

YA
400
J48
1919
v. 1
c. 1

Copy No. 2

~~CONFIDENTIAL~~

~~CLASSIFICATION CHANGED TO~~

~~CANCELLED~~

ON AUTHORITY OF ^{V2125-1} (Dsecur) 29 Apr 68

Hilp Hoyle
(Signature) (C.D.HIST)

REPORT

DATE JAN 2 1976

OF

ADMIRAL OF THE FLEET

VISCOUNT JELlicoe OF SCAPA
G.C.B., O.M., G.C.V.O.

ON

NAVAL MISSION

TO THE

DOMINION OF CANADA

(November-December, 1919)

Volume I

CONTENTS

Letter of 31st December, 1919, to His Excellency the Governor
General and Commander-in-Chief, enclosing:—

	PAGE
Chapter I— <i>The Naval Requirements of Canada—including estimates, and remarks on the value of surface vessels</i>	12
Chapter II— <i>Administration</i>	19
Chapter III— <i>Personnel</i>	28
Chapter IV— <i>Discipline</i>	35

No. P.-227.

THE DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA,

31st December, 1919.

SIR,—

I have the honour to inform Your Excellency that in accordance with instructions received from the Lords Commissioners of the Admiralty, issued as the result of a request from the Government of Canada, I arrived at Esquimalt in H.M.S. *New Zealand* on the 8th November, 1919. The object of my visit is defined in my terms of reference as follows:—

“To advise the Dominion Authorities whether, in the light of the experience of the war, the scheme of naval organisation which has been adopted, or may be in contemplation, requires reconsideration; either from the point of view of the efficiency of that organisation for meeting local needs, or from that of ensuring the greatest possible homogeneity and co-operation between all the naval forces of the Empire; and, should the Dominion Authorities desire to consider how far it is possible for the Dominion to take a more effective share in the naval defence of the Empire, to give assistance from the naval point of view in drawing up a scheme for consideration.”

2. The subjects on which advice was requested by the Government of Canada are given in a memorandum as follows:—

“The Canadian Government would be glad to have your opinion on the necessary steps to be taken and the best methods to be adopted in the event of the Canadian Government deciding to adopt a policy of a local navy.

“2. The Government would be glad if this advice would cover as many incidental points as possible, and a list of definite questions is attached. These questions should not be considered as exhaustive, and should be considered in the light of the request in the first paragraph.

“3. If you desire to submit alternative recommendations the Government will be glad to consider any such proposals.

“4. The Government will also be glad to have your opinion on any point connected with Naval Defence on which you may care to express an opinion.

“ 1. *Canadian Pacific Naval Base.*

“(a) Is a Naval Base considered necessary on the Canadian Pacific coast on account of either Canadian or Imperial interests?

“(b) If so, which is considered the best site for the purpose?

“(c) On what scale should the base be constructed?

“(d) Is it considered that Esquimalt should be abandoned as a Naval Station?

“(e) Is it considered that any points on the British Columbian Coast should be fortified?

“ 2. *Policy, Co-operation and Administration.*

“(a) In what manner do you consider that Canada can best co-operate in the naval defence of the Empire and its sea communications?

"(b) If Canada does co-operate, do you consider that the first effort should be on the Atlantic or Pacific coast, or divided between them?

"(c) Under such circumstances, will you suggest the type of vessels you recommend that Canada should first acquire and maintain?

"(d) Will you state the suggested total naval force which you recommend that Canada should acquire in the immediate future under different financial conditions, viz., between the limits of the smallest force that can be of real value, and that which would form such a portion of the Empire's naval forces as would be commensurate with the importance of Canada's population and her position in the Empire?

"(e) What advice have you to offer on the subject of the administration of the Canadian Naval Service, if it is decided to maintain naval forces of the strength mentioned in paragraph (d)? Obviously the *strength* of the administration will depend on the size of the force, and it should therefore be capable of expansion.

" 3. *Royal Canadian Navy—Personnel.*

"(a) Do you recommend a system of long service or short service for Canadian personnel?

"(b) If short service is recommended—

- i. What length of service is considered best?
- ii. What proportion should short service men bear to long service men, (some of which, it is assumed, would be required)?
- iii. What method of training do you advocate, both for Military and Engineering branches?

" 4. *Royal Canadian Navy—Works.*

"What are the minimum works necessary on the East and West coasts?

- i. To maintain the vessels recommended for construction.
- ii. To maintain efficient bases for the use of the ships of the Royal Navy.

" 5. *Halifax Dockyard—Reconstruction.*

"(a) Do you consider the scheme submitted sufficient for the purposes enumerated above in 4 on the East coast?

"(b) If not, what alterations are considered necessary?

" 6. *Naval Bases on the East Coast.*

"(a) Do you consider that Halifax is sufficient as a naval base on the East coast?

"(b) Do you consider that any ports on the East coast other than Halifax and Quebec, should be fortified for naval purposes?

"(c) If so, to what extent?

" 7. *Mining.*

"(a) Do you consider that preparations should be made for mining any Canadian Ports in case of emergency?

"(b) If so, which, and to what extent should preparations be made?

"(c) How do you consider the personnel necessary should be raised and trained?

"(d) What type of mine is recommended?

" 8. *Aerial.*

"(a) Do you consider that permanent aerial forces are necessary for the defence of Canadian coasts?

"(b) If so, on what scale?

"(c) Where do you consider air stations for naval purposes should be erected?

"(d) In the event of the Canadian Government deciding to create a separate Air Force, what method of co-operation between Navy and Air Force, do you recommend with regard to training, discipline, control and operations?

