



On the Tactics Best Adapted for Developing the Power of Existing Ships and Weapons (Gun, Ram, and Torpedo) Which Should Regulate Fleets, Groups, and Single Vessels in Action

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ESSAY.

**“ON THE TACTICS BEST ADAPTED FOR DEVELOPING
THE POWER OF EXISTING SHIPS AND WEAPONS
(GUN, RAM, AND TORPEDO) WHICH SHOULD REGU-
LATE FLEETS, GROUPS, AND SINGLE VESSELS IN
ACTION.”**

By Lieutenant SOMERSET A. G. CALTHORPE, R.N., H.M.S. “Vernon.”

“Qu’il faut tâcher de former ses projets de façon que leur irrécussite même soit
suivie de quelque avantage.”—*Maxime du Cardinal de Retz.*

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Introduction.

THE underlying principles of war upon which naval tactics are based, hold good for all time. The details involved in the application of these principles, however, vary with every change in war matériel.

Whilst looking back into history to gain an insight into what has

gone before, in fact the elements of "cause and effect" in the old wars, a study can also be made with great advantage of the works of modern writers on naval subjects; to obtain the opinions of various tacticians, and their methods of applying known principles, to the effective development of the powers of modern ships and weapons.

Captain Mahan says:¹ "The battles of the past succeeded or failed according as they were fought in conformity with the principles of war; and the seaman who carefully studies the causes of success or failure will not only detect and gradually assimilate these principles, but will also acquire increased aptitude in applying them to the tactical use of the ships and weapons of his own day."

In studying the works of tactical writers of modern date, it is remarkable to observe how very much they disagree, how many indeed are diametrically opposed to one another. For instance, few agree as to the best formation in which to endeavour to approach the enemy before going into action.

Line ahead, Line abreast, modifications of these, group formations, &c., all having their advocates.

Some go as far as to assume that it matters little what formation a fleet is in, as a general action will soon degenerate into a *mêlée*. This was, indeed, a prevalent opinion in France some years ago. Admiral Aube,² writing in 1874, remarks: "Absence de règles fixes, l'énergique audace du capitaine assurant le triomphe bien plus que les savantes combinaisons du tacticien, tout vestige des ordres antérieurs disparaissant dans la mêlée, après le premier choc, un hasard devenant l'événement décisif de la journée, l'audace, le sang-froid, le coup d'œil du capitaine, c'est-à-dire des qualités morales, ce qui est le moins fixe, le plus ondoyant, le moins appréciable, l'imprévu enfin: tels sont bien les derniers mots aujourd'hui, de la tactique navale, de cette science qui avait naguère ses principes et, par suite, ses règles déterminées."

Again: "Pen importe la manière de s'aborder," writes Monsieur Gabriel de Charmes,³ "puisque après une première passe . . . la mêlée sera complète."

Some writers state that the formation for battle must depend on that of the enemy, a view which would appear to leave matters until the eleventh hour, if the rapidity with which steam fleets may approach one another, be considered.

Other officers there are who advocate what has, rather derisively, been termed a "game of long balls," that is, practically speaking, bombarding an opposing fleet from a distance.

Arguments more or less in favour of most opinions there must be, no single method having had the practical trial of a modern war; and these same differences of opinion will, in consequence, be found running through entire systems of naval tactics, when discussing a modern battle between fleets or an engagement between single ships. Lieutenant Maurice Loir, of the French Navy, sums up the position

¹ "Influence of Sea Power on History," Captain Mahan, U.S.N.

² "L'Avenir de la Marine Française."

³ "La Réforme de la Marine," Gabriel de Charmes.

admirably. He says:¹ "Une tactique navale doit être simple, elle doit fixer des règles générales en petite quantité, elle doit restreindre autant que possible le nombre des formations, elle doit réduire au minimum les évolutions et les signaux qui leur sont nécessaires."

In the study of naval tactics, our object should, I think, be to weigh the opinions of those writers on the subject who are officers of experience at sea, and also those of men who are exponents of certain schools of thought; to seek thereby what arrangements and formations an enemy may be most likely to make, and those amongst them most disagreeable to ourselves: to try and evolve plans to frustrate these arrangements as much as possible: to have definite ideas—based on the unchanging principles of war—of how to get to work: and, whilst never despising our possible foes, to endeavour to be able, when called upon, to out-manceuvre them, and beat them; by the use of sound tactics, and by obtaining the best results from all our weapons, both of offence and defence.

The writer has in the following pages commenced by reviewing, separately and in a general sense, the various fighting qualities possessed by the gun, ram, and torpedo; and then endeavoured to deduce the best means of applying tactical methods to their maximum combined development in sea fights.

Of one fact only can we rest assured; namely, that when the day comes, and one of our cruisers appears closing the fleet, and flying the signal—"Enemy in sight," we must prepare to go into action full of that spirit which so distinguished our forefathers—every ship's company teeming with what may be termed *esprit de vaisseau*, with a fixed determination to fight to the last, to back up their comrades in line to the utmost of their power, and to beat the enemy at all costs—if we wish to uphold with honour the glorious traditions of our great navy.

On Guns in a Fleet Action.

The proper use of guns in a fleet action is a complicated question, by reason not only of the great variety of the types of guns in use, but that in every type of ship they are differently placed as regards acting in concert; and again, that the various types of possible enemy's ships are differently protected, and vulnerable to a greater or less extent at certain points.

So that we have to consider in combination when to use the guns, what to load with, and what to fire at. We possess, however, a good deal of the knowledge accumulated by experience to guide us with regard to the effect of gun-fire.

Obviously the first question to consider is, what is the object of gun attack?

There can be no doubt, I take it, that primarily it is the disablement and demoralization of the crews of the enemy's ships; and, secondly, the disablement of the ships themselves as fighting machines.

¹ "La Marine Royale en 1789," Maurice Loir, Lieut. de Vaisseau.

Having decided that the first object is to disable the crews, it would appear that armour-piercing projectiles must give way to shell to a very great extent; and this is, I think, an accepted axiom, at any rate in an engagement between the more modern types of battle-ships, by reason of their construction.

Experiments have shown that a large shell bursting in a battery will do almost incalculable damage, literally mowing down everything before it.

Given a shell of moderate bursting charge, and an enclosed battery, no matter how many ports and hatchways are open, there will be a thick choking fog of dense sulphurous smoke through which nothing can be seen, and in which breathing will be most difficult, for some minutes after its explosion.

An extract from "Modern Naval Artillery," quoted in "Brassey's Annual" for 1892, gives the following picture, the result of firing shell from 9·2-in. and smaller B.L. guns in the "Resistance" trials of 1889:—

"None but those who had witnessed the trials could picture the wholesale destruction of these shells. Of the dummy men, scarcely one in the vicinity of a bursting shell escaped; but one of the most remarkable features was the terrible smoke and fumes after each explosion, which set fire to the ship and prevented any one approaching the spot, in some cases for 20 mins. after the shell had burst."

Allowing for exaggeration, this picture is still sufficiently dramatic!

Here, then, we have all the elements necessary to foster demoralization. Men killed and wounded in all directions, difficulty of vision, and partial suffocation.

In casemated ships, effects like the above will doubtless be much more localized; but still bursting shell must always possess an extremely demoralizing effect.

The second question to decide must be, to what extent in a fleet we can afford to diminish the "armour-piercing" fire, since common shell are ineffective against heavy armour?

The answer to this question involves some knowledge of the composition of the enemy's fleet.

If the large majority of that fleet are ships of types which can be in any way fatally injured in their unarmoured portions—such as vessels whose stability depended upon unarmoured ends, or which had large secondary batteries full of men—I am of opinion that all guns, both heavy and light, should be loaded with shell at the outset.

If, however, there be also, as is most probable, vessels with the whole of their fighting powers behind armour, it will be for the Admiral to decide whether the heaviest guns in his respective battle-ships should not be loaded with full charges and armour-piercing projectiles; bearing in mind, however, that the erosive damage done to the interior of very large guns by the use of full charges has proved to be considerable where powder is used, and is expected to be worse if "cordite" is introduced.

No hard and fast rule can be laid down; everything depends, as above stated, on the types of battle-ship composing the enemy's fleet,

and all that can be suggested is the use of shell as much as permissible at first.

With regard to the proper moment to commence fire, it would appear to be at present an open question as to whether fleets will close each other at once, or manœuvre to endeavour to gain some advantage of position, shelling one another in the meanwhile.

The relative advantages and disadvantages of these two methods of engaging will be fully discussed further on.

But, assuming for a moment a cannonade of an enemy from a distance, it is probable that independent firing, all guns loaded with shell, would be the best to use. On the other hand, if the fleets are approaching one another at speed with a view to closely engaging, it is to be noted that relative bearings and distances will alter with *very great* rapidity, and that since it takes some minutes to reload and train a heavy gun, it would be desirable not to discharge the heavy ordnance until the proximity of the enemy gives a good chance of hitting, and this is the case more especially in vessels with our system of heavy guns mounted in pairs.

The opportunity referred to may be lost if the ships firing are thickly enveloped in the smoke of their lighter ordnance.

It is again always possible that an enemy may use torpedo-vessels—not necessarily torpedo-boats—under the cover of smoke, keeping them close under the quarters of each of his leading ships, or in some other position of comparative shelter, and sending them ahead with a rush at an opportune moment just before close action commences.

