

355
L61

UNIVERSITY OF TORONTO



3 1761 01060290 2



Presented to the

UNIVERSITY OF TORONTO
LIBRARY

by the

ONTARIO LEGISLATIVE
LIBRARY

1980





SEA POWER IN THE NEXT WAR

THE NEXT WAR SERIES

Edited by Captain Liddell Hart

SEA POWER IN THE NEXT WAR, by Commander Russell Grenfell, R.N.

AIR POWER IN THE NEXT WAR, by J. M. Spaight, C.B., C.B.E.

PROPAGANDA IN THE NEXT WAR, by Captain Sidney Rogerson.

TANKS IN THE NEXT WAR, by Major E. W. Sheppard, O.B.E., M.C.

INFANTRY IN THE NEXT WAR, by Colonel E. E. Dorman Smith, M.C.

GAS IN THE NEXT WAR, by Major-General Sir Henry F. Thuillier, K.C.B., C.M.G., D.S.O.

THE TERRITORIAL IN THE NEXT WAR, by Major-General Sir John Brown, K.C.B., C.B.E., D.S.O.

THE CIVILIAN IN THE NEXT WAR, by Jonathan Griffin.

THE NEXT WAR
a series edited by
CAPTAIN LIDDELL HART

Sea Power

in the next war

by

COMMANDER RUSSELL GRENFELL



GEOFFREY BLES
TWO MANCHESTER SQUARE, LONDON, W.1

First published in 1938



PRINTED IN GREAT BRITAIN BY
MACKAYS LIMITED, CHATHAM

CONTENTS

CHAP.	PAGE
EDITOR'S PREFACE	vii
I. SEA POWER IN THE LAST WAR	I
II. THE LESSONS OF THE WAR	18
III. GENERAL DEVELOPMENTS SINCE THE WAR	35
IV. TECHNICAL DEVELOPMENTS SINCE THE WAR	52
V. THE DEVELOPMENT OF THE AIR WEAPON	63
VI. INVASION	80
VII. THE DEFENCE OF TRADE	88
VIII. OUR MEDITERRANEAN COMMUNI- CATIONS	107
IX. OCEANIC COMMUNICATIONS	119
X. THE FUTURE OF THE BIG SHIP	131
XI. THE MERCHANT FLEET	153
XII. THE IMPERIAL DEFENCE PROBLEM	161
INDEX	181

2
J
J
A

EDITOR'S PREFACE

MODERN war has too wide an effect for its practice to be treated as a "mystery." Statesmen may direct it ; generals, admirals and air marshals may manage its operations—but every citizen, man or woman, is perforce a shareholder. The more they know about the way it is conducted the better for their security. The aim of this series is primarily to enlighten the intelligent public as to the probabilities of a future war in its various spheres, if it is hoped that the military reader also may find some stimulus to thought, about his problems.

Although twenty years have passed since the last great war ended, it left so deep an imprint that we are apt to overlook the fact that few of the men now under arms, and fewer still of those who might be called on, have any personal acquaintance with war. The natural consequences are to be seen in any of the exercises carried out by the Regular and the Territorial Army during the annual training season. On these battlefields without bullets or shells, many things are done which would be impossible under actual fire—and without their impossibility even being perceived. The unreality is often increased because the situations on which exercises are based have themselves an air of

EDITOR'S PREFACE

improbability. This is due largely to a tendency, natural in those who are practising any particular technique, to think of war in bits instead of as a whole. They find it difficult to visualise the effect on their bit that others may produce, with the result that the picture is distorted. The best corrective to the particularist tendency is to view each aspect of war against a wider background.

This series of volumes, in which different aspects are treated as far as possible in relation to each other, may help to form such a background.

Sea Power in the Next War is treated by Commander Russell Grenfell who was recently on the teaching staff of the Royal Naval College, Greenwich. It was only last year that he published his first book, *The Art of the Admiral*, but it placed him immediately in the front rank of naval writers. The attention it attracted, both from the public and the experts, was the more remarkable because it was in no way sensational, making its impression simply by the clarity of the reasoning, and the lucidity of the writing.

His present study of the wider problems of sea power has the same qualities. The balanced treatment of the subject as a whole gives, however, the more emphasis to his discussion of the risks that are being courted by the "large ship" policy, and to his proposals for the development of a "destroyer fleet."

CHAPTER I

SEA POWER IN THE LAST WAR

It was surprising enough that just before the last war a distinguished French soldier such as Foch could so ill-appreciate the value of sea power in war as actually to be capable of rating the British Navy as not worth one bayonet to the Entente Cause. It was very much more surprising that an influential British General, Sir Henry Wilson, could apparently agree with him. There may have been some excuse for the Frenchman with his eyes on the Franco-German frontier and his back to the sea. There was no excuse at all for the soldier of a country that owes almost everything to the sea and sea power; its trade, its overseas possessions, its security from foreign aggression. That Sir Henry Wilson's acquiescence in the disparagement of sea power was possible at all demonstrates the extreme danger of our pre-war system of allowing the armed forces to pursue their study of war in sectional seclusion.

The war resolved any doubts that may have existed in peace time, and gave to two nations in

particular a severe lesson in the power of navies and the part they could play in war if effectively employed. The submarine attack on its sea-borne supplies very nearly starved the British nation into submission, while the blockade of Germany is never likely to be forgotten by the war generation of that country; a generation that tried to exist for many months on half rations of diminishing supplies of food or rather food substitute and that saw its children growing up rickety and defective through under-nourishment. It is indeed the recollection of the British blockade of Germany that is the direct cause of the endeavour being made even now by so many countries to be as economically self-sufficient as possible. Again, it is to the fact that the command at sea was in our hands in the last war that is due our present mandatory possession of most of the former German overseas colonies. All over the world British and Dominion troops were transported by sea to wrest those colonies from Germany, and the latter with an inferior fleet was powerless to succour them.

But though there is no reason to think that sea power will be any less important in the next war than it has been in previous ones, it is a different matter when we come to consider the means whereby that power will be exerted. The circumstances of any war are never quite

the same as those of the previous one, and the more the general speed of life increases and the faster therefore that material progress takes place, the more pronounced is likely to be the distinction between one war and the next following one. The great technical improvements in aircraft since the war will, for instance, readily come to mind as one factor that is sure to have an influence, probably a far-reaching influence, over future naval operations. But though they may attract less attention, developments are nevertheless taking place all the time in other directions as well; in guns and gunnery, in torpedoes, in mining, in the construction of ships to withstand underwater explosion, and so on. The pieces that will be lined up on the nautical chess-board in the event of another war will not therefore be quite the same pieces as were used in the previous game and they will in some cases be capable of novel moves. While any such changes in the nature and capabilities of the chess-man must naturally bring changes in the way the game is played, they will not alter the general principles governing the game itself. The object will still be to checkmate the opponent's king or whatever represents it in the new alignment. Moreover the board will be the same as before. In deciding therefore how the game is likely to be played in the future, a useful preliminary will probably

be to notice how it was played on the last occasion when the board was set out.

The material object of the Navy in 1914 was the same as it had always been and still is ; namely, to control the use of the sea highways for ourselves and to deny them to the enemy. This control of the sea highways, if obtained, can be utilised in four principal ways. It can be used to blockade the enemy by cutting off his sea-borne supplies ; to maintain our own ; to secure our coasts from invasion by preventing the passage of enemy troops across the sea ; and to cover the passage of any military expedition that we might wish to send outside the United Kingdom.

The methods put into force at the beginning of the war to achieve the main object were very much the same as they had been in the past. Actually, the problem was in many ways an easier one to tackle than on most previous occasions, by reason of the extremely favourable geographical position enjoyed by Great Britain *vis-à-vis* Germany. The British Isles stood like a gigantic breakwater across the approaches to Germany, narrowing down the channels of access to and egress from her ports to the Straits of Dover in the south and the area between Scotland and Iceland in the north. To close these channels against supplies destined for Germany was not

difficult. The Straits of Dover were clearly impassable, since it was alive with the vessels of the Dover Patrol. To guard the northern route round Scotland, we stretched a line of ships between the Orkneys and Iceland, which kept up a patrol day and night, winter and summer, until the Armistice. This was the celebrated Northern Patrol and, despite the long nights and the Arctic gales of the winter months, very few ships slipped through its hands. It is true that it was open to ships to go round the north of Iceland ; but what with ice, fierce currents, and unlighted coasts, there were few that cared to make the attempt.

The same favourable geographical position also assisted the Navy in its defensive task of protecting our own shipping. Operating from bases well beyond the home terminals of British trade, German warships had first of all to get clear of the North Sea before they could attack the main mass of our sea-borne trade ; all, that is, except the comparatively trifling amount that passed across the North Sea to and from Scandinavia. To get clear they had to pass through one or other of the two aforementioned channels, the southern of which was watched by the Dover Patrol and the northern by the Grand Fleet at Scapa Flow. The British having the advantage of interior lines, the chances of any substantial

body of German men-of-war breaking out of the North Sea without being brought to action were small. The Grand Fleet was in fact acting as cover to all our maritime interests to the westward against a German attack in force. The merchant ships in the Channel, the ships passing up and down the coast of Spain and through the Mediterranean, those in the Indian Ocean and indeed all over the world were being covered against attack from the High Seas Fleet by the British battleships in Scapa.

But though the main portion of the enemy fleet was thus held in check, complete immunity could not be expected, any more than it had been in the past. There could never be an absolute guarantee that individual raiders would not be able to slip out and get away into the open ocean. Moreover, at the time the war started, the German ships which formed the normal peace time squadrons on foreign stations were all potential raiders, who being well clear of the restrictive influence of the Grand Fleet, were in a position to commence operations against trade at once, as most of them did.

Against the hostile activities of these early raiders who were already on the trade routes, and of others later on in the war who managed or might manage to elude our watch on the exits from the North Sea, the general cover

afforded by the Grand Fleet was unavailing, and counter-measures had to be devised on the spot. Of such counter-measures, the experience of the past offered two alternatives. One was the system of convoy, under which merchant ships were collected into groups and given an escort of warships to accompany them throughout their voyage or as far as danger was deemed to exist. The other was to leave merchant ships to sail independently and to provide a roving garrison of warships for any desired trade area to patrol up and down or go off in search of any enemy that might be reported. This was known as the Cruising System. It so happened that during the latter years of peace immediately preceding the outbreak of the war a strong prejudice had grown up against the convoy system as a means of protecting trade. While, therefore, it was used even in the early days of the war for guarding the passage of troop transports, the Admiralty remained resolutely averse to using it for the protection of mercantile shipping. The cruising or patrolling system was consequently the one brought into use at the outset of the war for this purpose.

As there was no knowing at what point in all the immense areas of ocean traversed by our shipping a raider would choose to appear, the number of warships allocated for trade protection

duty was bound to be large. Cruising vessels had necessarily to be stationed, if not in every area, at all events in every area where attack would be embarrassing. In the same way, by reason of their great intrinsic importance, escort was required for any military expeditions during their passage across the sea. The employment of all these vessels on protection duty, together with those engaged in intercepting enemy shipping or neutrals carrying contraband, necessarily entailed great dispersion. Anyone able to look down on the world from the stratosphere in 1914 would have seen odd cruisers dotted about in the Indian, Atlantic and Pacific Oceans, on patrol or making for the last reported position of a raider. In the South Indian Ocean he might have seen three or four armoured or light cruisers surrounding an Australian and New Zealand troop convoy steering for Suez, and the same thing might have been visible in the Atlantic where the first Canadian contingent was crossing to England. Up in the north, almost touching the Arctic ice, would be seen the vessels of the Northern Patrol spread perhaps 20 miles apart on their ceaseless vigil, while the Dover Strait and the Channel would be busy with patrolling destroyers, sloops and other small craft. All these ships would be engaged directly on the work of controlling the use of the sea highways

and can therefore be given the name of the Control fleet.

The ships of the Control fleet would, as has been said, be greatly scattered. Many would be by themselves. Others might be in twos or threes. Nowhere among them would be found any large concentrated body. For this reason, they could give no protection against any large concentrated body of the enemy that might appear in their area. The task of preventing these enemy concentrations getting away lay, as we have previously seen, with the main battle fleet, whose duty it was to ensure that they were brought to action before they could do any serious harm. If the battle fleet had failed in that, either by blunder or defeat, the Control fleet and shipping under its protection must have been cut to pieces.

A general survey of the naval war as it was being waged in 1915 or 1916 would therefore have taken the following form. Germany, as the weaker power at sea, had had her own commerce swept from the seas. The supplies that constant endeavour was being made to send to her in neutral bottoms were being intercepted and examined by our Control vessels, and those liable to seizure under the steadily tightening contraband regulations were being impounded. On the other hand, the trade routes of the world were alive with British and neutral shipping

bringing commercial produce and all manner of war materials to Great Britain and her allies. Widely distributed among all this great stream of shipping were the cruisers and other Control vessels on the look out for any odd raiders that might have slipped out of the North Sea to attack the vitally important flow of allied trade.

Standing like a huge sentinel over all this allied maritime activity was the British Grand Fleet, with its eyes glued on the High Seas Fleet on the other side of the North Sea, ready to proceed on the instant to checkmate any move the German Fleet might make. The latter, being the weaker of the two combatants, was powerless to interfere with the British control of the sea highways unless and until it could defeat the Grand Fleet that was watching it so closely from those tide-swept Orkney Islands. How to defeat the Grand Fleet and by that means to wrest the control of the sea communications from our grasp was, however, a problem that the High Seas Fleet never solved.

These then were the main characteristics of the war at sea during at all events the first half of the war; and in essentials they differed little from those of previous maritime struggles. In Nelson's day there were the same enemy raiders attacking trade and the same defending frigates and other cruising vessels acting against them and applying

at the same time the rules of contraband against neutrals trading with the enemy. There were also the same two sets of concentrated strength in the shape of the rival battle fleets, the weaker one lying impotently in its harbours, and the stronger one watching either from close outside or from a more distant anchorage to make sure that the enemy fleet was brought to action if it tried to break the pressure of the economic blockade. It is true that the ships and the weapons had changed out of all recognition since the days of sail. For the most part, however, these mutations had not affected the main principles of the game. The surface torpedo vessel was after all not very different in its nature from the fireship, while the mine was almost as much a navigational as an operational problem and had the result of turning the North Sea into an area full of uncharted and particularly dangerous shoals.

There was, however, one direction in which the march of science had created new potentialities altogether and had fashioned an instrument that was to have a disturbing effect on the time-honoured principles which had hitherto governed the use of sea power. This instrument was the submarine. At first, the possibilities of this vessel had not been fully realised. That it was a formidable weapon for use against warships was appreciated readily enough; almost too readily.

Being a type of vessel which was still in the embryo stage when the war broke out, it had been regarded before the war almost more from the academic than from the practical point of view, as an interesting innovation which might at some future date merit serious consideration when its capabilities were more fully established. This attitude did not survive the outbreak of the war. Though it had been the fashion before the war among many of the more senior British naval officers to treat the submarine with slightly patronising unconcern, no sooner did war come than the naval authorities became immediately and acutely submarine-conscious. Within a matter of days from the outbreak of hostilities, the Commander-in-Chief, Admiral Jellicoe, became so alarmed about the complete lack of anti-submarine defences at the fleet base that he would not consent to stay there any longer but took his fleet away to the west coast of Scotland where it would be out of submarine range until Scapa was netted in. It was also far beyond the point where it could mount an efficient guard over the High Seas Fleet, which could, during this period, have cut the British communications with France with impunity, had it known of the Grand Fleet's removal from the scene.

From that time onwards, the big ships went in fear of the submarine, a fear which was not

abated by such episodes as the sinking of the *Hogue*, *Cressy* and *Aboukir*, of the *Formidable*, and other ships. For the rest of the war, capital ships were not deemed able to go to or keep at sea without a screen of destroyers round them to frustrate the submarine in making its attack. One result of this was to reduce the effective fuel endurance of the fleet to that of the destroyers that accompanied it; which meant that battleships capable of steaming 5,000 miles had to return to harbour at the dictates of destroyers with a maximum steaming range of 1,800.

For the first two years of the war, the Germans utilised their new submarine weapon chiefly in the attack on enemy surface warships. It was natural in them to do so. The submarine appeared to provide a particularly promising means whereby the strength of the superior British battle fleet might be whittled down to the point where the High Seas Fleet could hope to seek a general action with good prospects of decisive victory, the achievement of which would of course knock England out of the war at a stroke. Moreover, one or two tentative attempts to use submarines against commerce were met with that international hostility and condemnation that is always meted out to the use of new weapons by a world that is by nature apprehensive of the unknown. A couple of years of warfare, however,

brought light to the Germans on two points. One was that, even with the aid of the submarine, there seemed little likelihood of effecting the defeat of the British Fleet. With that realisation came another one. If Germany's inferior surface fleet could not fight its way out past the ever watchful Grand Fleet to reach that happy hunting ground where enemy trade was crowding thick and plentiful into the narrow Channel approaches, there was nothing to prevent submarines, the first vessels in the history of the warship to move in three dimensions, from diving *under* the Grand Fleet to reach that same goal.

The decision was taken and the great German unrestricted submarine campaign against commerce was launched. Its success was immediate. Commencing on February 1st, 1917, 300,000 tons of British shipping were sunk in the first month, 350,000 in the second, and 550,000 in the third.

The Grand Fleet looked on, bewildered but impotent. Here was a situation to which none of the old principles seemed to apply. The cover provided by a superior battle fleet had never been able to prevent isolated raiders inflicting minor losses on trade; but never before had such an open and concerted attack on commerce as was now going on taken place almost under the nose of a greatly superior force of the most

powerful battleships in the world. The British battle fleet might be able to stretch a barrier between merchant shipping and the German surface forces which the latter were not able to break down. It could not prevent the submarines from dodging under the barrier.

What was even more embarrassing, the British battleships could do nothing to protect merchant vessels against the wholesale destruction that the submarines were meting out. In all previous wars, the appearance of line-of-battleships on the scene had sufficed to send all smaller classes of enemy ships scurrying for safety. The battleships of the Grand Fleet were, however, painfully aware that they were even more welcome targets to the submarines than were tramp steamers; and that their arrival in the area where the submarines were doing their deadliest work would only bring themselves into danger without providing any succour to the trade that was being decimated.

It was not the large but the small ship that defeated the submarine campaign; the destroyer, the sloop, the P boat, the Q boat, the trawler, the drifter. And these small ships defeated it not only by reason of their small size but just as much or even more by virtue of their large numbers. The small, fast and handy destroyers or P boats were difficult targets for a submarine, but not impossible

ones. Had they been as relatively scarce and irreplaceable as were the battleships, it would have been worth the submarines' while to have picked them off first, after which the merchant shipping, having no defenders left, could have been destroyed at leisure. It was because there were hundreds and hundreds of anti-submarine small craft available and because many more were pouring out of the shipyards that it was hopeless for the submarines to try to deal with them first, and led the underwater craft to develop their attack direct against the merchant ships.

Even then, it was not until the introduction of convoy that the submarine campaign was mastered. The records of the old wars showed that the system of convoy gave much greater protection to shipping and was more economical of warship tonnage than the unregulated cruising or patrolling to which the Admiralty at first pinned its faith. Patrolling was particularly ineffective against an enemy vessel that could submerge. Numberless were the instances where a patrolling destroyer would go off in chase of a submarine reported 10 or 20 miles away, only to find a blank horizon when the spot was reached. If merchant ships were collected into a convoy, however, and the convoy surrounded by anti-submarine escorts, it became impossible for the submarine to make its attack on shipping without the practical

certainty of itself making the close acquaintance of the dreaded depth charge. As the old wars had shown, the best way to deal with a raider was to place the defending warships at the one place where he had to go if he was to do any damage ; namely, alongside the quarry. It required, however, the near approach of disaster before the Admiralty would take to heart this lesson that history was shyly ready to bring to its notice.

The naval war was won on two fronts. The surface war was won by a battle fleet, consisting of a mixed force of big and small ships ; battle-ships, battle cruisers, cruisers, destroyers and fleet submarines. The submarine war was won by small craft alone.

CHAPTER II

THE LESSONS OF THE WAR

THE lessons of the war were many. One of them, the pre-eminence of the convoy system as a means of protecting non-combatant shipping, has received perhaps the greatest attention. This is probably due to the high degree of publicity it received during the war, when its introduction, forced on a reluctant Admiralty by outside pressure, brought relief to the nation when the severance of its sea-borne supplies seemed inevitable.

The lesson of the naval war which appears, however, to be the most far-reaching in its implications is that of the great moral effect exercised by the underwater weapons, the torpedo and the mine. The moral influence that emanated from these two weapons was primarily due to their great destructive properties which were directed against a ship's most vulnerable region. It was powerfully reinforced by that fear of the unseen that belonged naturally to an attack by the submerged submarine or the darkened destroyer at night. The mine was also a hidden weapon, and wherever a combatant had reason

to believe that he was negotiating a mined area, its influence too was considerable. It was, however, to the unseen but also mobile submarine that the greatest deference was paid.

The greater anxiety felt regarding the mobile than regarding the fixed underwater danger, was already visible in the Russo-Japanese war. The Russian personnel stood up well enough to the menace of the mine. When, however, on the occasion of the sinking of the Russian flagship through striking a mine, someone in the Russian fleet raised the cry of submarines, there was panic. For some minutes guns' crews lost all control of themselves and fired wildly into the water all round them.

The outbreak of the Great War showed that the disturbing influence of mobile underwater attack was not confined to one nationality. Within a few weeks of the commencement of hostilities, British men-of-war had on two occasions opened fire inside their harbours on enemy submarines that were not there. On one of these occasions, the whole of the Grand Fleet had hurried out of harbour and the Commander-in-Chief had led it to the distant security of west Scottish waters until anti-submarine defences of the main fleet base could be improvised. As mentioned in the last chapter, this retirement had the effect of uncovering the eastern part of the English

Channel, the approaches to the Thames and the east coast of England to German attack.

The powerful moral effect attaching to underwater attack was no less marked in later stages of the war. Jutland provides a particularly instructive example. During the course of the battle, British ships reported the presence of nine submarines, none of which in fact existed. These false reports, though psychologically instructive, did not, however, influence the course of the battle. It is to the torpedo as carried by the destroyer that we must turn for a greater effect.