" 9. *Anti-Submarine Measures.*

"(a) What preparations do you consider should be made against hostile submarines, for use in an emergency?

"10. *Defensively Armed Merchant Ships.*

"(a) Do you consider that armament should be maintained in reserve for Canadian Merchant Ships?

"(b) If so, what armament do you consider suitable?

"11. *Naval Intelligence Organisation.*

"(a) Do you consider the proposed Naval Intelligence organisation laid before you suited to both Canadian and Imperial requirements?

"12. *Wireless.*

"(a) Do you consider a high power W/T station is necessary or desirable on the Pacific coast?

"(b) If so, of what description should it be?

"13. *Royal Naval Canadian Volunteer Reserve.*

"(a) Have you any suggestions for the re-organisation of the Royal Naval Canadian Volunteer Reserve?

"14. *Minesweeping.*

"(a) What preparations, in your opinion, should be made for minesweeping in emergency.

3. I have the honour to present the attached report and appendices, in which these questions are answered. Remarks on other naval subjects are included in accordance with paragraph 4 of the covering memorandum.

4. During my stay in Canada I have visited the following ports—Esquimalt, Victoria, Port McNeill (Vancouver Island), Vancouver City, Ottawa, Montreal, Quebec, Halifax, and St. John, N.B.

Members of my staff have also visited Alberni and the Alberni Canal, Uchucklesit Harbour, Banfield Creek in Vancouver Island, and Prince Rupert Harbour proceeding by the Inner Passages. Sydney Harbour (Cape Breton), Shelburne and Liverpool Bay in Nova Scotia were also inspected by members of my staff.

I have visited by invitation the cities of Calgary, Regina, Winnipeg, and Toronto; and in all cases great anxiety for information on naval subjects was evinced.

The several branches of the Navy League in the Dominion were particularly desirous that I should address meetings in the principal cities with the object of emphasizing the supreme importance of Sea Power to the Empire, and this was done. In this connection I was much struck with the great work accomplished in some cities,

particularly Toronto and Victoria, in the formation of Boys' Naval Brigades and the excellent and systematic instruction given to the boys in seamanship, signalling, wireless, etc., and in fostering the sea spirit. The greatest credit is due to those who devote a very large proportion of their time and large sums of money to the furtherance of this work. At the head of the movement is Mr. Aemilius Jarvis of Toronto.

5. The question of the naval defence of Canada has been under consideration since the Colonial Conference held in 1902, and various developments that have taken place since that date are too well known to need detailed recapitulation.

The outcome of the 1902 and succeeding conferences was the passing of the Naval Service of Canada Act in 1910, and in August, 1911, His Majesty the King was graciously pleased to approve of the naval forces of Canada receiving the style of the Royal Canadian Navy, and of the ships of war of that navy being designated as His Majesty's Canadian Ships.

6. The heavy financial burden that has fallen on the people of the United Kingdom as the result of over four years of war has resulted in a great reduction in the strength of the British Fleet. This is common knowledge, but the fact emphasizes the increased importance and value of such co-operation on the part of the overseas Dominions in the protection of sea communications and general naval defence, as the people of the Dominions are prepared to afford. Some idea of the extent to which the United Kingdom insures her overseas trade by spending money on the Royal Navy is given in the approximate figures in Chapter I of this Volume.

7. The form which the Canadian naval effort should take has been a matter over which there has been considerable controversy in the past. The war having demonstrated, as in the case of previous wars, the vital importance of Sea Power to the Empire, it may be that the increased value of Dominion naval assistance, and the strength of the desire to afford that assistance, will make it easier to reconcile conflicting views.

In Canada, where so large a proportion of the population lives at a great distance from the sea, there will always be the inherent difficulty of obtaining recognition of the fact of the dependence of the prosperity of the people upon the safety of those sea communications along which produce travels. Winnipeg is some 1,125 miles from the Pacific and about 1,350 miles from the Atlantic. In contrast to this it is of interest to note that Warwick, in the centre of England, is only about 65 miles from the North Sea, and about 95 miles from the Irish Sea and the English Channel.

8. The German menace has now disappeared, but it will be seen from a perusal of the tables in Chapter X, Volume III, that very considerable efforts are required in the future by the people of the British Empire if they desire to maintain Sea Power on the same proportionate scale as in the past.

It has never been possible in any war for the British Navy to obtain such complete command of the sea as to exclude an opponent from all access to it, and modern conditions of naval warfare greatly increase the difficulty of preventing the escape of isolated raiders from a blockaded area. It therefore becomes increasingly necessary to keep sufficient naval force in various parts of the world to protect trade, and to ensure the early capture or destruction of such enemy vessels as may escape the main blockade with the object of interrupting our over-seas communications by gunfire, torpedoes, mines, or aircraft.

9. The exigencies of the military situation during the late war necessitated the use of a large number of our men-of-war abroad for the work of convoying transports from the various Dominions and India to the European theatre of war; and this fact, combined with the policy of reducing our overseas squadrons in order to effect the concentration in Home Waters which was necessary to give a sufficient margin of strength over Germany, resulted, when war came, in our being compelled to rely to a considerable extent upon the assistance of some of our Allies for the safety of our sea communications abroad. Thus, in the Mediterranean and West Atlantic, we relied upon help from the French; whilst in Far Eastern waters, and, in the latter half of the war in the South Atlantic, we were to a considerable extent dependent upon Japanese co-operation.

The naval assistance in the shape of cruisers, destroyers and other small vessels rendered during the last eighteen months of the war by the United States, was of great help in the institution of the system of protecting trade by convoy. Without this help we should only have been able to use convoys to a sufficient extent to meet the submarine menace by abandoning some of our overseas expeditions.