This possibility is the more worthy of consideration in view of the fact that several maritime Powers take their sea-going torpedo-boats to cruise with them for prolonged periods in peace time.

If, then, any guns of the fleet are to be fired before coming to close quarters—I assume fleets meeting “end on” or nearly so—they should not do so until about 4,000 yds. from the enemy, and then only the secondary armaments and small guns should engage, being ordered to “cease fire” by bugle, and then reload, train on the beam, and crews lay down in good time before meeting the enemy’s leading ships; as this, of all times, is the moment when an uninterrupted view as possible is indispensable, all the guns will be discharged on passing the enemy’s leaders, and then, using independent firing, engage ship after ship in succession.

Personally, I would prefer, if meeting the enemy’s fleet “end on,” to reserve the fire altogether until the enemy is passing, unless the torpedo craft of his fleet are sent ahead through our columns, when, at all costs, they must be destroyed.

The smaller quick-firing and machine guns will engage those of the enemy at close quarters, special attention being given besides to his torpedo ports. Guns in tops must engage the enemy’s top guns, and will also possess a very considerable “command” of his decks.

Touching the control of fire—what has by writers in the sister service been termed “fire discipline”—the main responsibility must, I think, fall on the officers of quarters, who will have received concise instructions, should be well acquainted with the various types of the

enemy's battle-ships, and who will have to use discriminating observation and judgment.

In the more modern battle-ships, "independent firing," if well controlled, is probably the best to use in every case. Ships of older types with large broadsides might use "broadside firing—gun-directing," especially on the first charge. "Director firing" is, however, altogether inadmissible in a fleet action, owing to its slowness and the difficulties of the constant communication it involves.

The officers of quarters and the gunnery officers in a ship must direct the gun fight; the captain will have his hands full in attending to his helm and engines alone, retaining, besides, general control and a comprehensive grasp of the entire situation; this latter no easy matter in a hail of shot and clouds of smoke when manœuvring a ship at high speed.

In estimating the effect of smoke in hampering the movements of a fleet in close order, anyone who has seen practice in peace-time carried out by ships in line ahead steaming past targets cannot fail to have been impressed with the fact that, directly the leading ship opens fire, she is hidden from her own consorts, at least temporarily, and that station keeping at once becomes more difficult.

It is unnecessary to enlarge on the fact that in a more complicated formation, with the possibility of having to change front rapidly, the difficulty would be enhanced.

We have not yet obtained a satisfactory smokeless powder for the heavy guns; when we do, all manœuvring in action will be simplified. Under present conditions, however, everything, in my opinion, points to reserving the fire as much as possible until in close contact with the enemy, when once you have turned to meet him. An opposing fleet may perhaps be bombarded at long range if the circumstances are favourable to this method of attack; but, as soon as an advantage has been gained, and the Admiral intends to close, "cease firing"—"reload"—"lay down."

Single Ships.—The gunnery questions involved in a single combat between two battle-ships will be governed by the same general rules as have been already advanced, with small modifications:¹ "A sea-going battle-ship," writes Lord Brassey, "when she fights a monitor, should not be handled in the same way as she would if she met a vessel of her own class. If her principal and auxiliary armament is better protected than that of her adversary, it would be in her interest to fight the battle at long ranges, which would diminish the chance of accident.

"On the other hand, if her inferiority in the matter of protection was clear, she should use her utmost endeavours to get to close quarters, in order to reach the final stage as soon as possible."

He goes on to say, that in certain cases tactics must be modified according to the morale and the training of the adversary.

It will, however, in the writer's opinion, be well never to incline towards holding the morale of an enemy in contempt.

¹ "The Naval Annual, 1893," Lord Brassey.

Splinters.—The detail of the various precautions to be undertaken to prevent or minimise the chances of fire and splinters is perhaps outside the limits of this essay; but it is interesting to note the very definite orders given in the French navy on the important question of boats when preparing for action.¹

“Les embarcations sont, autant que possible, rentrées et amenées sur leurs supports, à l'exception de deux embarcations légères.”

Elles sont débarrassées de tout le matériel autre que les avirons, remplies d'eau jusqu'aux bancs et revêtues de leurs étuis mouillés et de filets pare-éclats; leurs grues sont rabattues ou rentrées.

On the Ram.

Many writers consider the ram *the* weapon “par excellence.” In single-ship actions this may still be so, but I am inclined to the opinion that its value is somewhat overrated as a factor at the outset of a general engagement.

The power of the ram, successfully used, is irresistible. Unfortunately the judicious application of this power would appear to be the most difficult task that falls to the officer in command of a heavy battle-ship. The ship which uses her ram when breaking the enemy's line lays herself open to being also rammed by another ship, of perhaps greatly inferior value, astern of the vessel with which she is in actual collision. Of what avail for a great battle-ship like the “Royal Sovereign” to ram an enemy, if, in the process of so doing, and when fire from her stern guns is for the moment unsettled in the excitement which must ensue, she presents her quarter as an easy target for an enemy's little “Hero” (of good bow fire) coming up astern of the ship rammed?

If you ram an enemy's ship on first passing through his fleet—and this applies especially to leading ships—your hands are tied until you are clear of him; and you break up your own formation, by throwing ships in your immediate wake into confusion.

Of course, if an adversary endeavours to ram, the one course open is to meet him “end on,” and, other things being equal, the better captain will succeed, or the two ships may collide bow to bow and scrape past each other.

It may well be doubted, however, if any captain would risk ramming from such a position. When it is remembered that ships meeting “end on” might, and probably would, collide at a combined speed of about 20 knots, such a policy would appear to be suicidal, as both ships would be completely disabled.

Our recent disaster in the Mediterranean affords an indication of the amount of injury which may befall the ship ramming; and, in the instance quoted, it is noticeable that the ships themselves had been steaming under 9 knots; and, at the time of collision, both ships had their helms hard over, and engines reversed, which circumstances

¹ “L'Arrêté Ministériel sur le Service Intérieur à bord des Bâtiments de la Flotte,” 1896.

tended to materially check their "way," irrespective of the fact that they did not collide "end on."

It is conceivable that it would be good tactics to endeavour to pass through the enemy's fleet "en masse," that is in a concentrated formation, invariably manœuvring to meet them "end on"; and then to turn, reforming on guides immediately, with the object of falling upon them, if possible, in a weak spot, according to circumstances, before they have themselves had time to turn. The carrying out of this plan of action is of itself an objection to ramming on the first charge.

In most cases after turning, re-forming, and meeting again, the formations on both sides may fairly be expected to have become somewhat disordered, and the side which succeeds in concentrating a majority upon some defective spot in the opponent's fleet will have gained a great advantage.

Good ordnance and superior morale amongst guns' crews will give to one side or the other an advantage of comparative certainty; whereas ramming tactics, when in close proximity to many ships, will, as a general rule, leave too much to chance.

I repeat that, in many cases, it is probable that a ship which has succeeded in sinking an adversary and getting clear herself, may be found to be seriously damaged about the bows, perhaps to the extent of being very much out of trim, a calamity which would vitally hamper all subsequent movements. So difficult will it be, with a moving mass of 10,000 tons, to ram, and yet not over-ram.

A turn of extra speed at the shortest notice may in cases be absolutely necessary to avoid the enemy's rams; and I would suggest that on going into action the telegraph should remain at "half speed," with distinct instructions to the engine room that on their moving round to "full speed" this was to be acted on below as an order to increase speed *as rapidly as possible* by at least 2 or 3 knots. In all cases a *very* large increase of speed can only be effected with comparative slowness if dangerous priming and overheating of working parts are to be avoided; but it would be well to point out that by a quick increase of a few knots a ship may be able to get out of danger.

I do not for a moment advocate the entire disuse of rams, but have endeavoured to point out that it is undesirable to use them at the outset of an action for the reasons discussed, viz., (i) that ramming tends to break up the fighting formation of a fleet, thus paralyzing its mobility for subsequent manœuvres; (ii) that ships using their rams will in most cases be open to an immediate assault from the enemy's rear before they have had sufficient time to get clear, an operation which will necessitate going astern, then stopping and turning ahead, before even steerage way is obtained.

The ram is the weapon with which to give a *coup de grâce*, and as such can probably be used with greater advantage and far less risk at the end rather than at the beginning of an action.

On the desirability of constructing special small craft, of great turning power and good protection, as "rams," on the American plan, I have not touched, as being outside the scope of this essay.

It is nevertheless significant that a weaker naval Power should have seriously considered the matter.

On the use of Torpedoes in Fleet Actions.

1st Section: Battle-ships and Cruisers.—The Whitehead torpedo has, since its first introduction into our Service, made a steady advance both in accuracy of projection, size, and speed, and has now attained a position of great importance as a factor in naval engagements.

Although a weapon of great power, the use of the Whitehead is attended by rapidly increasing limitations. In other words, it is being driven down below the water-line by the growing necessity of protection consequent on the great progress in the development of quick-firing guns.

Experiments show that the guncotton charge is unlikely to explode, even if riddled with machine-gun bullets, unless the detonator itself is struck.

The effect of the bursting of the shell of a quick-firing gun, however, would probably be much more serious. Again, if the torpedo should explode, the damage done would almost unquestionably be of a vital nature, and the moral effect on the crew little less than disastrous.

