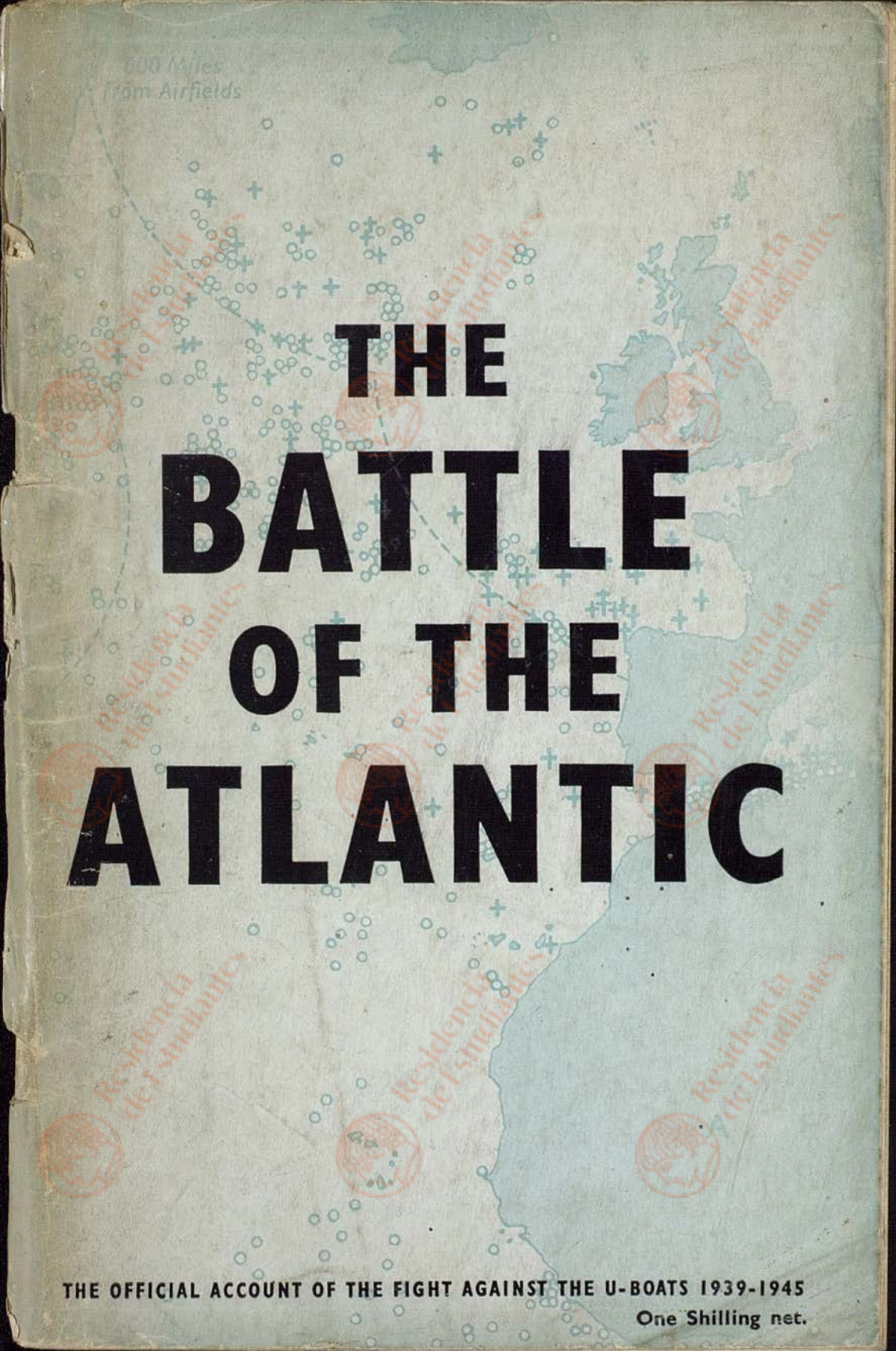

THE BATTLE OF THE ATLANTIC

THE OFFICIAL ACCOUNT OF THE FIGHT AGAINST THE U-BOATS 1939-1945

One Shilling net.

THE BATTLE OF THE ATLANTIC

PREPARED FOR THE ADMIRALTY AND THE AIR MINISTRY BY THE CENTRAL OFFICE OF INFORMATION

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THE BATTLE OF THE ATLANTIC

THE OFFICIAL ACCOUNT OF THE FIGHT AGAINST THE U-BOATS 1939–1945

LONDON: HIS MAJESTY'S STATIONERY OFFICE

Contents

THE BATTLE OF THE ATLANTIC

CHAPTER I

WAR AGAINST THE U-BOATS

For the space of sixty-eight months the Battle of the Atlantic raged with ruthless but varying intensity. It started with the sinking of the Athenia west of Ireland less than twelve hours after the outbreak of war on September 3rd, 1939, ended with Grand-Admiral Dönitz's signal of May 4th, 1945, ordering his U-boats to cease hostilities and return to base, followed four days later by the unconditional surrender of Germany.

Until the very end the German U-boat arm fought with discipline and efficiency. There was no relaxation of effort or hesitation to incur risks. Indeed, on the night before Germany's surrender, two merchant ships were sunk near the entrance to the Firth of Forth, and a minesweeper in Lyme Bay.

Had the U-boat war continued for any appreciable period, there is little doubt that it would have imposed an increased and severe strain upon Allied resources. In spite of the dislocation and interruption caused by the severe Allied bombing of the German building yards, bases, communications and assembly plants, which had a very considerable effect in delaying output, the U-boat fleet would have increased substantially in numbers and power. New and improved types of boats were also coming into operation. Their war potential was not exhausted when the victory of the Allied arms brought about the downfall of Nazi Germany.

In 1940 Grand-Admiral Dönitz had said: "I will show that the U-boat alone can win this war . . . nothing is impossible to us." In an order of the day issued simultaneously with his order to cease hostilities, he explained that a crushing superiority had compressed the U-boats into a very narrow area and that the continuation of the struggle was impossible from the bases that remained. But the U-boats nearly succeeded. The anti-U-boat war of 1939–45 was one of the most vital, protracted and bitterly fought sea and air campaigns in which the British Empire and her Allies have ever been engaged.

It is hardly necessary to point out that the severance of our Atlantic supply lines would have brought us to our knees through the eventual starvation of our war industries and population. Our power to continue

even a defensive struggle outside Britain would have vanished when the last tons of fuel held in reserve in the country had been expended by our warships and aircraft. Unable to bring in supplies of fuel from oversea, we should have seen our Navy and Air Force haltered and finally immobilized, with the hope of building up our strength for an offensive anywhere in Europe gone for ever. Disaster, comparable to that of France in 1940, would have stared us in the face.

A debt we can never repay is due to the men of the Merchant Navies, who, true to their fine tradition, and with a steadfast courage, devotion and endurance, refused to be intimidated by the heavy toll of sinkings and the threat of their ships being blown to pieces in one of the stormiest oceans of the world. An extra meed of praise is due to those who manned the ships carrying ammunition and explosives, and the tankers which carried the highly inflammable fuel and aviation spirit which ensured the mobility and operation of our warships, our aircraft and our mechanized armies in every part of the world. Of the more than 30,000 casualties to the personnel of the Merchant Navy caused by enemy action, some 23,000 were brought about by U-boats. A large proportion of the casualties to naval personnel, both in escort vessels and larger ships, were caused by U-boats.

With the men of the Merchant Navy must be linked the convoy Commodores, many of them retired Flag Officers of the Royal Navy, with senior retired officers of the Royal Naval Reserve. These veteran seamen were all volunteers. Many of them were over the age of sixty, and at least one was sixty-eight. They shared in all the vicissitudes and dangers of the long battle in the onerous and responsible tasks of conducting their convoys across the ocean and in coastal waters in the face of constant attack by submarines, aircraft and "E" boats, with the additional danger of enemy minefields. Twenty-four gave their lives in the country's service. Of these may be mentioned Admiral Sir H. S. Brownrigg, whose ship foundered in a severe gale in January, 1943; Vice-Admiral Sir R. Fitzmaurice, who was injured at sea and had to spend many weeks in hospital in the United States, but persisted in going to sea again and died after his next round trip across the Atlantic; and Vice-Admiral W. de M. Egerton, whose ship was sunk in convoy in December, 1942, but who was lost when the ship which had rescued him was sunk a few days later. Commodore W. H. Kelly, R.N.R., the oldest of the Commodores, and wont to conceal his age, was lost with his ship in June, 1941, while Commodore H. C. Birnie, R.N.R., was drowned after his ship had been torpedoed in March, 1943. This officer had been recalled to his duty as one of the Elder Brethren of Trinity House. He was so anxious to remain at sea as a Commodore that he begged to be allowed to take one more convoy across the Atlantic. He lost his life on the return voyage.

Mention must also be made of the 38,000 men in Britisn ships, some pensioners of the Royal Navy and Royal Marines, others of the Maritime Royal Artillery, who manned the varied defensive armaments in our merchant

ships. Frequently in action, their casualties in killed and missing amounted to nearly 4,000.

At the outbreak of war Germany had 57 operational U-boats of modern design, the crews of which formed a *corps d'élite* of her Navy. Long beforehand Britain had made repeated efforts to outlaw submarines and drastically to restrict their use. Though bound by treaty in 1935 to adhere to certain rules governing and limiting submarine warfare, there was no guarantee that Germany would, in fact, do so. Even then her vast building yards were being adapted for turning out large numbers of U-boats, and in the event of war we visualized an output of about 100 boats in the first twelve months, rising to 200 a year later. In 1942 Germany was actually to complete 304 U-boats, 33 of which were built in Dutch and French yards. At the end of that year she had no fewer than 485 submarines in service, 68 being Italian.

It was as well that we realized beforehand the futility of any efforts to deprive submarines of their power to wage unrestricted warfare as they had done in 1917–18. So far as our lamentably shorn Navy Estimates would permit, Britain had used the breathing-space to develop and perfect anti-submarine tactics, weapons and devices, as well as to build a few escort and anti-submarine vessels and to organize a comprehensive Convoy System. The "Asdic" detecting device was the principal instrument upon which we pinned our faith, and using our own submarines as targets a number of officers and men had been trained in its use and in the development of anti-submarine measures. This comparatively small and select body was to form the nucleus of the huge anti-submarine branch of the Royal Navy during the war.

When hostilities broke out in 1939 we possessed some 200 asdic-fitted surface vessels of all types, though few of these could be used on the convoy routes. Some were too small for work in the open oceans, while others were required for the anti-submarine protection of our major fleet units. Germany possessed two battle-cruisers, three "pocket" battleships and a number of cruisers, all of which were capable of raiding the Atlantic convoy routes. In 1939, as in 1914, we had to maintain a superior covering force of capital ships and cruisers to deal with these possible raiders. The demands made by these upon trained personnel, destroyers, fuel and supplies, formed a permanent drain on the naval resources available for the anti-submarine war. More escort craft had to be provided for the coastal convoys round the British Isles, and, later, for the convoys to North Russia, as well as the extensive convoy systems in the Mediterranean and Indian Ocean. All of these were open to U-boat and air attack. Until the end of the war, and in spite of our building programmes, the number of destroyers and escort vessels was never really equal to the demand. At the peak period in 1944 there were under the operational control of the Admiralty 880 vessels of the British, Dominion and Allied Navies normally employed on ocean convoy work, and about 2,200 other asdic-fitted vessels for work nearer inshore.

To the general public, too, the term "air warfare" implied the bombing of land targets, fighting in the air, reconnaissance and, to a much lesser extent, attacks upon capital ships. Aircraft specially fitted and armed for anti-submarine work were hardly in the picture. Certain bases in the north and north-east of the British Isles were well suited for intercepting U-boats on their way to and from the Atlantic. As in the case of the Navy, however, the Air Estimates had been drastically cut. The Royal Air Force was desperately short of aircraft. Like Bomber and Fighter Commands, Coastal Command deployed among its nineteen first-line squadrons a number of obsolescent types of low endurance. Various anti-submarine exercises had been carried out with the Navy before the war, though not on the scale they deserved. The striking power of those well-equipped long-range squadrons which, thanks to the introduction of airborne radar and to improvements in anti-submarine weapons, were later in the war to sink and harry the U-boats in mid-ocean and thereby to tip the scale in our favour, had not been fully foreseen.

As regards carrier-borne aircraft, these also had been trained to some extent in screening the fleet against submarine attack. But escort carriers, which afterwards were to play so important a part in protecting convoys outside the effective range of shore-based aircraft, were still a dream of the future in September, 1939.

As was the case with the war of 1914–18, the main naval effort of Nazi Germany was concentrated against our essential shipping. U-boats, aircraft and surface raiders, together with mines laid from aircraft, submarines and surface vessels, were all used to this end. By far the greatest losses in tonnage, 69 per cent of the total, were inflicted by U-boats, which in the sixty-eight months of the struggle sank 2,775 British, Allied and neutral merchant ships of about 14½ million gross tons out of the total loss of 4,786 vessels of more than 21 million gross tons.

Enemy aircraft, which did not become a really serious menace until after the enemy's occupation of Norway and France, accounted for another 13 per cent of the shipping losses; surface raiders and mines each for another 7 per cent; and the usual hazards of navigation, or causes unknown, for 4 per cent. Sixty-four per cent of the losses through all causes occurred in the North and South Atlantic, while 54 per cent of the total losses in all areas—2,566 ships of more than 11¼ million gross tons—were British.

Though the conditions prevailing during the 51 months of the First World War were by no means identical with those of 1939–45, it is interesting to compare the respective figures of the losses inflicted by U-boats. During 1939–45, as has been said, submarines sank 2,775 merchant vessels of about 14½ million tons, giving a monthly average of 40 sinkings. The comparable figures during 1914–18 amounted to 4,837 merchant vessels of 11,135,000 gross tons, with a monthly average of 95 sinkings. The average monthly tonnage sunk by U-boats in both wars was roughly the same at about 215,000 gross tons, the disparity in the numbers of ships being accounted for by the

fact that in 1914–18 the average tonnage of vessels sunk was 2,300, whereas in 1939–45 it was 5,200.

The difference in the rates of loss of ships is all the more remarkable when it is remembered that modern U-boats have a far greater operational range and destructive power than those of thirty years ago, and that after the fall of France in June, 1940, when Britain was to fight practically single-handed for eighteen months, Germany had occupied the western seaboard of Europe from the North Cape to the Franco-Spanish frontier. This provided her with numerous operational bases on the flanks of the British Isles and the convoy routes in the Atlantic. Italy's entry into the war vastly increased our naval commitments in the Mediterranean, while also necessitating the despatch of troops and supply convoys to Egypt round the Cape of Good Hope. This meant further surface escorts and aircraft for their protection. At the same time Germany was provided with a reinforcement of 100 Italian U-boats, some of which were later based at Bordeaux for operations in the Atlantic. Yet, in all these circumstances, the U-boats in 1914–18 were able to sink merchant ships at more than double the monthly rate achieved in 1939–45.

One of the main reasons for this was that a Convoy System was put into force soon after the outbreak of war in September, 1939, whereas in the First World War the first convoys were not started until May, 1917, and did not become fully operative until the following October. Other reasons for the lower loss rate during the recent war were the most effective counter-measures against U-boats provided by long-range aircraft, and by the use of new and perfected weapons and devices, such as the asdic and radio-location or "radar."

The U-boat campaign was controlled from Germany. For fully two-thirds of the war the enemy was on the offensive. Using his U-boats with consummate strategical skill and flexibility, he constantly threw the concentrated weight of his onslaught on the weakest spot in our defences. No sooner had our counter-measures in any one area become effective than the U-boats withdrew, probed for another "soft spot" and again attacked with vigour. As time went on our defence was stretched to the limit, for it was impossible always to foresee where the next blow would fall. The initiative was in German hands, and a campaign which started in the Western Approaches to Britain eventually spread across the navigable globe. At one time or another U-boats operated as far afield as the Kola Inlet in North Russia, the Gulf of St. Lawrence, the east coast of the United States, the Caribbean, the coast of Brazil, the west coast of Africa and the Mediterranean. Even the South Atlantic, the Cape of Good Hope, the Gulf of Aden, the Indian Ocean and the coast of Australia were not immune. But as the charts show, the main and most ruthless battle was fought in the Atlantic between September, 1939, and the end of May, 1943, during which period it resolved itself into a series of well-defined phases when we were always on the defensive in the changing focal areas of attack. It was not until the

spring of 1943 that the tide turned in favour of the Allies, and by the end of that year, thanks to immense exertions, the enemy's approach to victory was gradually turned into the pathway of defeat.

No fewer than 781 German and 85 Italian U-boats were destroyed during the war by one means or another, an average of nearly 13 a month. However, there is no reason to suppose that they would not have fought on in a losing campaign if the defeat of the German Army had not brought collapse and surrender. Their morale was unimpaired to the bitter end.

The Allied defeat of the U-boats in the North Atlantic cannot be ascribed to any single service or arm. The seamanship, airmanship and science of the United Nations all combined in wresting the victory. The Royal Navy and its Naval Air Arm, the Royal Air Force, the Royal Canadian Navy, the Royal Canadian Air Force, the Allied navies and aircraft, with the Allied merchant navies, all shared in the struggle. Later they were reinforced in strength by the seamen and airmen of the United States, who threw themselves into the battle with a wealth of material which was used with vigorous efficiency and a fine fighting spirit.

As regards the purely British and Canadian effort it may not be out of place here to emphasize some figures already published. During the war 75,000 merchant ships were escorted in British-controlled convoys in and across the Atlantic, and the total number of ships lost in convoy was 574, equivalent to one ship in every 131 which sailed. On occasion there were as many as 700 merchant ships at sea in the Atlantic, with 100 warships protecting them. More than 200 million miles were covered by merchant ships in convoy in the Atlantic, while British naval escort vessels made some 13,200 separate voyages of long duration in escorting them. Passages of twenty to twenty-six days, in heavy gales, with the additional dangers of thick weather and ice, were by no means uncommon. Coastal Command, the Royal Air Force and the Royal Canadian Air Force made more than 120,000 sorties while protecting convoys and in offensive patrols in the U-boat transit area, involving 850,000 flying hours and 100 million miles flown, frequently in the most appalling weather conditions.

Air Forces worked not merely in co-operation with Naval Forces, but as part of the same strategical team. The Naval and Air Commanders concerned worked in the same Headquarters ashore and played their respective parts in one plan. Air Forces often patrolled independently in an offensive role to attack submarines in the transit areas between their bases and the shipping lanes, but when escorting convoys they worked in co-operation with the Naval Forces as part of the same tactical team. This welding together of the Navy and Coastal Command ranged from strategical decisions taken on the highest level down to the smallest details of drill and signalling between ships and aircraft.

The Allied bombing attacks upon the U-boat bases also had a profound effect upon Germany's output of these craft. Moreover, the bombing of inland factories and the destruction and dislocation of the railways and

canals made it difficult, if not impossible towards the end, for the prefabricated parts of U-boats to be brought to the assembly plants on the coast. The Germans had placed great reliance on their inland waterways for the transport of the heavier sections of their new submarines.

During the war nearly 260,000 British mines were also laid in all theatres of war by naval surface and submarine minelayers and the aircraft of Bomber and Coastal Command and the Naval Air Arm. A large proportion of these were laid round the U-boat bases in Germany and occupied Europe, and as mine barriers to protect our coastal and ocean traffic lanes.

Nevertheless, the main and most bitter struggle was at sea, and it was the men, the seamen and the airmen, who brought about the final victory over the U-boats in the Atlantic. They were fighting a ruthless and highly efficient enemy who was constantly perfecting new methods of attack. It was a battle of wits and human endurance, above all of supreme fortitude and courage on the part of many anonymous men, the great bulk of whom had neither been seamen nor airmen before the war. Mr. Winston Churchill described the Battle as a war of groping and drowning, of ambuscade and stratagem, of science and seamanship, which indeed it was.

No description of the Battle of the Atlantic would be complete without mention of the effort and wholehearted co-operation of the Royal Canadian Navy, which began the war with six destroyers and less than a score of local craft, and a strength of just under 4,000 officers and men. By May, 1945, Canada's naval personnel amounted to more than 94,000, and her Navy to no fewer than 939 warships of different types, large and small. This total includes two cruisers, two escort carriers and 17 destroyers, together with more than 200 frigates, escort vessels, corvettes and miscellaneous craft all directly concerned with the war against the U-boats. The Royal Canadian Air Force, working mainly in the Western Atlantic, but with some of its squadrons attached to Coastal and Bomber Commands, gave unstinted help in the Battle of the Atlantic. Its phenomenal expansion was comparable with that of the Royal Canadian Navy. Canada's naval and air achievements are some of which that great Dominion may well be proud.

Seamen and airmen from Australia, New Zealand, South Africa and Newfoundland also played their part in the struggle, as did men from all the British Colonies and the countries devastated and overrun by the Nazis. The battle was fought on the sea, in the air, and under the sea. But that it could be fought through to victory was largely due to many others besides the fighting men in the ships and aircraft. There were those who planned and directed the operations from the highest levels, and the operational staffs which carried the plans into effect. There were those in control of the merchant shipping, others who organized and routed the convoys, and supervised or did the actual work of loading and unloading the cargoes. There were the scientists and experts who designed and perfected the instruments and weapons for many different needs, the workers who fashioned them and who built and maintained the ships and the aircraft. Their name is

legion. A host of men and women of many different countries and peacetime occupations all shared in the Battle of the Atlantic. It was not the battle of any one nation or of any particular sections of their communities, but of the United Nations as a whole.

The narrative that follows does not pretend to give a full and detailed account of the Battle of the Atlantic, nor does it purport in any way to describe the part played by Bomber Command of the Royal Air Force. It is merely the abbreviated story of a few of the more important highlights in the several phases of a ruthless and protracted campaign which, but for the grace of God, might well have brought about not merely the defeat of Britain and the disruption of the British Empire, but the eventual Axis domination of the world.

NOTE. As already stated, 781 German and 85 Italian U-boats were destroyed during the war by one means or another. The U-boat sinkings shown by crosses on the charts are those for "kills" known at the time and of which the positions were certain. They include Italian U-boats between June, 1940, and September, 1943, together with a limited number of Japanese submarines known to have been sunk in the Indian Ocean. Information received from Germany since the war has disclosed a considerable increase in the U-boat losses as originally assessed, and the figures mentioned in the text are correct to May, 1946.

The symbols on the charts for merchant ships sunk by U-boats were those known at the time. The figures mentioned in the text, with tonnages in round figures, have been corrected by the latest information to May, 1946.

CHAPTER 2

THE FIRST PHASE, September 3rd, 1939–June, 1940

In the last week of August, 1939, a number of U-boats left their bases in Germany for positions off the north-western and south-western approaches to Britain, at least one moving as far south as the coast of Portugal. Their first blow was struck within nine hours of the declaration of war when, on the evening of September 3rd, the liner Athenia was torpedoed without warning 250 miles west of Ireland. It is now clear that the U-boat commander exceeded his orders. The enemy strenuously denied the responsibility. But there was no doubt about it, since the submarine came to the surface and was seen by responsible witnesses. It was discovered later that the submarine responsible was U-30—Oberleutnant zur See Lemp, who perished when U-110 was sunk in May, 1941. In the Athenia incident, however, 128 persons lost their lives, and Germany broke the Anglo-German Agreement of 1935 restricting submarine warfare.

Though plans for the Convoy System which had served Britain so well in 1917 were ready and implemented, the scheme could not be put into full operation the moment war was declared. Merchant ships were scattered all over the world and at sea, while the necessary escort forces had to be col-

lected and organized. During the first few weeks the U-boats made the most of this inevitable delay. Operating off the English Channel, the Scottish and north-east coasts and off Ireland, they usually attacked the unescorted ships at periscope depth by daylight, but afterwards also at night when the visibility conditions permitted.

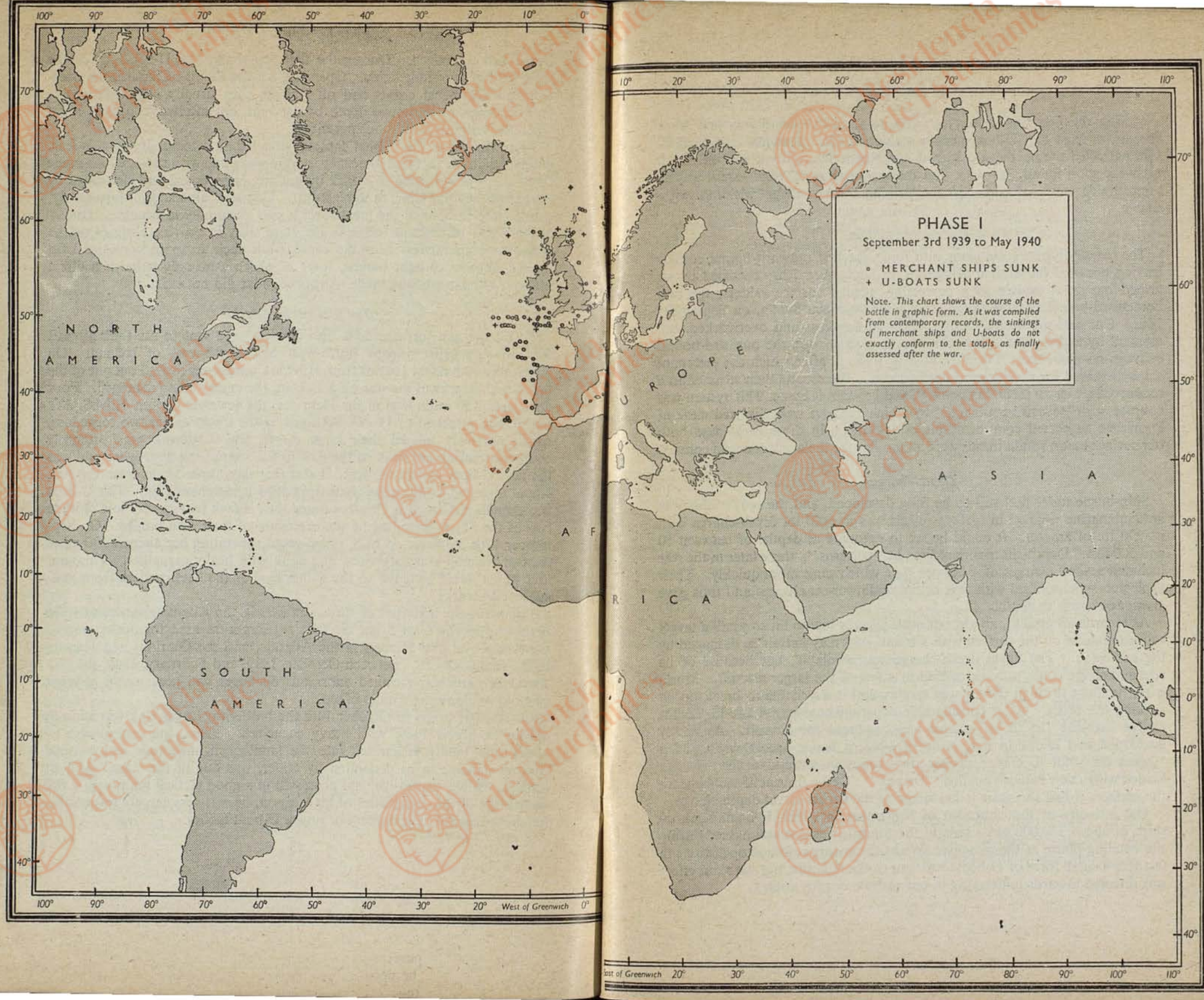
From the outset the U-boat captains dreaded air attack. It was this fear, coupled with the fact that almost every ship was fitted with radio, which made them chary of surfacing to attack by gunfire, or to board and sink ships by bombs as they had done in the last war. Coastal Command, unfortunately, was a mere embryo of the great force it was eventually to become. Its few aircraft had insufficient range to do more than to provide close escort to convoys comparatively near the coast, while their weapons consisted of a limited number of light bombs, some of which were only lethal if a direct hit on a U-boat was obtained. Airborne radar did not exist.

The first aerial attack

To fill the gap further afield, fleet carriers were sent to use their aircraft for anti-submarine sweeps north-west and south-west of Ireland. On September 10th naval aircraft from H.M.S. Courageous carried out one of the first aerial attacks of the war on a U-boat, the enemy being damaged. Four days later, 150 miles west of the Hebrides, the new fleet carrier, H.M.S. Ark Royal, was attacked by U-39. Betrayed by the tracks of her two torpedoes, which narrowly missed their large target, the submarine was promptly counter-attacked and sunk by the Ark Royal's screening destroyers, and was the first U-boat loss of the war. Later that day, three Skuas from the Ark Royal attacked U-30, which had torpedoed a merchant ship. The U-boat was damaged, though in pressing home their attack from a very low altitude two of the Skuas were lost by the explosion of their own bombs. On September 17th, however, H.M.S. Courageous, operating her aircraft 200 miles west of Ireland, was torpedoed and sunk with heavy casualties. This, our first major naval loss, led to the withdrawal of the fleet carriers from anti-submarine work.

Following the activities of surface raiders in the Atlantic, particularly the break-out of the Graf Spee, the fleet carriers were used for ocean search: the Ark Royal and Hermes in the Atlantic, and the Glorious and Hermes in the Indian Ocean. Between October, 1939, and February, 1940, the Ark Royal in particular steamed enormous distances and her aircraft covered some 4½ million square miles of sea.