10. The Admiralty, in a memorandum on Sea Power in 1902, informed the Dominions that—

“It would be necessary that we should have sufficient power available to carry on a vigorous offensive against hostile outlying squadrons, without unduly weakening the force concentrated for the decisive battle, whether in Europe or elsewhere.”

The weakness of our outlying squadrons already mentioned prevented the early institution of this necessary vigorous offensive in the late war.

11. War experience has also shown that submarines can operate successfully at immense distances from their bases, and this fact necessitates the provision of defence against this type of attack in almost all parts of the Empire.

12. The growing development of aircraft produces yet another type of attack which must be met by local forces, even when the hostile nation is at some considerable distance.

13. The naval problem of Canada is complicated by the fact that the two coast lines of the Dominion are separated from each other by some 2,500 miles as the crow flies. By sea the distance from Vancouver to Halifax is some 6,400 nautical miles via the Panama Canal, and some 13,800 nautical miles via the Straits of Magellan. For safety *under all conditions* each of the Canadian coast lines requires certain local defences, and in addition each requires a naval force to guard the trade and the coast. It is, of course, true that in some cases the danger of attack is remote, and the risk may be accepted.

The strength of the Canadian Naval Forces considered necessary for the defence of the Canadian Coasts and of Canadian trade, and the reasons governing that strength, are dealt with in Chapter X, Volume III.

14. It may possibly be desired to give consideration in addition to the question of Canada's being equipped to play a part in the naval defence of the Empire by the provision of a force which can assist in such operations in the main theatre of any future war as will bring the war to a victorious end.

Figures are given in Chapter I showing the naval force that could be maintained for various alternative sums in the event of any policy of this nature being adopted.

15. It is naturally more difficult to attain and maintain a high pitch of efficiency in a small naval force than in a large fleet. The important element of competition is largely absent; there are fewer brains at work on improvements and innovations; and the officers, particularly those in the higher ranks, have insufficient experience in fleet work. These difficulties will be largely overcome if the officers in particular, as well as some of the men, of the Royal Canadian Navy spend a proportion of their time in ships of the Royal Navy. Frequent meetings of Canadian vessels with those of other Dominions, and of the Royal Navy; and fleet exercises carried out annually on a large scale, would give opportunities for acquiring experience, would produce interchange of ideas, and would promote competition. Officers and men would see for themselves how they compared in efficiency with those whom they met.

One fact must always be borne in mind, however, viz., that first class efficiency in the naval service can only be produced by hard work and continuous training, whether it be connected with the handling of ships and fleets, gunnery, torpedo, mining and engineering work, seamanship, or signalling; and that a fighting service on which so much depends can never be satisfied with anything less than the highest efficiency.

16. In Chapter III proposals have been made with a view to ensuring that officers of the Royal Canadian Navy should have all the possibilities open to them for advancement to the highest commands in the fleet of the Empire.

17. The organization for training officers and men for any Canadian Naval Force is dealt with in Chapter V, Volume II. The question is complicated by the great distances which those under training must necessarily travel in order to reach training establishments, as well as by the fact that if such establishments exist on one coast only, officers and men are constantly very far away from the localities in which they reside.

In the case of very small naval forces only being maintained by Canada it would probably be more economical to send the few officers and men needing specialist training to England than to construct and maintain Canadian training establishments for this purpose.

It will be seen by reference to Chapter V that it is proposed that the training of boys should be carried out in establishments on shore. This is a more economical method than that of maintaining a training ship. The *Niobe* and the *Rainbow* could, under these circumstances, be disposed of.

18. A chapter has been devoted to the important subject of discipline, as it is felt that this is a matter to which special attention is necessary at the present time in view of the general unrest throughout the world which has resulted from the strain of prolonged war.

In all ages it has been accepted as an axiom that no armed force can exist without discipline. The only real difference of opinion that arises is as to the method by which discipline is first acquired and then maintained. Accepting, then, that discipline is essential to armed forces, the question at issue is as to the method of instilling discipline into the personnel of naval forces, and of maintaining it. Unquestionably this should not be done by undue severity, but by other and better methods which almost unconsciously breed the sense of duty, and the spirit of discipline, especially in the young. For this reason officers and men should be entered at an early age. Discipline is instilled with comparative ease by those who understand the temperament of the young, and it is therefore essential to select with great care those who will have the upbringing of the future generations of naval officers and men belonging to the Dominions.

ion. Once, however, these trainers of youth are selected, it is essential that, so long as their action is correct, they should be supported by authority, as nothing can be more fatal to discipline than action tending to bring into disrepute the head of any training establishment on a disciplinary question.

In his final despatch during the late war Field Marshal Earl Haig made the following remarks on the subject of discipline:—

'Discipline has never had such a vindication in any war as in the present one, and it is their discipline which most distinguishes our new armies from all similarly created armies of the past. At the outset the lack of deep seated and instinctive discipline placed our new troops at a disadvantage compared with the methodically trained enemy. This disadvantage, however, was overcome, and during the last two years the discipline of all ranks of our new armies, from whatever part of the Empire they may have come, was excellent. Born from a widespread and intelligent appreciation of the magnitude of the issues at stake, and the firm belief in the justice of our cause, it drew strength and permanence from a common-sense recognition of what discipline really means—from a general realization that true discipline demands as much from officers as from men, and that without mutual trust, understanding and confidence on the part of all ranks, the highest form of discipline is impossible.'