The day was misty, and Jellicoe had deployed his fleet into line of battle before he could see the German battle line with his own eyes. The rear half of the British line, however, just came within sight of the leading German ships and was able to bring them under fire. Scheer, on his side, equally could not see the ships of the Grand Fleet, but he could see their gunflashes stabbing out through the mist up and down what seemed an unpleasantly long battle line. He realised that he was in the presence of the Grand Fleet, and evidently concluded that it was time he made off. He therefore swung his whole line round and retired.

Jellicoe did not see him go. The Germans had merely disappeared, and though the Commander-in-Chief altered the course of the Grand Fleet

several points inwards, no enemy was to be seen for some time. Then suddenly he came into view again. What had happened, though Jellicoe did not know it, was that, after having retired for 15 or 20 minutes, Scheer believed he had shaken the Grand Fleet off, and that if he altered course back to the eastward he would pass well clear astern of it and be able to escape back to Germany by the Skagerrack. Round, therefore, came the High Seas Fleet to an easterly course once more ; only for Scheer to find himself in greater peril than ever. For his fleet of battleships in line ahead was now heading straight towards the middle of the Grand Fleet which was stretched across its path in that particularly favourable tactical position known as crossing the enemy's T. The High Seas Fleet was steering directly for destruction, which Scheer quickly realised as the combined broadsides of a large part of the British battle line crashed down on his leading ships. There was only one thing to do and not a moment to lose in doing it. Scheer ordered another reversal of course in the hope of being again able to break away to the westward. The German " battle turn," a delicate enough manœuvre at any time, was this time rendered trebly difficult by being done under a heavy fire, especially for the German 3rd (battle) Squadron, which was leading the line,

and therefore bearing the brunt of the British cannonade. The manœuvre of turning a battleship through half a circle takes 10 to 12 minutes, and while they were turning the leading German ships were in desperate danger. The unexpected turn, being made under a concentrated fire, had thrown them into some confusion. The ships were badly bunched up, there was danger of collision, and most of them had their fire masked by the ship next to them, while salvos of heavy enemy shells were rushing down on them from several directions at once. To make matters worse, one German battleship's port engine had broken down, and another's torpedo nets had fallen off the netshelf and were in danger of fouling the screws.

The opportunity thus presented to Jellicoe was such as a commander could hardly hope to improve upon. Damaged, in confusion, and turning slowly round to retreat, the German 3rd Squadron at the very least, if not the rest of the High Seas Fleet, were his for the asking if he would turn in after them. Was he doing so? Unfortunately he was not. As the German line swung gradually round under helm, the hostile fire slackened and died away. The British had sighted some German destroyers moving out to attack, and Jellicoe had put into practice his long decided policy of not exposing his fleet to underwater damage if he could avoid it. He had turned

away and was steaming in the opposite direction. When he altered back again, the enemy was nowhere to be seen. For the remaining hour and a quarter of daylight the Grand Fleet steamed along in silence, wondering where the enemy had gone and wondering in vain. At length, just as dusk was settling down over the sea, Beatty's battle-cruisers sighted and had a brief engagement with some German battleships, who soon turned away and disappeared in the gathering gloom. For the battleships of the Grand Fleet, however, the chance had been allowed to slip away over an hour and a quarter earlier, never to return.

In view of these occurrences, can there be any doubt as to which was the decisive weapon in the battle? Jellicoe had with him on the battle-field a total of 27 battleships against the enemy's 22. Six of the enemy's battleships, however, were pre-dreadnoughts, which could count as only half the strength of the average British dreadnought battleship. A true comparison would therefore be 27 British to 19 German, which gave the British a numerical superiority of nearly 50 per cent. This British superiority becomes even clearer if measured in terms of guns on a broadside.

	15"	14"	13·5"	12"	11"	Total
<i>British</i>	40	10	110	76		236
<i>German</i>				112	43	155

This greatly superior British fleet had $2\frac{1}{2}$ hours of daylight from the time of first deployment in which to effect the destruction of its enemy ; an amply sufficient period if close action had been sought and maintained from the outset. There was even long enough from the time of Scheer's second appearance after his first retreat to the westward, if Jellicoe had clung to the High Seas Fleet from then onwards. What undoubtedly prevented that destruction and saved the High Seas Fleet was the firing of 30 odd torpedoes by those aforementioned destroyers at the critical moment, leading as it did to the Grand Fleet turning away.

This turn-away was a result of no momentary decision. It had been decided on nearly two years before. In October, 1914, Admiral Jellicoe had sent to the Admiralty a memorandum in which he outlined his probable tactics in a fleet action. In this memorandum he had expressed particular concern regarding the possibility of a turn-away by the German fleet. Any such retiring movement, he said, he would regard as a trap. "If, for instance, the enemy battle fleet were to turn away from an advancing fleet, I should assume that the intention was to lead us over mines and submarines, *and I should decline to be so drawn.*"

"The situation is a difficult one. It is quite

within the bounds of possibility that half our battle fleet might be disabled by underwater attack before the guns opened fire at all, if a false move is made, and I feel that I must constantly bear in mind the great probability of such attack and be prepared tactically to prevent its success."

These extracts from Admiral Jellicoe's memorandum are of the greatest significance, not only for their tactical content but for their psychological. They afford a real glimpse into the workings of his mind and they show, as clearly as anything could, to how serious an extent it was swayed by apprehension of the underwater weapon. That this apprehension was the fruit of instinctive dread rather than exhaustive examination and analysis admits of little doubt. Tactical investigations carried out since the war have shown that the successful use of mines in the rush and uncertainty of a fleet action, the venue of which cannot be known beforehand, is so unlikely as to be hardly worth consideration ; and very much the same could be said of the submarines then possessed by either side. Admiral Jellicoe's fears, anyway as regarded the submarine and the mine, were groundless. It is true that it was from the torpedoes fired by destroyers that he turned away at Jutland, but his action in doing so was obviously in tune with the attitude of mind revealed by his memorandum of not taking any

chances with underwater attack, whatever its form. In the event, his avoiding movement was as ineffectual against the destroyers as it would have been unnecessary against hypothetical mines and submarines. For, in spite of the turn-away, the torpedoes passed through the British line. Jellicoe would therefore have been just as safe if he had turned towards the enemy as away from him, and the manœuvre which broke off the action and led to the escape of the High Seas Fleet need never have been made.

The importance of the moral effect produced by the underwater weapon was again exemplified, and this time even more strongly, in the German Fleet's sortie of August 18th, 1916. Admiral Jellicoe had received warning that the High Seas Fleet was probably coming out and had sailed with the Grand Fleet to meet it. He had also been warned that a number of submarines were believed to be in the North Sea.

In the early morning of August 19th, the Grand Fleet was steaming south not far from the coast of England. The Commander-in-Chief had information which pointed clearly to the High Seas Fleet being at sea and somewhere to the south-eastward of him. He also knew that the *Nottingham*, one of the advanced cruisers 20 to 30 miles ahead of him had been either torpedoed or mined, and the report of an enemy submarine

had just reached him. On the strength of these comparatively meagre indications of possible submarine danger ahead, he turned his fleet round and steamed away to the northward for about two hours. When we remember that the High Seas Fleet was out, that its destruction was the cornerstone of our naval strategy, and that after the disappointing outcome of the Battle of Jutland only two months before, Jellicoe must have been particularly keen to get another chance at the enemy, we get some idea of the powerful deterrent effect that the underwater menace must have had on his mind to induce him to turn north at such a time. When he resumed a southward course again shortly after 9 a.m., his chance of meeting the High Seas Fleet had gone. Whether he would have met it if he had never abandoned his southerly course can never, of course, be known. His two hours retreat to the northward made it certain, however, that he would not.

This episode illustrates once again and with particular clarity the vastly greater influence that could be exerted by the underwater weapon than by the gun. The Grand Fleet was in great superiority, its battleships being 28 to the German 17 (the old 2nd Squadron having been left behind). If action with the High Seas Fleet could have been brought on, the battle, if estimated by

gunnery standards, could hardly have failed to result in the complete victory of the British. Nevertheless, we find that the greatly superior British fleet which, with all its cruisers and attendant destroyers, numbered about 150 ships mounting nearly 1,000 guns, was checked in its southerly course and sent steaming back on its tracks for two precious hours by the report of one enemy submarine carrying perhaps half a dozen torpedoes. Such is the power of the invisible danger.

That the mine could exert a similar influence to the torpedo was illustrated in the cruiser action of November 17th, 1917. A German cruiser force was surprised in the North Sea by a superior force of British cruisers and made for home, pursued by the British. That particular part of the North Sea was known to be mined and the admiral in command of the British advanced forces had provisionally selected a line beyond which he would not advance. As he approached this line, the forces with him were in full action with the inferior enemy and if the pursuit were prolonged there was good reason to hope for definite results. When the Germans reached the line they continued straight on. When the British reached it, the most important units turned off, despite the reasonable presumption that where the enemy was content to go it was probably

safe to follow. As a result, the enemy escaped.

These three episodes are particular instances where the underwater weapon played the decisive part. Its influence was not, however, confined to isolated occasions but overspread the whole naval strategy that we employed during the war. As early as October, 1914, Jellicoe had become so infected by the submarine and mine danger as mentally to have abandoned the southern part of the North Sea on that account. Writing to the Admiralty in that month, he said that "the Germans cannot rely with certainty upon having their full complement of submarines and mine-layers present in a fleet action, unless the battle is fought in waters selected by them, and in the southern area of the North Sea. . . . My object will therefore be to fight in the northern portion of the North Sea. . . ."

By the end of August, 1916, he had become more explicit and more cautious. "Hitherto, it had been understood that we ought not to seek action inside the area bounded by the latitude of Horn Reefs and the 5th Meridian. Admiral Jellicoe now proposed an extension of the zone, and stated that, in his opinion, the fleet ought not to operate in the area to the south of Lat. 55° 30' N., and the east of Long. 4° E., except under exceptional circumstances."¹ His

¹ *Naval Operations*, Vol. IV, p. 48.

successor, Admiral Beatty, appears to have taken the same attitude.

The war did not in fact confirm the claim of Lord Fisher and the school of gunnery officers who with him had virtually ruled the Navy from the beginning of the century to the outbreak of war that the gun was the decisive weapon of the fleet. Admiral Jellicoe was one of this school and he showed how much the decisive weapon theory had taken hold of his mind. As Commander-in-Chief of the Grand Fleet, he viewed the problem before him through gunnery spectacles. He did not ponder deeply how he was to sink the enemy. He decided from the start that he would sink him by the guns of his battleships. "It is undoubtedly to our advantage," he said, "to sink the enemy by gunfire." Such a remark reveals the partiality of his view. Provided the enemy were sunk by some means or other, it could not matter what those means were. Jellicoe had two main weapons, the heavy guns of his capital ships and the torpedoes of his destroyers. Whether it was the guns or the torpedoes that delivered the *coup de grâce* was immaterial so long as the *coup* was given. Jellicoe, however, could only think in terms of turret guns. He relegated the destroyers, with their 250 torpedoes, to the subsidiary rôle of preventing the enemy's destroyers from interfering with the main gun

duel. As a result, two quite exceptional and altogether golden opportunities of attacking the enemy with torpedoes were missed ; for Scheer's two advances in line ahead towards the British line provided the Grand Fleet flotillas with the sort of chances of which every destroyer officer dreams. Those 250 torpedoes, however, remained in their tubes.

Indeed, the claim on behalf of the gun to be the decisive weapon of the fleet contained the seeds of its own refutation. For if actions were to be dominated by the gun, the bigger it was the better. But the bigger the gun and the heavier the armament carried, the bigger the ship that was needed to carry it. The larger the ship, however, the fewer of them the country could afford ; and the shrinkage in numbers consequent on increasing size inevitably moved the balance back in favour of the underwater weapon. For the fewer his ships and the greater the reliance he placed on the gun battle as the decisive act, the less inclination would be felt by an admiral, especially a gunnery admiral, as was Jellicoe, to run any avoidable risk from those hateful underwater weapons, with their unfair and malignant power to stab him in the back and so to prejudice his prospects in the all-important gunnery duel. It was the great size and small number of the big ships that gave the underwater weapons their

moral influence. One must not of course underestimate the intrinsic moral effect that belongs to the danger that cannot be seen ; to the invisible mine, to the lurking but unseen submarine, and to the darkened destroyer that might loom suddenly out of the blackness of the night to discharge its dreaded torpedoes. That unseen dangers of this kind make their mark on all men's minds is undeniable. Yet the behaviour of the smaller ships during the war goes to show that it was not these natural human weaknesses that played the dominant part in determining the shrinking attitude of the big ship commanders towards the underwater perils.

The smaller classes of ship went about their business undeterred by possible dangers below the surface. While the capital ships drew an ever-narrowing circle round themselves to denote the area in which it was safe for them to operate, the small ships moved freely in all parts of the North Sea. They ventured into mined areas. They hunted submarines. They met the destroyer at night on equal terms. They went very largely where they pleased.

Their comparative indifference to the underwater dangers was partly due to their small size. Small and handy ships made poor targets for the torpedo as fired either by submarine or destroyer. But it was not that so much as their

large numbers that gave them their freedom of action. Over a hundred of these small ships were lost during the war, by mines, by torpedo, by gunfire, by collision, by shipwreck. The authorities did not care very much, since there were many more. Because they were numerous they were allowed to take risks. In the problem of size or gunpower versus numbers, the war points in more ways than one to the value of numbers.

A further example may be given in the case of Admiral Jellicoe's complaints regarding his lack of destroyers with the Grand Fleet. Jellicoe was always bemoaning his shortage of destroyers. Writing in his book, *The Grand Fleet*, of the destroyer situation in August, 1914, he says that the Germans had 96 destroyers against our 76, regarding which comparison he talks of the "superfluity" of destroyers that the Germans possessed compared with us. Our own boats were, however, very much the more powerful gun vessels, their armaments consisting mostly of three 4" guns, while none mounted less than two 4" and two 12-pounders. By contrast, some of the German boats had an armament of two 24-pounders (3.5"), but the majority had no more than three 4-pounders. As gun vessels ours were vastly superior. Yet although Jellicoe had charged our own destroyers with the primary

task in a fleet action of engaging the German destroyers by gunfire and frustrating their attack on the battleships, he appeared to take no comfort from the great superiority of the British boats' gun armament or to consider that it made up for their inferiority of numbers. To the Admiral it was numbers that seemed to count.

To summarise therefore, we may say that the chief lessons of the war were :—

1. That convoy was greatly superior to cruising and patrolling as a means of protecting trade.
2. The very powerful influence exerted by the underwater weapons over the actions of the big ships, but not the small ones.
3. The decreasing range of utility of the great ships.

CHAPTER III

GENERAL DEVELOPMENTS SINCE THE WAR

THE victory of the Allies, coupled with the surrender of the German and Austrian fleets, left the British Navy in a position of supremacy unique in its history. The German Navy had been practically destroyed. Austria as a naval power had ceased to exist. The French and Italian navies hardly counted. The only ones that mattered were the Japanese and the American, and we were allied to the Japanese. Even alone our position was secure enough, as this following comparison shows :

		Capital ships	Cruisers	Destroyers
Britain..	..	49	88	380
America	..	35	18	100
Japan	18	21	85

The position was however less fortunate than it seemed. Britain might possess a vast war fleet, but she had neither the resources nor the will to keep it up. The four years' struggle, though it had ended victoriously, had left her very nearly bankrupt and had given rise to an intense aversion to war and a passionate desire to beat the sword into a motor-car body as quickly as possible. As had often happened before, the breaking up of the fleet that had brought us victory was put in hand.

Our position, moreover, was threatened by competition from without as well as weariness within. The war had brought untold wealth to the United States. The customary exercise of Britain's maritime belligerent rights had also caused widespread resentment among United States citizens, who were deeply indignant at what they regarded as our unwarrantable interference with their neutral rights to trade with whom they pleased over seas which should be free to all. That they had to put up with this interference on our part, the American people correctly ascribed to their lack of a large enough fleet; and as the wealth of Europe began to flow westward in an expanding stream, they were presented with the means of rectifying the omission. A very large building programme was put in hand, designed to safeguard Americans

from any recurrence of what they conceived to be the unbearable indignities to which the British blockade of Germany had subjected them.

Across the Pacific, Japan was also making hay while the sun shone. The war had brought her, too, unexpected wealth. This and the pre-occupation of the western nations with their mutual destruction in Europe, gave the Japanese a chance to forge ahead with their policy of ensuring for themselves the hegemony of the far East. They also embarked on a building programme, an action which immediately brought suspicious glances from the American side of the Pacific Ocean. No sooner therefore were the exhausted and impoverished British free from the German trouble than they found themselves faced by a new naval competition led by the United States and Japan.

This competition was saved from becoming a deadly race by the initiative of the United States in proposing the Washington Conference. In the ensuing Washington naval treaty, we gave up our centuries-old policy of a predominant navy and agreed to parity with the United States. This parity applied, however, only to capital ships and aircraft carriers. It was agreed that the capital ship and carrier tonnage of Britain, the United States and Japan should be proportioned in the ratio of 5 : 5 : 3, none of the capital ships

being allowed to exceed 35,000 tons or carry guns larger than 16". France and Italy agreed to an equal but lower ratio of 1.67 each.

An attempt was also made on our initiative to abolish the submarine as being a weapon of aggression alone. Some other nations, notably France and Japan, did not take this view of its character and the proposal was defeated. It was, however, agreed that it should never again be used in the attack on commerce unless the passengers and crew of ships attacked were first put into a place of safety, from which category the ship's boats were expressly excluded. Chiefly owing to the defeat of our proposal to abolish the submarine, quantitative limitation was not extended to cruisers and smaller vessels. Cruisers were however limited to 10,000 tons and 8" guns.

As an inducement to Japan to accept the position of inferiority that the 5 : 5 : 3 ratio laid upon her and which had hurt her *amour propre* considerably, it was agreed that no further development should take place to naval bases in the Pacific such as Honolulu, Guam or Hong Kong, which might be regarded as being intended for use against the Japanese Islands. By this agreement, Japan received a measure of assurance that neither the United States nor Britain had aggressive designs against her, since they were

thus relinquishing the means for sending their fleets near enough to Japan to be a serious threat.

The new British base that had been started at Singapore in 1921 was excluded from this provision. It was claimed by us that the Singapore Base, while necessary for the defence of the British Empire, could not possibly be regarded as menacing Japan; which was true enough since it lay 2,500 miles from the Japanese main islands. The base was indeed an obviously defensive measure. Nevertheless, it was equally obviously against the possibility of Japanese aggression that it was being constructed; which formed a somewhat significant commentary on the degree of dependence that we were placing on the security to be derived from the Anglo-Japanese Alliance.

That Alliance was not, however, to outlast the Conference. For various reasons, among which the desire to please the United States undoubtedly played a prominent part, we decided to terminate the Alliance. In doing so, we were setting the seal on a change in the fundamental problems of our naval strategy that was of the utmost importance.

In every war we had waged before 1914, our chief enemy had been a European one; the French, the Dutch, the Spanish, the Russians.

In all these wars, the question of the defence of our outlying possessions was complementary to the defence of our territory and interests in home waters. By blockading the enemy fleets in their own ports, we protected not only the British Isles but every British possession no matter how far distant against attack by those fleets. Strength at the centre covered the whole Imperial perimeter. If, on the other hand, an enemy detachment were to escape the blockade and sail off to attack British interests in the West Indies or the South Seas, a British squadron of appropriate size could be sent after it without materially affecting the balance of strength in home waters. In those old wars, British squadrons could and did fight all over the world, but such operations were always intimately bound up with the main contest in European waters. If the main enemy strength were in European waters, so had ours to be. Should the enemy send an important part of his fleet to distant seas, as did the French to the West Indies in the War of American Independence, we could follow suit without in any way lessening the security of the British Isles. Operations in home waters and in outlying parts of the world were and always had been interdependent.

All this was changed by the rise of the United States and Japan as great naval powers at the

latter end of the nineteenth century. We were then faced, for the first time in our history, with powerful foreign fleets far distant from the old battlegrounds of Europe. No longer therefore was the naval situation in European waters for us the determining factor in our strategy. We were now presented with the possibility of major attack both at home and in one or even two far distant areas at the same time. The likelihood of becoming embroiled with the United States is one that we have, with instinctive wisdom, refused to countenance. As regards Japan, the conclusion of the Anglo-Japanese Alliance in 1902 served for many years to prevent all the implications of the new alignment from becoming fully recognised, especially during the Great War, when it permitted us to pursue our time-honoured strategy of keeping our eyes fixed on the European enemy. That the virtual disappearance of any serious European rival brought about by the war led to an awakening on our part to the significance of the new situation in the Far East is indicated by the commencement of the Singapore Base even before the Anglo-Japanese Alliance was abandoned. The termination of the Alliance brought that new situation into the front rank of our strategical liabilities. In the future, we must take account of the possibility of having to conduct a major naval war in two hemispheres at once, a

thing we have never done before, and of this possibility the establishment of the Berlin-Rome-Tokyo triangle gives a clear warning.

The success of the Washington Conference caused naval limitation to become a factor in the internal politics of more than one country. The ten years that followed the Conference saw the flood-tide of reaction against war and the springing up, especially in America and England, of peace societies, women's anti-war movements, pacifist groups, League of Nations enthusiasts and similar bodies, controlling important numbers of votes. To placate these peace groups became the serious concern of democratic governments. In America, the peace movement had a specially naval bias, arising from the fact that the Washington Treaty had been brought about by American initiative, and was therefore regarded with particular pride as an essentially American product. It was not long therefore before the further extension of naval limitation began to be actively canvassed among American political groups and thereby to engage the earnest attention of the administration. The ratio principle, said Americans, having been successfully applied to capital ships and aircraft carriers, what should prevent it being extended to cruisers and smaller vessels? In the British view there was a good deal to prevent it. While battleships and battle cruisers were vessels of

combat only, whose number and size could therefore be calculated with exclusive reference to rival capital ships, the same did not hold good for other classes of ship. Absolutely dependent on overseas supplies in a way that the practically self-contained United States were not, Britain had good reason to know that her requirements in cruisers and smaller surface vessels were determined not only by what other nations had got but also by the volume of trade that required warship protection. For vessels of these trade-protection classes, requirements had to be assessed on an absolute as well as a relative basis. Britain consequently claimed that by virtue of having the largest volume of trade in the world that needed protection, she had a right to a larger number of cruisers and other trade protection vessels to look after it. This number she placed at 70, a figure which she declared to be necessary to her whatever other powers might have.

