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Wednesday, June 13, 1894.

H.S.H. PRINCE LOUIS OF BATTENBERG, G.C.B., in the
Chair.

THE DIFFERENTIATION OF NAVAL FORCE: A COMPARISON.

By Mr. H. LAWRENCE SWINBURNE.

Of all that pertains to the navy, that classification of war-ships which Admiral Colomb has so aptly termed the differentiation of naval force, is probably that least understood by the average layman. To him every large ship is an "ironclad" and every small one a "gunboat" unless it happens to be a "torpedo-boat," in pronouncing on which he generally feels pretty safe. It would also appear as if ignorance on this point was not confined to the general public alone. We constantly come across it in the press, and that, too, in the best informed portion of the press. I have read in a Service paper of a collision between the German "ironclads" "Stein" and "Stosch," in the "Times," of an explosion on the French "gunboat" "Magenta" and the launch of another French gunboat the "Charles Martel," while a popular novelist has moved me to amazement and admiration by his graphic description of a cruiser "fitted with bow-chasers and Gatling guns." From an evening paper, celebrated for always possessing the earliest and most exclusive information, we learn that the keel has been laid of "the 1st class gunboat 'Powerful,' which is a vessel of the 'Majestic' type." Even in the last edition of the "Aide-Mémoire de l'Officier de Marine" - I find the "Barfleur," "Centurion," and "Renown" classed as "garde-côtes." It is, indeed, marvellous how often we come across men distinctly above the average in general information, who are either unaware of, or ignore, the fact that for efficiently carrying out those duties, for the performance of which a nation relies upon its navy, not only are ships of varying size, power, and speed required, but that each group of ships has its distinct *raison d'être* and its proper place in any scheme of war operations. As a civilian, I feel as if it were presumption on my part to read a paper on such a subject in this theatre and before this audience, and I am oppressed by the feeling that I am going over ground well known to and often traversed by my hearers. I am, however, emboldened to do so by the hope that my paper may form the basis for such a discussion as will contribute to the information of the general public on this subject. My paper, indeed, is intended merely to bring the subject forward, and this I purpose to do by instituting a comparison between the naval force of this Empire and that of a Franco-Russian alliance, such comparison being preluded by and based upon a system

of classification which shall differentiate ships according to their war value, such value being determined by the nature of the work they are built for, or are only capable of, performing.

Amongst the war-ships of every navy, and more especially that of this country, will be found vessels which, while essential for various peace services, and which might undoubtedly be utilized under certain conditions in time of war, can hardly claim to have a recognised war value. Again, there are others so obsolete in type or construction, or so out of repair, as to be valueless under modern conditions. Such ships can perforce have no definite place in the enumeration of a nation's maritime strength, and even if capable of being utilized, it could only be in subordinate and desultory operations, or as localized guard-ships in conjunction with land defences. In instituting our comparison, we may then commence by eliminating from consideration in our classification:—

1. All ships built only for various peace services and which—though they might mayhap be utilized under certain conditions—cannot claim a distinct and recognised war value ; and
2. All ships so obsolete in type or construction, or so out of repair, as to be valueless under the conditions of modern naval warfare.

To weed out those coming under the first category is an easy task, and we can at once eliminate:—

- a. All “non-effective” ships such as paddle-ships, yachts, transports, survey-vessels, store-ships, &c.
- b. All ships under 2,000 tons in displacement which are incapable of a maximum speed of 16 knots.

With regard to the latter, their doubtful value for war service is easily demonstrated. If they are under 2,000 tons they cannot possess high powers of offence and defence, and hence, if of value, it can only be on account of a speed enabling them to be of use either as scouts or torpedo-boat destroyers. Without this speed their value must only be problematical, and hence speed forms a safe criterion of efficiency with regard to small craft.

With regard, however, to elimination for obsolescence, the task is by no means so easy, and it requires careful consideration to decide how far obsolescence, whether in construction, protection, engine power, or armament, tends to lessen the value of a war-ship in relation to the particular purpose for which it was designed, and the sphere of operations in which it is intended to act. These are the four elements which go to constitute efficiency in every war-ship, and if in all a war-ship has attained the highest development as yet attained in her class, she is modern in every sense of the word. It is, however, evident that from this perfection down to absolute obsolescence in every essential element of efficiency the gradations are many, and as showing this I will take some typical cases from amongst the ships of our own navy. The battle-ship “Alexandra,” for example, is constructed of iron, and not of steel, is protected by wrought iron, in lieu

of steel (or steel-faced) armour, and has a main armament composed to a great extent of the obsolete muzzle-loading type. But, on the other hand, she is an excellent sea boat, can keep station with a squadron at 14 or 15 knots speed, has a complete armour belt, carries a powerful armament of its type, and is, in short, a powerful and effective battle-ship. Again, take the cruisers "Iris" and "Mercury," they have no protection and their armament is not quick-firing, but they can claim a powerful breech-loading armament, and a high rate of speed, and are in consequence capable of efficiently performing much of the work that will in war-time devolve upon their class. Again, obsolescence in one or other respect may render a ship unsuitable for the purpose for which she was originally designed and yet leave her a very efficient factor in some other sphere of war operations. For example, a ship originally designed for the line of battle may be absolutely unfit for such a function under modern conditions, and yet, if she has a light draught and powerful ordnance, be capable of doing effective work as a coast-defence ship, or, if fast and a good sea boat, she may make an excellent cruiser. As typical of the former class I may quote the "Penelope," "Belleisle," and "Orion," and of the latter the broadside ships of the "Minotaur" type. Our process of elimination for obsolescence cannot then be governed by hard and fast rules, and in regard to this question we must deal with each ship separately and find cause for her exclusion, or retention, as the case may be. If we so base our process we may feel sure that it will exclude no ship which can claim a distinct war value.

Broadly speaking, we have in war-ships four main groups, each having its own distinct rôle. To battle-ships we will trust to maintain our supremacy of the sea by blockading the enemy's fleet in its own ports, or by bringing it immediately to action if it attempts to put out to the open sea. They are our first fighting line stationed on the enemy's coast, that is to say, on the frontier of that sea which we claim as our territory. Behind them again are our coast-defence ships, which, to continue a military parallel, we may compare to an artillery reserve. A mobile defence capable of concentration on any given point where attack is threatened by the enemy having broken through, by defeat or evasion, our first line, and so having obtained command of that portion of sea over which such attack can advance. Next come cruisers and scouts, which play two rôles. Firstly, they are the division guarding the line of communications, as until the first line is burst through they protect our commerce, and ensure the safety of those trade routes over which it is carried, and by means of which intercommunication between the different parts of the Empire is maintained. Secondly, they are when in the fighting line the cavalry division. They are the eyes and ears of a squadron, the ublans of the fleet. They keep their army corps in touch with the enemy, they afford a rapid and ready communication between headquarters and outlying detachments, they are on the alert to warn it against contemplated attack. Finally, we have torpedo craft, the outcome of the development of that class of submarine mine which is auto-mobile and capable of use as a projectile. They form a special corps for use

in those operations in which the auto-mobile projectile torpedo is the main factor as a weapon, and though small ships are yet more or less capable of acting independently of a shore base, either alone or in conjunction with other war-ships. Such a classification is, however, by no means precise enough to enable us to draw an accurate comparison between two navies. A much more minute sub-division is yet necessary, and to arrive at such we must consider one by one the main elements which go to constitute efficiency in a war-ship. These, as I have said before, are four in number, viz.,

1. Method of construction.
2. Amount of protection.
3. Power of offence; and
4. Quality of propelling power.

With regard to construction, wood as a material is so hopelessly obsolete that it may be at once dismissed from consideration. As iron has superseded wood, so has steel superseded iron, and for much the same reason, increased strength and lightness. Other things being equal, the steel-built ship is, therefore, of higher efficiency than the one with the iron hull. Again, take protection, which indeed is a part, and a very important part, of construction. Here two points come into consideration.