At the commencement of a fleet action the fire may reasonably be expected to be particularly heavy, and it is therefore open to doubt whether above-water discharges are so efficiently protected as to render them, comparatively speaking, invulnerable.

It would appear, then, that there may be a dangerous risk attached to the use of torpedoes above the water-line at the early stages of a general action, more particularly in those ships where the discharging apparatus is totally unprotected.

The following question will have to be carefully weighed: Is the use of an above-water discharge justifiable, especially in the case of a ship possessing submerged discharges on both broadsides as well, when in close proximity to the enemy's vessels, whilst their secondary armaments are still intact?

A few officers there may be who are still of opinion that torpedoes should not be "let loose" in a fleet action at all, on the grounds that they will be as dangerous to friends as to foes.

Doubtless they might be if discharged indiscriminately, but in many cases (on first going into action, for instance, in a formation of narrow front) each ship might get beam shots on passing the enemy with, practically speaking, absolute safety to her consorts.

Here, then, is the opportunity for submerged tubes. The dangerous objections already discussed disappear altogether; and this weapon, the submerged tube, I hold to be one, if not the, most important engine of destruction in a ship.

A vessel may be crippled, her steering gear shot away, her machinery disabled, half her guns dismounted or out of action, and, in fact, be in a semi-sinking condition, and yet retain intact on each

broadside a weapon representing the destructive force due to about 200 lbs. of gun-cotton.

The torpedo practice in our navy from submerged tubes has, on the whole, been very good at everything but extreme speeds, and fairly-straight shooting might be anticipated with confidence at speeds up to at least 15 knots, which speed will probably not be exceeded by large fleets manœuvring in close order.

If it is conceded that the risk of employing Whiteheads from above water is too great during the first vigour of the light gun fire, it might perhaps be desirable to keep the torpedoes below the water-line fully charged and adjusted, and ready to be hoisted up and launched into the tubes at any moment at the discretion of the captain, bearing in mind that the time occupied in whipping up and launching in would, in most cases, not greatly exceed that required to load a heavy gun. As a close action develops, it is fair to assume that the light gun fire will diminish considerably in intensity. Some guns at this stage will have been disabled, guns' crews will have suffered, and the supply of ammunition may not be as regular as at first; the risks incurred by the use of torpedoes from above-water discharges will have been correspondingly reduced.

In the case of a stem tube, if it is intended to load it, it must be discharged before arriving at close quarters with any probability of using the ram. In some cases, indeed, a torpedo in the stem tube may be regarded as a prolongation of the ram itself; in other words, if an enemy is right ahead, he may be struck by a torpedo fired from the stem tube, while the two ships themselves are still at some distance from one another; or be forced to diverge from his course in order to avoid it.

With regard to the enemy's use of his torpedoes, it is impossible to lay down any rules as to attempting to elude them. The captain of a ship must employ his utmost judgment in his use of the helm, taking heed at the same time of his position in the fleet.

In all cases, some quick-firing guns should be specially directed when at close range at any of the torpedo ports of the enemy's ships that are visible.

The above considerations apply equally to cruisers. All our new 1st class cruisers are fitted with submerged tubes; and all have totally unprotected above-water discharges. It should be practicable to so modify our discharges in all ships that the pistol and primer could be screwed in at the last minute, without "launching back" the torpedo. This would greatly diminish the present risks attendant on above-water fire, and brought about by the great strides made in the development of quick-firers.

On the Use of Torpedoes in Fleet Actions.

2nd Section: Torpedoes used from Torpedo Craft.—In this section we come upon very debatable ground. There are two opposite opinions on the subject: one side consider that torpedo craft will stand no chance against the tremendous light gun fire of modern

fleets, and would besides hamper their movements; the other side are of opinion that an enemy may, and probably will, bring torpedo craft to sea with him; which must be met and if possible destroyed, by opposing torpedo craft, who will also act offensively against the enemy's ships.

The late Admiral Long, in an essay on the "Probable Influence of Quick-firing Guns," says,¹ "The prospect of a fast torpedo-boat passing through the zone of fire of a battle-ship during daylight and clear weather is quite a forlorn hope." And Mr. Laird Clowes, in his lecture on torpedo-boats, remarks,² "The attacks which in my humble view are not permissible are . . . attacks during actions wherein two fleets are engaged, concerning the almost absolute hopelessness of success by daylight against any respectable enemy I need, I think, say nothing."

These are two very strong expressions of opinion; on the other hand, the last-quoted writer admits that "French tacticians notoriously believe them to be practicable."

To quote a French view of some few years back:³ "C'est ainsi qu'une escadre de nos jours, si elle était dépourvue de torpilleurs, serait très certainement détruite par une escadre de même force qui en conduirait à sa suite. La lutte même serait à ce point inégale, que nous ne voyons pas comment elle pourrait être soutenue."

Again, Captain May, in the discussion which followed Mr. Laird Clowes' lecture, after observing that 99 out of every 100 great sea-fights have been within one hundred miles of land, went on to say: "I am perfectly sure if we are fortunate enough to get the enemy out, as Nelson got him out at Trafalgar, that he will bring out his torpedo-boats with him."

The writer inclines strongly to this opinion. Although quite admitting the soundness of the view that torpedo-boats cannot keep up with large fleets at speed in anything but fairly fine weather; still I think it is imperative to take the bigger torpedo craft (by which I understand torpedo-catchers and torpedo-boat destroyers) to sea, or risk being caught at a most serious disadvantage. When cruising in the open the speed of a fleet must necessarily be moderate, unless it is close to a coaling base; torpedo craft should then be able to keep up.

Even if they could not do so at the last, in heavy weather, on the assumption that the fleet largely increase speed before going into action, it is conceivable that, arriving on the battlefield an hour or so later, they could use their torpedoes with most destructive results on half disabled ships with decimated and exhausted crews.

I am, therefore, of opinion that torpedo-catchers and torpedo-boat destroyers should be attached to a sea-going fleet, under convoy if necessary; should close the enemy under the lee of the hulls of the battle-ships; and should, primarily—exercising the function for which they were constructed—attack the torpedo craft and boats of the

¹ Journal R.U.S.I., January, 1892.

² Journal R.U.S.I., May, 1892.

³ "La Marine de Guerre." Par M. Gougeard, ancien Ministre de la Marine.

enemy, if there be any, which is probable; and secondarily, should attempt to disable the enemy's ironclads with their torpedoes. Their commanding officers would be previously directed that they were invariably to get out of the way, and in no case to hamper the movements, of friendly battle-ships.

The new torpedo-boat destroyers are small vessels credited with a speed of 26 or 27 knots; assuming they can maintain even a speed of 22 knots for the time occupied in making a short desperate rush, they will, if "end on," close an advancing enemy at the rate of about 34 knots, perhaps more. The question then arises, will they all so assuredly be sunk, as some writers assume, before discharging even one of their several torpedoes, if they remain under cover till the latest moment?

I will close this portion with an expression of opinion given lately by Admiral of the Fleet Sir Geoffrey Hornby: "I look upon it the ironclad and the torpedo-boat ought to look upon one another as comrades, the one protecting the other from fire, the smaller boat protecting the ironclad from that deadly weapon, which there is no doubt we ought to hold in great respect, and which I hope we shall do."

On the Composition of a Fleet and its Organization.

The composition of a fleet depends so much upon the material at hand which is available at the moment of war being imminent, that the following views can only be taken as an attempt to indicate how to group ships of various types together on emergency, rather than a selection of the best ships to be assembled to form homogeneous fighting bodies.

The main essential to be aimed at is to develop extreme mobility; and the fleet must besides be what has been termed "plastic" in the hands of the Admiral. It is therefore obviously necessary, to combine together as much as practicable, vessels of nearly the same turning powers and speed.

I would lay down two general principles with regard to the main bodies of fleets.

Firstly. If a very large fleet is to be formed consisting of both modern and comparatively obsolete vessels, then I think it would be best to organize in two very distinct squadrons.

The first squadron to be composed of speedy modern battle-ships; the second squadron of the older types of broadside ironclads and turret ships.

These two squadrons to form two separate fighting bodies. The modern and speedy squadron leading into action; the older vessels giving the second blow.

This arrangement would allow the leading division to form with great rapidity, and take any advantage of the enemy that speed might give; allowing the second squadron in the meanwhile to form more slowly under cover in their rear.

¹ When Chairman at R.U.S.I. Mr. Laird Clowes' lecture.

I do not think that the objection of want of concentration can be fairly urged against this system of attack, as the rear squadron should be upon the enemy very soon after the action commences, and yet would not embarrass the movement of the faster ships, and should be well hidden at first by the smoke of the leading squadron.

It would appear to be probable that concentration carried to an extreme in naval tactics, by hampering fast ships with the association of slow ones, may seriously interfere with a rapid and effective blow.