On the other hand, the British saw a promising avenue towards economy in the reduction in the sizes of certain classes of ship. If battleships, she said, were drastically reduced in size by all the principal naval powers, no one would be relatively worse off and everyone would gain by a great saving on construction costs. Similarly, she thought that the 10,000 ton cruiser, at which maximum tonnage cruiser size had been stabilised

at Washington, could well be cut down to 7,000 tons without disadvantage to anyone.

In 1927 these rival theories were brought together at the Geneva Conference. The Americans pressed for a numerical reduction of cruisers and smaller vessels and the establishment of parity with England in those classes, a contention that Britain was unable to accept. On the other hand, the natural American instinct for the "bigger and better" led the United States to oppose the British proposal for reduction in size. The Conference ended in a deadlock.

The Washington Treaty had contained a clause allowing for a further naval conference in 1930 to consider the action to renew or modify the original Treaty, which latter was for an initial period of ten years only. By 1930 naval limitation had become a primary factor in British internal politics as well as American. The Labour Party was in power, and it was determined to make a striking gesture towards disarmament at the 1930 Naval Conference, even if this meant overriding its own naval advisers. In pursuance of this resolve, it agreed at the London Naval Conference to the American proposal for further limitation of the smaller surface ships that included a reduction to 50 of the 70 cruisers that the British Government had declared to be necessary in 1927. In addition, the capital ship replacement

that would otherwise have commenced in 1931 would be put off till 1936. The qualitative limitations set at Washington were therefore continued for a further period. The following table shows the numerical strength of the British Navy after the London Treaty reductions had taken effect compared with its strength in 1914, and at the end of the war. The 1914 figures include only ships less than twenty years old.

	Battleships and battle cruisers	Cruisers	Destroyers, sloops, etc.	Submarines
1914 ..	69	108	285	74
1919 ..	49	88	450	98
1933 ..	15	47	143	56

In 1932 the great Disarmament Conference met at Geneva and proved a complete failure. The next year saw the genesis of the present stage of international politics in the rise of the Nazi régime in Germany. From then onwards, the drift of affairs towards pre-war conditions has been unchecked. Early in 1935 Germany began to repudiate the naval and military limitations that the Versailles Treaty had imposed upon her, but in June, 1935, she made an agreement with us,

in which she undertook to accept for herself a surface navy about one third the size of ours, though she demanded a higher proportion of submarines.

The most violent disturbance of the post-war conditions was brought about by the crisis over the Abyssinian affair. The near approach of war against Italy brought the British Government up with a jolt against the hard fact that the defences of this country had been allowed to decline a long way below the danger mark. International gestures had evoked no response and had merely reduced this country, as the chief gesturer, to a state of weakness that invited attack. The sudden realisation of our undefended condition, as the cold blast from the Abyssinian highlands swept away the Genevan mists that had lain for so long over the British Isles, came as an unpleasant shock to the country and caused a strong reaction. The nation hurriedly set in motion a huge rearmament programme to cost £1,500,000,000—undoubtedly the largest in its history. It is easy enough to drop behind, however, but not so easy to regain the lead. No sooner did we embark on this great programme for the recovery of our security than all our rivals did the same thing.

Meanwhile, in December, 1934, Japan had given the required two years' notice of her

intention to terminate the Washington Agreement. This intimation necessitated the calling of a conference in the following year, which would in any case have been required under the terms of the 1930 Treaty. The conference met in December, 1935, and endeavour was made to secure general agreement. The Japanese, however, remained obdurate in making demands which the other powers felt they could not accept, and eventually the representatives of Japan left the conference. It continued without them, and in 1936 an agreement was reached between the United States, France and Britain, the most important effects of which were to limit the capital ship to 35,000 tons and 14" guns, cruisers to 8,000 tons and 6" guns, and aircraft carriers to 23,000 tons, while numerical or quantitative limitation was abandoned.

Hardly was the ink dry upon the signatures than rumours began to reach the other naval powers that Japan was building or intending to build battleships of over 40,000 tons, armed with guns of over 14" calibre. The three signatories of the 1936 Treaty thereupon addressed a query to her, asking if these rumours were true. Their truth Japan, in reply, would neither confirm nor deny; whereupon the other three Powers informed her that failing specific denial they would assume the rumours to be true, and would in that

case reserve their liberty of action to take whatever counteraction they considered necessary. They have consequently decided to raise the maximum tonnage level up to 45,000, though Britain has announced that she does not intend for the present to go beyond 40,000 tons. With the coming into operation of these clauses, it may be said that effective limitation of naval armaments will have disappeared.

There would still remain, however, one generally accepted instrument affecting naval warfare on the international Statute Book. The abolition of what is usually known as "unrestricted" submarine warfare against commerce was agreed to at Washington by Britain, the United States, Japan, France and Italy. In 1936 it was also accepted by Germany and Russia. Almost immediately the Spanish war broke out. In that war, the exploits of the so-called pirate submarines, which nobody believes to have been Spanish, have dropped an eloquent hint to the world of how much reliance it, the modern civilised world, may expect to place on those international undertakings which are commonly described as solemn.

Treaties of naval limitation seemed valuable safeguards only so long as the world had no serious need of them. With the first touch of real danger, the nations have thrown them hurriedly aside. As a consequence, the nation that made the

greatest sacrifices in order to keep them in being found itself in an unpleasantly weak position when they crumbled into dust. Successive British Governments reduced the Navy considerably below the strength that responsible naval opinion regarded as necessary for the safety of the country and the Empire. After 1935 the country began, almost feverishly, to make good the deficit that had been allowed to grow up in its naval defences. It was not so easy. In 1936 a naval programme was announced for the construction of :

- 2 capital ships
- 2 aircraft carriers
- 7 cruisers
- 20 destroyers and sloops
- 8 submarines
- and other smaller vessels.

This was followed in 1937 and 1938 by further programmes totalling :

- 5 capital ships
- 3 aircraft carriers
- 14 cruisers
- 19 destroyers and sloops
- 10 submarines.

Other countries, however, were also putting guns before butter. Germany was building large battleships, cruisers, destroyers, and submarines.

So were Italy, France, the United States and (it is believed) Japan, the latter's battleships being possibly of a larger size than ever. Germany and Italy, and especially Italy, were turning out submarines at a phenomenal rate. Imposing as was our naval rearmament programme, was it restoring to us that margin of safety that we had voluntarily relinquished in our quest for collective security? We can probably take Germany, Italy and Japan as our most likely antagonists. A comparison of the naval situation before rearmament and when existing programmes have been completed should show to what extent we are making headway.

The table opposite shows fairly clearly that, in relation to the groups that we can presumably regard as antagonistic, we shall at the best be no better off after the completion of our new construction than we were before. Other nations are building in proportion as fast or faster than we are.

GENERAL DEVELOPMENTS SINCE THE WAR

	Great Britain		Germany		Italy		Japan		Germany & Italy		Germany & Japan	
	A	B	A	B	A	B	A	B	A	B	A	B
Capital Ships ..	15	22	1*	6*	4	8	9	?13	5*	14*	10*	?19*
Carriers ..	5	10	—	2	—	—	4	6	—	2	4	8
Cruisers ..	46	75	6	13	18	22	30	35	24	35	36	48
Destroyers and Sloops ..	146	222	16	66	92	155	94	123	108	221	110	189
Submarines ..	48	73	—	63	49	106	59	63	49	169	59	126

A=Before rearmament. B=When present programmes have been completed.
 * Counting the 3 "pocket" battleships as equal to 1 Nelson.

CHAPTER IV

TECHNICAL DEVELOPMENTS SINCE THE WAR

WHILE the political and strategical developments described in the last chapter were taking place, technical matters were not standing still. Indeed, the great advances in aeronautical technique alone that have been made since the war have introduced into naval strategy a number of problems of the highest significance. So novel are these problems and so important may be their bearing on future naval warfare that it is thought preferable to discuss them separately, and they are set out in the next chapter.

Technical developments in other directions have followed the historical path of a contest between the means of offence and defence. In the nineteenth century this contest expressed itself in the well-known competition between guns and armour. The post-war naval treaties caused a suspension of this particular contest by slowing up battleship construction and setting an agreed limit to the size of the gun. The rivalry between the offensive and the defensive continued,

however, in other directions, notably in connection with the underwater weapons.

The great influence wielded by the torpedo and the mine in the Great War has been described in Chapter II. Up to 1914 it had occurred to no one to devise defensive measures directed towards minimising the effects of the weapons themselves. Attention had been given only to counter-attack and avoidance. If possible, the ships that carried the torpedoes or mines should be sunk before their weapons could be fired or laid. If not, contact with the weapons should be avoided by sweeping or by steering to miss them.

The great havoc caused by the torpedo during the war brought forth the idea of structural defence. By fitting "bulges" outside the underwater part of the ship's side, torpedoes might be made to explode at such a distance from the side proper as to preserve it intact against the explosion. Only a few ships were fitted with these bulges during the war owing to the difficulty of sparing vessels for long enough periods during actual hostilities. After the war, however, all existing capital ships were taken in hand and had bulges fitted. With the new battleships *Nelson* and *Rodney* of the post-war programme, a further development was made by putting the bulges inside the ship rather than outside, thus maintaining the normal underwater streamline shape of the ship.

This bulging of the big ships has been claimed to have given them a high degree of immunity from torpedo fire, the effect of which is now spoken of as less to be feared than that of heavy shell. It is doubtful, however, whether this optimism is justifiable. Bulge protection, being mostly a post-armistice development, is still very largely an unknown factor under war conditions. It is true that experiments have been carried out, but they were necessarily wanting in certain battle ingredients whose absence must leave the value of the experiments to some extent in doubt. The armour penetration tests conducted before the war on the proof range against a fixed plate gave our naval artillerists a very erroneous conception of what would happen under action conditions with the plate itself moving rapidly in a different plane to the shell. Similarly, a torpedo test against a rapidly-moving bulged vessel—which so far as I am aware has not been made—may quite easily give results that are quite different from those against a ship at rest. There were cases in the early days of bulges or a section of bulge coming away in bad weather, and on at least one such occasion the captain reported that there was danger of other sections coming away as well and taking the ship's side plating with them, a risk that compelled him to reduce to a very low speed. Though it is possible that a strengthening of the bulge

structure may have eliminated this danger, it remains the fact that we do not yet know for certain what reduction of speed a torpedo explosion on the bulge would necessitate.

Ships with internal bulges will be more or less free from the above limitation. Yet, however efficient bulges, whether internal or external, may prove to be, the average effects of a torpedo or mine explosion cannot fail to be more serious than those of the shell. For a shell may explode on armour, and do no damage at all; while if it enters the ship, there are many places where it could burst without causing any appreciable reduction of the ship's fighting value. A mine or torpedo explosion, on the other hand, will always mean a couple of months in dock. A ship torpedoed on the bulge may live to fight another day; but it may not be the day you want.

Even if the bulges are all that is claimed for them, it is necessary to remember that they do not cover the whole of the ship's side. There still remains an unprotected section at each end of the ship. They do not in particular cover that very vulnerable sternmost section of the ship that contains those vital objects the propellers, the propeller shafts and the rudder, the damaging of which would be very serious indeed. There is also the possibility, which although unlikely ought not to be ignored, of a torpedo entering

the hole blown in the bulge by a previous one and exploding against the ship's side proper.

Moreover, the admitted strengthening of the defence that the bulge, whether outer or inner, brought with it had its natural reaction in endeavours to increase the power of the offensive. Though the side might be shielded, there remained the ship's bottom which it was almost impossible to protect against a heavy underwater explosion. Something can be done by increasing the height of the double bottoms, but it is generally believed that a heavy explosion under the bottom could hardly fail to burst in the inner hull, and very possibly displace the engines or boilers in doing so. What, then, was needed was to devise means for causing a torpedo to explode under a ship's bottom. To adjust the depth so as to make it run under the ship was easy. To make it go off as it passed underneath called obviously for some non-contact apparatus to be brought into operation by the near presence of the ship. It is known that foreign navies have been making experiments with this end in view, though whether any of them have succeeded in perfecting any method of doing so is not certain. If a non-contact explosion has been evolved—and if so, it is not likely to be confined to one navy only—the torpedo will have recovered its wartime power of causing very severe damage and possible

destruction with one hit. In that case, all the moral power that belonged to it as being, with the mine, far the most devastating weapon of naval warfare is likely to return to it. It does not even seem necessary for the non-contact gear actually to have been perfected for this to happen. Being, as the non-contact torpedo is, a possibility that has to be reckoned with, a naval commander will not know for certain whether his adversary possesses it or not. If the last war is any guide, he is likely to assume the worst and to frame his strategy accordingly. In dealing with the underwater weapon, the threat may be as powerful as the actuality. To declare an area mined in the last war was often as effective in keeping ships out of it as actually to mine it.

The same general arguments apply to the mine as to the torpedo. The development of a non-contact mine would permit it to be laid at a depth below the normal ship's draught, which again would enable it to circumvent the paravane and explode under the bottom. Unless therefore some counter to the non-contact exploder is previously devised, it seems likely that in the next war both the mine and the torpedo will be regarded with the same dread and treated with the same respect that they were in the last.

If the torpedo has been liable to vary in importance according to the ebb and flow of its

destructive power relative to the defensive equipment of the ship attacked, the same applies to the vessels that carried the torpedo. Particularly is this so in regard to the submarine. The outbreak of the war had found the surface ship practically defenceless against the submarine, provided the latter could approach near enough to get in its attack. A means of counter-attack was produced during the war in the depth charge. This was an effective anti-submarine weapon provided it could be dropped near enough to its target. The difficulty was that there was no means of knowing where a submarine was when it was under water. Up to the end of the war this problem was never solved, and the first indication of a hostile submarine was usually the firing of torpedoes. When the enemy had thus disclosed himself, the dropping of depth charges was still more or less a blind affair, and it was chiefly luck if the submarine was damaged.

Very shortly after the war, science managed to produce a means for determining the position of submerged objects, the lack of which had hitherto handicapped surface ships so severely in dealing with the submarine. An instrument was produced, working on the echo principle, which enabled the approximate range and bearing of a submerged object to be ascertained. With this apparatus it became possible to locate and attack

an unseen submarine with a far greater chance of success than had previously been possible.

The invention of the echo detection gear caused a slump in the shares of the submarine, just as the development of bulge protection had lowered the estimated value of the torpedo. In the case of the submarine, it is likely that the reaction was all the stronger by reason of the fear and alarm which the underwater vessel had inspired during the war, when it had so very nearly brought Great Britain to her knees. The new appliance was warmly greeted as providing the necessary antidote to submarine warfare which would, it was confidently assumed, be reduced in future to a shadow of its former self.

This comfortable assurance of the decline of the submarine as a potential danger is well illustrated in a recent speech of Sir Samuel Hoare's in the House of Commons, when he said that :

“ to-day we are justified in saying that, although we regard the submarine as an extravagant nuisance that ought to be abolished, the submarine is no longer a danger to the security of the British Empire.”¹

In uttering this inspiring judgment, Sir Samuel was giving a lead to the optimists which they were not slow to follow. Many of them seized on his

¹*Hansard*, November 15th, 1937.

words as evidence that the submarine could in future be largely discounted as a war factor. To take an example, the anonymous writer of a *Times* article on oil in wartime last December quoted Sir Samuel's statement in order to argue, in opposition to the opinion of Admiral Sir Howard Kelly, that the tankers bringing oil to this country in wartime would be in no real danger from submarine attack. Since from this and other references to it, Sir Samuel's confident statement seems to have been widely noticed and to have had no little influence in shaping lay opinion in the country, it is desirable to examine whether the available evidence bears him out.

The presumption is that Sir Samuel's statement was based on the result of the peace practices that the fleet is constantly carrying out. Now, as every service man knows, peace practices can never be quite representative of actual warfare, being always conducted under partially artificial conditions and usually under specially favourable ones. Considerations of a rationed fuel allowance and of an always over-stocked training programme demand that the most be made of the time allocated to any form of training. Such things as anti-submarine exercises are therefore inevitably carried out in areas where submarines have previously been stationed and usually take place in moderately good weather and last a comparatively short time.

In wartime with long periods of strain, uncertainty, fatigue, and with every kind of weather to contend with, good, bad and very bad, the results obtained are likely to be a good deal poorer than peace exercises would promise. Such at all events was the lesson of the last war in regard to gunnery and torpedo results. It is noteworthy that this estimate has not been contradicted by the experience of the international patrol against the activities of the "pirate" submarines in the Mediterranean. The evidence provided under these semi-active service conditions has not been particularly encouraging. On October 4th, 1937, the British destroyer *Basilisk* thought she detected a submarine through her echo gear and proceeded to drop depth charges on its supposed position. Later on, after an inquiry, the Admiralty informed the world that it was satisfied that no submarine had been present.

This episode suggests that the detecting apparatus is by no means faultless and that what occurred here where no great issue, such as the protection of a fleet of battleships or of a convoy, was at stake and where the nerves of officers and men cannot have been under any serious strain, may happen again and more frequently under the greater hazards of actual hostilities. Had Sir Samuel's pronouncement been made before this episode, its optimism could be better understood.

But since it was uttered a short time afterwards, its confident tone seems less easy to justify. Actually, I have yet to meet the naval officer who is ready to endorse Sir Samuel's cheerful estimate or who does not view it as mistakenly over-sanguine, especially in view of the shortage of small craft to be referred to in Chapter VII.

CHAPTER V

THE DEVELOPMENT OF THE AIR WEAPON

IT will be useful at the beginning of this chapter to state what the aircraft is. The aircraft that flies over the sea to take part in warlike operations against or connected with ships is to all intents a ship itself. With its ability to fly above the surface of the sea, it is blood-brother to the submarine with its ability to move below it. We may therefore regard warships as divisible into three distinct species: surface vessels, which operate on the surface; submarine vessels, which operate below the surface; and supermarine vessels or aircraft, which operate above it. The supermarine vessels may be either ship-borne aircraft, carried by and operating from a ship; or they may be shore-based aircraft operating from a land aerodrome. Both are capable of performing the same general functions and are therefore operationally indistinguishable. For that reason, it is imperatively necessary that the Navy should be given full control over those of its aerial warships that operate from shore bases.

The use of aircraft over the sea did not develop sufficiently during the war for them to exert much influence over naval operations. The lighter-than-air vessels performed a certain amount of useful reconnaissance work, notably the Zeppelins in the German sortie of August 18th 1916, and the British "blimps" in anti-submarine patrols. The part played by aircraft in actual sea fighting, however, was negligible.

The coming of the peace ushered in a period of great development for naval flying, which has continued unchecked up to the present time. Large aircraft carriers were built and the part that aircraft would play in naval operations began to receive more and more attention. This process of development was stimulated by the propaganda disseminated by the recently created Royal Air Force, anxious to consolidate its position as an independent service. Claims began to be heard that the new and rapidly growing air weapon would soon supersede navies altogether. It was claimed in particular that aircraft would be able to bomb the battleship out of existence, an assertion that gave rise to the well-known "bomb *v.* battleship" controversy, a controversy which is by no means extinguished to-day.

The fact that the verbal projectiles of the early Air Force enthusiasts were directed mainly against the surface warship may account for the

fact that for a good many years it was this aspect of air development that monopolised the attention of both sailors and airmen. The Admiralty saw the problem in terms of battleships. On the one hand, how best could the air weapon be utilised in the attack on the enemy's battleships, and on the other, how could our battleships be protected against aerial attack by the enemy? The solution to the first part of the problem was comparatively simple. Having built all the aircraft carriers that the Washington ratios allowed, the Admiralty proceeded to supply battleships and cruisers with as many catapult aircraft as it was felt the ships could take without prejudice to their fighting quality. The solution to the defensive problem was more open to question. There was passive defence by gunfire from the ships themselves; or there was active defence by means of fighter aircraft who would shoot down the attacking planes before they could drop their projectiles. There were several drawbacks to the active method. The great speed of aircraft made the period of approach of attacking planes so short that it was doubtful if the defending fighters, if kept on deck until the attackers were reported coming, could get into the air in time to meet the attack. If, however, a constant fighter patrol were kept in the air, it had necessarily to be so weak as to throw doubt on its power to provide adequate protection.

From the first, therefore, passive defence by gunfire was adopted as one essential element at least of anti-aircraft defence. Moreover, as aircraft speeds grew higher and higher with the passing of the years, we find also more and more reliance being placed on anti-aircraft gunfire for the defence of battleships and other surface ships. So much so, in fact, that the last two or three years have witnessed the conversion of old cruisers into special anti-aircraft gun vessels. At the time of writing two cruisers have been so converted, but it is understood that a number of others are to undergo the same treatment. This allocation of an appreciable amount of our admittedly inadequate cruiser tonnage to the duty of anti-aircraft gun vessel is expressive of the great reliance the Admiralty had come to place on this form of anti-aircraft defence. The same reliance on anti-aircraft fire is again indicated in this speech of Sir Samuel Hoare's when introducing the 1937 naval estimates:—

“Of all the targets that air forces might attack, the fleet was the least attractive target that any possible enemy might select. He did not want to put the case too high or to suggest that, because it was such an unattractive target, no enemy would ever attack a fleet. What he said was that a fleet of this kind

would be so unattractive a target that an enemy was likely to think twice or thrice before attacking it."

It has to be noted that this confidence of the Admiralty's in the anti-aircraft gun to deal with attacking aircraft is inconsistent with the partiality it has shown, and particularly so in recent years, for the aircraft carrier. This country has notably taken the lead in the construction of these vessels, having ten built, building or projected against six of any other power. Now carriers are expensive vessels, the new ones costing with their aircraft the best part of £4,000,000. But the greater the ability of the anti-aircraft artillery on or surrounding the battleships to defeat the aircraft, the less obviously must be the value of the aircraft carrier as a factor in battle. For either the aircraft is no real danger to the battleship, in which case it would seem that a good deal of the very considerable tonnage we are devoting to carriers could better be allocated to some other class of ship; or else the anti-aircraft gun is not really so effective against aircraft after all, in which case the great confidence that the Admiralty is evidently placing in anti-aircraft fire would seem to be misplaced. So far as battle is concerned, therefore, an official policy that aims at taking a lead in aircraft carriers

and also in anti-aircraft cruisers must be founded on a contradiction. Apart from battle the utility of carriers would appear to be limited, for they are too large and therefore too few to play much part in the defence of trade. It is true that I have heard it suggested that they would be useful for carrying out air raids on an enemy's territory. Wars, however, are not won by bombing coastal towns and villages and it is not to be thought that the Admiralty would build large ships with such a purpose as that in view. If, therefore, Sir Samuel Hoare was indeed correct in saying that aircraft would think not twice but thrice before attacking a battle fleet, our expenditure of £20,000,000 on new aircraft-carriers seems to need some explaining away.