19. It is obviously necessary that the personnel of the Navy should be given every consideration and comfort that the conditions of life on board a warship permit, but it is inevitable that life at sea can never compare in comfort with life on shore, and if the manhood of a nation is not prepared to put up with the inherent discomforts of sea life, and to submit to necessary discipline, that nation cannot hope to become a Sea Power.

20. The questions of Intelligence and Communications are dealt with in Chapter VI, Volume II. The war has shown the exceeding value of a first rate naval intelligence organization. It is recommended that every possible encouragement should be given to the development of such an organization, which should work in close collaboration with the Intelligence Divisions of the War Staffs of the Royal Navy and other Dominion Navies.

The proposals also made in the same chapter on the subject of wireless organization and wireless communication are of considerable importance. They are the outcome of experience gained during the war in which wireless work in the Navy played such an important part. Rapid developments are in progress in this branch, and should be closely watched.

21. The very important subject of aircraft for work in conjunction with the naval forces is dealt with in Chapter VII, Volume II. Chapter XI, Volume III, deals with the different types of vessel recommended to form part of a Royal Canadian Navy.

22. It is very desirable that Canada should become independent of outside assistance in the work of minesweeping. The simplest, and by far the cheapest, method of obtaining in war the services of efficient minesweeping vessels is by the encouragement of a trawler fishery service on both the Pacific and Atlantic Coasts during peace. Steam trawlers are already operating on both coasts, and have proved to be commercially successful. This matter is dealt with in Chapter IX, Volume II, and is of such importance on economic grounds that I beg to draw special attention to it.

23. The question of fuel reserves is dealt with in Chapter VIII, Volume II, which also contains recommendations on the subject of bases, docking, repair and other facilities for men-of-war required in Canada, as well as the defence arrangements necessary for the safety of bases. In all cases the fullest weight has been given to the necessity for general economy, and only the *least* requirements consistent with the maintenance of sufficient forces to meet the naval situation have been suggested.

24. Finally, I wish to tender my grateful thanks to Your Excellency, to the Prime Minister, the Minister of the Naval Service, Marine and Fisheries, and the other members of the Canadian Government, and to the Deputy Minister of the Naval Service, the Director of the Naval Service and the Assistant Director, for the assistance which has at all times been so freely afforded to my staff and myself during our visit. The ready help we have received on all sides has much furthered the work of the Mission.

I am also much indebted to the Department of the Naval Service and to the various local authorities and harbour boards for the assistance rendered on all occasions and I shall be obliged if my deep appreciation of the great courtesy we have received throughout the Dominion may be conveyed to all.

I have the honour to be,

Sir,

Your Excellency's most Obedient Servant,

J. Currie

Admiral of the Fleet.

His Excellency

The Duke of Devonshire,

K.G., P.C., G.C.M.G., G.C.V.O.,

Governor-General and Commander-in-Chief,

The Dominion of Canada.

CHAPTER I.

The Naval Requirements of Canada.

1. The late war has once again demonstrated the dependence of the British Empire on the safety of its sea communications. Sea Power has saved the Empire as on many occasions before, but in this case it has also saved the cause of the Allies and of Civilization. General recognition of this fact will surely lead to the maintenance of British sea supremacy in the future. A navy of very considerable strength is still required for this purpose, although the menace of our late enemies has ceased to exist.

2. War experience has shown very clearly the immense capabilities for the destruction of, or interference with, sea communications, given by modern weapons. Our late enemies used many of these weapons illegitimately, but even if measures are found in the future to prevent such means of naval warfare, it is still possible to cause great havoc to trade without infringing the tenets of international law.

3. Canada has sea communications both in the east and in the west, and, excluding trade with America either by the Great Lakes or by the open seas, the value of her overseas trade in 1913-14, which is the last year unaffected by the war, reached the total of £112,000,000. The trade with America has been omitted, since some considerable proportion of it could be carried on during war in territorial waters in comparative safety. Canada's merchant tonnage in 1916 consisted of 8,660 vessels of 942,598 net tons; of which 4,202 vessels of 491,181 net tons were steamers. About two-thirds of them were employed in ocean and coastal trade, and one third on the Great Lakes. In 1917, 184 vessels of 28,638 net tons were built in Canada.

On the 30th November, 1919, the number of vessels on the Canadian Register was 8,631, with a gross tonnage of 1,469,176. The vessels built, building and ordered under contract for the Canadian Government consist of 60 ships of 359,945 tons (of which 23 are already completed).

Out of the total of 101 steel and wood merchant steam vessels under construction in Canada on the 30th September, 1919, 78 vessels of 156,790 tons, are intended for seaborne trade, and 23 vessels of 53,833 tons for the Great Lakes.

It will thus be seen that Canada has great interests on the ocean, for which in war naval protection would be necessary.

4. The question of the naval forces required by Canada may be viewed in two ways; first in the light of Canada's own requirements and Canada's own safety; and secondly in the broader light of the security and safety of the Empire as a whole. The requirements under the first heading are discussed in Chapter X, Volume III, and the reasons stated for the conclusions arrived at. The naval force suggested as adequate purely for the protection of Canada's trade and Canada's ports *under the conditions assumed* comprises:—

- 3 Light Cruisers
- 1 Flotilla Leader
- 12 Torpedo Craft
- 8 Submarines with
- 1 Parent Ship

and certain auxiliary small craft for training purposes etc. The Air Force needed for co-operation with the above naval force is also given. In addition certain fixed naval defences are needed for the protection of the important harbours. These are stated in Chapter IX, Volume II.