In the early hours of October 14th the battleship Royal Oak was sunk at anchor in Scapa Flow with heavy casualties. Prien, the commander of U-47, who boldly penetrated into the landlocked anchorage and escaped without damage to be decorated by Hitler, was one of the "ace" U-boat leaders. Brave, aggressive, and possessed of a good tactical brain with a full knowledge of the capabilities of his weapon, he was very largely responsible for the successful development of future U-boat tactics.


PHASE I
September 3rd 1939 to May 1940
° MERCHANT SHIPS SUNK
+ U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
West of Greenwich
East of Greenwich

During the first few weeks our striking forces of destroyers had some success, at least two U-boats being accounted for. Trawlers and whalers, too, patrolled the northern exit from the North Sea, but without effect. It was very soon found, however, that the searching of "likely" areas was an unprofitable waste of effort, so the striking forces and patrols were withdrawn.

The convoy system

The convoy system soon came into force, the first outward-bound convoy leaving ports of the United Kingdom on September 7th. Escorted by an armed merchant cruiser as a protection against surface raiders, the first homeward-bound convoy sailed from Halifax, Nova Scotia, on September 16th. Our anti-submarine escorts, short in numbers and overworked, but manned by experts and fitted with asdics, usually took the outward-bound convoys no more than 200 miles west of Ireland, after which the merchant ships dispersed for their several destinations. The escorts then steamed to a rendezvous, met an incoming convoy, and brought it home. This system was coupled with "evasive routeing," by which convoys were diverted clear of known or suspected concentrations of U-boats. In those early days both our surface escorts and aircraft were all too few for the work of ocean convoy.

Depth-charges

Ship-borne radar had still to be fully developed, and the only exclusively anti-submarine weapon in surface vessels was the 400-lb. depth-charge with its 290 lb. of amatol. It could be set to detonate at depths of between 50 and 500 feet. Depth-charges were fired in "patterns"; these later in the war included several charges of a heavier type which sank more quickly. Their explosion synchronized with that of the shallower-set charges and thus gave greater coverage in depth.

As regards air attacks, an aircraft must fly very low to hit so small a target as a submarine on the surface with a bomb, and may herself be damaged by the explosion. The naval depth-charge was available, but because of its size and shape could only be carried in a few of the larger aircraft. Moreover, its flight through the air was erratic, and it was liable to break up on striking the water. After considerable experiment a special 250-lb. depth-charge carrying 165 lb. of amatol was produced for aircraft. As finally developed and issued in the spring of 1942, it had a special head and a "break-off" tail to ensure proper trajectories in air and water. It was loaded with a new explosive called "Torpex." Detonating at 25 feet beneath the surface, it had the same lethal range as the earlier naval depth-charge.

The intensity of the campaign of September in which U-boats sank 40 ships of about 150,000 gross tons in the Atlantic was not maintained during the opening phase of the struggle. When the enemy resumed operations in October a small force of U-boats was sent to the Atlantic, but his main effort was directed towards minelaying in our inshore convoy routes.

Meanwhile we were busy supplementing our escort flotillas by laying down large numbers of "Hunt" class destroyers and corvettes, while the arming of merchant ships for defensive purposes continued at full pressure. The asdic, with which the majority of convoy escorts were fitted, had very soon proved its value. For fear of counter-attack by aircraft, the U-boats approached the convoys submerged, thus rendering themselves open to asdic detection, the efficiency of which came as an unpleasant surprise and forced them to abandon their daylight attacks as too dangerous. Whereas in September 97 per cent of the total merchant ship losses were by daylight, November saw more than half the sinkings being carried out by night, when the U-boats could escape on the surface unobserved by aircraft and comparatively free from detection by asdic.

Air and surface co-operate

Coastal Command, too, was gradually building up its strength and gaining wider experience. Radar had been fitted to a few aircraft by January, 1940, and by March it was possible to locate a convoy in bad weather at a range of 18 miles. Single ships and U-boats also could be located at a distance. It was therefore possible to economize in the numbers of aircraft required to search or attack in any given area. The all-important tactical co-operation between aircraft and ships was being developed and improved. In January a Sunderland of No. 228 Squadron had assisted surface forces in the destruction of a U-boat 100 miles west of Ushant, and at the end of June a Sunderland of 10 Squadron, Royal Australian Air Force, shared with escort vessels the destruction of U-26, some 300 miles west of the Scillies.

During the winter of 1939–40, the larger U-boats were operating off the Irish coasts, in the south-western approaches to the Channel, and off the Scottish coasts, while the small 250-ton boats attacked shipping on the east coast of Britain, besides laying magnetic mines in the coastwise channels and off the Thames and Tyne. Within a few weeks this minelaying was extended to Liverpool Bay and the approaches to the Clyde, though activity in this area was curtailed by the destruction of a U-boat off the Clyde in February, 1940.

By the end of 1939 no more than 39 U-boats were in operational use, of which less than ten were at sea at any one time. The enemy, indeed, was preparing for his campaign in Norway and Western Europe, while the best of the early U-boat commanders, admirably trained and experienced in the light of their war experience, were evolving the tactics of night attack on the surface which presently were temporarily to defeat our counter-measures and to make the Battle of the Atlantic so costly for the Allies.

Lull before the storm

By the middle of March, 1940, the offensive had died away. Every available U-boat, even those used for training, had been recalled for the Norwegian campaign, in which it seems their primary duty was the protec-

tion of German shipping. The descent upon Norway took us by surprise, but the U-boat losses of four sunk and two damaged were heavy, partly because the enemy was still unfamiliar with the capability of the asdic, partly because of the inexperience of many of the commanders of training boats. It was in this campaign that the first U-boat to be sunk by a naval aircraft was destroyed in a fiord by a Swordfish catapulted from H.M.S. Warspite on April 13th, 1940.

Though surface raiders had been at sea in the Atlantic, necessitating the use of cruisers in hunting groups, the ocean was clear of U-boats until May, when their operations were resumed in the south-western approaches. It was an attack we were ill-prepared to meet. France was being overrun, and the evacuation of the Army from Dunkirk called for all the available small ships from destroyers downwards and all available aircraft. Even the anti-U-boat squadrons of Coastal Command were employed for the unfamiliar duty of protecting ships against air attack. In this operation our losses in escort vessels and their trained crews were severe, and some time had to elapse before we could build up our convoy escort forces to a strength compatible with their vastly increased responsibilities.

"*The situation was now black indeed*"

With the fall of France in June and the entry of Italy into the war, the circumstances of Great Britain were changed radically for the worse. She was encompassed on the north, the east and the south. Air and U-boat bases were available to the enemy in Norway and the Biscayan ports of France. Britain's harbours and industrial cities and towns were at once open to heavy air attack, while she had also to guard her coasts against the possible threat of invasion. The capture of asdic material supplied to the French may have helped the enemy to work out U-boat tactics to frustrate it, while enemy long-range aircraft were able to search for and bomb our shipping at long distances out in the Atlantic, and to direct the U-boats on to our hard-pressed convoys. Enemy surface raiders were at large in the North and South Atlantic, and were presently to penetrate to the Indian Ocean. In the Eastern Mediterranean our Fleet under Sir Andrew Cunningham was nominally inferior in strength to the Italian, though it was very soon to show its mettle in offensive operations in which the Italians sought safety in flight.

So far as the Navy and Coastal Command were concerned, there had never been a "phoney" war; but for Britain the situation was now black indeed. Our slender naval and air defences were stretched almost to breaking-point, though they were strong enough to force the U-boats further afield into the Atlantic. Our merchant ship losses were grievous, and in site of our most strenuous efforts there was little or nothing we could do to prevent them. Only that vital life-line across the Atlantic remained, and foreign observers did not hesitate to predict the doom of Britain, the only remaining bastion of defence against the Axis domination of Western and Southern Europe.

Worse was yet to come; but the seamen, like the airmen who won the "Battle of Britain," fought gallantly on against a relentless enemy in circumstances of incalculable hardship and peril.

CHAPTER 3

THE SECOND PHASE, June, 1940–Mid-March, 1941

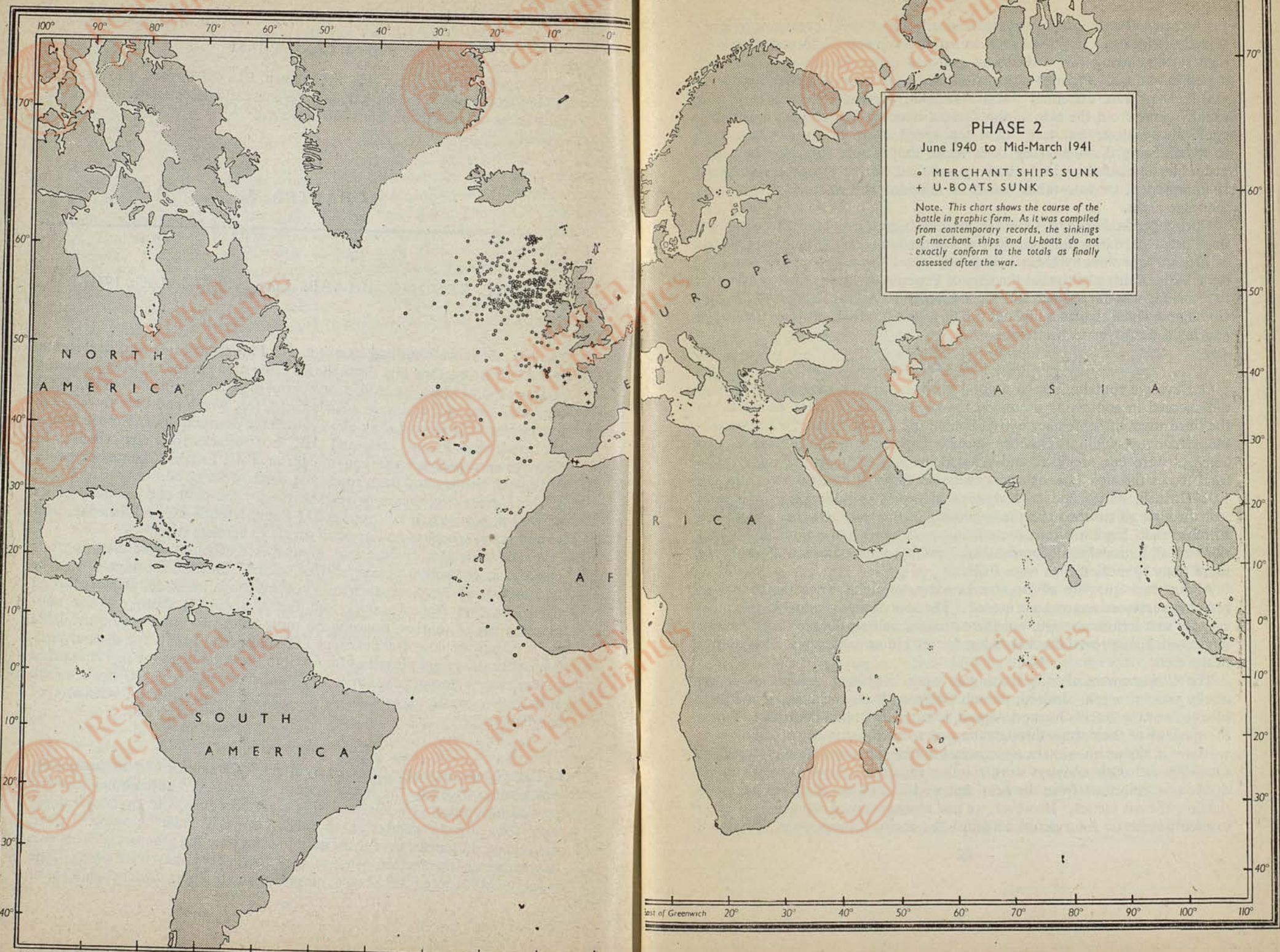
The fall of France soon had its effect. In June there came a recrudescence of the U-boat warfare, and through this cause alone in the next three months no fewer than 152 British, Allied or neutral merchant ships of about 747,000 tons were sent to the bottom. Air attacks, too, which had been responsible for the loss of 36 ships during May, caused the destruction of 73 more during June, July and August. Air and "E" boat attacks soon compelled us to discontinue routeing ocean convoys through the English Channel or south of Ireland, and to send them round the north of Scotland.

The U-boat fleet was now remarkable for the skill and audacity of its personnel, particularly of captains like Prien, Kretschmer and Schepke, who scored many successes and inspired others to emulate them.

Armed merchant cruisers and sometimes battleships were escorting our convoys as protection against surface raiders. But the shortage of smaller anti-submarine escort vessels was so acute through losses and damage during the evacuation from Dunkirk and the diversion of destroyers for anti-invasion duties that on occasion no more than two escorts were available for a convoy of 40 merchant ships. The dispersal points for the outward-bound convoys were pushed as far out into the Atlantic as the fuel endurance of the escorts permitted; but it was not far enough. The U-boats struck still further west, to sink many unescorted ships with an economy of torpedoes.

A new enemy technique

These operations were followed by attacks of a new kind upon the sparsely protected convoys in the north-western approaches. Submarines had low speed under water. While attacking escorted convoys at periscope depth they were always vulnerable to attack through asdic detection. Their periscopes, moreover, gave them no more than fleeting glimpses of what was happening on the surface, while if they dived deep they were blind. The highest surface speed of U-boats, however, was 18 knots, faster than most of


PHASE 2
June 1940 to Mid-March 1941
MERCHANT SHIPS SUNK
U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
West of Greenwich
East of Greenwich

the escorts. To defeat the asdic the experienced U-boat commanders conceived the idea of using their craft as submersible surface torpedo-boats by night. Shadowing the convoys at extreme range during daylight, they closed in at dusk. Flooded down with little more than their conning-towers visible, they were extremely difficult to spot, particularly as their attacks usually came from the side of the darkest horizon. In an emergency they could always dive; but creeping at low speed astern of one of the escorts to avoid being discovered by their wash, they would fire their bow torpedoes at selected ships in the convoy and then turn to escape at full speed. If unmolested, torpedo-tubes would be reloaded and another attack made the same night.

During September the U-boats showed even greater boldness by attacking unescorted ships by gunfire on the surface, though of the 59 merchant vessels of 295,000 tons sunk by U-boats in this month 40 were in convoy. It was in the middle of this month that the City of Benares, carrying children evacuees to Canada, was torpedoed and sunk at night. A Sunderland of Coastal Command which sighted a lifeboat full of young survivors dropped a message and led a destroyer to the rescue.

"*Two convoys were cut to pieces*"

Our evasive routeing served a good purpose, though whenever a U-boat did succeed in contacting a convoy the results were likely to be fatal. In the third week of September two U-boats sank eleven ships of a homeward-bound convoy, while in October, during the period of the full moon, two convoys were cut to pieces and suffered the loss of thirty-one ships. The total losses through U-boat attack were 63 ships of 352,000 tons. In all, 1,026 British, Allied and neutral ships of nearly 4 million tons had been lost through all causes since the beginning of the war. Of these, 568 ships of more than 2 million tons were British. U-boats had accounted for 471 ships of all nationalities of more than 2 million tons, of which 250 ships of more than $1\frac{1}{4}$ million tons were British.

About three-quarters of the attacks came by night, when the chance of rescuing survivors was slender indeed. The loss of many valuable ships and cargoes was serious enough, but the casualties among the merchant seamen might well have proved disastrous but for the indomitable spirit and courage of the men.

The U-boats were already starting to work in groups, though not as yet at any great strength. Indeed, though Germany had proclaimed a complete blockade of the British Isles on August 15th, calling upon neutrals to forbid the passage of their ships through the war zone, the number of submarines working in the north-western approaches during the autumn of 1940 seldom exceeded six. Our convoys were running regularly. Several weeks might divide one holocaust from the next, but we still had no effective counter to the new U-boat tactics. However, we had already started the fitting of radar to escort vessels. As a defence against the enemy's long-range aircraft we

began the fitting-out of catapult ships carrying one single-seater fighter aircraft, and escort carriers which could fly their fighters off and on. We had also started to lay mine barrages off the east coasts of England and Scotland and further north between Orkney, Shetland, the Faeroes and Iceland, to catch U-boats and surface raiders. Numbers of frigates, larger, faster and more seaworthy than the corvettes, together with more corvettes and sloops, were being built in the United Kingdom, while in the autumn of 1940 we received an invaluable contribution from the United States in the shape of fifty destroyers built during the last war. They were soon on service as a welcome reinforcement to our sorely tried escort forces.

The lot of those in the escort craft was difficult indeed in the light of the new U-boat offensive. As often as not the only indication that an attack had occurred was an explosion, which might not be heard more than half a mile away, or perhaps a rocket or a sheet of smoke and flame as a torpedo went home. The weather was often boisterous. The problems of how best to employ their small forces in hunting a U-boat, rescuing survivors, whipping in stragglers and guarding against further attack, strained the ingenuity and endurance of the escort commanders almost to breaking-point. It was a time of severe mental and bodily strain for all concerned at sea.

Radar

In Coastal Command, radar was really coming into its own. In August, 1940, No. 502 Squadron was rearming with Whitleys, and these aircraft of greater range were equipped with a new type of radar which enabled ships of less than 1,000 tons to be located at ranges of up to 27 miles. In July, too, the all-important decision had been made to abandon the use of anti-submarine bombs and to adopt depth-charges of naval design. This enabled air crews to attack from very low altitudes and consequently to obtain much greater accuracy in their attacks. But even so late as September, 1940, the aircraft of Coastal Command were neither sufficiently numerous, nor did they possess the range, to follow the U-boats out into mid-ocean where they were operating to escape the threat of air attack. It was in October that the first R.A.F. squadron was moved to Iceland, which had been occupied by British forces, while later on, when shipping losses became more serious still, an anti-submarine squadron under the orders of the Commander-in-Chief, Coastal Command, was stationed there also. As a large number of the U-boats were working almost out of range of our aircraft at this period, the lack of air bases in the west was causing serious concern. One base for flying-boats had been opened in the west of Scotland, and preparations were being made for others in Northern Ireland. However, a factor which had a considerable effect in limiting the range of air patrols was the denial to us of bases in South-Western Ireland.

Our submarines patrolling in the Bay of Biscay and elsewhere enjoyed

considerable success against the U-boats during the late summer and autumn, sinking at least four. Lorient, which was in full use as a U-boat operational base, was also being bombed by the Royal Air Force. But far away to the west the depredations of the U-boats continued, while more losses were being caused by the enemy's long-range Focke-Wulf Condors.

Sunk in four minutes

On October 26th, 50 miles north-west of Ireland, enemy aircraft bombed and set on fire the Empress of Britain. The fire was controlled and the damaged ship taken in tow with two destroyers as escort. But U-boats in the vicinity had been warned of the occurrence by the German Admiralty, and that same night U-32, commanded by Hans Jenish, succeeded in getting home on its target with two torpedoes. After heavy explosions the Empress of Britain sank in four minutes. On October 30th, still off the Irish coast, Jenish fired a torpedo at the s.s. Balzac. It missed, and the steamer's S.O.S. brought destroyers racing to the scene. Depth-charged by H.M.S. Highlander and brought to the surface, U-32 was riddled by gunfire at point-blank range and sank stern first, twenty-nine survivors of a crew of thirty-eight being rescued.

Three days later, in the same area, U-31 met a similar fate at the hands of H.M.S. Antelope. Prien's boat, U-47, had been severely mauled by three Hudsons of Coastal Command on October 23rd while returning to Germany along the coast of Norway, and on November 5th, U-99, commanded by Kretschmer, one of the most redoubtable U-boat captains, was so badly damaged by H.M.S. Beagle that she was forced to abandon her cruise and return to Lorient.

Largely as a result of these incidents the battle quietened down during early November, though in the middle of that month the U-boats found a soft spot off West Africa and sank four ships. Later in that month another six ships were torpedoed in an Atlantic convoy, the enemy losing U-104 at the same time.

"*Regardless of the odds*"

Meanwhile the enemy pocket-battleship Admiral Scheer was at large in the Atlantic, and on November 5th fell in with a large convoy of 37 ships escorted by the armed merchant cruiser Jervis Bay. What happened is already well known. Regardless of the odds against him, Captain Fegen ordered his convoy to scatter and steered straight for the enemy. Overwhelmed by heavy shell fire and blazing furiously, the Jervis Bay fought to the end. Five of the ships in the convoy were sunk, the others escaping in the growing darkness. But for Fegen's gallant conduct the losses would have been far heavier. The Admiral Scheer continued to operate in the Atlantic and Indian Oceans and returned to Germany on April 1st, 1941, having sunk or captured sixteen ships of more than 99,000 tons.

December, though it started badly, saw something of a lull in the U-boat war, with the enemy moving his operational area further into the Atlantic to attack convoys outside the range of our surface escorts and to escape the increasing effort of Coastal Command. January, 1941, too, brought Italian submarines from Bordeaux operating to the southward of the German, while the intensification of the Focke-Wulf attacks led to heavy losses of shipping, particularly during the early months of the year. Enemy aircraft, too, were successfully "homing" the U-boats on to our convoys.

Up to December, 1940, aircraft had not succeeded in sinking a U-boat single-handed in the open sea, though many U-boats were severely harassed by air attacks. On January 6th, 1941, however, Sunderland "H" of 210 Squadron, captained by Flight-Lieutenant E. F. Baker, sighted an Italian U-boat on the surface during a patrol 150 miles west of Cape Wrath. The submarine at once started to dive, and two depth-charges were released and exploded ahead of the swirl. A large piece of twisted metal was seen to be thrown up from the disturbed water, and for an hour afterwards the sea was covered with thick oil. This was Coastal Command's first unaided success.

To meet the extension of the U-boat operational area to the westward, we began to develop Iceland as a naval base. Nineteen escort destroyers and fifty-six corvettes had been completed during 1940, but still more frigates were ordered to meet the need for higher speed and greater seagoing endurance. The development of air bases in Northern Ireland was proceeding, while to counter the Focke-Wulfs, Beaufighters were included in Coastal Command.

Admiral Sir Martin Dunbar-Nasmith, Commander-in-Chief Plymouth since before the outbreak of war, was also in command of the Western Approaches until February, 1941. Admiral Sir Percy Noble, with combined sea and air headquarters at Liverpool, then became Commander-in-Chief Western Approaches. Air Chief Marshal Sir Frederick Bowhill was Commander-in-Chief, Coastal Command.

Three types of U-boat

The first U-boats of the large numbers laid down by Germany on the outbreak of war were ready for service early in 1941. They were of two standard types, the so-called "500-ton boats" with a total range of 11,000 miles at economical speed, and the "740-tonners" with 4,000 miles more. It was not until later that the U-cruisers made their appearance in limited numbers. At slow speed they had a range of 25,000 miles, and there is a case on record where a U-cruiser—U-188—was away from her base in France for eleven days short of one year. After refuelling from a surface tanker in the South Indian Ocean, she went north to operate off the Gulf of Arabia, finally arriving at Penang after covering 19,000 miles in 121 days at sea. She embarked a valuable cargo of tin, rubber, quinine, wolfram and four chests of opium at Singapore, and sailed to sink seven ships between Ceylon and Aden, and, after a series of adventures, reached Bordeaux,

having been at sea for 162 days from the Straits of Malacca. Even the 500-ton boats could spend up to three months at sea. When the cramped discomforts and strain of life in submarines are realized, these extended cruises provide a fair indication of the stamina and morale of the U-boat personnel. Our ideas of heroism may differ, but it was not without reason in May, 1945, when all was lost, that Admiral Dönitz paid tribute to the tenacity of his men who were laying down their arms "after a heroic fight which knows no equal."

The year 1941 opened with tempestuous weather, and at about this time the straggling of ships from slow convoys had become very prevalent. It was causing great concern and considerable loss, and continued to do so until the end of 1943. It was not so much the fault of the shipmasters as of the age and unsuitability of some of the ships we were now compelled to include in the convoys.

Though our losses in both January and February, 1941, were lower than in any month since June, 1940, U-boats still took toll of 57 ships. The heavy cruiser Hipper with the battle-cruisers Scharnhorst and Gneisenau were also raiding in the Atlantic during February and March, sinking or capturing between them twenty-seven ships. The Scharnhorst and Gneisenau reached Brest in March, where they were still a serious menace to our Atlantic convoys.

In March the spring offensive of the U-boats started in real earnest. At least a dozen boats, some of them commanded by the most able captains, were at sea. The enemy's "wolf pack" tactics started, and our losses mounted alarmingly. Among the U-boats operating were U-47, Prien; U-99, Kretschmer; and U-100, Schepke, all of whom were reported by the Germans to have sunk 200,000 tons of shipping, for which they received the adulation of their countrymen and the automatic award of the Knight's Cross of the Iron Cross with oak leaves. Prien, in particular, was a fervid disciple of the head of the submarine service, Admiral Dönitz, himself a U-boat captain of the last war.

The end of three "aces"

In the course of the month, however, six U-boats were liquidated in the North Atlantic, and among them were those commanded by the three "ace" captains. Prien's boat was sunk by depth-charges from the destroyer Wolverine on March 8th. There were no survivors. At 3 a.m. on March 17th, Schepke's boat, hunted and depth-charged, was forced to the surface, to be rammed and sunk by the destroyer Vanoc. Schepke himself was killed, crushed by the Vanoc's bows between his crumpled bridge and periscope. Half an hour later Kretschmer's U-99, which had been operating with U-100, suffered the same fate at the hands of the destroyer Walker, Kretschmer himself being a survivor.

The elimination of these three "aces" had a considerable effect upon the

Battle of the Atlantic. They outshone all the others in ability and cunning. Few of the U-boat commanders who came after were their equals.

"*We must take the offensive*"

On March 6th a directive from the Prime Minister had stated that: "In view of various German statements, we must assume that Battle of the Atlantic had begun.

"The next four months should enable us to defeat the attempt to strangle our food supplies and our connexion with the United States."

For this purpose, among other measures, the Prime Minister directed:

"1. We must take the offensive against the U-boat and the Focke-Wulf wherever we can and whenever we can. The U-boat at sea must be hunted, and the U-boat in the building yard or in dock must be bombed. The Focke-Wulf, and other bombers employed against our shipping, must be attacked in the air and in their nests.

"2. Extreme priority will be given to fitting out ships to catapult, or otherwise launch, fighter aircraft against bombers attacking our shipping. Proposals should be made within a week.

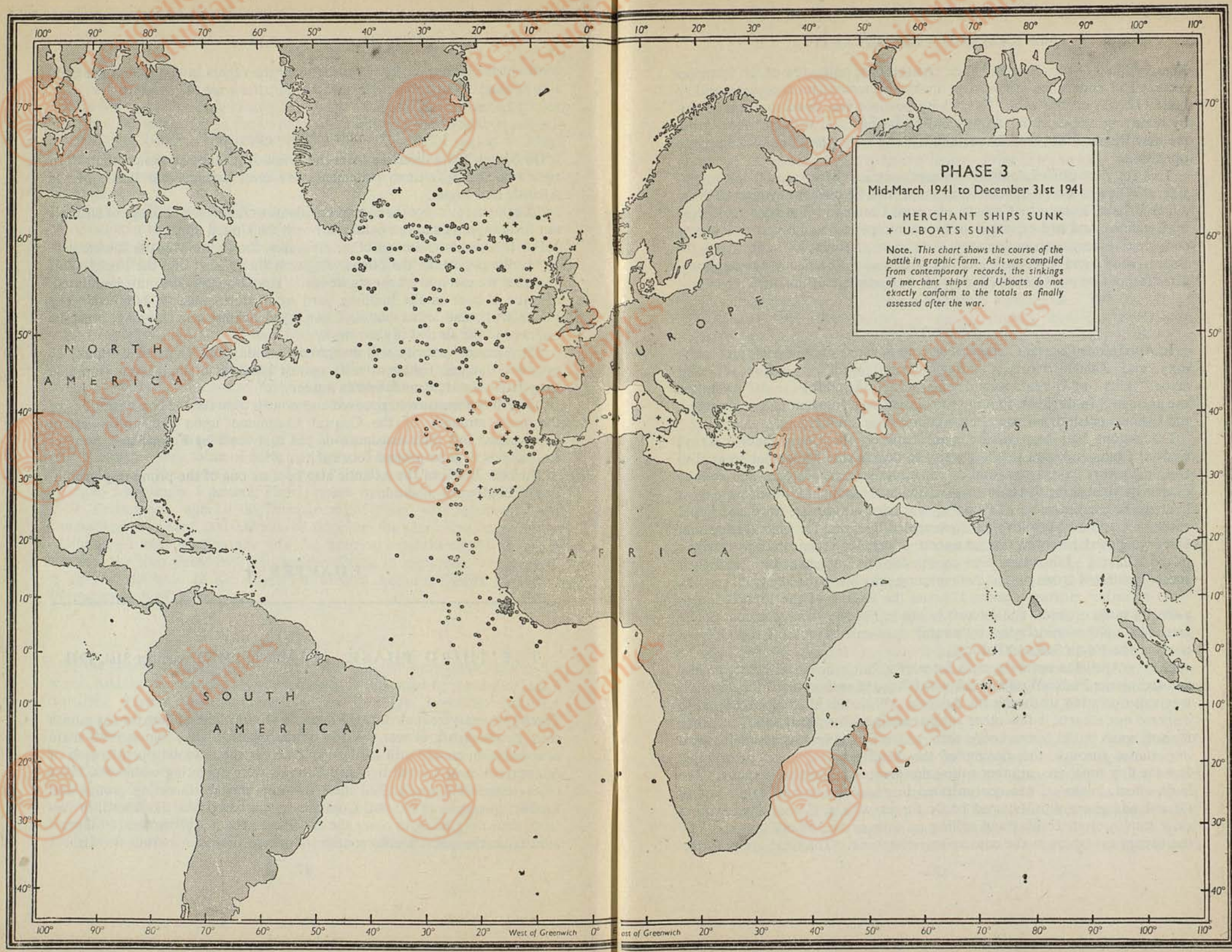
"3. All the measures approved and now in train for the concentrations of the main strength of the Coastal Command upon the north-western approaches, and their assistance on the east coast by Fighter and Bomber Commands, will be pressed forward. . . ."

