which are not engaged should try to pass to leeward of the fleet *ab, cd, ef.* But should the ships of the weather fleet, which are placed be­tween B and F, bear away, as they appear in the figure, be­tween C *i* and F *i,* the ships between A and B, which are fighting to windward, cannot bear away with them. Sup­pose now that the ships between C *i* and F *i* have passed to leeward, the squadrons *c d, e f* which are ranged ac­cording to De Grenier’s system, and have not yet been en­gaged, should come to windward, and join with their friends *a b* against that squadron of the enemy AB which is still to windward and engaged ; it is almost impossible but that the squadron AB must be destroyed by so great a superi­ority, before it could receive assistance from the ships to leeward between C *i* and F *i.*

De Grenier pro­poses only three orders of sailing; one, when a fleet is to pass a strait ; a second, when it steers in open sea, on the look-out for an enemy, or with a view to avoid him ; and a third, when on an extensive cruise, disposed so that it cannot be easily surprised or broken. Of these three orders, only the second and third differ from the usual orders of sailing. The former of these is represent­ed by fig. 34, where the columns, *a b, c d, e f,* are disposed on three sides of a regular lozenge, on the two close- hauled lines. The ships of the two divisions *cd, ef,* sometimes to windward, as in fig. 35, and some­times to leeward as in fig. 34, of the third division *a* *b,* are to be formed on two parallels of one of the close- hauled lines in

the wakes of their respective headmost ships ; while the third division *a b* is to be ranged ahead or astern of the others on the other close-hauled line, steering chequerwise the same course as the other divisions.

When *a b* is to windward of *c d* and *e f* (fig. 34), De Grenier calls that the *windward primitive order of sailing ;* and when to leeward (fig 35), the fleet is said to be in the *leeward primitive order of sailing.* These are the two prin­cipal positions in almost every case, and, with very little va­riety, may become the order of battle, of chasing, &c.

His third order is illustrated by fig. 36, where the divi­sions *a* *b* and *ef* are supposed at the distance of about six leagues from each other ; *c d* and *e f* resting on the extre­mities of the base of a triangle STV, while the centre ship of the division *a b* rests on its summit T : none of the di­visions could be cut off by an enemy, however formidable, seen from its centre ship at the distance of six leagues. For if, on the proper signal, the division *a b* should steer from T toward X, on the course opposite to the close- hauled line it steered before, and the two divisions c *d* and *ef* steer from V and S towards X likewise, it is plain that each of these divisions would have only three leagues to run in order to join the other two, while the enemy, which was first perceived at the distance of six leagues, must run nine before he can come up with the nearest of these squadrons.

To form De Grenier’s order of battle, represented in fig. 37 and 38, it will be sufficient for the ships of the three divi­sions ranged in the windward primitive order of sailing, to heave in stays all together, and get on the other tack on the opposite line of bearing (fig. 37) ; or for the ships in the leeward primitive order at once to haul the wind on the same tack as they steer ; and they will find themselves in order of battle, fig. 38. When the two columns *c* *d* and *ef* are to leeward of the third division *a* *b,* ranged in order of