- (a.) The nature of the material; and
- (b.) The method of distribution.

As regards material you may protect a ship either by (a) soft wrought iron bolted on to a timber backing, (b) a hard steel plate welded on to a back of wrought iron, (c) hard steel throughout, or (d) a mild steel so admixed with other ingredients as to give it a hard face, or, in other words, a chemically compounded, as distinct from a mechanically compounded, plate. By using the first you get a plate not liable to fracture, and which gives a good resistance to "racking" attack, but fails to keep out "punching" projectiles. By your third you get greater power to resist "punching" attack, but coupled with a liability to fracture under the continuous attack of projectiles incapable of actually perforating it. In your second and fourth materials you have plates possessing a hard face to resist perforation, and a soft and less brittle material behind, holding the plate together and preventing fracture. Here, as in construction, there can be no disputing the point that your compound plates, whether mechanically or chemically created, are the best; and that the ship thus armoured has the highest degree of efficiency as far as the material of this element is concerned. Next you come to the question of distribution of armour. You can protect ships by any one, or by two or more in combination, of three methods.

- (a.) By vertical plates affixed to the hull.
- (b.) By vertical plates affixed to the gun positions.
- (c.) By horizontal plates, i.e., an armoured deck.

Whichever method is chosen the extent and distribution of the

plating may vary enormously. You may give a vessel a complete belt, as is universal with our neighbours across the channel, and in all our earlier ships designed by Sir Edward Reed; or you may armour the vitals and leave the ends to deck-protection only, as in the designs by Sir Nathaniel Barnaby, and with greater length of belt in those of Mr. White. Again, the width of your belt may vary. You can have it rising only up to or barely above the water-line, as in our "*Impérieuse*" and "*Aurora*" classes, or you may carry it right up to the battery deck, as in the French "*Dupuy de Lôme*" and "*Bruix*" types. Then as to your gun positions, you may enclose them in turrets, or mount your pieces *en barbette*; and you may more or less heavily armour your secondary battery, as in our "*Royal Sovereigns*," or you may leave it practically unprotected, as in our "*Admiral*" class. Again, you may protect only the hull of your ship by vertical plates, and leave your gun-positions unprotected, as in some armoured cruisers; or you may trust to deck protection alone, strip your hull of vertical plates, and heavily armour the gun-positions, as in some of the Italian ships.

Finally, if you confine yourself to deck protection only, you can make it either "partial," extending only over the vitals, or "complete," running right fore and aft. You may, moreover, keep it with as few openings as possible, and keep your machinery below it, or adopt vertical engines and run round your engine-hatch a protection of glacis plates sloping upwards from the protection deck. On this question of distribution expert opinion varies very considerably, and certainly for a layman it would be presumption to say, "Such and such is the best method of distribution, and the ship possessing it can claim the highest degree of efficiency." I think, however, I can hope to have the bulk of naval opinion in this room with me if I take it that high efficiency in this element requires a complete belt, or at any rate a big proportion of the whole length belted, a well protected secondary battery, and in the case of a deck-protected ship a fore and aft deck so arranged that engine-room accommodation is not cramped.

Turning to power of offence, we can very briefly summarize it. Complete efficiency requires B.L.R. ordnance for main and Q.F. for secondary armaments. With regard to disposition I will say little. The methods we have adopted for carrying our main armament have been decided on after careful consideration, and would, judging from the discussion on the subject which took place in this theatre some twelve months ago, seem, on the whole, to meet with the approval of those most competent to judge, namely, those on whom the duty of using the weapons will devolve. The fore and aft arrangement removes all danger of the blast from the main ordnance interfering in any way with the secondary battery, a portion of a ship's armament that will play a very important part in an action. It would also appear that what seems to me the weakest point in the distribution of ordnance, namely, the want of good bow and stern fire in many of our cruisers, is being remedied in later designs. Finally comes engine power, and here we may safely take it that modernness and

efficiency are synonymous. The more modern the engines of the ship are, the greater is her speed, the less is her coal consumption, and the lighter is the weight of the propelling machinery that she has to carry through the water. This gives her these advantages: The faster she is the better able will she be to bring on, or avoid, action, as may suit her, and when in action to take the position most advantageous to her. The less her coal consumption, the higher her coal endurance. The less the percentage which the weight of engines bears to the total displacement, the greater will be the amount of displacement that can be afforded to powers of offence and defence. We may, then, take it that the more modern a ship is in this essential the nearer she approaches to the highest type of efficiency.

I have, I think, said enough to show that to arrive at a classification accurate enough to enable us to draw a comparison between two navies we must not only split each of our four main groups into classes differentiated according to the size and power of the ships composing it, but we must also divide each of these classes into two sub-divisions, the one containing all ships modern in every sense of the word, the other those whose value is to a greater or lesser extent impaired by obsolescence. Such a classification will then show for each ship, (a) its sphere of occupation; (b) its value within that sphere; and (c) the extent to which its value is impaired by obsolescence. This classification I will make as follows, giving hereafter the reasons which have guided me in adopting it.

Group I. *Battle-ships*.—All armour-clads other than those specially built as, or recognised as only suitable for, (a) coast-defence ships, (b) cruisers.

Class I.—10,000 tons and upwards.

A. Modern in construction, speed, armament, and protection.

B. Obsolete in one, or more, of the above.

Class II.—Under 10,000 tons.

A. As for Class I, A.

B. As for Class I, B.

Group II. *Coast-defence Ships*.—All armour-clads, specially built as, or recognised as only suitable for, coast defence.

Class I.—Sea-going, *i.e.*, other than in-shore monitors or armour-clad gunboats.

A. 14 knots speed: B.L.R. ordnance.

B. Failing in either of the above.

Class II. In-shore monitors and armour-clad gunboats.

A. 12 knots speed: B.L.R. ordnance.

B. Failing in either of the above.

Group III. *Cruisers*.—All armour-clads specially built as, or recognised as only suitable for, cruisers, and all unarmoured ships (other than torpedo depôt-ships or torpedo-rams) of 2,000 tons and upwards.

Class I.—All armour-clads, irrespective of displacement, and fully protected ships of 7,000 tons and upwards.

A. 16 knots speed: B.L.R. ordnance.

B. Failing in either of the above.

Class II.—Unarmoured ships from 4,000 to 7,000 tons.

A. 18 knots speed: B.L.R. ordnance; full protection.

B. Failing in one or more of the above.

Class III.—Unarmoured ships from 2,000 to 4,000 tons.

A. As defined for Class II, A.

B. As defined for Class II, B.

Group IV. *Scouts*.—All unarmoured ships (other than torpedo depôt-ships or torpedo-rams) between 600 and 2,000 tons.

Class I.—A. 18 knots speed and upward.

„ II.—A. 16 to 18 knots in speed.

Group V. *Torpedo Craft*.—All torpedo depôt-ships, torpedo-rams, torpedo-boat destroyers, and sea-going torpedo-boats.

Class I.—A. Depôt-ships.

„ II.—A. *Rays*.

„ III.—A. Destroyers (200 to 600 tons).

„ IV.—A. Sea-going boats (over 118 ft. in length).

By this classification all effective war-ships have been collected into 20 sub-divisions, in one or other of which every ship with a definite value and a distinct rôle to play finds a place, each sub-division moreover consisting of units so similar that to each the same value may be attached; and the reasons which have guided me in adopting this classification I will now give by dealing with each group *seriatim*.