What light do the post-war years throw on the problem of air attack on warships and the efficacy or otherwise of anti-aircraft fire as a means of defence? There have been a certain number of incidents in recent years in which aircraft and men-of-war have come into hostile contact. There was the Greek naval rebellion of 1935, when aircraft were sent out to bomb the rebel cruiser *Averoff*. There was the Dutch naval revolt in the Far East a couple of years earlier, when they were similarly sent to deal with a mutinous battleship. And there has been the evidence of the Spanish war. In all these cases,

the achievements of the aircraft have been poor and a long way below what the air enthusiasts claimed would be the case. This has been particularly so in the Spanish war where, for example, the insurgent warships blockading Bilbao steamed slowly about for days on end without apparently suffering damage or even inconvenience from the Government aircraft. These vessels would seem to have furnished ideal targets for aircraft.

It is proper to remember, however, that all these instances were connected with civil wars, in which all the motives normally at work in warfare between sovereign States may not be present. While the contestants in civil war may not be reluctant to kill off the persons of their opponents, they may not be so anxious to sink or destroy the other side's warships, which after all belong to their common country and will still be needed for national defence which ever side wins. It is conceivable that such considerations may disincline the contestants in civil conflicts to make a thorough-going test of the destructive powers of aircraft against warships.

The same sentiments would not, of course, apply to air attacks against commercial vessels, such as suspected blockade runners, especially when they are foreigners. In this direction, the Spanish war provides more evidence. At the time of writing, over ten British ships have been

sunk by air attack and a larger number hit and damaged. On the other hand, there have been a good many instances of ships being unsuccessfully attacked from the air, the bomb marksmanship being often extremely bad.

When we turn to the Chinese war, we leave the sphere of internal strife and come to ordinary warfare in which no modifying influences play a part. The evidence here, such as it is, does not seem to support the aircraft against the ship. The Japanese flagship lay in the Whampao river off Shanghai for months and was attacked continually by Chinese aircraft without being hit. The Chinese may not, of course, be very good shots, and any European airmen who might have been flying their planes would presumably not be highly trained bombing pilots. Did not the more professional Japanese sink the *Panay*? True, they did; but there again, it has to be remembered that the Americans were taken by surprise and that the *Panay's* means of defence were not exactly powerful. Taken all round, the results of the air attack against ships cannot be called impressive.

The same can equally be said of the gunnery results against the aircraft. British warships have on several occasions opened fire on aircraft during the Spanish war, without I think one

success. In the Chinese war, if the Chinese bombing marksmanship against the Japanese was hopelessly bad, the Japanese anti-aircraft fire against the Chinese planes does not seem to have been very much better. The testimony of the Chinese war on the air problem seems in fact to be more negative than positive.

Such are the lessons of experience up to date. It may quite reasonably be argued that they are inconclusive, and that with the more highly-trained air forces or anti-aircraft gunners that several countries are no doubt sure they possess the results would be very different. Quite possibly they would. Nevertheless, the results, as they are, are below the estimates.

While, therefore, the full potentialities of the air weapon in a first-class European war can so far only be guessed at, the indications are that it is not likely to sweep the surface warship from the seas in the way that was once claimed for it. The same claim was made, though less vociferously, for the submarine before the war, but when the time came it was found that the underwater vessel, though it added greatly to the complication of naval warfare, was not able to keep the surface vessel, in one form or another, from fulfilling its customary rôle. There is no reason yet to think that the new aerial element in naval fighting

will again prove any more than an added complication or that it will be able to change the whole face of naval warfare.

But though it may quite well be argued from the available evidence that the practical results likely to be achieved by naval aircraft in the next war are much less than is commonly believed, it would be a mistake to assume that their influence over naval operations will be small. That influence may be much greater than the actual results achieved by them would warrant. We noticed in Chapter II the striking moral effect produced by the submarine over the operations of the Grand Fleet in the last war. Yet the practical achievements against that fleet were so small as to be almost trifling. Two light cruisers were successfully torpedoed and sunk on August 19th, 1916. Apart from that, not one ship of the Grand Fleet was sunk by a submarine, and not one battleship of that fleet was even hit by a submarine's torpedo.

The great moral influence of the submarine is derived from its unseen approach and from its use of the dreaded underwater weapon. It is quite possible that the aircraft may exert a comparably powerful moral influence and for generally similar if not exactly identical reasons. The aircraft cannot expect to approach unseen in the way that was possible to the submarine in the last war, but by means of cloud-flying

something not far short of that unseen approach may be attainable. Even in cloudless weather, the disadvantage of the aircraft's open approach will be very largely nullified by its great speed, which by reducing the period between the first sighting and the delivery of the attack to seconds rather than minutes should produce most of the elements of surprise.

The attacking aircraft will have the choice of bomb or torpedo. In popular discussions of the air problem the use of the torpedo is largely overlooked. For the public, the question is always one of "bomb *v.* battleship," never torpedo. Yet it is possible that the torpedo may be the more promising aerial weapon of the two for use at sea. The mathematical chances of hitting a line of ships with a torpedo fired from 2,000 yards are a good deal greater than those of hitting with a bomb from 6,000 feet. Moreover the damage to be expected from the explosion of a non-contact torpedo is probably much greater on the average than that from a bomb. The torpedo exploding somewhere under the bottom can hardly fail to inflict a grave injury. The bomb coming from above may explode in some comparatively innocuous compartment inside the ship. For these reasons, the possibility of aerial torpedo attack may appear more forbidding to an admiral than attack by bomb.

But though the material destructiveness of the bomb may be less to be feared, it carries a novel and unpleasant menace that is all its own. This is its power of attacking the personnel of men-of-war rather than the material, and of attacking it unawares. In battle, the ship's company of a big ship is distributed all over the ship, a good deal of it behind armour or otherwise under protection. At other times, a surprise emergency due to being torpedoed by a submarine or to striking a mine results in damage to the ship more than to loss of life among the crew. Surprise attack by bomb from the air, on the other hand, may catch the men at their ease on the mess decks, where they will be both unprotected and collected under crowded conditions that will enable the bomb to wreak the utmost havoc, as occurred in the case of the *Deutschland*.

This unpleasant possibility must in future add not a little to the strain of naval warfare, for it means that whenever men-of-war are within reach of attack by hostile aircraft, the normal life of the ship cannot go on without exposing the officers and men to decimation by a lucky bomb exploding in their living quarters. The moral effect due to air attack will hardly, however, be affected by whichever of the two weapons, bomb or torpedo, is used on any particular occasion. Moral effect is born of the threat and not of the

reality, and where two dangers of differing seriousness are both equally possible, it is in human nature to make mental allowance for the graver of the two.

The admiral of a surface fleet who pins his faith to the orthodox gun duel between the rival battleships is likely to be as little anxious to expose his ships to the untoward consequences of sporadic air attack as his predecessors of the Great War were to brave the risks of submarines and mines. And he will probably entertain this feeling more pronouncedly towards shore-based than ship-borne aircraft. Attack by ship-borne aircraft will mean that there are enemy carriers or other large men-of-war within flying range which his own aircraft or ships can counter-attack. Against attack by shore-based aircraft he will be mostly unable to retaliate, and for that reason will be all the more desirous of avoiding their attentions. Whenever therefore an admiral may feel concerned to preserve his vessels from avoidable damage—as for instance the comparatively few and consequently precious capital ships of present-day navies—he is bound to experience a reluctance to take them within the effective zone of the enemy coastal air bases. To penetrate this zone will be to expose himself to the danger of repeated torpedo or bomb attacks and will place him in the anxious dilemma of

condemning his men to long periods closed up at action stations or of exposing them to severe casualties if given their normal and necessary relaxation. One effect of the air weapon in future must be to hamper and restrict the operations of surface fleets over and above those restrictions already imposed by mines and submarines.

This restrictive influence that the air seems destined to exert will necessarily vary with the size of the ship. Just as great reluctance was shown in the last war to expose the large and therefore comparatively scarce capital ships to mine or torpedo, but a good deal less solicitude was manifested for the immunity of destroyers and other small craft, so may we expect a greater readiness in the future to allow the smaller and more numerous ships to brave the dangers of air attack than the larger ones. In the last war the great ship went in fear of the submarine. It will not be surprising if it goes in fear of the aircraft as well in the next.

The probable inclination on the part of warships to keep out of reach of enemy shore-based aircraft must also affect the position of naval bases. An admiral who may feel reluctant to lead his fleet within effective range of hostile aerodromes will feel even less disposed to use a base within the same zone. To do so is to expose his ships to damage under specially unfavourable conditions ;

that is, when they are motionless at anchor and are powerless to take avoiding action. It means also that the personnel will be liable to continuous harassment in what corresponds to their rest billets. There must therefore be a natural desire to make use of naval bases outside the coastal air zone. The farther bases are removed from the enemy's coast, however, the less the strategical value of the base from the naval point of view, a complication which must become more and more embarrassing as the range of aircraft steadily increases. The time is likely to come before very long, if indeed it has not already arrived, when naval bases cannot be sited outside hostile coastal air zones without taking the fleet too far away to keep an effective watch on the enemy's ships. The Mediterranean is a case in point. In 1935 the close proximity of Malta to the Italian coast caused the British Mediterranean Fleet to remove itself to Alexandria. Now, however, that no part of the Eastern Mediterranean can be regarded as outside the range of Italian aircraft, a similar retirement would not have the same utility. In fact, with the arrival of aircraft of transatlantic range, the point seems to have been reached where fleets cannot be kept clear of shore-based aircraft, and will have to put up with air attack in their bases if they are to continue to exercise their proper functions.

So far we have been considering the influence of the air on the operations of the battle fleets. What now of its bearing on other aspects of naval warfare such as trade protection or attack. The aeroplane shares with the submarine the ability to move in three dimensions instead of two. We may therefore be sure that for it, too, distant cover by a superior battle fleet will be ineffective in preventing it reaching its objective. Whereas the submarine can dive under the battle fleet on its way to attack trade, the airplane can fly over the top of it for the same purpose. Nor does it seem possible for defending aircraft to exercise the principle of "cover" in the air that the warship can develop against its own kind on the surface. We may conclude, therefore, that the same principle of defence will apply in both cases; namely that if trade is to be defended against air attack the defence must be provided on the spot. In other words, shipping must be given some form of anti-aircraft defence. What form this should take will be discussed in later chapters.

Summarising the evidence we have reviewed regarding the power of aircraft, there is reason to think that it is a good deal less than has generally been expected. Encouraged by the non-realisation of the more extreme claims previously made for the air, there are a number of naval officers who

are now saying that the air will prove a negligible factor in future naval warfare. Admitting that much of the evidence of the Spanish and Chinese wars is in these officers' favour, I should nevertheless be more inclined to agree with them did I not remember that exactly the same thing was said of the submarine before 1914. As it turned out, the material damage the latter caused to the warship fleets was comparatively small, while its moral influence over them was great. On the other hand, while it caused great destruction among merchant shipping, its moral effect on their movements was unexpectedly small ; to the surprise and confusion of the Germans and the great honour of their officers and crews. It would not be surprising if the influence of the airplane were to be generally similar.

CHAPTER VI

INVASION

HAVING now examined the use of sea power in the last war and having traced the principal developments that have occurred during the interval between the Armistice and the present time, we are in a position to estimate what effect these developments are likely to have in a naval war of the immediate future.

As mentioned in Chapter I, the value of sea power is to be measured in terms of the sea communications. Its importance lies in the power it can give to one side or the other to use the sea highways for its own purposes and correspondingly to deny them to the enemy. This use of the sea highways has two main aspects, one dealing with invasion and the other with trade and supplies. In this chapter we will examine the question of invasion.

Since the principles of naval strategy first began to be properly understood, the feasibility of overseas invasion has been a question of the superiority or inferiority of the surface fleets.

INVASION

Generally speaking, the side with the most powerful fleet could send its armies across the sea to attack any selected enemy territory, either his home territory or his overseas possessions, and the inferior side could not. If the latter tried to do so, the expedition was liable to be set upon by the superior fleet and either destroyed or captured. In the last two or three centuries, this unpleasant possibility has been sufficient to deter any ruler or government from attempting a serious invasion of its enemy's home territory in the face of his superior fleet. Napoleon, standing on the shore at Boulogne with his " Army of England " behind him, would not embark on his attempt until the French fleet could gain command, if only temporary command, of the Channel ; which it never did. Minor raids, whose failure would not be regarded as a severe reverse, might be attempted. The poor communications and the slow and uncertain speed of ships in the old sailing days gave such raids a fair chance of getting away and reaching their destination undiscovered ; as for example the French raids on Ireland. Even so, the record of such raids is one of almost unbroken failure.

The great improvements in the means of communication and in the propulsion and speed of ships during the nineteenth century made things even more difficult for the invader, and the

difficulty was still further enhanced by the growing complexity of army weapons and equipment. The requirements of an army have increased so much in diversity and volume in the last hundred years that an army corps, which in Napoleon's time could be put ashore to live very largely on the country, would now require a daily supply of over a thousand tons of provisions, ammunition, barbed wire and military stores of all kinds, all from its own transports. So hazardous in fact had any sort of overseas military expedition become by 1914 for the inferior naval power that no such attempt was made by any of the Central Powers during the war, except in the case of the Oesel Island expedition by the Germans in the Baltic, in which sea they happened to enjoy the naval superiority.

At the outbreak of the war, the superior naval power still enjoyed his historic freedom to send his armies across the sea as he pleased. It was not long however before it became clear that for him, too, the progress of science had begun to exercise a hampering effect. The submarine was still a new and only partly developed weapon in 1914. The British military lines of communication with France were moreover so short and therefore well guarded as to afford the submarine little scope. The Dardanelles expedition gave it a better opportunity to show its power. The

expedition had gone to waters which at the time were free of submarines, and it went to work in the traditional manner. Clustered round the beaches were the transports and the battleships, cruisers, destroyers and other small craft of the supporting fleet. Exactly one month after the landing, a submarine arrived out from Germany and torpedoed one and then another of the battleships. The effect was impressive. The best part of that great array of shipping, warships and transports, hurriedly dispersed and, like rabbits going to ground, disappeared into distant harbours; all except the destroyers and small craft, who now became a ferry service between the sheltering transports and the beaches. The army however was well established ashore by that time and had a reserve of supplies on land with it. Had the submarines been present at Gallipoli a month earlier, it is safe to say that the landing would not have been attempted.

Since then, measures for dealing with submarines have made much headway, as described in a previous chapter. Even with these improvements, however, it is very doubtful if transports anchored off an open stretch of coast could be adequately protected against submarine attack at the present time. To give an expedition that reasonable degree of anti-submarine protection to render an opposed landing a practical operation it would

almost certainly be necessary to find an enclosed harbour which could be netted in and made submarine-proof.

This limiting condition must detract to no inconsiderable extent from the military chances of the expedition's success as an invading force. It has always been rightly held that the greatest source of strength of a sea-borne military force lies in its power to effect surprise through its ability to select any point on the enemy's coast for its landing, provided only that boats could be beached there. If the selection is now to be narrowed down to the always comparatively few good harbours, the previous element of surprise must be very much reduced and the task of the defenders made correspondingly simpler.

Air power is likely to add yet further to the disabilities already imposed on an invading force by the submarine. If the latter tends to reduce the highly important element of surprise by restricting the choice of landing beaches, the airplane should be able to reduce surprise still more by reason of its great powers of reconnaissance. With the large and increasing ranges of modern aircraft, it should in many cases be possible to keep up an air patrol sufficiently far to seaward to sight an approaching expedition the evening before its arrival. Its sighting a long way out at sea should enable the calling up

of intercepting submarines and of destroyer forces to attack the vulnerable convoy during the dark hours. Air observation also imposes on the invaders that difficult operation a dawn landing as the alternative to having their final approach accurately reported from the air. The air will also be of direct assistance to the defenders by allowing troops to be moved to the threatened spot by troop-carrying aircraft, as an even swifter means of concentration than that due to modern motorised transport.

Nor will the contribution of aircraft be limited to reconnaissance. Since the number of ship-borne aircraft available to an expedition is likely always to be comparatively small relative to the great quantities of shore-based aircraft that the nations are now engaged in producing, an expedition once discovered may well be subject to frequently recurring bomb and torpedo attacks as it approaches its anchorage, and the troops to bombing and machine-gunning during their disembarkation.

The submarine, the airplane, and wireless telegraphy have each and all added to the strength of the defence against invasion. To the superior naval power these extra safeguards come as additions to the security traditionally due to the possession of the stronger surface fleet. To the weaker surface power they come as some sort of a substitute for its inferiority on the surface.

It may be true to say that invasion has never succeeded without surface superiority. It would be by no means true to say that surface superiority ensures success. It did not ensure success at Gallipoli, for although the Anglo-French surface superiority in the Mediterranean was unchallenged and sufficed to bring the expedition to the beaches in complete safety, it was only with great difficulty that the troops managed to land and even then they eventually had to come away. The progressive strengthening of the defence since that time will have made it, in the average case, even more difficult for the troops to get ashore.

The invasion of a country that possesses the command at sea had by 1914 become so unpromising as not to offer even that outside chance that justifies a risky undertaking. The Germans certainly had never any thought of despatching any sort of military expedition against this country, though our own authorities were always unnecessarily fearful lest they might. Indeed, the odds on our inflicting a resounding defeat on any such expedition, with the probability of a fleet action thrown in, were so promising that we ought to have done our best to encourage the Germans to make the attempt, by keeping Britain invitingly denuded of troops. Instead, we did the opposite. Nowadays, with the air as an

additional safeguard, the danger of invasion to the superior naval power is, if possible, even more remote.

For Great Britain, moreover, invasion is an academic rather than a practical subject ; for if the defeat of our surface fleet were to take place, which alone would make it practicable, the victor would have no need to waste his military strength on storming bullet-swept beaches. He could starve us into submission without risking the life of a single grenadier.

For more self-supporting countries who might be also inferior at sea, such as Australia and New Zealand, invasion is a more real possibility ; and for them the strengthening of the defence is a factor of importance, whose value will be considered in a later chapter.

CHAPTER VII

THE DEFENCE OF TRADE

OPERATIONS in connection with sea-borne trade resolve themselves into those of attack and defence. For this country, defence must take priority. Absolutely dependent as we are on sea-borne imports for the maintenance of ourselves and our industries, and on exports for the preservation of our credit, the defence of our overseas communications must be regarded as a prior charge to attack on the enemy's. Not until we have satisfied ourselves on the first item can we legitimately go on to the second. Moreover, the defence aspect of overseas communications is far and away more difficult than that of attack. In the last war, we were for a time at our wits' end to protect our trade against the German submarine attack. Never at any time, however, did we experience any particular difficulty in intercepting enemy or contraband trade. It is true that the geographical factor made things easy for us. Nevertheless, the experience of the French wars suggests that, even under much less favourable conditions, the problem of the

attack will always be far less troublesome than that of defence. It is therefore proposed to deal here principally with the problem of defence of our overseas communications. If we are able to solve that problem to our own satisfaction we may rest confident that the attack on a future enemy's trade will not be beyond our capacity.

When we speak about our overseas communications, we naturally think mainly of our trade, since the bulk of our shipping on the high seas is necessarily engaged in the transport of commercial goods. In wartime, the term communications must also cover the movement of troops by sea. We considered the question of invasion in the last chapter, but chiefly from the point of view of the final assault on the hostile territory. So far as concerns their passage over the ocean to the near vicinity of their landing place, the problem of the protection of the transport is virtually the same as that of ordinary trading vessels. Both are covered by the term "sea-borne communications." While, therefore, extra precautions are always taken over the protection of troop transports, the general principles of their defence are the same as for commercial shipping.

In the last war we had to protect our communications against two forms of attack, surface and submarine. In the next war the problem

will be made even harder by the addition of a third danger from the air. If this air attack on commerce is to be at all effective it must necessarily be of the "unrestricted" variety. The existing international law on the subject of trade attack demands the observance of "visit and search" as a prelude to capture or destruction, and in the latter alternative it ordains that the crew must first be put in a place of safety, a condition that the use of the ship's boats is deemed not to satisfy. Now the airplane cannot observe these rules. In its present stage of development it can neither conduct visit and search nor can it provide any greater security than the ship's boats for the passengers and crew. Consequently, if it is to be used for the attack on commerce, it can only do so in violation of International Law. The same thing applies also to the submarine. It, too, can only be a serious threat to trade by disregarding the existing rules of war and indulging in "unrestricted" submarine warfare. What is the likelihood of the rules being observed? It was mentioned in an earlier chapter that the Washington Conference had affirmed the illegality of unrestricted submarine warfare and that as late as 1936 Germany and Russia had subscribed to this affirmation, thus making the signatories Britain, the United States, Japan, France, Germany, Russia and Italy. No such

convention has, however, been drawn up in regard to air attack, which remains legally free of limitations. It seems likely, however, that the use of the air and the submarine weapons against commerce will go hand in hand. If a country is prepared to disregard international opinion by engaging in unrestricted air attack it is hardly to be expected that it would be scrupulously exact in its utilisation of the submarine.

What then are the prospects of the limiting conditions agreed to regarding submarine warfare being observed in practice? Very little, I suggest. The sanction for the condemnation of unrestricted submarine warfare lies in the humanitarian sentiment that deplores the endangering of the lives of the non-combatant crews (and passengers) of peaceful merchant ships. But if the nations are prepared, as everyone takes it for granted that they are, to rain death and destruction on civilian populations from the air, there is absolutely no reason at all why they should harbour any greater consideration for the officers and men of merchant ships. The air bombing of civilians that is even now going on in two continents implies the complete disappearance of any mitigating factor in warfare of the future. We must therefore regretfully accept unrestricted submarine and air attacks against trade as a probable feature of the next war.