Thus the Battle of the Atlantic also became one of the prime responsibilities of Bomber Command.

CHAPTER 4

THE THIRD PHASE, Mid-March, 1941–December 31st, 1941

Seven U-boats were sunk during March, 1941, the highest figure for any month since the outbreak of war. Partly as the result of this, the enemy's main concentration moved still further west across the Atlantic out of reach of our surface escorts, until by April U-boats were operating within 500 miles of the coast of Canada. To meet this new menace escorting groups and further squadrons of Coastal Command were based near Hvalfiord, in Iceland, their duty being to cover the convoys to the neighbourhood of Greenland from the point to the southward where the escorts from the United


PHASE 3
Mid-March 1941 to December 31st 1941
o MERCHANT SHIPS SUNK
+ U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
NORTH AMERICA
SOUTH AMERICA
EUROPE
AFRICA
ASIA
West of Greenwich
East of Greenwich

Kingdom had to turn back to refuel. At this time only a few of the destroyer escorts had endurance sufficient to make the transatlantic passage and to hunt U-boats on the way. Everything possible was done to improve this by removing non-essential fittings and replacing them with fuel-tanks; but the new frigates, fast, well armed and of long range, had not yet come into operation.

This relay system of convoy was uneconomic. Moreover, it left a considerable gap in mid-Atlantic which could not be covered by aircraft from either Britain, Iceland or Canada. Coastal Command had been reinforced by Catalinas, and had extended its sphere of operations. It was now strong enough to escort each convoy for a distance of some 400 miles from the British coast, and on April 15th the Admiralty assumed the operational direction of Coastal Command through its Commander-in-Chief.

A million miles

In April alone Coastal Command aircraft flew one million miles on convoy duty, and 200,000 miles on anti-submarine patrol, though as yet their actual "kills" of U-boats were disappointing. Aircraft were still of limited use at night. In daylight, sighting the aircraft as a rule before being sighted, the U-boats crash-dived and altered course after submerging.

Discussions had been taking place between the Commander-in-Chief, Coastal Command, and the Admiralty to decide whether or not to abolish close air escort to convoys, and to substitute sweeps, searches and convoy escorts by air striking forces in areas where it was thought U-boats were most likely to be concentrated. This policy was tried out during April and found successful, and on May 9th was implemented by signal for general adoption. Our crying need, however, was for aircraft of very long range to bridge the gap in the Atlantic. Liberators were chosen for this important task, and their specially selected crews started their training, which was the key to all success.

As a further measure against U-boats the mining of the French Biscay ports by surface vessels and aircraft began in February and was continually extended. Other minelaying by aircraft was carried out off the German ports in the North Sea and Baltic.

During April the enemy's main force of about a dozen U-boats, greatly assisted by the Focke-Wulf aircraft which located and reported the convoys, was still operating in the North Atlantic. With the idea of forcing us to disperse our escorts, a few other submarines had been sent south to probe for soft spots in the Sierra Leone area, where Freetown was assuming great importance through the closing of the Mediterranean to our shipping. For the first time, too, another submarine went south of the Equator. The main effort, however, was concentrated in mid-Atlantic and south-east of Greenland, where April started badly for us with a U-boat shadowing a slow convoy from Halifax and calling up four or five others to assist. Of the twenty-two ships in the convoy ten were sunk. The total losses in this

month through U-boat attack were 41 ships of more than a quarter of a million tons gross.

The Bismarck is sunk

Towards the end of May air reconnaissance showed that the German battleship Bismarck with the heavy cruiser Prinz Eugen had sailed from Bergen, in Norway. As they could have wrought havoc in the Atlantic, the Navy and Air Force were set in motion. On May 24th these ships were brought to action by naval forces in the Denmark Straits between Iceland and Greenland, when the Hood was blown up and sunk and the Bismarck damaged. Until the early hours of the 25th the enemy were shadowed to the southward, when they were lost in thick weather. Naval forces were concentrating, and on the morning of the 26th the Bismarck was located in very bad weather by a Catalina of Coastal Command. The net closed in. Attacked with torpedoes by naval aircraft and destroyers, the Bismarck was finally sunk by battleships and cruisers on May 27th. The Prinz Eugen, which had not been sighted since the early morning of the 25th, reached Brest, where the Scharnhorst and Gneisenau were already lying.

May had also brought an increase of submarine activity in the Freetown–Cape Verde area, where a group of six U-boats sank 32 ships during the month. Nevertheless, the convoy battles still continued to rage far to the west and south in the North Atlantic, with an increasing number of U-boats at sea. The only logical reply was "end to end" surface and air escort throughout the North Atlantic and southward to Gibraltar and Freetown with the few suitable vessels and aircraft we then possessed. Valuable help was given in the far west by the Royal Canadian Navy, which based all its available destroyers and other anti-submarine craft at St. John's, Newfoundland. The transfer of ten coastguard cutters to the Royal Navy by the United States greatly helped to reinforce our hard-pressed, long-range escorts.

Our losses by U-boats in the 92 days of March to May, 1941, inclusive, amounted to no fewer than 142 ships of nearly 818,000 tons. Of these 99 ships of about 600,000 tons were British. In the same three months enemy aircraft, surface vessels and mines had accounted respectively for another 179, 44 and 33 merchant ships. The total British, Allied and neutral loss through all causes in that period totalled 412 ships of 1,691,499 tons, up to date the worst three months of the war.

With the sinking of U-110 in May, the active career of the last captain to have commanded a submarine at the beginning of the war was ended. But the heavy German building programmes undertaken during the first winter were coming to fruition, and in June there were 35 U-boats at sea with all but ten in the North and West Atlantic. There is evidence which shows that at this time the U-boat service was suffering from "dilution." A great proportion of the officers and crews were young and inexperienced,

though what they lacked in skill they partly made up for by pertinacity and fanaticism.

"Snowflake"

To frustrate the U-boat attacks during darkness a brilliant illuminant, known as "Snowflake" and designed to turn night into day, was introduced during May. As a defence against the ever-growing threat of enemy aircraft, merchant ships had already been armed with anti-aircraft guns and the crews trained in their use. The real defence, however, was in the air, and in May, 1941, offensive interception by Coastal Command's long-range fighters and anti-submarine escort aircraft was supplemented when the first merchant ship fitted with a catapult and a single Hurricane sailed with a convoy. Once flown off, the aircraft was irrecoverable and the pilot had to bale out and be rescued from the sea. The system was tried out by the Naval Air Arm, after which it was operated by Fighter Command, R.A.F. The first escort carrier, the Empire Audacity, later H.M.S. Audacity, converted from a merchant ship, was at sea by June. She carried aircraft flown and maintained by the Naval Air Arm, and had a flight deck for their operation.

June, 1941, saw a slight diminution in our total monthly losses, though with 57 ships sunk by U-boats, 35 of them British, they were still serious enough. On the other hand, our escort groups were gradually increasing in number and getting into their stride, the month seeing six U-boats, two of them Italian, satisfactorily destroyed. On June 14th, Air Chief Marshal Sir Philip B. Joubert de la Ferté relieved Sir Frederick Bowhill as Commander-in-Chief, Coastal Command.

Though the enemy exerted every effort, particularly to the south-east of Greenland, July and August were comparatively lean months for his submarines. August, indeed, saw imports into the United Kingdom continuing to come in at the rate of nearly one million tons a week. The new policy of employing aircraft offensively against the U-boats was very successful. Whereas we lost 57 ships in the North Atlantic during May, 22 were sunk in August. Our evasive routeing was also having its effect, and the U-boats moved east with a view to attacking the denser concentrations of shipping nearer the British Isles. They were placing increasing reliance on their aircraft for help in locating convoys and maintaining contact. During August one convoy outward bound to Gibraltar was shadowed all the way from the west of Ireland to the latitude of Lisbon and lost ten ships, two of which were escorts, in a series of U-boat attacks lasting four nights.

North Russian convoy

Following Hitler's attack upon Russia and our promise to send all possible aid to our new Ally, a new commitment arose in August with the despatch of the first convoy to North Russia. Loaded in Britain or America, the ships usually assembled in Iceland and sailed to Archangel or Murmansk. Nine east-bound Russian convoys comprising in all 63 ships were to sail

before the end of the year. Only one of these ships was lost by U-boat attack during the outward and homeward voyages.

Capture of U-570

August 27th, 1941, was a red-letter day for Coastal Command. At 8.30 that morning, in very bad weather, a Hudson on anti-submarine patrol sighted a U-boat on the surface about 80 miles south of Iceland. Though unaware that she had been seen, the submarine—U-570—dived, so the aircraft dropped smoke floats to mark the spot and sent off a sighting report. Two hours later another Hudson aircraft, "S" of 269 Squadron—Squadron-Leader J. H. Thompson—sent out from Iceland, sighted U-570 just as she was surfacing. The submarine tried to crash-dive, but the aircraft was too quick and dropped four depth-charges. They were well placed, though the damage caused was not lethal. However, the explosions, the smashing of instruments and some slight flooding brought panic among the U-boat's seasick and inexperienced crew. Rahmlow, her commander, was not of the calibre of men like Prien or Kretschmer, who would have restored order, repaired damage and probably made good their escape. Convinced that all was lost and fearful of chlorine gas, he ordered his men to put on their life-jackets and brought the U-boat to the surface. Men appeared on deck, while the Hudson, fully master of the situation, sent off a signal asking for surface vessels, and by skilled manœuvring and judicious use of her machine-guns prevented the Germans from manning their anti-aircraft weapons. But the enemy was in no mood for fighting it out. He waved a white flag: actually the captain's shirt. Until the afternoon, in tempestuous weather, the Hudson circled her prize. Then, with her fuel running low, she was relieved by a Catalina and further relays of aircraft kept watch during the night, occasionally dropping flares to keep the U-boat in sight. A trawler arrived at 11.0 p.m., and warned Rahmlow not to attempt scuttling. More trawlers and a destroyer appeared early next morning, and later that day, still in very stormy weather, U-570's crew were removed and she was taken in tow, to be beached in Iceland. She was not extensively damaged, and was soon on her way to England manned by a skeleton British submarine crew, later to be commissioned as H.M.S. Graph. She provided us with technical details which greatly assisted in our anti-submarine measures.

This incident suggested the deterioration in some of the U-boat crews. It was U-570's first war cruise, though there was nothing in her damage to have prevented her from diving. Instead, Rahmlow preferred to surrender. Some of that U-boat's older and tougher men, as prisoners of war, voiced their contempt for the inexperience of their officers and the pusillanimity of the young Nazi crew.

Net defence

Throughout the war there were many suggestions for countering the U-boat menace. They were all carefully scrutinized at the Admiralty, among them

proposals for various forms of obstructions to intercept torpedoes, usually intended to be towed by ships on the flanks of the convoys. The only practical form of baffle was a light but strong wire net, carried by the ship herself. It was slung from booms, and rigged whenever the state of the sea allowed it. This "Admiralty Net Defence" was fitted to a few ships in August, 1941, and by the end of the war had been provided for about 700 vessels. It was never infallible, and covered no more than 60 to 75 per cent of the ship's side. Nevertheless, its provision was worth while. Of the 21 ships contacted by torpedoes while nets were streamed, six were sunk through the nets being penetrated or the torpedoes striking the hull in an uncovered part. In the other fifteen instances the torpedoes either exploded in the net, causing non-lethal damage, or else failed to penetrate it. In the case of one troopship a live torpedo was found entangled in the nets when they were hauled up on arrival in harbour. The ship had unwittingly been towing it for 36 hours.

Though the United States had not entered the war, it had been arranged in April, 1941, that American warships and aircraft would carry out periodical sweeps along the trade routes and in focal areas in the Western Atlantic, any Axis ships met being shadowed and reported. United States ships were ordered not to take offensive action. Early in September this benevolent form of neutrality was considerably modified, in that United States warships and aircraft were ordered to destroy surface raiders which attacked or threatened to interfere with shipping using the route between North America and Iceland, which had been occupied by the United States Army in July. On this route, in October, U-boats sank one United States destroyer and damaged another. In September, too, the United States had undertaken the escort of the faster trade convoys in the Western Atlantic, while in November President Roosevelt signed the Bill authorizing the arming of American merchantmen and permitting their passage to ports in the war zone.

Fuelling at sea

In September, 1941, with our greatly extended convoy routes demanding protection against the widening activity of the U-boats, we were still very short of long-range escorts. It was now that successful experiments were first made in fuelling the escorts at sea, thereby increasing their endurance. This system soon came to be adopted as normal. For us, however, September was again a month of heavy loss, 53 ships totalling more than 200,000 tons being sunk by U-boats. At least twelve submarines were working in the Western Atlantic, one slow convoy homeward bound losing a quarter of its 64 ships in a series of attacks lasting four days. As against this we could claim seven U-boats destroyed in all areas.

It so happened that the Chambly and the Moosejaw, new corvettes of the Royal Canadian Navy, were at sea on a "shake down" cruise when they were ordered to reinforce the escort to this particular convoy. They saw rockets fired during a night attack and immediately altered course to close.

About forty minutes later a contact was obtained with the asdic, whereupon the Chambly attacked and fired a depth-charge pattern which brought the submarine—U-501—to the surface close to the Moosejaw, so close that when the latter put her engines astern the U-boat was practically alongside. Men could be seen on the conning-tower with their hands up, and the German captain, Forster, took his chance and leapt deftly and dryshod on board the corvette. Others were about to follow when the Moosejaw sheered off. U-501, minus her commanding officer, made off at high speed, some of her crew running forward to man their gun. The Moosejaw turned to ram, struck the U-boat a glancing blow and opened fire, whereupon the Germans abandoned ship. U-501 was boarded, but sank soon afterwards. Forster's excuse for being the first to leave his ship was that he wished to demand that his crew should be saved. His captors thought otherwise. This was the first occasion on which a U-boat surrendered to ships of the Royal Canadian Navy, and neither the Chambly nor the Moosejaw had been in action before.

Heavy gales

The last three months of 1941 was a period of exceptionally bad weather in the North Atlantic. It reacted upon the activity of the U-boats, and our losses fell to 32 ships in October, 12 in November and 25 in December. Heavy gales followed each other in rapid succession, which brought tribulation to the escorts no less than to the merchant ships. Entire convoys were scattered or forced to heave to, while many ships had to put back through weather damage or mechanical breakdown. With a large number of vessels in ballast and therefore difficult to handle in a seaway, straggling increased, which greatly added to the anxieties and responsibilities of the escort commanders. There is a case on record in November where a convoy of 43 ships had no fewer than 26 stragglers.

During the late summer and autumn the U-boats, including some Italian, were concentrating on the Gibraltar and Sierra Leone convoys. Focke-Wulf aircraft were also attacking, and "homing" the U-boats on to the convoys. Against the former our fighter catapult ships were having some success. On August 3rd, 1941, a Hurricane from H.M.S. Maplin, flown by a naval pilot, shot down a Focke-Wulf. The pilot ditched his aircraft after the combat, and was picked up unhurt. Martlet aircraft from H.M.S. Audacity, converted as already mentioned into an escort carrier, shot down one Focke-Wulf during her first trip to Gibraltar with a convoy, and two more on her next voyage.

The surrender of U-111

A notable event occurred on October 4th, 220 miles west-south-west of Teneriffe, when the armed trawler H.M.S. Lady Shirley, Lieutenant-Commander A. H. Callaway, R.N.V.R., sighted the conning-tower of a U-boat ten miles away. Altering course to investigate, the trawler soon established a contact, and after she had fired a pattern of depth-

charges a submarine duly broke surface. The Lady Shirley at once engaged her more heavily armed opponent with every gun that would bear. The trawler lost one man killed and four wounded and was considerably damaged, but after a fierce engagement lasting less than fifteen minutes U-111 surrendered. She sank soon afterwards, and the Lady Shirley returned to Gibraltar with 44 prisoners, greatly outnumbering the trawler's crew. Eight Germans, including U-111's captain, were killed during the battle.

The enemy strength in U-boats was now sufficient to allow a gradual penetration into the South Atlantic, where ships were sunk off the coast of Brazil and off St. Helena. Cruiser patrols, however, by sinking three submarine supply ships, prevented a large-scale campaign against unescorted shipping in this area. U-boats had also started to enter the Mediterranean for operations along the North African coast. This effort was intensified in November during our offensive in Libya, off the coast of which on the 25th of that month H.M.S. Barham was sunk by U-331.

The well-known aircraft-carrier H.M.S. Ark Royal was sunk west of Gibraltar on November 13th, 1941. Her nine Swordfish aircraft of 812 Squadron, Naval Air Arm, were flown to Gibraltar and used to assist Coastal Command squadrons in anti-submarine duties. Though their equipment and spares had been lost with their parent ship and conditions at the airfield were difficult, the squadron carried out a series of night patrols until the middle of January, 1942. Provided with radar, these small aircraft proved their value in detecting U-boats trying to make the difficult passage into the Mediterranean. They made nine attacks, resulting in one U-boat being sunk and three damaged. A U-boat destroyed off Gibraltar on December 21st was the first to be sunk by aircraft at night.

December 7th, 1941, had seen the entry of the United States into the war after the Japanese attack upon Pearl Harbour. It made little immediate change in the U-boat war, though during that month no more than 20 U-boats were at sea in the North Atlantic. The enemy was preparing for his U-boat campaign in American coastal waters, while using every effort to reinforce his flotillas in the Mediterranean. Several were sunk while trying to pass through the Straits of Gibraltar, others being so damaged that they had to return to base.

Gibraltar convoy

The outstanding event of December was the homeward passage of one of the Gibraltar convoys. It consisted of 32 ships, with an escort which varied between 9 and 18 vessels with the escort carrier Audacity, the whole force commanded by Commander (later Captain) F. J. Walker. This gallant officer, now deceased, used the most aggressive and often novel tactics and was soon to become the foremost U-boat killer of the war. In this particular case numerous aircraft sightings on the convoy's route made it appear likely that trouble lay ahead. Indeed, the convoy was being shadowed by U-boats within a few hours of sailing, and by Focke-Wulf aircraft early next day.

It was on the third day out that a U-boat was sighted on the surface by one of H.M.S. Audacity's aircraft 22 miles from the convoy. Five escorts, including Commander Walker's ship, H.M.S. Stork, moved out at full speed to attack. After a series of depth-charge attacks U-131 came to the surface and was sunk by gunfire, though not until she had succeeded in shooting down one of the Audacity's aircraft.

On the fourth day out U-434, which was shadowing the convoy, was sunk within the hour by two destroyers, while at much the same time the Audacity's fighters drove off enemy aircraft and damaged one.

The enemy scored their first success in the early hours of the fifth day, when one of the escorting destroyers was torpedoed and blown up. Within ten minutes the submarine had been located. She was seen on the surface 200 yards ahead of the Stork, which increased speed to ram and opened fire with her forward guns. For ten minutes U-574 circled continuously just inside the Stork's turning circle, but was finally rammed and rolled over with ten depth-charges to complete the business as she passed astern. A little later one of the ships in the convoy was torpedoed and finally had to be abandoned and sunk by a corvette. Full daylight came and two enemy aircraft appeared, one of which was promptly shot down by the Audacity's fighters. That ship had now only three serviceable aircraft remaining, though the same afternoon they shot down another Focke-Wulf ahead of the convoy.

A plank between them

Early in the morning of the sixth day, the naval aircraft of the dawn patrol discovered two U-boats alongside each other 25 miles astern of the convoy, with a plank between them. They seemed to be making good some damage. The aircraft dived and shot three men off the plank, whereupon the U-boats made off on the surface, steering away from the convoy. That same night another merchant ship and H.M.S. Audacity were both torpedoed and sunk, the Audacity's aircraft, which had given such valuable service, being lost with her. Several depth-charge attacks were made on a number of asdic contacts, while other U-boats were seen on the surface. One of these—U-567—was later admitted by the Germans to have been lost.

By the morning of the seventh day out, two of the escorts, the Stork and Deptford, were reduced to slow speed and had their anti-submarine equipment out of action. That day, however, Commander Walker received a timely reinforcement in the shape of Liberators of Coastal Command operating 800 miles from their base in Ulster. They attacked and damaged one U-boat and forced another to submerge. The enemy, however, still hung on and it was not until the next night that the last U-boat shadower was forced to dive by two destroyers sent out from England to reinforce the escorts.

"Everything depended upon team-work"

That greatly harassed convoy reached its journey's end after thirteen days at sea. It had lost the Audacity, one destroyer and two merchant ships;

but it cost the enemy four U-boats. Above all, it showed that a convoy could be fought through against substantial odds if provided with an adequate number of escorts manned by seamen and airmen of courage and efficiency. The importance of escort by aircraft of very long range was again emphasized. After their arrival no more ships were lost. Everything depended upon team-work and co-operation, not merely between the vessels of the escort groups, but between the surface and air escorts.

It was encouraging to know that our counter-measures of all kinds were gradually gaining ground over the U-boats. Whereas 42 had been sunk during 1940, 53 were destroyed in 1941, with no less than nine in December. Nevertheless, optimism was premature. The U-boats were not beaten. With the entry of the United States into the war, the effort of a greatly increased U-boat fleet was soon to be concentrated anew in a most vital and vulnerable area.

CHAPTER 5

THE FOURTH PHASE, January–July, 1942

The entry of the United States into the war in December, 1941, provided the German U-boat Command with new and welcome theatres of operation. The submarine campaign against seaborne trade in 1940–41, serious though it was for us, had been only a limited success for the enemy, and everywhere our counter-measures were gradually gaining the ascendancy. But no fewer than 260 U-boats were now available, and more were coming into service at the rate of about twenty a month. By the end of 1941, moreover, the Germans had largely surmounted their problem of dilution. Many U-boats had been at sea during the past year, and there were numbers of tried and trained men of seagoing experience who could be used to leaven the mass of newer entries into the submarine service.

In American waters

Allowing for the time spent in crossing the Atlantic, the 500-ton U-boats could spend at least three weeks off the east coast of the United States, and the 740-tonners about the same period in the Caribbean. Both promised to be soft spots. Apart from her heavy commitments in the Pacific, the United States had to operate and protect an extensive network of traffic on other

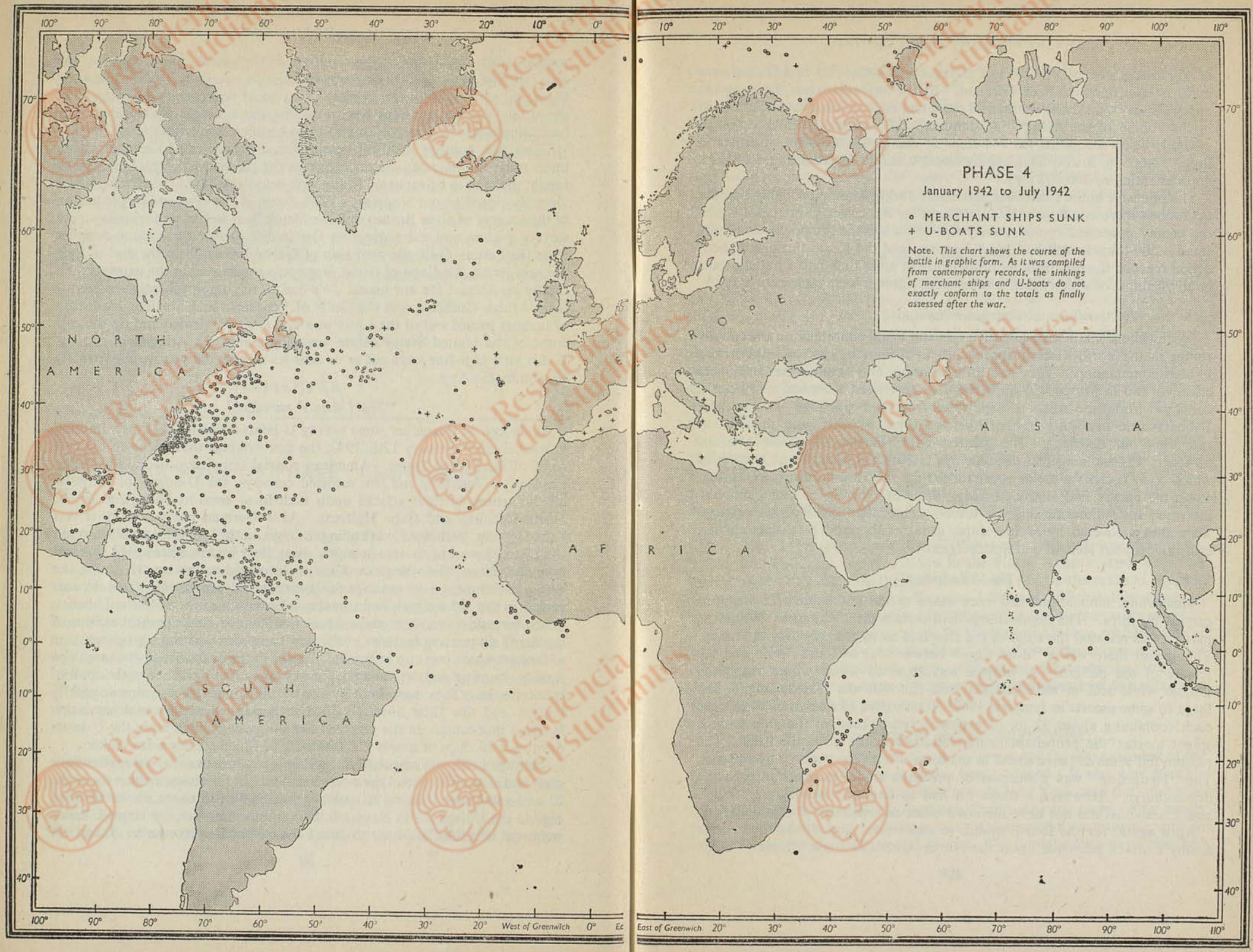
routes. For the U-boats the limiting factors were torpedoes and the endurance of the crews. There was a strain in operating so far from their bases and sometimes in the tropics. Even so, it was considerably less than the strain of these constant battles against the convoys, protected by our increasing escort groups working in close co-operation with aircraft.

There was another excellent reason for a concentrated German attack upon trade in American waters. Except for the convoys which had to be fought through to beleaguered Malta with heavy loss, the Mediterranean was virtually closed to our shipping. With Japan in the war and in possession of the sources of oil in Borneo and the Dutch East Indies, and with Japanese surface raiders and submarines in the Indian Ocean threatening supplies from the Persian Gulf, the provision of fuel to Britain from the east in long voyages round the Cape of Good Hope was precarious in the extreme, and totally insufficient for our needs. We had to rely upon oil from the west—from Aruba, Curaçao, and the Gulfs of Venezuela and Mexico. A stream of tankers passed out of the Caribbean and Gulf of Mexico and up the east coast of the United States before voyaging across the Atlantic in convoy. If this vital pipe-line were cut at or near its source, the war would virtually be won by the Axis.

"*The U-boats' paradise*"

At the end of December some twenty U-boats sailed for their new hunting ground, and on January 12th, 1942, the first sinkings took place off the east coast of the United States. American coastal shipping usually sailed independently. Avoiding the few escorted convoys, the U-boats concentrated all the venom of their attacks upon such focal areas as Hampton Roads, North Carolina and Cape Hatteras. As a German prisoner said, it was "the U-boats' paradise." Spending the days on the bottom in shallow water, the U-boats worked mainly at night, using their high surface speed to overtake and choose their targets. Their main consideration was to obtain the best possible return in tonnage for their limited armament—fourteen torpedoes in the 500-tonners, and sometimes twenty-one in the 740-ton U-boats. When torpedoes ran short ships were often gunned, and the most serious of the many disquieting features of the new campaign was the high percentage of tankers which went up in flames. People in the coastwise towns saw ships sinking, burning and exploding. The sky was often darkened with a pall of black smoke. They were kept awake by the sounds of the almost nightly battles, and saw their hospitals filled with maimed and burned survivors. It was a holocaust. In the nineteen remaining days of January the U-boats destroyed 39 ships of nearly 250,000 tons, of which sixteen were tankers.

Through her heavy responsibilities elsewhere, America was short of surface craft and aircraft to patrol the now vital area. In February, Britain sent over 24 anti-submarine trawlers to assist, while ten British corvettes were turned over to the United States Navy. In that month, however, the larger U-boats were sent into the Caribbean to attack the oil traffic at its source, in the Gulf


PHASE 4
January 1942 to July 1942
o MERCHANT SHIPS SUNK
+ U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
West of Greenwich
East of Greenwich

of Venezuela, and off Aruba and Curaçao. Six German and Italian submarines later operated near Trinidad. As the anti-submarine forces in the area were very weak, no fewer than 23 more tankers were sunk in the Caribbean in the course of the month. In January and February combined, in all areas, U-boats accounted for 144 ships of nearly 800,000 tons. Further to the east near the British Isles, enemy aircraft had destroyed another 44 ships approximating to 200,000 tons.