I. *Battle-ships*.—In this group displacement has been taken as a line of division between the two classes, and for this reason, that increase of size means—or, at any rate, should mean— increase of offensive and defensive power, the most important elements of efficiency in this class of war-ship. In both classes I have, under the head of A (or modern), classed those ships which have (1) hulls of steel (or iron and steel in combination), (2) steel (or steel-faced) armour, (3) breech-loading ordnance, and (4) a maximum speed of not less than 14 knots. Failing in any one of these essentials, they come under the head of B (or old type), and practically this relegates to the B classes all ships laid down prior to 1880. Fixing a speed limit insures that any ship of the A classes could be incorporated in a squadron without reducing its maximum cruising speed below 14 knots, or its manœuvring speed, which may be taken at 2 knots less, below 12 knots. The importance of this is evident when we remember that the want of speed in one or two of the component units of a squadron may prove a source of serious embarrassment to the officer in command, by compelling him to choose between the abandonment of

such vessels to their own defence, or the departure from some line of action which he knows it would be wise to pursue, but which entails a speed of which they are not capable.

- II. *Coast-defence Ships*.—In this group seaworthiness and habitability has been taken as the dividing line between the classes; and it would therefore be possible to affiliate any of those in the first class to a sea-going squadron acting within a moderate distance of their base, while those of the second class would find their most suitable sphere in localized operations for the defence of harbours, estuaries, narrow channels, &c. As the work that will devolve on this group is not such as to demand the very highest degree of efficiency in every essential, we take a fair rate of speed and B.L.R. ordnance as qualifications entitling those ships possessing them to rank in the A class.

- III. *Cruisers*.—Here also the differentiation into classes has been by size, with the exception that all protected by armour rank in the first class, irrespective of their displacement. This has been done, as the possession of armour protection is a guarantee that the ship possessing it has been designed with the idea of her playing an important rôle. In all the classes a high rate of speed, B.L.R., or Q.F. ordnance, and full protection characterize the A ships; and here again the differentiation practically relegates to the B classes all ships more than 10 years old.

- IV. *Scouts*.—With this group speed has been made the test of differentiation as to class, and all are grouped as "modern," as, with the exception of the French ships "Milan" (1881), "Condor" and "Épervier" (1883) and "Vautour" and "Faucon" (1885), none were laid down prior to 1885. In this class I have merged all vessels officially classed as "twin-screw gunboats, 1st Class," "torpedo-gunboats," "croiseurs-torpilleurs," or "avisos-torpilleurs," with displacements of 600 tons and upwards; and for this reason.

If a torpedo-gunboat has a displacement of 600 or more tons it ought to possess sea-going qualities capable of enabling it to be useful as a scout; and I take it, moreover, that the main, distinctly offensive war operation that a scout should be considered as capable of performing should be that of defending the squadron to which it is attached against torpedo-boat attack. In short, I take it that a "torpedo-gunboat" should be capable of acting efficiently either as a "scout" or as a "torpedo-boat destroyer," while I look upon a "torpedo-boat destroyer" as utilizable only for attack on torpedo-boats, or delivery of torpedo-attack, and incapable, except in certain waters or under exceptional weather conditions, of effectually acting as a scouting adjunct to a squadron.

- V. *Torpedo Craft*.—The differentiation of classes in this group has been into "depôt-ships," "rams," "destroyers," and "sea-going boats;" and, like the scouts, all class as modern,

TABLE I.—*Showing Numerical Strength.*

Flag.	Battle-ships.			C.D. ships.			Cruisers.				Scouts.			Torpedo craft.					Grand total.
	Class I.	Class II.	Total.	Class I.	Class II.	Total.	Class I.	Class II.	Class III.	Total.	Class I.	Class II.	Total.	Class I.	Class II.	Class III.	Class IV.	Total.	
France (A)	16	8	24	2	8	10	9	4	18	31	12	4	16	1	—	10	109	120	291
Russia (A)	9	8	17	2	3	5	7	—	—	7	2	—	2	—	—	14	77	91	122
France-Russian (A)	25	16	41	4	11	15	16	4	18	38	14	4	18	1	—	24	186	211	323
Great Britain (A)	28	3	31	3	—	3	22	17	35	74	29	17	46	1	1	46	77	125	279
France (B)	—	7	7	4	—	4	4	3	13	23	—	—	—	—	—	—	—	—	31
Russia (B)	—	1	1	5	14	19	3	1	2	6	—	—	—	—	—	—	—	—	26
France-Russian (B)	—	8	8	9	14	23	7	4	15	26	—	—	—	—	—	—	—	—	57
Great Britain (B)	2	17	19	5	7	12	4	8	13	25	—	—	—	—	—	—	—	—	56
France-Russian (A and B)	25	24	49	13	25	38	23	8	33	64	14	4	18	1	—	24	186	211	390
Great Britain (A and B)	30	20	50	8	7	15	26	25	49	99	29	17	46	1	1	46	77	125	335

as, with the exception of our "Polyphemus" (commenced in 1878, though not launched till 1881) and the French "Bombe" class (1883), all were laid down in or since 1885. Ships ranging from 200 to 600 tons in displacement are classed as "destroyers," while for torpedo-boats 118 ft. has been fixed as the limit of length entitling them to be considered as sea-going. This latter limitation enables us, therefore, to exclude from consideration all those craft which have to be carried into action on the deck of a large war-ship, as well as those whose lack of sea-going qualities enables them to be used only for localized operations, or in conjunction with fixed land defences.

Based, then, on this differentiation of naval force, I have in Table I summarized the numerical strength of the navy of this country as compared with that of a Franco-Russian alliance, including ships building, or the construction of which has been definitely decided on. Moreover, as the statements regarding the Russian construction of torpedo craft under her last programme are conflicting and in a measure as yet unauthenticated, I have taken six torpedo-boat destroyers and 20 sea-going torpedo-boats as the construction to be entered on, an estimate, if anything, probably under the mark. I have already stated that with regard to elimination for obsolescence, it is necessary to individually consider the case of each ship, and such a process has led me to disregard those I will now name—

England.	C.D. ships: "Prince Albert," "Scorpion," "Wivern," "Viper," "Vixen."
	Cruisers: "Nelson," "Northampton," "Shannon," "Hector," "Black Prince," "Warrior," "Inconstant," "Raleigh," "Boadicea," "Bacchante," "Euryalus," "Active," "Volage," "Emerald," "Garnet," "Ruby," "Tourmaline."
	Torpedo craft: "Hecla."
France.	Battle-ships: "Marengo," "Océan," "Suffren."
	C.D. ships: "Bélier," "Bouledogue," "Onondaga."
	Cruisers: "Thétis," "La Galissonnière," "Triomphante," "Victorieuse."
	Scout: "Hirondelle."
	Torpedo craft: "Japon."
Russia.	C.D. ships: "Kreml," "Pervenets," "Netron Menya."
	Cruisers: "Asia," "Afrika."

My reasons for omitting these vessels I will give very briefly.

Great Britain. "Prince Albert," "Scorpion," "Wivern":—Carrying obsolete M.L.R. ordnance, and unarmoured against anything above a 4-in. B.L.R. "Viper," "Vixen":—Officially recognised in the latest Parliamentary Return as "practically worn out."

"Nelson," "Northampton," "Shannon":—Hope-

lessly slow, carrying obsolete M.L.R. ordnance; batteries unprotected except from direct ahead fire, in "Shannon," and from ahead and astern fire, in the other two.

"Hector":—Officially recognised as "unfit for further service."

"Black Prince" and "Warrior":—Obsolete ordnance, unarmoured against anything above a 4-in. B.L.R.; unprotected steering-gear.