To illustrate my meaning, in dealing with a fleet in two squadrons, a list is appended of vessels forming an imaginary Channel fleet on the sudden outbreak of war:—

<i>Van Squadron.</i>		<i>Cruiser Squadron.</i>
"Empress of India," Flag.	"Royal Sovereign."	6 ships of the "Edgar"
"14,000 ton ship."	"14,000 ton ship."	or "Aurora" class.
"14,000 ton ship."	"14,000 ton ship."	10 ships of "Apollo"
"Admiral" class.	"Admiral" class.	and "Latona" class.
		4 ships of "Haleyon"
		class.
<i>Rear Squadron.</i>		6 torpedo-boat "de-
"Edinburgh," Flag.	"Colossus."	stroyers."
"Alexandra."	"Old broadside ship."	
"Broadside ship."	"Broadside ship."	
"Thunderer."	"Devastation."	

The "van" and "rear" squadrons cruise at sea as a main body, surrounded by their lighter consorts.

On sighting the enemy the squadrons would take up position in fighting formation in two separate bodies, one astern of the other. The question of the best formations will be presently discussed.

It may be well at this point to quote the opinion of Captain Mahan:¹ "When a fleet becomes too large to be handled by one man, it must be subdivided, and in the heat of action become practically two fleets acting to one common end; as Nelson, in his noble order at Trafalgar, said, 'The second in command will, *after* my intentions are made known to him' (mark the force of the '*after*,' which so well protects the functions both of the Commander-in-Chief and the second), 'have the entire direction of his line, to make the attack upon the enemy, and to follow up the blow until they are captured or destroyed.'"

The two squadrons then, should act independently; that is to say that the Commander-in-Chief with the leading squadron should be able to feel that whilst he was free to move rapidly, yet the second in command was following his lead with the rear squadron, with the firm intention of backing up his tactics to the utmost, and at the same time taking advantage, if possible, of any unforeseen developments which might take place, after the first contact of the fighting line with that of the enemy.

Much would in this arrangement depend on the readiness of resource of the Admiral commanding the rear squadron. Suppose, for instance, that the opposing fleets meet "end on," and that the leading squadron pass through the enemy's lines. It is not improbable that

¹ "Influence of Sea Power upon History."

the latter could be caught between two fires, for whilst the first squadron was turning and re-forming, the enemy would possibly be engaged with the second; or they might have approached so close as to prevent his being able to turn to meet his original foe without danger from the rams of the supporting rear squadron coming up. The Admiral in command of the second squadron, therefore, should have a free hand to lead his ships in any direction most harassing to the disposition of the enemy, having due regard to his leader's intentions, and to the necessity of giving him support.

The object of this policy, as before indicated, is that the first blow should be given with great rapidity by an homogeneous body of fast powerful ships on the enemy's fleet, or some part of it. This blow to be well backed almost immediately afterwards by a fresh body of ships in good order.

Secondly. If the entire fleet is too small to permit of this disposition in two separate squadrons, its mobility must be impaired, and all battle-ships will have to act together as a whole; in which case, speaking very generally, I would put the strongest ships in the van and rear, and the older and weaker types, should there be any, in the centre.

With regard to Cruisers and Light Craft.—The proportion I have assumed for a fleet of 16 battle-ships is 6 large cruisers of the "Edgar" or "Aurora" classes, 10 smaller cruisers of the "Apollo" class, and 10 torpedo craft (torpedo-catchers and torpedo-boat destroyers).

Their disposition at sea when searching for the enemy, and as "look-outs" generally, scarcely comes within the scope of this essay; except that on the efficacy of their "look-out" will depend the time given the fleet in which to form, and raise steam for full speed.

Four general rules may be indicated with reference to "look-out" duties:—

Firstly. That since the enemy must approach far more rapidly from ahead than from any other position, it is more important to look out in that direction than in any other.

Secondly. That the outer "look-outs" should, as far as possible, be large cruisers, powerful enough to engage and drive in any cruiser of the enemy's; both to prevent his forming a correct estimate of the number and power of the fleet, and to enable the cruiser herself to give more information with regard to that enemy.

Cruisers of the "Edgar" and "Aurora" classes should therefore be allocated to the outer positions.

Thirdly. That the connecting or intermediate cruisers between the outer cruisers and the main fleet should be the smaller vessels of the "Apollo" class.

Fourthly. That the cruisers should *not* look out on a fixed compass bearing, irrespective of the course of the main fleet, but should alter course with them and take up their former positions with respect to the fleet, when the fleet alters course. This last principle involves a greater expenditure of coal than if they looked out on a fixed compass bearing, but is a necessary corollary to the first rule laid down.

Torpedo-catchers and torpedo-boat destroyers would cruise with the van squadron, carrying orders in many cases to the inner line of look-outs, who would then close the outer line and repeat; they should also act as despatch vessels if close to a base, but would be of no value as "look-outs" proper, owing to their limited arc of vision, and to the excessive vibration experienced in them at speed, rendering the observation of any object or signal through a glass a very difficult operation.

The position of the cruisers and light craft in action would depend very much upon the organization of the main fleet; but as a general rule, on being recalled to take up their stations for battle, I think cruisers should form on the rear flanks of the van squadron, ready to act as directed, and attack the enemy's cruisers; and that the torpedo craft should be either affiliated to the more important ships, or should be stationed in the immediate rear of the van squadron, where they would in no way interfere with the movements of the battle-ships, and where they should gain great protection from their hulls until ordered to advance.

Discussion of a Policy of "Long Balls."

The commencement of a general action may be governed by one of two extreme principles, viz.: either to lay off the enemy's fleet and bombard it, manœuvring in the meanwhile to gain an advantage; or, to close him rapidly, endeavouring to bring him into close action and to pass through his fleet, making in the process all possible use of both ram and torpedo, as well as the gun fire.

The first principle depends more, however, on the intentions of the enemy than the second. If he is determined to close at once, it will be difficult to avoid him without drawing off altogether for the time, a risky course to pursue, and one which is nearly always likely to entail a disadvantage to the retreating side, unless from strategical reasons it is necessary to avoid a decisive engagement.

Keeping at a distance from the enemy to make the maximum possible use of gun fire, presupposes either heavier ordnance, or very good shooting from the guns of the side wishing to adopt these tactics; and given these advantages, it is worthy of note that the elements of chance introduced by close action are largely reduced. Though some officers of high rank consider this bombarding policy a very dangerous one, since ships remaining at a distance would be the longer exposed to an enemy's fire; granting that your ordnance is superior to his in weight and calibre, and your shooting is in no whit inferior, it would appear that remaining at a distance may in some cases be a distant gain.

No sooner do fleets close each other, than the elements of chance must increase enormously in proportion, by reason of the fact that huge machines are moving in very close proximity to one another—possibly in thick smoke—and are open to attack by both ram and torpedo besides.

Captain Mahan remarks:¹—"A *mêlée* between numerically equal

¹ "Influence of Sea Power upon History."

fleets in which skill is reduced to a minimum, is not the best that can be done with the elaborate and mighty weapons of this age. The surer of himself an Admiral is, the finer the tactical development of his fleet, the better his captains, the more reluctant must he necessarily be to enter into a *mêlée* with equal forces, in which all these advantages will be thrown away, chance reign supreme, and his fleet be placed on terms of equality with an assemblage of ships which have never before acted together."

In a foot-note Captain Mahan says: "He believes that a fleet seeking a decisive result must close with its enemy, but not until some advantage has been obtained for the collision, which will usually be gained by manœuvring, and will fall to the best drilled and managed fleet."

This, then, would appear to be a very sound tactical principle. Try to out-manœuvre the enemy and fight him with your guns, remaining outside the range of his rams and torpedoes until you have obtained an advantage, and then fall upon him, in his weakest spot if possible. To do this your fleet must be in a good formation for the gun fight, so as to develop to the utmost the capabilities of the guns, and yet be able to obtain a rapid change of front by means of the simplest manœuvres and an absolute minimum of signals.

The advantages which a leader should endeavour to obtain before determining to close may be different on every occasion, depending, as they do, on both wind and sea—the former as regards smoke, the latter as regards manœuvring generally—and also on casualties in both fleets, due to the effect of the gun fire.

I do not advocate a bombardment as a necessary preliminary to a fleet action in all cases; it will sometimes be desirable to close the enemy at once, in which case it would, in my opinion, be better to reserve the heavy gun fire. For instance, in the case of unequal fleets, it would generally be an advantage to the weaker side to get into close action as quickly as possible; again, a determination to do so on the part of an enemy must be considered. At the same time I would point out that an Admiral inevitably loses a great deal of his control over his ships as soon as they close, and that the elements of chance at once develop to a maximum, for the reasons before stated.

The Commander-in-Chief, therefore, must grasp the exigencies of the moment and manœuvre so as to be able, if possible, to arrive opportunely on a selected point in the enemy's fleet with a superior force, to overwhelm and break up that portion of the enemy's formation, and thereby weaken the mutual support and co-operation amongst his opponent's ships.

On the Selection of a Fighting Formation.

The writer is strongly of opinion that the fighting formation of the fleet should be determined on beforehand, and not left until almost the last moment, then to be based, if practicable, on the formation of the enemy.

The answer to the question—What formation is the best?—is commonly evaded on the above grounds.

An officer in command can only have very indefinite plans, and his subordinates still more vague ideas, if this view obtains in a fleet.

Would it not be better to pick out some sound fighting formation and adhere to it as much as possible?

I maintain that a lot of changes in formation and "steam tactics," though most excellent as drill, are not the essentials in obtaining the greatest mobility from a fleet at that particular time when rapidity of action is most necessary.