The offensive in the Caribbean slackened during March, probably because operations there could only be carried out by the larger U-boats, of which the enemy possessed comparatively few. But off the American coast the smaller 500-tonners still had good hunting, and the losses through U-boat action reached the new peak monthly figure of more than half a million tons, in all 94 ships, of which again a substantial number were tankers.

Convoys without loss

Meanwhile a small-scale offensive was still being continued on the convoy routes in the north-western approaches to Britain by the less experienced U-boat commanders. They had little success. Our counter-measures were effective, and in March 450 ships reached the United Kingdom in 19 ocean convoys without the loss of a single vessel from enemy action. Two or three U-boats were operating in the Freetown area, possibly with the idea of extending our defences. The greatest effort outside the West Atlantic, however, was made against our convoys to North Russia, the protection of which soon became a major commitment for the Home Fleet. By March, 1942, the enemy had stationed heavy ships in Norwegian bases and had increased his submarine and air forces. Thereafter the Russian convoys were always covered by capital ships, usually supported by a fleet carrier, cruising between Iceland and Spitzbergen.

The "Hedgehog"

Meanwhile, innovations had been made in the anti-submarine weapons carried by ships. The depth-charge had certain disadvantages. When the pattern was released the stern of the ship had to be roughly over the target. This meant there was a "dead time" between the last asdic echo and the release of the pattern. A weapon was required which would reach the U-boat while still in asdic contact, and this was the "Hedgehog," first fitted to some escorts in January, 1942. It consisted of a salvo of 24 charges each containing about 32 lb. of explosive fired ahead of the ship from a spigot mortar, the propellant being contained in the projectile itself. The pattern fell some distance ahead in the form of an ellipse of 120 by 140 feet. The "Hedgehog" was a weapon of precision and a great advance on the depth-charge. However, a direct hit had to be made to ensure a "kill," and a near-miss did not have the same effect as a pattern of depth-charges.

April again, for the fourth month in succession, saw all the fury of the enemy's attack launched upon the North American coast. Four U-boats

were operating in the Caribbean, while two or three Italian boats sank a number of ships off the coast of Brazil. Elsewhere in the Atlantic there was comparatively little activity. The merchant ship losses for April—75 ships of less than half a million tons—showed a reduction on those for March. This, unhappily, was not so much brought about by the success of any counter-measures as by the melancholy expedient of curtailing sailings, together with the fact that the enemy could not immediately replace his U-boats on patrol. The first submarine to be sunk in American waters was U-85, caught in shallow water off Cape Hatteras by U.S.S. Roper in the darkness of the early morning of April 14th.

A single organization

As our own experience had proved, it was obvious that the concentrated attacks on the American coast could only be met by a convoy system. The measures took some time to bring into force, but the whole scheme of trans-atlantic escort was rearranged, and all anti-submarine forces, American, British and Canadian, were pooled into a single organization. The first convoy between Hampton Roads and Key West was run in the middle of May. The effect was immediate. The U-boats withdrew to focal areas where convoy was not in force, notably in the Gulf of Mexico and the Caribbean. One also went to the Gulf of St. Lawrence and torpedoed two ships, though further depredations in this area were largely prevented by the vigilance of the Royal Canadian Navy and Air Force. Successful though these early American coastal convoys were, they were no more than a palliative, for in May the U-boat sinkings in all areas amounted to 125 ships of more than 600,000 tons, the highest figure for any month of the war up to date.

June, with 144 ships of more than 700,000 tons destroyed, was even worse. There were about 65 U-boats at sea in the North Atlantic, and they were operating in wider areas off the American coast, and on the route to Halifax. By way of a diversion one of the new 1,000-ton U-boats laid mines in Chesapeake Bay, which accounted for three ships before they were swept.

The U-boats were remaining at sea for longer periods than we had thought possible. Moreover, the enemy could still afford to make occasional strikes at our convoys from his Biscay ports, while more ships were sunk off West Africa. In June, for instance, a convoy outward bound to Gibraltar lost five ships in an attack by seven or eight U-boats.

"Counter-measures were rapidly improving"

The coastal convoy system on the American seaboard was extended at the beginning of July, several more routes being opened. It was now possible for a ship to sail from the United Kingdom to New York, and then on to the oil ports in the Gulf of Mexico and the Caribbean, and to be under escort for the entire distance. Counter-measures were rapidly improving, and so were the numbers of attacks upon U-boats. The diminishing success obtained

in American waters caused the enemy to shift the main scene of his operations to the Freetown area. For some months, however, he continued to maintain U-boats near Cuba and Haiti, and in the eastern approaches to Trinidad, to interrupt the traffic between North and South America, as well as the stream of supplies on its way from America round the Cape of Good Hope to the British Empire and Russian armies then engaged in the operations culminating in the decisive victories of El Alamein and Stalingrad.

The period mid-January to the end of July, 1942, during which the U-boat campaign raged in the Canadian and American coastal areas and in the Caribbean, cost the Allies 495 merchant ships of more than 2½ million tons. Of these vessels, 142 were represented by tankers of more than one million tons. In all areas, during the first seven months of 1942, Germany and Italy lost 42 U-boats from all causes.

The Libyan offensive

On the other side of the Atlantic, in the Mediterranean, our offensive in Libya was causing considerable naval activity along the coast. For some time the Germans had been building up their U-boat flotillas based on Italy to stiffen the ineffective naval efforts of their Ally. It was here that British submarines were successfully used against the U-boats, three of the latter, German or Italian, being despatched in the course of one month. One of the victims was the second enemy submarine to be destroyed by H.M.S. Upholder, commanded by the late Lieutenant-Commander Wanklyn, V.C., D.S.O.

By May, 1942, our commitments with Russia required more shipping for the regular convoys to Murmansk and Archangel, with stronger surface and air escort. The enemy had some twenty U-boats and numerous aircraft based in Norway, while surface raiding forces of battleships, cruisers or destroyers might appear at any moment. This meant that each and every Russian convoy must be covered by heavier vessels of the Home Fleet. Further cover was also provided by two Coastal Command squadrons of torpedo-carrying Hampdens based in North Russia.

In those far northern latitudes there is no darkness during summer, and evasive routeing was impossible because of the barrier of thick ice about Jan Mayen and Bear Island. The convoys were within easy striking distance from Norway, and were constantly shadowed and attacked by aircraft. U-boats, though hampered by the ice, were sometimes used as well, and consequently a flight of Coastal Command Catalinas was based in North Russia. We suffered heavy losses in ships and men in fulfilling our pledge to Russia, and the strain on the men who made these long voyages was probably not exceeded in any other theatre of war. Winter, with its almost perpetual darkness, brought little relief, for the Arctic temperature fell well below zero, with gales of wind and heavy snow alternating with thick fog. Men rescued from the sea after their ships had been sunk rarely recovered.

Official statistics of the killed and missing give only part of the picture of

the hazards of the war at sea. With ships carrying explosives or petrol, the end often came quickly by disintegration in a sheet of flame. Ships carrying heavy ores, too, frequently sank like stones. We were taking all possible precautions for the safety of the crews. The regulations as to the equipment of lifeboats and rafts were rigidly enforced. They had to carry special provisions in tabloid form, and emergency stores ranging from fishing-lines to apparatus for condensing sea-water. The first ship's lifeboat fitted with an automatic radio was in use towards the end of 1940. Every ship had to carry three radio officers and at least one motor-boat, while the small red electric lights fitted to life-jackets saved many lives on dark nights when the proximity of U-boats prevented the use of searchlights by the rescue ships.

Rescue ships

The rear ships of convoys had at first been detailed for the work of rescue, though there had been cases of additional sinkings through masters, true to the tradition of the sea, disobeying orders and stopping to rescue their comrades in distress. But in 1941 special rescue ships were fitted out and equipped for the sole purpose of saving life. They were stationed astern of the convoys, and if a ship were torpedoed they remained in the danger area rescuing men while the rest of the convoy took evasive action and steamed on. To offer a restricted target, the rescue ships had to be small, handy and relatively fast, and the only vessels available to meet the requirements were the small ships of the coastal lines with passenger accommodation, or the steamers belonging to the railway companies. These devoted little vessels, manned practically entirely from the Merchant Navy, fought the full-blooded winter gales of the North Atlantic, and were frequently in action with enemy aircraft. Up till June, 1945, 29 rescue ships covered 2¼ million miles on 796 voyages with convoys, and saved the lives of about 4,200 British and Allied seamen.

As has been seen, the U-boat war during the first seven months of 1942 was generally unfavourable to the Allies, though the same period saw developments in our measures of defence which were to prove of immense importance. The strength of our surface escort groups was being augmented by new construction in Britain, Canada and the United States, while Coastal Command, in spite of its many other responsibilities, was playing an increasing part in the Battle of the Atlantic. By January, 1942, a steady stream of newly-commissioned U-boats was coming out by the northern transit route from Germany between the Orkneys and Iceland, some going direct to America, others to the Biscay ports. The efforts of Coastal Command to hunt them in the north were curtailed by lack of aircraft, the shortage being further accentuated by the need for maintaining patrols against the enemy's surface units off Norway and Iceland, as well as off Brest, where now lay the Scharnhorst, Gneisenau and Prinz Eugen. In May, however, reinforced by squadrons from Bomber Command, Coastal Command was able greatly to reinforce its offensive against the U-boats in the transit area of the Bay

of Biscay, through which they all had to pass to reach the Atlantic convoy routes from their main operational bases in France. Until June, 1943, when the first Escort Group could be spared to supplement the air effort, the only means of providing offensive operations in these waters was by Coastal Command aircraft, and the battle grew in intensity as more squadrons became available. The determination and courage with which air crews fought this bitter struggle was to have a profound effect upon the course of the whole battle of the Atlantic.

Air attack by night

Since the beginning of the war, U-boat commanders had enjoyed almost complete immunity from aircraft attack at night. Coastal Command's first attempts at a Bay offensive in the autumn of 1941 had been defeated by the U-boats taking advantage of this weakness by surfacing to charge their batteries under cover of darkness, and proceeding submerged by day. However, they were to receive a severe shock. No. 172 Squadron, manned by specially trained night crews flying Wellingtons fitted with Leigh Lights, had been formed at Chivenor in North Devon, and this new weapon was thrown into the battle of the Bay of Biscay early in June, 1942. The Leigh Light, so named after the officer responsible for its operational development, was a searchlight fitted in the under-turrets of Wellingtons. In conjunction with radar it was possible to locate and home on to surfaced U-boats at night, finally illuminating the target at the range of one mile and attacking with depth-charges in conditions approximating to daylight. The Leigh Light in a modified form was later fitted to Liberators and Catalinas. So the darkness gap was bridged, and from now on it was possible for Coastal Command effectively to hunt the U-boats throughout the full twenty-four hours.

The first night the Leigh Light Wellingtons were used, two U-boats were sighted and attacked, and for the rest of June 172 Squadron continued to have successes. Forced to change their tactics, the U-boats were compelled to spend the least possible time on the surface in the transit area. This they usually did by day, when at least they could see the approach of attacking aircraft. At night the Leigh Light Wellingtons approached unobserved, to complete their attacks a few seconds after showing their searchlights.

The spring of 1942 saw another important addition to the armoury of Coastal Command. This was a depth-charge loaded with the deadlier explosive "Torpex" and set to explode at a depth of only 25 feet.

Better weapons and aircraft

From June onwards, the Bay of Biscay offensive from the air raged with increasing ferocity. Better weapons and better aircraft in larger numbers gradually became available. None of the counter-measures the enemy devised could loosen the stranglehold over the U-boats which Coastal Command held in this, their favourite hunting ground. Up till July there had been only one case of a U-boat remaining on the surface to fight it out with

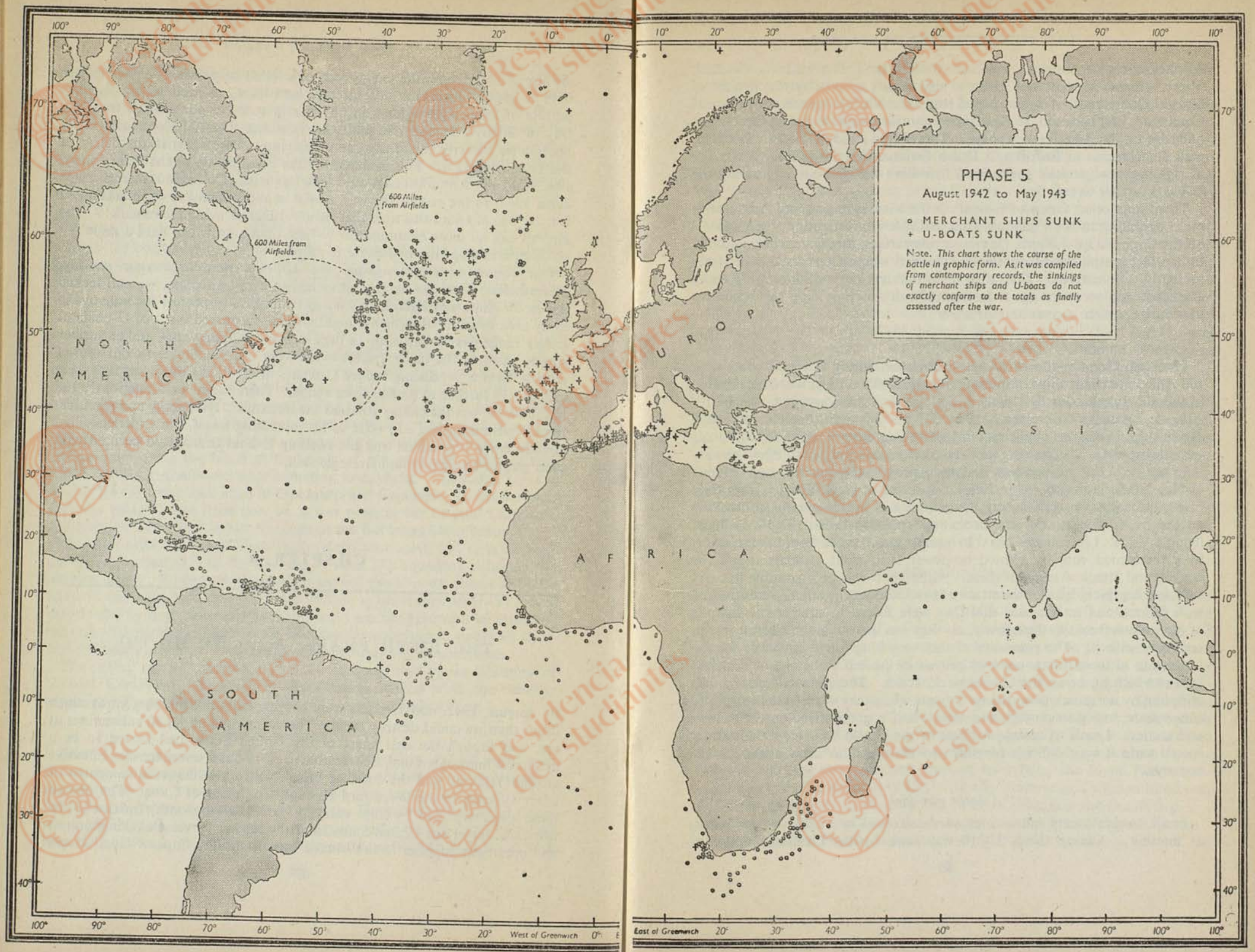
an aircraft; but now the enemy was compelled to provide his submarines with a greatly increased anti-aircraft armament, as well as to organize patrols of long-range fighters in an attempt to drive our aircraft from the Bay of Biscay. It was not until this time that Coastal Command really became an effective force, capable of playing a major part in the defeat of the U-boat menace. This is shown by the fact that up to the end of May, 1942, only about nine U-boats were sunk by Coastal Command, whereas from June, 1942, to the end of the war a total of more than 200 were accounted for. It was at about this time that Admiral Dönitz made the remark: "The aircraft can no more eliminate the U-boat than a crow can fight a mole"—an observation he later had cause to regret.

Our counter-measures against the U-boats were improving steadily. Nevertheless, with our defence stretched in every direction, we still lacked the escort ships and aircraft in sufficient numbers to protect the convoys in every area in which the enemy might strike. Improved types of U-boats of longer range were completing in the German building yards, and as surface supply ships in the more distant areas were too vulnerable to our cruiser patrols, he was producing tanker U-boats, or "Milch Cows," as they were called, still further to extend their range. There might be a temporary lull in the battle, but the enemy still had the initiative. His energy and resourcefulness were immense. In spite of his increasing losses, our experience had already made it manifest that his swelling U-boat fleet would be used with even greater originality and strategic skill.

CHAPTER 6

THE FIFTH PHASE, August, 1942–May, 1943

By August, 1942, new U-boats were coming from the building yards much faster than we could destroy them. The enemy had about 80 submarines at sea, and though the east coast of the United States had ceased to be a profitable hunting ground, he was able to carry out a severe ten-day offensive around Trinidad and the coast of Brazil, with a simultaneous campaign of lesser violence in the Windward Passage, south-east of Cuba. The first of these areas was used by ships carrying bauxite from South America to the war factories of the United States, and the second by vessels taking aircraft and other war supplies to the Middle East round the Cape of Good Hope.


PHASE 5
August 1942 to May 1943
o MERCHANT SHIPS SUNK
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Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
600 Miles from Airfields
600 Miles from Airfields
NORTH AMERICA
SOUTH AMERICA
EUROPE
AFRICA
ASIA
West of Greenwich
East of Greenwich

All these ships were in convoy in areas in which the U-boats usually operated, where valuable support was given to the surface escorts by the aircraft of Coastal Command. A squadron of Hudsons, No. 53 Squadron of Coastal Command, had been sent to Rhode Island in July to help during the U-boat offensive on the American seaboard. Transferred a month later to Trinidad, with detachments in British and Dutch Guiana, they made a large number of sightings and attacks and helped to relieve the pressure by forcing the U-boats further to sea.

There were other forces of U-boats in the Mediterranean and Arctic, with more operating in the Freetown area and a few investigating "soft spots" off the Cape of Good Hope. Japanese submarines, too, were working in the Indian Ocean and the Mozambique Channel, where German U-boats were presently to join them. The range of the submarines was constantly being extended, and we were again having difficulty in providing the necessary long-range surface escorts and air cover.

"Wolf packs"

The main German effort in August, however, during which U-boats sank 108 Allied merchant ships of more than half a million tons, was concentrated in the old-style battles by "wolf packs" against the convoys in the North Atlantic. Attacks took place both by day and by night, one convoy losing eleven ships in a series of encounters lasting four days in which four U-boats were destroyed. The training of Coastal Command crews to man the very long range (V.L.R.) Liberators had been progressing steadily, and aircraft of No. 120 Squadron based in Iceland, working at great distance from their bases, did valuable work during this period and helped greatly in breaking up the pack attacks. On one occasion, Squadron-Leader T. M. Bullock, flying a V.L.R. Liberator of No. 120 Squadron 600 miles from base in escort to a threatened convoy, sighted no fewer than eight U-boats round the convoy and attacked seven of them. Although it was only possible to carry sufficient depth-charges for the attack of two U-boats, the others were attacked with cannon and so harassed that they were forced to submerge. In spite of the serious threat to the convoy, no ship was lost while the aircraft was in company with it. The extension of this very long range air cover for the protection of the Atlantic convoys proved in the end to be one of the chief factors which broke up the U-boat pack tactics. The destruction or serious crippling by air attack of so many U-boats while they were endeavouring to concentrate and gain positions to attack had a great effect on their crews and tactics. Loath to surface for fear of air attack, their slow underwater speed made it very difficult for them to mass and to draw ahead on the convoys.

"A fierce gun duel"

In all, twelve enemy submarines were destroyed in August by one means or another. Among them, U-210 was sunk by the Canadian destroyer

Assiniboine during thick weather in the North Atlantic. The action started with a fierce gun duel on the surface in which the destroyer incurred casualties and had her bridge set on fire, and ended with U-210 being twice rammed and then depth-charged. Another success was the sinking of the first "Milch Cow"—U-464—by an American Catalina. The regular rendezvous area for these supply U-boats was south of the Azores, where the weather was normally fine and thus suitable for refuelling the long-distance U-boats operating off Central America or the Cape of Good Hope. U-464, however, was on her way to a rendezvous in the Western Atlantic.

During September a force of U-boats was on its way to the Cape of Good Hope. This movement south was temporarily checked by the sinking of the liner Laconia 300 miles north-east of Ascension Island on the 12th of that month. In addition to her normal complement of passengers, she carried nearly 2,000 Italian prisoners of war, and the German submarines in the vicinity were ordered to search for survivors. Some of them had to travel considerable distances, and the delay of five days, until, indeed, the U-boats were attacked by aircraft and ordered by U-boat Command to disperse, enabled one of our large troop convoys on its way round the Cape of Good Hope to draw well ahead and out of harm's way.

Convoy battles, though on a reduced scale, still continued on the trans-atlantic routes, where half the enemy's main effort was concentrated. But though Allied losses by U-boat in September were still heavy, 98 ships of about 485,000 tons, the enemy had been deterred by his losses, and the attacks were carried out with less boldness and vigour. German exaggeration for propaganda purposes was beginning to become very noticeable. Three ships were sunk of a convoy of small steamers from the Great Lakes on their way to the United Kingdom. This was acclaimed by the enemy as a "massacre of American troop convoy of large liners."

Merchant aircraft-carriers

By the end of September the range of air cover available from Iceland had been increased to 800 miles; but to bridge the gap in the Atlantic where shore-based aircraft could not operate, the Admiralty in October ordered that six grain ships then under construction were to be fitted as Merchant Aircraft-Carriers, or M.A.C. ships. Six tankers were also taken in hand for the fitting of flight decks. All these vessels were manned by the Merchant Navy and continued to sail in convoy and to carry cargoes. Their flight decks were small—400 feet by 62 feet—and only the older type Swordfish could operate from them. They carried four aircraft, flown and maintained by the Naval Air Arm. The first of these vessels, which must not be confounded with the escort carriers manned entirely by the Royal Navy, were in operation by the summer of 1943. In all, fifteen vessels were so fitted out, all of which operated in the Atlantic. Two of them flew the Dutch flag.

September, 1942, also saw the formation of the first "Support Group" to operate in the North Atlantic. It consisted of two sloops, four of the

new frigates and four older destroyers. Manned by highly-trained crews and fitted with all the latest methods of attack, the support groups were designed to work independently of the convoys. Untrammelled by any other responsibility they were to locate, hunt down and destroy the packs of U-boats in the most dangerously infested waters. Co-operation between the support groups and aircraft operating offensively in a hunting role was soon developed to a very high standard. It became a common practice for surface ships to be homed by the aircraft to a position where a U-boat had been forced to dive, so that the ships, using their asdics, could carry on the hunt after the enemy had obtained temporary respite under water. In their first operational cruise the ships of the original support group had extremely bad weather, and very soon afterwards had temporarily to be withdrawn because every possible escort vessel that could be found was required for the forthcoming Allied landing in North Africa—operation "Torch."

In September, for the first time, an escort carrier sailed with one of the Russian convoys. Valuable experience was gained, and the naval aircraft did good service in driving off enemy shadowers. Later, one or more escort carriers normally provided close air cover for each Russian convoy.

October was another bad month for merchant ship losses—93 ships of more than 600,000 tons—among them five large liners of speeds between 15 and 21 knots sailing independently and hitherto considered practically immune from U-boat attack. We had begun to withdraw all available escorts for the North Africa expedition, so that the defence of our ordinary transatlantic convoys was thinned to danger-point. Two groups of large U-boats were operating off the Cape of Good Hope, while the Trinidad area was again being attacked, as was shipping off the coast of Newfoundland. Long-range aircraft from Iceland were not yet covering this latter area, and the airfields used by the Royal Canadian Air Force were frequently shrouded in fog. Nevertheless the battle was not entirely one-sided. Whereas twelve U-boats were destroyed in September, sixteen were sunk in the month following.

Operation "Torch"

Aware during October that there were large concentrations of shipping and unusual activity in many ports in Great Britain and the United States, the German High Command must have realized that a large Allied expeditionary force was about to be sent oversea. Everything pointed to a landing in Africa, and the blow, the Germans considered, would be directed against Dakar. They made their dispositions accordingly, some sixty German and Italian U-boats being massed around the Azores and Madeira. A convoy bound for Sierra Leone ran into part of this concentration and was very severely handled, thirteen ships being sunk in attacks lasting four consecutive nights.

Seven convoys, containing in all some 800 ships, carried the Allied Expeditionary Force to North Africa, the first convoy sailing on October 19th and

the others soon afterwards. All our resources were stretched to their very limit to protect this huge armada, and not only with the escorts sailing with each section. Additional anti-submarine vessels patrolled the U-boat transit area in the Bay of Biscay. There were heavier surface ships in the Denmark Strait between Iceland and Greenland, with another force operating between Iceland and the Faeroes, to deal with any attempt on the part of the enemy's surface ships from Norway to break out into the Atlantic. The demands upon Coastal Command also were great. A considerable proportion of its anti-U-boat force had had to be diverted to the pursuit of blockade-runners and as an assurance against the threat of surface raiders. R.A.F. Bomber Command was also called upon to help by providing escort to the convoys, and together with the Eighth United States Air Force carried out precision bombing of the U-boat bases in the Bay of Biscay and the naval port of Brest.

"*Completely misled*"

The defence for the "Torch" convoys, with its covering force of heavy ships, was marshalled in strength. But no imaginable defence could altogether have warded off the concentrated attacks of 30 to 40 U-boats. The procession of large convoys converging upon the Straits of Gibraltar passed close enough to submarine concentrations. It is the almost incredible fact that they were not attacked, and sustained no casualties whatever, previous to our simultaneous assaults at Casablanca, Oran and Algiers before dawn on November 8th. Completely misled, the enemy had laid his plans for an attack upon Dakar and was not aware of his mistake until too late. This immunity was largely due to the Allied aircraft which kept the convoy areas clear of enemy reconnaissance planes and forced his U-boats to remain submerged.

Once the North African landings were accomplished, the U-boat Command was swift to react. All available U-boats from the Italian bases were rushed to the westward, where they had some success by sinking five warships and a transport. Submarines outside the Mediterranean were ordered to attack the North African supply line in the Atlantic, while further to the north some 72 U-boats operated against the normal transatlantic convoys, at that time largely denuded of their escorts by the exigencies of "Torch." Four of these convoys were attacked, one of them losing 15 ships in a battle lasting three nights. About 100 U-boats were now available for operations, so that others were forthcoming for work off the Cape of Good Hope and in the Mozambique Channel.

In spite of the success of operation "Torch," however, it was clear that we should have to face an ever-increasing threat, and on November 4th, 1942, the Prime Minister, Mr. Winston Churchill, presided over the first meeting of the newly-formed Anti-U-boat Committee. This Committee was specially convened to co-ordinate our efforts in the U-boat war, and in addition to Ministers, it comprised Admiral of the Fleet Sir Dudley Pound,

First Sea Lord and Chief of the Naval Staff ; Air Chief Marshal Sir Charles Portal, Chief of the Air Staff, with representatives of the Allies. The decisions that were taken played no small part in the conflict that lay ahead.

These forebodings were soon justified. Allied losses in November, 1942, the worst month of the whole war, were 117 merchant ships of more than 700,000 tons sunk by U-boats, out of a total of 134 ships of more than 800,000 tons lost through all causes combined. Great as the risks were, our losses in the North African venture amounted to no more than about one-fifth of the total. The U-boats in the Mediterranean, moreover, were soon being severely punished through the efficacy of our surface and air escort to the coastal convoys. In November alone more than 100 aircraft of Coastal Command and the United States Air Forces working from Gibraltar and North Africa made 64 attacks, resulting in six U-boats being sunk and nearly a score damaged. They were assisted by the Swordfish of 813 Squadron of the Naval Air Arm from H.M.S. Eagle, which had been sunk in the Western Mediterranean on August 11th during one of the hard-fought convoys to Malta in which we suffered severe loss. In all areas during November fifteen U-boats were destroyed and many more damaged.

A direct hit

One of those destroyed was accounted for by Flying-Officer M. A. Ensor of No. 500 Squadron operating off Algiers in a Hudson aircraft from Gibraltar. From a height of 7,000 feet, a 500-ton type U-boat was sighted on the surface. The conning-tower was still visible when the aircraft delivered its attack, which was made from 70 feet. Of the four depth-charges dropped, the second evidently scored a direct hit, for two seconds after the release there was a violent explosion. This was followed by two more heavy explosions inside the U-boat, which removed the main gun and most of the conning-tower. When the upheaval had subsided, the bows of the U-boat were seen on the surface in the midst of an area of bubbles. It stayed so for half a minute and then disappeared. The force of the first explosion blew the aircraft 300 feet into the air, removed the rudders and elevators, jammed the aileron control and bent six feet of each wing-tip up at right angles. With his aircraft in this precarious condition, Ensor set course for base, but twenty minutes later one of his engines failed and the crew baled out and landed in the waters of Algiers Bay.

The weather in the North Atlantic during the fourth winter of the war was even more tempestuous than it had been in any of the previous years. Winds of gale force, with correspondingly heavy seas, blew for no less than 116 days during a period of twenty weeks. They spelt bitter discomfort, not to mention storm damage, for both sides, and the strain was very great. Up till the last week of 1942, however, it seemed as though we had the measure of the U-boats, but then a pack of twenty trailed a convoy outward bound to Newfoundland and sank 14 ships in a series of battles spread over four days. These encounters occurred in the Atlantic gap, or the "Black

Pit'' as it had been called, beyond the range of shore-based aircraft from either side of the ocean.