That being so, we have to admit that the defence of trade has become a more intricate problem than it has hitherto been. The addition of air attack has brought with it the complication that this attack may be made either by ship-borne or by shore-based aircraft. Since it seems likely that the attack on trade by shore-based aircraft will prove much more formidable than that by the ship-borne variety, the problem of defence may differ considerably according to whether the mercantile shipping requiring protection is inside or outside the range of hostile coastal aircraft, and in the former case, whether the hostile coastal zone is or is not flanked by British territory. It is therefore proposed to divide the problem up into three representative cases, those of the protection of trade in Home waters, where both foreign and British coastal zones will affect the issue; in the Mediterranean, where foreign coastal aircraft may provide the chief air component; and thirdly, in the open ocean, where coastal aircraft can play no part at all. The remainder of this chapter will be devoted to the first of these cases.

The home terminals of British trade are necessarily the places where that trade is the most exposed to attack if it can be got at; for it is there that all the various mercantile streams from the different parts of the world come together as

they approach the British Isles. It was there that the German submarines found their most fruitful hunting-ground in the last war ; in the Western approaches, in the English Channel, in the North and St. George's Channels and the Irish Sea. The most promising area of all was that covering the approaches to the great Port of London, but that region happened to be unpropitious for submarines, being profuse in shallows, sandbanks and strong tides, all of which the submarine dislikes.

Should we go to war with Germany again, we ought to be prepared for a renewal of that submarine warfare. The whole of her naval policy points in that direction. In the first place, her agreement to a one-third ratio of surface forces shows that she has abandoned any idea of competing with us for the surface command. Secondly, she is pushing on very fast with the construction of submarines, having completed 30 in the last two years and having 30 more under construction. It is only prudent to think that this rapid submarine building is being done with a view to their employment in the same manner as in the last war, a surmise that is not contradicted by an opinion expressed to Lieutenant-Colonel P. T. Etherton by the Ex-Crown Prince in 1933, that "the next naval war will not be fought on the water *but below it* ; and that submarines

will largely decide the issue to be fought out by the rival navies.”¹

Against a recurrence of the German submarine campaign against trade, we should need to employ the same counter-measures as before, namely convoy and escort. While, however, the introduction of convoy will this time be a straightforward matter, for which it has been officially stated that preparations are ready, the supply of escorts is in a less fortunate state than it was in 1917. What defeated the submarine in the last war was the introduction of convoy coupled with the employment of very large numbers of convoy escorts and anti-submarine small craft. It is important to notice that these two factors were interdependent. Convoy was the right policy to adopt, but its adoption depended on adequate numbers of convoy protection vessels being available. So much was this the case that the Admiralty of 1917 was always complaining that it had not got enough escorts to protect the convoys if they were formed. Yet even before convoy was generally introduced we had about 400 escort vessels (destroyers, sloops and patrol boats) available for convoy work, besides several thousands of trawlers, drifters and other auxiliary vessels patrolling the Channel approaches.

What is the position now? At the present

¹ *Sunday Express*, May 8th, 1938.

moment our total available supply of escort vessels (destroyers, sloops, patrol boats) is 180, and we have 50 building. From our present 180, we must subtract at least 60 destroyers which would be required for work with the battleships, a similar or larger number employed in that way in the last war being additional to the 400 escort vessels previously mentioned. On a direct comparison, therefore, we can now only muster about 120 convoy escorts, as against the 400 that were regarded as barely sufficient in 1917. Moreover, our total of trawlers, drifters and other small craft has also declined.

Now, we have noted in a previous chapter that the invention since the war of a submarine detecting device has rendered the task of the submarine a good deal more hazardous. At the same time, we questioned whether Sir Samuel Hoare was justified in his somewhat sweeping assertion that the submarine was no longer a menace to this country. And there is another aspect of the case that seems to indicate that Sir Samuel may have been allowing his optimism to run away with him. The new detecting device, though it has undoubtedly improved the escorting vessels' prospects of dealing successfully with submarine attack on a convoy, has done nothing to reduce the number of escorts required to do so. Indeed, the efficacy of the new gear is to a

great extent dependent on there being a certain number of vessels available to operate it. Since, therefore, we now have only about a third of the escorts—or under a half when the existing programme is completed—that the Admiralty considered necessary for the proper protection of our “convoys in the last war, we seem to have a very serious shortage in vessels of this type. For, as things are, we appear to be faced with the alternative of reducing the number of escorts allotted to each convoy a long way below what is necessary, or of leaving well over half our trade without escorts at all.

There is, as we have earlier agreed, a chance that aircraft may prove a useful ally to trade against the submarine. While allowance is proper to be made for this possibility, it is very questionable whether it can wisely be held to compensate for our apparent very serious shortage of escort vessels as compared with the last war. On the basis of that experience, we shall still be over 200 of these ships short of requirements even when those that are now building have joined the fleet. But so far from the Admiralty speeding up the construction of this type it is actually doing the opposite ; for in the original building programme for 1938, it omitted to make any provision for escort vessels at all. The omission gave rise to a good deal of comment and criticism in Parliament,

and caused no little surprise in professional circles, where it seemed altogether inexplicable that, while provision could be made for almost every other class of ship, and particularly for depot ships and submarines, the escort classes, destroyers, sloops, and similar vessels, of which we stood most in need were just those that found no place in the programme. It is difficult, in fact, not to regard the Admiralty's apparent attitude of complacency towards the submarine danger without a definite feeling of anxiety. The recent increases in the submarine fleets of the totalitarian powers have been impressive. It is impossible to think that the Admiralty can be placing such complete reliance on the observance of international undertakings not to engage in unrestricted submarine warfare against commerce as to be taking no precautions against their breach. But if not, it seems to be discounting one of the most dearly-bought lessons of the last war to an extent that the acquisition of any new defensive measures against the submarine cannot be thought to justify. One naturally inclines to assume that the Admiralty is fully alive to what it is doing and has plans ready to meet all eventualities. At the same time it is only prudent to remember that it has more than once shown a disinclination to take a sufficiently serious view of the submarine danger. Prior to 1914, it tended to make light

of the underwater craft. The result was that the outbreak of war found us with no anti-submarine defences for the principal naval base. Again, during the war, despite the clear warnings Germany gave us in 1915 and 1916 of the possibility of unrestricted submarine warfare, the actual commencement of that warfare in 1917 discovered us largely unprepared to deal with it.

Then we come to the air. Assuming again that we are at war with Germany, to what extent would our merchant shipping be in danger from air attack? First of all, what form of air attack is to be apprehended? Will it be ship-borne or shore-based? A moment's reflection will make it clear that ship-borne attack is extremely unlikely. The Germans would hardly expose expensive aircraft carriers to the risk of destruction by our own surface vessels or aircraft when they could get the same or a better result by means of aircraft flown over from German land aerodromes. It is shore-based aircraft which would be the danger. If so, how would they be likely to act? Practically the whole of the Channel and the East Coast of England must now be regarded as within practical bombing range of aerodromes inside the present German frontiers. We can certainly say that the North Sea as far as the Humber and the Channel as far as Portsmouth

are within comfortable bombing range. That means that a long stretch of the approaches to the Port of London is exposed to shore-based air attack, whether the trade were routed by the Channel or north about round Scotland.

The crowded funnel of the Thames Estuary itself is almost the nearest point of all to Germany. This small and highly vulnerable terminal region into which something like 40 per cent. of our import trade converges seems therefore to form the most promising point of attack, especially since the tendency of recent years has been to extend the list of commodities, all or nearly all of which are handled by London's port; and since, moreover, the existing organisation for feeding the population of London itself has grown up round the Port of London, as being the centre of distribution.

In planning an attack on a converging stream of enemy supplies, the most profitable place to choose is the point of final junction, if it can be got at. In this case it can be got at; for the stream of supplies bound for London meets ultimately in the London docks. If enemy aircraft can bomb the docks, they can not only attack our shipping in its most concentrated and therefore most vulnerable state, but they may also be able to demolish the dock gates, the transit sheds, the unloading apparatus, and the railway

sidings, all of them essential elements in the process of discharging the cargoes after the ships that carry them have reached port. What is the chance of hostile bombers being able thus to cut short London's supplies by smashing up the organization for handling them at the point of arrival? No one knows. Defence in the shape of anti-aircraft guns, fighter aircraft and balloon barrages might be able to keep them off sufficiently to prevent decisive damage being done; or it might not. It seems to be generally accepted that it is extremely difficult to prevent attacking aircraft, or some of them at all events, getting through to their target. How much damage they will do to a well-defended target when they have reached it remains however an unknown factor. We must not close our eyes to the possibility that enemy bombers might be able to paralyse the Port of London by smashing up the docks or dislocating the unloading organisation. Again, they might not.

If they could not, then it is possible that they might transfer their operations farther down stream where the defence is less easily staged; namely, the sea approaches to London. The hydrographical features of the Thames Estuary, which we have previously noted as operating as a deterrent to the submarine, do not present the same unfriendly countenance to the aircraft.

While shoals and narrow channels are a bogey to the underwater vessel, they mean nothing to the bomber ; but they unpleasantly restrict the movements of ships desiring to manœuvre clear of the bombs.

Defence measures would be considerably more difficult for ships in the Estuary than for the docks. The anti-aircraft guns would have to be transferred from solid ground to the unsteadier ship, and the number of anti-aircraft gun vessels required would be large. In proportion, moreover, as their fire proved effective, a progressively increasing number of such vessels would be required, as the attacking aircraft would naturally endeavour to outflank them by moving down towards Dover or into the Channel. Again, balloon barrage might or might not be possible from a ship platform ; while not only would there be less warning of the approach of enemy aircraft, but our own defending aircraft would have to fly farther from their aerodromes in order to deal with them. If, therefore, we have had to concede that the chances of being able to prevent enemy aircraft from reaching and attacking the docks are not good, the chances of preventing them attacking shipping in the Estuary seem even less promising ; though of course the target is presented in a more dispersed and therefore less

vulnerable form the farther away from the docks it is attacked.

Whether or not concentrated air attack on the London docks or on shipping in or approaching the Thames Estuary would be stronger than the defence is a matter which cannot be known till the time comes. It might be found that our own aircraft could obtain that degree of "air superiority" over the Straits of Dover and the Estuary as to provide cover for the docks and the shipping using them. It might even be found that the attack was not so very concentrated after all. It is fair to expect that Germany would not be at war with us alone and that she might have her aerial hands distinctly full in dealing with the air forces of Russia, France and Czechoslovakia. The hordes of airplanes that we are inclined to picture as lined up all ready to descend with a roar on London, its docks, and its shipping, might therefore have urgent engagements elsewhere.

But while we need not necessarily believe in the worst, we should be foolish not to prepare for it. Failure to do so would, if our expectations have been over-sanguine, precipitate us into even greater danger than our neglect to prepare against unrestricted submarine warfare in 1914, 1915 and 1916, threw us in 1917. The question, therefore, is, what could we do if the Port of London could

no longer be used? The answer seems fairly obvious. If London is too dangerous for shipping, the latter's port or ports of arrival must be shifted to the less vulnerable west coast; and Plymouth, Avonmouth, Cardiff, Liverpool, Glasgow and other smaller ports be used to absorb the additional traffic.

The transference of London's shipping to the western ports would be no light task. Questions of the extra dock, transit shed and warehouse accommodation would need careful attention. More difficult still is probably the transport problem, for whereas London's food is now deposited at its doorstep, it would then have to be carried a hundred miles or more across country. The diversion of shipping to the westward would also mean a serious dislocation of business connected with the London docks and all the centuries-old wharfage and warehousing firms that have served the Port of London. The magnitude of the task of transferring London's sea-borne traffic elsewhere is certainly not to be minimised. But as such transference may become urgently necessary at a moment's notice, it is very much to be hoped that the Government's plans for doing so are fully prepared.

The transference of the ports of arrival to the west coast would not necessarily take them beyond bombing range, for it would only add a

hundred miles or so to the hostile aircraft's journey, which is not very much in view of the great range of modern aircraft. Yet that extra hundred odd miles means a flight right across England, with greatly increased chance of being shot down by defending fighters while doing so. This consideration, together with the substitution of half a dozen ports for one single one as the bomber targets, means undoubtedly a great increase of security.

It may legitimately be asked, however, whether all this tremendous reorganisation would be of any avail if London itself is liable to be bombed to pieces. Certainly, there is no object in making intricate and expensive arrangements for feeding London through the western ports if there is going to be no London left to feed. That is the great question. Can London be so badly bombed as to bring England to submission, food or no food? The examples of Madrid, Valencia, Barcelona and Canton suggest not. If Spaniards and Chinamen can undergo the severe civil bombings that have recently been their portion without surrender, there should be no cause to assume in advance that Englishmen cannot stand the same punishment. It is fitting also to remember that such direct attack upon a nation's life without first overwhelming its armed forces has never yet been decisive. As Admiral Sir Herbert

Richmond has said, "It is a theory only, yet to be proved." The next war may bring the proof, but up to now the evidence is wanting.

So far little has been said about battleships, large cruisers and aircraft carriers. The truth is that they can take little part in the operations previously considered in this chapter. Battleships and large cruisers are useless for the direct attack on the submarine. They are much too large and unhandy to attack submarines with any prospect of success, and they are such good targets and such valuable and important vessels as to become objects of attack themselves. Against aircraft, their anti-aircraft batteries might be effective, but here again they could not be used to protect other vessels without automatically exposing themselves to concentrated air attack, a contingency that there is every reason to think they will do their utmost to avoid. Aircraft carriers are unlikely to be used, for generally similar reasons. Submarine attack on our commerce, in order to be effective, has necessarily to take place in the congested area where trade converges on approaching the British Isles ; in an area therefore which is bound to be covered by the British coastal aircraft zone. In that case, whatever help aircraft can give in defeating the submarine can be given just as efficiently by shore-based as by carrier-borne aircraft, without exposing the large,

expensive, and vulnerable aircraft carriers to the likelihood of submarine attack. Even less value would the carrier possess as a source of protection against shore-based aircraft, for to attempt that rôle would be to engage in a duel in which the carrier is almost certain to come off worst. The part to be played by the large ship—the battleship, the large cruiser, the carrier—in a war against Germany would be limited, as in the last war, to keeping watch on the large surface forces of the enemy. Since, therefore, Germany, by accepting the one-third ratio with us in those classes, has made it reasonably clear that she does not intend to fight a surface war against us for the time being, the function of our large ships in a war against her seems destined to be a minor one. It will be on the small vessels, the small cruiser, the destroyer, the sloop, the patrol boat, that the main burden of our naval defence is almost certain to fall in a German war.

CHAPTER VIII

OUR MEDITERRANEAN COMMUNICATIONS

IF we were to come to blows with anyone in the Mediterranean it would presumably be Italy, allied probably to Germany. We might or might not be alone. Probably we should not, but let us assume first of all that we are. Could we in that case maintain our communications through the Mediterranean, and if so how? In the first place, what should we have to contend with? It is impossible to scrutinise Italy's fleet without being struck with the very great number of her small craft. She has over 80 submarines, the second biggest fleet of them in the world. She has also 100 torpedo craft and 50 motor torpedo boats. Her battleships number only 4 though she has 4 building, two of which will not normally be completed for another three years.

Then there are her air forces; or, to be more exact, her shore-based air forces, for she has no aircraft carriers. Having Sardinia, Sicily and Libya at her disposal for air bases, she is in a position to keep aerial watch over a long section of the through-Mediterranean route from the

line Sardinia–Algeria to the borders of Egypt, a distance of 700–800 miles. The narrowest part of this section is the channel between Sicily and Africa, which is only 70 miles across. In this channel stands the island of Pantellaria, narrowing it still further, which the Italians are reported to be fortifying and developing as an air base. A little farther to the south-eastward comes Malta, 50 miles from Italian territory.

It can easily be seen that the situation of British shipping passing through the Mediterranean in a war against Italy would not be an agreeable one. For the distance of 700–800 miles, or two and a half days' steaming at 12 knots, that they would be within the Italian coastal air zone, they would be liable to repeated attacks from the air. For the same distance or even longer, they would also be liable to attack by surface craft and submarine. The passage of the Sicily–Africa channel in which Pantellaria stands would be a particularly hazardous one. For there one could expect them to receive the concentrated attentions of aircraft, submarines, destroyers and fast motor boats, under the most favourable conditions for the attackers; and the two latter by night as well as by day.

Could our shipping be given effective protection against these dangers? In the first place, could aircraft from Malta be regarded as playing any

appreciable part ? It is extremely doubtful ; as it would also be imprudent to count on the use of Malta by the fleet, in view of its great exposure to air attack from Sicily. The problem then resolves into that of a fleet based on Gibraltar ensuring the safe passage of British shipping along the 1,900 mile route through the Mediterranean and, in particular, past the bottle-neck of the Pantellaria Channel.

Convoy of course would be essential ; and the escorts would need to be substantial. A strong anti-submarine escort would be required, in view of the large number of submarines the Italians possess. An equally strong anti-aircraft escort is called for. Carriers would be no help, for the odds are that they would not be able to stand up to the shore-based aircraft. Reliance would have to be placed on anti-aircraft gunnery, and probably a number of special anti-aircraft gun vessels would be required. But all these escorts, though possibly competent to deal with aircraft and submarines, might also be set upon by surface forces, such as strong bodies of destroyers or cruisers or even battleships, as their convoy passed close to Italian territory. In fact, the task would be nothing less than that of having to force a passage for a convoy past the Pantellaria bottle-neck in the face of the whole Italian Navy, surface and submarine, and of its air forces as

well. To do this would obviously require the presence with the convoy of a very substantial British force. The question is, what sort of force could be made available? Battleships, for instance; would they be forthcoming? To use them on regular convoy duty backwards and forwards through the Middle Sea would be to expose them continually to air attack, submarine attack, fast motor boat and destroyer attack. When we remember that Lord Jellicoe with over 30 capital ships, and a good many more in reserve, was sent steaming away northwards on August 19th, 1916, by the report of one submarine, despite the fact that the High Seas Fleet was known to be at sea to the southward of him, the likelihood of our present fifteen ships (with no reserve) being allowed repeatedly to brave the attentions of 80 submarines, 50 fast motor boats, 100 destroyers, and many hundreds of aircraft, without any hope of a fleet action, seems slender indeed. Indeed, so long as large battleships are regarded as the foundations of naval power, it is not to be supposed that they would be exposed in this way to frequently recurring attack by small craft, especially when it is remembered that their presence would provide no extra protection to the convoy against such attack. The same may be said of large cruisers, since they, too, would be more of a target than a shield.

What of our smaller craft? Our patrol boats and all but three or four of our sloops would be of little value in this case, because they are more weakly armed than the average Italian destroyer. There remain our smaller cruisers and destroyers. These, however, are nothing like numerous enough to deal by themselves with the whole Italian submarine and surface navies, submarines, destroyers, small cruisers, large cruisers and battleships, even if we denuded the Channel and the Thames area of all light cruisers and destroyers, and threw in the battle fleet cruisers and destroyers as well.

What chance, therefore, is there of our maintaining our communications through the Mediterranean? If we ourselves were inhabiting Italy, we should undoubtedly feel confident enough of being able to stop the passage of enemy ships through the Mediterranean under these conditions. If we say that Italians could not do it, we would seem to be in danger of that under-valuation of a rival against which history provides many warnings. That is to say, if we were fighting alone, as postulated at the beginning of this chapter. But if we had France on our side? We should then have the benefit of the French bases, the French fleet, and above all the French shore-based aircraft in Algeria and Tunis. The latter territory flanks the dangerous Pantellaria

bottle-neck, and French air protection would thus be available for the British convoys as they passed through that perilous area. Would it be able to defeat the Italian air attacks? It has to be admitted that it probably would not. Aircraft with their high speed are particularly unsuitable for escorting the comparatively tortoise-like surface ship, and moreover a system of regular patrol involves a dissipation of strength that is likely to render the air escort inferior to a concentrated force of aircraft attacking at its own selected moment. The principle of "cover" is generally agreed to have only a fraction of the application in the air that it has on the surface, and the chances of air attack getting through seems to be greater than its chances of being intercepted. Surface defence, if added to air defence, might, of course, make the difference. The question is whether the addition of the French to the British surface forces, together with the use of the French bases and the co-operation of the French aircraft, would enable the combined fleets to dominate a sea area that we have previously decided that the British forces could not command alone. That question can be simplified down to an Anglo-French surface superiority on the one hand versus a great Italian advantage of position on the other; and what the answer would be, if the

Italians played their hand properly, it seems injudicious to hazard.

French naval and air co-operation therefore might or might not prove the turning-point in the maintenance of our Mediterranean communications. If it did not, then we should perforce have to consider alternatives. If it did, we may be fairly sure that it would only be forthcoming at a price. What price we may be prepared to pay for that co-operation will depend on what importance we attach to the preservation of the Mediterranean route for our shipping. Ministers, and notably Mr. Eden, have frequently referred to it as vital to our Imperial security. Only a short time ago, a distinguished admiral, in a letter to me, said that if we lost the use of the Suez Canal it would be "good-bye to the Empire." Was he right? Let us take a quick look round the Empire. Canada obviously is quite indifferent to the Suez route. South Africa? The same there. Australia and New Zealand? The voyage from London to Melbourne via the Cape is only 1,400 miles longer than by the Canal. In the very difficult convoy conditions in the Mediterranean that we have envisaged, a general convoy delay of a fortnight for that section of the route cannot be thought excessive; which at 12 knots means an addition of 4,000 miles to the journey. The unconvoyed Cape route to

Melbourne would therefore be virtually 2,500 miles shorter than the convoyed route via the Canal. None of the Dominions therefore seems to be affected seriously, if at all. In fact, for Australia and New Zealand, it would seem actually to pay us to discard the Mediterranean route in the event of hostilities in that sea.

The cases of the Straits Settlements and India are more difficult. The voyage to Bombay, for instance, is increased from 6,000 odd miles by Suez to 10,000 odd miles by the Cape, though if we add the convoy delay in the Mediterranean the difference becomes a good deal less. Of course, were India to be attacked, succour would certainly take a long time to reach her by the Cape. But India has a very large garrison of her own, and in any case it could hardly be threatened until the Straits Settlements, and Singapore with them, had been reduced; and reinforcements from England for Singapore would take so long to arrive in any case that we may well ask whether an adequate naval force on the spot is not the only solution to that problem. That question is considered in a later chapter. With these exceptions, the Suez route does not seem so really vital to the Empire after all.