5. If the question of the co-operation of Canada is looked upon in the wider sense of participating with the United Kingdom and the other Dominions in the naval defence of the whole Empire, it naturally assumes much larger proportions. The question is of course one for decision by Canada, and if Canada desires to consider the proportion of the total cost of Empire naval defence which might under such conditions reasonably be incurred by the Dominion, the cost of the naval forces

considered necessary for the adequate defence of the Empire and its sea communications as a whole must be known. I have no official information on this point, but it seems probable that, owing to the greatly increased cost of labour and materials, and to the increased rates of pay of the officers and men of the navy, there is little, if any, likelihood of the British naval estimates falling much below the sum of £55,000,000, whilst the annual cost of the Royal Australian Navy, even if only maintained at its present strength, will be over £2,000,000. In 1914 the British naval estimates were slightly less than £50,000,000, and the Australian expenditure on the Navy a fraction below £2,000,000. These were the highest figures reached in pre-war days.

It is not unreasonable to anticipate that Australia will add to her naval effort in the future, and that New Zealand will shortly acquire naval forces. It will be within recollection that in 1909 New Zealand contributed one battle cruiser to the British Navy at a cost of some £2,000,000, and that in 1912 the Malay States gave a battleship of the first class—H.M.S. "Malaya"—at the cost of about £2,500,000.

6. The population of the United Kingdom in 1914 was 46,000,000.

The value of the overseas trade of the United Kingdom for the same year was £1,540,000,000 which is equivalent to £33 9s. 6d. per head of population.

If the naval estimates of the United Kingdom in the near future amount to an annual sum of £55,000,000, it will be equivalent to £1 4s. per head of population.

By spending £1 4s. per head on the navy to protect overseas trade, of the value of £33 9s. 6d. per head, the United Kingdom is virtually paying an insurance premium at the rate of approximately 3.6%.

7. It may be of interest to indicate the naval forces of the greatest assistance to the Empire which could be provided for certain figures.

The tables at the end of this chapter have accordingly been drawn up to show the fleet which it is thought would be most valuable to the Empire if the naval estimates of Canada eventually reached totals approximating to £5,000,000 per annum, £3,500,000 per annum, £2,000,000 per annum, or less than £1,000,000 per annum, and these tables may be of use to the Government in deciding the question now or in the future.

8. In the cases of the three higher figures approximate estimates are given for a term of years during which the fleet shewn might be brought into being. This term in the case of the £2,000,000 estimate covers a period until 1927, and in the case of the £5,000,000 and £3,500,000 estimates a period until 1929. The period can of course be shortened if desired, by increasing the annual expenditure in the earlier years.

The cost of the new vessels is included and the total varies year by year until finality is reached, when new construction ceases (except as required for replacement of obsolete vessels) and the annual cost thereafter remains at the specific figure quoted. Replacement of obsolete vessels is provided for by a sum set apart for depreciation which is included under "Maintenance".

In the case of the two higher estimates the *total* commitment is arrived at by superposing the estimate concerned on to the £2,000,000 estimate, as it is *additional* to that estimate, and the figure £5,000,000 is arrived at by adding the sum £3,162,450 for maintenance of the ships shewn, to the sum £1,739,500 for the maintenance of the £2,000,000 fleet. Similarly for the £3,500,000 estimate.

In each case, local defence and defence of trade in the vicinity of the coast is first provided for. In the case of the two higher estimates, real help is also afforded to Empire naval defence as a whole.

9. In the case of the estimate of £2,000,000 per annum, defence of Canada's trade in the Pacific is given in addition, but there is little naval force which can be used offensively; in other words whilst Canada would be protecting her own interests *defensively* it would fall to the lot of the United Kingdom, with the assistance of the other Dominions, to endeavour to take such action as would be necessary to bring war to a conclusion.

10. The figures in the tables give the annual cost of *maintenance* as well as the first cost of construction of such of the vessels as are not a gift from the British Government. The vessels included in the two lower estimates, except the light cruisers

and the submarine parent ship, are assumed to be a *gift*. Once the ships are in existence, the sum included under the heading "maintenance", will cover their replacement when obsolete. This sum represents in effect the annual depreciation of the ships as well as the expenditure on fuel, repairs, etc., and is based on the assumption that they will remain efficient for a certain definite period. This period is taken to be as follows:—

Type of Ship.	Initial Cost.	Effective life.
	(£)	(Years)
Battle Cruiser.....	4,000,000	15
Light Cruiser.....	500,000	15
Flotilla Leader.....	200,000	12
Destroyer.....	160,000	12
"P" Boat.....	15
Submarine.....	150,000	15
Depot or Parent Ship.....	200,000	25
Submarine Parent Ship.....	200,000	25
Fleet Minesweeper.....	70,000	20
Aircraft Carrier.....	200,000	25

11. If Canada decides at any period to co-operate in the general naval needs of the Empire in the sense mentioned in paragraph 5, it may be convenient to possess a basis on which to build up her fleet. The basis suggested under these conditions is a fleet-unit which, it is considered that war experience has shown, should comprise, in the case of Canada:—

- 1 Battle Cruiser.
- 2 Light Cruisers.
- 6 Destroyers.
- 4 Submarines.
- 2 Fleet Minesweepers.

The units require certain auxiliary vessels in the following proportion.—

- For every 18 destroyers.—1 Depot Ship.
- " 9 destroyers.—1 Flotilla Leader.
- " 8 Submarines.—1 Depot Ship.
- " Unit.—1 Aircraft Carrier.

This basis has been used in the alternative estimates given in the tables.

12. Air work for the navy is of exceeding importance, and as time goes on this importance will increase. Any naval unit, to be complete, must, in the future, possess its proper complement of aircraft for the different purposes required. The cooperation of aircraft with naval forces will be of great and increasing value, and aerial operations will influence naval tactics and strategy.