There were still nearly 100 U-boats at sea. Spread in long lines across the convoy routes, one or other of them would sight and shadow a convoy and concentrate others for a series of attacks which might continue for days. Further north, where Coastal Command aircraft from Iceland could provide cover at their extreme range, these U-boat tactics were difficult to carry out. During December three large convoys got through with the loss of only three ships. One of these was persistently shadowed and was undoubtedly the target for a large ''wolf pack,'' but the presence of air escort and offensive patrols on the flanks of the convoy prevented any massed attack developing.

Our requirement was obvious: adequate air cover with each and every convoy. This could only be provided by shore-based aircraft of very long range or by escort carriers—when possible by a combination of both. The short career of H.M.S. Audacity had shown the value of escort carriers, and by the end of 1942 we had six of these vessels in commission: the British-built Activity, and the American-built Archer, Attacker, Battler, Biter and Dasher. Experience had also shown that the closest co-operation was necessary between aircraft and the surface vessels of the escort and support groups, all trained to work under senior officers who knew, and were known by, those under their command. Success depended almost entirely upon leadership and team-work. Our energies had already been devoted to these ends, but results had been retarded by the demands of the North Africa expedition. They were concentrated anew.

At the end of November, 1942, when Admiral Sir Percy Noble went to Washington in succession to Admiral Sir Andrew Cunningham, who had been appointed Naval Commander of the expeditionary force to North Africa, Admiral Sir Max Horton became Commander-in-Chief, Western Approaches, with his headquarters at Liverpool.

Special training

Early in 1940 special training had been started for the crews of all anti-submarine vessels in the use of the increasingly complex equipment provided for locating and fighting U-boats. The ships' companies were welded into efficient teams in intensive courses lasting about three weeks. These were held at Tobermory, on the west coast of Scotland. The organization consisted of a ship, H.M.S. Western Isles, and was under the command of Vice-Admiral Sir Gilbert Stephenson, serving in the rank of Commodore. Each newly-commissioned ship received individual attention from specialist officers at sea and in harbour, and by the end of the war more than 1,000 anti-submarine vessels had passed through Tobermory.

There were further instructional centres in most of the bases used by anti-submarine vessels at home and abroad. These were used for ''refresher'' courses when ships returned to harbour, and were particularly valuable for training newly-entered officers and men.

An advanced tactical training system was established by the Commander-in-Chief, Western Approaches, in February, 1943, when H.M.S. Philante was commissioned with a staff of anti-submarine specialists and a shore Tactical Unit started at Liverpool. By that time the increasing number of U-boats working in concentrated packs called for a very high degree of understanding and team-work between the ships in each escort group. Each group was taken to sea in turn for elaborate and realistic U-boat "battles" in conjunction with Coastal Command and the Naval Air Arm, using our own submarines as targets. These large-scale exercises allowed commanding officers to carry out all the necessary complicated manœuvres, and to plan and try out new schemes to combat the constantly changing tactics of the enemy.

The limited endurance of some of the escorts had always been a problem when it came to "end to end" convoy across the Atlantic. A service of escort oilers was started in the winter of 1942–43 and was in operation by the spring. It was built up by equipping commercial tankers with an outfit of rubber hose through which fuel could be pumped to the escorts while steaming with the convoys. More than 140 ships were so fitted, though owing to the run of their commercial work it so happened that two dozen tankers were responsible for half the fuelling done during the war. In the 2½ years that the service existed 350,000 tons of fuel were transferred to warships under way in all weathers up to the force of a full gale. The performance of those who served in these tankers was outstanding.

After the holocaust of November, the loss in December of 61 ships of 336,000 tons through U-boat attack seemed slight in comparison. But in all, during 1942, U-boats were responsible for the loss of some 6¼ million gross tons of Allied merchant shipping, nearly three times the figure for 1941. Some 100 U-boats were destroyed for certain in the year, more than twice the number for 1941, while against our loss in tonnage some 34 million actual tons weight of essential war cargoes, including about 11 million tons of petroleum products, were landed in the ports of the United Kingdom. This meant the safe arrival of some 4,000 ships for these purposes alone. These figures do not include the substantial number of additional ships involved in the transport of troops, or the convoys routed from the United States to North Africa or to any theatre of war outside Britain. In the face of the fierce and determined onslaught by the U-boats, not to mention the attacks of the enemy aircraft and surface raiders, the huge volume of Allied merchant shipping using the oceans was remarkable. It is a tribute not only to the defensive organization and the shipbuilding and repairing effort on both sides of the Atlantic, but above all to the superb courage and endurance of all those serving at sea and in the aircraft primarily concerned with the U-boat war.

No delusions

January, 1943, with the sinking of 37 ships of rather more than 200,000 tons, showed another improvement. But nobody in authority was under the

delusion that the partial lull heralded any diminution of the submarine effort. January was a month of pestilentially foul weather in the North Atlantic, gale succeeding gale with depressing regularity. It reacted against the successful operation of the U-boats, though it also caused straggling among convoys and the disorganization of our hard-pressed escort groups through storm damage.

Further south, in the finer weather of the Central Atlantic, on the convoy route for tankers from Trinidad to North Africa, the U-boats gave a better account of themselves and an evil indication of what we might expect. A convoy of nine tankers weakly escorted by one destroyer and three corvettes, and out of range of any air cover, was attacked some 1,100 miles north-east of Trinidad. It was probably a chance encounter, but the destination of the convoy was correctly appreciated and a pack of U-boats was diverted to intercept. Six nights later, when 600 miles west of the Canaries, a series of heavy attacks accounted for five ships. The weak escort could not provide protection for crippled vessels, at least one of which might have been saved. Twenty-four hours afterwards one of the remaining tankers was torpedoed. She burst into flames, to reveal no fewer than four U-boats between the convoy and the escorts. Seven of those nine tankers were lost. The only other convoy to suffer severe loss during January was when U-boats, taking advantage of a gap in the air cover, sank four ships out of twelve off the coast of Brazil.

Canada scores

U-boats were still active in the Mediterranean, where we lost two ships off the coast of Morocco and three off Cyrenaica. On the other hand, five submarines were sunk, two of them being accounted for by the Canadian corvettes Ville de Quebec and Port Arthur. Early in February, too, H.M.C.S. Regina was to add to the Canadian score by destroying the Italian submarine Avorio at night off Philippeville.

At about this time the shattering power of our naval depth-charge was increased by the use of a new explosive called "Minol." This would crack the pressure hull of a U-boat at 25 feet, and would probably cause the U-boat to surface at double that distance. As submarines sometimes went to 900 feet, it was necessary also to provide a depth-charge with very deep settings.

The month of February, 1943, saw the main concentration of the U-boat effort in the North Atlantic. Never before had the enemy shown such singleness of purpose in using his strength for the destruction of our supplies from America. There were bitter and prolonged convoy engagements, and the enemy was working in very large packs. One slow east-bound convoy of 64 ships, with twelve escorts, had a particularly gruelling passage. The weather was bad, with a heavy sea. Because of this the convoy at one time occupied an area of 52 square miles, which greatly increased the work of the escorts in whipping in the stragglers. The weather necessitated the cancel-

lation of several of the very long range aircraft from Iceland, though the daylight air escort from other bases was good and contributed greatly to the dispersal of the U-boats. The convoy, however, was probably discovered by the accidental burning of a bright light. Sighted by U-187, which shadowed, about twenty other U-boats were homed in to the attack, which started forty-eight hours later. Our losses were serious, eight merchant vessels and the rescue ship being sunk during the dark hours, though in the course of the engagements three U-boats, including the contact keeper, were destroyed. Seven or eight more were damaged.

Closing the gap

Shortage of aircraft had greatly restricted the scope of the offensive operations of Coastal Command, though it had been found possible to provide a number of very long range aircraft by fitting extra fuel-tanks to Liberators at the expense of their defensive armament. The arrival of two Liberator squadrons of the U.S.A.A.F. in January, 1943, to join in the Bay of Biscay offensive, was a welcome reinforcement. It had been laid down at the Casablanca Conference in January that the defeat of the U-boats should be the first charge on the combined Allied resources. This resulted in an Atlantic Convoy Conference which met in Washington during March under the chairmanship of Admiral King, Commander-in-Chief of the United States Fleet. The aim of the conference was to pool all Allied resources, naval and air, American, British and Canadian, to standardize procedure, and to concentrate all possible forces in the areas where convoys were most liable to attack by the U-boats. The most urgent need was to cover the vital mid-Atlantic gap some 600 miles south-east of Greenland with very long range shore-based aircraft, with more aircraft working from escort carriers. Even so there were many pressing demands on the British and American aircraft industries to provide the very long range bombers necessary for penetrating deep into Germany, so priority between the anti-submarine aircraft for Coastal Command and the bombers for Bomber Command, R.A.F., and the United States Eighth Air Force required the most delicate adjustment.

The Atlantic Convoy Conference brought about a closer understanding of the air problem and a redistribution of available aircraft, mainly American. It also enforced priority for the conversion of bomber aircraft for anti-submarine duties. The close co-ordination of the air effort in support of the Atlantic convoys finally made possible the permanent closing of the Atlantic gap by a shuttle service of very long range anti-submarine aircraft of the Royal Air Force, the Royal Canadian Air Force, and the United States Army Air Force, working between the United Kingdom, Iceland and Newfoundland. The Atlantic gap was to be sealed still more effectively by escort carriers sailing with the convoys and now coming into operation.

Our losses in February through U-boat action amounted to 63 ships of about 360,000 tons, but in all areas twenty U-boats were sent to the bottom.

Air Marshal Sir John C. Slessor had become Commander-in-Chief, Coastal Command, on February 5th.

"A real hammering"

In March came the crisis of the Battle in the North Atlantic and the peak of the submarine effort. There were 112 U-boats at sea, and their increasing density made evasive routeing largely useless. Such was the strength against us that no area from the Indian Ocean to the Arctic was immune. The U-boat Command had realized we had various methods of fixing the positions of submarines, and German science and ingenuity provided partial antidotes. Moreover, the enemy had produced a "search receiver" which temporarily defeated the radar used by aircraft, and had started to plan the now well-known "Schnorkel" which eventually made it unnecessary for U-boats to come to the surface to charge their batteries. However, British scientists invented a new type of radar for aircraft which defeated the enemy's search receiver, and by March the U-boats in transit across the Bay of Biscay were receiving a real hammering from Coastal Command. Sufficient aircraft were now available to enable us to choose an area across the U-boat's track in the Bay, and to flood it.

But in the North Atlantic very large packs of U-boats were operating, and in March in all areas we lost 108 ships of 627,000 tons through their attacks. This figure was not so high as in the previous November, but the disquieting feature was that 85 of the ships sunk were in convoy or stragglers. Moreover, the great bulk of the losses were in the North Atlantic. The wild weather was partly responsible. The escorts were small ships, and many were absent from their groups making good damage sustained during the bitter gales. What this meant in practice was illustrated by the remarks of the senior officer of a convoy escort who found himself with a hybrid collection of escort vessels instead of a trained escort group. "Loyal and intelligent as was the co-operation shown by the ships allotted," he said, "it could not make up for the group training and mutual understanding which lie at the very root of successful convoy escort."

Premature champagne

Typical of the more dramatic incidents now occurring in mid-Atlantic was an action which took place on the night of March 10th–11th. The destroyer Harvester—Commander A. A. Tait, Royal Navy, senior officer of an escort group of British, French and Polish units—sighted a U-boat on the surface soon after midnight. The submarine, which was stalking a merchant ship, crash-dived, only to be depth-charged and forced to the surface through damage and flooding. The Harvester's guns came into action, after which she rammed the U-boat at 27 knots. In this process the destroyer's hull was badly damaged and the submarine became jammed for ten minutes under one of the propeller shafts. U-444, as she was, finally slid clear, and a heavy explosion put the Harvester's other engine out of action. U-444 was not

sunk, for about an hour later the French corvette Aconit—Lieutenant de Vaisseau J. M. L. M. Levasseur—found the destroyer stopped and the U-boat moving at slow speed. Holding U-444 in her searchlight, the Aconit rammed and dropped depth-charges as she passed over the spot. Five survivors were picked up and both Allied ships shaped course to rejoin the convoy. The Harvester, however, could make no more than 11 knots on her one serviceable engine, so the Aconit was ordered to part company and go ahead.

Daylight came. During the morning the Harvester's remaining propeller shaft cracked, to leave her drifting and helpless. The Aconit turned back to assist, though before she arrived the damaged ship had been seen by U-432, which circled her several times and then fired two torpedoes from periscope depth. The stricken Harvester broke in halves and sank with heavy loss of life, her captain being among the casualties. The U-boat submerged to 65 feet with her crew in a state of jubilation. They ate and drank, the officers celebrating their victory with champagne. An hour later they heard the sound of approaching propellers and the crew rushed to their action stations. The faithful Aconit had returned. Immediately afterwards came the jar and thudding explosion of her depth-charges. U-432 was not much damaged, but she lost trim and dived deep. Tanks were blown and she started to rise slowly. The moment she broke surface she at once came under heavy fire from the French corvette, and her captain was killed. She was finally rammed and sank. With two U-boats to his credit in the course of a few hours Levasseur had done excellent work. What was so greatly to be regretted was the loss of the Harvester and so many of her officers and men. They could ill be spared, and Commander Tait was one of the most experienced and successful of the escort group commanders.

Crisis

March 20th probably saw the culmination of the enemy's effort in the North Atlantic. The U-boats had come very near to success, but their strength was temporarily exhausted. Our defence was potent and fifteen U-boats had been sunk during the month. Though as yet the victory was by no means ours, the German offensive started to wane.

The months of April and May, 1943, will probably be chosen by future historians as the critical period when the offensive at sea finally passed into the hands of the Allies. This will neither be because the numbers of merchant ships lost through U-boat attack—in April 56 vessels of 328,000 tons, in May 50 ships of 265,000 tons—were the lowest for some months, nor because of the highly satisfactory figures of 16 U-boats sunk in April and 45 in May. The main reason why these two months brought the turning-point is because for the first time the U-boat captains were showing definite signs of losing heart. They were never immune from attack. There were still a great number of submarines at sea, and the German building yards were feverishly increasing their output. But the U-boats' captains were

failing to press home their attacks even when favourably placed for doing so. Their operations in some cases even savoured of timidity.

It is true that our anti-submarine measures were now formidable indeed. The escort groups had been strengthened and reinforced, and the independent support groups, unfettered by having to guard the convoys, had come into being and were hunting the U-boats wherever they might be found. The gap in the North Atlantic, too, had largely been bridged by aircraft of very long range working from both sides of the Atlantic, their efforts being supplemented by aircraft of the Naval Air Arm flown from the escort carriers with the convoys.

"*She would almost certainly be spotted*"

During the last week of April, 1943, two Coastal Command aircraft from Iceland had each accounted for a U-boat, while a Hampden sank another north of the Faeroes. Naval aircraft from the escort carrier H.M.S. Biter, too, spotted and attacked a submarine which was finished off by the support group with which the Biter was working. By May, during which shore-based aircraft under British control sank no fewer than eighteen U-boats outright, besides sharing others with surface craft, the anti-U-boat force of Coastal Command consisted of nearly thirty squadrons equipped with Liberators, Hudsons, Catalinas, searchlight Wellingtons, Whitleys, Halifaxes, Sunderlands or Fortresses. With so many more aircraft available, it was now found possible to cover the transit area of the Bay of Biscay so thoroughly that, whenever a U-boat surfaced to charge her batteries, by day or by night, she would almost certainly be spotted within half an hour. At this time a drastic change in U-boat policy became evident. Instead of trying to avoid detection by diving, U-boat commanders were ordered to remain surfaced and fight it out with attacking aircraft, employing the increased anti-aircraft armament with which their boats had been specially equipped. The result was that in May Coastal Command had 213 U-boat sightings leading to 136 attacks, its record monthly total for the whole war. The enemy's flak caused the loss of many aircraft and damaged many more, but thanks to the gallantry and determination of the air crews the new policy of battle on the surface turned to the advantage of the aircraft. The losses they inflicted on the U-boats were greater than those they sustained.

During the early hours of May 23rd, U-752, on patrol about 750 miles west of Ireland, sighted a homeward-bound convoy in the distance. Coming to the surface to gain speed, the U-boat proceeded to shadow the convoy. A Swordfish aircraft from the escort carrier Archer, piloted by Sub-Lieutenant H. Horrocks, R.N.V.R., had previously seen the periscope and was able to use cloud cover to approach undetected to within 300 yards. U-752 tried to crash-dive, but it was too late. A rocket pierced the hull, causing great damage. With her pressure hull holed the U-boat could not dive, so chose to fight it out on the surface. However, a Martlet from the Archer

called up by the Swordfish swept U-752's bridge with her front guns, killing the captain and several of the crew. The situation was hopeless, and the U-boat's engineer officer flooded the tanks. The submarine sank, a few survivors being rescued. Apart from the Biter's success, this was the first case of aircraft from a British escort carrier being wholly responsible for sinking a U-boat, and the first instance in which a rocket was fired operationally by any of the Western Allies. The projectile had a solid head weighing 25 lb. Fired at a range of about 600 yards and at a suitable angle, it would sometimes penetrate both the near and the far plating of a submarine's pressure hull. The weapon was later used with considerable success by naval aircraft working with the North Russian convoys, sometimes in conjunction with other aircraft carrying depth-charges.

No time was wasted

Reporting on this particular convoy, the Senior Officer of the Escort Group in H.M.S. Keppel wrote: "Air coverage by shore-based aircraft was excellent from both sides of the Atlantic . . . visual and radio-telephonic communication was good, and no time was wasted in passing to aircraft the particular patrol that was required. . . . H.M.S. Archer more than filled the 36-hour gap between the departure of the last aircraft from Newfoundland and the arrival of the first home-based aircraft. . . ." The convoy experienced a strong north-westerly gale with the usual heavy sea. The Archer was pitching violently. The skill with which her aircraft flew off and on her short flight deck evoked the admiration of those who saw it.

At the end of April the enemy could still spare about a dozen U-boats for a minor offensive off Freetown, where six ships were sunk, while two more had some success in the Mozambique Channel and others off the West Indies and the coast of Brazil. But by May the U-boats were gradually being forced out of the North Atlantic by their heavy casualties and lack of success, while by the end of that month the pack attacks had ceased.

The hard training of our surface craft and aircraft had begun to pay a handsome dividend. We had found a counter to every major stratagem which the enemy had been able to introduce in his attacks on our vital supply line across the Atlantic. Co-operation and understanding between ships and aircraft had vastly improved. The two Services had worked together for three and a half years and had learned to appreciate each other's capabilities and limitations. In the Bay of Biscay and to the North of Scotland, aircraft operated independently, but on the convoy routes in the Atlantic it was the escort group commanders who bore the main brunt of the battles and the heavy responsibilities of fighting the convoys through the U-boats and directing the engagements. In frequent bad weather in one of the worst oceans of the world, those in the small vessels and the carriers which formed the escort and support groups were working for days and sometimes weeks on end in conditions of supreme strain and discomfort. It was much

the same for those in the aircraft. Neither seamen nor airmen enjoyed chances of relaxation.

"Outstanding skill and leadership"

Invidious though it may seem to single out any particular unit during this period of hard fighting, one escort group, "B.7," was conspicuously successful. Its senior officer, Commander P. W. Gretton, Royal Navy, showed outstanding skill and leadership in the defence of convoys battling their way through dense concentrations of U-boats.

One of these sailed from the United Kingdom on April 23rd. There was a strong head wind and a full-blooded Atlantic gale lasting three days. It took sixteen days of struggling against the weather before the convoy reached the spot off Newfoundland where the ocean escort parted company. Eight U-boats were in contact on the fifth day out, and that night delivered an attack which resulted in one merchant ship being sunk. More U-boats were homed on to the convoy until no less than forty were in contact on May 4th. Ten ships were sunk in the next three days and nights, though some forty attacks were delivered on the U-boats by surface craft and aircraft of the Royal Canadian Air Force. The full story cannot be told here, but on the night of May 5th–6th the escorts frustrated no less than twenty-four attacks. In all, six U-boats were sunk, one by our aircraft, and many were damaged.

On May 11th a slow convoy, again escorted by Commander Gretton's group, sailed from Halifax, Nova Scotia. It consisted of 37 merchant ships in ten columns with eight escorts. They had fog and ice during the early stages of the voyage, and air cover was provided by the Eastern Air Command of the Royal Canadian Air Force in Newfoundland for the first 600 miles, which was the limit of their endurance. On the evening of the seventh day out and less than 24 hours after cessation of air cover, however, there were indications that the convoy was being shadowed, and later, during the night, that four U-boats were in contact. Just before dawn next morning Gretton turned the convoy 90 degrees in the opposite direction. Soon afterwards the first aircraft from Iceland, a Liberator of No. 120 Squadron, sighted and attacked a U-boat in what would have been an ideal position but for the convoy's turn away. This aircraft sighted five more submarines around the convoy during its patrol, and forced them to submerge, one of these being attacked by an escort vessel. Meanwhile two of the escorts made promising attacks on a U-boat ahead of the convoy and oil appeared on the surface. Two hours later another attack was frustrated by Commander Gretton's ship, the destroyer Duncan. All these incidents happened in a few hours. Another Liberator was on the scene by 11.20 a.m. and in the next one and a half hours sighted four U-boats and attacked one. Meanwhile another escort group was joining from astern of the convoy to support, and at about noon, when fifteen miles distant, sighted and attacked two U-boats, to bring up more oil and some wreckage. At about 4.0 p.m. on this same day two

more Liberators sighted six U-boats and attacked three of them. The vigilance of the aircraft, combined with the arrival of the second escort group that evening and evasive alterations of course by the convoy, discouraged the U-boats, for only one further attempt was made early on the ninth day, which was beaten off. On this day and the next air cover was provided in strength. There were fourteen sightings, all some distance away, and by early on the tenth day it was clear that the large pack of U-boats had lost touch.

That slow convoy was trailed for forty-eight hours and lost not a single ship, whereas three U-boats were sunk and many others damaged. This happy result was attributable to a number of causes: the accurate appreciation of the situation at all stages by the escort commander and his conduct of the defence and counter-attack; the strength of air support, its excellent co-operation with the surface escorts and the particularly valuable support of the very long range Liberators from Iceland, working nearly 800 miles from their base; the timely arrival of an additional escort group in support; and the most successful evasive steering of the convoy. No fewer than twenty emergency turns were made during the time the U-boats were in contact, and the thirty-seven merchant ships in their ten columns carried out these complicated manœuvres, as Commander Gretton wrote, "with the precision of a battle fleet."

The supply line was safe

In April Goebbels had told the German people—"In the U-boat war we have England by the throat." By the third week in May, however, the tide had definitely turned in our favour. The convoys were still coming through and the Atlantic supply line was safe. Moreover, for the first time, the rate at which the Allies were destroying the U-boats substantially outnumbered the enemy's output. More important still, the stamina and efficiency of the U-boats' crews had started to wilt. Continually harassed at sea, they had no rest in harbour, for during the winter and spring Bomber Command had been dropping thousands of tons of bombs on the Biscay ports. The U-boats might be lying safely in their pens, but the towns in which their crews sought rest and relaxation after their long and arduous patrols at sea were blasted into heaps of rubble. After sailing they had to pass through waters mined by Bomber Command, and on reaching deeper water were harried and hunted for days and nights by the aircraft of Coastal Command.

On our side, the greatest battle of the war was not yet fully won, but the U-boats had been forced on to the defensive. Bewildered for the time, the U-boat Command could find no antidotes to the great and growing power of the Allies working together in unison on the sea and in the air.

CHAPTER 7

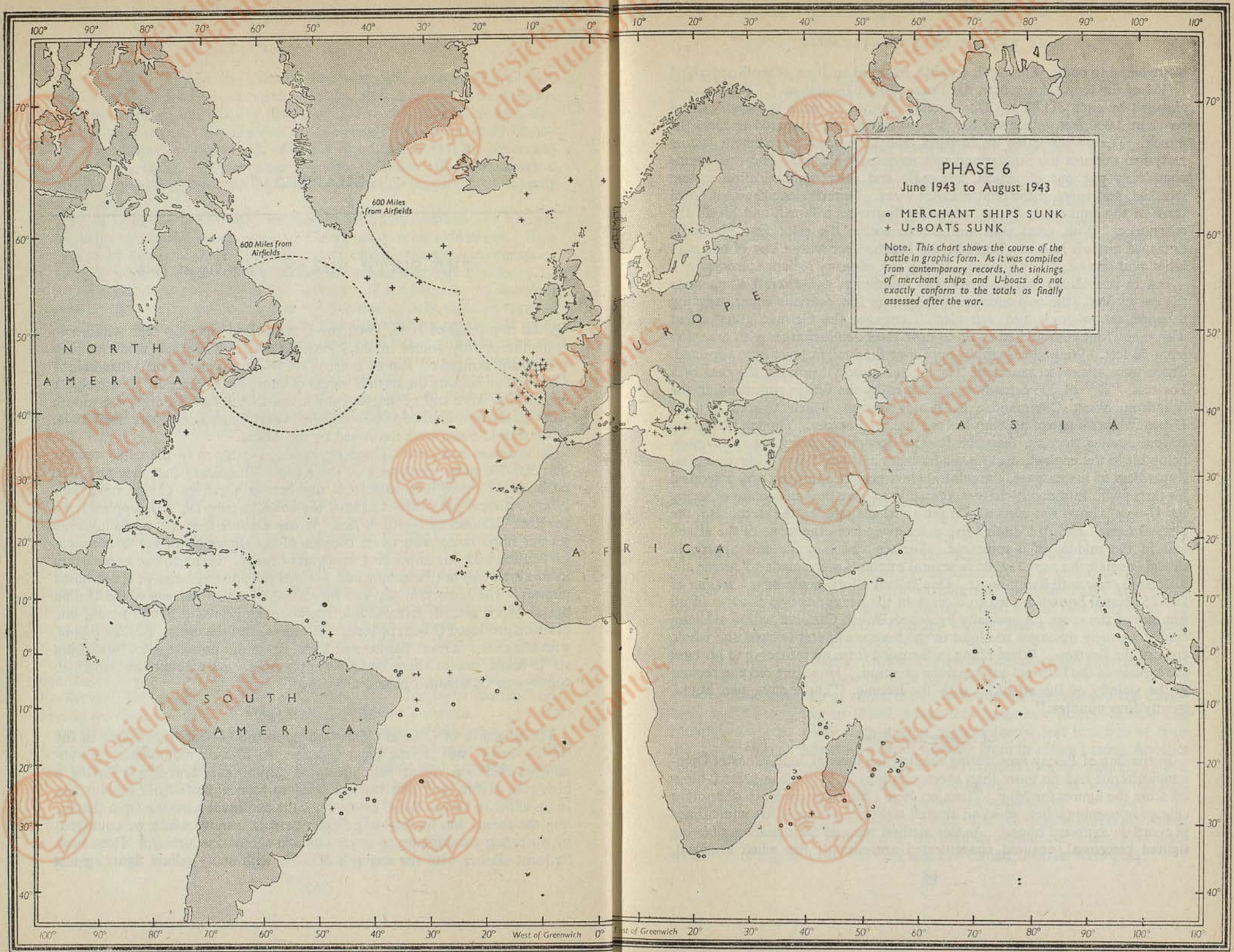
THE SIXTH PHASE, June–August, 1943

By the beginning of June, 1943, the U-boats had virtually been withdrawn from the convoy routes in the North Atlantic. Their spasmodic activity was chiefly centred off Rio de Janeiro, off Freetown and in the Mozambique Channel, all outside the normal range of shore-based aircraft. Some eighty submarines were still at sea, and the losses they inflicted during the month were 20 ships of about 96,000 tons, the lowest figure since November, 1941. Seventeen U-boats were destroyed by the Allies.

Submarines had been sighted on various occasions in the calm weather belt 500–700 miles south-west of the Azores. It seemed that they might be concentrating here in considerable numbers in the hope of repeating their North Atlantic pack tactics against the convoys carrying war supplies from the United States to North Africa. It was a route that was assuming even greater importance than usual because of the surrender of the Axis armies in Tunisia, and our impending invasion of Sicily. Hitherto the submarines in this area had not been attacked. It was outside the range of shore-based aircraft. The important gap was now filled by escort carriers of the United States Navy, aircraft from U.S.S. Bogue making several good attacks, one of which produced U-boat prisoners. In this same area during July the Bogue, with the escort carriers Santee and Core, again did notable work by sinking six U-boats, one of them being a supply boat. As a result the American convoys to Casablanca passed unscathed.