What will be required of all commanding officers is a thorough previous knowledge of the general policy of the tactics the Admiral intends to pursue. Each captain will then be more likely, in the words of the late Amiral Jurien de la Gravière, to "*comprendre son chef à demi-mot.*" He will have more confidence in his knowledge of the responsibility incumbent on his own post in the fighting formation, and in the ships which should support him. He will know more certainly the position of his "Guide," on whom he will have to reform, and he will be more likely, in the confusion of close action, to grasp the situation. Once in the thick of the fight there can be no signalling for instructions, and assistance and support should be mutually given, on a pre-arranged plan.

However able a leader may be, history has shown us again and again that his action will be hampered, if not entirely frustrated, from want of proper support. It is of the first importance, therefore, that the Admiral should possess the confidence accrued by knowing he is well backed, and the fewer the alterations in formation at the eleventh hour the more certain can he be that the captains of ships understand the duties of their individual stations.

We come next to a review of the various formations in which a fleet may go into action.

Fighting formations for battle-ships all come under one of the following categories, originally enunciated years ago by Admiral Colomb:—

- I. Narrow front—great depth.
- II. Extended front—slight depth.
- III. Front and depth equal.
- IV. Groups.

The extremes of I and II are, of course, Line ahead and Line abreast. It is now proposed to discuss them and their modifications.

Firstly, with regard to *Single line ahead*. This is perhaps the easiest formation in which to keep station and manœuvre; it is extremely flexible, and all ships have the same leader to follow. It is easily re-formed.

On the other hand, the formation is so prominent that the leader would invariably "draw" an exceedingly heavy fire. The return fire may be, at first, very much masked. The line is too extended for mutual support, and is particularly weak in the rear.

Divisions Ahead—Disposed Abeam.—A modification of this, though

an excellent navigating formation (order of sailing), possesses the same defects as single line, though to a modified extent, but without corresponding advantages. It is slow for a rapid change of front.

Indented Line Ahead.—(Columns 2 cables apart, ships in columns $2\frac{1}{2}$ cables apart.) One leader formed 4 points on the quarter of the other would appear to be a strong formation. Station keeping in it is easy, since ships may be always in Line ahead on their guides if this formation is assumed by closing two columns together.

It is fairly compact, it possesses an uninterrupted broadside fire, a possibility of using torpedoes from the outer broadsides of all the ships composing it with safety to friends, and it is fairly flexible.

This formation, however, is weak in the rear.

It is observable that in some cases a fleet formed with a narrow front will conceal its strength.

Secondly, with regard to *Line abreast*. A good ramming formation, but extremely slow for change of front. The leaders are not sufficiently prominent, neither broadside guns nor torpedoes can be used with the same safety. Weak against concentrated attack by reason of unhandiness, and especially weak in the flanks.

Divisions Abreast—Disposed Astern.—Better, but has several of the defects possessed by Line abreast.

Divisions in Quarter Line—Disposed Astern.—A good fighting formation, as regards the use of the offensive powers of the ships forming it. Bad both for station keeping and changing front, and has the disadvantage of the various ships having to keep position by bearing on their leaders, instead of simply following them.

Taking the third category. *Front and depth equal.* The main objection to all formations of this type would appear to be the fact that the use of both guns and torpedoes must be interfered with, by the proximity of friendly ships in every direction. It is also an unhandy type of formation for any alteration of front.

Fourthly, *the group formations*, as associated with all types of triangles, would appear to be bad for manœuvring and unhandy, since the smoke of one of the three must almost of necessity envelop one of the remaining two ships composing the group; relative bearings and distances would be very difficult to maintain. If smokeless powder is eventually used for all types of guns, this objection would, of course, be much modified.

It is probable that any formation is a bad one for battle which depends on the majority of the ships composing it having to maintain a certain bearing from a guide.

There is, of course, no limit to the number of modifications of the formations already discussed, and it would be impracticable within the scope of a short essay to survey each one in detail.

All that can be attempted is to consider the points essential to a good formation, and, having selected one, to try its capabilities against others which may be advanced against it by an enemy.

The main conditions of an efficient formation I take to be these :

Firstly. Mutual safety in manœuvring at a high speed in all

weathers and in thick smoke, combined with the least possible difficulty in station keeping.

These conditions, to my mind, at once indicate the advantages of lines ahead on leaders in some form, combined with equal speed.

Secondly. The maximum effectiveness of both gun and torpedo fire, compatible with a minimum of risk to friendly ships.

These advantages would appear to be best gained by keeping both "beams" of every individual ship clear of her consorts.

Thirdly. The power to "Change front," with the least difficulty, and in the least time.

Fourthly. Good mutual support throughout the formation, and a possibility of easily re-forming on leaders.

In the writer's opinion, on the whole, the indented line ahead is the formation which best covers these conditions. Its weakest point lies in the chance of rear ships being attacked by an overwhelming force after the majority of the fleet have passed through the enemy's lines, and therefore when they would have to turn to be able to support them. The way to meet this objection is obviously to make the rear very strong, and this might be effected by attaching to it two of the most powerful cruisers and two torpedo-vessels, stationed on the off quarters of the respective rear ships, which would in no way hamper the columns in their movements. This, however, would only be necessary if the case of a comparatively small fleet acting as a whole is taken. If there are two separate squadrons, the rear of the first squadron should be supported, if in danger, by the leaders of the second squadron coming up.

The indented formation ahead has also been accused of want of flexibility; but it is probable that with the columns two cables apart, no difficulty should be experienced in making a turn, if it was clearly laid down, that the outer line was to increase, and the inner line reduce speed, by a fixed amount, as recommended by the late Sir George Tryon, and practised in the Mediterranean Fleet.

In comparing this formation with single line abreast (a favourite formation of some foreign writers), it will be seen that in passing through the enemy's line at whatever point, the whole fire of the fleet will be successively directed at the two or three nearest of his ships, and that they cannot be properly supported by their consorts without the entire formation being broken up.

The formation of single line abreast is said to be a good one for ramming; as before stated, I am of opinion that to attempt to ram, in an "end on" attack, is nearly as fatal to the ship ramming as the one rammed.

Attacking a deeper type of formation, say divisions in quarter line disposed astern; it would be well perhaps to attempt to attack one of the flanks of the enemy's rear column, and overwhelm, if possible, the whole of that column, before the leading column had time to turn and close. And this brings before us a fact that it will always be important to bear in mind, viz., that in most instances, once leading ships are through the enemy's lines, they are powerless to assist their consorts astern, except in a limited way by the

use of their guns, until they have turned, which takes some minutes.

There is nothing in the formation I have advocated to prevent the Admiral "turning together" any number of points, at the last moment, signalling by the use of one or two flags only, if he sees a probability of being flanked before closing by reason of his relative position.

On the Post of the Commander-in-Chief in Battle, and his Signals.

The difference of opinion which has existed as to the proper position of the Commander-in-Chief in battle is not so marked as it was formerly. The consensus of opinion at the present time would appear to point to the senior officer leading in the van.

The question in all its bearings, due weight being given to historical experience, is fully discussed by Captain Mahan, in his admirable work. Summing up, he says:¹ "The ease and quickness with which a steam fleet can change its formation make it very probable that a fleet bearing down to attack may find itself, almost at the very moment of collision, threatened with some unlooked for combination; then where would be the happiest position for an Admiral? Doubtless in that part of his own order where he could most readily pilot his ships into the new disposition, or direction, by which he would meet the changed conditions; that is in the position of leading."

Of course the concentrated fire of many ships may be directed on his flagship, and that ship if leading will be in the most prominent, and consequently most exposed position in the fleet. On the other hand it has been pointed out that if the Admiral is to fly his flag at all, it is open to the enemy to pour a heavy fire on him, no matter where his ship is placed.

Experience has shown that it is extremely difficult, especially when dealing with rapidly approaching fleets, to judge distance from the rear or centre; by which I understand the being able to estimate how much sea-room is possessed in which to change front, or perform any other manœuvre, before the leading ships on both sides come to close quarters.

Looking astern for signals from the Commander-in-Chief does not commend itself to the judgment of most officers, and, practically speaking, as ships will be worked in action from their fore conning towers, it would be most difficult to keep in touch with the intentions of a senior in the rear.

Again, however clear the instructions of a Commander-in-Chief may be, the unforeseen may constantly have to be reckoned with, and the leader, if not the senior officer, may be doubtful of how to act. "At such critical moments of doubt," says Captain Mahan, referring to the passage of Farragut's ships at Mobile, where a junior was leading, "any but the highest order of mind tends to throw off the responsibility of decision upon the superior, though from the instancy of the case hesitation or delay may be fatal. A man who, as the com-

¹ "Influence of Sea Power on History."

missioned chief, would act intelligently, as the mere subordinate will balk. Nelson's action at St. Vincent will rarely be emulated;

It is an historical fact, and one which has been exemplified on several occasions in sea fights, that an advantage has been lost, or disaster incurred, through some junior doubting as to the purpose of his Commander-in-Chief. If we neglect this truth we shall be neglecting that "human element" which is the great controlling factor in all the combinations of man.

The Commander-in-Chief, then, should lead into action. The practice some years back in our navy was to place the ship of the senior captain immediately in the wake of his flagship. It would, perhaps, be better to station her as leader of the second line—taking the indented line as the fighting formation, this being the best position from which to continue the plan of action of the Admiral, if calamity befall him.