How would the interruption of our Mediterranean communications affect our interests in the Mediterranean itself? Malta's concern will be

much more with Italian air attack than maritime communications. Of Egypt there is no need to say much. Its importance to us is bound up with the Canal itself. Palestine? The British people would no doubt be reluctant to leave their Palestinian experiment in the air; but if the Pantellaria channel should prove impassable, in the air it would very largely have to be left, though the Red Sea and Suez Canal offer a possible alternative approach. The carriage of oil westward from the Haifa pipe-line would also be cut short. I have seen it authoritatively stated that the value of this oil supply to the Navy is so great that we must at all costs maintain a British fleet in the Eastern Mediterranean to preserve it inviolate; and that for this purpose a new naval base east of Malta, preferably in Cyprus, is necessary in case the former place were to prove untenable. Apart from the fact that the construction of a new base would cost a good many millions, we may usefully ask ourselves what is the main purpose of the oil supply to the Navy's oil-fired boilers. The answer is (and it has been given many times by official spokesmen) that oil firing for the Navy gives it greater speed, greater endurance, and greater freedom of action than coal or dual firing. But if the protection of this oil supply demands the presence of the fleet or a substantial portion of it in the Eastern

Mediterranean, it follows that the very agent that was to give the fleet its freedom has succeeded in chaining it securely to the cul-de-sac of the Levant. This is a contradictory position that calls plainly for rectification.

Finally, there is the prestige question, beloved particularly of the Foreign Office. If we were to lose the use of the Mediterranean, would not our prestige in the Near East and India and Africa be seriously affected? No doubt it would be affected, but how seriously or how long is another matter. The truth is that prestige is an elusive and unpredictable benefit which is determined by many factors, and by no means only by the power to sail ships through a particular area. We abandoned the Mediterranean without visible disaster in 1796, and if we suffered loss of prestige it was partially repaired by two naval victories outside the Mediterranean in 1797, St. Vincent and Camperdown; while it was not only fully restored but brought to hitherto undreamt-of heights by the return of Nelson's squadron to the Mediterranean and his victory of the Nile in 1798. Loss of prestige was the one great argument pressed against the evacuation of Gallipoli, but no one would now claim that whatever we may have lost in that respect could have justified our further expenditure of life and money on an unsuccessful enterprise. Prestige is indeed

an unstable counsellor and the nation that prefers its guidance to that of the hard facts of its military position will become a prey to vague and intangible fears that may well lead it from one strategical indiscretion to another.

Our survey of the Empire does not, in fact, seem to confirm the foreboding that the severance of our Mediterranean communications in a war with Italy would bring the Imperial edifice tumbling to the ground, and suggests that we are justified in taking a reasonably matter-of-fact view of the price we should be prepared to pay to France for her help in keeping them intact. For instance, were that price to involve the military defence of the French frontier, we might well conclude that it was too high. If so, then we should frankly face the possibility that in a war against Italy, we *might* not be able to keep the Mediterranean route open, just as we could not keep the Baltic route open in the last war. We need not, however, allow that reflection unduly to alarm us. For if ever two countries had every reason to avoid coming to blows it is Italy and ourselves. If she can hurt us by closing to us the Suez route to the East, we can wound her just as severely in return. With a naval force working from Aden or Port Sudan we could cut her communications with her new Colony of Abyssinia. We could close both the Western

gate for her commerce at Gibraltar and the Eastern gate at Aden. By so doing we could stifle her oceanic trade. In the Mediterranean itself our men-of-war and especially our submarines would not be inactive; while if our ships had the use of the French ports, larger scale operations could be undertaken in conjunction with the French Navy that should make Italy exceedingly uncomfortable in her own waters and should sever her communications with Libya, while leaving her East African possessions open to attack from India. Such offensive operations would only be possible if our naval forces were freed from the encumbrance of defending or trying to defend the British mercantile communications to Suez.

Italy has far too much to lose from British hostility to want to incur it lightly, and the fact that both countries now have colonial communications running through the Suez Canal gives them an excellent reason for being friends rather than enemies.

CHAPTER IX

OCEANIC COMMUNICATIONS

FINALLY, there are the deep sea routes which traverse oceanic regions well clear of enemy or friendly coastal air zones. With these may be bracketed the coastal areas adjoining what will probably be neutral territory, such as Brazil or the Argentine. In these oceanic areas and neutral coastal regions, surface and submarine vessels will be the governing factors.

It is common to read in reports of official utterances that this country needs so many cruisers for the defence of its trade on the oceanic routes, the large number required being due to the great length of the Imperial communications. The ordinary member of the public might well conclude from such statements that trade defence on these routes is a matter of cruisers only, and patrolling cruisers at that. The claim that the length of the communications determines the number of ships necessary suggests that our requirements in this respect are a matter of linear measure ; that the trade routes would be

more or less divided up into sections, and that in each section a cruiser would keep guard.

That conception of the problem, though it is the natural deduction from the usual Admiralty statements on the subject, cannot be the correct one. For one of the clearest lessons of the war was the ineffectiveness of the cruising or patrolling system of protecting trade. The chase of such ships as the *Emden* by patrolling cruisers became a wild goose chase, with the patrolling ships always one move behind in the game. The superiority, both in protection value and in economy of force, of convoy over patrolling was demonstrated time after time and was finally established beyond doubt during the German submarine campaign.

A truer computation of the number of trade protection cruisers required would go somewhat as follows. It would first of all be necessary, in the circumstances of any particular war, to decide in what areas of the world convoy would be necessary. In these areas, trade cruisers would have to be allocated according to the number of convoys to be dealt with, and not to the length of the convoy route. In areas where convoy was not in force, cruisers might not be necessary at all; or perhaps some might be kept ready there in case convoy had to be extended to that region at short notice. In either case, the number of

cruisers required would necessarily vary to some extent with the strength and vigour of the enemy attack.

Can we, on this basis, make an accurate calculation of the number of cruisers required. The official figure of 70¹ has been in force for a good number of years. Admiral Sir Herbert Richmond, in his recent book *The Navy*, has placed the number at 86.¹ It does not seem, however, that anything more than a tentative approximation is possible, since the cruiser force required to be allocated to trade duty must depend on who is the enemy, the naval strength of that enemy at the moment, and the general trade route policy ; such, for example, as whether or not the Mediterranean is regarded as being open, and for what areas convoy would be probable. If the last war can give us any guidance, we find that at the end of 1917, there were a little over 100 cruisers or similar vessels on convoy escort duty or acting as police garrison on distant stations.

It will be noted that the word "cruiser" has so far been employed to indicate the type of vessel that would be mainly required for trade protection on the oceanic routes. This is in

¹Both these figures include an allowance for fleet cruisers, which may be taken as being in the region of 20. The trade element is therefore 50 and 66 respectively.

accordance with official usage, the term cruiser being the one invariably used by the Admiralty in connection with the general problem of oceanic trade defence. In thus placing reliance on the cruiser for the protection of commerce on the High Seas, the official mind is no doubt dwelling on the circumstances of the last war, in which convoys were usually given an "ocean escort" of a cruiser or an armed merchantman to accompany them during their voyage. Can we be sure, however, that this arrangement, even if it was suitable in the last war, will be equally applicable in the next?

The use of cruisers or their equivalent for ocean escort duty worked well enough in the last war, but it has to be remembered that the system was never challenged. It was a constant expectation on our part that the Germans would send a battle cruiser out on to the trade routes to attack shipping. Had they done so, the cruiser escorts with the convoys must have proved broken reeds, for they could not have stood up against the attack. Cruisers, in fact, are only useful as protection against similar cruisers or smaller vessels. Against larger cruisers or capital ships they could offer no effective resistance. It has hitherto always been the rule that, whatever the scale of attack, the defence must be on a corresponding scale. That is to say, if battleship attack is to be

anticipated, battleship defence must be provided. That was certainly the procedure followed in regard to the Scandinavian convoys in the last war, where eventually divisions of battleships formed the escort. The same procedure was frequently followed in the old wars of the sailing era, it being a common occurrence for line-of-battleships to be included in the escorts given to convoys.

It follows that a cruiser can only be regarded as the proper escort for a convoy so long as nothing larger than that cruiser attacks it. Can we be certain that in the next war nothing more than cruiser attack is to be apprehended on the ocean trade routes? There is no reason why we should allow ourselves to think so, or to dismiss the possibility that a more serious form of attack may be made. That possibility was certainly present to the mind of the naval correspondent of the *Times* when he recently wrote that. . .

“Another form of departure from treaty limits would be to build ‘super-cruisers’—ships exceeding the 10,000 tons and 8-inch gun limits of the treaty, but falling within the ‘non-construction zone,’ and thus not reaching the size or cost of battleships. The super-cruiser could play havoc with any convoy not protected by a battleship. . . .”

If that can be said of "super-cruiser" attack, it applies even more forcibly to attack by battle-cruiser or battleship. Following the traditional rule, therefore, we seem to be presented with the possible necessity of providing battleship escort for our oceanic trade in the next war, in the same way as we often have in the past. But while the necessity may be the same as on many past occasions, the means of satisfying it have unfortunately diminished. We have now only 15 capital ships all told, with another five to be added when the existing programmes are completed. These capital ships are officially regarded as the main citadel of our naval strength, and on the supremacy of the battle fleet containing these capital ships the fate of the Empire is held to depend. How then can we possibly contemplate disintegrating this battle fleet and scattering its units over the trade routes of the world? To do so would be to invite its destruction in detail at the hands of more concentrated bodies of enemy ships. Even, however, if we were free thus to disperse our capital ships on escort duty, their number is quite inadequate for the purpose. A world-wide trade of 7,000 ships is not to be given protection by 15 or 20 units. Battleship escort to trade is nowadays obviously impracticable as a general strategical measure.

In that case, it may be asked, how was it a

practicable undertaking in the old days? The answer is that the very much larger numbers of battleships of former times made all the difference. In the year of Trafalgar, for instance, British line-of-battleships numbered 120, eight times as many as we have now. This comfortable total certainly left a reasonable margin over for trade protection after the demands of the battle fleet had been fully met. In the last war the number had fallen to under half, Beatty having no more than 46 capital ships (including the American ships) at his disposal at the time of the inauguration of the battleship escorts for the Scandinavian convoys. The very much smaller number of capital ships in 1917 compared with 1805 had already begun to make our admirals restive about detaching any of them for trade duty. Early in 1918 we find Admiral Beatty complaining to the Admiralty that he had not enough ships to protect the Scandinavian convoys and fight the High Seas Fleet at the same time. Now that the number of our capital ships has still further declined to a third of what Beatty had 21 years ago, the difficulty of persuading a naval Commander-in-Chief to relinquish any of his precious 15 for trade escort duty will certainly have doubled.

What then can we do? Can we build up our capital ship fleet to the numerical level of Nelsonian days; or even of Beatty's time? There is not the

slightest chance of the former and very little of the latter. With the unfortunate tendency of capital ships to get more and more enormous, till their cost has now reached the forbidding figure of £11,000,000 apiece, the possibility of producing them in large numbers has more or less disappeared. The conclusion therefore seems unavoidable, that while there is nothing to stop a possible enemy sending off one or more of his capital ships to raid our shipping on the ocean trade routes, it has become virtually impossible for us to utilise our own capital ships in order to protect them.

Does this mean that our trade on the oceanic routes cannot be protected? It is no use expecting a convoy cruiser to stand up to a raiding battle-cruiser or battleship. And if our own battleships or battle-cruisers cannot be there to do it, must we therefore conclude that the use of enemy capital ships in the direct attack on our trade is bound to cut it to pieces? Not necessarily; but it does mean that we shall have to devise new means of protecting it.

In devising these means, can we not make use of that moral factor which we have already observed to have exerted such a powerful influence on the actions of our own big ships in the last war? We have noticed the very great dread felt by the capital ship for the submarine. We might

therefore utilise that dread for our own purposes. If we cannot provide a battleship for each convoy, there is nothing to prevent us providing two or three submarines. If it were known that our convoys were liable to have submarines stationed a couple of miles or so away on one or two likely bearings of enemy approach, a raiding battleship or large cruiser would have the uncomfortable knowledge that in order to attack the convoy it must automatically bring itself within close reach of submarine attack. It will be strange if that knowledge is without its effect on the big and valuable attacker, and on the authorities that may be wondering whether to expose it to the risk.

With this possibility in mind of utilising moral effect, let us make a re-survey of the problem of the protection of a convoy. Attack on oceanic convoys may be of three kinds ; surface, submarine, or air. Against submarine attack, a number of small craft are the best protection. That was proved clearly by the last war and need not be re-argued. Surface attack may be either by large or small ships. Against large-ship attack, we have argued that submarine escort might prove a useful deterrent ; in which case it should be noted that the larger the attacking ship, the greater the deterrent effect of the submarine must be.

This deterrent effect could be intensified by the additional use of aircraft. These could be carried

with a convoy either in an aircraft carrier, or in the ships of the escort, or in the ships of the convoy themselves. Carriers being even more scarce than capital ships, only a very small fraction of convoys could be given carrier escort. Aircraft could be carried easily enough in one or more of the ships of the escort, but it would mean that they would have to be cruisers at least, it being not yet practicable for aircraft to be carried in destroyers or sloops. Alternatively, a certain number of merchant ships on any particular run might be fitted with an aircraft and catapult on the poop or elsewhere in the ship, the routing organisation being so arranged that every convoy contained one or more of such ships. Torpedo-bomber attack on a raiding big ship could thus be added to submarine and perhaps surface torpedo attack.

Against small-ship attack, either by light cruiser, destroyer or sloop, the deterrent effect of submarine and aircraft will be small. This form of attack calls for surface defence and the choice might well lie between a cruiser and three or four destroyers or sloops. As between our present destroyers and sloops, the decision must go to the destroyers, for they are not only the better gun-vessels, but they also carry the torpedoes that would be useful in the event of big-ship attack. The fact is our sloops are neither one thing nor the

other. Most of them are too weak to engage a destroyer and almost too slow to deal with a submarine, while to a raiding cruiser or bigger ship they would present little trouble. Destroyers, on the other hand, being fast and armed with torpedoes, could not be ignored by a raider of whatever size, while in combinations of three or more they might well be a match for a single cruiser.

Air attack on an oceanic convoy must come either from carrier aircraft or those few carried by a raiding cruiser. Defence by gunfire, so far as it might be effective, calls for a number of anti-aircraft gun-vessels stationed round a convoy, so as to cover the principal directions of aircraft approach, the object being to keep aircraft high, even if they could not be kept off altogether. One single convoy cruiser would leave too many vulnerable points unguarded. This numerical inadequacy of cruisers applies particularly to the three or four special anti-aircraft cruisers into which our older cruisers are being converted. Valuable as these ships might be for the protection of convoys, they are far too few in number to be a serious factor in oceanic trade defence. Nor is the anti-aircraft arming of the merchant ships themselves likely to be of much value, for anti-aircraft gunnery is the most difficult form of the ballistic art. The best chance seems to lie with the fire from small-ship escorts.

Counter-attack by aircraft is a possibility, and here again, catapult aircraft installed in the merchant ships themselves would appear the best combination, for the same general reasons as those advanced on page 128.

Summing up, we get the following results for the most promising forms of defence of oceanic convoys. Against attack by capital ship and large cruisers, submarines and aircraft carried in some of the ships of the convoy, together with torpedoes in the surface escort. Against light surface-craft attack, an escort of three or four destroyers. Against submarines, six or more destroyers or sloops. Against ship-borne aircraft, anti-aircraft fire from at least three escorts, and merchant-ship aircraft. Balancing up these demands we arrive at the final conclusion of submarines, aircraft in ships of the convoy, and three or four destroyers, with an addition to the anti-submarine escort when passing through specially dangerous waters.

I use the term "sloop" rather than the title "escort vessel" recently coined by the Admiralty. The latter, as a description of the sloop class, seems singularly maladroit; for escort vessels are in fact liable to be anything from battleships to submarines. To bestow the function name on one out of six or seven classes of ship liable to do the duty seems unnecessarily confusing.

CHAPTER X

THE FUTURE OF THE BIG SHIP

THE examination that we have just completed of the forms that the control of the sea highways in the next war is likely to take seems to produce certain inferences regarding the proper types of warship required to exercise that control. Of these inferences, none seems more unmistakable than that concerning the great ships. In our survey of invasion, of trade defence, of submarine and aerial warfare, we have been constantly noting the diminished importance of the large, heavily-gunned, heavily-armoured capital ship. In defence against invasion, it is now faced with the competition of submarines, aircraft and torpedo craft. It is very doubtful if it will ever again act in close support of an invasion, on account of the great risks to itself from mines, submarines, aircraft and surface torpedo craft that such support must involve. In defence of trade, either in Home waters, in the Mediterranean, or in more open waters, we have seen that it appears unlikely to play any direct part.

The causes of its limited and diminishing utility are not far to seek. They lie in the modern capital ship's great size and therefore enormous cost. Battleships that have reached the tonnage of 40,000 and have come to cost over £10,000,000 each, have become so expensive that the nations can afford to possess a very few of them only. The more scarce and costly they are, however, the more valuable they will appear in the estimation of their possessors, and the greater disinclination there will be to expose them to avoidable risk. If the responsible authorities believe that the security of the Empire resides in fifteen battle units it would not be surprising that they should weigh very carefully every hazard to which those fifteen precious units may be subjected. The result is an increasing tendency to think more of preserving the great ship from damage than of using her to damage the enemy. A study of Naval Estimate speeches of recent years reveals an official attitude towards the battleship that is concerned chiefly for her safety ; an attitude that expresses itself in the questions—can she stand up to the heavy shell ; to the air bomb ; to the torpedo ? Moreover, this attitude of defensive solicitude is undoubtedly driving its roots farther and farther into the naval soil. A recent paper on the functions of the battleship by a naval Lieutenant-Commander published in the *Journal of the Royal*

United Service Institution opened with these significant words :

“ The *first essential*¹ of the battleship is that it shall be able to withstand all forms of attack, whether from the sea, the air, or the land.”

There is only too much reason to fear that there is a growing tendency to think of the battleship in terms of “ can we keep her safe ? ” rather than of “ can she sink the enemy ? ”

This preservative attitude of mind towards the great ship is further exemplified in the very heavy overhead charges now attaching to the battleship in the shape of the various kinds of protective vessels with which it is increasingly surrounding itself. Modern battleships will not venture to sea without a crowd of destroyers to shield them from the submarine, without anti-aircraft cruisers to shield them from the airplane, without cruisers to guard them from the destroyer, without aircraft carriers to furnish it with fighter patrols. All this auxiliary tonnage presents a formidable proportion of the total battle-strength. Our present fifteen capital ships, aggregating 480,000 tons, would probably require an auxiliary array of fifteen cruisers, fifty destroyers, four anti-aircraft cruisers and three carriers, totalling 280,000 tons. This proportion of 37 per cent.

¹My italics.

auxiliary to 63 per cent. of capital ship tonnage may be compared with the 8 and 92 per cent. of frigate and line-of-battle ship tonnage with which Nelson sailed into action at Trafalgar. We noted in Chapter II the very marked tendency that existed in the last war to preserve our battleships from damage, though we possessed a comfortable superiority in them. With the acceptance since the war of the one-power standard, the considerable decline in numbers from those of the last war, and the emergence of a new hazard in the shape of the air menace, the tendency to nurse them is unlikely to have grown any weaker.

The curious thing is that these great ships which more and more thought is being given to guard from harm are still spoken of as the most powerful and indispensable fighting ships afloat. Yet by this and most other tests, their ancient supremacy seems to be no longer what it was; for there are at least two classes of war vessel, the submarine and the airplane, that are more of a menace to the great ship than the great ship is to them. Why then do we continue to profess such unswerving faith in the big ship's dominance? An answer often given is that since every other important naval power is also convinced of the value of the large capital ship our own Admiralty's adherence to the same doctrine receives ample confirmation. But if the main

justification for the British Admiralty's faith in 40,000-ton battleships is that the American, Japanese, German, French and Italian Admiralties profess the same faith, how can we be sure that, for instance, the American policy is not determined by the apparent conviction of the British, French, Italian, German and Japanese: and so on round the circle? The game of follow-my-leader is no new one in naval policy, as is shown by this extract from the report of our own Committee on the Design of Warships, which sat in 1871:

“ a *simple* and perhaps, under ordinary circumstances, a *safe* method by which the requirements of the British Navy may from time to time be estimated, is to watch carefully the progress of other nations in designing and constructing ships of war, and to take care that our own fleet shall be more than equal both in number and power of its ships to that actually at the disposal of any other nation.”¹

The fact that all the maritime nations are building huge ships does not alter the fact that their utility has been steadily declining. They can at the present time take very little part in the defence of trade or the protection of overseas military expeditions by reason partly of their

¹My italics.

great vulnerability to underwater attack and partly of the extreme fewness of their number, due to their prohibitive cost. Their function has practically been reduced to that of watching the movements of the corresponding great ships of an enemy and bringing them to action if they offer an opportunity for doing so.

In view of this severe limitation on their value, the question must arise whether this their last remaining function of fighting the opposing battle fleet could not also be taken over by the smaller vessels on which all the other functions of the battleships seem now to have devolved. If they could, the final justification for the construction of the great ships will have dissolved. In short, cannot small size and large numbers form an efficient substitute for large size and small numbers? In examining this possibility, do not let us make the mistake of thinking that the question at issue is the abolition of the battleship. As is often and very truly said, the battleship is an indispensable instrument of naval power. Yes, but the point is, what size of battleship? The battleship is but the largest class of surface warship that a country possesses, provided it can out-fight the average merchant ship and keep the seas in all weathers. So long as it can satisfy these conditions, a warship is as much a battleship if it is of fifteen hundred tons as of forty-five thousand.

Let us therefore examine the possibility of substituting much smaller vessels for the present great ship for battle as well as for other purposes. First of all, how much smaller vessels shall we consider? Shall we take lesser battleships of, say, 25,000 tons, or armoured ships of 10,000 tons, or something smaller even than that? There are two reasons for going as low as possible on the scale. The first is that it is the smallest ocean-going vessels of all that have been increasing in importance for control purposes; for defence of trade and for defence against invasion. The second is that the present-day unhealthy regard for the protection and security of the great ship comes from its comparative scarcity. Battleships are now so valuable that the loss of even one of them (*e.g.*, *Audacious*) is regarded as a disaster that must be concealed at all costs. The consequence is that considerations of their armour protection and general preservation from harm come to occupy excessive attention. The proper fighting frame of mind is unlikely to be recovered until the question of "protecting" a fighting ship has ceased to be a matter of great concern; and that can hardly occur until on the one hand fighting ships have become so small that serious armouring is impracticable, and on the other hand that they have become so numerous that possible losses among them can be regarded

as part of the natural and not very grievous concomitant of battle. These considerations point to the destroyer or small cruiser (the same thing) as the first object of our investigation. We may therefore select the destroyer class for our test, this being about the smallest class that embodies the qualities postulated above.