"Inconstant," "Raleigh," "Boadicea," "Bacchante," "Furyalus," "Active," "Volage," "Emerald," "Garnet," "Ruby," "Tourmaline":—Obsolete armament, absolutely unprotected, many of their classes already removed from Navy List.

"Hecla":—Old merchant ship, never a fighting craft, and now hopelessly slow.

France.

"Marengo," "Océan," "Suffren," "La Galissonnière," "Triomphante," "Victorieuse":—Wood hulls, too thinly armoured for the line-of-battle, too slow for cruisers, too deep draught for coast defence. (The "La Galissonnière" class draws about 5 ft. more water than the "Penelope." The "Océan" and "Marengo" have about the same draught as the "Royal Sovereign," and the "Suffren" draws $1\frac{1}{2}$ ft. more than the "Benbow," our deepest draught battle-ship.)

"Bélier," "Bouledogue," "Onondaga," "Thetis":—Officially recognised as "sans valeur sérieuse."

"Hirondelle":—Wood hull, launched in '69.

"Japon":—34 years old, no longer officially classed as "transport de torpilleurs."

Russia.

"Kreml," "Pervenets," "Netron Menya":—Unarmoured against anything above a 4-in. B.L.R.; practically only floating batteries and very badly protected at that.

"Asia," "Afrika":—Absolutely unprotected; too slow for cruisers; they were bought from Cramp of Philadelphia, and were, I believe, originally designed as merchant ships.

There is, moreover, another reason for eliminating all these vessels from consideration, and one which appears to me unanswerable, and more especially with regard to this country. That is, that it will be of paramount importance to withdraw vessels of doubtful value from active operations in order that their personnel may be better utilized. It would be folly to keep a body of officers and men to man a ship of doubtful value when the supply to equip modern ships will be tested

to breaking strain. The crew of an "Inconstant" would supply complements for a couple of "Apollos" and leave over enough to bring a "Havock" into action.

Besides the vessels eliminated as without serious value, I have not abided strictly to the rules laid down for differentiation in the case of three ships, the French "Amiral Duperré," and the British "Conqueror" and "Hero." The former, strictly speaking, should class as a battle-ship, Class I, B, as she does not fulfil all the conditions entitling a battle-ship to be called modern. I have, however, grouped her in Class I, A, as she only fails in one respect, and that is that she is protected by iron instead of steel or compound armour. Her maximum belt armour is 55 cm. (21·65-in.), thick enough to resist at 1,000 yds. range anything under 13·5-in. B.L.R., or perhaps the new 12-in. B.L.R. Her belt is complete and runs well down to strengthen the ram. Her main ordnance is powerful and her secondary battery numerous, and both are modern. She is a high-freeboard ship with a fair rate of speed. In short, in spite of the slight obsolescence of her protection she is a powerful, useful battle-ship and fairly entitled to be classed as modern. The "Conqueror" and "Hero," though officially entitled battle-ships, I have classed as coast-defence ships, Class I, A. They are indeed but developments of the "Hotspur" and "Rupert" types, handy rams with a heavy bow fire, but without any powerful stern fire or secondary battery. As such they are specimens of a very high class of coast-defence ship, but I do not think the type can claim to rank as battle-ships until it reaches the large displacement, and acquires the stern fire and secondary battery of the "Sous-Paréil" and "Victoria."

By so classing the "Conqueror" and "Hero," I in no way wish to depreciate the sea-going qualities of these ships. I believe them—and I shall be very glad to be corrected if I am wrong—to be as good, if not better, sea-boats than the "Admiral" class. I was present at the last naval manœuvres in the Blue squadron, and I had an opportunity of seeing the "Benbow" and the "Hero" together. Steaming against a heavyish swell, the "Benbow" was taking in a good deal of water over the bows. Anyone forward of the fore-barbette would have been pretty damp, to say the least of it, while at the same time men were about on the deck of the "Hero" forward of the turret, and she seemed to be rising easily to it and taking in no water forward.

Table I, however, only affords us a comparison based on numerical strength, and there still remains to be drawn a comparison based more strictly on the war value of each component unit of the two navies. Thus I will do by assigning to each sub-division a numeral representative of the value of each unit in such sub-division. Thus:—

	Battle-ships.	C.D. ships.	Cruisers.	Scouts.	Torpedo craft.
Class I, A.....	30	10	20	15	15
" I, B.....	15	5	10	—	—
" II, A.....	20	6	16	10	10
" II, B.....	10	3	8	—	—
" III, A.....	—	—	10	—	5
" III, B.....	—	—	5	—	—
" IV, A.....	—	—	—	—	2

To assign to any class a numeral representative of its total value, I multiply the number of ships in the class by the unit value, and the result expressed decimally gives the value of the class as a whole. For example, we possess, or rather will possess, 28 battle-ships Class I, A, and the unit value of the class is 30—

$$\therefore 28 \times 30 = 840 \text{ and } \frac{840}{100} = 8.4.$$

i.e., value of battle-ships Class I, A.

In this manner I have calculated the war value of the various navies with the result summarized in Table II (p. 1220).

While claiming for this table that it fairly represents the value of each class, I, of course, admit that in cases the full value is not given to a ship as compared with other ships credited with the same value. For instance, both the "Powerful" and "Aurora" are each, as units of cruisers Class I, A, credited with a value of '2, although the former will undoubtedly be a much more powerful ship than the latter. But as a matter of fact the ships over-rated and those under-rated about balance one another, and so the unit taken is in fact representative of the *average* value of a ship of the class. I believe that, apart from the lengthy and laborious process of comparing ship by ship right through, no fairer test than that I have adopted could be found. I must, however, urge you to remember that each group has been treated perfectly apart, and that no comparison between different groups is admissible. For instance, I assign 30 as the unit value for a modern 1st class battle-ship, and 20 as the unit value for a modern 1st class cruiser, but I by no means assume that three 1st class cruisers are an equivalent for two modern battle-ships. There can be no comparison whatever between the two types of ship, as they are designed for totally different functions. What may be an absolute essential for efficiency in one type may be unnecessary, or of only secondary importance, in another. The adding together, however, of the values of the various groups does give us a fair idea of the total value of a navy, and for this reason. By keeping each group apart we have got a definite value for each group, which must necessarily be the equivalent of the value which the naval policy of the country attaches to that particular group. The preponderance in strength of our cruisers is a good typical case. Our strength in this group is clear evidence that the necessity for securing protection to our commerce and food supplies must be one of

Table II.—*Showing War Value.*

Type.	Franco-Russian Alliance.						Great Britain.		
	France.			Russia.			Total.		
	A.	B.	Total.	A.	B.	Total.	A.	B.	Total.
Battle-ships. Class I..... Class II.....	4.8	—	4.8	2.7	—	2.7	7.5	—	7.5
	1.6	.7	2.3	1.6	.1	1.7	3.2	.8	4.
	6.4	.7	7.1	4.3	.1	4.4	10.7	.8	11.5
C.D. Ships. Class I..... Class II.....	.2	.2	.4	.2	.25	.45	.4	.45	.85
	.38	—	.48	.18	.42	.6	.66	.42	1.08
	.68	.2	.88	.38	.67	1.05	1.06	.87	1.93
Cruisers. Class I..... Class II..... Class III.....	1.8	.4	2.2	1.4	.3	1.7	3.2	.7	3.9
	.61	.24	.85	—	.08	.08	.61	.32	.96
	1.8	.65	2.45	—	.1	.1	1.8	.75	2.55
Scouts. Class I..... Class II.....	4.24	1.29	5.53	1.4	.48	1.88	5.64	1.77	7.41
	1.6	—	1.6	.3	—	.3	2.1	—	2.1
	.4	—	.4	—	—	—	.4	—	.4
Torpedo Craft. Class I..... Class II..... Class III..... Class IV.....	2.2	—	2.2	.3	—	.3	2.5	—	2.5
	.15	—	.15	—	—	—	.15	—	.15
	—	—	—	—	—	—	—	—	—
	.5	—	.5	.7	—	.7	1.2	—	1.2
	2.18	—	2.18	1.54	—	1.54	3.72	—	3.72
Grand total	2.83	—	2.83	2.24	—	2.24	5.07	—	5.07
	16.35	2.19	18.54	8.62	1.25	9.87	24.97	3.44	28.41
							30.06	4.15	34.21

the main factors which govern our naval policy. It is, therefore, only right that strength in any particular group should have its full effect in estimating the total strength of a navy. Moreover, this method of comparison enables us to ascertain on broad lines the conditions which govern the naval policy of a Power, by noting the proportion borne by the different groups to the naval force as a whole.