Many gallant fights

The offensive of Coastal Command upon the U-boat transit area in the Bay of Biscay was having great success. As already mentioned, the submarines had been fitted with increased anti-aircraft armaments having a high rate of fire, and had been ordered to fight aircraft from the surface. In an effort to relieve the U-boats from the continual harrying from the air, too, the enemy was maintaining fighter patrols, a move which we countered by operating Beaufighters to cover our anti-submarine aircraft. There were frequent clashes with the enemy's JU.88's, with many gallant fights against


PHASE 6
June 1943 to August 1943
o MERCHANT SHIPS SUNK
+ U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
600 Miles from Airfields
600 Miles from Airfields
NORTH AMERICA
SOUTH AMERICA
EUROPE
AFRICA
ASIA
West of Greenwich
East of Greenwich

overwhelming odds. One such combat occurred in June, when Sunderland N/461 of the Royal Australian Air Force, Flight-Lieutenant C. Walker, was engaged by eight JU.88's. Our aircraft climbed to reach the scanty cloud cover at 3,000 feet, jettisoned her depth-charges, and prepared to meet the attack. The enemy came on in pairs, and in a fierce engagement lasting forty-five minutes the Sunderland was repeatedly hit. She had one engine completely put out of action, her radio and intercommunication system wrecked, and some of the controls shot away. Nevertheless, she shot down three of the Junkers in flames, probably destroyed a fourth and hit all the remainder. With great skill and determination the pilot flew his badly damaged aircraft home to England and beached her with a loss of one man killed and several others injured. It was one of many gallant episodes.

But in providing their U-boats with additional anti-aircraft armaments the enemy had little real success. Flying very low over the water, weaving to upset the enemy's aim, our aircraft engaged the German guns' crews with their front guns and came on to drop their depth-charges with precision from 50 feet. We had casualties, but fewer than might have been expected. There were several instances of "knock for knock," notably the case of a Fortress, "R" of 206 Squadron, captained by the officer commanding the squadron, Wing Commander R. R. Thompson, which sighted a large U-boat while on patrol between Iceland and the Faeroes. Though the enemy started evasive steering, the aircraft came straight in firing her front guns, being hit in the engines, cockpit, mainplanes and bomb-bay while doing so. Regardless of the damage, the pilot made a perfect approach and straddled his target with four depth-charges, presently to have the satisfaction of seeing the U-boat's bows rise vertically in the air as she sank by the stern. But the aircraft herself had to "ditch" five miles away from the scene of the attack and in the middle of a minefield. Surface vessels could not approach, though during the next few days several attempts were made to rescue the distressed crew with flying-boats. One gallant effort, made by a Catalina of 84 U.S. Naval Squadron, led to a crash in the heavy sea and the loss of all but one of the crew. A specially lightened British Catalina with a skeleton crew eventually managed to alight in the long swell, and rescued the whole crew of the Fortress. When filling in the usual form on returning to his base the captain of the Fortress answered the question, "How long did you remain in the vicinity of the attack?" with the laconic, "Three days, two hours, twenty-four minutes."

A change in tactics

In the Bay of Biscay area during the first ten days of June, Coastal Command aircraft had no more than seven sightings of U-boats, a great falling-off from the figures for May. Then, on June 12th, came evidence of another change in enemy tactics, when an aircraft sighted a group of five submarines in company outward bound. As this method reduced their chances of being sighted piecemeal, ensured concentrated anti-aircraft fire when attacked,

and allowed for more aircraft cover within range of the German air bases, it was not unexpected. We countered this new move by using aircraft in greater numbers, and surface anti-submarine forces to work with them. Any aircraft sighting U-boats homed others to the spot, which meant that simultaneous attacks took place from different directions. This added to the difficulties of the enemy's anti-aircraft gunnery.

The value of close co-operation between surface forces and land-based aircraft in the defence of shipping had been well demonstrated in the Atlantic and off the coast of North Africa. The necessary technique and team-work had made great strides, and an attempt was now made to use the same tactics to deal with the U-boats on passage from and to the Biscay ports. A likely spot north-west of Cape Ortegal was chosen. It was within reach of long-range aircraft from the United Kingdom and Gibraltar. On June 17th the Second Escort Group under Captain F. J. Walker in the Starling, with the Woodpecker, Wild Goose, Wren and Kite, sailed from Liverpool for a position in the Bay of Biscay on the fringe of the area in which enemy aircraft could operate. A cruiser provided surface cover in case of an attack by enemy destroyers. Here, in seven hours on June 24th, 135 miles north-west of Cape Ortegal, Captain Walker's group sank two U-boats.

By the spring of 1943 it had been found that U-boats were evading attacks by going to depths of 600 feet and more. For technical reasons this meant they could not be detected by asdic at close ranges. To counter this Captain Walker had devised the "creeping attack," in which the U-boat was stalked at slow speed by a directing ship on the flank keeping constant asdic touch at about 1,500 yards, and at the same time guiding an attacking ship slowly over the U-boat's position. When the bearings and ranges of the U-boat and attacking ship coincided, the latter dropped her depth-charges by signal over and along the path of the target. There was now no need for the last-minute increase in speed by the attacking ship which, heard by the U-boat on her hydrophones, gave warning that a depth-charge attack was imminent and facilitated escape. Unaware that a ship was following, the attack now came unheralded. Captain Walker first used this new method on June 1st, 1943, when he sank U-202.

In June, in the Atlantic, United States anti-submarine forces destroyed five enemy submarines, four of them by air attack.

During July a group of about fifteen U-boats was operating in the Caribbean and off the coast of Brazil, where they had some success against one convoy and sank a few ships sailing independently, but lost five of their number, mainly to American aircraft working from Brazilian bases. Another small group was exploiting the Freetown–Takoradi neighbourhood, while a dozen submarines, including some "U-cruisers," were at work off East Africa and in the Indian Ocean, where we lost some ships.

The invasion of Sicily had started on July 10th. In spite of the large number and variety of targets presented in the Mediterranean our losses were comparatively slight, and two German and five Italian U-boats were sunk.

But 19 of the 46 "kills" of U-boats in July were made in the Bay of Biscay area within 300 miles of Cape Finisterre. Of these, no fewer than 18 were accounted for by aircraft of Coastal Command and of the United States Navy which had joined in the operations at the beginning of the month.

The captain maintained his course

On July 24th, Wellington "Q" of No. 172 Squadron on daylight patrol engaged the 1,600-ton supply U-boat, U-459, and was desperately damaged by intense and accurate flak. The captain, Flying-Officer W. T. H. Jennings, maintained his attacking course, and the aircraft crashed on to the U-boat's deck, setting it on fire and wrecking the guns. Two of the depth-charges of the aircraft lodged on the U-boat and were later thrown into the water by the crew, where one of them exploded and caused severe damage to the stern of the submarine. The U-boat was unable to dive, and because of this and the threat of further air attack, her commander ordered his crew to abandon ship, personally setting the scuttling charges and going down with his ship. The U-boat crew was eventually picked up together with Q/172's rear gunner, Sergt. A. A. Turner, who had miraculously survived the crash.

Another of the outstanding actions of this period occurred on July 30th when a Liberator of Coastal Command sighted three U-boats on the surface about 90 miles north-west of Cape Ortegal. The Liberator was joined by a Sunderland and a Catalina, and then by an American Liberator. Captain Walker's Second Escort Group, which was patrolling in the vicinity, was called to the scene by the Catalina, and the three other aircraft went in to the attack, undeterred by the heavy flak and the arrival of a JU.88. The U-boats separated, and the action was still in progress when two Halifaxes and a Sunderland of the Royal Australian Air Force joined in. Two supply U-boats were sunk, one of them, U-461, by an extraordinary coincidence, being destroyed by the Sunderland also numbered U/461. It was the first time the captain of this aircraft had attacked a submarine. Captain Walker, meanwhile, having sighted the U-boats and the bomb splashes, had hoisted the signal "General Chase," and was steaming at full speed for the scene of the action, his ships opening fire at long range with their 4-inch guns. Before long they were passing the survivors of U-461 and of U-462, which had been sunk by "S" of 502 Squadron, huddled in their rubber dinghies. The third U-boat had dived, but was soon located by asdic and attacked by the Kite and Wren, their depth-charges bringing a quantity of oil to the surface. The hunt went on for about two hours, with the Woodpecker and Wild Goose joining in. More oil, some wreckage, a German uniform jacket and packages of food floated to the surface as a result of their attacks. All those three U-boats were destroyed.

The Allied merchant ship losses in July, including those incurred during the invasion of Sicily, were higher than those in June. They amounted to 45 ships of about 244,000 tons. However, taking into account the large number of U-boats sunk and the large increase of essential imports into the

United Kingdom, July was the better month of the two. No attacks had taken place on the North Atlantic convoys, with which the mercantile aircraft-carriers, or "M.A.C. ships," were now sailing regularly.

August, 1943, was another lean month for the U-boats in which, for the first time, the Allies sank more submarines than the submarines sank merchant ships. Twenty-three U-boats were destroyed for the loss of 16 merchant ships of about 86,000 tons. A fourth supply U-boat was sunk early in the month between Iceland and the Faeroes. The continual loss of these "Milch Cows" undoubtedly curtailed enemy activity in Brazilian waters, and by the end of the month the campaign had been abandoned.

Nevertheless, their spasmodic operations were widespread. In the Brazilian area, hitherto a soft spot, United States ships and aircraft, the latter based in Brazil or at Ascension Island, sank three U-boats. Another was destroyed south of Madagascar by two Catalinas, while in the Mediterranean a British and a Greek destroyer sank a U-boat off Pantellaria by depth-charges and ramming.

A six-weeks' slaughter

Nearer at home, in the Bay of Biscay, no fewer than nine U-boats had been sunk in one week. This concluded a six-weeks' slaughter which had begun in the last week of June, during which a total of 21 U-boats were sunk by aircraft of Coastal Command and three by H.M. ships. Thereafter fewer U-boats crossed the Bay, and those which did travelled submerged. Their tactics of fighting by daylight on the surface had proved far too costly, and the few that made the passage hugged the north coast of Spain more narrowly than ever before, sometimes, indeed, within the three-mile limit of Spanish territorial waters. It was an area crowded with fishing craft, and, because of its distance from the air bases in the United Kingdom, was difficult of access to our anti-submarine aircraft and their supporting fighters. The Bay, too, was now flooded with enemy aircraft. We instituted a vigorous series of air patrols off the Spanish coast with the assistance of British and American aircraft from Gibraltar and Morocco, and between Capes Finisterre and Ortegal in conjunction with escort groups of surface vessels. The results, however, were disappointing.

The Victoria Cross

West Africa Command of the Royal Air Force also contributed towards the successes of the air war against the U-boats. On August 11th, Flying-Officer L. A. Trigg, D.F.C., a New Zealand pilot, was flying Liberator "D" of No. 200 Squadron on anti-submarine patrol when he sighted U-468 on the surface 215 miles west-south-west of Bathurst. On the run in to attack, the aircraft was hit by flak and set on fire. In spite of this the depth-charges were accurately released and the U-boat sank within ten minutes. The aircraft unfortunately crashed straight into the sea in flames after the attack, and there were no survivors. Later, part of the German crew were rescued

from the aircraft's rubber dinghy. As the result of their evidence Flying-Officer Trigg received the posthumous award of the Victoria Cross.

But the U-boats were not beaten. They had entered a phase of ultra caution. Self-preservation was their aim while new plans were prepared and new weapons perfected. August 25th saw the first use of one of these new weapons against an Escort Group in the Bay of Biscay, when H.M.S. Egret was sunk and other ships damaged. This was the radio-controlled glider bomb released from aircraft, used next month with considerable effect against the Allied vessels covering the landings at Salerno. This new form of attack, and the need for strengthening the escorts for the trans-atlantic convoys, caused the temporary withdrawal of our escort vessels from the Bay of Biscay and the routeing of the Gibraltar convoys far to the westward.

The U-boats still crept across the Bay, surfacing only at night for the minimum time to charge their batteries.

CHAPTER 8

THE SEVENTH PHASE, September, 1943–April, 1944

The outstanding event at the beginning of this period was the unconditional surrender of Italy on September 8th, and the arrival of the Italian fleet at Malta three days later. By the end of that month 29 Italian submarines were under Allied control. More than another 80 had been destroyed through all causes. The German U-boats that remained in the Mediterranean continued to work from their bases at Toulon and Spezia, with another operational base at Salamis in the Ægean. Constant efforts were made by the enemy to pass more U-boats into the Mediterranean. A few succeeded, but several were destroyed by combined sea and air forces in the narrow waters round the Straits of Gibraltar.

Thanks to the arduous and highly successful work of the British mine-sweepers in clearing channels through the thickly-laid minefields in the Sicilian narrows and along the North African coast, the Mediterranean was now open to through convoys. The enemy still had air bases in southern France, northern Italy, Greece and the Ægean Islands. However, apart from the extensive saving in tonnage brought about by the use of this greatly shortened route to the Middle East and India, instead of the long stretch

round the Cape of Good Hope, cover by shore-based aircraft could readily be provided for convoys in the Mediterranean.

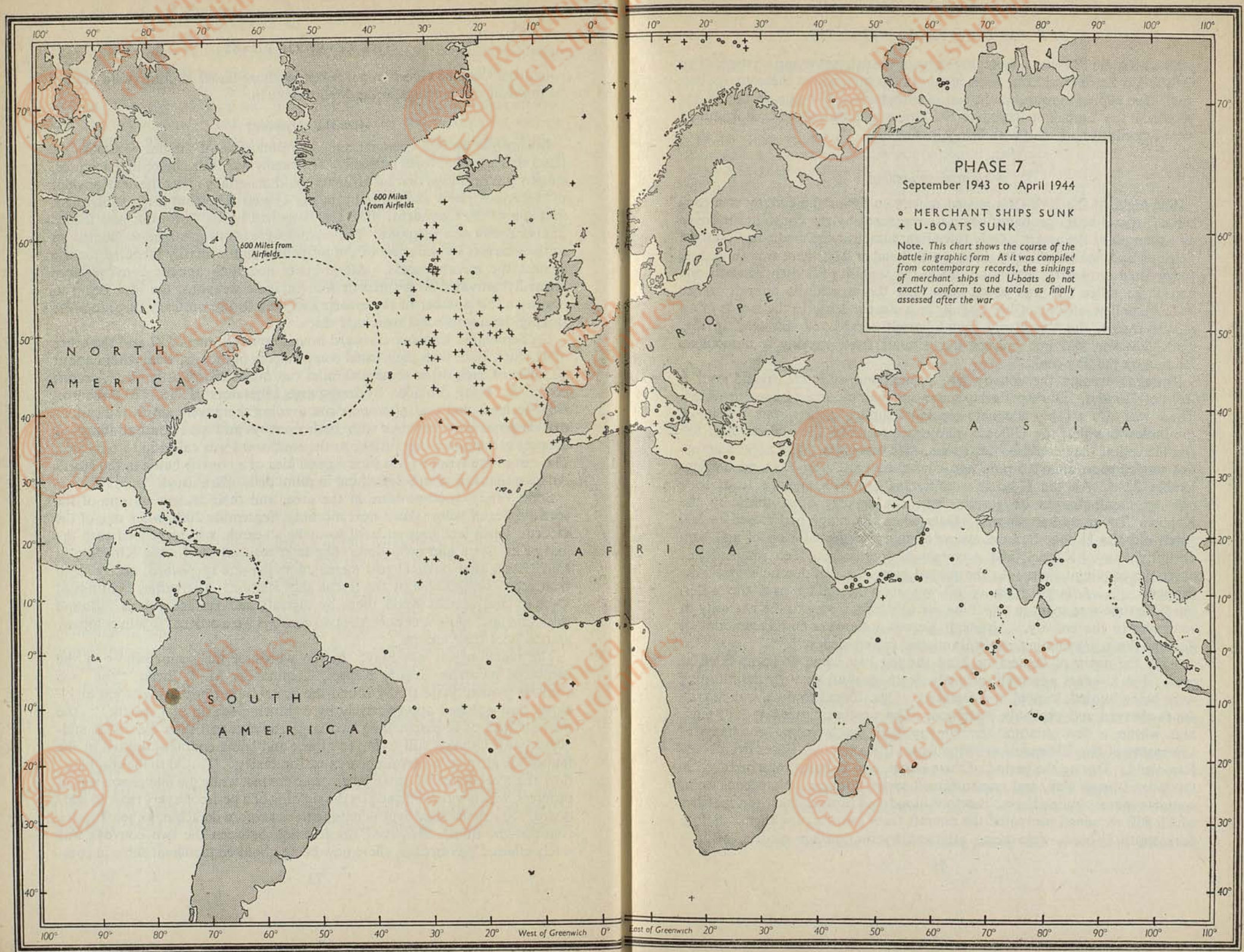
Acoustic torpedoes

Meanwhile we had been expecting a resumption of the heavy attacks on the convoys in the North Atlantic. The enemy had little choice in the matter, since it was only here that his U-boats could materially affect the development of the Allied plans and build-up in the United Kingdom for a subsequent invasion of the Continent. The Germans had begun to try out new tactics of attack with new weapons. These latter were acoustic torpedoes homed on to their targets by the noise of the propellers and primarily intended for use against the escort vessels. All U-boats operating against convoys were normally provided with three or four of these weapons, the idea being to destroy a fair number of the escorts and then to use ordinary torpedoes for sinking the unprotected merchant ships.

On September 19th two outward-bound convoys, one of 27 and the other of 41 ships, both with their usual complements of escorts, were within about 90 miles of each other some 650 miles out in the North Atlantic. Aircraft cover was being provided by long-range Liberators of No. 120 Squadron from Iceland, and that afternoon and evening there were ample indications that U-boats were in touch with both convoys and were concentrating. A support group operating further to the southward was called in to reinforce. The rest of the voyage gives such a good idea of a convoy battle in the North Atlantic that it is worth describing in more detail than usual.

Some fifteen U-boats were in the area, and their attacks on one of the convoys began before dawn next morning, September 20th, when one of the escorts, which had been ordered to make a search, was torpedoed with the loss of her stern and propellers. She later reached the United Kingdom in tow. Soon after daylight two merchant ships were torpedoed, nearly all of their crews being saved by the rescue ship Rathlin. Thereafter, sightings of U-boats and attacks upon them by aircraft and surface vessels followed thick and fast. At about noon the two convoys were ordered to join company and to pool their escorts.

The junction was not easy. In the words of the senior officer of the combined escort in H.M.S. Keppel, Commander M. J. Evans, "the two convoys gyrated majestically round the ocean, never appearing to get much closer and watched appreciatively by a growing swarm of U-boats." The onerous task of re-marshalling two large convoys and their escorts in mid-ocean, with U-boats still trying to attack and being counter-attacked in the immediate vicinity, must ever give cause for anxiety. To add to the complication, the Keppel herself obtained an asdic contact while the manœuvre was in progress, which was confirmed by the sighting of a periscope very close to starboard. She made four depth-charge attacks before detaching other ships to continue the hunt. However, the junction between the two convoys was safely effected before dark, there now being about 66 merchant ships in com-


PHASE 7
September 1943 to April 1944
o MERCHANT SHIPS SUNK
+ U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war
600 Miles from Airfields
600 Miles from Airfields
NORTH AMERICA
SOUTH AMERICA
EUROPE
AFRICA
ASIA
West of Greenwich
East of Greenwich

pany with some 17 escorts, including those of the support group. Astern, after nightfall, a fierce battle was soon raging in the area where the convoys had met. The support group was in action with various U-boats, in the course of which the Canadian destroyer St. Croix and the corvette Polyanthus were torpedoed and sunk with heavy loss of life.

A miraculous landing

The night of the 20th–21st passed quietly so far as the convoy was concerned, the U-boats probably being disorganized by the constant air cover and strength of the escort. Only three light attacks were made, and all were detected and beaten off. By dawn on September 21st there was thick fog. It persisted until early afternoon, when the visibility lifted to between one and three miles. It was about now that the mercantile aircraft carrier Macalpine flew off one of her aircraft in a clear patch. In the words of an official report, she "suddenly found herself completely shrouded in fog. This, however, did not prevent her aircraft from making a miraculous landing on the tiny deck."

Towards evening the convoy had opened out and was spread over a front of 9½ miles. During the day shore-based air escort had been provided. There was also a fairly adequate screen of surface escorts, and in spite of the indications that the U-boats were again massing, the senior officer felt confident that they could be dealt with. He was right. The night's activities started soon after 9.0 p.m. and continued until after 6.0 a.m. on September 22nd. All the U-boats were beaten off, with damage to at least two by depth-charges or gunfire, and the sinking of a third by the Keppel. To quote her report: "Only when the range had closed to 800 yards did the U-boat become aware of the presence of Keppel and turn abruptly away. Keppel fired a couple of rounds and then rammed just abaft the conning-tower. As she passed over . . . ten depth-charges were dropped. . . . A large patch of oil was soon spreading over the water, but little time was spent in searching for souvenirs owing to the necessity of returning to the convoy. Although Keppel suffered a certain amount of damage through ramming, she still retained full efficiency."

With the dawn of September 22nd the fog had come down as thick as ever. The U-boats were still in touch astern, and all through the morning were being hunted, located and attacked. One, forced to dive, was heavily depth-charged and probably destroyed. The weather cleared at 3.20 p.m., and within a few minutes the convoy had the welcome company of Liberators of No. 10 Squadron of the Royal Canadian Air Force from Newfoundland. During the period of their escort, two U-boats were attacked in the face of heavy flak, and one sustained severe damage. Numerous radar contacts were obtained, but the low clouds and occasional fog patches which still remained prevented the aircraft from investigating them. Before dark more U-boats were being attacked by the surface escorts, while a

Swordfish aircraft from the Macalpine was in action with another. The convoy, however, had straggled to a depth of six or seven miles. There were 16 escorts present. Nevertheless it was not a very pleasing prospect with which to start a night of probable heavy attacks.

From about 9.30 p.m. until 2.30 a.m. on the 23rd, U-boats singly or in pairs were attacking practically continuously and from all directions. Most of the escorts were in action, and the enemy's earlier attempts were successfully beaten off. At about midnight, however, the frigate H.M.S. Itchen, ahead of the convoy, detected a surfaced U-boat a short distance ahead. The frigate turned on a small searchlight and opened fire. About fifteen seconds later she was torpedoed, to blow up with a blinding flash. Nearby observers saw a brilliant tongue of flame shooting up from amidships as she broke in two and foundered. It was a tragedy. She carried all the survivors from the St. Croix and Polyanthus. Of the combined ships' companies only three men were rescued by one of the ships in the convoy, the James Smith, whose master had seen men in the water and courageously stopped to save their lives. More attacks were made and driven off, one pattern of depth-charges bringing a dark irregular patch to the surface with a slight smell of oil. Then, at 2.20 a.m. on the 23rd, three merchant ships were torpedoed, two being sunk. While this was happening a destroyer engaged a surfaced U-boat and forced her to dive.

"*The enemy was easily discouraged*"

The next four hours passed quietly until, at 6.48 a.m. on September 23rd, another merchant ship was torpedoed and damaged. She had to be abandoned, the U-boat being attacked by gunfire until she dived. Daylight brought the arrival of more Liberators from Newfoundland. Their reports and other indications showed that U-boats were still in contact, two attacks being carried out on them in the vicinity of the convoy. By nightfall a few submarines seemed to have worked ahead of the convoy, two being attacked by the escorts shortly before midnight, and another soon afterwards. The fog had set in again, and to quote the report—"the enemy seems to have been easily discouraged from pressing home his attacks."

Thick fog still persisted throughout September 24th, though it did not prevent five Liberators from Newfoundland providing air escort. The U-boats, however, had been shaken off, and at 11.0 a.m. next day two fresh escort groups arrived and took over the convoy. That evening the merchant ships were split into their two original convoys, which reached their respective destinations without further incident.

In all we lost six merchant ships, with three escorts sunk and another damaged, the four latter by the new acoustic torpedoes. The enemy's exaggerated claim included twelve escorts sunk and three damaged. Three U-boats were destroyed and several others damaged by air and surface attacks.

In peacetime the task of conducting some eighty ships in company

through thick fog is hazardous and nerve-racking enough. But in fog and clear weather, by night and by day, that pack of about fifteen submarines was able to keep contact and to attack over a period of more than 100 hours, during which they trailed the convoy for nearly 900 miles. The experiences of this convoy were not exceptional. Words cannot convey any real idea of the heavy load of care and anxious responsibility borne by the senior officers of the escorts and the convoy Commodores, no less than by the captains and masters and all the officers and men of the warships and merchantmen comprising the convoys crossing the Atlantic, month in and month out, in the sort of conditions just described. The debt owed to thousands of anonymous seamen of all ranks and grades, and to the airmen as well, is immeasurable.

Death of the First Sea Lord

On October 1st Admiral of the Fleet Sir Dudley Pound, First Sea Lord and Chief of the Naval Staff, was forced to resign through ill health. It was announced four days later that his successor would be Admiral of the Fleet Sir Andrew Cunningham, the Commander-in-Chief, Mediterranean, who took up his new appointment on October 15th. Sir Dudley Pound died at 6.21 a.m. on October 21st, the anniversary of Trafalgar. His ashes were scattered at sea.

October saw a continuation of the attacks in the North Atlantic by packs of fifteen to twenty U-boats, but with singularly little success for the enemy. There were numerous air attacks upon one concentration which foolishly ventured within striking range of Iceland while waiting for a convoy, which resulted in four or five U-boats being sunk and others damaged. Towards the end of the month the main enemy force moved west to within 600 miles of Newfoundland, though here again they had little success. This was partly due to our evasive routeing, partly to the skilful use of support groups of surface ships and the aircraft which kept down any U-boats which made contact. On October 8th–9th one homeward-bound convoy was attacked by a pack of about fifteen submarines. They sank one merchant ship and the Polish destroyer Orkan, commanded by the gallant Commander Hryniewiecki, who did not survive. The loss of this ship and her captain were sad blows to the Polish Navy and to those with whom the Orkan had served. On the other hand, three U-boats of this pack were sunk outright by British and Canadian aircraft, which had probably destroyed others of the same pack before the convoy was met.

Two other westbound convoys were attacked a few days later. In the first encounter against a convoy of 56 merchant ships not one was sunk, and the U-boats again lost three of their number by air attack. On the second occasion we had one ship sunk and the enemy another three U-boats. One of these was finally destroyed by H.M.S. Byard, one of the new American-built "Captain" class frigates now coming into operation.

It was at this time that one escort group, at sea for over three weeks, gave

support to five separate convoys, mainly within range of shore-based aircraft from Iceland. All attempts by U-boats to stage co-ordinated attacks were frustrated. Such was now the strength of our combined sea and air defence that never again did the enemy attempt any large-scale pack attacks on our shipping in the North Atlantic.

Aircraft from the Azores

Three British escort carriers were operating with the convoys in the North Atlantic, while the American carriers continued their good work south of the Azores. It was in the autumn of 1943 that, by arrangement with the Portuguese Government, we were able to strengthen our defence in this same area by operating British aircraft from the Azores. There was a certain amount of U-boat activity in the Mediterranean, where we lost a few ships, while about nine German and Japanese submarines were at work in the Indian Ocean, particularly off Mombasa and the coast of Arabia. One or two boats were operating off Freetown. It seemed as though, conscious of ill-success in the North Atlantic, the U-boat Command was again spreading its effort with the idea of extending our defence and thereby weakening it in the vital area there.

November brought another change in U-boat tactics. While still concentrated in packs they remained submerged by day, only surfacing at night to charge their batteries or to gain ground in chasing a convoy. In the far North Atlantic not a single ship was sunk on the east-west convoy routes, and towards the end of the month there were indications that the only U-boats in these high latitudes were those on passage from Norway. Disappointed, the enemy started to use long-range aircraft for the purpose of homing U-boats on to the convoys to and fro between the United Kingdom and Gibraltar. In consequence, the convoys had to be routed further west, which increased their time on passage but brought them within range of escort by aircraft based in the Azores. Enemy aircraft claimed several ships, but though the convoys passed through considerable U-boat concentrations they suffered negligible loss. The half-hearted attacks were not pressed home. One or two U-boats succeeded in passing through the Straits of Gibraltar to bring the total number in the Mediterranean up to fifteen. The attempt to pass a greater force was severely punished by the combined efforts of aircraft based on Gibraltar and surface ships, which resulted in four submarines being sunk in the narrows.

The Allies lost only thirteen ships to U-boats in all areas during December, 1943, the sinkings occurring off the Central and North American coast, off Freetown, off the heel of Italy, in the Gulf of Aden, and off the coast of India. However, the new acoustic torpedoes still continued to be used with considerable success against our escort vessels. On December 11th, H.M.S. Cuckmere was torpedoed off the North African coast, but succeeded in reaching Algiers, and on the day following H.M. ships Tynedale and Holcombe were sunk in the same neighbourhood. In this case the U-boat

responsible, U-593, was hunted to exhaustion by "swamping" the area day and night with relays of aircraft, with surface vessels ready to give the *coup de grâce* when the submarine finally appeared. U-593 was eventually destroyed by U.S.S. Wainwright and H.M.S. Calpe after a hunt lasting 32 hours, during which 21 Wellington sorties were flown and the U-boat was able to spend only a few minutes on the surface.

Early in August one of the German broadcasters had announced—"The enemy defence in the Atlantic has got the better of us. Mind you, I say at present, and I add, this superiority is temporary, we shall overcome it. . . . Never before have we worked more zealously and intensely in the laboratories, workshops, at the bases and at headquarters, than during the past few weeks to speed up development against this temporary superiority of the enemy defences. . . ."