Canada has formed an Air Board to control aerial matters, and from the naval point of view it is most necessary that the full weight of naval requirements should be put before this Board. It is considered desirable for the Royal Canadian Navy to be strongly represented thereon, in order that due weight may be given to naval air matters.

13. Air proposals in this connection will be based on the operational requirements for a Royal Canadian Navy, and on this basis the questions of personnel, training, and matériel, are discussed at some length in Chapter VII, Volume II.

THE VALUE OF SURFACE SHIPS IN MODERN WARFARE.

14. The introduction of a large number of scientific devices, and the rapid advances in efficiency made by so many of the weapons in use during the recent war, renders it particularly desirable to investigate the present value of surface ships, and to consider the probabilities of their use in the future.

The subject is treated under two headings, viz.:—

- (a) Capital Ships.
- (b) Other Men-of-war.

(a) *Capital Ships.*—

The evolution in the past fifty years of the capital, or line-of-battle, ship of the present day is the result of the struggle which has been in progress between.—

- (a) The gun and the ship.
- (b) The torpedo and the ship,
- (c) The mine and the ship, and, more recently,
- (d) Aircraft and the ship.

The advent of explosive shell and the increasing power of guns led to the introduction of steel ships with armour, and armoured decks.

The advent of the torpedo led to the successive introduction of:—

- (i) Torpedo nets.
- (ii) Greater internal water-tight subdivision.
- (iii) Internal torpedo bulk-heads.
- (iv) External bulges.

The advent of the mine led to the introduction of paravanes.

The advent of aircraft necessitates the thickening of armoured decks, the carrying of protecting aircraft by ships, and the fitting of high angle firing guns in ships. Further developments in aircraft will necessitate further counter measures.

In each case enthusiastic supporters of the new devices have pronounced the speedy disappearance of the line-of-battleship; but, instead, the line-of-battleship has in each case been altered, and means found to counter the latest danger to its existence.

It is natural to ask—"Why has such trouble been taken to preserve the costly line-of-battleship?" The answer is not far to seek.

Millions of tons of cargo, and in time of war, of men and stores also, are carried in ships, and until some other means of carrying these millions of tons over or under the ocean have actually materialized it is imperative for the British Empire to retain the command of the surface of the sea. This need will continue until, if ever, surface men-of-war lose their *métier*, and are displaced by aircraft or submarines.

The capital ship is the strongest form of engine of war which exists for operating on the seas. Its external bulges, which were invented during the late war, render it immune from torpedo attack until hit (in the case of the newest type now building) by a large number of torpedoes, thus minimizing the effect of each hit obtained by torpedoes fired by surface craft, submarines, or torpedo-carrying aircraft.

The capital ship is also usually protected against torpedo attack by escorting destroyers, and in future will be assisted by various scientific devices, recently invented, which will enable it to carry out defensive or offensive tactical manoeuvres against submarines.

Paravanes, which were invented during the late war, form an efficient protection against moored mines of present type.

Thick armoured decks at present protect the vitals of the capital ship from bombs dropped by aircraft, which when dropped from the low heights necessary under present conditions to give much probability of hitting, have but low striking velocities and therefore only small penetrative effect. As the accuracy of bomb attack and the weight of bombs carried increase, modifications will be necessary in the construction of ships.

High angle fire guns assist in keeping attacking aircraft at heights from which hitting by dropped bombs is, *at present*, improbable.

The aircraft carried on board, or in an attendant vessel, serve to protect the capital ship against enemy airships and aeroplanes.

The secondary anti-torpedo-craft guns can establish "barrages" of bursting high explosive shell to protect the ship against attack by small fast surface-craft loaded with explosives and controlled from an independent position. Vessels of this type will, however, only be encountered in sheltered waters and rarely, if ever, on the high sea.

Armour and armoured decks protect the ship against attack by enemy's gunfire.

High speed and great gun power enable the capital ship to bring vessels of less speed, power, or protection successfully to action.

The country whose fast capital ships and their complementary units are not contained or held by similar enemy's ships can, with these vessels, sweep from the seas the enemy's vessels and sea-borne trade carried in surface ships.

The flying and the submarine enthusiasts of today are following in the foot-steps of the explosive shell, the torpedo, and the mine enthusiasts who preceded them; whilst those who recognise the necessity for the capital ship are devising, so far successfully, means to counter each fresh menace to her existence.

It behoves us, therefore, to be cautious in accepting the opinion of specialists in any particular arm in this matter which is so vitally important to the Empire.

In view of the above quoted brief history of the gradual evolution of the great capital ship of the present day, in warding off the perils which successively threatened her existence, and in view of the tremendous rôle played by the capital ship, the wise course to pursue is to continue to build capital ships until, if ever, it is definitely shown that some other weapon has been found which permanently renders them inefficient.

(b) *Other Men-of-War.*

Following the same line of argument, it is necessary to investigate the desirability, or otherwise, of continuing to build light cruisers, destroyers, and other small vessels.

The struggle in progress between the offensive weapons and the defensive arrangements in capital ships has been reflected in the construction of the smaller types of surface vessel to a modified extent owing to less weight being available for such protection.

Light cruisers are necessary for look-out and scouting work for the capital ships, their great speed assisting their escape from these vessels if sighted. Their smaller cost justifies their employment for operations where the use of the capital ship would be both unwise and unnecessary. They are also eminently suitable for the protection of convoys, being superior both in speed and fighting power to any raiders which are likely to be met.