In conclusion, I will, after this explanation, briefly analyze the figures given in Table II. Everyone will admit that the lowest minimum for our war-strength must be a superiority to a Franco-Russian alliance, and if we take into consideration only the totals of the respective fleets it would appear as if we held this superiority. But a moment's consideration will show us that such is not really the case. Superiority in one group does not necessarily counter-balance inferiority in another. It may mean only that the requirements of our position demand a specially powerful force of ships of this particular group, whereas the conditions governing the naval policy of France and Russia may render the possession of strength in this particular group a matter of secondary importance. Our rule should read thus: The strength of each group in the British Navy must be, to the strength of the corresponding group in the allied navy, equivalent, not merely in value, but in a direct ratio to the interests such groups have to safeguard. Dealing with each group separately, we find that in battle-ships we are in an inferiority. Our existence as a nation depends on our supremacy at sea, and for holding such supremacy battle-ships, and battle-ships only, can suffice. In this group our inferiority is in vessels of the second class, and, what is worse, our inferiority is entirely in those of modern type. In coast-defence ships we can accept our position, as a superiority in this class is not a part of our naval requirements. With regard to cruisers, we have, it is true, a superiority of 12·31 as against 7·41; but is this sufficient? It is simply a truism to say that our national existence is bound up in our commerce to an infinitely greater degree than is the case with either France or Russia, and yet France, to correspond with a mercantile marine but slightly over a million tons and sea-borne commerce valued at less than 300 millions, has a cruiser strength of 5·53; Russia, whose mercantile marine aggregates less than half a million tons, and whose sea-borne commerce represents only 55 millions, has a cruiser strength of 1·88; while Great Britain, with her 12 million tons of merchant shipping, and her sea-borne commerce valued at nearly *one thousand millions*, has only a strength of 12·31! In the face of these figures, is it possible to maintain that our cruiser strength is adequate to fulfil the duties that an outbreak of war will entail upon it? Turning to scouts, we find, again, that our superiority is marked. We must, however, remember that the rôle our squadrons will have to play will be that of a blockading force. In these days of steam, and considering the extent to which torpedo attack has developed, such a blockade must be a "masking" one. The squadrons will not lie in-shore, but will trust to their cruisers and scouts to keep them in

touch with the enemy. The demand, therefore, on this class will be very great, and our superiority in this type is not one whit more than is necessary. Finally, we come to torpedo craft, in which we again find ourselves in an inferiority. This inferiority, however, lies only in torpedo-boats, a type of war-ship which does not find much scope in our scheme of naval policy. Thanks to the recent progress made in the construction of "destroyers," the most useful type of torpedo craft to a nation bound to hold the supremacy of the sea, we, in this group, may be considered as holding our own.

We may then take it that we possess an adequate strength in coast-defence ships and torpedo craft, are inferior in battle-ships, and that our superiority in cruisers and scouts, though marked, does not reach the standard to which it should attain when we consider the heavy work which will fall on these two classes of war-ship, when war breaks out, or, to put it more strongly, our inferiority, on the whole, is marked, as we are superior only in those classes on which, in our navy, a demand will be made far in excess of that which will be made on their corresponding groups in the navies of the Alliance, and we are, moreover, inferior in that class of war-ship most absolutely essential to the Power to whom it is vital to retain the supremacy of the sea. From this I can draw but one conclusion, and that is, that our future construction should be in the main devoted to battle-ships, with, of course, the proviso that such an allotment of displacement be given to cruisers and scouts as to well maintain our superiority in these groups, and, as far as money is available, without reducing battle-ship construction, this superiority should be increased. Construction of vessels like the "Alert" and "Torch" appears to me to be neither wise nor economical. Admiral Colomb has well said that this country should never build a ship which does not "designedly occupy her place in the great scheme of preparation for war."

We can build ships for peace services, but we should see to it "that above and beyond this they will fall immediately into their places on a declaration of war." What place can a 13-knot sloop like the "Alert" fill in any scheme of modern naval war? In the United States they can turn out 16-knot boats on the same displacement, carrying a more powerful armament, and for almost the same cost, as our "Alert." Which is the most likely to be useful in actual war? In fact, our peace ships, if I may so term them, should all be 16-knot boats. With regard to battle-ships, it would appear as if medium-sized ships were what we most wanted. "Barbours" rather than "Royal Sovereigns," "Renowns" rather than "Magnificents." Two years ago, in the pages of the *United Service Magazine*, I ventured to suggest the "Alexandra" as a type that might be reverted to and improved upon, and quite recently Lord Brassey, in a letter to the *Times*, advocates the same type, with the addition of a turret aft of the battery. Surely, we want some fast and powerful light-draught vessels of 8,000 to 10,000 tons in displacement. France and Russia each have eight of this class built or building. Another type which I think would be welcomed in the navy is a scout, of, say, 2,000 tons, in which armament and protection should be entirely subsidiary to

speed and sea-going qualities. Improved "Alacrity's," in fact—ships with a high freeboard, capable of keeping their speed in a seaway, with ample engine-room space, carrying nothing heavier than a 25-pounder quick-firer—ships, in short, built to be above all fast, sea-going, and habitable. A dozen vessels of this class could be built for the cost of one "Magnificent," and would be a reinforcement to our fleet of incalculable value when the day of trial comes. Before sitting down I will again apologise for my presumption in having ventured to address an audience of experts, and more especially for venturing to suggest types for construction. This latter I have done because I believe that they are types which the bulk of naval opinion would gladly see embodied in our fleet; and I am anxious to ascertain whether I am right or wrong in that belief. My being here at all is due to the fact that a naval officer, well known to many in this audience, was kind enough to assure me that "naval officers are quite ready to hear intelligent civilians on these subjects," and was flattering enough to say that he thought my paper "interesting, and giving the basis for useful discussion by naval men."

Battle-ships.

CLASS I, A.		CLASS II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Royal Sovereign	Charlemagne	Collingwood	Caïman
Royal Oak	Henri IV	Colossus	Terrible
Ramillies	St. Louis	Edinburgh	Indomptable
Repulse	Masséna	(3)	Requin
Resolution	Bouvet		Bourvins
Revenge	Lazare Carnot		Tréhouart
Empress of India	Charles Martel		Jémappes
Hood	Jauréguiberry		Valmy
Barfleur	Brennus		(8)
Centurion	Hoche		Navarin
Renown	Magenta		Alexander II
Magnificent	Marceau		Nicolai I
Majestic	Neptune		Twelve Apostles
Nile	Amiral Baudin		Gangoot
Trafalgar	Formidable		Cissoi Veliki
Anson	Amiral Duperré		Cissoi Veliki No. 2
Benbow	(16)		Cissoi Veliki No. 3
Camperdown			(8)
Howe	Sevastopol		
Rodney	Petropaulovski		
Sans Pareil	Poltava		
Prince George	Catherine II		
Victorious	Tchesmé		
Hannibal	Sinope		
Illustrious	George the Victori-		
Cæsar	ous		
Jupiter	Three Saints		
Mars	Paris		
(28)	(9)		

Battle-ships—continued.