Sinkings dwindled

German ingenuity is inexhaustible, and this new acoustic torpedo was to remain a considerable menace. Nevertheless, towards the end of 1943 it was obvious that in spite of the number of U-boats at sea their new captains lacked the fiery vigour of their predecessors, a third of whom would never sail again. The targets were still there in quantity, but the number of sinkings dwindled as the potency of our counter-measures increased. Twenty Allied merchant ships of 119,000 tons were sunk by U-boats during September, 1943; 20 of 97,000 tons in October; 14 of 67,000 tons in November; and 13 of 87,000 tons in December. Reckoned by ordinary standards these are large figures, but small in comparison with the appalling losses in those black months of June and November, 1942. Moreover, the U-boats destroyed in the four months September to December, 1943, inclusive, were, respectively, 11, 26, 19 and 8, a total of 64 in 122 days. In all, since the beginning of the war, no fewer than 473 German and Italian submarines are now known to have been sunk by the end of 1943.

End of the Scharnhorst

At 9.30 a.m. on December 26th, 1943, the Scharnhorst, working from her base in Norway, made contact with one of our convoys to North Russia. Twice she was driven off by British cruisers, and in the afternoon was lured under the guns of the Duke of York, coming in from the westward. Heavily fired upon and attacked by destroyers with torpedoes in the darkness of that Arctic winter evening, the Scharnhorst was finally sunk 60 miles north-east of the North Cape.

The first four months of 1944, during which some 70 U-boats were usually at sea at any one time, saw no great change in their operation. Extreme caution and indecision still seemed to persist, though the enemy strove to disperse our forces by sending U-boats to work as far afield as the Indian Ocean and off the west coast of Africa.

During January, when submarines sank 13 merchant ships of 92,000 tons in all areas, there was a tendency for the U-boats in the North Atlantic to work within about 350 miles of the coast of Ireland, instead of their normal distance of about 700 miles. The appalling weather conditions gave them immunity from sustained air attack, but again they had little success against convoys. In the Bay of Biscay transit area, during the first and fourth weeks of this month, there were many U-boat sightings by Coastal Command aircraft and two known kills. In the middle of January, however, foul weather greatly curtailed flying. Further southward, off the Azores and later off Cape Verde, aircraft from the American carriers and their supporting escorts had continued success against U-boats which had been sent to patrol independently, while U.S.S. Block Island rescued 43 survivors from a U-boat sunk by a British Wellington, "L" of No. 172 Squadron, based on the Azores. We lost no merchant ships in this area, and a number of promising attacks were made by the British, Canadian and French vessels forming close escorts to the convoys. Further north, again, in the Arctic, U-boats made considerable effort against two convoys bound to North Russia. On the first occasion, in attacks lasting eighteen hours, they sank three merchant ships and damaged a destroyer. When next they tried the same tactics the defence was too strong. No merchant ships were lost, though a destroyer was sunk. In the Mediterranean, the Allied landing at Anzio on January 22nd had produced a large concentration of shipping and tempting targets for submarine attack. Though the enemy was again too late to achieve any great result, it is probable that three U-boats commanded by experienced captains were able to penetrate the Straits of Gibraltar to reinforce the flotillas in the Mediterranean. Altogether, thirteen U-boats were destroyed during January.

"*We shall smash Britain's supply*"

On January 20th Air Chief Marshal Sir W. Sholto Douglas became Commander-in-Chief, Coastal Command, in succession to Air Marshal Sir John Slessor. It was on this same date that Grand Admiral Dönitz said at a conference at Stettin : "The enemy has succeeded in gaining the advantage in submarine defence. The day will come when I shall offer Churchill a first-rate submarine war. The submarine weapon has not been broken by the setbacks of 1943. On the contrary, it has become stronger. In 1944, which will be a successful but a hard year, we shall smash Britain's supply with a new submarine weapon." It is to be noted that this passage in Dönitz's speech was omitted in all versions broadcast inside Germany.

Of the 18 merchant ships of 93,000 tons sunk by submarines in February, ten were lost in the Indian Ocean, where six German U-boats were operating from Penang. A few Japanese submarines were also busy in the same area, and on February 11th convoy escorts sank one of these off the east coast of India. Another, which had attacked and sunk a big ship in convoy south-west of Ceylon on February 12th, was brought to the surface by two

destroyers and sunk after a fierce gun action. A few days later H.M. submarine Tally Ho destroyed an Italian U-boat manned by Germans in the Straits of Malacca.

In the Atlantic, the enemy maintained a considerable concentration of U-boats 200 to 400 miles south-westward of Ireland. Here, relying to some extent upon the reports of their long-range aircraft, they were in a position to attack our convoys going south to Gibraltar, as well as those outward bound across the Atlantic, which at that time of year were routed well to the southward. We were fully aware of the danger, and had escort groups at hand to deal with any U-boats trying to mass ahead of the convoys.

It was here, in a remarkable cruise of twenty days, that Captain F. J. Walker's Second Escort Group of five ships, H.M. ships Starling, Wild Goose, Woodpecker, Magpie and Wren, destroyed six U-boats and captured the entire crew of one of them. Three of the six were sunk in less than seventeen hours, whereby two convoys were saved from almost certain attack. Captain Walker, the senior officer of this well-trained team, had long experience of U-boat tactics and possessed an almost uncanny knowledge of where each submarine was likely to be found. Having detected her, the group then proceeded to hunt her to exhaustion. Once contacted, not one U-boat escaped. In all cases the enemy was driven deep, and the longest hunt lasted from 10 a.m. until 5.0 p.m., when U-264, worn to exhaustion, appeared on the surface and scuttled herself, fifty-one prisoners being taken. From the other five there were no survivors. Four of these U-boats were first detected by H.M.S. Wild Goose, which ship, as ever, took a very energetic part in the hunting. No merchant ship was sunk in the area, though at the end of the operations H.M.S. Woodpecker had her stern blown off at night by an acoustic torpedo. She was taken in tow next morning and would probably have reached a southern port but for a gale which sprang up seven nights later. Battered by the heavy seas, she capsized and sank off the Scilly Islands after being seven days in tow, all her crew being rescued. The other four ships of the group received a vociferous welcome when they returned to their base at Liverpool, as well they might.

In much the same area, on February 18th and 19th, the frigate H.M.S. Spey, Commander G. A. G. Ormsby, senior officer's ship of the Tenth Escort Group, destroyed two U-boats within twenty-four hours. On each occasion the submarine was brought to the surface by a single well-placed pattern of depth-charges, to be sunk by gunfire. The second of these U-boats made the most of a hopeless situation by fighting back with her guns while trying to escape on her Diesel engines.

February was a bad month for the enemy, eighteen U-boats being destroyed. One praiseworthy kill was made by a British Catalina aircraft, M/210, Squadron-Leader F. J. French, operating at the extreme range of 750 miles from her base in Shetland, in waters where the enemy had usually little to fear from our aircraft. Called out in support of a convoy returning from North Russia, the Catalina discovered a U-boat 250 miles north-west of

the Lofoten Islands. Because of the length of her flight the aircraft carried no more than two depth-charges. These, however, were so well placed that the U-boat was sent to the bottom.

The longest hunt

March, too, saw the enemy operating with great caution in the North Atlantic, where they sank only one merchant ship in convoy. Here, however, one U-boat withstood a hunt of 38 hours by the ships of the First Escort Group, the longest hunt on record during the entire war. On surfacing with his air and battery power exhausted after two days and one night under water, the U-boat's captain still had heart enough to torpedo one of the hunters, the frigate Gould. H.M.S. Affleck avenged her consort by sinking the U-boat, and then turned to rescue the Gould's survivors, a difficult operation skilfully carried out in a gale of wind and a heavy sea. This was the second U-boat killed by the First Escort Group in five days. Another memorable and successful hunt in this period was carried out by Canadian and British escorts. It lasted 30 hours.

With the probable idea of dispersing our defence, however, the U-boats continued to work far afield in the Indian Ocean and off the west coast of Africa, while a few more managed to pass through the Straits of Gibraltar into the Mediterranean. Of the 23 ships of 143,000 tons sunk by U-boats during March, eleven were destroyed in the Indian Ocean. However, enemy activities here were considerably curbed by the sinking of two of their tankers carrying fuel, while South African aircraft co-operating in a search over a wide area sank one U-boat some 400 miles south of Capetown. A U-boat carrying spare torpedoes and an operational U-boat, both bound for the Indian Ocean, were also destroyed by the aircraft of an American escort carrier group near the Cape Verde Islands.

Not far from the Azores, U-575 was discovered and attacked by a British aircraft which called up a Canadian frigate. The frigate in turn called up two American escorts. This international gathering brought the U-boat to the surface, where she was destroyed by gunfire from the ships and rockets from an aircraft. Four more U-boats were sunk during the month in the Mediterranean, while in the western approaches to the Straits of Gibraltar British surface forces, in conjunction with American Catalinas from Casablanca, destroyed yet another. In the Bay of Biscay area the U-boats were treating our aircraft with the greatest circumspection and were rarely on the surface during daytime. Instituting patrols closer in to the coast, however, Coastal Command aircraft in March still sighted U-boats at the rate of about one each day and each night, and attacked more than half of them. It was in this area, too, that two Mosquitoes armed with six-pounder guns, and supported by three other Mosquitoes of the same squadron, sighted a U-boat on the surface escorted by four destroyers and covered by eight JU.88's. Five attacks were made on the submarine through flak which was soon intense and accurate, while the other Mosquitoes battled with the JU.88's. Four of

the latter were shot down into the sea, while the U-boat, holed in at least six places, was sunk.

Eleven escort carriers and seventeen mercantile aircraft-carriers were now working with our convoys, and others with hunting groups. On March 15th an aircraft from H.M.S. Vindex, working in conjunction with Captain Walker's Second Escort Group, detected a U-boat on her radar and provided the group with its thirteenth kill.

Of the twenty U-boats sunk during March, four were destroyed during the passage of our North Russia convoys, on which route escort carriers were now playing a vital part in the protection of merchant shipping. During the passage of one convoy, Swordfish from H.M.S. Chaser destroyed three U-boats in three consecutive days, in each case with rockets. The submarines were all in the process of shadowing the convoy from distances of 10 to 15 miles, and the encounters occurred well north of the Arctic Circle in bitter weather with the temperature nearly down to zero. The air crews suffered greatly from the cold in their open cockpits, and had to be lifted out half-frozen on their return to their ship. In each case survivors from the U-boats were seen in the water, some being rescued by our surface vessels. The great cold probably reacted in our favour. The flak was not very intense, due no doubt to iced-up gun-barrels and the numbed fingers of the gunners.

Immediate dividends

April, 1944, saw the loss of only nine Allied merchant ships of 62,000 tons through U-boat attack, the lowest figure for four years. The enemy was using more caution than ever, his patrols in the North Atlantic being few and sparsely maintained. A considerable proportion of the larger submarines were on passage to or from the Indian Ocean, where we had no losses. Aircraft from escort carriers of the United States Navy sank U-boats south of Halifax, Nova Scotia, and in the Cape Verde and Madeira areas, though in the Bay of Biscay the submarines still travelled submerged and Coastal Command had fewer sightings than usual. A strong force of U-boats was operating from bases in Norway, partly against our convoys to North Russia, partly as a precaution against the invasion of Europe which the enemy now realized was imminent. They achieved little against the Russian convoys. In the beginning of April the usual battle developed against enemy aircraft and U-boats on this far northern route. Two escort carriers were present with the convoy, the Activity as a fighter carrier and the Tracker for anti-submarine duties. This division of responsibility paid immediate dividends. All six enemy aircraft which tried to shadow the convoy were shot down, while of the eight or more U-boats operating three were sunk and others damaged.

The U-boat fleet was clearly being husbanded in anticipation of a major effort against our expected invasion, while a number of the boats at sea were transmitting meteorological information for the benefit of the staffs planning the enemy's military and air operations. Other U-boats in Ger-

many were being fitted with "Schnorkels" in preparation for work in coastal waters. However, in spite of the few chances offered, seventeen U-boats were sunk during April.

The battle of the scientists

The effectiveness of the radar fitted in our surface vessels and aircraft had forced the U-boat commanders to remain submerged as much as possible. Even when on the surface at night for the minimum time necessary to charge their batteries, they were intensely vulnerable. This led to the development of the "Schnorkel," which permitted the U-boats to charge their batteries when submerged. As finally developed, it consisted of two tubes within a single casing hinged to the deck just forward of the bridge. When raised and in use the top of the intake tube was level with the top of the periscope, while the exhaust, somewhat shorter, discharged the burnt gases downwards. When the boat was about to charge her batteries she was brought to periscope depth with Schnorkel raised and Diesel engines running, and could charge and make three or four knots simultaneously. Conditions inside the boat were unpleasant, the chief discomfort being the violent reduction in pressure when a wave covered the Schnorkel head and caused the intake valve to close. Nevertheless, by careful trimming a good engineer officer could mitigate some of the discomfort, and as time went on the enemy's technique improved. Schnorkel was finally fitted to all U-boats, and made their detection almost impossible from the air, except in calm weather.

Meanwhile the battle of the scientists continued. The Germans had also produced a new "search receiver" which told the U-boats when they were being hunted by our own new type of radar. It had some success, though certain ingenious decoys to give false radar echoes had little more than a temporary nuisance value.

We in our turn were not idle. The U-boat's habit of surfacing only at night, with the consequent difficulties of sighting and attack, had emphasized the need for better flares for those aircraft not fitted with the Leigh Light. The illuminant known as the Snowflake, which "turned night into day," had already been provided for the surface escorts. And now, early in 1944, aircraft were also re-equipped with parachute flares producing two million candle-power.

To the uninitiated the lull in the Atlantic at this period might have indicated that the battle against the U-boats was won. But this was not the case in reality. Addressing flag-officers in December, 1943, Admiral Dönitz had referred to the heavy U-boat losses during that summer, and then spoke of creating what was virtually a new Navy, far greater and stronger than anything that had gone before. "I alone cannot do this," he added. "It can only be done by the man who controls European production . . . who bears the responsibility, before the Führer and the German people, for having the new vessels ready for us on the appointed day."

Enemy scientists had already designed the V1 and V2 weapons which

later wrought us such harm and destruction. The better to outwit our measures of defence against the U-boats they had developed entirely new types of submarines, which were now being built. With streamlined hulls and high submerged speed, they were to have a very long seagoing endurance. A great part of Germany's war effort was directed towards turning out the prefabricated parts in factories all over the Reich and in occupied territory. The parts were being rushed to the building yards on the coast for assembly, where work was stopped on all but the almost completed U-boats of older design. It was intended that 350 of the new boats should be completed in 1945.

It was lucky indeed for us that the process of assembly was greatly dislocated by heavy Allied bombing of the enemy's factories, shipyards, railways and canals, and that the design of the new boats was even more complicated than usual. Like most intricate machines, their first troubles took a lot of getting over. It was a case of Teutonic thoroughness defeating its own ends, and later many of the picked officers and men who might have been manning operational U-boats at sea were battling with the many defects and difficulties which made themselves apparent when the new boats underwent their first trials. Their mass production was not possible by the time Germany was forced into surrender, though a few of the new type were in operation by April, 1945.

With their greatly improved Schnorkels, detection from the air would have proved even more difficult, while when submerged their speed was comparable with that of our escort vessels, which could have made them extremely difficult to counter, particularly in a heavy sea.

The advent of these new U-boats would have revolutionized submarine warfare.

CHAPTER 9

THE EIGHTH AND FINAL PHASE, May, 1944–May, 1945

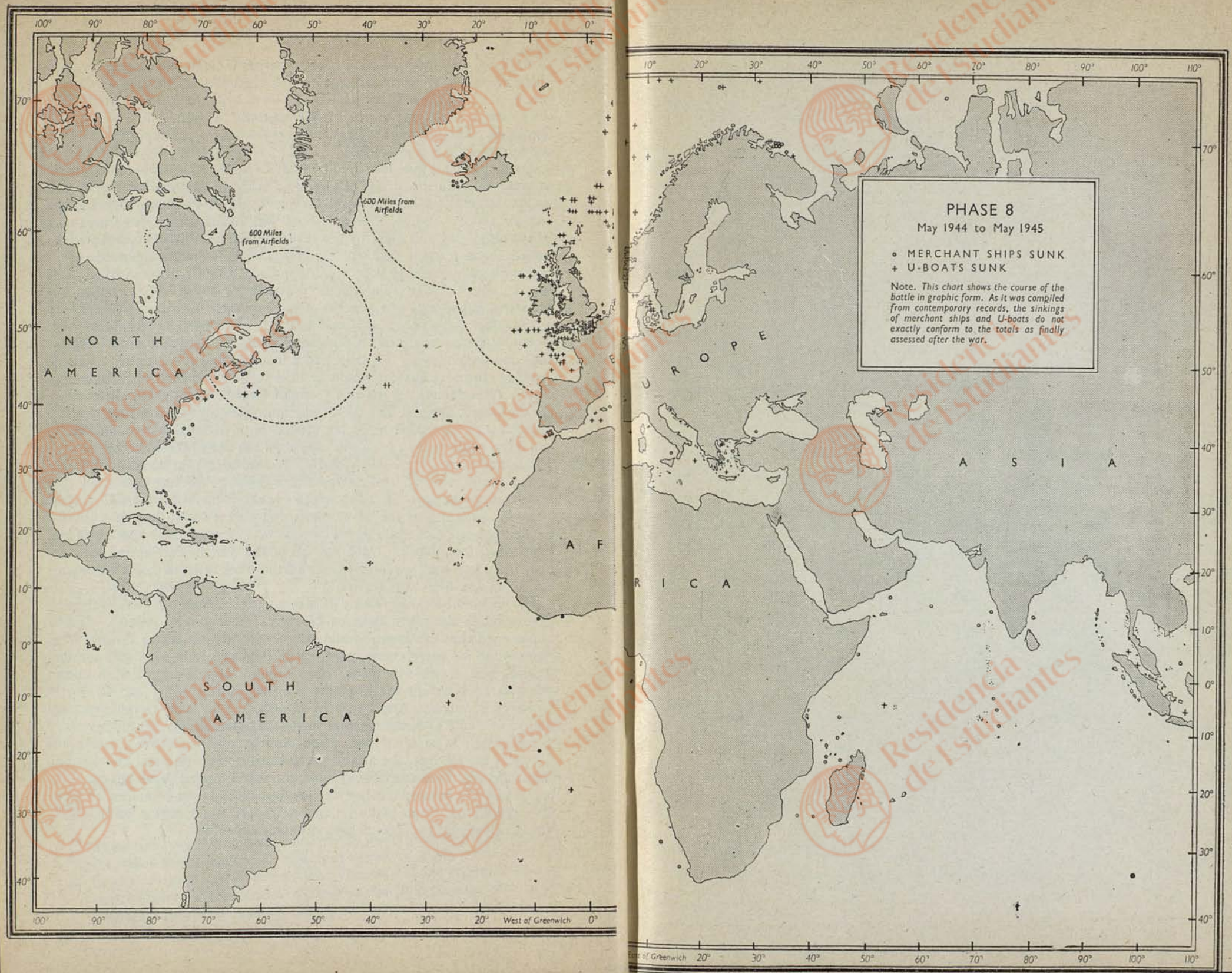
There was very little offensive activity by the U-boats during May, 1944, and the Allied loss in merchant ships, four vessels of 24,000 tons, was lower than in any previous month of the war. The bulk of the enemy's 500-ton boats were in Norwegian harbours or the much-battered ports in the Bay of Biscay preparing to operate against our invasion convoys, though some continued

to work on the North Russian route. Larger U-boats, unsuitable for anti-invasion duties, were on passage to, or operating in, the Indian Ocean, where on May 2nd a U-cruiser—U-852—was driven ashore on the Somali coast after a damaging attack by Wellingtons "T" and "E" of No. 621 Squadron. The survivors of her crew were rounded up on shore by a landing party from H.M.S. Falmouth.

Another U-boat was destroyed by joint air and surface forces when trying to break through the Straits of Gibraltar, while in the Mediterranean itself we had several further successes through good co-operation between sea and air forces. When once a U-boat was located, the whole area was "swamped" day and night by relays of aircraft, with British and American surface forces ready to deal with the enemy when he finally appeared.

The Germans kept up their attacks on the Russian convoy in May. The escort carriers Activity and Fencer provided air cover. The weather was appalling, but in spite of six inches of snow on their flight decks, thick cloud at 1,000 feet and a very heavy sea which caused the carriers to roll and pitch violently, the naval aircraft continued to operate. Frequent snow blizzards shut down visibility to less than half a mile, so that it was often a gamble whether returning aircraft would be able to find and land on their parent ships. Nevertheless, of the two German aircraft that sighted the convoy, the Activity's fighters shot down one and seriously damaged the second. The Fencer's Swordfish made ten attacks upon U-boats and sank three in two days, while at the end of the voyage all but one of these veteran aircraft which she carried were still serviceable. Remembering the fierce inhospitality of the Arctic weather, with temperatures down below zero and spray and snow freezing as they fell, all these facts speak volumes for the skill, endurance and gallantry of the naval pilots and air crews, no less than for the outstanding work of those in the carriers who directed their operations and maintained the aircraft. Until the end of the war the carriage of war supplies to North Russia remained one of the most arduous commitments of the Royal and Merchant Navies.

The really outstanding feature of May was the brilliant offensive of Coastal Command in the north between Norway, Shetland and Iceland. It was appreciated that the enemy would try to reinforce his Biscay flotillas from Norway, so air patrols were instituted in this area. On May 16th the first sighting and attack was made, and Coastal Command started an all-out offensive to intercept the U-boats, the first patrols being carried out in Norwegian waters. Appropriately enough, it was a Norwegian-manned Sunderland of 330 Squadron that made the first sighting 200 miles west of Trondheim. In spite of her severe damage and casualties through the U-boat's intense flak, the attack was pressed home with great courage and determination, the enemy being sunk with a well-placed depth-charge. The captain of the Sunderland had the greatest difficulty in regaining his base. The aircraft had been badly hit, her starboard outer engine being wholly out of action and the inner engine vibrating violently.


PHASE 8
May 1944 to May 1945
MERCHANT SHIPS SUNK
U-BOATS SUNK
Note. This chart shows the course of the battle in graphic form. As it was compiled from contemporary records, the sinkings of merchant ships and U-boats do not exactly conform to the totals as finally assessed after the war.
600 Miles from Airfields
600 Miles from Airfields
NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
West of Greenwich
East of Greenwich

The area to the eastward of the Faeroes had not been closely covered by our aircraft, and the enemy perhaps thought himself more or less immune. But between May 16th, when this offensive on the northern transit area started, and the end of the month, aircraft of Coastal Command made 22 sightings and 13 attacks. They sank here six U-boats of the total of 22 destroyed in all areas during the course of this month.

The invasion of Europe

June 6th, 1944, saw the landing of the Allied armies in Normandy, the greatest combined operation in the history of war. More than 70 U-boats were operating, and apart from a few of the larger boats in the Caribbean and Indian Ocean, this gave the enemy more than sufficient numbers to launch mass attacks on our vast convoys on D-Day and the nights and days following. In theory they might have saturated and penetrated our defence and endangered the success of our whole huge undertaking. As it happened, they were unable in any way to affect the course of the landings, though towards the end of June a few U-boats, using their Schnorkels, succeeded in passing the numerous obstacles and penetrating into the invasion area.

Because of the immunity in the open ocean we had been able to scale down the strength of the surface escorts for the transatlantic convoys, and to use the ships thus released with the invasion convoys in the Channel. Coastal Command was allotted the first line of defence to prevent the U-boats from the Bay of Biscay ports penetrating to the routes of the invasion forces, the Admiralty having decided that, until the first landings were complete, they would have few surface ships available to operate in the outer defences. This entailed the continuous flooding by aircraft of the waters from the South of Ireland down to the Biscay port of Lorient, and in the mouth of the Channel. On D-Day, U-boats started to stream out of their Biscay bases, travelling at full speed on the surface in their haste to reach our Channel convoys, only to meet the full blast of Coastal Command's patrols. The first four days were crucial, and from the night of D-Day, June 6th–7th, until June 10th, aircraft in the Bay and Channel areas sighted 36 U-boats by day and by night and attacked 23, six being sunk and about the same number severely damaged. No U-boat fleet could stand such losses, and after D + 4 the enemy changed his tactics. Boats using Schnorkel attempted to creep past the air barrier, but, difficult as they were to locate, a further 23 U-boats had been attacked by aircraft by the end of June, three being sunk, two of these in co-operation with naval forces, and several others damaged. Of those that escaped the aircraft, four were sunk by surface escorts.

"*Unmolested by the U-boats*"

Aircraft manned by British, Canadians, Americans, Norwegians and Czechs were successfully employed. In each and every case the U-boats

fought fiercely back. Our aircraft suffered losses and damage, but, thanks to the efforts of Coastal Command and the surface escorts, the huge volume of invasion traffic passed in safety, unmolested by the U-boats.

There were many outstanding incidents during this eventful period. On the night of June 8th–9th, for instance, a Liberator aircraft, "G" of 224 Squadron, Flying-Officer K. Moore, on patrol off Ushant, broke all records by sinking two U-boats in half an hour. Having been detected by radar, both were attacked in the light of the full moon. On each occasion the aircraft was heavily engaged, but the attacks were duly pressed home. Having taken good photographs of the enemy *in extremis* the Liberator continued her patrol.

Surface forces, too, had several successes in the latter half of June, off the British and French coasts. Two U-boats were destroyed off Start Point in Devon. Off Brittany, ships of the Fourteenth Escort Group came under fire from the enemy's shore batteries while dealing with a submarine and withdrew under cover of a smoke-screen after completing the kill.

Another U-boat was sunk during this month off the Azores, a second by the United States Navy near St. Helena, and a third by a British submarine off the Lofoten Islands. And again the U-boat's northern transit area west of Norway was being well combed by Coastal Command in spite of periods of fog and foul weather. There were 22 sightings in this area, with 15 attacks and seven certain kills. The outstanding achievement of the Cansos of No. 162 Canadian Squadron, which had been specially loaned to Coastal Command by Canada, is worthy of special mention. Between June 3rd and June 30th they attacked with such accuracy that five U-boats were sunk. During the engagements three of their aircraft were shot down. One of these actions was that of the late Flight-Lieutenant D. E. Hornell, Royal Canadian Air Force, flying Canso T/162 of 162 (R.C.A.F.) Squadron. On June 13th this officer sighted a U-boat on the surface, and made a gallant attack through intense and accurate flak. The submarine was sunk. The aircraft, however, was badly damaged in both wings and the starboard engine. The vibration became so violent that this engine soon fell out of its mounting. A fire started in the starboard wing which could not be extinguished. The aircraft was forced to come down in the very heavy swell, her hull being so riddled by enemy gunfire that she sank in twenty minutes. Though no member of the crew was injured while alighting, there was much trouble with the rubber dinghies. One burst and the other capsized. The sea was heavy and bitterly cold. Before a rescue launch arrived twenty-one hours later, two men were dead, Hornell had lost his sight and, with two others, was in a state of exhaustion. This brave young officer, typical of many others of his Service, died soon after being rescued. His gallantry and fine leadership were recognized by the posthumous award of the Victoria Cross.

The U-boats had been trained primarily for operations in ocean waters, but from now on, indeed until the end of the war, they made increasing use

of their Schnorkels and crawled submerged along the coast to reach their patrol positions. When the depth of water permitted, they lay on the sea bottom for rest. Outlying rocks made them very difficult to detect by radar, while the eddies and tide-rips in the comparatively shallow water of the English Channel mi'itated against the successful use of the asdic. Nevertheless, 24 U-boats were sunk during June, while in all areas they inflicted a loss of eleven Allied merchant ships of 58,000 tons. In the invasion area and British coastal waters only five merchant ships were sunk by submarine and another five by being mined, an infinitesimal proportion of the great mass of shipping engaged in the operations and far less than we had a right to expect.

In the Indian Ocean, where three merchant ships were sunk in June and five in July, the demands in the critical Channel area made it difficult to afford the surface and air escort and hunting forces adequately to carry on an offensive against the U-boats in this distant theatre. In all during July we lost twelve merchant ships of 63,000 tons, while sixteen submarines were destroyed at sea and five in bombing raids. In home waters, using their Schnorkels, they were still most difficult to detect, though in sinking only three ships in the invasion area they did little to interfere with the stream of convoys crossing the Channel for the build-up of the invasion. Coastal Command continued its successful operations off the Norwegian coast and in the Bay of Biscay and Channel areas, though U-boat sightings on the surface by day or by night had become comparatively rare. The days of the old straightforward fights were passing.

"The operations were most successful"

However, it was probable that some of the U-boats in North Russian bases might not yet have been fitted with Schnorkel, so in mid-July long-range aircraft of Coastal Command launched an offensive in the waters of the Arctic Circle, 800 miles from their bases, where it was hoped that U-boats would be located on the surface charging their batteries on the Russian convoy routes. The operations were most successful. In seven days 15 U-boats were attacked, of which three were sunk and three seriously damaged. One of those killed was by a Catalina of No. 210 Squadron, captained by Flying-Officer J. A. Cruickshank. A U-boat was sighted on the surface about 500 miles from base and well within the Arctic Circle. It was immediately attacked, and during the run in under intense and accurate flak the Catalina was badly hit, the navigator being killed and the captain and three others wounded. In spite of his very serious wounds, Cruickshank's attack was lethal. Though weakened by loss of blood and refusing morphia in order to maintain consciousness, he assisted his second pilot, who was also wounded, to bring back the damaged aircraft to its base, where it had to be beached because of the damage. Cruickshank had to be given a blood transfusion before he could be moved from the aircraft. For his outstanding bravery, Cruickshank was awarded the Victoria Cross. Of the three officers

of the Royal Air Force who received this decoration for anti-U-boat operations, he alone survives.