In a very large fleet of two distinct squadrons, one composed of the faster battle-ships, the other of the less modern vessels, the latter squadron should, as previously stated, be in the hands of the second in command, the Rear-Admiral. To him will then fall the very responsible position—the most responsible in fact, after that of leader, of efficiently supporting the main attack.

A great deal of attention has been directed of late to the manœuvring of large fleets using as few signals as possible.

A careful study of this important point was made by the late Admiral Sir George Tryon, resulting in the well-known "T.A. system." It must be obvious that an Admiral's intentions and movements will always be delayed, unless some system is adopted in which the signals made are of extreme simplicity.

A meaning must often be conveyed by a single flag, so that little or no reference to a signal book need take place; and, as long as the Admiral leads the fleet, a great many simple manœuvres would require no signals at all.

This summer (1893) in the China cruising squadron under Sir Edmund Fremantle, alterations of course up to 16 points, ships "turning together," were performed, signals being made by the use of three pendants and two flags only; and this in a squadron (in lines ahead, disposed abeam) whose *columns* were only $1\frac{1}{2}$ cables apart.

It is not the purpose of this essay to elaborate a system of signals. I would merely indicate that it appears to be practicable to work a fleet in "Indented Line ahead" by the use of very few flags.

The main requirements in the formation indicated being to be able to—

- (i) *Turn in succession*, leaders first, any number of points (up to 16), to starboard or port.
- (ii) *Turn together*, any number of points (up to 16), to starboard or port.
- (iii) *Re-form*, in line ahead or leaders.

On Engaging an Enemy's Fleet.

The writer's next endeavour will be to attempt to indicate a plan of action which might be adopted, taking the indented line ahead as a fighting formation.

The fleet is in this instance assumed to be a large one on the lines discussed before; that is a van squadron, led by the Commander-in-Chief, of fast modern vessels, and a rear squadron of older battle-ships under the second in command.

In the present example each squadron is assumed to have eight battle-ships, supported by a cruiser squadron of 16 vessels, besides the torpedo-craft.

The order of sailing is "Divisions Ahead—Disposed Abeam," the cruisers being in their look-out positions, and the torpedo-craft forming a third line on the off-beam of the Admiral (see Plate I).

A cruiser closes the Admiral, flying "Enemy in Sight." The fleet at once forms the fighting formation by one column in each squadron closing in to two cables' distance from the other; ships in column opening out to one-third greater distance apart than when in close order, and accurate station in the indented formation being taken up.

The torpedo-vessels will have orders to place themselves according to the arrangements of the Admiral as before indicated; the main object to be obtained being to give them at first as much cover as possible without hampering the movements of the larger ships.

The cruisers, having been recalled as the enemy heaves in sight, take station on each quarter of the van squadron on their leaders. After being thoroughly instructed in the Admiral's general views they should, I think, be left free to a great extent to exert their utmost powers as circumstances appeared to direct under the cruiser squadron leaders; their first objective being the cruisers of the enemy.

The fleet would now be in formation, alter course towards the enemy, and increase speed (see Plate II).

At this stage the writer would almost prefer to stop. It seems presumptuous to the last degree for any officer writing in the quiet of peace-time, to lay down the law as to how to conduct a fleet action—a science only to be learned by sad experience.

The following must therefore be taken as merely an outline sketch of the policy he would adopt if possible.

The enemy draw nearer, but are still out of range; every eye on the bridge of the flagship will be straining to make out his strength, his formation, and the component parts of his fleet.

The question then to be considered by the Admiral will be, can we, and if so, is it well to shell him at long range before closing?

This, again, will depend upon a combination of circumstances; but I am inclined to the opinion that, as a general rule, it may be well to do so, if he has equal or superior ordnance in his fleet to that possessed by the enemy, and if his opponent appears to be disinclined to come to close quarters. The late Admiral Long stated, as his opinion, that if one side turned off to bring their broadsides to

bear, that the other side would very probably do the same in the early stage of an engagement.

In the eighteenth century wars, when a determined leader almost invariably steered straight for his enemy, it is to be remembered that his ships carried short-range guns, which were harmless at distances which with modern ordnance have become fatal, and by closing, no additional adverse chances at all to be compared with those involved by the use of rams and torpedoes were incurred.

If the Commander-in-Chief elect to engage at long range, he will endeavour at the same time to manœuvre to gain the position which, according to circumstances, appears to offer most advantages at the time; and he may possibly in the meanwhile be able to form an estimate of the manœuvring capacity of his antagonist.

Sooner or later the fleets must close, and when within about 1,000 yds. the firing should cease, and the fleet be led straight for the enemy.

It does not, perhaps, follow that the Admiral will invariably be in a position to charge through the enemy's lines, though in "end on" attack this would be the best course to adopt, in my opinion, as a general rule; indeed, in several formations it would be dangerous to pass close to, and parallel with, one wing of his formation.

An example should make this clear. Suppose enemy to be in "Divisions ahead—disposed abeam," and that the fleet in "Indented Line ahead" pass close to and outside his port column. (See Plate III.) If, at the moment the two leading ships pass each other, enemy's starboard column alter course together eight points to port, this column will shortly be in an excellent position for ramming, assuming the fleet in "Indented Line ahead" to be so close as to have neither room nor time to turn; on the other hand, the latter fleet will have enjoyed the superiority of fire all through; this advantage, however, would not compensate for the danger of their position.

In considering the question of torpedo craft, their tactics, I think, would depend mainly upon whether the enemy sent his own ahead or not before the main fleets actually came into collision. In the first case the torpedo craft must go ahead and engage; in the second case, or in the case of the enemy being without any torpedo craft, I should keep them right astern of the battle-ships. They would there gain the greatest protection and be able eventually to advance with a rush at the very period when the enemy was about to turn and re-form, after he had just received the whole force of his adversary's fire, and when he was possibly least expecting a torpedo attack.

To continue, the fleet cease fire and are leading straight for the enemy, men at their quarters laying down, guns loaded. Good station should be comparatively easy to keep, as the ships are in line ahead on their guides.

On the leaders passing through the enemy's formation, they should deliver the whole of their fire from both sides. Guns horizontal, and trained, if anything, before the beam. The turret or barbette guns being trained on the beam away from the friendly column, to prevent

the possibility of their fire being masked if from any cause the ships are out of station; and torpedoes discharged from that beam only.

The remainder of the fleet do the same, as they follow in the wake of their leaders. The moment the leaders are clear of the enemy's rear, I am of opinion that they should put their helms hard over, turning outwards from one another, to be followed by the other ships of their respective columns in succession.

The Admiral may then close the leader of the opposite line, or signal him to close, as appears to be most desirable. It is imperative, while passing enemy's rear ships, for leaders to turn *at once*, if any advantage is to be gained, the main object being to fall upon him again while he is in the act of re-forming.

The heavy guns in each ship are reloaded during the turn, and the inner beam becomes the outer one. If the rear squadron is following very close in the wake of the van, it would, perhaps, be safer to turn in succession, leaders first, either to starboard or port, instead of turning outwards, so as to prevent the possibility of fouling the rear squadron or hampering their movements.

As far as practicable, the engagement should, I think, be fought out to the bitter end on these lines; in fact, that ships of the fleet should invariably endeavour to re-form in line ahead on their guides, and that anything approaching a *mêlée* should be avoided. I entirely agree with Admiral Colomb, who stated as his opinion, at the Royal United Service Institution, that "a *mêlée* is an abomination, a thing that no English officer ought ever to dream about or think about."

No proper mutual support could ever be obtained, nor would the Admiral have control of his ships, if the fighting formation were entirely broken up.

I have assumed, in this sketch, an enemy with a comparatively broad front, mainly because some foreign writers appear to advocate formations of this type, and are very antagonistic to line ahead. Personally, I think that "Indented Line ahead" will meet any other formation on at least even terms, being, comparatively speaking, easy to handle.

As regards ramming, it is probable that in order to gain some tactical advantage for the gun fight, fleets will manœuvre and subsequently get into close action at high speeds; this being the case, it would be very dangerous to attempt to ram a ship when meeting her anything like "end on," or on the bow.

The late Admiral Long observed:¹ "Some event of importance to one side or the other would sooner or later occur, determining the course of an engagement by rendering it imperative to succour some disabled ship, and it would be futile to attempt to carry the movements further. Rams might then be employed."

The only period during the earlier portions of a battle in which ramming is strictly permissible is, to my mind, in the event of being able to re-form after turning so quickly as to catch the enemy whilst he is in the act of doing so.

¹ Essay on "Influence of Quick-firing Guns," at R.U.S.I.

This great advantage could only be obtained by an exceedingly well handled and lucky fleet.

One last word on the subject of a fleet action, and that is to call attention to the immense importance of proper mutual support and regard for friendly ships. It is to be hoped that we have not in the Service altogether lost that generous and devoted spirit which so distinguished Nelson's captains, and which was fostered by constantly fighting in company.

The policy of "everyone for himself" never helped a side to win a game of football, nor is it likely to lead a fleet to victory.

It will not, therefore, be sufficient for a captain to fight his own ship well; he should besides have constantly in his mind his duties to his comrades.