CLASS I, B.		CLASS II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Inflexible Dreadnought (2)		Devastation Thunderer Neptune Alexandra Superb Sultan Ajax Agamemnon Téméraire Monarch Bellerophon Hercules Audacious Invincible Iron Duke Swiftsure Triumph (17)	Courbet Dérastation Redoutable Colbert Friedland Trident Richelieu (7) Petr Veliky (1)

Abstract.

	Great Britain.	France and Russia.
Class I, A	28	16 + 9 = 25
„ II, A	3	8 + 8 = 16
	31	24 + 17 = 41
„ I, B	2	0 + 0 = 0
„ II, B	17	7 + 1 = 8
	19	7 + 1 = 8
Total	50	31 + 18 = 49

Coast-defence Ships.

CLASS I, A.		CLASS II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Rupert Conqueror Hero (3)	Furieux Tonnerre (2) Admiral Senjavin Admiral Ushakoff (2)		Flamme Fusée Grenade Mitraille Achéron Cocyte Phlégéthon Styx (8) Otwajnee Gremyastchy Grozyastchy (3)
CLASS I, B.		CLASS II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Hotspur Glutton Belleisle Orion Penelope (5)	Fulminant Tonnant Tempête Vengeur (4) Admiral Lazareff Admiral Greig Admiral Chicagoff Admiral Spiridoff Kniaz Pojarski (5)	Cyclops Gorgon Hecate Hydra Cerberus Abyssinia Magdala (7)	Novgorod Popoff Smertz Tchiarodeika Ouragan Tifun Streletz Edinorog Bronenosetz Latnik Lara Perun Vestchun Koldun (14)

Abstract.

	Great Britain.	France and Russia.
Class I, A	3	2 + 2 = 4
„ II, A	—	8 + 3 = 11
	3	10 + 5 = 15
„ I, B	5	4 + 5 = 9
„ II, B	7	0 + 14 = 14
	12	4 + 19 = 23
Total	15	14 + 24 = 38

Cruisers.

CLASS I, A.		CLASS I, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Powerful. Terrible. Impérieuse. Warspite. Aurora. Australia. Galatea. Immortalité. Narcissus. Orlando. Udaunted. Blake. Blenheim. Edgar. Crescent. Grafton. Gibraltar. Royal Arthur. Endymion. Hawke. Theseus. St. George. (22)	Dupuy de Lôme. Bruix. Chanzy. Charner. Latouche Tréville. Pothuau. Jeanne d'Arc. D'Entrecasteaux. Tuge. (9) Rurik. Rossia. Rossia No. 2. Admiral Nakhimoff. Dimitri Donskoi. Vladimir Monomach. Pamyat Azova. (7)	Agincourt. Minotaur. Northumberland. Achilles. (4)	Bayard. Turenne. Du Guesclin. Vauban. (4) Edinburghski. General Admiral. Minin. (3)
CLASS II, A.		CLASS II, B.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Eclipse. Minerva. Talbot. Flora. Forth. Fox. Hermione. Astræa. Bonaventure. Cambrian. Charybdis. 6 new. (17)	Cécille. Alger. Isly. Jean Bart. (4)	Forth. Mersey. Severn. Thames. Amphion. Arcthusa. Leander. Phaeton. (8)	Sfax. Duquesne. Tourville. (3) Korniloff. (1)

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Abstract.

		Great Britain.	France and Russia.	
Class	I, A	22	9 + 7	= 16
"	II, A	17	4 + 0	= 4
"	III, A	35	18 + 0	= 18
		<hr/> 74	<hr/> 31 + 7	= 38
"	I, B	4	4 + 3	= 7
"	II, B	8	3 + 1	= 4
"	III, B	13	13 + 2	= 15
		<hr/> 25	<hr/> 20 + 6	= 26
		<hr/> 99	<hr/> 51 + 13	= 64
	Total,			

Scouts.

CLASS I, A.		CLASS II, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Dryad Halcyon Harrier Hazard Hussar Alarum Antelope Circe Hebe Jason Jaseur Leda Niger Onyx Renard Speedy Gossamer Gleaner Salamander Seagull Sharpshooter Sheldrake Skipjack Spanker Speedwell Assaye Plassy Boomerang Karakatta (29)	Fleurus Wattignies Milan Cosmao Coëtlogon Forbin Lalande Surcouf Troude Cassini D'Iberville Casabianca (12) Zacken Ilyn (2)	Barham Bellona Barracouta Barrosa Blanche Blonde Scout Fearless Archer Brisk Cossack Mohawk Porpoise Raccoon Tartar Alacrity Surprise (17)	Condor Épervier Faucon Vautour (17)

Abstract.

Great Britain.		France & Russia.
Class I, A..	29	12 + 2 = 14
„ II, A..	17	4 + 0 = 4
Total ..	46	16 + 2 = 18

Torpedo Craft.

CLASS I, A.		CLASS III, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Vulcan (1)	Foudre (1)	4 " Rattlesnake " class 42 " Havock " class (46)	2 " Léger " class 8 " Bombe " class (10) 2 " Gaidamak " class 6 " Kazarsky " class 6 new ships (14)
CLASS II, A.		CLASS IV, A.	
Great Britain.	France and Russia.	Great Britain.	France and Russia.
Polyphemus (1)		77 boats (77)	109 boats (109) 77 boats (77)

Abstract.

Class I, A	1	1 + 0 = 1
" II, A	1	0 + 0 = 0
" III, A	46	10 + 14 = 24
" IV, A	77	109 + 77 = 186
Total..	125	120 + 91 = 211

TABLE III.—*Summary of Tables I and II.*

Differentiation.	A ships.				B ships.				Total fleet.			
	Great Britain.		France and Russia.		Great Britain.		France and Russia.		Great Britain.		France and Russia.	
	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.	Numerical strength.	War value.
Strength in battle-ships	31	9.00	41	10.70	19	2.00	8	0.80	50	11.00	49	11.50
" coast-defence ships ...	3	0.30	15	1.06	12	0.46	23	0.87	15	0.76	38	1.93
" cruisers	74	10.62	38	5.64	25	1.69	26	1.77	99	12.31	64	7.41
" scouts	46	6.05	18	2.50	..	..	..	..	46	6.05	18	2.50
" torpedo craft	125	4.09	211	5.07	..	..	..	..	125	4.09	211	5.07
Total strength	279	30.06	323	24.97	56	4.15	57	3.44	335	34.21	380	28.41

Admiral Sir ERASMUS OMMANNEY, C.B.: I think we are under a deep debt of gratitude to the lecturer for the very comprehensive paper he has brought before us. I am sure the amount of labour and research which he must have undergone to do this has rendered a great service to the navy and to the country in general. I am not sufficiently in touch with the details of the Service now to make any criticism of the paper which we have just heard read with so much interest. I generally approve of what he has given us, with one part more particularly: I think he produced a very methodical and accurate classification of ships. I do not know whether it corresponds with what the Admiralty have adopted, but I think it is one deserving of the very greatest attention. The paper contains information which is very much to be desired for the public in general. I hope it will receive a very large circulation, for I am sure it will be of great interest to all the maritime population of this kingdom and to the Naval Service in particular. I can say no more than to express my great pleasure at having been here to hear this paper read. Did I gather that the French have a larger proportion of obsolete ships than we have?

Mr. SWINBURNE: Do you mean France alone or the Franco-Russian?

Admiral Sir ERASMUS OMMANNEY: The French and Russians together, if you like.