The new 40,000-ton battleships we are understood to be on the point of laying down are stated to cost £11,000,000 each. This capital outlay is represented by an annual interest charge (at 3 per cent.) of £330,000 a year. There are no annual upkeep figures available for such ships yet, to include such items as the pay of the crew, refit costs, fuel, upkeep and maintenance charges. Thirteen years ago, the corresponding figures for the 35,000-ton *Rodney* were stated in Parliament¹ to be £430,000 annually. Allowing for the one-seventh larger size of the new ships we get £490,000 for them. The total cost of a 40,000-ton battleship is therefore represented by an annual charge of £820,000.

The modern destroyer, on the other hand, costs £320,000 to build, which again is represented by an annual charge of £9,000. I have been unable to find official figures for its annual maintenance charges, but *Jane's Fighting Ships* gives the sum of £41,000 for the destroyers of the E class

¹ *Hansard* for August 5th, 1925.

which were first commissioned in 1935. The cost of one destroyer to the country may therefore be given as £50,000 per annum. It follows, therefore, that we could have 16 destroyers for the same financial outlay as one battleship of 40,000 tons. For a fleet of, say, ten such battleships, therefore, a number that we are quite likely to be building in the next decade, we could instead have a mass of 160 destroyers. The comparison would not, of course, be between 160 destroyers and 10 battleships, because the battleships would infallibly have an auxiliary fleet of, say, 12 cruisers, 40 destroyers, four anti-aircraft cruisers and two or three carriers with them for general protective purposes. We must therefore add a corresponding equivalent force of destroyers. This would mean about 115 additional ships. The final comparison would therefore be between a mixed force of 10 battleships, with cruisers and destroyers, and a body of 275 destroyers, or 260 odd if we give the latter a couple of carriers of their own.

What sort of chance would the cloud of smaller vessels have against the much fewer number of greatly larger ones? If the smaller ones were handled with skill and with due regard to the tactics most suitable to their own particular powers and characteristics they should present a very awkward problem for the battleships.

Though battleships can now be given high speed, it can be taken that small and light vessels such as destroyers can generally be given a higher one, and they will besides be handier and quicker to gain their speed than the great ships. The light craft should also be able to make valuable use of the tactical adjunct of funnel smoke, an expedient that, though it is difficult to utilise with advantage in the heavy-gun duel and has therefore received only meagre consideration in our own fleet, ought to be capable of considerable exploitation in connection with high-speed torpedo attack. That such a possibility has not escaped the notice of foreigners is shown by this extract from a letter written to the *Daily Telegraph* by a Frenchman, M. Gautreau, who spoke of "our 30-odd super-destroyers of 2,400-3,000 tons and 36 to 45 knots speed, for the utilisation of which special tactics have been successfully elaborated. Let it be sufficient to say that in these times of artificial clouds and limited visibility, without speaking of night warfare, projectile-like vessels propelled at over 40 knots and ready to launch salvos of six or eight torpedoes of 22 in. diameter, might make their meeting disastrous for the largest and best-protected target."

It is clear, in fact, that a reliance on small ships instead of big ones would demand the working out of tactical methods appropriate to their small

size ; and these methods would not necessarily be those of our present-day flotillas. The latter's tactical technique has not been allowed to develop independently, but has for years been subordinated to the requirements of the battleships' gun duel. Destroyers have not been able to attack when it suited them best as destroyers, but when the battleships wanted them to. How cramped and subservient has been their rôle is well illustrated by Jellicoe's handling of his destroyers on the night of Jutland. Every consideration of destroyer tactics called for their being sent out to find and attack the High Seas Fleet during the dark hours. Instead, Jellicoe tied them to the rear of his own battleships, presumably to afford the latter extra protection from enemy destroyer attack.

Let us therefore picture an encounter between a fleet of 260 odd destroyers and the composite force of battleships, cruisers and destroyers that would be its financial equivalent. One part of the destroyer fleet might be told off to deal with the cruisers and destroyers of the enemy. There are many destroyer officers who would cheerfully engage one cruiser with a division of four destroyers. The 12 cruisers and 40 destroyers of the orthodox fleet would therefore require the attention of 100 of the destroyers of the unorthodox. This would leave 160 to deal exclusively

with the battleships, in which they could rely on their high speed, on their large numbers making it difficult for the battleships to fire at more than a few of them at a time, and on the use of smoke.

Alternatively, they might hold off at long range during the day with a view to exploiting the destroyer's greatest friend, the darkness of the night. The battleship admiral who found that the dense masses of enemy torpedo craft were keeping at arm's-length and refusing action during the day would hardly anticipate the approach of night without serious misgiving. Still more anxious would he be likely to feel if the enemy had spent the daylight hours picking off, by virtue of their greatly superior numbers, his own destroyers and cruisers, who if they were to guard him effectively would have to be disposed as outposts some miles away from the capital ships. To see his scarce and costly battleships being gradually denuded of those protecting light craft on which the great ships have come so heavily to rely must increase the anxieties of the battleship admiral twenty-fold, and might very easily induce him to abandon his enterprise and return to harbour.

It seems, in fact, that a reversion to small size and large numbers would open up possibilities of the use of skill and ingenuity in naval tactics

that has largely departed from the present-day slogging match of the great battleships. Certain it is that Jellicoe's tactical policy in the last war was one in which anything in the nature of tactical finesse was reduced almost to vanishing point. He had decided that if the enemy turned away he would not follow. He had announced that he was opposed to action on opposite courses, that he would not stand up to enemy destroyer attacks, and that he would avoid a night action. He would, in fact, only fight in daylight, and only then if the enemy would obligingly steam along on a parallel course at a convenient range and allow himself to be destroyed by superior gun-power, without making any endeavour to redress the balance by the use of underwater weapons. The tactical conception was that of the battering-ram only and it credited the enemy with neither intelligence nor even the ordinary instincts of self-preservation.

It might perhaps be argued that even to contemplate the use of delaying tactics for the small ships such as have been envisaged here would be to disregard the Nelsonian tradition of close action as rapidly as possible. It would be a mistake, however, to regard Nelson as the advocate of mere blind attack. We should remember that two out of three of his victories were fought at anchor, and that his tactics at Trafalgar

were based on a belief in the Allied Fleet's inefficiency and on a conviction that to close with a Frenchman was the way to beat him. That his mind was far from shut to the subtleties of skilful tactics can be seen from his well-known dictum, "Close with a Frenchman, but outmanœuvre a Russian." Even against a Frenchman the immediate mêlée was not always his aim. "Do not be surprised," he said to his captains during the chase after Villeneuve from the West Indies, "if I do not fall upon them immediately. We won't part without a fight."

We have, moreover, in this matter the example of another great sea warrior, Sir Francis Drake. The tactics employed by the British Fleet against the Spanish Armada were almost exactly those implicit in Nelson's last-quoted intention of selecting the right moment and the right manner to attack. The British ships in 1588 were generally smaller and less well-manned than the Spanish. Howard and Drake did not therefore rush into close action. They held off on the outskirts and maintained a harassing action with the Armada during its passage up the Channel. Then when it had anchored at Calais, they launched the equivalent of the night destroyer attack—they sent in the fireships. And the moral effect of that attack was too much for the Spaniards. They cut their cables and fled.

It therefore seems by no means impossible to regard a large number of small ships, *provided they employ tactics appropriate to their kind*, as capable of successfully giving battle to a small number of large ones. And if so, it must follow that it is within the power of the destroyer, which has already usurped more than one of the functions formerly held by the battleship, to perform also the latter's last remaining one of giving battle to the enemy's battle fleet. And that is speaking of the battle between the surface forces only, without counting possible air participation. If we introduce aircraft into the battle, whether as shore-based or as carrier aircraft, the destroyer fleet's chances would even be improved. While the large, few and unwieldy battleships form good aircraft targets, the numerous, small, and very swift and handy destroyers present comparatively poor ones. The smallness of the individual destroyer target and the embarrassing multiplicity of those targets from the point of view of the attacking airman constitute in fact the destroyer's best defence against air attack. That being so, the task of any carrier aircraft that might be at the disposal of the destroyer admiral would be greatly simplified; for he would need to waste no thought on the defence of his own surface craft, but could devote his whole energies to the attack on the enemy's.

In thus marshalling the relative merits of the small and large ships, it has not been forgotten that bad weather hampers the small ship more than the big one. It takes, however, more than usually bad weather to embarrass the modern destroyer ; besides which, bad weather does not last indefinitely, and it would be open to a destroyer fleet to hold off till it moderated.

Whatever may be said by the upholders of large battleships in their favour, it is difficult to know what active part they are likely to play in a war against either Germany or Italy. Germany having accepted the one-third ratio with us, it is hard to see what else our own battleships would do in a German war but sit in harbour and wait for some movement by the German battleships which would probably have no intention of making any movement at all. Against Italy, as we have seen in our consideration of trade defence in the Mediterranean in Chapter VIII, the battleship's scope would be almost equally circumscribed. Indeed, it was an open secret among the officers of the Mediterranean Fleet during the Abyssinian crisis that the question that our Commander-in-Chief found the most puzzling was what to do with his capital ships.

The adoption of small and light ships of the general characteristics of destroyers as the battle-

ships of the Navy, in place of the present huge, heavily-gunned, heavily-armoured leviathans, would have a number of important advantages. It would almost eliminate the menace of submarine and destroyer attack which loomed so large in the minds of battleship admirals in the last war. The destroyer has naturally no particular reason to fear its fellow-destroyer and it knows that the submarine would rather avoid than attack it. In the same way, the air menace that looms almost as largely in the minds of our present-day battleship admirals would be greatly reduced, by reason of the exceedingly unpromising nature of the new target.

The problem of naval bases would also be very considerably eased. As explained in a previous chapter, no admiral will willingly use a base open to constant air attack by enemy shore-based aircraft. Especially reluctant will he be to expose his few and valuable capital ships to such attack. As the range of aircraft increases, therefore, there will be a natural desire to seek naval bases farther and farther away from enemy territory. Such a process has, however, its limitations ; for unless a fleet base is reasonably close to the area in which the fleet will have to operate, the latter cannot do its work in that area. It may be doubted whether that limitation was fully present to the mind of Sir Samuel Hoare when he touched on the

question of bases in introducing the 1937 Naval Estimates. "While certain bases," he said, "are more convenient to the fleet than other bases, there is no single base that is absolutely indispensable, and if the worst came to the worst, we could transfer our operations from one base to one of the many other bases in which this country and the Empire are so rich." The implication seems clear enough. If the fleet could not stay in England, it could go to Scotland. If Scotland became bombable, it would go on to Ireland, and then, shall we say, to Bermuda. No doubt it would be safe enough at Bermuda, but from there it would afford no protection whatever to the British Isles. I am sorry to keep on tilting at Sir Samuel Hoare, but I fear his solution to the naval base problem is altogether too facile.

The fact is that the point has practically been reached already when warships cannot enjoy immunity from air attack in their bases if they are to perform their proper functions; in which case they will be faced with the alternative of admitting that they can no longer discharge those functions, or of finding some way of discounting the air menace to fleets in harbour. A reliance on small ships instead of big ones would unquestionably contribute towards the satisfactory solution of this dilemma. The possi-

bility of air attack doing decisive damage to a fleet in harbour becomes progressively less with the decrease in the size of the ship and the increase in its numbers. It also becomes less in proportion to the number of bases in use. That again is where the small ship has the advantage. It was all very well for Sir Samuel Hoare to talk about the country being so rich in naval bases. So it is, but not in big ship bases. Not only in Britain but in the world, the problem of bases suitable for present-day battleships is known by every naval officer to be a very difficult one, by reason of the great size and deep draught of the ships. Against Germany, there are only three practicable big ship bases: Rosyth, Cromarty and Scapa, all a long way north. A destroyer fleet could use these and many others as well, and could come much farther south; to the Tyne, the Humber, Harwich, the Medway, and Dover.

Perhaps, however, the most beneficial result of a drastic reduction in size and increase in numbers would be the freeing of the naval officer's mind from thoughts of protection and the avoidance of damage. Since the first iron plate was screwed on to the side of one of our old wooden walls, naval officers have been increasingly concerned with armour and other protection for their ships. The notion of a "balanced ship" is nowadays one in which offence and protection are nicely

adjusted. When ships are so small, however, that the enemy's shells cannot be kept out, it becomes possible to think of a "balance" in terms of weapons. The larger the ship, the greater the influence of the underwater and aerial weapons relative to the gun, and *vice versa*. Large numbers of small craft would be needed to wrest the sovereignty away from the great ship. Once that issue had been settled, and all nations had reduced their battleships down to the size of destroyers, the gun would rise in importance and there would then be a natural tendency for it to increase in size and carry the ship with it on the upward trend again. This process would go on until a true "balance" had been struck between the gun and the other weapons; which should occur when ships had so increased in size and scarcity as just to induce doubts about exposing them to underwater and air attack. This balance I should judge to be reached somewhere about the 3,000-ton mark. Any increase by one nation above the "balance" mark (at whatever tonnage it might be) would make it worth its rival's while to decrease size with an accompanying increase of numbers.

The balance between offence and defence, on the other hand, leads to great size, and great size leads to a cautious attitude of mind. It is not difficult to picture the change that would come

over the mentality of our generals if their army consisted of 15 men, replaceable only after two or three years. That army analogy may indeed be a useful one. The increase in weapon power on land has destroyed the value of the old mass-attack and has caused the mass to be broken up into many fragments. May not the increase of weapon power at sea demand the same thing ?

Are we, in fact, making the same mistake that we made in 1917 ? Faced with the novelty of the unrestricted submarine campaign against commerce, we sought to defeat that campaign by the weight of material output. It was by means of more guns, more depth charges, more air bombs, more indicator nets, more patrol vessels, more motor boats ; it was by a great multiplication of material resources that we tried to frustrate the German endeavour. And yet all the many, many millions we spent in these ways were spent unnecessarily, for all that was really wanted was an idea costing nothing—the introduction of convoy. Faced now with another novel problem, the greatly-increased menace of the air, superimposed on the existing menaces of the submarine and the destroyer and the minelayer, we are again trying to meet it by increased industrial output ; by more anti-aircraft guns, by special anti-aircraft cruisers, by horizontal armour, bigger battleships ; none of which the country is receiving

as free gifts. The general similarity to 1917 in the way we are meeting this new menace provokes the query whether we are not falling into the same general error in incurring once more great (and needless) expenditure on lavish material equipment, when all that is required is a change of system in the shape of a drastic reduction in the size of ships.

There is one final point to consider in connection with this question of size. If the destroyer policy is the right one, other nations would presumably follow us in adopting it; and in that case, should we be any better off? The answer must be, yes. The smaller ships are, the more quickly they can be built and in greater numbers. At a pinch destroyers can be turned out in six months. Battleships take much longer and the number of yards where they can be built are much fewer. A small ship policy makes possible, therefore, a much more rapid naval expansion in times of war or emergency than a policy based on 40,000-ton battleships. And since our shipbuilding resources are the greatest in the world, a small ship policy should enable us to extract the maximum benefit from our advantage in that respect.

CHAPTER XI

THE MERCHANT FLEET

FOR many years past this country has seen fit to follow an industrial economic policy that has resulted in the country being dependent on imported supplies of food and raw materials. This policy may add to the wealth of the nation, but it has certain grave disadvantages in wartime in that the stream of overseas trade on which the physical and industrial feeding of the country depends forms a highly-vulnerable element which demands constant and careful protection.

In the last war the German submarine attack on our commerce brought this point home to us very forcibly, for the shipping losses were such as to cause the authorities the greatest anxiety for the maintenance of our supplies. At that time we owned over 40 per cent. of the world's shipping. Moreover, the fact that the merchant tonnage of the world was almost wholly coal-fired enabled us to press no small amount of neutral tonnage into our service through our ability to apply bunker control.

Since the war, as is widely known, the problem of supplying this country has become steadily more difficult. British cargo tonnage (exclusive of tankers) has declined by 3,500,000 tons and the number of such ships by 2,000. The British percentage of the world's shipping has declined from the 44 per cent. of 1914 to 28 per cent. now. At the same time as the means of supply have been diminishing, the demands on that supply have been growing. A million acres of our agricultural land have been given over to the builder and the roadmaker, and another million have gone out of cultivation. Meanwhile, the population that requires feeding has gone up by four millions. In addition, the increasing use of oil as a propellant at sea has seriously reduced our power of recruiting the aid of neutral tonnage through the agency of bunker control. What is even worse, the conversion of half our own merchant tonnage to oil-firing has put that part of our own merchant fleet within the reach of the foreign bunker controller. Let us also remember that our naval strength has been cut down drastically since the Armistice, and that the small craft available for escorting convoys are now about 200 below what were found necessary in the last war.

The supply situation has now, therefore, the

appearance of being not merely worse but very much worse than in 1914, and in view of the straits to which we were reduced in the last war, seems to invite conjecture as to the sanity of the nation and of its rulers. A nation that allows itself to become completely dependent for its very life on imported supplies may or may not be putting bank balances before security. A nation that having accepted that position of dependence does not take good care to have enough shipping of its own to bring in those supplies might be thought at first sight to be qualifying for certification.

But is the situation really as bad as it seems? There are no doubt arguments to be advanced for the contrary view. One of these is that while our 1914 cargo tonnage was admittedly larger than it is now, it was also larger than we needed for our own supplies, since we were then the carriers for the world to a much greater extent than now. While, therefore, our world-carrying capacity has declined, it may be held that our capacity for supplying the British Isles remains adequate. The weak point of that argument would seem to lie in the great anxiety that arose regarding merchant ship tonnage during the German submarine campaign. Although our mercantile marine may have been much larger

in 1913 than we needed for the maintenance of our own home supplies, it did not prove to be superabundant under the stress of wartime losses.

Another argument is that, admitting that British cargo shipping has decreased in favour of foreign tonnage, economic considerations can be relied on to ensure that much of that foreign tonnage will be at our disposal in the event of war ; for the simple reason that if it refused to serve the British market, it would have no alternative markets available. This may possibly be true. Nevertheless, the argument seems to ignore the possibility of political action. One of the most powerful weapons we possess in war is our ability to prevent neutral supplies reaching enemy countries, by virtue of our superior sea power. The more, however, we ourselves come to rely on neutral shipping for our own supplies, obviously the less will these same neutrals be inclined to put up with our contraband control, a control to which they have always strongly objected in the past. There is good reason to think, therefore, that any appreciable dependence on neutral shipping in war can only be enjoyed at the expense of economic pressure on the enemy.

A third argument lies in the safeguard of storage. Now it is essential to distinguish between

storage as a substitute for merchant tonnage and storage as an insurance against temporary trade dislocation due to the unpredictable effects of large-scale air attack. Against the possibility of such dislocation it is perhaps wise to make provision, and it is on those grounds that the Government has already accumulated certain supplies. In the recent words of the Prime Minister, "We must provide against the dislocation which would occur, or might occur, after an air attack. We require to keep certain reserves to enable us to tide over that first emergency period. Those reserves have already been laid in." Apart from this the Prime Minister went on to say we should "rely on the Navy and the Mercantile Marine to keep open our trade routes and to enable us to import our food and raw materials indefinitely."

That is undoubtedly the correct policy to follow. This country does not need to store food, oil, or other supplies unless there is a possibility of the supplies failing to arrive. But if the supplies do fail, it will be because there are insufficient ships to carry them. So long, therefore, as there is any possibility of the failure of supplies, the soundest policy must be to spend whatever money is available in building more ships; whether more merchant shipping, or more naval

tonnage, or both, as the principal need may be. To spend money on storage is to have so much the less money for ships and is thereby to increase the very danger against which storage is supposed to be a safeguard. In addition to these concrete defects, storage for anything more than temporary dislocation inculcates a defensive attitude of mind towards the supply problem, the only true solution of which will be reached by the exertion of our merchant ships and of the men-of-war who must fight to protect them. It is all very well to argue, as some people do, that because Germany has gone in for storage we should do the same. The two cases are entirely dissimilar. Storage may be a sound enough measure for a country that must expect to lose the command at sea in war. Our own country cannot afford to contemplate the loss of that command, and is therefore on dangerous ground if it even considers storage as an alternative to the maintenance of sea-borne supplies.

It is clear, however, that the Government does not intend to rely on storage rather than ships. But if not, we seem to be back at our original difficulty that the merchant tonnage at our disposal has every appearance of being inadequate for our wartime needs. And what is worse, even that tonnage cannot be kept in service in the

face of foreign subsidisation. Owing to this subsidisation and to declining trade, our shippers are even now laying up many of their ships. Does this laying up matter? It may be argued that laid-up ships are still available in wartime. So they may be. But what of their crews? If ships are laid up for any length of time, the personnel tends naturally to drift off to other employment, from which it may not be detachable when seamen are again wanted. The number of our merchant seamen in employment is now 4,500 less than in 1914, and it is known that during the increased shipping activity of the last two or three years great difficulty has often been experienced at the ports in getting men. Serious fluctuations in the mercantile tonnage in use are therefore bound to produce difficulties in the manning question, even if not in the ships themselves.

The shipping situation seems in fact to have got into a dangerous tangle. One cannot, of course, blame the owners for laying up ships or for paying sole regard to their own profit and loss accounts. It is no part of their duty to consider whether the aggregate of British mercantile tonnage is adequate for the needs of the country under war conditions. But it is most definitely the Government's duty, and as a first

step towards straightening the tangle out, let us at least have a Minister of Marine with the undivided duty of looking after one of the greatest of our national services and one which in time of war is as essential a part of the national defences as the Royal Navy itself.

CHAPTER XII

THE IMPERIAL DEFENCE PROBLEM

WHAT is our Imperial Defence policy? What is the defence relationship between Great Britain and the Dominions? Does this country still regard itself as the guardian of the whole Commonwealth, bound to come to the assistance of any threatened section of it, whether Colonial or Dominion? Or does it regard the British forces as maintained primarily for the defence of the British Isles? And what corresponding attitude do the different Dominions take up?