Manœuvring in "Indented Line ahead" might be regarded, I think, for purposes of support to a great extent as fighting in pairs. The "opposite number" in the other line forming the comrade of a ship, supporting her by gun fire and otherwise as far as consistent with keeping her own position astern of the guide of her column; but in no case should a ship leave her station in the fleet entirely without overpowering necessity, unless signalled to do so. I quote, in conclusion, from a printed extract of a letter, written 13 years ago by Admiral of the Fleet Sir G. Hornby: "That which constitutes the main strength of a squadron is the mutual confidence which the captain and crew of each ship have in their consorts."

"Groups in Action."

I am not quite clear as to what is meant by the term groups; if considered as a portion of a fleet mutually supporting one another, they have been already dealt with, and, as previously stated, my view is, that for purposes of support, "pairs"—one ship being on the quarter of the other—is the best system in the indented formation.

I have in the following remarks taken the other view, viz., that the group in action means a small or detached squadron.

It is to be assumed that no light squadron would be detached or allowed to cruise in the vicinity of an enemy's fleet unless all the ships in that squadron were possessed of considerable speed, otherwise they might be overtaken and overpowered by a superior force. The capabilities of aggression of a light squadron must depend upon their number and size, and very general rules only, therefore, for their conduct can be laid down. In certain cases they might possibly harass the rear of large fleets if possessed of great speed; and, again, in thick weather a small fast squadron should be at an advantage. Also, with ships of high freeboard and a powerful stern fire, it is conceivable that it might be good tactics to endeavour, if possible, to induce an enemy to chase head to sea, the advantage here being that he would be firing his bow guns in the teeth of sea and spray, whilst the return fire on his bows and conning tower would be delivered from, perhaps, equally powerful guns in a comparative calm.

¹ Quoted from Brassey's "Annual," 1893.

Obviously, in a retreating fight such as here indicated, the ships with the best stern fire should be in the rear, and a "wide" formation adopted.

As a general rule, however, when engaging a squadron of about equal powers, a small squadron should go into action in "Single line ahead," the most powerful vessels being in the van and rear. I am persuaded that the advantage of position must lie, to a very great extent, with the side whose ships can manœuvre¹ most rapidly, and the simplest formation, that of "Line ahead," is for that reason probably the best to use, although too extended in length to give proper support in the case of a large number of ships.

In it, according to circumstances, you are more likely to gain the weather gage to the advantage of your lee guns, should this be desirable owing to a rough sea, and consequently excessive spray at high speeds, or maintain some other position outside the range of rams and torpedoes, involving a superiority of gun fire.

The general principle should be the same as with large fleets, viz., that the fight should be a gun fight until such time as some distinct advantage has been gained.

These tactics, be it remembered, always infer at least an equality of gun fire. Should a weaker force determine to attack a stronger one, it is in their interest to close at once, as the elements of uncertainty produced by the use of rams and torpedoes are probably, if anything, in their favour, whereas the superiority of the enemy's gun fire must eventually tell if they remained at a distance.

The *cruisers of a fleet* considered as groups, and going into action with the fleet, would be stationed under their leaders, one half being on each "quarter" of the van squadron.

I am of opinion that they should fight the enemy's cruisers in single line ahead.

On Single Vessels in Action.

(i.) *A Battle-ship in Action.*—It will probably be rare for a single battle-ship to be sent on any mission alone in war-time, but instances may occur in which a ship may go alone to join and reinforce a fleet, and that the enemy might detach another battle-ship or ships to intercept her.

The ultimate object of a single ship action is generally considered to be to ram, and this being the case the maximum possible speed must be maintained, as it is a fundamental principle that turning powers being equal, the fastest ship has the advantage, and need never be rammed as long as she retains her speed and is properly handled.

The manœuvring principles governing a ram attack have been exhaustively discussed, both by English and foreign writers, for many years.

Lieutenant Besson, of the French Navy, went closely into the

¹ "Manœuvring" is here used in the sense of getting rapidly from one position to another, and not in the sense of changing formation.

subject in his "Étude sur les Combats de Mer," where he enunciated 13 theorems relating to two ships of equal powers attempting to ram one another.

It is not proposed in this essay to recapitulate all the various arguments which have been advanced as to ramming tactics between single ships; but it is to be noted that although the theoretical study of this interesting subject is most instructive, and has elucidated many points, on the other hand writers appear to have, to some extent, omitted to sufficiently weigh the fact that it will be most difficult to estimate correctly what an antagonist—suddenly met with face to face—can or cannot do in manœuvring, under all the various conditions to be met with at sea, from deductions based on the speed and turning powers his ship is said to possess in some report.

The state of a ship's bottom as regards fouling, her draught of water, due to the amount of coal she has burnt, and the state of the sea, all combine to make statistics untrustworthy.

In view of the fact, therefore, that there is admittedly in cases a difference only of half a ship's length between ramming and being rammed, I incline to the opinion that, whilst closely watching the enemy's movements, it would, on the whole, be inexpedient to risk approaching him to ram from any position which does not practically preclude the possibility of his forestalling you, so long as his manœuvring powers are intact.

It is true that an argument of the sort cuts both ways, your adversary being in much the same position in regard to his knowledge of your powers; this is, however, no reason why either side should 'chance it.'

This view would be modified in the case of an exceptionally handy ship, whose captain was thoroughly *au fait* with the exact limitations of her powers, and judged her to be tactically superior to her enemy. But in all cases the power of the ram has been weakened by the great strides made by the torpedo.

No battle-ship should ever be despatched alone for any duty without she be accompanied by one "destroyer" at least. If the enormous cost and large complement of a modern ironclad be considered, a torpedo-boat destroyer to assist her is not, by comparison, an expensive consort. The objection that in a big sea the boat could not keep up with the ship of course holds good; but how often will it be absolutely necessary to make a passage at extreme speed against a heavy sea, involving, as it would, so much of that coal without which the ship is valueless?

If, in such a case, the 26-knot boat cannot keep up, she should be left behind to make the best of her way to a friendly port; a mere speck on the ocean difficult to capture.

The duty of a torpedo-boat destroyer, in an engagement when affiliated to a battle-ship, would be to take cover on the off beam of her parent ship, and endeavour to torpedo the enemy, advancing with a rush, under cover of smoke if possible, when directed to do so.

This would at once place an enemy adopting ramming tactics at a serious disadvantage.

Our modern battle-ships, protected as they are on their beams by submerged tubes, would be very dangerous to ram from any position except those of the quarter or nearly astern.

The whole object of the tactics on first meeting then resolves itself briefly into the following:—

(i.) The enemy must on no account be allowed to occupy a position inside your turning circle (especially abaft the beam), and bows towards you, unless you possess a greatly superior speed.

(ii.) You must endeavour, as often as possible, to bear obliquely from the enemy, and at the same time to get his side at right angles to your fire.

As an illustration of (i): the danger of engaging broadside to broadside on the same course, if at very close quarters, may be taken as a case in point. If, when so placed, one vessel suddenly slightly reduces speed and turns towards her adversary, she at once obtains a position of great advantage, and should ram successively, unless her adversary, keeping her course, runs away at full speed, or is able to torpedo her.

Any other manœuvre but keeping straight on must, of necessity, reduce the distance between the two ships; as the rear ship will be able to "cut off corners" in turning, and thus, using less helm, will not decrease her speed to so great an extent as the ship chased.

With regard to proposition (ii) Admiral Bourgeois says:¹ "The skill of the manœuvrer, when the ram blow shall be denied him by torpedoes, should be directed to avoid presenting his broadside to the direct or normal impact of his adversary's projectiles, while at the same time delivering his own with direct impact on the enemy's side."

There is one other obvious advantage in this procedure, viz., that the enemy, if at right angles to your fire, is presenting the largest possible target.

With the above two main propositions in mind the captain of a battle-ship should, I think, go into action.

Certain peculiarities in the distribution of both guns and armour may modify the conditions.

A fast ship with very strong stern fire might turn from the enemy and steam away head to sea to draw her antagonist into a disadvantageous stern chase, if there was a heavy sea.

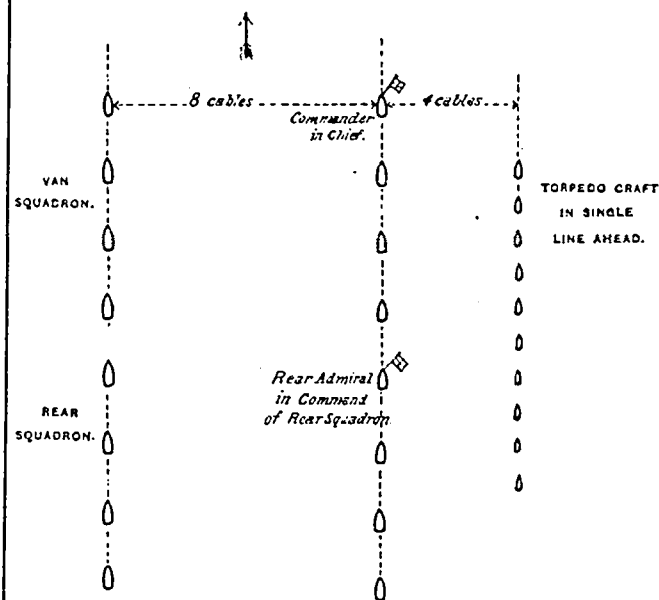
(ii.) *Cruisers*.—*Engagements between cruisers in war* may be expected to be frequent, and their tactics should, I think, be governed by the same rules as here indicated for battle-ships. In nearly all cases they would use shell only from their guns, and the oblique position will probably be of less importance than in the case of battle-ships; though still an advantage to the ship able to adopt it, as presenting a smaller target whilst obtaining the use of all the guns on a broadside.