Mr. SWINBURNE: France and Russia together have 57 as against our 56. In fact, our cruisers are almost identical: we have 25 against their 26. But they have only eight obsolete battle-ships in the whole of their battle-ship strength, whereas out of our battle-ship total of 50, 19 are more or less obsolete.

Admiral OMMANNEY: That shows the great importance of your paper in bringing this information before us.

Admiral P. H. COLOMB: I think one of the reasons why nobody rises to discuss this paper is because it is more, perhaps, a paper to be read and studied than to be discussed off-hand. On first glancing it over, I thought it might be a paper that could be easily criticised. On reading it more closely I find that that is not so. Although the lecturer appeared in the early part of his paper to overlook certain very important points, yet in the latter part he shows that he has not overlooked them at all. Those important points I take to be these: that the differentiation of naval force for comparative purposes depends upon what the force is going to do; that you have a differentiation in a country which has to defend its waters, which will certainly not be that of a country which has to attack those waters. Therefore, if you compared ship with ship, class with class, and went no further, you would be doing wrong. But I think we must credit the lecturer with perfectly seeing that point, as in his later remarks especially he throws away those parts of our organization in which we may appear weak, because, as he says, those are not parts which would be called much into play in case of war. I take it the differentiation of force for the defence will be different from that for attack, and I think it is clear that our differentiation must be the differentiation for defence: that we are to hold the waters; that we are to keep our roads clear; that it will be the endeavour of any enemy, such as France, or France and Russia combined, to interfere with our hold of those waters and to occupy those roads. Therefore I think we should find that speed was not with us, or ought not, at any rate, to be with us, so strong a differentiation as other elements. In old times, the differentiation was chiefly in defensive force, and the ships which claimed to have greater power of resistance than others sacrificed speed for that purpose. On the other hand, those ships which were anxious to increase their speed sacrificed their force for it, and I think that must still be so with us. Those classes of ships which have to maintain a position must sacrifice speed for force, offensive and defensive, while those ships which might be required to cross, as it were, into the enemy's territory might sacrifice force for speed. The author of the "*Navire de Combat*," published in France last year under a pseudonym, puts the differentiation in this way:—Speed first; then the ram; then the gun; and then the torpedo. I do not know that that method of differentiation would be perfectly satisfactory for us. We may have difficulties now, inasmuch as weapons which did not exist in the old times must differentiate to some extent. The ram, however, has not so much power, because we can apply it to almost any ship; it does not interfere with her

other qualities. The torpedo, to a certain extent, is applicable to any ship, and does not so much necessarily alter the class of ship. The guns and armour seem to be the chief differentiators of naval force. The amount we put on for armour, and the size of the gun we carry, seems to be that which chiefly determines the size of our ship. I am not quite prepared to agree with the grouping the lecturer has put forward in bringing in as he does the coast defence as one of four groups of duties which would have to be done by our ships. As I view the rôle of the coast defence ship it is more that of fixed guns in the fortress when the army has been driven behind them and has cut off their supplies : that is to say, they are not a part of the army, but they are a protection to the army when it gives up the territory outside. I always feel a slight shrinking when I find in England the coast defence system brought at all into discussions as to the general condition of naval affairs. So far as I understand the question, it cannot possibly come in till that naval force is destroyed or forced back into its harbours. But the lecturer corrects the first impression one might get by pointing out, towards the end of his lecture, that after all coast defence ships do not come in as part of our naval polity. The author takes the duties which different classes of ships have to perform fairly well, except that I think it would have been better if he had in the first instance left out the coast defence ships altogether as not being part of the organization. With regard to the battle-ships, I think we cannot call them in any way an outlying line of defence which may be broken and then may be defended by the line farther in. It seems to me if the battle-ships are defeated there will be an end of it ; if that line is driven in, no other line can hold its place. Mr. Swinburne says : "cruisers and scouts play two rôles." I think that is quite right. But I think the rôle of the cruisers is more after all taking possession of certain waters and holding them than anything else. Certainly that was so in the old war. Our cruisers, certainly, for the protection of our commerce, took certain positions in the tracks of our merchant ships and held them. The fact of their being in those positions prevented the enemy from coming anywhere near, and left the roads free for the merchant ships to pass. But undoubtedly that duty is a different duty from that which belongs to the cruiser when she is attached to a fleet. If we look back in history we shall see that when we did attach cruisers to the fleet, which we were generally very loth to do, having so few to spare, those ships had qualifications which were not the same as those they used for holding certain waters. The lecturer, we must understand, is differentiating the force, not with a view of showing us how a force ought to be distributed so much as saying, "Now you have this force : if you look at it from a different point of view you will be able to see how it classifies, how it agrees, or how it differs, what its superiority or inferiority is to the force of possible enemies." He takes, for instance, two classes of battle-ships. It is difficult to say why you should have two classes of battle-ships, except upon this ground : it is inconvenient for many reasons to send a first class battle-ship to foreign waters, to the West Indies, the East Indies, China, South Africa, and so on, and therefore there seems good reason, and always has been historically good reason, for having a smaller class of battle-ships for the purpose. But if we say that there are two classes of battle-ships with the apparent idea that they are going to fight in one line or formation, then we are historically incorrect, and, I think, physically incorrect. Our line formation of battle-ships ought to be uniform. We cannot justify, on any technical ground, the placing of a weak ship amongst strong ships which are to fight together, or the placing of a strong ship amongst weak ships with the same view. I think we might divide the rôles that our ships have to perform into really three broad classes :—Firstly, holding the sea against fleets or cruisers, which must be done by battle-ships ; secondly, the holding of the sea against cruisers only, which can be done by cruisers only ; and thirdly, the watching of the enemy's ports, and I think the lecturer and I agree on this point. I am very glad to see Mr. Swinburne eliminating on both sides the ships that are obsolete and do not come into the classification properly. On both sides it is very important. There is difficulty in comparing force with force unless we largely eliminate from both sides the ships which are obsolete. The lecturer makes a wise remark where he says, "It would be folly to keep a body of officers and men to man a ship of doubtful value when the supply to equip modern ships will be tested to

breaking strain." I think that is a very shrewd and valuable remark. I am sure it is one which will be noted when this paper goes out to the navy. I think he is wise, again, in drawing our attention to the fact, and I believe the navy will go thoroughly with me there, and I am not aware that it has been so distinctly said before, that we cannot make any comparison between given groups of different classes of ships. With one class of ships for one thing and another class of ships for another thing we cannot, by lumping them, so to speak, make the one force answer to the other force. I think that, also, a remark worth its weight in gold. But then the lecturer points out that we "ascertain on broad lines the conditions which govern the naval policy of a Power by noting the proportions borne by the different groups to the naval force as a whole," and it gives us the key to the method we ought to pursue to meet that probable policy. Then he says, wisely again, I think, "Superiority in one group does not necessarily counterbalance inferiority in another." That is a true remark. Then he says: "In these days of steam, and considering the extent to which torpedo attack has developed, such a blockade must be a 'masking' one. The squadrons will not lie in-shore, but will trust to their cruisers and scouts to keep them in touch with the enemy." I believe—as far as I can see the drift of opinion—that that is a growing view in the navy. We do not look much to stationing the fighting force, as it were, off the enemy's port, but we look more and more every day to the watching ships, giving the fighting ships notice of possible movements of the enemy, in order that if they do come out they shall be followed and caught by the fighting force; but you do not keep the fighting force off the port to waste itself. I think the paper is a really good solid paper, and I consider the lecturer has been very well advised in reading it. Naval officers might not agree, perhaps, to every part of it, but the point is this, that if a layman comes forward and speaks fairly in accordance with the naval view, he is quite certain to put it in words that the public will understand, where a naval expert, who might know very much better what he meant, might have much more difficulty in putting himself *en rapport* with the public mind. I think there is great advantage to the Naval Service and to the public generally when laymen come to this Institution and give us the benefit of their thoughts as the lecturer has done to-day.