Destroyers are suitable for anti-submarine work, and for screening ships against submarine attack, as well as for offensive action against larger vessels.

Both light cruisers and destroyers form, therefore, an essential part of a fleet, and a fleet not provided with its complementary light craft would be at a very serious disadvantage as compared with one properly equipped. They are also needed for trade protection.

Modern light cruisers are fitted with a form of torpedo protection and all types carry paravanes as protection against mines. They are also provided with thin armour and armoured decks to resist gunfire. In future no doubt the armoured decks will be thickened in order to be better able to withstand bombing attacks by aircraft.

In addition, the smaller draught of these vessels diminishes the chance of their being hit by a torpedo or mine, and their smaller size makes them a more difficult target for torpedo and gunfire and enables them to operate in shallower water than capital ships.

The great speed and handiness of both light cruisers and destroyers as compared with capital ships renders easier evasion of attack by gunfire, torpedoes, or dropped mines, by alteration of course during the passage of the missile or missiles directed at them.

It is therefore necessary to continue the construction of light craft both as a complement to the capital ship and for the other duties enumerated.

TABLE I.
STATEMENT SHOWING THE STRENGTH OF THE SEPARATE FLEETS UNDER THE DIFFERENT ESTIMATES, WHEN COMPLETED.

5 Million Pound (25 Million Dollar) Fleet.	3½ Million Pound (17½ Million Dollar) Fleet.	2 Million Pound (10 Million Dollar) Fleet.	1 Million Pound (5 Million Dollar) Fleet.
2 Battle Cruisers.	1 Battle Cruiser.	—	—
7 Light Cruisers.	5 Light Cruisers.	3 Light Cruisers.	—
1 Flotilla Leader.	1 Flotilla Leader.	1 Flotilla Leader.	—
12 Destroyers.	6 Destroyers.	—	—
1 Destroyer Parent Ship.	1 Destroyer Parent Ship.	—	—
16 Submarines.	8 Submarines.	8 Submarines.	8 Submarines.
1 Submarine Parent Ship.	1 Submarine Parent Ship.	1 Submarine Parent Ship.	—
2 Aircraft Carriers.	1 Aircraft Carrier.	—	—
4 Fleet Minesweepers.	2 Fleet Minesweepers.	—	—
4 Local Defence Destroyers.	4 Local Defence Destroyers.	4 Local Defence Destroyers.	4 Local Defence Destroyers.
8 "P" Boats.	8 "P" Boats.	8 "P" Boats.	8 "P" Boats.
4 Trawler Minesweepers.	4 Trawler Minesweepers.	4 Trawler Minesweepers.	4 Trawler Minesweepers.

Also provided for:—
Administration.
Training Establishments.
Dockyards.
Local Defences.
Fuel Reserves and Storage.
Wireless.
Naval Air Squadron—6 Machines.
6 Other Flying Machines.

TABLE II.

ADDITIONAL CHARGES TO BE SUPERPOSED ON THE £2,000,000 PROGRAMME—RESULTING IN ANNUAL ESTIMATES OF ABOUT £5,000,000 AT THE END OF THE EIGHTH YEAR. WHEN THE FLEET IS COMPLETELY FORMED.

N.C.—Cost of New Construction

M.—Maintenance—including Depreciation charges to allow for replacement due to age, etc.

	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30
	£	£	£	£	£	£	£	£	£
2 Battle Cruisers. (1 in 1921, 1 in 1925)	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
					685,000	685,000	685,000	685,000	685,000
Light Cruisers. (1 laid down each year from 1925 to 1928).					500,000	500,000	500,000	500,000	500,000
					(1)	(1)	(1 Full Comm.)	(1 Full Comm.)	(2 Reserve.)
T.B.D.'s. The sum taken allows for the completion of one T.B.D. and the advancement of a second every year.	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000
		67,600	202,800	270,400	405,600	439,400	507,000	540,800	549,250
		(1)	(3)	(4)	(6)	(6 Full Comm.)	(6 Full, 3 Res.)	(6 Full, 4 Res.)	
T.B.D. Parent Ship		100,000	100,000	92,500	92,500	92,500	92,500	92,500	92,500
Submarines (Lay down 1 per annum)	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
		33,200	66,400	99,600	132,800	149,400	166,000	182,600	199,200
		(1)	(2)	(3)	(4)	(4 Full, 1 Res.)	(4 Full, 2 Res.)	(4 Full, 3 Res.)	
Extending Dockyards And Training Establishments	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
4 Fleet Minesweepers (1 each year for 1st four years)	70,000	70,000	70,000	70,000	24,000	24,000	24,000	24,000	24,000
		6,000	12,000	18,000					
		(1)	(2)	(3)					
Aircraft Carriers—1 in 1921, 1 in 1927	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Totals	1,760,000	1,860,000	1,660,000	1,560,000	1,990,000	1,990,000	2,190,000	2,190,000	2,190,000
		106,800	481,200	680,500	1,539,900	1,801,300	1,991,000	2,146,900	3,162,450
Grand Total	1,760,000	1,966,800	2,141,200	2,240,500	3,529,900	3,791,300	4,181,000	4,336,900	3,162,450

TABLE III.

ADDITIONAL CHARGES TO BE SUPERPOSED ON THE £2,000,000 PROGRAMME—RESULTING IN ESTIMATES OF ABOUT 3½ MILLION POUNDS AT THE END OF THE EIGHTH YEAR, WHEN FLEET IS COMPLETELY FORMED.

N.C.—New Construction.

M.—Maintenance—including Depreciation charges for replacement due to age, etc.