Cruisers as a rule should, if possible, I think, work in pairs for mutual support and assistance.

¹ Quoted from Admiral Long's Essay at R.U.S.I. on "Probable Influence of Quick-firing Guns," 1892.

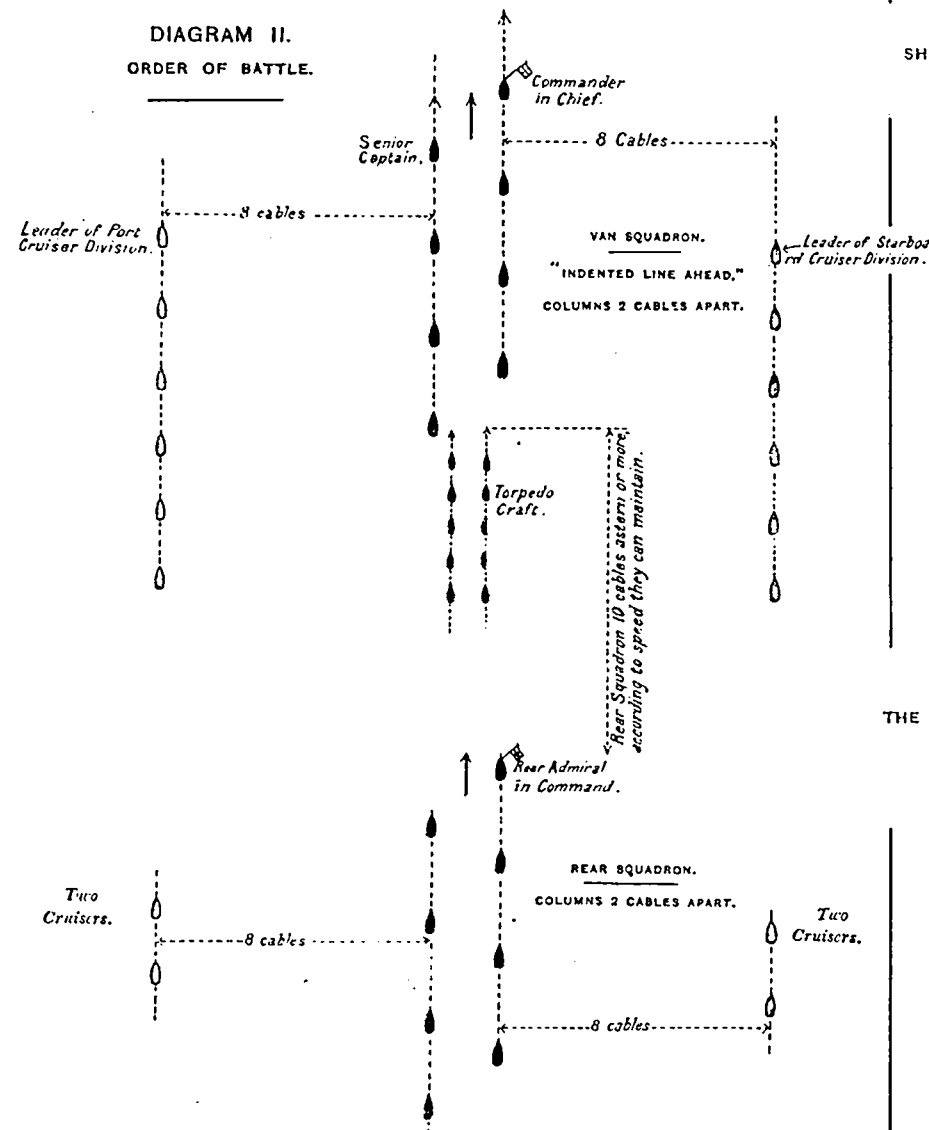
DIAGRAM I.

ORDER OF SAILING: MAIN BODY OF FLEET.



- (1) Battle-ships in each squadron organised in two divisions.
- (2) Columns manœuvring distance apart for Van Squadron.
- (3) All Cruisers acting as "look-outs" surrounding Fleet according to arrangements of Commander-in-Chief.

DIAGRAM II.
ORDER OF BATTLE.



NOTE.—Cruisers which were Rear Guard "Look-out" in the order of sailing, form two on each beam of Rear Squadron.

Fleet to consist of 8 fast Battleships.

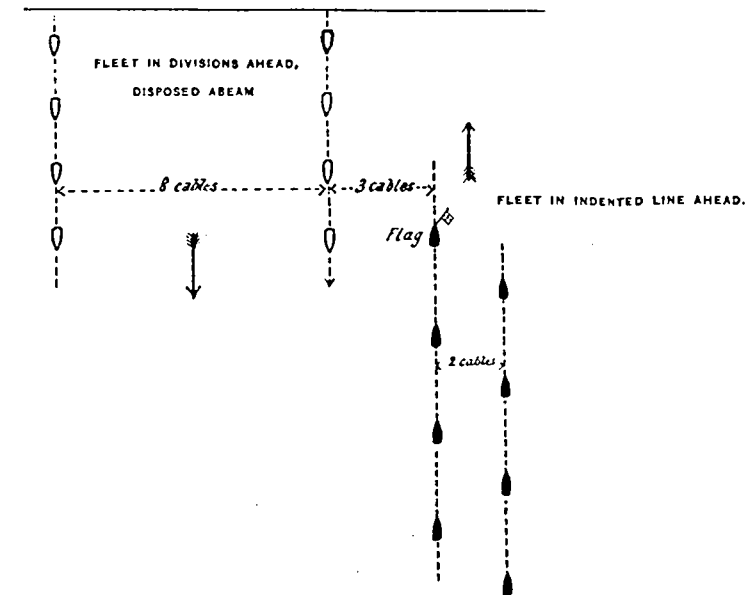
8 older type Battleships.

16 Cruisers.

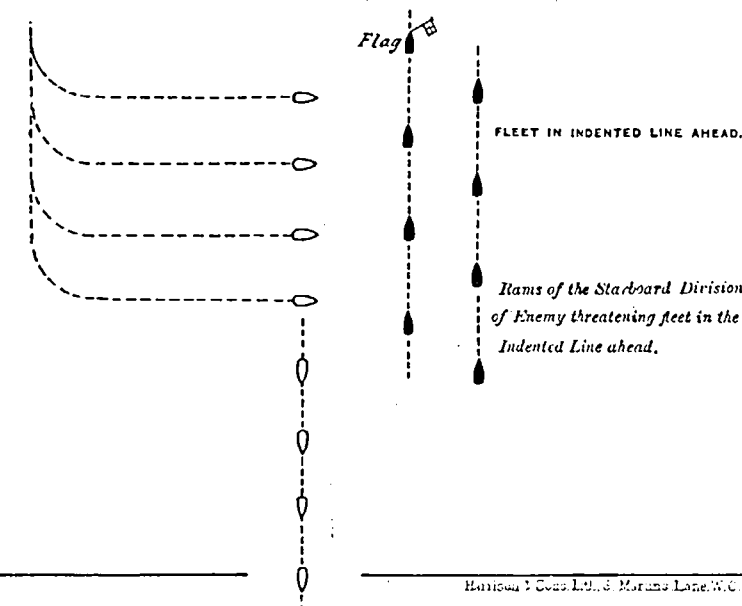
10 Torpedo Craft.

DIAGRAM III.

SHOWING DANGER OF PASSING ENEMY IF CLOSE TO, AND PARALLEL WITH, HIS COURSE, IN CERTAIN FORMATIONS.



THE SAME FLEETS AFTER AN ADVANCE OF 8 CABLES, OR IN ABOUT 3 MINUTES, IF BOTH FLEETS STEAM 15 KNOTS.



Long cruisers of great speed will probably be more likely to make a running fight of it with their guns than to attempt to ram at first.

Conclusions.

As regards Fleets.—1. That the fighting formation should be determined on, and the fleet practised in it, prior to meeting the enemy.

2. That "Indented Line ahead" will meet any other formation on at least equal terms.

3. That the Commander-in-Chief should lead in the van, and manœuvre the fleet with as few signals as possible.

4. That very large fleets should be divided into two squadrons, van and rear; and that the second in command should lead the rear squadron. Half the cruisers, in single line ahead, being stationed on each quarter of the van squadron.

5. That the tactics of a fleet should, at the outset, be gun tactics, when engaging an equal or an inferior enemy.

6. That torpedo craft are necessary to a fleet, but, not torpedo-boats.

7. That the enemy, on closing, should if possible be kept "end on," as the safest preventive against his rams.

8. That torpedoes should be freely made use of from the beams of ships, when passing the enemy at close quarters.

9. That ships of the fleet should work in pairs for purposes of gun support; station should be maintained, and *mêlées* avoided.

10. That the ram should, as a general rule, be used only as a *coup de grâce*.