Colonel BAYLIS, Q.C.: I, as a layman, also am much struck with the popular language in this lecture, and also with the value of the statistics and their excellent arrangement.

Mr. EDWARD HICKS: I, also as a layman, should like to add my thanks to those which have already been given to Mr. Swinburne for his excellent lecture.

Mr. SWINBURNE in reply said: I am most flattered at the reception I have met with. I would just like to say I came here with no intention of attempting to enter on a discussion with professional men; but merely to elicit naval views on a question which I think is one of the very greatest interest to the public, and I read the paper mainly with the idea of eliciting what naval men think on the matter. I should, however, like to say a word on this question of differentiation. I take it from Admiral Colomb that all battle-ships to go into the line of battle should be on an equality, as I group them: for example, would you put the "Barfleur" as an equal ship to go into line of battle with the "Royal Sovereign"?

Admiral COLOMB: My point of view would be that there ought not to be the least difference between the "Royal Sovereign" and the "Barfleur;" that if those ships are intended to serve in the same fleet they ought to be the same class of ship.

Mr. SWINBURNE: Broadly speaking, do you not think they are on an equality as regards class? Of course the "Royal Sovereign" is a more powerful vessel.

Admiral COLOMB: No, I suppose they are not.

Mr. SWINBURNE: But what I mean is, if you form a squadron, say to protect the Mediterranean, you must have some ships much more powerful than others. I merely bring this forward because the question of coast defence has been brought in. I do not think coast defence is a naval matter whatever, *i.e.*, I do not think a ship intended for coast defence has a right to rank as a naval asset. She is part of the localised defence.

Admiral COLOMB: You would not bring her in.

Mr. SWINBURNE: No, but we have ships which are sea-going; you have nowhere to put them if you cannot bring them into line of battle. They certainly are not cruisers, and I introduced the "coast defence" simply as a place for those vessels. You can hardly eliminate them.

Admiral COLOMB: Of course that is a different question. My own impression is in war you would have ships, we always used to have ships that you did not consider were up to the line of battle, yet if you had no other service for them we could use them and put them in.

Mr. SWINBURNE: There is another point I should like to note on the question of differentiation between cruisers and scouts. Will you in your next great naval war utilise powerful ships like the "Aurora" class, the "Royal Arthur" class for scouting? Will you attach them to the squadron, or will you send them out for the protection of commerce and trade routes?

Admiral COLOMB: All you can say is in former times it was the big ships that were attached to fleets as scouts, and I think that would be so.

Mr. SWINBURNE: I thought rather the other way, that you would have so much more heavy duties to fall on your large vessels that you would utilise your smaller craft such as the "Scout" and "Archer" class, and "Barham" for scouting purposes entirely, not for commerce defence.

Admiral COLOMB: These are very difficult questions, but what you used to do was to group your weaker vessels in pairs and those generally in pairs could hold the waters they were intended to hold for the protection of commerce. They had not the size or speed necessary for scouts, so that I take it you would be obliged to use your heavier cruisers because they have the speed and coal supply necessary as scouts for the fleet, whereas with the smaller group you would be able to hold certain waters where speed was not called in question.

Mr. SWINBURNE: You have hit on what I considered to be the chief point.

Admiral COLOMB: I do not know whether I am quite in order.

The CHAIRMAN: I think this is exceptional.

Mr. SWINBURNE: That question of not being able to compare two classes was really one of the chief reasons that led me to write this paper and to read it here, because I do not think the average layman does understand that point. He sees two large ships together, one a battle-ship and the other a cruiser, and because they are both large vessels he believes they are both battle-ships, and fails to realise that they differ enormously in essentials, and are intended to play totally different rôles.

The CHAIRMAN (H.S.H. Prince Louis of Battenberg): I am sorry, for the sake of the lecturer, that there has been so little for him to reply to in criticism, but I agree with Admiral Colomb that this is much more a paper to be studied and thought about than one to be discussed on the spot. Of course the ordinary duty of a chairman would be to sum up the expressions of opinion, but as there have been practically none I will confine myself to my own views on the subject. I feel myself very much in sympathy with the lecturer in his opening remarks. I thought of it this morning when I read in the "Times," from their own correspondent in Paris, that the gunboats "Hoche" and "Neptune" were ordered somewhere; and yesterday another paper spoke of them as the "men-of-war" "Hoche" and the "cruiser" "Neptune," implying that a cruiser was not a man-of-war; it is impossible to conceive greater nonsense. Going through this classification carefully I confess on the whole I feel myself in accord with the lecturer, but I think it is well to point out that however praiseworthy and desirable it is to arrive at some classification and differentiation, it is based upon what must necessarily be an arbitrary proceeding; that is to say you must draw the line under different heads—displacement, speed, armament, obsolescence, and so forth. Now, who is to say where this line is to be drawn. For purposes of comparison with other navies, it is obvious that by a little manipulation, drawing the line a little higher up or lower down, you can considerably increase one class of vessels or decrease another class. At any rate the picture is somewhat misleading. An example which occurs to me is that of the cruisers; it affects this country more especially. Turning to the tables at the end I find under "Cruisers," Class II and III, by fixing 4,000 tons as the limit between the two classes you get into Class II the whole of the

ships of the so-called "Astræa" class, but you relegate to Class III the whole of the ships of the "Apollo" class. I quite admit that the "Astræa" is a better ship than the "Apollo," but whether she is so very much better as to merit a superior class is perhaps a question of opinion. The chief defects of the "Apollo" class were: not sufficient coal endurance, and the fact that her broadside guns were placed too low. Both these are corrected in the "Astræa" class. As such they are better, but how much better is difficult to say. The point where I part company with the lecturer is when he begins to give numerical values to ships of different classes. The lecturer says, "I assign 30 as the unit value for a modern 1st class battle-ship, and 20 as the unit value for a modern 1st class cruiser, but I by no means assume that three 1st class cruisers are an equivalent for two modern battle-ships." This is very sound as a principle, and I do not see much object in giving numerical values to individual ships and classes. It follows logically from this that if you add up the totals of these numerical values, and finally say the grand total of the war fleet of England is 31.2 as against 23.4 of France and Russia, it is distinctly misleading; moreover, it is really doing that which the lecturer very properly tells us we should not do. We add up fictitious values of different classes of ships and then compare the totals. I should have been glad if this "addition" had been left out of the table, because it may lead to wrong conclusions being drawn. When it comes to discussing what should be our future building programme and so forth, I think it is a subject I would rather not touch upon. I do not know what the Admiralty programme is, and it is also somewhat beside the subject under discussion. There is another point I omitted to mention when talking of drawing the line under different headings; I refer to "obsolete," which is an extremely wide term nowadays. Things go so rapidly that very likely in a few years' time we shall call any ship "obsolete" that has not got water-tube boilers or "induced draught." Similarly as to the larger Q.F. guns. Unquestionably a ship armed with 6-in. Q.F. guns with four times the rapidity of fire is a better ship than one armed with 6-in. ordinary B.L. guns. So that under that heading a list like this would have to be constantly revised. I think that is all I have to say. I am glad to think that though there are very few of my brother officers here to-day, some 4,000 or 5,000 copies of this lecture will be going out to all parts of the world, and I believe it will be received with much satisfaction. It is now my pleasant duty to offer to Mr. Swinburne the best thanks of this meeting for the very great trouble and pains he has been to in preparing the paper; which must tend not only to correct the mistakes which are mentioned in the opening paragraphs of the paper, but also to enable the public generally to put a proper value on the different fighting units of the English and other navies.