SPECIALIZATION OF SHIPS OF WAR.

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In times past the fighting powers of a ship of war was measured by the weight of metal thrown by her broadsides. Obviously, the old standard is no longer applicable: What then is the true measure of fighting power in the present day.

The fighting powers of a vessel of war are dependent on:—1. Her gun power. 2. Her degrees of invulnerability in regard of ramming and projectiles. 3. Her speed. 4. Her handiness in manœuvring, 5. On the powers of her spur and torpedoes. 6. On the absence of rigging, which by its fall in action might foul the screw. 7. On her seagoing qualities enabling her to engage without tactical disadvantages in all weathers. 8. On the skill and capacity—general as well as special—possessed by her commander and crew. Ships designed for special duties should possess in addition, the special qualities requisite for the accomplishment of such duties. Thus, ships for coast defence should have a light draught of water, so that all the channels and refuges along the coast may be accessible to them. Ships designed for naval sorties and sudden attacks, should be as much as possible, invisible at night; ships for ocean cruising should be good sailors, and carry an ample store of provisions, &c. &c.

Passing by the qualities indispensable to the performance of particular duties, let us examine, rather more closely, some of those elements of fighting power, to that we may recognize more clearly the inconsistent nature of the conditions which admit of an increased development of particular qualities.

1. The gun power of a vessel is dependent on: the calibre and description of her ordnance; the number of her guns; the ease and expedition with which the latter can be worked, and their angle of fire.

Pieces under a certain calibre—small bore guns more especially—may be regarded as useless against ironclads, as an increase in their numbers pronounces scarcely any augmentation of the tactical power of the vessel. High gun power implies heavy weight, and this, together with the arrangements necessary for fitting and working the guns, causes an increase of gun power in any particular vessel to be accompanied by a very considrrable increase in her draught of water Consequently, it is only ships of a very large size that can carry any number of the heaviest guns. But an increase in the dimensions of a ship causes a loss of turning power and handiness in manœuvring. It is only at the sacrifice of seagoing qualities and speed that we can place heavy armaments in vessels of small size.

2. To increase the invulnerability of a vessel, it is necessary to protect her with heavy armor. Heavy armor involves loss of manœuvring power. On the other hand, invulnerability to ramming depends on speed and turning power to increase the manœuvring power, a decrease in the size of the vessel becomes necessary. Here we see that invulnerability at all points would suppose the co existence of two diametrically opposite condition—an *increase* and *decrease* in the size of the vessel. Rigging diminishes invulnerability, as a vessel with masts may easily be deprived of the latter, and so rendered powerless in action.

3. The speed of any given vessel depends immediately upon the power and height of her engines, so that she would attain the maximum speed possible for her if she carried her machinery alone. To armour a vessel of given dimensions, possessing the highest speed attninable with those dimensions would necessitate the cutting down of her engines, and consequently a reduction of her speed. To put guns in her would only be to reduce her powers of speed further. To rig her and place in her a liberal supply of provisions &c., would be to diminish her speed still more; and so on. Thus we see that the conditions essential to speed are incompatible with the existence of every other quality. which necessitates the carriage of weight over and above that of the machinery. It should be observed that the larger the vessel the greater the speed attainable; in practice, the greatest speed is always attainable with ships of the largest size, the enormous weighi they carry in other ways notwithstanding. Still, there can be no doubt that were the same engine power given to vessels of a smaller size, the speed attainable would be even greater.

Of the proportion between the breadth of the midship section and the length, which we know, exercises an enormous influence over the speed, we shall not speak, preferring to confine ourselves to the elements of fighting power dependent on—draught of water, motive power and thickness of armour.