The answers to the majority of these questions are difficult to obtain. We know that the Statute of Westminster has theoretically turned the Dominions into independent sovereign States, free to engage in or abstain from a war in which Britain or any other fellow-Dominion might be involved. More than one of the Dominions have so far appreciated this aspect of their duly registered freedom as openly to declare that they would not necessarily feel committed by a British declaration of war, and would not allow

themselves to be so committed unless their own positive interests were involved. Our own British attitude remains undeclared. My impression is that there remains among the mass of the people of this country a considerable residue of the old sentiment of Imperial trusteeship, even if the Statute of Westminster has removed their legal responsibility. Moreover, certain of the statements made by Dominion statesmen on return from the Coronation celebrations last year lend colour to the possibility that some guarantee of protection may have been given by the British Government to some at least of their Dominion colleagues. For instance, the Prime Minister of Australia, in a report to the Commonwealth Parliament on August 24th last, was stated in *The Times* to have said that :

“ the safety of Imperial interests in the Eastern hemisphere depended on the presence at Singapore of a fleet adequate to secure sea communications. The necessary strength existed for this purpose. It was obvious that the United Kingdom Government would not spend a huge sum on a fleet base at Singapore if it did not intend to safeguard such communications should the need arise and, in the process, safeguard Australia.

“ It was outstanding in military history that

the future of overseas territories was always decided by the outcome of war in the main theatre, which for Australia meant a struggle between British and enemy fleets for the control of the sea communications. Australians were unlikely to accept a policy of non-co-operation depriving them of Great Britain's powerful aid in these uncertain times."

The whole tenor of this statement is strongly suggestive of an assurance having been given to Mr. Lyons while in London that the British fleet would come to the aid of Australia if she were attacked.

But though our inclinations may be all in favour of our hurrying to the aid of any threatened portion of the Commonwealth, we ought to be quite certain, before we assure any Dominion of our helpful intentions, that we are fully able to honour them, and that we are not merely allowing our Imperial enthusiasms to run away with our judgment. There is one passage at least in the report of the Australian Prime Minister's speech quoted on the previous page that gives cause for apprehension as to whether the difficulties in the way of our acting as the general Imperial protector are properly appreciated. When Mr. Lyons said that "it was outstanding in military history that the future of oversea territories was always

decided by the outcome of war in the main theatre," we may reasonably conclude that he was enunciating a proposition with which the British authorities were in agreement, if indeed they were not the originators of it. If so, there is cause to fear that the responsible authorities may have failed to perceive the fundamental change that has come over the strategical situation of the Empire, consequent on the rise of Japan as a great naval power and the abrogation of the Anglo-Japanese alliance. For, as we saw in Chapter III, this change completely falsifies the traditional principle that the safety of oversea territories is decided in the main theatre; and for the reason that there are now two main theatres of war to be reckoned with, one at Home and one in the Far East. If our Admiralty has failed to realise the profound significance of this new situation, and the passage in Mr. Lyons' speech suggests that it has, then there seems to be a strong possibility that our Imperial strategy is being framed on out-of-date premises. In view of that possibility, we shall do well to examine the practicability of our being able to afford the assistance to Australia (and presumably also New Zealand) that we may have promised them.

If we send the fleet to the Far East in sufficient strength to dispute the command at sea with the

Japanese, what must that strength be? The Japanese capital ships now number nine. In the last war a fifty per cent. superiority in capital ships was deemed barely sufficient to ensure our command at sea against the Germans. If we reduce that necessary superiority to as low as thirty per cent. for our Far Eastern force, we should need to send out at the very least twelve capital ships. Two of our fifteen capital ships being under reconstruction, this means that at the moment the whole of our capital ship fleet but one would have to proceed eastward. With the bulk of the fleet 10,000 miles from Europe and only one battleship left to deal with, would it not be a terrible temptation to Italy with four battleships and Germany with three pocket ones to try to get the better of us while our main strength was occupied elsewhere, and so to gather in what Mr. Churchill has called "the fattest spoil and plunder available to the have-not nations"? When the present building and reconstruction programmes are completed, the position would be no better; for we should then have to send eastwards at least seventeen ships to meet thirteen Japanese, leaving five at home to compete with eight Italian and six¹ German. Judged in terms of small ships, the position would be equally

¹ Counting the three German pocket battleships as equal to one Nelson.

difficult. If the battleships went to the East they would take a good many cruisers and sixty or seventy of the destroyers with them. This would now leave eighty or ninety destroyers at home, in face of a hundred Italian and twenty German.

Neither by large nor small ship standards, therefore, could we conduct an offensive naval campaign in Far Eastern waters, either now or in the measurable future, and retain the command at sea in European waters at the same time. It is, of course, probably true that if both Italy and Germany were hostile, France would be friendly. Could we in that case contemplate handing over our security in home waters to her, while our own fleet went eastward to deal with the Japanese? It is a question that I have heard answered in the affirmative by naval officers of seniority and distinction. To me, however, it is frankly unthinkable. I cannot conceive it possible that we should be so incautious as to entrust our own island security to the keeping of a foreign country. What if she failed us? What if our shores were invaded or our vital supplies cut off because her protection proved less effective than we had hoped? We had to exert our last ounce of strength to defeat the German submarine campaign in the last war. Could we reasonably expect any foreign nation to make a like desperate effort on someone else's

behalf? We should surely be excessively confiding if we did.

To take the converse case, could we expect the French to be willing to send the whole of their field army to Cochin China, leaving the frontiers of France to be defended only by British soldiers? Assuredly not. There is even evidence for thinking that they would be averse to entrusting their far less vital sea communications to our care. Speaking at Nice last year, M. Pietri, a former Minister of Marine, said that "to leave our naval defence to Britain would clearly be to sign our death warrant as a naval power. The work of the British fleet is not the same as ours, which is to undertake the transport of troops to and from Africa."

There can, in fact, be no doubt that the defence of Britain and of the vital overseas supplies without which she must quickly collapse are a first charge on the British fleet. Any other conclusion is to ignore human nature. It is really impossible to think that the British public, even where it harboured the warmest feelings of solicitude for the welfare of the Dominions, would consent to see the best part, if not all, of the fleet that it had paid vast sums to build and maintain disappearing through the Suez Canal, when its disappearance would leave the British Isles themselves in grave danger. That

would surely be to make far too meagre an allowance for the instinct of self-preservation. We should never dream of expecting the Dominions to act like that towards us. We should therefore be equally realists in our attitude towards them. Nor should we really be consulting their true interests if we were quixotically to hazard our own security in order to come to their aid. For if Britain goes down, the Empire goes down with her.

We must therefore face the likelihood that, in any circumstances that can reasonably be foreseen, we cannot send a battle fleet to the East capable of seizing and holding the command at sea and therefore of controlling the sea communications. Does this mean that we should be unable to come to the support of Australia and New Zealand if they were attacked? Not necessarily; but it does mean that we could not aid them to the extent that they may have been led to expect. And that means that they would have to rely on their own resources to a much greater degree than hitherto.

Indeed, a policy for the Dominions aiming at self-sufficiency in defence seems a desirable one from several points of view. It is, for one thing, the logical corollary of the Statute of Westminster. The Dominions having demanded and obtained their legal sovereignty, the only satisfactory and

honest procedure is for them to assume to the full all the responsibilities of sovereignty at the same time as they enjoy its advantages. For them to claim freedom to decide whether or not they will fight in any of Britain's wars, and at the same time to rely on British arms for their own defence, is neither fair to us nor good for themselves ; and for us to encourage them to continue to lean on parental support long after they have been acknowledged to have reached man's estate is equally unfair to them. The more, therefore, that each Dominion can be self-defending, the better for its moral stature.

While, however, a general policy of individual self-reliance may be commended as the right one for the Commonwealth as a whole, there is no reason why this should rule out mutual support ; but it should be mutual support based on community of interest and real equality of status, and not a disguised tutelage masquerading as friendship.

What, then, should be a naval defence policy for the Empire based on these principles ? Taking Britain's own problem first, we are probably safe in ruling out the United States as a possible enemy. That leaves us with two primary responsibilities, our own British security and the protection of our Colonies and India ; and two primary points of danger, Europe and the

Far East. Strength in home waters covers both of our responsibilities against a European enemy, but leaves certain of our Colonies open to attack by Japan. As previously demonstrated, however, we cannot be in superior force both at home and in the Far East simultaneously, and since we have agreed that safety at home is the paramount consideration, it follows that our correct British policy is superiority in European waters and a defensive policy in the East. In that case, what form should this defensive policy take? If we count France as being friendly, we should require enough battleships in European waters to meet a possibly hostile combination of Germany and Italy. That means that we need seven or eight capital ships in European waters now and seventeen or eighteen in three or four years' time. In both cases, we should have four to six capital ships surplus to European requirements and available therefore for a Far Eastern fleet. The large battleship, however, is ill-adapted for defensive work. It is a weapon of combat, and attempts to use it defensively have registered consistent failure. The battleships of the Russian Port Arthur fleet ended an inglorious career by being sunk at anchor. The German battleships, after remaining in harbour for most of the war, committed suicide in Scapa Flow. It is the smaller vessels, the destroyers and submarines,

that must be relied on for defensive work. We have indeed suggested in a previous chapter that they are of greater value than the great ship for offensive work as well. The arguments in this chapter are developed, however, on the ruling assumption that the great ship remains the measure of naval strength. If it does not, then it is comparatively a simple matter to substitute corresponding calculations on the small ship scale.

The further consideration of the Far Eastern problem can usefully be postponed until we come to deal with Australia and New Zealand. Suffice it to say at this point, that the surplus of four to six battleships which we have at our disposal for a Far Eastern fleet do not seem very suitable for the purpose.

Let us now go on to Canada. Against the very unlikely contingency of a Japanese attack, she must obviously stand on the defensive, and for that purpose needs destroyers, submarines and aircraft on her western seaboard. Since one of the points where Britain could most fruitfully take the offensive in a war against Japan would be the eastern part of the north Pacific, a British force of cruisers or destroyers should join the Canadian one and the two should *work together*. Against an attack from a European enemy, Canada is adequately covered by the British European

fleet, just as the United States was covered by that fleet against an attack by Germany in the war. In order to take her recognised share in warding off that danger, it is desirable that Canada should maintain certain Canadian-manned ships, say a flotilla of destroyers, as part of the British fleet in Europe.

South Africa is also secured against attack from Europe by the British European fleet. An attack on her from the East is at present so remote a danger that we can disregard it. For her, too, an appropriate contribution would be a naval unit working with the main fleet in Europe, while we, on our part, might assist her financially with the maintenance of the Simonstown naval base. Whether the South African Government would be willing to maintain a naval unit with the British fleet is not a possibility that I would care to bet on. But if that Government is not so prepared, it should recognise that it is getting cheap security from someone else.

Then we come to the Far East and to Australia and New Zealand. On the general moral principle that each Dominion should, if possible, furnish its own defence, what could these two countries do? Neither singly nor in combination could they hope to build a capital ship fleet capable of dealing with the Japanese Navy. The cost of the modern great ships, with all their attendant

cruisers, destroyers, and so on, would be far beyond their resources. Nor could such a fleet be completed by them even if we threw in as a nucleus the four or five British battleships that we have seen to be surplus to requirements at home. It is clear, therefore, that a defensive policy is their portion. Fortunately, however, our previous investigations into the question of invasion under modern conditions have indicated that the defence has been growing steadily stronger. Since, therefore, Australia and New Zealand are largely self-contained as regards food, defensive measures against invasion based on destroyers, motor torpedo boats, submarines, shore-based aircraft, and military forces should have good chances of success. The present policy of the Australian Government of a reliance on naval defence based on the command at sea can hardly be other than a mistaken one. The command at sea implies a superior navy, and as Australia cannot hope to possess a fleet superior to the Japanese by herself and as the chances of her receiving British reinforcements to that extent are, as we have seen, problematical, she seems to be following a policy that is optimistic to the verge of unreality. Her cruiser fleet on which she is spending a lot of money can be of little use to her. Being primarily gun vessels, they would be helpless against the Japanese

capital ships ; whereas torpedo-carrying craft and minelayers would at least have a chance of dealing the big ships a mortal blow. The dividend she is likely to obtain from destroyers, submarines, bombers and minelayers is surely much more promising.

Apart from the primary danger of invasion, Australia and New Zealand have the protection of their trade to consider ; and here their interests meet and mingle with those of Britain. The latter's problem in Eastern waters consists of the protection of India, the Straits Settlements, Borneo, Hong Kong and other of her territorial possessions, and also of her Eastern trade. Singapore is frequently spoken of as the key to this problem, but it is important to note that that description is only partly true. Singapore certainly covers India, Ceylon and the Straits Settlements. It partly covers Australia and New Zealand, in that a force proceeding to attack either of them would have to leave Singapore on its flank and to have, therefore, its communications open to flank attack. A force operating from Singapore might also be able to protect British North Borneo. But no naval force at Singapore, however strong, can cover Hong Kong ; because Hong Kong is too far beyond it to receive cover against the Japanese. Should Japan therefore take it into her head to attack

us, the odds are that she would be able to take Hong Kong and that we should be unable to prevent her. We should not, however, regard that possibility as implying the first stage in the break-up of the Empire. There are other ways of striking at Japan besides fighting a fleet action against her in waters where all the advantages would be with her and against us. There is, in fact, good reason to anticipate that even if we lost Hong Kong to start with, we might recover it later on. Our West Indian possessions were constantly changing hands in this way in former times. St. Lucia, for instance, was passed backwards and forwards between us and the French no less than nine times between 1762 and 1803. Our China trade would probably go, too, but as it constitutes only 2 to 3 per cent. of our total trade the loss could not be regarded as vitally crippling.

We could, however, reasonably aim to hold the general line Singapore–New Zealand and to protect the trade inside that line. The protection of trade under these conditions would mean oceanic convoys, and both for these and for the defence of territory we have argued in this and previous chapters that destroyers, submarines and aircraft are the most suitable agents. All our conclusions point, therefore, to the chief naval Far Eastern requirements of Britain,

Australia and New Zealand to be small craft—destroyers, submarines and aircraft, together with minelayers. These classes of vessel are, moreover, much more appropriately related to the exchequers of the latter countries than cruisers or battle-cruisers. What, for instance, could Australia do with one or two battle-cruisers? Nothing at all except to send them into action against a probably superior force of Japanese battleships, in which they would almost certainly come off worst. But a force of thirty or forty destroyers and fifteen or twenty submarines should not be beyond Australian resources and would be a much more effective instrument. Pooling the resources of Australia, New Zealand and Britain's Far Eastern contingent, we might well reach a combined force of 150 destroyers, and 60 or 70 submarines without going much beyond present expenditure. Such a body of ships would undoubtedly be a good deal more formidable than a mixed collection of five or six battleships, nine or ten cruisers, and twenty or thirty destroyers, which is the sort of surface fleet we might expect to be able to deploy in Eastern waters under existing strategical ideas.

It is such a force of small craft, therefore, that we seem to need in Eastern waters. And there is no doubt that it should be permanently stationed there. The idea of sending the fleet out to the

East from Home waters in wartime is fundamentally unsound. In the first place, there could never be any certainty that, when the time came, it would be able to go ; and the Dominions who might have counted on its coming might thereby be left unexpectedly in the lurch. Secondly, it would take many weeks to arrive and might well arrive too late. Thirdly, the arrangement prevents anything like proper training. The British contingent straight out from Home waters would be fighting in waters unfamiliar to officers and men, and would have to co-operate with Dominion forces whom they had never previously met. Every consideration of strategy and efficiency calls in fact for a permanent Far Eastern fleet, consisting of British, Australian and New Zealand vessels *working together*.

In writing this chapter, I have been unable to contribute to the prevalent conception of the British main fleet steaming in full force about the world, ready to deal out crushing blows wherever it went. That is an all-too-popular idea of the Navy's capabilities, especially dear to those who harbour animosities against Japan. It is an idea that Sir Samuel Hoare certainly encouraged by his talk of a "two-hemisphere" fleet (there I am criticising Sir Samuel again), but I believe it to be none the less a fanciful one. It is hardly to be expected that the fleet could proceed in

greatly superior force to the Far East, demolish the Japanese fleet, and then return in triumph to do the same thing to, say, Germany. Things are hardly as simple as that. While the fleet was delivering a smashing stroke in one part of the world, nations elsewhere who might anticipate similar attentions later on are unlikely to be waiting fatalistically for the blow to fall. The European theatre of war will always be for this country the main theatre, and if the British public insists on the bulk of the fleet remaining in European waters, it will be correct in doing so. The protection of the British Isles is the main purpose for which the fleet exists and nothing can justify that purpose being neglected.

I started this book with a reminder of how the value of sea power was misappreciated in the recent past. In the present anxious state of the world, there seems to be a danger of the same thing happening. Many responsible people have quite recently been saying that the domination of Europe by Germany would open the way for her to world conquest. It may be a useful corrective to cast our minds back to a parallel contingency 133 years ago. Napoleon had over-run Europe. But his Grand Army could take him no farther than Europe; and the reason lay, as a distinguished American naval officer has pointed out in a celebrated phrase, in the far distant and

storm-beaten ships of the British fleet which "stood between it and the dominion of the world."

There are people who say that air attack has altered all that and that we are now exposed to invasion and defeat by air. They may be right, but there is so far no evidence to show that they are. The Spanish and Chinese wars have been going on for some time and much bombing of civil populations or open towns has taken place, especially at Canton which, if not as large as London, is certainly more crowded. But in neither of these wars has a combatant yet been brought to subjection by these means. It would be unwise to overlook the possibility that, in certain circumstances, air attack alone might be decisive. It were equally unwise to ignore that up to now it has only played an auxiliary rôle, and one which competent observers aver to have had the effect of stiffening, rather than weakening, the resistance of the enemy nation. And that being the present state of the case, it does not seem that we can yet afford to neglect the admonition of Lord Halifax in 1694, recently reiterated by Admiral Sir Barry Domville: "Englishmen, look to your moat."

INDEX

	PAGE
ABYSSINIA	46, 117
Aden	117
Air attack on convoys	129
Aircraft carriers	67, 109
Anglo-Japanese Alliance	39, 41, 164
Anti-aircraft gunfire	66, 67
Anti-submarine apparatus	58, 59
“ Army of England ”	81
Australia	87, 113, 163, 168, 171-177
—, Prime Minister	162
“ BALANCED SHIP ”	149-151
Baltic	117
Bases	77, 148, 149
<i>Basilisk</i> episode	61
Beatty, Admiral	30, 125
Bombay	114
Bomb <i>v.</i> battleship	73
Borneo, Br. North	174
CAMPERDOWN	116
Canada	171-2
Canton	179
Cape route	113-4
Ceylon	174
Chinese War	70, 179
Committee on Design, 1871	135
Contraband	9
Convoy	7, 94
—, escorts	94-7, 122, 130, 154
Cost of battleships	138-9
— — — destroyers	138-9
Cruisers	120-3

INDEX

	PAGE
Cruising system	7
Cyprus	115
DARDANELLES EXPEDITION	82
<i>Daily Telegraph</i>	140
“Decisive weapon” theory	30
<i>Deutschland</i>	74
Disarmament Conference	45
Domville, Admiral	179
Dover Patrol	5
Drake	144
EDEN, MR.	113
Egypt	115
Escorts, convoy	94-7, 122, 130, 154
Etherton, Lt.-Col.	93
FAR EASTERN FLEET	177
Fireships	11, 144
Fisher, Lord	30
Foch	1
French bases	111-2, 118
— fleet	111-2
GALLIPOLI	116
Gautreau, M.	140
Geneva Naval Conference	44
German Sortie of August 18th, 1916	26-8
German Submarine Campaign	14-16, 98
Gibraltar	109, 118
Grand Fleet	5, 6, 10, 14, 19, 23
HALIFAX, LORD	179
High Seas Fleet	6, 10, 12, 13, 21-2, 24, 27
Hoare, Sir Samuel	59, 66, 95, 147, 148, 177
Hong Kong	174-5
INDIA	114, 169, 174
International Law	90
Ireland, raids on	81
Italian Fleet	107

INDEX

	PAGE
JELlicOE, ADMIRAL	12, 21-2, 25-7, 29, 30, 33, 110
Jutland	20-6, 141
 KELLY, ADMIRAL	 60
 LIBYA	 107, 118
London Docks	99-104
London Naval Conference	44
Lyons, Mr.	163
 MALTA	 77, 115
Mediterranean	107-118
Memorandum, Jellicoe's	24
Merchant tonnage	154
Mines	11, 18, 28
 NAPOLeON	 81, 178
Nelson	143-4
New Zealand	87, 113, 168, 171-7
Non-contact mine	57
————— torpedo	57, 73
Northern Patrol	5
North Sea	5, 6
November 17th, 1917, Action of	28
 OESel ISLAND EXPEDITION	 82
Oil fuel	60, 115
Oil firing	115, 154
 PALESTINE	 115
Pantellaria Channel	108-9
Patrolling	7, 16, 120
Pietri, M.	167
Port Arthur Fleet	170
Port of London	99-104
Prestige	116
Protection of Ships	137
 REARMAMENT PROGRAMMES	 49
Richmond, Admiral	105, 121
Russians	19, 144

INDEX

	PAGE
St. LUCIA	175
St. Vincent	116
Scapa Flow	5, 6, 12, 170
Scheer, Admiral	21
Simonstown	172
Singapore	39, 41, 162, 174
Sloops	130
Small ships	15, 16, 17, 32, 33, 76, 106
South Africa	172
Spanish Armada	144
— War	69, 179
Statute of Westminster	161, 168
Storage	156-8
Straits Settlements	114, 174
Submarines	11, 12-17, 19, 126, 127
Suez route	113, 114
THAMES ESTUARY	99-104
<i>Times, The</i>	162
<i>Times, Naval Correspondent</i>	123
Torpedo	18, 24-5
Trafalgar	125, 134
UNDERWATER WEAPONS	18, 29, 31, 72
Unrestricted submarine warfare	48, 90
U.S.A.	36, 169
WASHINGTON CONFERENCE	37, 90
Wilson, Sir Henry	1



PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

VA
454
G7

Grenfell, Russell
Sea power in the next war