On July 9th the Royal Navy and the nation sustained a great loss in the death of Captain Frederick John Walker, who died at Liverpool at the age of 48 after playing a leading part in the invasion of France. Some of this gallant officer's achievements have already been mentioned in this narrative. A prime seaman and fighter and a brilliant leader, he was without doubt one of the outstanding and most inspiring figures of the anti-submarine war. From first to last his ship, or the Escort Group he commanded, destroyed twenty U-boats. The funeral service was held in Liverpool Cathedral on July 12th, Admiral Sir Max Horton, Commander-in-Chief, Western Approaches, reading a Solemn Acknowledgment. Captain Walker's body was afterwards embarked in H.M.S. Hesperus for burial at sea in the Western Approaches he knew so well. It happened that outward-bound ships were leaving the Mersey as the destroyer steamed seaward at high speed. A homeward-bound convoy was also arriving in Liverpool Bay. As the Hesperus passed with her ensign at half-mast the crews of those merchantmen mustered on deck to pay their tribute to a brother seaman who had fought so well.

"They were now risking nothing"

In the first six months of 1944 the enemy had lost 122 U-boats through Allied action by sea and air, with many more damaged. Badly mauled, though not yet defeated, they were now risking nothing more than was absolutely necessary.

August saw the beginning of the withdrawal of the U-boats from the Channel area, and their movement from Brest, Lorient and Saint Nazaire, all threatened by the Allied armies, to La Pallice, Bordeaux and southern Norway. To deal with this migration, hunting forces of surface vessels working in conjunction with aircraft were sent to operate inshore in the northern part of the Bay of Biscay, where enemy aircraft were no longer able to interfere. There were many attacks, with seven U-boats sunk. One of the prisoners taken remarked that it was as difficult to move across the Bay as it was to carry out an operational patrol. In the Channel area, during the first three weeks of August, six Allied merchant ships were sunk and three U-boats destroyed by surface forces. It was now that a new weapon was installed in certain anti-submarine vessels. This was known as the "Squid," and consisted of a three-barrelled mortar firing a pattern of large charges ahead of the ship with great accuracy. They could be set to explode at any depth.

It was thought at this time, and correctly, that the majority of the Biscay submarines would be sent to Germany or Norway for rest and re-equipment before renewing their attacks on shipping in the Atlantic. A number were soon on their way, and to draw off our surface and air forces from these boats on passage, the enemy sent a few submarines to operate in coastal

waters off North Cornwall and in the approaches to the North Channel between Scotland and Northern Ireland. There were no attacks on the convoy routes in the North Atlantic, and August saw the safe passage of one eight-knot convoy of 167 ships under the escort of a frigate and six corvettes of the Royal Canadian Navy. "The feat," to quote an official report, "reflects much credit upon the merchant ships and escorts, since the conduct of so large an assembly of ships presents many difficult problems." That convoy, which in close order covered more than 30 square miles of sea, met considerable fog and bad weather. Nine of its ships were bound for North Russia with nearly 66,000 tons of cargo, which included locomotives, explosives, tanks, cars and trucks, with steel, miscellaneous machinery and food. The 156 ships which entered the ports of the United Kingdom brought 1,019,820 tons of cargo, including 307,874 tons of petroleum products, 216,676 tons of foodstuffs, and more than 10,000 vehicles.

During August the passage of our convoys to and from North Russia continued to attract the attention of what is now known to have been about a dozen U-boats. No merchant ships were lost on this route, though two escort vessels were sunk and an escort carrier damaged. It may here be added that from August 21st, 1941, when the first convoy sailed for North Russia, until the end of the war in Europe, nearly four million tons of cargo were delivered to our Russian Ally through the ports of Murmansk and Archangel. No fewer than 775 ships loaded in the United States and United Kingdom sailed in the outward-bound convoys, and of these 57, apart from warships, were lost by enemy action. Of the 707 ships in the 35 convoys which sailed on the homeward voyage, 21 were lost through enemy action.

Coastal Command's offensive in the northern transit area continued. By the end of August, in a campaign which had started in the middle of May and had ranged from the Lofoten Islands to the Bay of Biscay, its aircraft sank 31 U-boats and damaged 36 more. On the debit side, 31 anti-submarine aircraft were lost by enemy action and another 17 through operational hazards. More than 400 officers and men of the air crews were lost and a considerable number wounded or injured.

To meet the change in the U-boat dispositions from the Biscay ports to Norway, preparations were made to move our main air effort to northern waters and to regroup and strengthen the surface escort and support groups as a counter-measure to any renewal of the attacks on the North Atlantic convoys. To expedite the departure of the U-boats from La Pallice and Bordeaux, moreover, the fuel storage at these two ports was bombed by Allied aircraft during August, while before long similar attacks were to be made on the U-boat bases at Bergen and Trondheim.

Twenty U-boats were sunk at sea during August ; four through bombing ; and a further ten when the Biscay ports were occupied by the Allies. In this same month U-boats caused the loss of 18 Allied merchant ships of about 99,000 tons. Eight of these vessels were lost in the Indian Ocean, where twelve U-boats were still operating. But by now our defence there had been

greatly strengthened. On August 5th a merchant ship had been torpedoed off the northern entrance to the Mozambique Channel, and the hunt that followed ended a week later a thousand miles away with the destruction of the U-cruiser responsible west of the Seychelles. H.M.I.S. Godavari and H.M.S. Findhorn were responsible for the final kill, but two escort carriers, H.M. ships Shah and Begum, with their aircraft, four frigates, two Indian and one British sloop, two corvettes, with shore-based aircraft of 246 Wing, Royal Air Force, all took part in the widespread search. The hunt was conducted by the Flag Officer, East Africa, who described the co-ordination of effort between the escort carriers and escort group under Captain J. E. Broome as "an excellent example of the power of such a combination," and the co-operation of 246 Wing R.A.F. as "close and efficient." No less than 871 hours were flown. Shore-based Catalinas undertook the night searches.

With the final expulsion of the U-boats from the Biscay ports, the last four months of 1944 showed no great change in the enemy's submarine tactics or operation. With the main object of avoiding detection, they were employed with great prudence. The primary efforts of the Schnorkel-fitted boats were confined to the coastal waters of the United Kingdom and to operations from Norway against our Russian convoys, in both of which areas they had slight success. A few more U-boats of ordinary type worked in Canadian waters and off the east coast of the United States. In the Indian Ocean, apart from Japanese, five or six German boats were based at Penang or Batavia. Of these, one was sunk off Penang by H.M. submarine Trenchant during September, while in October the Dutch submarine Swaardfisch accounted for another. September, too, saw the elimination of the last two operational U-boats in the Mediterranean.

September brought the loss of seven Allied merchant ships of 43,000 tons, and the destruction of twenty-three U-boats through all causes. The corresponding figures for October were one merchant ship of 7,000 tons and twelve U-boats sunk, and for November seven merchant ships of 30,000 tons and eight U-boats.

December, when we lost nine merchant ships of 59,000 tons to seven U-boats destroyed in action and another five through other causes, was rather a disappointing end to a successful year. After six months' experience of using Schnorkels in coastal waters the U-boats succeeded, for the time being at least, in gaining a considerable degree of immunity from both air and surface attack. There was a sharp recrudescence of submarine activity in the English Channel, where five merchant ships and a frigate were torpedoed and sunk and another two merchant vessels and a frigate damaged, between December 18th and 29th. Though a Wellington of Coastal Command sank a U-boat off Cherbourg on the 30th, there was no evidence of success in any of the other counter-attacks against the comparatively few submarines responsible for the losses mentioned. This was in spite of the large number of surface escorts concentrated in the area, and

was due in the main to the great difficulty of asdic operations in shallow water.

From the point of view of Coastal Command—"It had become clear that while we had succeeded in keeping the enemy under, and had thus greatly limited his power of attack, he, by his skill with the Schnorkel and with the aid of his radar warning devices, had succeeded in eluding us. The situation is indicated by the reduction which is seen in the totals of sightings and attacks during the autumn months when between 50 and 70 U-boats are known to have been at sea. September, 21 sightings, 10 attacks; October, 10, 3 ; November, 12, 10. It was a situation, moreover, that called for new counter-measures, for although the enemy was doing little damage to us . . . we were getting no better success against him and a stalemate was in view." The use of Schnorkel and the difficulties of winter weather also brought disappointing results from the constant patrol by surface forces of the coastal waters round the British Isles.

A move to Norwegian ports

The change-over of the U-boats from the Bay of Biscay to the Norwegian ports required a great deal of organization, besides adding about 1,000 miles to their passage to the operational area in the English Channel. The time taken was probably 16 to 20 days, depending upon how long the commanding officers dared to remain on the surface at night with their engines running at high speed. For fear of air attack, however, the great majority of boats did the whole distance under water, using their engines for a few hours with Schnorkels raised while simultaneously charging their batteries, and then lowering their Schnorkels and using their batteries to proceed completely submerged. Schnorkelling, however, was disliked by the U-boats' crews because of the fumes and partial vacuum it caused inside the boat, while in calm seas the tube made a considerable flutter which could be seen by ships or aircraft. It also tended to reduce the efficiency of the periscope look-out.

At 10.30 a.m. on December 18th, the lighthouse-keeper on the Wolf Rock, south of Land's End, reported that a U-boat had been washed up on the rocks, and had slipped off and was proceeding westward on the surface with men on the conning-tower. This was the 500-ton Schnorkel-fitted U-1209, which had left Norway on November 24th and had made most of her journey submerged. Early on December 18th, after patrolling for three days off Land's End, a steamer was sighted through the periscope. The U-boat was just about to attack when the navigating chief petty officer informed the captain that the boat was heading straight for the Wolf Rock. The captain disagreed. There was a heated argument, at the height of which the U-1209 struck heavily on the bottom, grating along and being thrown off and on the rocks by the heavy swell. Badly holed aft, with the water rising rapidly in the Diesel and motor rooms, she surfaced with her stern well down. It was impossible to open the conning-tower hatch, so the boat submerged again, oil fuel having to be pumped out before she finally sur-

faced. The crew abandoned ship just before she sank, and 43 of the total of 51 men were picked up. The captain himself died later of a heart attack on board H.M.C.S. Montreal, which rescued the survivors.

But the Schnorkel-fitted boats were no more than a stopgap. The enemy, as already mentioned, was planning to replace all the older boats by U-boats of the new and improved type.

On December 16th Their Royal Highnesses the Duke and Duchess of Gloucester had sailed from Liverpool in s.s. Rimutaka on their way to Australia. She was escorted by the cruiser Euryalus, two destroyers, and the five frigates of the Eighteenth Escort Group. On the night of the 17th the Rimutaka and her escort were south of Ireland zigzagging on a south-westerly course in a heavy sea. At 11.15 p.m. H.M.S. Nyasaland, one of the escorting frigates, obtained a submerged contact at long range on her asdic. It indicated that there was a U-boat fine on the Rimutaka's port bow, which would have been an excellent attacking position as the ships were just about to alter course eighteen degrees to port. The Nyasaland promptly made the alarm signal, and the ships turned in the other direction. The frigate remained behind to hunt, and at 11.38 p.m. made her first attack. Twenty minutes later she attacked again, the explosion of her depth-charges being followed by a violent submerged detonation which lifted the frigate in the water. Large quantities of Diesel oil coming to the surface told their own tale.

The Tirpitz is sunk

The German 56,000-ton battleship Tirpitz had been reported in Alten Fiord, in the far north of Norway, at the end of September, 1943. Attacked and damaged in turn by midget submarines and aircraft of the Naval Air Arm, she was finally sunk by Lancasters of Bomber Command on November 12th, 1944. This eliminated the last of the heavy German warships threatening the safety of our North Russian or Atlantic convoys.

In January, 1945, between 50 and 60 enemy submarines were still operating, their main effort being concentrated inside the Irish Sea, where they sank five merchant ships and damaged two more, and we destroyed two U-boats. Two submarines sank four merchant ships off Halifax, while another merchantman was lost in the western approaches to Gibraltar. The enemy's operations were still fairly widespread, for more U-boats were at work in the Arctic, where two Russian destroyers were torpedoed. In all during this month our merchant ship casualties were eleven vessels of 57,000 tons, while seven U-boats were destroyed at sea, and five through bombing and other causes.

Because of the use of Schnorkel, the shore-based aircraft of Coastal Command had no luck in actual kills, though their continual presence over all our coastal waters had an enormous influence in restricting the enemy's activity. Two attacks by Bomber Command, one on the U-boat pens at Bergen and the second on the Blohm and Voss building yard at Hamburg,

were very successful. To deal with the Schnorkel-fitted boats we were also laying minefields at various places round the British Isles. They seem to have had some success. In March the crew of U-260 landed at Galley Head, County Cork, with the tale that their boat had been abandoned after being damaged by "bombs." There is no record of any bombing attack, but there were minefields in the vicinity.

The enemy's best hope

Introducing the Navy Estimates in the House of Commons in February, the First Lord of the Admiralty, Mr. A. V. Alexander, emphasized the fact that in spite of our continual and encouraging successes it must not be assumed that the war against the U-boats was ended. After mentioning the new types of enemy equipment, their new U-boats, and the recrudescence of submarine activity in the coastal waters of the British Isles, he went on to say that the Germans were making great efforts to renew the U-boat war on a big scale. That they should consider it worth while to devote so large a part of their resources to this form of warfare after the trouncing they had suffered in 1943, the First Lord added, was highly significant. It showed, he said, that the enemy still considered it to be "his best hope of averting defeat against a nation which lives by sea-borne supplies. This is a highly important fact which will, I trust, never be forgotten by future First Lords, future Boards of Admiralty, or future Governments, or by the people of this country."

February indeed, with sixty U-boats still operating, saw no slackening in the enemy's effort. In this month the enemy increased his air attacks on our Russian convoys. Using every available aircraft, torpedo-carrying JU.88's made over 100 sorties, but only succeeded in sinking one merchant ship. Four JU.88's were destroyed, two probably destroyed, and three damaged by fighters from the escort carriers Nairana and Campania. In all we lost during February fifteen merchant ships of 65,000 tons, of which eight were sunk in the North Sea or British coastal waters, one by a so-called "Midget" submarine. Of the others, two each were lost in the North Atlantic and Arctic, and one each in the western approaches to Gibraltar, the South Atlantic and the south Indian Ocean well to the west of Australia. This last sinking, with that of a merchant ship 75 miles from Sydney, was probably the responsibility of one or other of the German boats based on Penang. Fourteen U-boats were sunk in action at sea in the course of this month, and another eight through other causes. As a result of the experience gained the asdic was achieving much more success in the detection of Schnorkel boats working close inshore. Notable successes were gained by ships of the Tenth Escort Group, under the command of Commander P. W. Burnett, R.N., when in a fortnight they sank three U-boats on passage through the transit area between the Orkneys and the Faeroe Islands. H.M. submarine Venturer was responsible for another kill off the Norwegian coast, her second in four months. At this time, and apart from the close

surface escorts for the convoys, we now had twenty independent escort groups, or a total of about 120 ships, for hunting U-boats.

In the inshore campaign reliance for the detection of U-boats had mainly to be placed upon surface vessels and their asdics, which always had the difficulty of distinguishing between a U-boat on the bottom and the wrecks and rocks which abound round the coasts of Britain. In February our hunting groups began to take a heavy toll. It gradually increased, until 21st Escort Group, Lieutenant-Commander R. Hart, R.N., succeeded in sinking three U-boats between March 27th and 30th in the difficult and restricted waters of the Minches, between the Hebrides and the mainland of Scotland. He followed this up with a fourth "kill" on April 8th some 150 miles west of the Scillies.

The reduced opportunities to kill submarines at sea had led Coastal Command to seek the enemy in his own waters. A number of operations were carried out in the U-boat training area near Bornholm Island in the Western Baltic. The war was also carried into the Skagerrak and Kattegat, where mines laid by Bomber Command forced the U-boats to proceed on the surface, by Liberators at night and rocket-firing Mosquitoes and Beaufighters by day. During the first quarter of 1945, too, the minelaying offensive of Bomber Command continued in enemy waters. Whereas 3,043 mines had been laid during the last three months of 1944, 3,220 were put down between January and March, 1945, inclusive. Nearly 300 were laid off the U-boat base at Horten, in Oslo Fiord, while attention was freely given to the enemy's main swept channels in the Kattegat and in other areas in the Baltic between Flensburg and the Gulf of Danzig. The work was unspectacular and dangerous, the enemy doing his best to intercept the minelaying aircraft with strong forces of night fighters. Twenty heavy bombers were lost on this duty during the quarter, but there is good reason to believe that the casualties to enemy shipping, including U-boats, and the general dislocation and delay caused to his sea-borne traffic, greatly helped towards retarding the date of his expected large-scale U-boat offensive. During the first quarter of 1945 highly successful bombing attacks were also carried out by Bomber Command and by heavy bombers of the Eighth United States Air Force. Their targets included U-boat bases and building yards in Norway, Holland and Germany. Apart from the great damage to shore installations, several U-boats were wrecked in the building and assembly yards.

The scale of the U-boat offensive had continued to increase during March, with the greatest energy still concentrated in British coastal waters, but with a few boats operating off Newfoundland and Nova Scotia, and others in the Arctic off Iceland and in the eastern part of the North Atlantic. Our losses during the month were twelve merchant ships of 58,000 tons, of which nine were sunk in British waters. A further three ships were sunk in the English Channel by midget submarines. There were many attacks by surface ships and aircraft in the Irish Sea and around Land's End, and in all areas thirty-four U-boats were destroyed, sixteen of them by bomber raids.

On March 14th His Majesty's South African ship Natal, which had been only a fortnight in commission, was on passage from Newcastle-on-Tyne to the Firth of Forth. Early in the afternoon she was informed that a ship in convoy had been torpedoed about five miles to the northward, and a few minutes later her look-outs sighted a lifeboat and rafts. The Natal was ordered to carry out a search, and within twenty minutes had an unmistakable contact. Her attack brought a large amount of oil and a heavy cylindrical tank to the surface. A second attack brought up more oil and a small metal tank, after which contact was lost. Three days later, however, other ships confirmed the Natal's success by finding and plastering her target with depth-charges, which yielded up a considerable quantity of wreckage.

Two other kills during March are of interest. Early on March 11th U-681, on her first war cruise, was off the Scilly Isles. It was the captain's intention to enter St. Mary's Road. He took bearings of the Bishop Rock Light and the old lighthouse on St. Agnes. At 11.0 a.m., when proceeding submerged at 80 feet, the boat struck heavily on a rock. In trying to get off, her hull and propellers were damaged, and oil and water poured into the control-room and motor compartment. Forced to bring his boat to the surface, and unable to dive, the captain started to drive her towards the Irish coast, 130 miles away, before abandoning ship. He might have succeeded had the U-boat not been sighted by a Liberator of 103 Squadron of the United States Navy. Orders were given to abandon ship, and while some men got out the dinghies, others made a vain attempt to keep off the aircraft by opening fire. However, the Liberator sank her quarry with a stick of depth-charges, and then homed other aircraft and ships of an escort group, which rescued most of the crew.

"*Object in the water very close!*"

U-1003 had left Bergen on her second war cruise on the night of February 18th–19th. She had been Schnorkelling in the North Channel area for about three weeks when, at 11.17 p.m. one of the look-outs in H.M.C.S. New Glasgow, patrolling off Lough Foyle, heard a loud noise and reported, "Low-flying aircraft approaching!" Almost immediately afterwards, however, the same man reported, "Object in the water very close!" There was moonlight, and the object was soon identified as a periscope and Schnorkel between 50 and 100 yards away on what was described as "a perfect collision course." About three feet of the Schnorkel protruded above water, obscured by a heavy pall of thick yellow smoke which mushroomed out around it. In a few seconds both periscope and Schnorkel struck the New Glasgow's port side immediately below the bridge.

The U-boat's crew felt the heavy impact, and water immediately poured into the control-room, where it rose knee-deep before it could be checked. The conning tower, periscopes and Schnorkel were all badly damaged, and the captain at once took his boat to the bottom, to hear the explosion of

depth-charges some distance away. He lay there all night, and at daylight on March 21st rose to 60 feet and cruised submerged until dusk, when he came to the surface. The air in the boat was foul and the batteries very low. He intended to charge them, but before they could be topped-up U-1003 was forced to dive by the approach of hunting craft. Pumps had been running ever since the collision, and though he knew there were anti-submarine vessels all round him, the captain struggled on through another day. Soon after midnight on the 22nd–23rd, however, the pumps failed altogether. The batteries were exhausted, so the captain surfaced and ordered his crew to abandon ship. Thirty-one of the crew were rescued by H.M.C.S. Thetford Mines.

In April it was estimated that the enemy still possessed between 220 and 250 U-boats available for operations all over the world, while 72 were still at sea. In all areas we lost thirteen merchant ships of 73,000 tons through U-boat attacks, of which seven ships were sunk in coastal waters and four in the North Atlantic. The offensive in British waters continued with vigour, though enemy patrols of about six boats were operating north-west and south-west of Ireland, with other U-boats north of the Azores and off the east coast of the United States. On the other hand, 33 U-boats were sunk at sea, the highest figure since the records for May and July, 1943. Another 24 were destroyed through other causes, thus producing the highest monthly total for the war.

Among others, kills were made by American escort carriers north of the Azores in an area studded with sunken U-boats, while 150 miles south-south-east of Halifax, Nova Scotia, U.S.S. Buckley attacked a contact and brought up wreckage, oil and, as was often the case, pieces of human flesh. Other U-boats were destroyed to the south-west of Ireland, off Ushant, off the Bloody Foreland in north-west Ireland, in the Irish Sea, off Start Point and the Isle of Wight, off the coast of Northumberland, in the Kattegat and Skagerrak, and off the coast of Norway.

In one of the Irish Sea encounters U-1024 was brought to the surface and taken in tow in thick fog, though unluckily the tow parted and the U-boat sank. In another, Sunderland H/201 sighted the flutter of a Schnorkel at 5,000 yards and attacked. A heavy snow squall came down immediately afterwards, but the aircraft had dropped a marker and the kill was completed by three ships of the Fourteenth Escort Group. This once again proved the importance of really efficient co-operation between surface ships and aircraft. In an engagement off the Northumbrian coast, H.M.S. Viceroy attacked a U-boat which had torpedoed a ship in convoy, but had no evidence of success. Eight days later in the same spot the Viceroy again made contact with this same target. Her attacks produced wreckage of undoubted German origin, the most interesting relic being "a dinghy-container in which were stowed six dozen of good brandy, fortunately none of them broken."

H.M. submarine Tapir torpedoed a U-boat off the Norwegian coast

which blew up and disintegrated, while two motor-torpedo-boats of the Royal Norwegian Navy, Nos. 711 and 723, had a running fight with another on the surface off the Norwegian coast near Hardanger Fiord. They fired torpedoes which unfortunately missed, and then closed in to point-blank range, firing all their guns while trying to get ahead to drop depth-charges. The U-boat, travelling at full speed, twice turned and tried to ram her adversaries, nearly succeeding. M.T.B. 711 just scraped across the enemy's bows, and thereafter the U-boat was engaged from both sides at ranges which at times were no more than 25 yards. After some minutes there was a heavy explosion abaft the U-boat's conning-tower, and her fire ceased. Her speed fell, and M.T.B. 711 was able to cross ahead and to drop depth-charges, which exploded under the now fiercely burning submarine. Severely damaged and apparently out of control and sinking, the enemy drifted close in to the rocky coast. The battle had been fought in full visibility, and since there was an enemy watch post and radio station near by and an airfield within 30 miles, the M.T.B.s considered it advisable to withdraw. That submarine took no further part in the war.

Great success

The advance of the Russian armies from the east and the other Allies from the west was gradually squeezing the U-boats out of the Baltic ports and increasing the flow to the bases in Norway, and during April Mosquitoes and Beaufighters of Coastal Command working from the east coast of Scotland had great success in the Skagerrak and Kattegat. In their first skilful attack, a wing of Mosquitoes made full use of the sun and took three U-boats completely by surprise, overwhelming them with accurate fire from rockets and cannon before they could take avoiding action. One blew up and the others sank in the usual litter of oil and debris. The explosion of the first U-boat blew up one Mosquito and so damaged three others that they were forced to land in Sweden. The same squadron attacked again ten days later. Sighting three U-boats escorted by a minesweeper, they sank one and severely damaged the others. This same month saw an intensification of the successful attacks by Bomber Command upon Kiel, Heligoland, Bremen, Hamburg and Vallo, in the Oslo Fiord.

Three Allied merchant ships of 10,000 tons were lost to U-boat attacks during May before the German surrender became effective. The last two were torpedoed and sunk within a mile of May Island on the 7th of that month by one of the new type U-boats with high under-water speed. In the same period twenty-five U-boats were destroyed in action. Coastal Command, in the battle to the end, assisted by the Second Tactical Air Force, accounted for no fewer than twenty-two of them. Most of the kills took place in Danish waters, through which the U-boats were trying to escape to Norway, and the final sinking of the war on May 7th was achieved by a Catalina of 210 Squadron. The aircraft had sighted a Schnorkel or periscope and had attacked with depth-charges, and though there was evidence that

the submarine was damaged, the extent could not be estimated. It later became known that the U-boat, after struggling for nearly two days to reach her base, had foundered. To quote an official report of this period, "Coastal Command Liberators were in at the death. It was strange but pleasurable to read of aircraft from such squadrons as 86, 206 and the Czech-manned 311, which had achieved such great things in the Battle of the Atlantic, attacking in such unfamiliar positions as '18 miles south of the Skaw' and '15 miles north-east of Arnholt Light.'" Another great success was achieved by the Home Fleet and the Naval Air Arm when aircraft from the escort carriers Searcher, Queen and Trumpeter sank the U-boat depot ship Black Watch and a submarine lying alongside her at Harstad, in Norway.

Germany surrenders

A few hours after this attack, on May 4th, 1945, at 4.14 p.m., Grand Admiral Dönitz sent off a signal to all the U-boats at sea to cease hostilities and return to base. Germany's capitulation was signed at Rheims on the night of May 6th–7th. At noon on May 8th the Admiralty announced that the German High Command had been ordered to give surrender orders to all U-boats at sea. They were to surface, hoist black flags, report in plain language their positions and numbers, and proceed by fixed routes to designated ports and anchorages.

The first U-boat to obey, U-249, surfaced off the Lizard on May 9th, and was escorted to Portland, the earliest home of the Anti-Submarine School. On May 10th, U-532, which carried a cargo from Japan of 110 tons of tin, 601 tons of rubber, 8 tons of wolfram, 5 tons of molybdenum, and half a ton of quinine, surfaced near the Faeroe Islands, and was sent to Loch Eriboll. On May 14th, at Lissahally in Northern Ireland, Admiral Sir Max Horton, Commander-in-Chief, Western Approaches, fittingly took the formal surrender of seven U-boats which had been escorted thither from Loch Eriboll. On May 16th, the Norwegian destroyer Stord, on passage to Narvik, met a convoy of fifteen U-boats proceeding down Vestfjord in company with five enemy surface ships. The latter were ordered to continue their voyage to Trondheim, while the U-boats were escorted to Loch Eriboll by the ships of a Canadian Escort Group.

Up to May 31st forty-nine U-boats had surrendered at sea. By mid-September, at which time a fuller, though not necessarily final, inventory was possible, 156 German U-boats had been surrendered to the Allies, and another 221 were found to have been scuttled or destroyed by their crews. Another eight had been dismantled, while seven more were known to be in Japanese hands. We know that a total of 781 German U-boats were sunk or destroyed during the war. Of these 635 were sunk at sea by Allied warships, aircraft or mines, 63 were destroyed by Allied bombing raids, and 83 were lost through collision, grounding or other causes unknown. The charts were compiled from day-to-day records, and do not show the total U-boat losses now known to have occurred. However, they depict in the most

graphic form the several phases of the U-boat war, and the areas in which the bulk of the losses at sea took place.

Any attempt to evaluate the individual efforts of the Allies, or the respective contributions of their fighting and industrial forces in the war against the U-boats, is invidious and unprofitable. The United States of America, with the great mass of her fleet engaged in the gigantic struggle against Japan in the Pacific, was still able to spare strong forces of aircraft-carriers, surface escorts and aircraft for the Atlantic and Mediterranean. At the same time she supplied Britain with shipping, surface escorts and aircraft to be manned by our own personnel.

In all, Naval and Air Forces under the control of the United States were responsible for the destruction of 132 German U-boats at sea, the corresponding figure for the forces under British control being 503. Of this total of 635, 531 were sunk by surface ships and shore-based aircraft in almost equal proportions. The remainder were destroyed by carrier-borne aircraft, submarines, and mines laid from surface ships and aircraft.

So ended the prolonged and costly battle against the U-boats with the complete triumph of the United Nations. It lasted sixty-eight months and was the hardest-fought victory in history. Cold-blooded heroism and endurance were required by the men of the Allied Fighting Services and Merchant Navies, and many paid with their lives. But the men at sea and in the air fought with the ships, the aircraft, the weapons, the fuel and the many scientific devices and instruments designed, fashioned or produced by thousands of anonymous men and women working behind the scenes in many different countries. Those others, too, who planned and directed the anti-U-boat campaign and co-ordinated the Allied effort must not be forgotten.

In truth, the Battle of the Atlantic was won by the entire peoples of the United Nations. It was the triumph of right over evil—the calm determination of men and women of many different races, languages and creeds, no matter at what personal sacrifice, to prevent the domination and enslavement of the world.

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