	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30
	£	£	£	£	£	£	£	£	£
1 Battle Cruiser					1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Light Cruisers—1 in 1921, 1 in 1923	250,000	250,000	250,000	250,000	211,300	211,300	211,300	211,300	211,300
			105,650	105,650	(2 Reserve)				
6 T.B.D.'s (Lay down 1½ each year for 1st four years)	240,000	240,000	240,000	240,000	405,600	405,600	405,600	405,600	405,600
		67,600	202,800	270,400	(6)				
		(1)	(3)	(4)					
1 T.B.D. Parent Ship			100,000	100,000	92,500	92,500	92,500	92,500	92,500
2 Fleet Minesweepers	70,000	70,000	70,000	70,000	12,000	12,000	12,000	12,000	12,000
		6,000	12,000	12,000					
		(1)	(2)						
Extending Dockyards and Training Establishment	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
1 Aircraft Carrier									
Total	610,000	610,000	640,000	640,000	1,050,000	1,050,000	1,250,000	1,250,000	1,606,400
		73,600	320,450	388,050	721,400	721,400	721,400	721,400	1,606,400
Grand Total	610,000	683,600	960,450	1,028,050	1,771,400	1,771,400	1,971,400	1,971,400	1,606,400

TABLE V.

MINIMUM ESTIMATE.

One million pounds.
(Five million dollars.)

Item.	First Cost.	Annual Maintenance.
	£.	£.
8 Submarines.....		200,000
4 Local Defence T.B.D's—2 Full, 2 Reserve.....		120,000
8 "P" Boats—2 Full, 2 Reserve, 4 Special Reserve.....		87,500
Specialist training (passages of officers and men to United Kingdom for such training).....		25,000
Boys Training Establishments.....		100,000
Local Defences and Reserve.....	250,000	50,000
4 Trawler Minesweepers and training.....		12,000
College (reduced numbers).....	75,000	20,000
Administration.....		20,000
Dockyards.....		150,000
Fuel Reserve and Storage.....		20,000
Total.....	£ 325,000	£ 804,500

TABLE IV.
SUGGESTED DETAILS OF APPROXIMATE ANNUAL NAVAL EXPENDITURE FOR CANADA—ON THE BASIS OF WORKING UP TO ANNUAL ESTIMATES
OF ABOUT £2,000,000 (\$10,000,000 AT \$5—£1).

N.C.—New Construction.

M. —Maintenance—including Depreciation charges for replacement due to age, etc.

Item.	Armament.	—	1920-21	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28
			£	£	£	£	£	£	£	£
1 Light Cruiser "Bristol" Class*.....	2-6" guns... 10-4" guns...	N.C. M.	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Lay down 1 Light Cruiser—1920.....	6" guns.....	N.C. M.	100,000	250,000	150,000	200,000	200,000	200,000	200,000	200,000
Lay down 1 Light Cruiser—1922.....	6" guns.....	N.C. M.			100,000	250,000	150,000	200,000	200,000	200,000
Lay down 1 Light Cruiser—1924.....	6" guns.....	N.C. M.					100,000	250,000	150,000	200,000
4 T.B.D.'s Local Defence..... 2 Full Commn. 2 Reserve.	3-4" guns.....	N.C. M.	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
8 'P' Boats..... 2 Full Commn. 2 Reserve. 4 Spec. Res.	1-4" gun.....	N.C. M.	87,500	87,500	87,500	87,500	87,500	87,500	87,500	87,500
"Ithuriel" (Reserve).....	4-4" guns & 4- 21" T Tubes.	N.C. M.	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
8 Submarines..... 4 Full Commn. 4 Reserve.		N.C. M.	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
1 Submarine Parent Ship.....	2 Guns.....	N.C. M.	50,000	100,000	150,000	60,000	60,000	60,000	60,000	60,000
Training Establishment.....		N.C. M.		80,000	80,000	80,000	20,000	20,000	20,000	20,000
Naval Fixed Local Defences, Minesweeping and Reserves.....		N.C. M.		50,000	50,000	50,000	50,000	50,000	50,000	50,000
W. Coast.....		N.C.	20,000	50,000	50,000	50,000	40,000			
E. Coast.....		N.C.	10,000	50,000	50,000	50,000	50,000			
Dockyards.....		N.C. M.	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Administration.....		N.C. M.	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Cadets' College.....		N.C. M.	30,000	50,000 30,000	50,000 30,000	30,000	30,000	30,000	30,000	30,000
2 Boys' Training Establishments.....		N.C. M.	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
4 Trawler Minesweepers.....	1-12 pdr. gun	N.C. M.	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Fuel Reserve and Storage.....		N.C. M.	10,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
		N.C. M.	160,000 999,500	530,000 1,059,500	630,000 1,059,500	430,000 1,319,500	340,000 1,339,500	250,000 1,539,500	150,000 1,539,500	1,739,500
Total.....			1,159,500	1,589,500	1,689,500	1,749,500	1,679,500	1,789,500	1,689,500	1,739,500
Wireless.....		N.C. M.		100,000	200,000	200,000	60,000	60,000	60,000	60,000
Air Squadron—†6 Machines (including Armament).....		N.C. M.		55,000	20,000	20,000	20,000	20,000	20,000	20,000
†6 Other type Flying Machines.....		N.C. M.		200,000	50,000	50,000	50,000	50,000	50,000	50,000
Total (Air).....		N.C. M.		255,000	70,000	70,000	70,000	70,000	70,000	70,000

*NOTE.—After 1926 the "Bristol"—being then over 15 years old—might be used as a seagoing training ship. †See para. 26, Chapter X., Vol. III.