4th. Handiness in manoeuvring depends on draught of water and engine power. The greater the draught of water in a vessel of given dimensions, the larger will be the circle she describes in turning, and the longer she will be in passing over it; on the other hand. the higher the speed the shorter will be the time required for the same purpose, and the more readily will the vessel answer her helm. Thus, the qualities which facilitate manoeuvring, are those that favor an increase of speed. Although relatively to the draught of water, they are reciprocally incompatible, so that it is impossible to unite maximum speed with the highest degree of turning power; still if other circumstances do not interfere therewith, a very high degree of each of these qualities may be combined in one and the same vessel.

5th. The excellence of a vessel as a ram or torpedo ship depends directly on her speed and turning power, so that whatever is unfavorable to these qualities will militate against her efficiency in the performance of the special duties aforesaid.

All the most recent tactical authorities recognize ramming and torpedo warfare as at least equal in importance to artillery fire. This appears to have led to the practice of giving a spur to armor clad vessels without exception, although in the majority of cases, these vessels do not possess the special qualities necessary for the effective employment of this weapon. It cannot be otherwise, as the objects aimed at in designing them have invariably been limited to gun-power, thickness of armour plating, ocean going qualities, and the possession of auxiliary sail power. The spur, generally speaking is added as something of quite secondary importance, so that the ram power of the vessel is sacrificed for the sake of other considerations, not one iota of which is suffered to be abated. Nevertheless, spurs and torpedoes will, beyond all doubt, become powerful indeed well nigh irresistable weapons, when the vessels carrying them possess the requisite speed and turning power in combination.

6. The existence of masts and rigging implies an increase in the draught of water, so that they exert a direct and injurious influence over the speed and handiness of the vessel carrying them. Besides, in rapid changes of position, they render the vessel less obedient to her helm, as they check her speed in going against the wind. Lastly, masts and rigging diminish the invulnerability of a vessel, because, as before observed, falling portions may easily foul the screw in action, and so deprive the vessel of her powers of locomotion, and render her incapable of continuing the combat.

7. Seagoing qualities in combination with fighting powers are only attainable by largely increasing the dimensions of a vessel, so that to have good seagoing qualities in a vessel of given size, we must be content to sacrifice some portion of her fighting capabilities.

8. The professional skill possesed by the commander and crew is, no doubt, one of the most important elements of fighting power in any vessel. The art of handling a ship can never be brought to absolute perfection, it must always be more or less relative in degree. Independently of personal capacity and profound technical knowledge, superiority in this respect will depend very greatly on the individual faculty of concentrating the attention upon any one particular object.

Let us suppose the case of two commanders of equal capacity placed in similar circumstances. One devotes his attention exclusively, either to ramming his opponent or to attacking him with torpedoes; the other brings his guns into play as well. The advantage on the side of the former will be incomparably greater; that is to say he will commit fewer errors, because his attention will be less divided. We may express the conclusion in other words by saying, "The handling of a vessel under given circumstances will be more perfect in proportion as it is more special in its objects."

The rapid review of the several elements of fighting power shows clearly what was already evident to every seaman—that to combine qualities of all descriptions in one and the same vessel is a practical impossibility. Still, the desire to do so remains, and the results are to be seen in the monster constructions to be found in the fleets of the present day. All these—their vast cost and unprecedented large dimensions notwithstanding—cannot unite all the essentials of fighting power, seeing that each one of these qualities is only really formidable when possessed in a supreme degree.

Gun power will have reached its maximum only when it can penetrate any thickness of armor plating, and continue so to do throughout an engagement. Armour plating is only of service when it protects the vessel carrying it. Speed is only advantageous when it enables us to attack an opponent suddenly, or to show him our heels, or for ramming or torpedo, warfare. Turning power is only really useful in enabling us to avoid the onsets of the enemy's rams. The spur will only prove truly effectious when the vessels carrying it have the speed and turning power requisite to give full effect to a weapon of this description.

All these considerations indicate the necessity of combining certain special and predetermined qualities in individual vessels so as to secure the *maximum* of effect; they show too, that it is as impossible to institute a comparison between the tactical values of ships of different types as it would be to draw a parallel between those of a regiment of infantry and a battery of artillery. Each has its fullest tactical value under cer-